



SELF-PACED Learning for a FAST-PACED World

A Manager's Guide to Financial Analysis

SIXTH EDITION

Powerful Tools for Analyzing
the Numbers and Making the
Best Decisions for Your Business

ELIOT H. SHERMAN



American Management
Association®

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Eliot H. Sherman

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About This Course

A Manager's Guide to Financial Analysis, Sixth Edition, is intended for managers who have a basic understanding of accounting and of the structure of financial statements. It covers the fundamentals of financial analysis: financial statement analysis, ratio analysis, assessment of current asset management and capital investment proposals, capital structure, and analysis in support of mergers and acquisitions.

As a traditional, basic course for financial managers, *A Manager's Guide to Financial Analysis, Sixth Edition*, is designed to help users of financial statements perform more sophisticated analysis and make better decisions based on the information available in those statements. Financial analysis can contribute significantly to operational improvements, evaluation of investment choices, and business preparation for mergers and acquisitions (whether in the role of acquirer or acquiree). With today's heightened focus on business performance, financial managers must understand the impact of business decisions on the company's financial statements and outsiders' judgments regarding their company.

Eliot H. Sherman, CPA, is a Senior Lecturer in Finance at the D'Amore-McKim School of Business at Northeastern University. He teaches financial management and financial analysis to students ranging from undergraduates to executive MBAs. He is also a discussion leader for the American Institute of CPAs and has written several popular programs for them. He has also authored *Business Perspectives in Project Management*, published by Kendall-Hunt Publishing, and *Finance and Accounting for Nonfinancial Managers* for the American Management Association.

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How to Take This Course

This course consists of text material for you to read and three types of activities (the Pre- and Post-Test, in-text exercises, and end-of-chapter Review Questions) for you to complete. These activities are designed to reinforce the concepts brought out in the text portion of the course and to enable you to evaluate your progress.

Pre- and Post-Tests

Both a pre-test and a post-test are included in this course. Take the pre-test before you study any of the course material to determine your existing knowledge of the subject matter. To get instructions on taking the test and having it graded, please email AMASelfStudy@amanet.org, and you will receive an email back with details on taking your test and getting your grade. This email will also include instructions on taking your post-test, which you should do upon completion of the course material.

Certificate

Once you have taken your post-test, you will receive an email with your grade and a certificate if you have passed the course successfully (70% or higher). All tests are reviewed thoroughly by our instructors, and your grade and a certificate will be returned to you promptly.

The Text

The most important component of this course is the text, for it is here that the concepts and methods are first presented. Reading each chapter twice will increase the likelihood of your understanding the text fully.

We recommend that you work on this course in a systematic way. Only by reading the text and working through the exercises at a regular and steady pace will you get the most out of this course and retain what you have learned.

In your first reading, concentrate on getting an overview of the chapter's contents. Read the learning objectives at the beginning of each chapter first. They serve as guidelines to the major topics of the chapter and enumerate the skills you should master as you study the text. As you read the chapter, pay attention to the heading and subheadings. Find the general theme of the section and see how that theme relates to others. Don't let yourself get bogged down with details during the first reading; simply concentrate on remembering and understanding the major themes.

In your second reading, look for the details that underlie the themes. Read the entire chapter carefully and methodically, underlining key points, working out the details of the examples, and making marginal notations as you go. Complete the exercises.

Exercises and Activities

Interspersed with the text in each chapter you will find exercises that take a variety of forms. In some cases, no specific or formal answers are provided. Where appropriate, suggested responses or commentary follow the exercises.

The Review Questions

After reading a chapter and before going on to the next, work through the review questions. By answering the questions and comparing your own answers to the answers provided, you will find it easier to grasp the major ideas of that chapter. If you perform these self-check exercises conscientiously, you will develop a framework in which to place material presented in later chapters.

Questions About Grading/Retaking the Test

If you have questions regarding the tests, the grading, or the courses itself, please email Self Study at AMASelfStudy@amanet.org.

If you fail the Post-Test, you have one year to retake the test for one year after the course's purchase date.

Pre-Test

A Manager's Guide to Financial Analysis

Sixth Edition

Course Code 95084

INSTRUCTIONS: *To take this test and have it graded, please email AMASelfStudy@amanet.org. You will receive an email back with details on taking your test and getting your grade.*

FOR QUESTIONS AND COMMENTS: *You can also contact Self Study at 1-800-225-3215 or visit the website at www.amaselfstudy.org.*

1. The short-term lenders of a firm would be most interested in looking at _____ ratios.
 - (a) profitability
 - (b) liquidity
 - (c) activity
 - (d) leverage

2. An increasing debt-to-equity ratio indicates that the:
 - (a) level of stockholders' equity is increasing in relation to debt.
 - (b) level of debt is increasing in relation to stockholders' equity.
 - (c) level of total assets is increasing.
 - (d) amount of long-term debt is increasing.

3. Short-term unsecured promissory notes that are issued by large industrial firms are called:
- repurchase agreements.
 - negotiable certificates of deposit.
 - commercial paper.
 - short-term tax-exempts.

Use Exhibit Pre-/Post-Test-1 to answer Questions 4 through 7.

E

Exhibit Pre-/Post-Test-1

Apple Apparel's Balance Sheet as of December 31, 2013 (in 000s)

Current Assets:

Cash	\$10,000
Accounts receivable	34,000
Inventories	172,000
Other	18,000
Total Current Assets	\$234,000

Net Plant and Equipment	66,000
Total Assets	\$300,000

Current Liabilities:

Notes payable	\$14,000
Accounts payable	65,000
Salaries and wages	22,000
Taxes payable	15,000
Total Current Liabilities	\$116,000

Long-Term Debt	\$70,000
----------------	----------

Shareholder's Equity

Common stock	14,000
Additional paid-in capital	60,000
Retained earnings	40,000
Total Liabilities and Equity	\$300,000

Additional Information:

Sales	\$489,000
Cost of goods sold	366,000
Accounts receivable, December 31, 2012	37,000
Inventories, December 31, 2012	161,000

4. What was its average collection period during 2013?
- 26 days
 - 53 days
 - 25 days
 - 14 days

-
5. The debt-to-equity ratio for year 2013 is:
 - (a) 0.62.
 - (b) 1.16.
 - (c) 1.63.
 - (d) 2.01.

 6. The inventory turnover of Apple Apparel is:
 - (a) 2.13.
 - (b) 2.84.
 - (c) 2.20.
 - (d) 0.91.

 7. Each of the following is concerned with the ability to pay current debts as they become due except:
 - (a) quick ratio.
 - (b) net liquid balance.
 - (c) working capital.
 - (d) times-interest-earned.

 8. The investors of a company would be most interested in examining which type of ratio?
 - (a) Profitability
 - (b) Liquidity
 - (c) Activity
 - (d) Leverage

 9. The denominator for the price-earnings ratio is:
 - (a) net income.
 - (b) operating income.
 - (c) earnings per share.
 - (d) net income less preferred stock dividends.

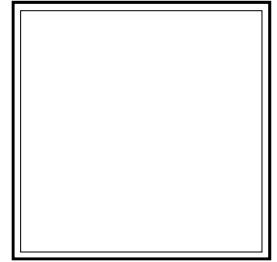
 10. The percentage changes in certain elements in the financial statements over time are studied in:
 - (a) horizontal analysis.
 - (b) cash flow analysis.
 - (c) vertical analysis.
 - (d) component analysis.

 11. Financial analysts are most concerned with:
 - (a) assuring the accuracy of the financial statements.
 - (b) identifying opportunities for financial improvement.
 - (c) increasing the profitability of short-term investments.
 - (d) protecting the current market price of the company's stock.

12. Decentralizing the financial analysis function:
- (a) localizes the focus of the analyst.
 - (b) increases the neutrality and objectivity of analyses.
 - (c) facilitates the broadest perspective in analyses.
 - (d) increases the promotability of the analyst.
13. If the cash conversion cycle is negative, it means that:
- (a) the company cannot pay its bills until it collects its accounts receivable.
 - (b) the company's cash balance is negative and the company is insolvent.
 - (c) the company's average payment period exceeds the sum of its average collection period and its inventory holding period.
 - (d) the company's average payment period is less than the sum of its average collection period and its inventory holding period.
14. A zero balance account:
- (a) indicates that the company has no cash.
 - (b) permits flexibility in divisional cash disbursing practices.
 - (c) results in maintaining redundant compensating balances.
 - (d) guarantees local control over receipts and disbursements.
15. The weighted average cost of capital reflects:
- (a) the minimum level of dividends a company is required to pay its shareholders.
 - (b) the average of all amounts paid out to all investors.
 - (c) the lowest interest rate applicable to corporate debt from any source.
 - (d) the minimum rate of return necessary to satisfy all of the sources of capital.
16. The beta coefficient, β , can be described as:
- (a) the relative riskiness that a company has to the market as a whole.
 - (b) the critical component in determining the cost of debt.
 - (c) the determinant of an investment's attractiveness.
 - (d) the standard deviation included in the estimated return on a project's profitability.
17. Risk is best described as:
- (a) the probability of financial loss.
 - (b) the cause of a high return.
 - (c) uncertainty of an outcome, which may be positive or negative.
 - (d) the likelihood of an unfavorable outcome.

-
18. The net present value tells an analyst:
- (a) the expected rate of return on an investment.
 - (b) the time it takes to recover the investment amount.
 - (c) the financial benefit of an investment measured in current value.
 - (d) the financial recovery from an investment measured after the end of the life of the assets involved.
19. The internal rate of return is that percentage rate of return that:
- (a) equates the present value of the future cash flows of an investment to the original value of the investment.
 - (b) exactly meets the requirements of management.
 - (c) falls between the required rate of return and the modified internal rate of return.
 - (d) satisfies the lender's security requirements.
20. Sales-dependent assets:
- (a) determine the level of sales in the coming year.
 - (b) must be held, even during the lowest part of an operating cycle.
 - (c) rise or fall in proportion to the change in sales.
 - (d) turn into cash when sales goals are achieved.
21. A company's optimal capital structure:
- (a) minimizes the company's cost of debt.
 - (b) maximizes the company's share price.
 - (c) equates the company's debt and equity.
 - (d) maximizes the company's return on equity.
22. A stock dividend, which is defined as additional shares granted in proportion to shares held:
- (a) increases the percentage ownership of a shareholder.
 - (b) creates a capital gain.
 - (c) decreases the percentage owned by a shareholder.
 - (d) is perceived favorably even though a shareholder receives no financial benefit.
23. Goodwill on the balance sheet is an indication that:
- (a) the company has paid more for an acquisition than the value of the assets it has acquired.
 - (b) the company has established a very good reputation for itself in the marketplace.
 - (c) the company has made a substantial contribution to the city in which it is headquartered.
 - (d) the company has negotiated a real bargain in an acquisition it has completed.

24. When a company acquires another company for stock:
- (a) the total number of shares outstanding is decreased, raising the value of all shares.
 - (b) the stock must be offered in a public offering to the market at a price that equals the agreed-to purchase price for the target company.
 - (c) the absolute number of shares in the acquiring company will double.
 - (d) the number of shares needed to effect the acquisition will usually reflect a premium in value over the current market price of the acquired company's shares.
25. Comparing the current ratio to the quick ratio tells an analyst:
- (a) how current assets relate to current liabilities.
 - (b) how accounts receivable relate to current liabilities.
 - (c) how accounts receivable relate to accounts payable.
 - (d) how inventory relates to current liabilities.



Introduction

Although the financial decision-making techniques discussed in this course do not constitute the entire array of approaches to this topic, they do apply to most of the recurrent problems in financial management. This course addresses many of the techniques that financial managers need to develop in order to help their firms sustain growth and plan for the future. Consequently, the course focuses on short-term management issues such as ratio analysis, current asset management, and the integration of working capital components. In addition, the course discusses long-term investment decisions, such as the evaluation of long-term capital investment proposals, mergers and acquisitions, or capital structure and dividend policy.

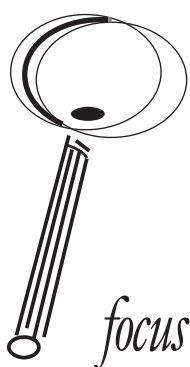
Excelling in financial analysis and interpretation goes beyond the mechanical application of techniques and modeling. Although the increased use of sophisticated computers can greatly simplify the financial manager's task, the manager needs to learn the proper application of these concepts and techniques and to identify the underlying issues and assumptions. The development of financial analysis skills, combined with facility in interpreting financial information, enables the financial manager to contribute valuable insights to the overall management of a business. By applying financial analysis-based information to forecasts of future results, past experience is linked to future expectations—making expectations more credible.

Qualitative as well as quantitative data are required for financial decisions. The business environment, geographic location, employee attitudes, and risk are factors that may affect financial decisions. Examining traditional financial ratios from alternative perspectives, as discussed in Chapter 3, moves this course from a simple, historically-oriented accounting perspective to a more dynamic, forward-looking perspective. This approach, which focuses on meaning and interpretation rather than on the numbers themselves, adds real value to the management of a business in today's fast-paced competitive environment.

Interrelationships among financial and nonfinancial data are extremely complex and beyond the scope of most financial books. This course, however, provides knowledge, application, and analysis to help you prepare for a future as an effective financial manager. By comprehending this information and modifying it to suit your own needs, you will be better able to evaluate future problems and offer better solutions.

1

Financial Decision Making and the Techniques Used in Financial Analysis



Learning Objectives

By the end of this chapter, you should be able to:

- Define financial analysis and discuss the financial analyst's role in the organization.
- List at least six financial management responsibilities and three areas of activity to be reported in financial statements.
- Describe how business strategy and the competitive environment affect financial management decisions.
- Identify analytical techniques that the financial analyst can apply to investment, financing, and operational decisions.
- Define the primary goal of financial analysis and describe how it is achieved in both the long term and the short term.
- List the four questions addressed by the balanced scorecard and the four management processes that link long-term strategies with short-term actions.

A Manager Sets the Stage for Change

Alfredo, the recently appointed controller of a medium-sized public company with a number of divisions and subsidiaries, opened his first staff meeting—a gathering of all the divisional and subsidiary controllers. While all attendees were direct reports to their respective organizational managers, they had a dotted-line responsibility to him and his office.

“Welcome to our first monthly group meeting. I’m happy to see all of you here. We have all been charged with producing financial statements and reports for our different organizations, but I think there is more that we can do to help make our organizations more competitive in this challenging economy. I thought we should think as a group about how we can contribute to this effort.”

“That’s a great thought, Al, but I’m already out straight,” interjected Jimmy, the controller of a small manufacturing subsidiary. Because of the slow economy, I’m already short-handed.”

“I’m not seeking to have everyone do more, Jimmy,” responded Al. “I want to have everyone rethink what we are currently doing in order to make it more proactive, more valuable. How many of you are being asked for more information by your managers after you deliver the financials?”

Everyone raised a hand.

“I think we can refine our reporting to be more valuable, without having to do so much firefighting. I’d like to get us a bit more out front, guiding the direction of our respective organizations.”

“That sounds great, but how do we do that?” asked Florence. She managed all financial reporting for another division.

“I think we need to anticipate the issues and beat the managers to the questions. By incorporating analysis into our monthly reports, we can help our managers be more effective, avoiding some of the requests for urgent additional reports that disrupt our routines.”

The group nodded in agreement. “Let’s get ahead of the curve,” someone said.

The accounting function quantifies the economic relationships of an enterprise; the finance function, on the other hand, is focused on future results; it manipulates those relationships to optimize the company’s liquidity and profitability. The accounting model may be viewed as a set of specific rules and conventions designed to record, analyze, and report the historic experience of all aspects of a firm’s operation. The financial model is a diverse set of techniques that are used to analyze and manage the future direction of the firm’s investments and financing. The purpose of this course is to show how financial managers can use accounting information and reports to guide future decision making.

Managers at every level must make difficult financial decisions continuously. Analytical tools or techniques are important in decision making, analysis, planning, and control. Most managers today have at least some financial management responsibilities, and it is important that they be able to apply

analytical techniques to their specific financial problems or decisions. It is impossible to say which of the various techniques of financial analysis is most relevant—they are all useful tools in decision making, and each should be applied according to the individual situation.

FINANCIAL ANALYSIS

In order to make financial decisions, you must be able to identify potential financial problems and analyze the effects of alternative courses of action. As a decision maker, you must be able to use the analytical techniques of financial analysis. Managers involved in financial decision making may or may not perform the actual financial analysis. In either case it is essential to understand the techniques and tools used to arrive at the recommendations. This course is for both those managers who want to do their own financial analysis and those who delegate this responsibility. An array of financial analysis topics is listed in Exhibit 1–1.

THE ROLE OF THE FINANCIAL ANALYST

Although this course is directed primarily toward managers who produce financial analyses, an overview of the role of the financial analyst in a large company provides some insights on the importance of financial analysis. The position of the financial analyst in the corporate structure and the scope of his or her work are interdependent. The needs of the enterprise govern the analyst's role and position in the company. The following sections describe the analyst's mission and assignments, as well as the corporate structures where the objectives of the analyst's mission can best be attained.



Exhibit 1–1 Financial Analysis Topics

- Profit planning
- Cash management
- Capital investment
- Lease versus purchase (buy)
- Financing structure
- Cost of capital
- Dividend policy
- Mergers and acquisitions
- Tax management
- Measuring management performance
- Measuring corporate health

Definition of the Analyst's Job

The financial analyst is a staff member who advises executives on the financial effects of management's proposals and decisions. Acting as an internal consultant, the financial analyst conducts studies, interprets information, and designs controls for profitability, cash flows, and diverse fiscal matters. The analyst does these tasks on behalf of decision makers; they do not usually make decisions. The analyst's role is generally to clarify and evaluate options, then provide recommendations for management action.

Typical Assignments

Within a company, the role of financial analysis depends on perceived needs and the types of decisions its management makes. Although companies' needs differ, most analysts evaluate the firm's operating performance and identify opportunities for improvement. Specific tasks include long-range planning, profit planning and budgeting, capital investment decisions, mergers and acquisitions, and the administration of temporary corporate investments.

Financial analysts must perform many activities periodically, such as: analyzing the company's liquidity, assessing operating results, and supervising the company's day-to-day financial activities. In addition, the analyst has annual or semi-annual duties, including periodic sales analyses, analysis of the company's debt structure, ratio analyses on company financial statements and reports, and analysis of investment alternatives for liquid reserves.

Similarly, the analyst undertakes specific projects that are either self-initiated or, more often, requested by others. For example, if a financial analyst sees a marked change in a particular financial ratio, they may analyze the factors that would cause such behavior. Also, the analyst might assess how the economic environment affects the company or, more specifically, how various tax policy or economic changes will affect the company. However, most of the analyses conducted by the financial analyst are situation-specific and usually are requested by other departments. For example, management may want to know whether a certain asset should be leased or bought; or the company may be considering purchasing land and therefore need a location analysis. The analysis may be company-wide or narrower in scope, perhaps pertaining to a single division or function within the company.

Planning plays an important part in most assignments undertaken by financial analysts. By *planning*, we mean both short-term objectives as well as long-term strategic goals. Financial analysts must integrate the goals and objectives of their companies in their analyses. Consequently, most of a financial analyst's assignments implicitly or explicitly include and affect aspects of company plans.

QUICK QUIZ 1-1

Answers to QUICK QUIZ questions can be found starting on page 191.

The financial analyst is responsible for:

- a. Managing the recording and reporting of transactions.
- b. Implementing the financial management policies of the company.
- c. Directing the functions of the accounting staff.
- d. Assessing the impact of management decisions.

The Analyst's Position in the Corporate Structure

The position of the analyst in the corporate structure varies with the nature of the company and its administrative organization. In smaller firms, a single individual may handle all financial activities, including any necessary financial analyses. In larger firms, there generally is a staff of financial analysts reporting to a financial manager, who in turn reports to the controller, who is supervised by a vice-president of finance or chief financial officer. Financial analysts may be at the corporate or divisional level.

The analyst's position within the company is important, because the topics of financial analysis are used to help improve the value of the company; frequently, they are also sensitive, conflict-provoking subjects. For instance, after conducting a financial analysis, an analyst might recommend the dissolution of a certain division or department. To say the least, this recommendation would not be popular with the members of the department or division in question. Centralizing the position of the financial analyst indicates that the role is a service and is separate from the operational units for which most of the analyses are performed. Placing the position in a central service unit offers certain advantages: (1) it allows the grouping of financial analysts, thereby pooling expertise and encouraging cooperation among analysts; (2) it promotes flexibility and accommodates departments that do not need an analyst full-time; (3) it facilitates multidepartmental assignments; and (4) it increases the neutrality and objectivity of analyses.

There are also advantages to placing the financial analyst in a decentralized position in the company, with financial analysis attached to and integrated with operating units. A decentralized positioning is favored when: (1) the analyst's role is to help and advise locally; (2) the operating unit needs full-time analysts and the management of the unit is receptive to analytical services; or (3) the operations of the unit are highly complex and much research is necessary before financial analysis can be done. In many large organizations today the financial analyst serves as a key member of the divisional management and also as the provider of critical financial information to the central administration.

The nature of a company signals which position—centralized or decentralized—maximizes the benefits from financial analysis. Some companies even mandate that a financial analyst work at both a centralized corporate level and a decentralized division level prior to being eligible for an advanced position. The rationale behind this rule is that the analyst will gain broader experience and familiarity with the company's products, policies, and procedures. In this course, the most important point is not the position of the analyst within the company, but rather the uses and benefits of financial analysis.



Think About It . . .

Will your company be better served with a centralized or decentralized financial analysis function? Why did you answer as you did?

FINANCIAL MANAGEMENT AND FINANCIAL ANALYSIS

The financial manager and the financial analyst may or may not be the same individual. As mentioned earlier, one major difference in their roles is that the managers make the financial decisions while the analysts recommend the best alternatives. The influence of the financial manager (and financial management in general) has increased substantially in recent years. Once, the manager's responsibilities were confined mainly to preparing financial statements, managing the company's cash position, and providing the means for paying bills and procuring additional funds. Now, financial management includes: (1) investing idle cash and liquid reserves; (2) synchronizing cash receipts and disbursements; (3) procuring financial sources of funds; (4) guiding operating decisions; (5) conducting analyses of suppliers, competitors, and customers; and (6) evaluating the financial impact of decisions and recommendations made by managers in other disciplines. As a consequence, the financial manager should be cognizant of external and internal user needs.

External users are primarily concerned about the liquidity, operating profits or losses, and business risk of the company. Business risks pertain to the relative volatility of the firm's expected net operating earnings. For example, a paper company experiences a business risk when its forests are exposed to losses due to fire or disease. Internal users are not only concerned about the day-to-day liquidity and profit/loss record from operations, but are also concerned about financing sources and the accompanying financial risk. A financial risk pertains to the likelihood of default on financial obligations.

The evolution of financial management and the increased use of financial analysis have been furthered by the availability of computers at every level in a business enterprise. The application of computers as analytical tools enables managers at every level to use sophisticated financial models and techniques in their decision making.

ACTIVITIES AND FINANCIAL STATEMENTS

Companies use physical and financial resources to implement their business strategies. What a business does is the result of its business activities—its operating activities (e.g., producing and selling goods), its investment activities (e.g., acquiring and selling plant and equipment assets), and its fi-

nancing activities (e.g., issuing and retiring long-term notes). These activities are reported in summary form in the financial statements through the company's accounting system. Because financial statements are usually prepared on an accrual basis, financial analysis is prepared to be consistent with regular financial reporting; thus it recognizes the full economic consequences of business activities.

BUSINESS STRATEGY

A company must have a strategy to create and sustain a competitive advantage. One strategy is to differentiate a product or a service and make it unique because of its high quality or technological capabilities. Another strategy is to focus on costs by concentrating on product efficiencies or purchase discounts, or by outsourcing. Lower costs can lead to high sales volume through lower prices. Such operational efficiencies can be easily imitated, with the result that nobody has a clear advantage over others. Most companies try to implement both strategies.

Michael Porter of the Harvard Business School has written extensively on strategy and strategic decision-making. Porter (1996) notes that competitive strategy means being different—either performing different activities or performing activities differently from other companies. A company may specialize in producing just a few products, providing just a few services, or meeting the needs of a select group of customers. Strategic positioning means choosing activities that differ from your competitors'. The same activity set cannot be everything to everyone. To sustain a strategic position, trade-offs are required. But what activities will the company forgo? The whole system is important. We must not speak of key or critical success factors. One activity affects another. It is harder to imitate a whole integrated system than a single activity.

In a USG Corporation annual report some years ago, Chairman and Chief Executive William C. Foote stated the company's strategic objectives:

1. Increase operational excellence (through core values such as safety, quality, service, low cost, integrity).
2. Invest for growth (become a low-cost producer to maintain profitability throughout the economic and construction cycle).
3. Improve financial flexibility (achieve debt reduction, eliminate collateral on debt obligations).
4. Build the USG team (enhance the team's effectiveness by increasing diversity).

COMPETITIVE ENVIRONMENT

Michael Porter of the Harvard Business School wrote two books in the 1980s that remain the guiding works in competitive and strategic management. Porter continues to be among the most visible advocates of competitive analysis as a

guide to business decision-making. He wrote (Porter, 1985) that the average profitability of an industry is influenced by five forces. The first three—rivalry among existing firms, threat of new entrants, and threat of substitute products—relate to the degree of actual and potential competition. The fourth and fifth—bargaining power of buyers and bargaining power of suppliers—determine whether or not the potential profits are kept by the industry.

The degree of competition depends on factors such as the following:

- Growth of the industry (whether rapid or stagnant)
- Number and size of firms in the industry
- Differentiation among products
- Existence of economies of scale
- Amount of research and development needed
- Amount of brand advertising needed
- Existence of entrance and exit barriers
- Distribution networks established
- Threat of substitute products

The threat of new entrants—or conversely, barriers to entry—dictate many of the financial decisions a company makes. If entry is relatively easy, pricing flexibility is limited, and every market action must be carefully choreographed. If there are barriers to entry, the strategies of the company are far more flexible.

The bargaining power of buyers is important, because if the buyers are economically powerful compared to the company selling the product or service, prices can be kept low; therefore, the selling company's revenues are not as high as they could be. Similarly, if the bargaining power of suppliers is high compared to the company selling the product or service, input prices are higher; consequently, the selling company's costs are higher than they could be.

Different industries have different competitive environments. Exhibit 1–2 presents the competitive environments in the national trucking and cereal industries.

THE APPLICATION OF ANALYTICAL TECHNIQUES FOR SPECIFIC PROBLEMS

Financial management may be separated into three main decisions: the investment decision, the financing decision, and the dividend decision. The application of financial analytical techniques likewise may be classified in terms of these three decision types.

The use of a specific analytical model, such as net present value or internal rate of return, depends on the question being asked. Many problems in financial management can be dealt with by employing more than one financial analysis technique. The purpose of applying an analytical technique is not necessarily to calculate a particular answer; rather, the purpose of a technique is to provide a more informed basis on which to make a decision.

E**xhibit 1–2
Competitive Environments**

National Trucking Industry:

- The industry is highly fragmented; no firm has a very large market share.
- There is intense competition for market share among competing common carriers.
- Competing services are very similar.
- Entrance barriers are relatively low.
- There is a great deal of price competition.
- There is enormous pressure to introduce new services and service improvements rapidly and to provide high-quality customer support.

Cereal Industry:

- Prices of top national brand cereals have dropped due to inroads made by private cereal brand names.
- Advertising is important for reinforcing established brand names.
- Developing new products to take advantage of the growing awareness of people about nutrition is important, although new product failure rates have been high.
- The two top companies selling ready-to-eat cereals have over 60 percent of the market share.
- Pressure to reduce prices has resulted in increased emphasis on reducing manufacturing costs.

An important consideration in financial analysis is timing. The timing of various financial policies is important in terms of interest rates, inflation, taxes, and the capital market. Most of the techniques used in financial analysis involve a time element. For example, when evaluating a capital investment proposal, the manager must be fairly certain of the time required for ordering, installing or building, and starting up a new investment. The following sections describe how specific techniques can be used under certain circumstances and describe how a financial analyst arrives at a particular decision.

Investment Decisions

Investment decisions are perhaps the most important of the three types of financial decisions, because the outcome of these decisions determines the amount of cash flow in future periods. In this context, investment decisions relate to how the company uses its money and refer to both short- and long-term reallocations of corporate funds. Short-term investment decisions focus on the level of current assets (for example: cash, accounts receivable, and inventories) necessary for day-to-day operations. Long-term investment decisions refer to fixed asset purchases, mergers, acquisitions, and corporate reorganizations.

Techniques used for effective management of short-term cash and accounts receivable are different from those used for purchases of long-term fixed assets. For example, to gauge the proper level of cash, an analyst may develop a cash budget, use ratio analysis to determine the trends or variations of current assets and liquidity, or use pro forma income and balance sheets to plan income, investments, and overall cash flows. These analytical tools are

interrelated and should be used together to manage current assets. Short-term investments and management of current assets are considered in Chapters 3 and 4 of this course.

On the other hand, capital investment—investment in expensive, long-lived assets—is a major aspect of the long-term investment decision. It is the allocation of capital to investment proposals that will realize benefits in the future. Investment proposals necessarily involve risk, because future benefits are uncertain. Consequently, investment proposals should be evaluated both for their expected return and for their risk to the company. Capital investment proposals include both investment in new assets and the relocation of capital and assets within the company.

The evaluation of capital investment proposals involves a number of different techniques and types of financial analysis, all of which are interrelated. A *risk analysis* determines the investment's risk as compared to the company risk. A *cost of capital analysis* determines the correct discount rate to use in the cost analysis. A *cash flow analysis* determines the expected net cash flow from a new investment. The determination of a predicted cash flow could involve a *sales analysis* to predict future sales from the investment, an *economic analysis* to study future trends, or a *financial forecasting analysis* to determine cash income and expenses. Once the cash flow analysis has been completed, it is necessary to conduct a *cost analysis* to determine the returns of the new investment or the allocation of capital. The areas commonly studied in cost analysis include: net present value, internal rate of return, cost-benefit ratio, and the payback period. Cost of capital and capital budgeting are considered in Chapter 5 of this course. When this evaluation is complete, a *sensitivity analysis* may be performed to test the validity of the analyst's original assumptions.

Mergers and acquisitions or failures and reorganizations should also be subjected to financial analysis. Appropriate techniques would include: determining certain financial ratios such as the price-earnings ratio, determining the exchange ratio, and analyzing the possible negotiation range for mergers and acquisitions. Once the cash flows with either a merger or a reorganization has been predicted, the net present value technique could be applied.

Financing Decisions

The financing decision, which relates to where the company gets the money it needs, varies with the size of the firm, the financing options available to the firm, the needs of the firm, and the location of the firm. Small firms generally do not have the same financing options as larger firms; consequently, small firms are more likely to experience difficulties financing growth and/or avoiding bankruptcy.

Funding sources frequently depend on the size of the firm and the length of time it has been operating. Small, newer firms have limited sources of funding; they are often restricted to family, friends, and suppliers for start-up funds and working capital. Well-established firms, even if small, may be able to access bank loans and Small Business Administration (SBA) support. Large firms, especially if well-established, have a much wider array of financing alternatives, including banks, insurance companies, stock and bond issues, and even commercial paper and other market-based options.

When making financial decisions, the manager must determine the best financing mix or capital structure for the company. In this sense, the best choice is the capital structure that allows optimal valuation of the company for the shareholders. The important elements to consider in making financial decisions include: (1) the nature and riskiness of the business operation; (2) the capital structure (debt-to-equity ratio) desired; (3) the length of time the assets will be needed; and (4) the cost of alternative financing.

Alternative sources of financing are an important subject of analysis. Businesses need short-, medium-, and long-term financing at various times to remain liquid and profitable. To analyze sources of short-term financing, the analyst must study the costs of each source, applying techniques such as present value analysis, compounding analysis, and interest factor analysis.

To evaluate alternative sources of long-term financing, security markets, types of securities (such as debt or preferred stock), common stock values, and sales should be added to the sources considered for short-term funding. Any analysis of a source of long-term financing would have to analyze the effect of the financing on the company's capital structure, as well as the costs and benefits of the financing.

Other forms of financing that could be the subject of financial analysis include term loans and lease financing. For either case, the analytical techniques used would include a comparison of that type of financing's present value costs or benefits with the present value costs or benefits of the alternatives.

A number of the analytical tools used for assessing performance are also pertinent when the subject of analysis is the optimum capital structure of the company. A *financial leverage analysis* determines the company's financial leverage and how it can use financial leverage in its capital structure. Capital structure and alternative sources of financing are explored in Chapter 7. *Trend* and *historical analyses* examine the company's past capital structure. *Ratio analysis* determines the current financial structure and other financial indicators. In addition to conducting the above analyses, the analyst could perform an analysis to determine the *current cost of capital* and ways to decrease this by changing the financing mix. All these analyses are concerned with the total valuation of the company.

Dividend Policy

The dividend policy that the company chooses is also a subject of analysis in financial management. Dividend policy relates to how the company rewards its shareholders. The four standard dividend alternatives—the stable dividend policy, the constant payout ratio, moderately increasing annual dividends, and the regular low dividend policy plus extra—must be evaluated according to the company's specific situation. In recent years, the repurchase of the firm's outstanding common stock has become an increasingly popular alternative to dividends as a way to further management objectives while providing funds only to those shareholders who wish to receive them. The aim of the dividend or repurchase analysis would be to determine which type of policy would maximize the value of the company's stock. To determine this, the analyst would compare the effects of different policies on the company's valuation. Choosing the dividend policy is a strategic decision, usually made by senior-level managers, with final approval subject to the board of directors.

PRIMARY GOAL OF FINANCIAL ANALYSIS

Criteria used in financial decision making should be based on the anticipated benefits to the present owners of the company. The primary goal is to increase the owners' wealth. The way to increase the owners' wealth is to increase the market value of their investment (equity) in the enterprise. Consequently, the decision criteria used in this course are those that maximize the market value of the shareholders' equity.

An obvious question is what criteria to employ for companies that do not have an observable market price. The answer lies in the characteristics that cause any earning asset to have value. The rule, then, is to optimize the expected return and to minimize the risk of the equity. Such optimization refers to the balancing of the risk and the return in an attempt to maximize what the decision maker believes would be the market price of the owners' equity if it were traded in the market.

LONG-RANGE VERSUS SHORT-RANGE GOALS

It is important to note that decisions are analyzed differently, according to the decision maker's point of view. Different levels of management treat financial decisions in different ways. For example, the board of directors and top management take a long-range view of the company and, therefore, of the effects of various decision alternatives on the company. Generally, top managers are more concerned with long-range strategic planning, and their decision criteria reflect this. Consider the dividend decision, which usually is made by the board of directors or top management. Their overriding consideration in choosing a dividend is the dividend's long-range impact on the company's stock price.

In contrast, the managers at the operating level of a company generally are more concerned with short-term goals and the short-term effects of various decision alternatives. For example, operating management is concerned with cash management decisions. Short-term objectives, such as cash liquidity and inventory control, are of primary concern in the financial analysis of cash management decisions.



Think About It . . .

Very often management is focused on short-term performance and achieving immediate results. The financial analyst must satisfy this need for current information while maintaining a long-term perspective as well. What steps must be taken to keep the long-term perspective in view?

THE BALANCED SCORECARD

Over the last business generation there has been a dramatic refocusing of management attention toward efficiency and cost management. Since the 1980s a

series of developments in business thinking have concentrated on managing rather than merely controlling operations. This is most evident in the area of Managerial Accounting. In the 1980s focus transitioned from standard costs, which distributed costs across products by allocating overhead to specific products based on the product's material or direct labor costs, to value, where overhead was assessed on the benefit (to the customer) it added to the product. The effort was to trace as much as possible of the overhead directly to the product, based on the factor responsible for the cost.

This discussion, initiated by Robert Kaplan and Thomas Johnson, (1987) led to a comprehensive examination of value, what the customer will pay for, and value-added, how much the contribution was worth to the customer. Johnson (1992) expanded on the ABC analytical approach in his later book. Later, by combining financial and operational measures, the balanced scorecard offered management a comprehensive view of the business. According to Kaplan and Norton (1992), the balanced scorecard provides answers to four basic questions that enable management to focus on the most critical measures, tied to key operational disciplines.

- How do customers see us? (a customer perspective) (Marketing)
- What must we excel at? (an internal perspective) (Operations)
- Can we continue to improve and create value? (an innovation and learning perspective) (Human Resources)
- How do we look to shareholders? (a financial perspective) (Finance)

The balanced scorecard represents a fundamental change from traditional performance measurement systems by putting strategy, rather than control, at the center. In this view, everyone in the company should be moving along the path toward the overall vision of the company.

Kaplan and Norton (1996) wrote that four management processes link long-term strategies with short-term actions:

1. Translating the vision into an integrated set of agreed-upon objectives and measures that are stated in meaningful terms.
2. Communicating management's strategy and linking it to departmental and individual objectives.
3. Through business planning, integrating business and financial plans and moving the company toward management's long-term strategic objectives by selecting measures of progress from each of the four balanced scorecard perspectives (listed above) and then setting targets for each of them.
4. Enabling a company through feedback and learning to see whether it and its components have met their financial goals and evaluating strategy in light of recent performance.

The balanced scorecard allows strategy not only to be implemented but also to evolve in response to competitive and technological changes. It also focuses the financial analysis activities on directing future performance rather than merely reporting on past performance.

TECHNIQUES PRESENTED IN THIS COURSE

This course presents several specific financial analytical techniques. Chapters 2 and 3 explain financial statement analysis and the use of ratio analysis. Chapter 4 provides a discussion of current asset and liability management. Chapter 5 describes several different techniques used to evaluate capital investment proposals. Chapter 6 examines forecasting and valuation. Chapter 7 discusses business and financial risk and optimum capital structure. Chapter 8 explores mergers and acquisitions.



This chapter described the role of the financial analyst, the criteria for financial decision making, the various financial decisions that most managers must make, and the specific analytical techniques that managers can use to make more informed financial decisions. Some techniques for analyzing three different financial decisions (investment, financing, and dividend) were explained. The interrelationship of various topics in financial analysis was introduced.

The scope of financial analysis and its location in the organization varies. Financial analysis is the responsibility of all the company's fiscally and economically oriented staff. It is performed not only financial analysts but also all managers who must make financial decisions. The subjects and the specific analytic approaches presented in this course are the basics upon which managers may expand their decision-making capabilities.

A company's strategy creates and sustains its competitive advantage. Most companies try to differentiate their products or services from their competitors and to control their costs. Profitability in an industry is a function of the rivalry among existing firms, threat of new entrants, threat of substitute products, bargaining power of buyers, and bargaining power of suppliers. Profitability in a company is often a function of how managers respond to internal signals included in financial results.

This course will enable managers to use financial analysis in a number of specific areas. More importantly, it presents sound financial analysis techniques that may be applied to most financial decision-making processes.



Review Questions

INSTRUCTIONS: Here is the first set of review questions in this course. Answering the questions following each chapter will give you a chance to check your comprehension of the concepts as they are presented and will reinforce your understanding of them.

As you can see below, the answer to each numbered question is printed to the side of the question. Before beginning, you should conceal the answers in some way, either by folding the page vertically or by placing a sheet of paper over the answers. Then read and answer each question. Compare your answers with those given. For any questions you answer incorrectly, make an effort to understand why the answer given is the correct one. You may find it helpful to turn back to the appropriate section of the chapter and review the material of which you are unsure. At any rate, be sure you understand all the review questions before going on to the next chapter.

1. An advantage of placing the role of financial analysis in a decentralized position is that it: 1. (d)
 - (a) increases the objectivity of analyses.
 - (b) pools expertise and encourages cooperation among analysts.
 - (c) facilitates multidepartmental assignments.
 - (d) allows for necessary research to be conducted for a unit's operations that are highly complex.

2. Financial management is not concerned with: 2. (d)
 - (a) increasing the overall valuation of the company.
 - (b) the investment of funds in capital assets.
 - (c) obtaining the best mix of financing.
 - (d) preparing financial statements.

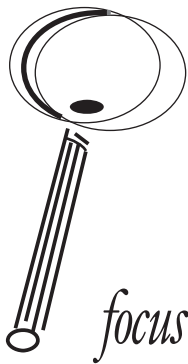
3. The main decisions in financial management do not include: 3. (c)
 - (a) the investment decision
 - (b) the dividend policy.
 - (c) the personnel policy.
 - (d) the financing decision.

4. A company's operating activities include: 4. (a)
 - (a) producing goods or services.
 - (b) retiring long-term notes.
 - (c) acquiring plant and equipment.
 - (d) following GAAP.

5. Whether or not potential profits are kept by the industry is partly determined by: 5. (c)
- (a) threat of new entrants.
 - (b) rivalry among existing firms.
 - (c) bargaining power of buyers.
 - (d) threat of substitute products.

2

Financial Statement Analysis



Learning Objectives

By the end of this chapter, you should be able to:

- Outline the priorities of the three primary groups with an interest in the company and its financial statements: creditors, investors, and management.
- Describe the structure and content of the balance sheet and the income statement.
- Describe the structure and content of the statement of stockholders' equity and the statement of cash flows.
- Define financial analysis and list its limitations.
- Explain the role of ratio analysis in evaluating financial data.
- Perform horizontal analysis.
- Perform vertical analysis.

Digging Deeper

Al opened the second gathering by asking a provocative question. “Why do we produce financial statements every month?”

“Because we have to,” answered Steve, the controller of the largest division. “Every month I am pressured to give Gloria, my division manager, the monthly financials so she can report to her boss.”

“Does she need complete financial statements, or does she need key information?” asked Al. “I suspect she really wants to know what went well and what went less well, not all the details of all of the accounts.”

“Honestly, ‘because we have to’ is not really a good reason,” Al continued. “What we should be doing is providing more specific focus to our financial reporting. Our managers don’t really want all the details. They want to know what they need to focus on and what they need to share with company management. Yes, we need to produce financial statements, and complete quarterly reports for the monthly analysts’ call, but our managers need more specific managerial information earlier than we have been providing it. If we can get them the information they need early, we will have time to do the reporting stuff more smoothly.”

“I think we provide a lot of information that is either not needed or not understood, raising a lot of questions and generating a lot of work, without really being usable to manage the operations. I think we can use available historic information and relationships from existing information to help our managers identify the places where we can make improvements.”

The analysis of financial statements is fundamental—both to financial analysis and to the managerial role. As most managers are aware, the amount of information describing even the smallest firm is enormous. To be useful, this information is organized into different concise financial statements. Analyzing these statements is an important part of financial analysis, and their analysis is a valuable aid to decision making for managers. This chapter will discuss financial statement analysis first by explaining the differing viewpoints facing the manager, then by delineating the basic structure of financial statements, and finally by illustrating horizontal and vertical analysis. Financial managers need a strong background not only in developing the ratios, but also in integrating the concepts. When considering financial statements as the basis for analysis and interpretation, awareness of accounting and tax changes will help the analyst maximize the value of the analyses conducted. The legal and regulatory environment is dynamic, and the global nature of business today is expanding the perspective necessary for the most valuable analysis.

DIFFERING VIEWPOINTS

How you use financial statement analysis depends on the viewpoint you have toward the company. There are basically three primary positions from which the company and its financial statements are viewed: creditor (debt, both due to business partners and to lenders), investor (equity), and management. The

management of a company must attempt to fulfil the expectations of the suppliers of the company's funds. Often these expectations differ; creditors are more interested in the company's liquidity position, while investors are more interested in long-term profit.

Creditors analyze a company's financial statements in terms of risk, liquidity, and solvency. Creditors want to know if they will receive funds due to them, whether as payment for invoices or as interest and principal payments. Creditors want to know if a company's operational, financing, and dividend policies create additional business risk.

Investors analyze the financial statements in terms of return on investment and growth rate. Investors want to know whether a company met their performance expectations and, if not, the reasons for the difference. Do assessments of future performance by the company need to be altered?

The management of the company analyzes the financial statements in terms of how to meet the different demands of investors and creditors simultaneously. Management is interested that the company is valued properly by external parties. Also, management wants to protect its own interests (job security) and uses the information on the financial statements to make decisions about the internal functioning of the company.

THE BASIC STRUCTURE OF FINANCIAL STATEMENTS

Financial statements provide the information that is needed for analysis. They summarize the company's transactions and report on management's effectiveness. Basically, there are four common financial statements used in financial analysis:

1. The *balance sheet*—provides information on what the company owns (assets) and what it owes (liabilities) as of a particular date.
2. The *income statement*—provides information on a company's revenues and expenses over a period of time (a year, for example).
3. The *statement of stockholders' equity*—provides information on the changes in a company's ownership interests over a period of time.
4. The *statement of cash flows*—provides information on a company's cash inflows and outflows over a period of time.

The Balance Sheet

The balance sheet (see Exhibit 2–1) presents information on the financial position of a business on a specific date. The statement shows the assets, liabilities, and stockholders' equity of the business at that time. Generally, most assets are reported on the balance sheet at their historical cost; most liabilities are reported at maturity value or discounted present value.

Assets are economic resources owned by the business. They either provide present benefits or they will provide probable future benefits to the business. Some assets are physical items, that is, they can be seen or touched; other assets

do not have physical form, but are instead represent legal claims or rights. The assets commonly presented on a balance sheet include the following:

- *Cash.* Cash includes currency, coins, and demand deposits in bank accounts; cash increases with deposits and decreases with withdrawals.
- *Marketable Securities.* Marketable securities consist of items such as bonds, notes, stocks, and bills that are readily marketable, which the company plans to sell as cash is needed, and which have relatively certain liquidation prices.

E

Exhibit 2-1 A Typical Balance Sheet

*Consolidated Balance Sheet
as of December 31, 2013 and 2012
(Dollars in Millions)*

	2013	2012
<i>Assets</i>		
<i>Current Assets</i>		
Cash	\$ 170	\$ 240
Marketable Securities	160	150
Accounts Receivable, Less Allowances of \$8 and \$7	530	550
Inventories	450	430
Prepaid Expenses	<u>160</u>	<u>150</u>
Total Current Assets	\$1,470	\$1,520
NET PLANT AND EQUIPMENT	\$2,800	\$2,930
INTANGIBLE ASSETS (net)	<u>\$ 630</u>	<u>\$ 600</u>
Total Assets	<u>\$4,900</u>	<u>\$5,050</u>
<i>Liabilities and Stockholders' Equity</i>		
<i>Current Liabilities</i>		
Accounts Payable	\$ 530	\$ 650
Notes Payable	570	750
Current Portion of Long-Term Debt	310	500
Accrued Salaries and Wages	160	210
Taxes Payable	<u>90</u>	<u>80</u>
Total Current Liabilities	\$1,660	\$2,190
LONG-TERM DEBT	\$2,220	\$1,810
STOCKHOLDERS' EQUITY		
Common Stock	\$ 140	\$ 90
Additional Paid-In Capital	90	70
Retained Earnings	940	990
Treasury Stock	<u>(150)</u>	<u>(100)</u>
Total Stockholders' Equity	<u>\$1,020</u>	<u>\$1,050</u>
Total Liabilities and Stockholders' Equity	<u>\$4,900</u>	<u>\$5,050</u>

Short-term investments in debt and equity securities are reported at market value. Some analysts view marketable securities as an extension of cash, perceiving them as immediately available. Others separate marketable securities and treat them as not operational investments.

- *Accounts Receivable.* Accounts receivable are claims against customers, usually arising from a sale made on credit. Accounts receivable are reported at net realizable value, deducting allowances for doubtful accounts from the reported balances.
- *Inventories.* Inventories of manufacturers include raw materials, work in process, and finished goods. Inventories increase by purchasing raw materials, and adding labor and overhead costs. They decrease by the cost of goods sold as finished goods are sold.
- *Supplies.* Supplies consist of items that are used, rather than sold, in the normal course of business (such as pens, wrapping paper, and cash register tapes). Some companies treat supplies as an operating expense and expense them as they are purchased. Such treatment will increase operating expenses and decrease taxes and profits.
- *Prepaid Expenses.* Prepaid expenses are amounts that are paid in advance for such services as insurance and rent.
- *Property, Plant, and Equipment,* net of accumulated depreciation. Property, plant, and equipment consist of tangible, long-term assets used in business operations. These assets include land, buildings, equipment, and natural resources. The cost of these assets (except for land) is allocated through depreciation over their useful lives.
- *Investments.* Long-term investments are securities of another company held for the long term.
- *Intangible Assets.* Intangible assets are rights used in carrying out business operations. These assets include copyrights, patents, trademarks, goodwill (excess of purchase price of a company over the fair value of its assets less its liabilities), organization costs, and franchises. Goodwill is often a very large asset on the books of major corporations that have been active participants in the merger and acquisition marketplace. The offsetting account to goodwill is often shareholders' equity; both intangible assets and the corresponding equity are deducted by bankers and other lenders when considering the creditworthiness of a loan applicant.

Current assets consist of those assets that are either cash, are expected to be converted into cash, or are expected to be consumed during the coming year or operating cycle, whichever is longer. The operating cycle is the average time that elapses between the purchase of inventory and its ultimate sale and conversion to cash. If the date of the balance sheet is December 31, 2013, then the coming year would be 2014. The operating cycle is used for those businesses that need more than one year to produce and sell their inventories (for example, some businesses that are engaged in construction). Examples of current assets are cash, marketable securities, accounts receivable, inventories, supplies, and prepaid expenses.

The assets of a business may be obtained through funding from two sources—the creditors and the owners. The creditors lend to the business

economic resources that must be repaid at specified times. The lending process may be in the form of a loan (for example, a bank loan) or in the form of goods or services that are provided to the business prior to payment (for example, purchases of merchandise on credit by the business). These debts, called liabilities, are commonly presented on the balance sheet and include the following:

- *Accounts Payable.* Accounts payable are amounts arising from purchases of merchandise or services on credit.
- *Notes Payable.* Notes payable are written promises by a company to pay specific sums at designated maturity dates.
- *Accrued Liabilities.* Accrued liabilities are amounts that will be due for services already performed for the company. An example of an accrued liability is salaries for work already done, but for which payment is not due as of the balance sheet date.
- *Long-Term Debt.* Long-term debt consists of obligations that are not expected to be liquidated within the coming year or operating cycle, whichever is longer. Long-term debt is reported at present discounted value.

Current liabilities consist of those debts that are expected to be settled during the upcoming year or operating cycle, whichever is longer, either by the use of current assets or by the creation of other current liabilities. Current liabilities include accounts payable, accrued liabilities, and notes payable (if due within one year or the operating cycle, whichever is longer). Long-term liabilities are debts that are not expected to be paid during the coming year or operating cycle, whichever is longer. Examples of long-term liabilities include a note that is payable to the bank in three years, a mortgage note that is payable in instalments after the coming year, and a pension liability that is due when employees retire after the coming year.

QUICK QUIZ 2-1

Answers to QUICK QUIZ questions can be found starting on page 191.

Can a company operate if its liabilities exceed its assets—that is, if its equity is negative?

Owners provide resources to a business by investing their personal property (for example, cash), and by reinvesting the profits into the business rather than withdrawing them as dividends. Stockholders' (or shareholders') equity usually includes the following:

- *Common Stock and Additional Paid-In Capital.* Common stock and additional paid-in capital represent the funds raised from the sale of a security having residual claim on the assets and earnings of the company after all other claims are met. Common stockholders have the right to vote on all matters pertaining to the overall management of a corporation.

- *Preferred Stock.* Preferred stockholders must be paid their dividends before any dividends are distributed to common stockholders. Preferred stock may be cumulative (past unpaid dividends must be paid before current preferred dividends and any common stock dividends). Preferred stock may be convertible into common stock or be callable at the corporation's option.
- *Retained Earnings.* Retained earnings are the reinvested earnings over the life of the company. Retained earnings increase with net income and decrease with a net loss, cash dividend distributions, or stock dividend distributions.
- *Treasury Stock.* Treasury stock is a company's previously issued stock that has been purchased by the company for some business reason (such as issuing stock to use for stock options exercised by employees).



Think About It . . .

With the dramatic increase in industrial globalization, companies are now trading with and competing with companies from all over the world. Much of the international market operates under International Financial Reporting Standards (IFRS) and reports their balance sheet using a different structure from that used in the United States. Think about how a different sequence of assets and liabilities and equity in the balance sheet might affect your interpretation for financial results.

In the balance sheet shown in Exhibit 2–1, assets are categorized as current assets and long-term assets, specifically plant and equipment and intangible assets; liabilities are classified as current or long-term. Both the current year and the previous year are reported.

The Income Statement

The income statement (see Exhibit 2–2) provides information regarding the results of a company's operations for a specified period of time. Investors and creditors are interested in a company's future net cash inflows. The income statement provides the best predictor of these cash flows.

For a manufacturing company, the income statement relates the sales of a given period to the manufacturing costs incurred in producing the goods that were sold and to the other expenses incurred in that period. For a service business, the income statement summarizes the expenses incurred to deliver the services provided. If cost of sales is reported, it captures expenses directly responsible for the revenues generated, such as the hourly costs of consulting services rendered. Net income estimates the amount realized by the company during the period after all relevant items are deducted. Net income indicates the profitability of the firm and is often used as a benchmark to determine dividend payments.

Net income flows and cash flows are not synonymous. For the purpose of the income statement, the accrual basis of accounting recognizes revenues when earned, and expenses when incurred. In other words, transactions are recognized on the basis of *expected* cash receipts and payments, rather than actual cash receipts and payments. Cash basis accounting, on the other hand, recognizes revenues when cash is received and expenses when cash is paid; this method is used to determine cash flows from operations. It does not recognize the full economic effects of transactions undertaken in a particular accounting period, if they have not been completed through the exchange of cash or cash equivalents.

Revenue in a period results in an increase in assets due to activities that are directed at making a profit. Expenses in a period result in either a decrease in assets or an increase in liabilities due to activities that are directed at making a profit. Revenue and expenses result only from those activities that are directed at making a profit. An increase in cash due to a bank loan is not considered to be revenue. Conversely, a decrease in cash due to the repayment of a bank loan is not considered to be an expense. Gains and losses that are due to incidental transactions or other events affecting the company are segregated from revenues and expenses, but affect overall profits. .

The income statement presents information on the revenues that are earned and the expenses that are incurred by a business during a specified period of time. When revenues and gains exceed expenses and losses, net income is reported for the period. When expenses and losses are greater than revenues and gains, the business has incurred a net loss for the period.

In the income statement shown in Exhibit 2–2, costs and expenses totalling \$5,820 million in 2013 are deducted from net sales (sales less sales discounts and returns) of \$6,800 million. The cost of goods sold figure relates the cost of inventories sold to the proceeds from the sales. Cost of goods sold does not equal production costs for the period; production costs may include both inventories sold (cost of goods sold) and not sold (changes in inventories) and may be greater or less than cost of goods sold, based on whether ending inventories rise or fall. The depreciation and amortization charges are allocated costs for plant and equipment and intangible assets acquired in the current year or past years; no cash outlays are associated with these expenses of \$280 million. This will affect the cash flow statement of the business. Interest, a cost of borrowing money, is deducted from the operating income of \$980 million to obtain pretax income of \$870 million. The provision for income taxes (or income tax expense) is deducted to arrive at the net income figure of \$530 million. Earnings per common share (to be discussed in the next chapter) is equal to the net income available to the common stockholders divided by the weighted average number of shares of common stock outstanding (560 million shares). Net income increases retained earnings, while dividends for the stockholders reduce retained earnings. Note that dividends are distributions of earnings, not an expense appearing on the income statement.

A primary function of the income statement is its use in predicting the results of future operations. Consequently, the income statement should disclose and distinguish clearly between those items considered to be normal and recurring and those considered to be unusual and nonrecurring. In addi-

E xhibit 2-2 A Typical Income Statement

*Consolidated Statement of Income
for the Years Ended December 31, 2013 and 2012
(Dollars in Millions Except per Share)*

	2013	2012
NET SALES	\$6,800	\$6,670
<i>Cost and Expenses</i>		
Cost of Goods Sold	3,300	3,100
Selling and Administrative Expenses	2,240	2,390
Depreciation and Amortization	280	250
Total Operating Expenses	<u>\$5,820</u>	<u>\$5,740</u>
<i>Operating Income</i>	\$ 980	\$ 930
Interest Expense	<u>(110)</u>	<u>(90)</u>
Income before Provision for Income Taxes	\$ 870	\$ 840
Provision for Income Taxes	<u>(340)</u>	<u>(330)</u>
NET INCOME	<u>\$ 530</u>	<u>\$ 510</u>
Earnings per Common Share	<u>\$.95</u>	<u>\$ 1.42</u>

tion, the results of discontinued operations should be reported separately from those of continuing operations. Also, the effects of changes in accounting principles should be reported separately on the income statement.

Extraordinary items are reported separately, net of any tax effect, on the income statement. To be classified as extraordinary, the event or transaction must be unusual in nature and not be expected to recur in the foreseeable future. An example of an extraordinary item is tornado damage in an area in which tornadoes rarely occur. The FASB has decreed that gains and losses from retirements of debt are classified as extraordinary items, even though the above-mentioned criteria are not met. However, the definition of extraordinary has been tightened significantly in recent years because companies have sought to segregate expenses that have adversely affected a business's results. Many managers believe that stock analysts will disregard extraordinary items when evaluating a company for investment. As a consequence of this definitional tightening, operating expenses and losses resulting from the World Trade Center tragedy on September 11, 2001 were not permitted to be classified as extraordinary.

The results of discontinued operations, along with the gain or loss from disposal of the segment, should be reported separately, net of any tax effect, on the income statement. A segment of a company is a component that represents a separate major line of business or class of customer. An example of a discontinued operation is General Electric's sale of NBC Universal to Comcast.

For most changes in accounting principles, the cumulative effect, net of tax, of the changes in the income of prior periods should be reported separately on the income statement. Most accounting changes are mandated by the FASB. For example, when the FASB introduced a requirement that health care benefits to be paid when needed after retirement be accrued as the employees worked and earned the benefits rather than shown as an expense as payments are made, companies reported a cumulative effect on the income statement in the year of adopting the new method. The cumulative effect was equal to the change in income in all prior periods as if the new requirement had always been implemented.

The Statement of Stockholders' Equity

A statement of stockholders' equity presents the beginning and ending balances in the stockholders' equity accounts and the changes that occurred in these accounts during the accounting period. An example of a statement of stockholders' equity is presented in Exhibit 2-3.

Common stock was sold for \$70, with \$50 being allocated to the common stock account at its par value (a dollar amount per share defined by the company as the value of a single share of stock) and \$20 (the difference between the \$70 proceeds and the \$50 par value) being allocated to additional paid-in-capital. Treasury stock costing \$50 was purchased. Net income (from the income statement) is added to retained earnings; dividends are subtracted from retained earnings.

E

xhibit 2-3

A Typical Statement of Stockholders' Equity

*Consolidated Statement of Stockholders' Equity
For the Year Ended December 31, 2013
(Dollars in Millions)*

	<i>Common Stock</i>	<i>Additional Paid-in Capital</i>	<i>Retained Earnings</i>	<i>Treasury Stock</i>
Balances on December 31, 2012	\$90	\$70	\$990	(\$100)
Issuance of Common Stock	50	20		
Purchase of Treasury Stock				(50)
Net Income			530	
Dividends			(580)	
Balances on December 31, 1999	<u>\$140</u>	<u>\$90</u>	<u>\$940</u>	<u>(\$150)</u>



Exhibit 2-4 A Typical Statement of Cash Flows

*Consolidated Statement of Cash Flows
for the Years Ended December 31, 2013 and 2012
(Dollars in Millions)*

	2013	2012
<i>Cash Flows from Operating Activities:</i>		
Net Income	\$530	\$510
Depreciation and Amortization	280	250
(Increase)/Decrease in Accounts Receivable	20	(110)
(Increase)/Decrease in Inventories	(20)	30
(Increase)/Decrease in Prepaid Expenses	(10)	(20)
Increase/(Decrease) in Accounts Payables	(120)	(50)
Increase/(Decrease) in Accrued Salaries and Wages	(50)	10
Increase/(Decrease) in Taxes Payable	10	(30)
Net Cash Flow from Operating Activities	<u>\$640</u>	<u>\$590</u>
<i>Cash Flows from Investing Activities:</i>		
Acquiring Marketable Securities	(\$ 10)	(\$ 10)
Purchase of Plant Assets	(150)	(100)
Purchase of Intangible Assets	(30)	(20)
Net Cash Flow from Investing Activities	<u>(\$190)</u>	<u>(\$130)</u>
<i>Cash Flows from Financing Activities:</i>		
Proceeds from Issuance of Long-Term Debt	\$410	\$250
Proceeds from Issuance of Common Stock	70	-
Payment of Cash Dividends	(580)	(560)
Paid Notes Payable	(180)	-
Bought Treasury Stock	(50)	(20)
Decrease in Current Portion Of Long-Term Debt	(190)	(100)
Net Cash Flow from Financing Activities	<u>(\$520)</u>	<u>(\$430)</u>
Net Increase/(Decrease) in Cash	<u>(\$ 70)</u>	<u>\$ 30</u>

The Statement of Cash Flows

While the income statement reports the results of operations for the period, and the balance sheet discloses the assets, liabilities, and stockholders' equity as of the end of the period, the statement of cash flows (see Exhibit 2-4) indicates where the company obtained its cash and what it did with it.

There are two common formats for presenting the Cash Flow Statement: the direct method, which presents a summary of cash receipts and cash disbursements, using the difference to reconcile with the change in cash on the balance sheet, and the indirect method, which consists consists of three major

sections: cash flows from operating activities, cash flows from investing activities, and cash flows from financing activities and again reconciling with the change in cash on the balance sheet. The direct method only tracks actual cash movements, so many non-cash transactions are not recognized. This is sometimes confusing to analysts and managers because sales or obligations that have not been paid do not show up. Neither do prepaid expenses paid for in prior periods or any accounting for depreciation. As a result, most public companies and many private ones use the indirect method, which is more easily tied to the period's financial statements, particularly when publishing their financial statements. The indirect method is presented in Exhibit 2-4.

The items included in each section are as follows:

1. *Operating activities*, including selling, purchasing, and producing goods; providing services; and paying suppliers, employees, and lenders.
2. *Investing activities*, including collection of loans receivable; acquiring and selling securities; and acquiring and selling plant assets.
3. *Financing activities*, including proceeds from the issuance of the company's bonds or stocks; outlays to retire bonds; and the payment of dividends.

In Exhibit 2-4 net income is adjusted for depreciation and amortization expense, because no cash outlay occurred due to these charges. The adjustments for changes in receivables, inventories, prepaid expenses, and payables are made to track the net movements of cash. Outflows from investing activities consisted of payments for acquiring marketable securities, plant assets, and intangible assets. Cash inflows for financing activities were due to the issuance of long-term debt and common stock; cash outflows occurred because of payments for cash dividends, retiring debt, and acquiring treasury stock.

Users of this statement can easily see how cash is moving through the organization and what the net impact on the cash balance is at year end. Basically, this statement informs the user where the cash came from and where it went. It provides insight into management's decisions regarding the financing of the business and its assets. This should help investors, creditors, and other users to determine the relationship between income and cash flows and to help gauge the availability of each for dividends and long-term investment; it will also help users and managers to recognize the firm's ability to finance growth from internal sources.



Think About It . . .

Financial statements available to those outside a company are those prepared after the end of the fiscal year. Because they will be reviewed by numerous interested parties, the company will make sure that they present the best, most favorable picture possible, akin to a job candidate polishing up a resume before an important interview. How does that affect the interpretation of those financial statements?

FINANCIAL STATEMENT ANALYSIS

Financial analysis is the examination of a company's financial statements in order to determine how well that company is doing and to get a sense of how the company can be expected to perform in the subsequent period. Has a company's financial position improved, deteriorated, or stayed the same over a period of time? Financial analysis is conducted by both internal and external users of financial statements. Internal users such as the company's management employ financial analysis in order to identify potential problem areas that need management attention. External users such as owners and creditors employ financial analysis in order to determine the reasonableness of committing financial resources to the company. For example, owners are interested in the present and future earnings prospects of a business, whereas short-term creditors may be concerned with the ability of a firm to meet its short-term obligations as they become due.

A commonly used technique for evaluating financial statement data is ratio analysis. A financial ratio is a fraction expressing a relationship between financial statement items. To examine the percentage changes in certain financial statement items from period to period, changes in the account balances that are reported in comparative financial statements are compared. This type of ratio analysis is called *horizontal analysis*. Sometimes we want to compare a financial amount with some total within the financial statements for a single year. This type of ratio analysis is referred to as *vertical analysis*. A third type of ratio analysis is used to compare one or more items within a set of financial statements to one or more items within the same or different set of financial statements. This type of ratio analysis is examined in the next chapter.

Limitations of Financial Statement Analysis

Making decisions requires a great amount of information. That information can be obtained in many different ways, and ratio analysis is only one of them. Therefore, you should not expect that the computation of a few ratios or a brief analysis of comparative financial statements will provide all the answers to important financial questions. While ratio analysis provides important inputs to the decision process, many other factors also provide necessary inputs. These other factors include the current and forecasted economic conditions, the rate of inflation both at home and abroad, the extent of and accessibility to the company's sources of supply and markets, and changes in the industry of which the company is a part.

Financial statements are based on many measurements, estimates, and judgments. Also, there is considerable flexibility allowed in determining accounting information under the techniques available. While the number of areas in which alternative accounting methods are used has been reduced significantly in recent years, management still has the ability to choose from alternative, generally accepted accounting methods in several important areas (for example, there are a number of inventory valuation methods that may be used).

For all these reasons the caveats related to ratios in analysis are many. For example, it is important to recognize that one ratio, even across several years, or several ratios measuring a single year, is not sufficient for making decisions. The analyst must use all the available data and often explore a wide range of sources before rendering a judgment or recommending an action. Ratios often provide the analyst with clues as to where else to look for the information needed. Analysts must be sensitive to changes in balances and in ratios and must actively look for corroborating indicators and explanations embedded in other ratios and relationships.

Horizontal Analysis

Analyzing the increases and decreases in a given financial statement item over two or more periods is called *horizontal analysis*. The changes are shown both in dollar amounts and as a percentage. The percentage change is computed by dividing the dollar amount of the change by the amount of the financial statement item for the earlier period. Change is always measured from early to late and is based on the early amount. For example, if the amount of an item changes from \$60,000 in 2012 to \$80,000 in 2013, we would indicate a \$20,000 increase in the amount of the item equal to a 33 percent increase. The 33 percent increase is computed by dividing the \$20,000 change by the \$60,000 balance for the item at the end of 2012. It is important to consider both the absolute and the percentage change in an item to obtain an indication of the significance of the change. For example, a large percentage change in a relatively small dollar item may be much less significant than a similar percentage change in a large dollar item. While the years of data may be presented in either early-to-late or late-to-early format, financial statements are typically presented with the most recent year closest to the captions. Using a consistent format makes analysis easier and clearer. Change is always measured from early to late and percentage change is measured based on the early amount.

Exhibit 2-5 shows a horizontal analysis of a comparative balance sheet. (Note: This horizontal analysis does not relate to the statements included in Exhibits 2-1 through 2-4.)

By looking at this exhibit, you can see the following:

1. One of the largest relative changes is indicated for cash. This would appear to be a positive sign, especially in relationship to the great increase in sales that is shown on the comparative income statements (see Exhibit 2-6). In other words, the company is not only selling more, but it is also realizing cash on those sales on a timely basis.
2. Accounts receivable indicate a slight decline while sales and cash have increased substantially. This would seem to indicate better collection efficiency and, perhaps, a somewhat tighter credit and collection policy by the company. That is, sales have increased by about 56 percent (see Exhibit 2-6) and cash has increased by about 50 percent, while accounts receivable have decreased by about 10 percent. Assuming that the company is selling primarily on credit, this indicates a solid policy on the granting of credit as well as the improved ability to convince customers to pay their bills on time.

E xhibit 2-5 Horizontal Analysis-Comparative Balance Sheet

*Horizontal Analysis-Comparative Balance Sheet
December 31, 2012 and 2013*

	2012	2013	Increase (Decrease)	Percentage Increase (Decrease)
Assets				
Current Assets:				
Cash	\$ 60,000	\$ 90,000	\$ 30,000	50%
Accounts Receivable	50,000	45,000	(5,000)	(10%)
Inventories	120,000	108,000	(12,000)	(10%)
Supplies	35,000	42,000	7,000	20%
Prepaid Expenses	8,000	10,000	2,000	25%
Total Current Assets	<u>\$273,000</u>	<u>\$295,000</u>	<u>\$ 22,000</u>	8%
Property, Plant, and Equipment:				
Equipment (net)	\$100,000	\$180,000	\$ 80,000	80%
Furniture (net)	40,000	50,000	10,000	25%
Total Property, Plant, and Equipment	<u>\$140,000</u>	<u>\$230,000</u>	<u>\$ 90,000</u>	64%
Total Assets	<u>\$413,000</u>	<u>\$525,000</u>	<u>\$112,000</u>	27%
Liabilities				
Current Liabilities:				
Accounts Payable	\$ 70,000	\$ 60,000	(\$ 10,000)	(14%)
Notes Payable	30,000	20,000	(10,000)	(33%)
Taxes Payable	20,000	34,000	14,000	70%
Total Current Liabilities	<u>\$120,000</u>	<u>\$114,000</u>	<u>(\$ 6,000)</u>	(5%)
Long-Term Liabilities:				
Notes Payable	\$ 42,000	\$ 78,000	\$ 36,000	86%
Total Liabilities	<u>\$162,000</u>	<u>\$192,000</u>	<u>\$ 30,000</u>	19%
Stockholders' Equity				
Common Stock	\$150,000	\$170,000	\$ 20,000	13%
Retained Earnings	101,000	163,000	62,000	61%
Total Stockholders' Equity	<u>\$251,000</u>	<u>\$333,000</u>	<u>\$ 82,000</u>	33%
Total Liabilities and Stockholders' Equity	<u>\$413,000</u>	<u>\$525,000</u>	<u>\$112,000</u>	27%

3. The slight decline in inventories also seems to indicate good management control procedures. In other words, it appears as if decisions on the purchasing of merchandise are being made with a reasonable understanding of the demand for the company's products. These control procedures are especially important in a business in which merchandise is relatively large

and could be held for considerable periods of time. Note, regarding the inventories, that while the amount of inventory has declined as sales have risen, which is good, the overall amount of inventory as a percent of cost of goods sold (measured because cost of goods sold and inventory are on the same basis) is quite high. This relationship will be considered with the inventory turnover discussion in the next chapter.

4. Although taxes payable increased, both accounts payable and current notes payable decreased. Notes payable showed the greatest decline (\$10,000 or about 33 percent) and is a favorable sign. It indicates that the company is able to generate cash to begin liquidating some of its most currently due loans. Often, these loans are made by banks to finance the purchase of inventories and supplies or to extend the time for payment on an account payable to a merchandise supplier.
5. There is a significant increase in the property, plant, and equipment accounts—equipment and furniture. The increase in these assets suggests the purchase of fixed assets during the period. This increase appears to have been partially financed by long-term debt, which increased 86 percent.
6. The company raised some money by issuing common stock (increased about 13 percent).
7. Retained earnings increased by 61 percent. This net increase is due to the 56 percent increase in net income and to the payment of dividends in the amount of \$24,000 to the common stockholders (beginning retained earnings of \$101,000 plus net income of \$86,000 less dividends of \$24,000 equals the ending retained earnings of \$163,000).

Exhibit 2–6 presents a horizontal analysis of a comparative income statement. By looking at this exhibit, you can see the following:

1. The income statements indicate a rather substantial increase (56 percent) in net sales. There is a corresponding increase in cost of goods sold, but at a lesser rate (45 percent). Therefore, the gross profit has increased by even more than the sales (67 percent).
2. An analysis of the operating expenses indicates large increases in both selling and administrative expenses. The increase in overall operating expenses was about 83 percent. The company should examine these expenses (especially the selling expenses, which increased by over 100 percent) in greater detail to see whether they are too high and whether or not they can be effectively controlled by management. For example, heat and light expenses may be considered as a fixed expense to the company, because these costs must be incurred in order for the business to operate. However, advertising is a cost (included in selling expenses) that to some extent management may control. Greater or lesser amounts of advertising may be advisable depending on circumstances.
3. The increase in interest expense is due to the increase in long-term debt being more than the decrease in current notes payable and due to the fact that long term interest rates are usually higher than short term interest rates.

E**xhibit 2-6
Horizontal Analysis-Income Statement***Horizontal Analysis-Comparative Income Statements
for the Years Ended December 31, 2012 and 2013*

	2012	2013	Increase (Decrease)	Percentage Increase (Decrease)
Net Sales	\$320,000	\$500,000	\$180,000	56%
Less Cost of Goods Sold	<u>158,000</u>	<u>229,000</u>	<u>71,000</u>	45%
Gross Profit	<u>\$162,000</u>	<u>\$271,000</u>	<u>\$109,000</u>	67%
Less Operating Expenses:				
Selling Expenses	40,000	82,000	42,000	105%
Administrative Expenses	<u>35,000</u>	<u>55,000</u>	<u>20,000</u>	57%
Total Operating Expenses	<u>\$ 75,000</u>	<u>\$ 137,000</u>	<u>\$ 62,000</u>	83%
Operating Income	\$ 87,000	\$134,000	\$ 47,000	54%
Add Other Income:				
Rent	1,000	2,000	1,000	100%
Less Other Expenses:				
Interest Expense	<u>4,000</u>	<u>9,000</u>	<u>5,000</u>	125%
Income before Income Taxes	\$ 84,000	\$ 127,000	\$ 43,000	51%
Income Tax Expense	<u>29,000</u>	<u>41,000</u>	<u>12,000</u>	41%
Net Income	<u>\$ 55,000</u>	<u>\$ 86,000</u>	<u>\$ 31,000</u>	56%

4. The 56 percent increase in net income is considered to be a positive sign. Nevertheless, management should analyze individual expense accounts and other factors in order to identify procedures for operating more efficiently. They should also consider other factors such as the market situation of the company, the state of the general economy, competitive advertising, and operating costs. In other words, the company may look very profitable, but it may still not be taking advantage of potential increases in operating efficiency.

The analyst should develop an evaluative aspect to their analysis, converting the analysis from a reporting of facts based on the numbers to an interpretative, in-depth explanation of the changes, and guidance for management based on knowledgeable understanding of the data, its causes, and its consequences. This will dramatically increase the contribution an analyst can make to their firm.

Vertical Analysis

Vertical analysis is used to examine the elements of financial statements of a single period. For the balance sheet, each element is shown as a percentage of total assets; for the income statement, each element is shown as a percentage of net sales. Such statements are often called common-size financial statements. A vertical analysis for the statements shown in Exhibits 2–5 and 2–6 is shown in Exhibit 2–7. By looking at this exhibit, you can see the following:

1. Current assets are a lower percentage of total assets in 2013 than in 2012. This is mainly due to decreases in accounts receivable and inventories.
2. Current liabilities are also a smaller percentage of total assets in 2013 than in 2012. Accounts payable and current notes payable are smaller percentages; taxes payable increased due to higher net income in 2013 than in 2012.
3. Long-term debt is a higher percentage of total assets in 2013 than in 2012. Acquisitions of plant and equipment were partially financed by long-term notes payable.
4. Cost of goods sold as a percentage of net sales has declined from 49 percent in 2012 to 46 percent in 2013. This resulted in an increase in gross profit from 51 percent of net sales in 2012 to 54 percent of net sales in 2013.
5. Selling expenses are 16 percent of net sales in 2013, a higher figure than the 13 percent in 2012. These expenses need to be carefully examined.



Financial statement analysis is a valuable analytical exercise for financial managers. The purpose is to compare the company's financial status from year to year and also to compare the company to other companies within the same industry. Through ratio analysis, problem areas may be identified, and management's attention can be focused on such areas.

The income statement, balance sheet, statement of stockholders' equity, and statement of cash flows are the foundation of financial statement analysis. You now understand the role of each of these statements in corporate financial disclosure. Any analysis of the figures in the statements is only as valid as the information in the statements themselves.

Two types of ratio analysis were discussed in this chapter. Horizontal analysis is used to examine the changes in a given financial statement element over two or more periods. Vertical analysis is used to study the financial statement items of a single period.

E xhibit 2-7 Vertical Analysis

Vertical Analysis-Comparative Balance Sheets December 31, 2012 and 2013

	2012	Percentage	2013	Percentage
Assets				
Current Assets:				
Cash	\$ 60,000	15%	\$ 90,000	17%
Accounts Receivable	50,000	12%	45,000	8%
Inventories	120,000	29%	108,000	21%
Supplies	35,000	8%	42,000	8%
Prepaid Expenses	8,000	2%	10,000	2%
Total Current Assets	<u>\$273,000</u>	<u>66%</u>	<u>\$295,000</u>	<u>56%</u>
Property, Plant, and Equipment:				
Equipment (net)	\$100,000	24%	\$180,000	34%
Furniture (net)	\$ 40,000	10%	\$ 50,000	10%
Total Property, Plant, and Equipment	<u>\$140,000</u>	<u>34%</u>	<u>\$230,000</u>	<u>44%</u>
Total Assets	<u>\$413,000</u>	<u>100%</u>	<u>\$525,000</u>	<u>100%</u>
Liabilities				
Current Liabilities:				
Accounts Payable	\$ 70,000	17%	\$ 60,000	12%
Notes Payable	30,000	7%	20,000	4%
Taxes Payable	20,000	5%	34,000	6%
Total Current Liabilities	<u>\$120,000</u>	<u>29%</u>	<u>\$114,000</u>	<u>22%</u>
Long-Term Liabilities:				
Notes Payable	\$ 42,000	10%	\$ 78,000	15%
Total Liabilities	<u>\$162,000</u>	<u>39%</u>	<u>\$192,000</u>	<u>37%</u>
Stockholders' Equity				
Common Stock	\$150,000	36%	\$170,000	32%
Retained Earnings	101,000	25%	163,000	31%
Total Stockholders' Equity	<u>\$251,000</u>	<u>61%</u>	<u>\$333,000</u>	<u>63%</u>
Total Liabilities and Stockholder's Equity	<u>\$413,000</u>	<u>100%</u>	<u>\$525,000</u>	<u>100%</u>

Vertical Analysis-Comparative Income Statements For the Years Ended December 31, 2012 and 2013

Net Sales	\$320,000	100%	\$500,000	100%
Less Cost of Goods Sold	158,000	49%	229,000	46%
Gross Profit	<u>\$162,000</u>	<u>51%</u>	<u>\$271,000</u>	<u>54%</u>
Less Operating Expenses:				
Selling Expenses	\$ 40,000	13%	\$ 82,000	16%
Administrative Expenses	35,000	11%	55,000	11%
Total Operating Expenses	<u>75,000</u>	<u>24%</u>	<u>\$137,000</u>	<u>27%</u>
Operating Income	<u>\$ 87,000</u>	<u>27%</u>	<u>\$134,000</u>	<u>27%</u>
Add Other Income:				
Rent	\$ 1,000	0%	2,000	0%
Less Other Expenses:				
Interest Expense	\$ 4,000	1%	9,000	2%
Income Before Taxes	<u>\$ 84,000</u>	<u>26%</u>	<u>\$127,000</u>	<u>25%</u>
Income Tax Expense	<u>\$ 29,000</u>	<u>9%</u>	<u>41,000</u>	<u>8%</u>
Net Income	<u>\$ 55,000</u>	<u>17%</u>	<u>\$ 86,000</u>	<u>17%</u>



Review Questions

Use the following financial statements to answer these review questions.

	2013	2012
Assets:		
Current Assets	\$ 25	\$ 20
Plant and Equipment	105	110
Intangible Assets	<u>25</u>	<u>30</u>
Total Assets	<u>\$155</u>	<u>\$160</u>
Liabilities:		
Current Liabilities	\$ 15	\$ 10
Long-Term Liabilities	<u>45</u>	<u>60</u>
Total Liabilities	\$ 60	\$ 70
Stockholders' Equity	<u>95</u>	<u>90</u>
Total Liabilities and Stockholder Equity	<u>\$155</u>	<u>\$160</u>
Net Sales	<u>\$ 85</u>	<u>\$ 80</u>
Cost of Goods Sold	<u>44</u>	<u>40</u>
Gross Profit	\$ 41	\$ 40
Operating Expenses	<u>26</u>	<u>30</u>
Income before Taxes	\$ 15	\$ 10
Provision for Income Tax	<u>4</u>	<u>3</u>
Net Income	<u>\$ 11</u>	<u>\$ 7</u>

1. Gross profit: 1. (c)
 - (a) rose by a greater percentage than sales.
 - (b) rose by a greater percentage than cost of sales.
 - (c) fell as a percentage of sales.
 - (d) fell by more than operating expenses.

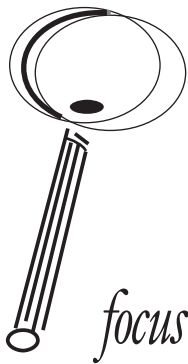
2. Which one of the following is true? 2. (b)
 - (a) Net sales increased more in terms of percentages than cost of goods sold.
 - (b) Income before taxes increased more in terms of percentages than net sales.
 - (c) The provision for income taxes increased more in terms of percentages than income before taxes.
 - (d) Net income increased less in terms of percentages than income before taxes.

-
3. The best estimate for dividends for common stockholders for 2013 is: 3. (b)
- (a) \$2.
 - (b) \$6.
 - (c) \$11.
 - (d) \$0.
4. As a percentage of total assets in 2013 compared to 2012: 4. (a)
- (a) current assets increased.
 - (b) plant and equipment increased.
 - (c) current liabilities decreased.
 - (d) long-term liabilities increased.
5. On a comparative basis: 5. (c)
- (a) net sales increased more than cost of goods sold.
 - (b) income before taxes increased less than gross profit.
 - (c) operating expenses decreased more than gross profit increased.
 - (d) income before taxes increased more than net income.

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3

Ratio Analysis for Financial Statements



Learning Objectives

By the end of this chapter, you should be able to:

- Name the four principal types of ratios and describe how they are used.
- Identify the four applications in which financial ratios are used.
- Explain the interrelationship of profitability, leverage, activity, and liquidity ratios.
- Apply a series of ratios to perform an intracompany, intercompany, and industry comparison analysis.
- Explain the importance of alternative asset management treatment.
- Explain the importance of alternative liability and equity treatment.

Positive Feedback and Some New Ideas

“Steve, I got a call from Gloria the other day telling me how pleased she was with the last monthly report. She really liked the monthly percentage change information you included.”

“Thanks. You were right. It wasn't hard to do those percentages and it changed the tone of our conversation last week.”

“I also heard from several other managers. It's clear that we are on the right track.”

There was a lot of affirmative mumbling, as the staff enjoyed the donuts and pastries that Al had brought in.

“Where can we get competitive data?” asked Franz, who was new to the group. “I'm sure competitive comparisons as well as percentage change measurements would be interesting. They would help us understand more about the competition and the business environment in our industry.”

“There are lots of sources for company data for public companies, but many of you compete with private companies where specific company data may not be available. However, there are a lot of sources of industry statistics available. While industry data may be interesting, I think that it is often better to track our own progress than to focus on what others are doing. I'll email you all a list of industry data sources after the meeting so you can explore what's available, but you should each think about what data will be most useful for your particular operation.”

“You should also think about how best to present performance information so that it will be useful to your managers. Remember, it's easy to provide too much information and that's almost worse than too little.”

This chapter is a continuation of the previous chapter, which introduced financial statement analysis and discussed horizontal and vertical analyses. We now turn our attention to the type of ratio analysis which compares one or more elements within the financial statements with other elements in the financial statements. The people whose job it is to analyze a company's financial position will often focus on certain ratios. However, managers must really be cognizant of all types of ratios.

The following sections will define and compute some ratios that are especially useful in financial analysis. The figures used in the computations of each ratio are taken from the balance sheet and income statement given in Exhibits 3-1 and 3-2. As will be obvious in this chapter, there are many different ratios highlighting different critical financial details. Analysts and managers frequently create their own ratios that measure relationships that they, the analysts, feel are particularly relevant to their specific business.

In conjunction with the discussion of individual ratios, some extended interpretation will introduce the managerial benefit of ratio analysis. By adding the familiar “Who, What, Where, When, Why, How, and How Much?” assessment to the calculation, the analyst can make the ratios lead to the deeper assessment and forward-thinking action planning that makes financial analysis so valuable.

E xhibit 3-1 Comparative Balance Sheet

*Comparative Balance Sheet
December 31, 2013 and 2012*

	<i>2013</i>	<i>2012</i>
<i>Assets</i>		
Current Assets:		
Cash	\$ 90,000	\$ 60,000
Accounts Receivable (net)	45,000	50,000
Inventories	108,000	120,000
Supplies	42,000	35,000
Prepaid Expenses	10,000	8,000
Total Current Assets	<u>\$295,000</u>	<u>\$273,000</u>
Property, Plant, and Equipment:		
Equipment (net)	\$180,000	\$100,000
Furniture (net)	50,000	40,000
Total Property, Plant, and Equipment	<u>\$230,000</u>	<u>\$140,000</u>
Total Assets	<u>\$525,000</u>	<u>\$413,000</u>
<i>Liabilities</i>		
Current Liabilities:		
Accounts Payable	\$ 60,000	\$ 70,000
Notes Payable	20,000	30,000
Taxes Payable	34,000	20,000
Total Current Liabilities	<u>\$114,000</u>	<u>\$120,000</u>
Long-Term Liabilities:		
Notes Payable	78,000	42,000
Total Liabilities	<u>\$192,000</u>	<u>\$162,000</u>
<i>Stockholders' Equity</i>		
Common Stock	\$170,000	\$150,000
Retained Earnings	163,000	101,000
Total Stockholders' Equity	<u>\$333,000</u>	<u>\$251,000</u>
Total Liabilities and Stockholders' Equity	<u>\$525,000</u>	<u>\$413,000</u>

Because financial statements reflect the accounting policies and practices specific to the company, an external analyst in particular should read and understand the published financial statement footnotes. While specific practices may have only modest impact on ratio calculations, the cumulative effect should be taken into consideration, particularly as regards any GAAP vs. non-GAAP differences.

The calculation of ratios often differs according to the interests of the analyst calculating them. Accounting-oriented analysts often measure ratios

E**xhibit 3-2
Comparative Income Statement***Comparative Income Statement
for the Years Ended December 31, 2013 and 2012*

	2013	2012
Net Sales	\$500,000	\$320,000
Less Cost of Goods Sold	<u>229,000</u>	<u>158,000</u>
Gross Profit	<u>\$271,000</u>	<u>\$162,000</u>
Less Operating Expenses:		
Selling Expenses	82,000	40,000
Administrative Expenses	<u>55,000</u>	<u>35,000</u>
Total Operating Expenses	<u>\$ 137,000</u>	<u>\$ 75,000</u>
Operating Income	\$134,000	\$ 87,000
Add Other Income:		
Rent	2,000	1,000
Less Other Expenses:		
Interest Expense	<u>9,000</u>	<u>4,000</u>
Income before Income Taxes	\$ 127,000	\$ 84,000
Income Tax Expense	<u>41,000</u>	<u>29,000</u>
Net Income	<u>\$ 86,000</u>	<u>\$ 55,000</u>

based on applying calculations across the year, while finance-oriented analysts use end-of-year numbers. Both calculation methods have merit and both have flaws. The accounting-oriented analysts frequently use a ratio denominator defined as “average,” determined as “beginning plus ending divided by two.” Because the beginning balances, which are the prior year’s ending balances, and the ending balances, drawn from the more recent end-of-year results, are based on balance sheets that have been dressed up as favorably as possible, the “average” may not bear any relationship to the true average balance during the year. That will be particularly true if there has been any acquisition or disposal or discontinuation activity during the year or if the business has grown significantly from year to year or exhibited any significant seasonality.

That said, the finance-oriented analyst, using year-end numbers, will calculate ratios that are really not a true measure, either. The year-end numbers are dressed up to look as favorable as the company can reasonably make them. The results will obviously not be truly representative of the company’s overall performance. Therefore, the finance-oriented analyst will apply an evaluation that may be characterized as an “If the numbers are as good as possible and the ratio is only fair, what does their real performance look like?” approach. The analyst must always be cognizant of the interpretation of the calculation results. One important consideration regarding the finance-oriented analysis is that, because accounting policies and practices are usually consistent from

year to year, the resulting ratios and analysis will provide valid comparisons and measures of company performance when comparing one year's results to the next.

The discussion that follows will focus primarily on the finance-oriented assessment and will seek to develop a predictive perspective in the analysis. This does not diminish the historic, or past performance, explanation typical of the accounting-oriented analyst. However, the accounting-oriented analysis must be actively extended if the interest is in future expectations. Similarly, the finance-oriented analysis must include a review of prior periods if the reasons for results are to be understood.

RATIO ANALYSIS

Financial ratios are intended to evaluate a company's operating, investing, and financing strategies considered in both historic and prospective contexts. The analysis may be done for a company over a period of time, or for a company in comparison to another firm or industry statistics at a specific point in time. Both will be discussed in this chapter.

Investors in a company's stock are mainly interested in profitability, both in the short-run and the long-run. Short-term creditors are concerned with liquidity, whether the company will be able to pay its accounts payable and short-term loans. Long-term creditors want to know whether the company will be able to meet its obligations for interest payments and principal repayment over the time horizon of the debts.

The ratios that will be discussed in this chapter can be categorized into four types as follows:

1. Profitability ratios
2. Liquidity ratios
3. Activity ratios
4. Debt and equity ratios

In addition, a brief discussion of the DuPont Analysis approach will demonstrate the value of combining ratios to explain results.

Each of the ratios varies according to the specific company and the industry of which it is part. A typical ratio for one company or industry may not be typical for another. Ratios for several companies, each in a different industry, will be presented to illustrate this point.



Think About It . . .

To a financial analyst, certain accounts or relationships stand out as being most informative. Which accounts or relationships do you find most compelling? Define or develop ratios that enhance the understanding of those key indicators.

PROFITABILITY RATIOS

Profitability ratios indicate the success of the company in earning a net return on sales or on investment. These ratios are the ones investors usually look at, because their main concern is a company's ability to earn profits.

Net Profit Margin

The net profit margin, also known as return on sales, equals net income divided by net sales, and measures the amount of net income earned for each dollar of sales. The net profit margin may be calculated as follows:

$$\text{Net profit margin} = \frac{\text{Net Income}}{\text{Net sales}}$$

For the years 2012 and 2013, the net profit margin (Examples are drawn from the amounts shown in Exhibits 3-1 and 3-2.) is:

$$\text{Net profit margin (2012)} = \frac{\$55,000}{\$320,000} = 17\%$$

$$\text{Net profit margin (2013)} = \frac{\$86,000}{\$500,000} = 17\%$$

Analysts often look at the net profit margin as an overall performance or bottom-line ratio. It incorporates the effectiveness of sales in producing profits as well as the impact of the financing method (leverage) on profits. While users often consider it an integrative or all-encompassing ratio, it is often misinterpreted. Some items, such as high tax rates or high interest charges, might offset other items, such as high sales levels. Consequently, the astute financial manager will look at several ratios, including leverage and activity ratios, before making any absolute judgments.

Exhibit 3-3 shows the 2012 net profit margins for nine well-known companies. The margins range from a high of 24.7 percent (Pfizer) to a low of 2.08 percent (Dow Chemical).

Operating Profit Margin

The operating profit margin, which equals operating income divided by net sales, is calculated as follows:

$$\text{Operating profit margin} = \frac{\text{Operating profit}}{\text{Net sales}}$$

For the years 2012 and 2013, the operating profit margin is:

$$\text{Operating profit margin (2012)} = \frac{\$87,000}{\$320,000} = 27\%$$

$$\text{Operating profit margin (2013)} = \frac{\$134,000}{\$500,000} = 27\%$$

E**xhibit 3–3
Profitability Ratios for Nine Companies for 2012**

<i>Company</i>	<i>Net Profit Margin</i>	<i>Net Operating Margin</i>	<i>Return on Assets</i>	<i>Return on Equity</i>	<i>Basic Earnings per Share</i>	<i>Price-Earnings Ratio</i>	<i>Dividend Yield</i>	<i>Dividend Payout</i>
Coca-Cola	18.78%	22.45%	10.47%	27.19%	\$2.00	18.13	2.81%	50.95%
Pfizer	24.70	23.06	7.84	17.84	1.96	12.80	3.51	44.90
Dow Chemical	2.08	5.09	1.70	5.42	0.71	45.54	3.74	170.42
ExxonMobil	9.89	16.31	14.28	27.78	9.70	8.92	2.67	21.85
Microsoft*	23.03	29.52	14.00	25.58	2.02	15.14	2.62	39.60
Procter & Gamble**	12.85	15.88	8.13	16.80	3.82	16.03	3.49	56.02
Kellogg's	6.77	11.00	6.33	38.75	2.29	24.18	4.84	117.13
Lockheed Martin***	7.26	9.40	7.10	7038.46	8.48	10.88	9.06	98.58
Wal-Mart****	3.65	5.96	8.37	22.27	5.04	13.88	2.27	31.55

*Microsoft's fiscal year ended on June 30, 2012.

**Procter & Gamble/s fiscal year ended on June 30, 2012.

***Lockheed Martin reported a very substantial Other Comprehensive Loss, principally for postretirement benefits, as part of shareholders' equity.

****Wal-Mart's fiscal year ended on January 31, 2013.

The operating profit margin indicates the profitability of sales before taxes and other income and expense (such as interest charges). The purpose of this ratio is to measure the effectiveness of production and sales in generating pre-tax profits. Operating profit margin may actually be the most telling performance measure because it measures operating results without regard for the sources of financing, taxes and tax rates, or unusual activities not tied to the operations of the business.

A declining trend in the operating profit margin may indicate a company's declining ability to compete, while a steady or increasing trend may indicate a company's strengthening competitive position. Yet one should take care not to infer too much from this ratio. A company with a low operating profit margin but a high net sales to total assets turnover may be as much as or even more profitable than another company with a higher operating profit margin. The characteristics of specific industries are often summarized in the measurement of their margins. Different marketing strategies might account for differences in operating profit margins.

Exhibit 3–3 also shows the 2012 net operating margins for the same nine companies; margins range from a high of 29.52 percent (Microsoft) to a low of 5.09 percent (Dow Chemical).

Return on Assets (ROA)

The return on assets ratio measures the management's ability to earn a return on the use of the firm's assets. The basic ROA ratio is:

$$\text{Net profit margin} = \frac{\text{Net Income}}{\text{Total assets}}$$

Using the data from Exhibits 3-1 and 3-2, the return on assets for 2012 and 2013 is computed as follows:

$$\text{Return on assets (2012)} = \frac{\$55,000}{\$413,000} = 13.3\%$$

$$\text{Return on assets (2013)} = \frac{\$86,000}{\$525,000} = 16.4\%$$

Accounting-oriented analysts often use a calculation that attempts to measure the results across a period, measuring a result divided by average balances. Such a calculation assumes a flat activity level across the period; it assumes that the beginning balance plus the ending balance, divided by two, provides a meaningful measure. However, because financial statements are usually presented at the end of the fiscal year, when management will seek to present the best picture possible, such a measure really is not very meaningful. It may be even more misleading if there has been a significant change during the year. When an analyst uses ending balances and calculates ratios, they must recognize that the results are based on the best impression the company can make. Therefore, if the results are good, perception needs to be tempered, and if the results are not particularly good, the analyst knows that the rest of the year, and the norm for the company, will be even less favorable.

The analyst must remember the audience for the analysis and the kind of information they are seeking. As noted earlier, the real key to financial analysis is consistency, both consistency of calculation and consistency of interpretation. Always remember that the results of the analysis create a cumulative perception to offer guidance for decision-making.

Whether the analysis is prepared from a finance perspective, with an eye toward predicting the future, or from an accounting perspective, focusing on historical results and the reasons for them, the overall results usually are not dramatically different and year-to-year comparisons generally offer similar pictures. It is, however, important to note that the accounting definition of "return" is frequently different when calculated as Return on Sales or as Return on Assets. There are numerous internet websites that offer financial ratio definitions. Some of them use definitions of Return on Sales that use Earnings before Taxes or Earnings before Interest and Taxes (Operating Profit) in the numerator. It is more logical to use the same definition of Return for all Profitability ratios that include "Return" in their description. In many cases the audience for financial analysis is not financial managers. Therefore, having different definitions for the same term may cause confusion and drive the discussion off track.

Getting back to the example: While the company's rate of return on total assets has improved, it must be compared with the minimum desired rate of return for the company and with the rates of return of other companies, particularly those in the same industry.

The 2012 returns on assets for the nine companies shown in Exhibit 3–3 range from a high of 14.28 percent (ExxonMobil) to a low of 1.70 percent (Dow Chemical).

Extending the analytical approach and expanding our understanding of this important ratio, we need to recognize that it is actually comprised of two ratios—the profit margin on sales and the total asset turnover (discussed later in this chapter). This approach, part of the DuPont model, is illustrated below

$$\begin{aligned} \text{Return on assets} &= \frac{\text{Net income}}{\text{Net sales}} \times \frac{\text{Net sales}}{\text{Total assets}} \\ \text{Return on assets (2012)} &= \frac{\$55,000}{\$320,000} \times \frac{\$320,000}{\$413,000} \\ &= 17.2\% \times 77.5\% \\ &= 13.3\% \\ \text{Return on assets (2013)} &= \frac{\$86,000}{\$500,000} \times \frac{\$500,000}{\$525,000} \\ &= 17.2\% \times 95.24\% \\ &= 16.4\% \end{aligned}$$

Both profitability (net profit margin on sales) and utilization of assets (total asset turnover) determine the rate of return on a given amount of total assets. This breakdown of the return on assets is useful, because it allows managers to determine easily the underlying basis for the particular return on assets result. For example, if the ratio is lower than expected, the manager can determine whether the low return is due to the profit margin on sales being too low, to sales being out of line in relation to total assets, or to a combination of the two. Conversely, the return on assets may be acceptable, but only because a very low profit margin was compensated for by a high asset turnover. This introduction to the DuPont analysis suggests how powerful it is. By combining ratios, it permits insights that are not as clear when looking at the individual ratios separately. This will be expanded on in the further discussion of the DuPont analysis later in this chapter.

Return on Equity (ROE)

The return on equity, which is an indication of the profitability of the capital supplied by the stockholders, is computed as follows:

$$\text{Return on equity} = \frac{\text{Net Income}}{\text{Stockholders' equity}}$$

Referring again to Exhibit 3–1 and Exhibit 3–2, the return on equity for 2012 and 2013 is computed as follows:

$$\begin{aligned} \text{Return on equity (2012)} &= \frac{\$55,000}{\$251,000} = 21.9\% \\ \text{Return on equity (2013)} &= \frac{\$86,000}{\$333,000} = 25.8\% \end{aligned}$$

The rate of return on equity is greater than the rate of return on total assets whenever the return to the owners of the business is greater than the cost of borrowed funds. If management is able to earn a higher return on assets than the cost of assets that are contributed by the creditors (interest expense, for example), this excess benefits the owners. This situation is referred to as *using debt as favorable leverage* in order to increase the owners' rate of return (leverage is discussed in more detail later in this chapter). In this illustration, favorable leverage has been achieved, because the return on equity is greater than the return on assets. The cost of borrowed money is less than the return earned on the company's assets.

The 2012 return on equity for the nine companies shown in Exhibit 3–3 ranges from a high of 7038.46 percent (Lockheed Martin), caused by an exceptional reduction in the value of equity, to a low of 5.42 percent (Dow Chemical). The Lockheed Martin situation is interesting because it highlights the impact that past decisions can have on future performance. A similar consequence contributed to the bankruptcy of General Motors in 2009. More generally, in Exhibit 3–3, the ROE ranged from 16.8% (Procter & Gamble) to 38.75% (Kellogg's). Clearly, analyzing ROE to focus attention on its cause is important and the DuPont Analysis enables us to do that. Generally, ROE will exceed ROA because the assets are only partially funded by equity. The return on equity exceeds the return on assets for each company in Exhibit 3–3.

If a company has both common stock and preferred stock outstanding, we may compute the rate of return on common stockholders' equity. This rate of return is a ratio that indicates a company's ability to earn profits based on the common stockholders' investments in the company. The ratio is computed by dividing the net income less any declared preferred stock dividends by the common stockholders' equity. The common stockholders' equity may be computed by subtracting the par value of the preferred stock from total stockholders' equity.

Analyzing Return on Equity (ROE) Using the DuPont Analysis

Earlier we saw that, by separating Return on Assets into Return on Sales multiplied by the Asset Turnover Ratio, we could see what caused the Return on Assets result. The DuPont Method goes further, recognizing that Return on Equity can be separated into Return on Sales times Asset Turnover times the Equity Multiplier (defined as Total Assets divided by Stockholders' Equity). This delves deeper into the cause of the ROE result.

$$\text{ROE} = \text{Net Profit/Net Sales} \times \text{Net Sales/Total Assets} \times \text{Total Assets/Stockholders Equity}$$

Recognizing that Return on Sales is a profitability measure and tells us about the quality of sales and the ability of the company to manage costs, that Asset Turnover is an activity measure and tells us about the company's ability to utilize its assets to generate revenues, and that the Equity Multiplier is a debt measurement (because Total Assets equals Total Liabilities plus Stockholders' Equity), which tells us about the company's use of and management's tolerance for debt, the DuPont Analysis gives us exceptional insight into the reasons for a company's performance results. There are descriptions of the

DuPont Analysis in nearly all basic finance textbooks, with a wide variety of exhibits showing how to analyze the entire financial structure of a company in terms of these separate components. Perhaps the most important consequence of the DuPont Analysis is that it suggests to an analyst that he or she has the ability, and the license, to develop specific ratios that enable him or her to see indicators relevant to a specific analysis being performed or particularly relevant to the company being analyzed.

Earnings per Share (EPS)

Earnings per share probably is the most widely used of all accounting statistics. Basic earnings per share is the net income available to the common stockholders divided by the weighted average number of common stock shares outstanding during the period. If both common and preferred stock are outstanding, preferred dividends declared should be deducted from net income before dividing by the weighted average number of common shares outstanding.

$$\text{Basic earnings per share} = \frac{\text{Net income} - \text{Preferred stock dividend}}{\text{Weighted average number of common stock shares outstanding}}$$

The weighted average number of common stock shares outstanding is computed by multiplying the number of common shares outstanding by the fraction of the year that those same number of shares were outstanding and adding the results. For example, assume that a company had 15,000 common shares outstanding at the beginning of the year and then issued 2,000 shares three months later. The weighted average number of shares is computed as follows:

$$\begin{aligned} 15,000 \times 3/12 &= 3,750 \\ 17,000 \times 9/12 &= \frac{12,750}{16,500} \end{aligned}$$

If 15,000 shares were outstanding for all of 2012 and the weighted average number of shares for 2013 is 16,500, then basic earnings per share for 2012 and 2013 is computed as follows:

$$\begin{aligned} \text{Basic earnings per share (2012)} &= \frac{\$55,000}{15,000} \\ &= \$3.67 \end{aligned}$$

$$\begin{aligned} \text{Basic earnings per share (2013)} &= \frac{\$86,000}{16,500} \\ &= \$5.21 \end{aligned}$$

In addition to basic earnings per share, companies that have convertible securities or stock options or warrants outstanding are required to compute diluted earnings per share. This ratio measures what earnings per share would be if all dilutive securities were converted and all dilutive options and warrants

were exercised. *Dilutive* means that the assumed conversion of the securities or exercise of the options and warrants would increase the number of shares outstanding and reduce the earnings per share amount.

While the basic earnings per share amount is based on the weighted average number of common shares actually outstanding, diluted earnings per share measures the weighted average number of common shares that could have been outstanding if the holders of all dilutive securities that were committed to be issued had acted. Since the securities were not actually issued and the options and warrants were not actually exercised, diluted earnings per share is somewhat hypothetical in nature. It does, however, give the analyst an idea of how many shares may be issued for existing commitments and the impact of such commitments.

Earnings per share is frequently mentioned in the financial press in relation to earnings performance. Also, earnings per share is reported on the income statement, and usually in various other sections of corporate annual reports. Earnings per share should be viewed with some caution; all of the significant aspects of a firm's performance cannot be reduced to a single figure.

The 2012 basic earnings per share amounts for the nine companies shown in Exhibit 3–3 range from a high of \$9.70 (ExxonMobil) to a low of \$0.71 (Dow Chemical).

Price-Earnings Ratio (P/E)

The price-earnings ratio is of primary concern to financial investors. The price-earnings ratio may be interpreted as the value that investors in the stock market place on every dollar of earnings for a particular firm. An investor may compare the price-earnings ratio of a firm with that of other companies in an attempt to estimate whether a firm's stock is overpriced or underpriced. The price-earnings ratio is computed by dividing the market price per share for the company's common stock by the earnings per share. If the market price per share of common stock was \$12 at the end of 2012 and \$18 at the end of 2013, the price-earnings ratio for 2012 and 2013 is computed as follows:

$$\begin{aligned}\text{Price-earnings ratio (2012)} &= \frac{\$12}{\$3.67} \\ &= 3.3\end{aligned}$$

$$\begin{aligned}\text{Price-earnings ratio (2013)} &= \frac{\$18}{\$5.21} \\ &= 3.5\end{aligned}$$

The 2012 price-earnings ratios for the nine companies shown in Exhibit 3–3 range from a high of 45.54 (Dow Chemical) to a low of 8.92 (ExxonMobil). One could conclude that the market has high expectations for Dow Chemical in the future; investors are paying a premium for the company's earnings per share.

Dividend Yield and Payout

The dividend yield is a measure of the return to common stockholders through dividends. This measure gives a basis to compare investment alternatives. The dividend yield is computed by dividing the dividends per share on common stock by the market price per share of common stock. If dividends per share were \$1 per share (\$15,000 dividend divided by 15,000 shares) in 2012 and \$1.40 per share in 2013, the dividend yield for 2012 and 2013 is computed as follows:

$$\begin{aligned}\text{Dividend yield (2012)} &= \frac{\$1}{\$12} \\ &= 8.3\%\end{aligned}$$

$$\begin{aligned}\text{Dividend yield (2013)} &= \frac{\$1.40}{\$18} \\ &= 7.8\%\end{aligned}$$

These dividend yields may be compared with those for other investments. The 2012 dividend yields for the nine companies shown in Exhibit 3–3 range from a high of 9.06 percent (Lockheed Martin) to a low of 2.27 percent (Wal-Mart). Some companies, even very profitable and well-established ones, do not pay dividends at all.

The dividend payout ratio gives an indication of a company's dividend policy. The ratio is computed as follows:

$$\text{Dividend payout ratio} = \frac{\text{Cash dividends to common stockholders}}{\text{Net income}}$$

The dividend payout ratio for 2012 and 2013 is computed as follows:

$$\begin{aligned}\text{Dividend payout ratio (2012)} &= \frac{\$15,000}{\$55,000} \\ &= 27.3\%\end{aligned}$$

$$\begin{aligned}\text{Dividend payout ratio (2013)} &= \frac{\$24,000}{\$86,000} \\ &= 27.9\%\end{aligned}$$

The 2012 dividend payout ratios for the nine companies shown in Exhibit 3–3 range from a high of 170.42 percent (Dow Chemical) to a low of 21.85 percent (ExxonMobil). Obviously, companies that pay out more in dividends than they earned per share are expecting better performance in the future and want to convey that expectation to their shareholders and the stock market as a whole.

Economic Value Added (EVA)

Economic value added is the difference between after-tax operating earnings and the after-tax cost of capital required to produce those earnings. The cost of capital includes both debt and equity capital. EVA is used for an entity as a whole, for divisions within an entity, and for individual projects.

If managers focus on EVA and their compensation is tied to the EVA level, they will be operating to maximize shareholder value. Invested capital will be employed efficiently. To illustrate EVA on a project level, assume that a company is considering an investment in which revenues are estimated to be \$500 million, operating costs (including taxes) are estimated to be \$120 million, and the after-tax cost of capital (the minimum dollar amount that must be earned to cover debt and equity capital) is \$300 million. EVA is computed as follows:

Revenues		\$500
Operating costs	\$120	
Cost of capital	<u>300</u>	<u>- 420</u>
Economic value added		\$80

Since the EVA for this project is positive, the project is acceptable. Using EVA may be beneficial for entities that derive much of their value from existing assets, but may not be useful for high-growth companies. Increasing the current return on assets increases the value of the company as long as expected future returns on assets are not sacrificed.

LIQUIDITY RATIOS

In basic terms, a liquidity ratio is used to measure a company's ability to pay its bills on time. In this sense, a liquidity ratio measures the company's capacity to meet short-term obligations out of its liquid assets. The two most widely used ratios are the current ratio and the quick ratio.

Current Ratio

The current ratio provides the simplest way to determine if a company is able to meet its short-term obligations. The current ratio is calculated as follows:

$$\text{Current ratio} = \frac{\text{Current assets}}{\text{Current liabilities}}$$

The current ratio for 2012 and 2013 is computed as follows:

$$\begin{aligned} \text{Current ratio (2012)} &= \frac{\$273,000}{\$120,000} \\ &= 2.3 \end{aligned}$$

$$\begin{aligned} \text{Current ratio (2013)} &= \frac{\$295,000}{\$114,000} \\ &= 2.6 \end{aligned}$$

A good current ratio for a company depends on the nature of the business. If the current ratio is too low, the company may have problems in meeting its short-term obligations. If the current ratio is too high, the company may have an excessive investment in current assets and should perhaps invest some of the funds in different areas. However, when a company is large and well-established, cash flows—as well as access to cash through the loans—may make it less important to evaluate the ability to pay bills than to evaluate the current ratio ratios to get a sense of management’s operating philosophies.

It is important to notice that both current assets and current liabilities are aggregate terms and do not assess the quality of the current assets available to pay the current liabilities. Referring to Exhibit 3–1, less than 50 percent of current assets are cash and accounts receivable. Thus, a low or high current ratio could mean different things, depending on the levels and quality of each of the specific assets or liabilities used to make up the aggregate. So, in the case we are examining, the high current ratios of 2.3 and 2.6 do not clearly indicate the firm’s ability to meet short-term obligations, because inventories, supplies, and prepaid expenses are not liquid. This ability is better reflected in the quick ratio.

The 2012 current ratios for the nine companies in Exhibit 3–4 range from a high of 2.63 (Microsoft) to a low of 0.75 (Kellogg’s).

Quick Ratio

The quick (or acid-test) ratio measures the company’s ability to meet its short-term obligations using those current assets deemed most liquid. The term “liquid” refers to assets that may be quickly converted into cash.

The quick ratio is computed by dividing the sum of cash, marketable securities, accounts receivable, and short-term notes receivable by the total of the current liabilities. The difference between this and the current ratio is that in this case inventories, supplies, and prepaid expenses are not included in the numerator of the ratio. A good quick ratio, like a good current ratio, depends on the nature of the business.

$$\text{Quick ratio (2012)} = \frac{\text{Cash} + \text{Marketable securities} + \text{Receivables}}{\text{Current liabilities}}$$

It is interesting to note in Exhibit 3–4 how many of these large companies have low overall liquidity and even negative Net Liquid Balances, as described in the next few pages. This suggests that these very large companies are not concerned about having cash on hand to pay their obligations. They are fully confident that, should they need cash, they can get it easily. As an analyst, it is critical to see and make these conclusions and include them in the analysis.

The quick ratio for 2012 and 2013 is computed as follows:

$$\begin{aligned} \text{Quick ratio (2012)} &= \frac{\$60,000 + \$50,000}{\$120,000} \\ &= 0.92 \end{aligned}$$

$$\begin{aligned} \text{Quick ratio (2013)} &= \frac{\$90,000 + \$45,000}{\$114,000} \\ &= 1.18 \end{aligned}$$

E**Exhibit 3–4****Liquidity and Activity Ratios for Nine Companies for 2012**

<i>Company</i>	<i>Current Ratio</i>	<i>Quick Ratio</i>	<i>Average Collection Period</i>	<i>Inventory Turnover</i>	<i>Net Liquid Balance</i>	<i>Free Cash Flow</i>
Coca-Cola	1.09	0.77	36.18	5.84	-0.52	3.83
Pfizer	2.15	1.58	76.59	1.60	1.47	12.95
Dow Chemical	2.06	1.22	32.61	5.64	-0.62	1.56
ExxonMobil	1.01	0.70	26.48	20.81	-0.85	1.64
Microsoft*	2.63	1.93	78.13	15.51	0.93	13.71
Procter & Gamble**	0.88	0.42	26.47	6.31	-0.82	3.35
Kellogg's	0.75	0.38	37.38	6.42	-0.94	1.66
Lockheed Martin***	1.14	0.70	63.34	11.56	-0.84	1.66
Wal-Mart****	0.83	0.20	5.30	8.05	-0.89	1.98

*Microsoft's fiscal year ended on June 30, 2012.

**Procter & Gamble's fiscal year ended on June 30, 2012.

***Lockheed Martin reported a very substantial Other Comprehensive Loss, principally for postretirement benefits, as part of shareholders' equity.

****Wal-Mart's fiscal year ended on January 31, 2013.

Use of the quick ratio became widespread after many companies with good current ratios went bankrupt and their inventories were worth much less than had been reported on their balance sheets. Many lenders now use the quick ratio, but it has not proved to be the hoped-for “acid test,” and other financial indicators must be considered along with this ratio.

The 2012 quick ratios for the nine companies in Exhibit 3–4 range from a high of 1.93 (Microsoft) to a low of 0.20 (Wal-Mart). Wal-Mart offers a valuable example, which will be repeated in the next section when we consider the Average Collection Period. Because Wal-Mart sells for cash or a general credit card (VISA, MasterCard, and similar) that remits to Wal-Mart within a day or two, the very low Quick Ratio is not an indication of significant risk. Wal-Mart has significant cash flow every day, assuring their ability to pay their obligations without concern for liquidity and without requiring holding substantial amounts of cash. This is discussed later, in the section on Cash Conversion Cycle.

Managers should be familiar with activity ratios, because they reflect the intensity with which the company uses its assets to generate sales. Neither the current nor the quick ratio considers this movement in current assets. Therefore, short-term creditors should use additional tests in considering the liquidity of two significant working capital items: receivables and inventories.



Think About It . . .

Many analysts believe that a current ratio greater than 1 indicates a company's sound management of its ability to meet its maturing obligations. However, if current assets exceed current liabilities, some of those current assets have been financed with relatively higher cost funding, reducing the return to the shareholders. How should a company determine its preferred current ratio?

Net Liquid Balance

The net liquid balance is an alternative measure to the cash conversion cycle (described later in this chapter) and may also be used as a measure of a firm's liquidity. It is composed of all liquid financial assets (including cash and marketable securities) minus all liquid obligations (including short-term notes payable and the current portion of long-term debt). If the measure is negative, it indicates both a dependence on outside financing and the likelihood that the firm will be given the minimum borrowing line required. However the prior discussion of managing the cash conversion cycle also applies. Net liquid balance may be used to forecast financing requirements. For instance, the difference in the financing requirements between periods is determined by comparing the spontaneous changes in the operating sources and requirements.

Negative net liquid balance indicates a firm's dependence on short-term debt and may help to identify an important trend. A firm can experience liquidity problems even when profits are rising. In fact, strong growth in sales and working capital requirements can be a major cause of liquidity problems. Such a change in liquidity may be a temporary phenomenon, depending on whether the firm is able to repay its financial obligations through earnings. A firm may also report a drop in liquidity when it experiences large losses. A persistent trend of losses may represent a deteriorating net liquid balance, which can indicate the risk of decreasing liquidity and bankruptcy.

A negative net liquid balance alone does not provide enough evidence to indicate whether a firm is expanding or contracting. The negative net liquid balance does serve as a warning signal, however; it indicates that certain factors are causing a firm to rely on temporary external sources of funds. A reliance on short-term funds may imply that management is taking an aggressive approach to the financing needs of the firm. Management often likes to use temporary sources of financing, because short-term debt is usually cheaper than long-term debt. However, severe liquidity problems may ensue if the debt cannot be refinanced and if the firm is unable to fund its needs internally.

The negative net liquid balance reveals the importance of financing permanent levels of operating requirements (permanent current assets) with permanent sources of funds. Permanent current assets, the level of current assets a company has even at the lowest point in its operating cycle, represents an interesting management opportunity. Because these assets will always be held, they may logically be funded with long-term funds, improving liquidity measures without actually having excessive overall current assets. Therefore, a conservative

firm would finance a permanent increase in working capital requirements with long-term debt or equity. This concept is consistent with the matching principle—long-term needs are financed with long-term sources and short-term needs with short-term sources.

The net liquid balance for 2012 and 2013 is computed as follows:

$$\begin{aligned}\text{Net liquid balance (2012)} &= \$60,000 - \$120,000 \\ &= (\$60,000)\end{aligned}$$

$$\begin{aligned}\text{Net liquid balance (2013)} &= \$90,000 - \$114,000 \\ &= (\$24,000)\end{aligned}$$

The 2012 net liquid balances for the nine companies shown in Exhibit 3–4 are presented as ratios [(cash + marketable securities-current liabilities) ÷ current liabilities] so that the amounts are not influenced by the size of the company. The ratios range from a high of 1.47 (Pfizer) to a low of –0.94 (Kellogg's). Compare the quick ratios to the net liquid balance ratios. In many cases, the negative net liquid balances ratios are dramatic and attract more attention than the low quick ratios.

ACTIVITY RATIOS

Activity ratios—also known as asset utilization ratios, asset management ratios, or just utilization ratios—measure the effectiveness of a company's asset management. A company's assets should be deployed to generate profits and benefits for the shareholders, whose money has been used to acquire the assets. When a company is not successful at managing its assets, costs tend to overwhelm profits and performance suffers. On the other hand, when assets are managed well, the company requires less capital, costs are generally better controlled, and the results are not only favorable, but tend to improve over time. The activity ratios provide insight into management's effectiveness, and also into the quality of the assets and the reliability of the values assigned to them.

Average Collection Period (ACP)

The average collection period (also known as Days Sales Outstanding (DSO)) measures the time it takes to collect cash from customers once the sales have been made. Many analysts calculate the average collection period by first finding the average credit sales per day and then dividing the average accounts receivable by the average credit sales per day.

$$\text{Average credit sales per day} = \frac{\text{Annual credit sales}}{365 \text{ days}}$$

$$\text{Average collection period} = \frac{\text{Average accounts receivable}}{\text{Average credit sales per day}}$$

However, determining average credit sales per day may be very difficult. As a result, analysts frequently assume all sales are made on credit. This is reasonable for business-to-business (B2B) companies, but not for business-to-consumer (B2C) companies. With B2C companies ACP really describes how long it takes to turn a sale into cash. Using average accounts receivable suffers from the same “beginning plus ending divided by two” problem discussed earlier, so finance-oriented analysts usually use ending accounts receivable, recognizing that they are not a real measurement, but that they are consistently determined from year to year.

It is appropriate here to consider an alternative to the 365-day year as used in the above formula. Many analysts use 360 days rather than 365. Doing so results in a more flexible result for discussing the ACP calculation because using 360 facilitates a discussion of months and quarters. A further benefit is that using 360 means that the results are approximate, overcoming the illusion of precision and focusing on meaning and interpretation rather than on the numbers themselves.

That said, we will still use the 365 days in a year. Assuming that all of the company’s sales are on credit and simplifying the equation by using year-end accounts receivable balances, the average collection period for 2012 and 2013 is computed as follows:

$$\begin{aligned}\text{Average credit sales per day (2012)} &= \frac{\$320,000}{365 \text{ days}} \\ &= 876.71\end{aligned}$$

$$\begin{aligned}\text{Average collection period (2012)} &= \frac{\$90,000 + \$45,000}{\$876.71 \text{ per day}} \\ &= 57.0 \text{ days}\end{aligned}$$

$$\begin{aligned}\text{Average credit sales per day (2013)} &= \frac{\$500,000}{365 \text{ days}} \\ &= \$1,369.86 \text{ per day}\end{aligned}$$

$$\begin{aligned}\text{Average collection period (2013)} &= \frac{\$45,000}{\$1,369.86 \text{ per day}} \\ &= 32.9 \text{ days}\end{aligned}$$

The decrease in the average collection period indicates a dramatic improvement in the company’s credit and collection policies. Such a substantial change from one year to the next would require further analysis and explanation of the actions of management or the changes in the business. It is likely that something significant has changed because such a dramatic reduction in the average collection period would be very difficult to achieve unless something unusual occurs.

An alternative way to compute the average collection period is to divide the accounts receivable turnover into 365 days. The accounts receivable turnover is annual sales divided by accounts receivables.

The 2012 average collection periods for the nine companies presented in Exhibit 3–4 range from a high of 78.13 (Microsoft) to a low of 5.3 (Wal-Mart). The Wal-Mart ACP is easily explained by the nature of Wal-Mart sales, as discussed in the section on the quick ratio. Firms that have attractive discount policies will generally have few days in receivables, because customers pay early and take discounts. However, this policy may not always be beneficial. Financial managers need to compare the financing cost of carrying longer receivables to the lost revenue resulting from discounts associated with early payments. In other words, financial managers are interested in expediting collections on uncollected funds and reducing bad debt expenses, but they have to be careful not to offer trade discounts that exceed the cost of slower cash receipts.

When calculating the ratios of financial analysis, any ratios that suggest an issue need to be examined further. For example, if the average collection period is high, perhaps too high, implying a receivables problem, the magnitude of a problem could be extreme. If the average collection period is too high to be reasonable, it suggests that some of the receivables are uncollectible. Uncollectible receivables are bad debts, but, since they are not reserved for, they will result in bad debt expense, reducing or eliminating profits in the future, at the time they are recognized. Because receivables are, effectively, overstated, assets are overstated. Therefore, equity is overstated. Uncollectible accounts receivable also suggest credit management issues, which may also reflect general management issues. If accounts receivable are overstated, the current and quick ratios can also be called into question. Clearly, the average collection period is an important ratio offering many valuable analytical opportunities.

QUICK QUIZ 3–1

Answers to QUICK QUIZ questions can be found starting on page 191.

ABC Company has \$5,000,000 in sales and an average collection period of 50 days. If the interest rate is 10 percent, and the industry average collection period is 36 days, how much do ABC's excess receivables cost on an annual basis?

Inventory Turnover

The inventory turnover ratio represents the relationship between the cost of merchandise inventory sold and the ending inventory for the period. The inventory turnover ratio measures how efficiently the overall inventory is sold. The inventory turnover ratio is calculated as follows:

$$\text{Inventory turnover} = \frac{\text{Cost of goods sold}}{\text{Inventory}}$$

The accounting-oriented analyst uses average inventory in the denominator. However, doing so may result in a greater distortion than using ending inventory balances. Average inventory averages the lowest inventory balances for two years and uses it to measure performance. In the following example we will use ending inventory. The inventory turnover for 2012 and 2013 is computed as follows:

$$\begin{aligned}\text{Inventory turnover (2012)} &= \frac{\$158,000}{\$120,000} \\ &= 1.3\end{aligned}$$

$$\begin{aligned}\text{Inventory turnover (2013)} &= \frac{\$229,000}{\$108,000} \\ &= 2.1\end{aligned}$$

A low inventory turnover implies a large investment in inventories relative to the amount needed to service sales. Using the example calculations, an inventory turnover of 1.3 turns means that the company is holding enough inventory to support 281 days of sales and an inventory turnover of 2.1 means it is holding enough stock to support 174 days of sales. The improvement from 281 to 174 is good, dramatic, and significant, but 174 days of sales in inventory is still probably much too long. Some of the investment in inventories could be put into more productive areas. A high inventory turnover may indicate that inventories are too small, and the company is not sufficiently meeting customer demand. It might also imply that the firm is selling the goods at too low a price, or it may indicate that the company is extremely efficient. To find corroborating evidence for a hypothesis, the analyst looks at other ratios to validate their perceptions. These other ratios, focused on profitability or activity should be examined and compared with historical performance and with competitors' averages.

Inventory turnover can also be a telltale ratio. Similar in power to the average collection period, an unsatisfactorily low inventory turnover suggests excess inventory, leading to the question, "How do you get rid of excess inventory?" The choices are all unattractive. You could offer a discounted price, reducing future profits, perhaps significantly. A second choice is to stop purchasing or even trying to return inventory to suppliers, potentially antagonizing your suppliers. A third option is to stop producing, perhaps laying off employees with all the related negative consequences that such a decision brings. Clearly, the choices are all unattractive, highlighting the importance of managing inventory well and controlling inventory turnover. As we will see a bit later, excess inventory brings significant unnecessary expense as well.

The 2012 inventory turnover ratios for the nine companies shown in Exhibit 3–4 range from a high of 20.81 (ExxonMobil) to a low of 1.6 (Pfizer).

QUICK QUIZ 3-2

Answers to QUICK QUIZ questions can be found starting on page 191.

If a company's current ratio is unchanged from one period to the next, but the quick ratio has increased, what has happened to the inventory?

Total Asset Turnover

The introduction to the DuPont analysis included an example of the Total Asset Turnover ratio. This ratio provides a measure of how well the company manages its assets to generate sales. The higher this ratio's value, the more efficiently the company utilizes its assets. Edward I. Altman (Altman, 1968) demonstrated in his Altman Z Score that if the Total Asset Turnover ratio is relatively high (usually about 3) a company with significant productive assets is unlikely to decline into bankruptcy.

$$\text{Altman Z Score} = Z = 1.2X_1 + 1.4X_2 + 3.3X_3 + 0.6X_4 + .999X_5$$

Where:

X_1 = working capital/total assets

X_2 = retained earnings/total assets

X_3 = earnings before interest and taxes/total assets

X_4 = total equity/total assets

X_5 = sales/total assets

The Altman Z score, although it has been in use for more than 45 years, is still an important contribution to financial assessment. Additional discussion of Altman's analysis appears later in this chapter.

Operating Cycle Working Capital Requirements

The operating cycle consists of three basic functions: production, sales, and collections. The length of the cycle depends on the respective efficiencies of conversion of raw materials, work-in-process, and finished goods into sales and of accounts receivable into cash. Purchasing, production, and distribution practices that lower the inventory turnover ratio increase the operating cycle. Similarly, credit policy changes that increase the collection period of receivables increase the operating cycle. The operating cycle is generally financed by spontaneous sources (accounts that increase with sales and expenses), such as trade credit and accrued wages and other accruals. A gap exists to the extent that cash inflows are unsynchronized with cash outflows. It is this gap that necessitates external funding of operations. Manufacturing firms generally pay trade creditors prior to being paid; consequently, growing inventory and receivable balances indicate a potential cash shortage, not corporate liquidity. Indeed, because current assets may include excessive accounts receivable or inventories that may not be convertible to cash, higher current and quick ratios may not necessarily indicate secure corporate liquidity.

Working capital requirements can be defined as the difference between current operational requirements, such as inventories and accounts receivable, and current operational resources, such as accounts payable and accruals. Operational requirements and operational resources are spontaneous items associated exclusively with the operating cycle: procurement, production, sales.

The operating cycle recognizes the total elapsed time from the ordering of raw materials through the receipt and availability of customer payments. As this time period increases, there are more opportunities for delays in processing or cash receipts to drain financial resources. However, at least partially offsetting the limitations in available cash are the payment policies of the company. Together, these measures create the Cash Conversion Cycle, the amount of time from the outflow of cash until it is recovered. The Cash Conversion Cycle is calculated as

$$\begin{aligned}
 &+ \text{Days Sales Outstanding} \\
 &+ \text{Days Purchases in Inventory} \\
 &- \text{Days Purchases in Payables} \\
 \hline
 &= \text{Cash Conversion Cycle}
 \end{aligned}$$

The higher the cash conversion cycle, the more financing the company needs. The lower the cycle, the lower the financing need. Today, many companies have a negative cash conversion cycle, receiving customer cash before they have to pay out their funds, using their vendors to finance their operations.

E xhibit 3–5 Cash Conversion Cycles for Nine Companies in 2012

Company	Average Collection Period	Inventory Turnover	Days Purchases in Inventory	Days Purchases in Payables	Cash Conversion Cycle
Coca-Cola	36.18	5.84	62.50	166.3	-67.62
Pfizer	76.59	1.60	228.10	137.3	167.39
Dow Chemical	32.61	5.64	64.70	38.3	59.01
ExxonMobil	26.48	20.81	17.50	69.8	-25.82
Microsoft*	78.13	15.51	23.50	86.9	14.73
Procter & Gamble**	26.47	6.31	57.80	38.2	46.07
Kellogg's	37.38	6.42	56.90	58.4	35.88
Lockheed Martin***	63.34	11.56	31.60	22.2	72.74
Wal-Mart****	5.30	8.05	45.30	39.4	11.20

*Microsoft's fiscal year ended on June 30, 2012.

**Procter & Gamble/s fiscal year ended on June 30, 2012.

***Lockheed Martin reported a very substantial Other Comprehensive Loss, principally for postretirement benefits, as part of shareholders' equity.

****Wal-Mart's fiscal year ended on January 31, 2013.

Over the past several years, companies have actively tightened collections, controlled inventories, and lengthened payables—consciously shortening the cash conversion cycle and reducing the amounts that they borrow. It has shown up in a number of dramatic changes in the general operations of businesses. For example, retailers now generally sell to consumers for cash or general credit cards (VISA, MasterCard, Discover, American Express) that remit cash to the retailer within one or two days, nearly eliminating accounts receivable and the need for credit and collection management expenses. Such is visible in the data for Wal-Mart in the exhibits. By actively managing inventory, drawing on practices initially developed by Japanese manufacturers, but extended to all industries, companies have reduced inventories to much lower levels than in the past, deploying just-in-time and consignment policies to minimize stocks. They have negotiated longer payment cycles, in some cases even arranging secured financing for their suppliers in return for extended payment terms. The result is significantly reduced and continuing to decline cash conversion cycles.



Think About It . . .

The cash conversion cycle may be positive or negative. What is the impact on risk of one or the other? What is the impact on profitability?

Free Cash Flow

Free cash flow, which equals net cash flow from operations minus capital expenditures, measures the cash available for discretionary outlays after required outlays have been made. Discretionary outlays include payments for reducing debt and paying dividends. Free cash flow has also been described as the amount of funds that could be withdrawn from the business, of particular interest to lenders seeking loan service and repayment, and private equity and hedge fund investors seeking large dividend distributions.

While free cash flow sounds good, implying that negative free cash sounds bad, negative free cash flow may not be unfavorable. Depending on other managerial actions, negative free cash flow may be the result of significant capital expenditures for acquisition or productive assets or may represent a temporary, non-repeating situation. Further analysis will tell the analyst the reasons behind the numbers.

The 2012 free cash flows for the nine companies shown in Exhibit 3–4 are presented as ratios (net cash flow from operations divided by capital expenditures) so that the amounts are not influenced by the size of the company. The ratios range from a high of 13.71 (Microsoft) to a low of 1.56 (Dow Chemical).

DEBT AND EQUITY RATIOS

Debt ratios are used to measure the extent of the company's total debt burden. The ratios indicate the company's capacity to meet its long-term and short-term debt obligations. Interest and principal payments on debt must be made. Failure to do so can result in default on the debt and possibly lead to bankruptcy. Before explaining the various debt ratios, it is necessary to define leverage.

Leverage

Changes in the broad economic environment have important impacts on business. Earnings estimates are sensitive to the growth of disposable income and unemployment, and their degree of sensitivity differs among companies. To predict how a company will be affected, the vulnerability of sales, operating leverage, and financial leverage must be considered. Sales in some areas of the economy, such as consumer durables and construction products, tend to be very cyclical; others, such as cosmetics and medicine, are far less so. The industry in which a company competes may be commanding an increasing or a decreasing share of the gross domestic product. A very competitive industry, such as agriculture, may make the profits of any company within it very vulnerable from year to year. On the other hand, a company in another industry may protect itself by dominating a segment of its total market and thereby ensuring stable sales and profits (for example, Coca-Cola in the carbonated beverage industry).

The sensitivity of earnings before interest and taxes to unexpected changes in sales, called operating leverage, is influenced by the level of fixed operating costs compared to variable costs and to the proximity of the company to its break-even point. Heavily mechanized industries, such as automobiles, air transport, and chemicals, tend to have high operating leverage. When the economy is strong and sales are high, their high level of fixed costs and lower levels of variable costs enable them to make large profits, but, conversely, their operating earnings decrease proportionally much more than sales during recessionary periods when sales slow down. Financial leverage is the sensitivity of earnings per share to changes in earnings before interest and taxes as the result of financing with debt rather than equity. Because interest rates are usually fixed, while profits decrease with increased debt, earnings per share increase because the higher debt percentage yields a lower equity level. As a result, companies with greater debt will tend to have more volatile earnings per share, all other things being equal.

Debt-to-Equity Ratio

The debt-to-equity ratio indicates the relationship between funds supplied by creditors and those provided by stockholders. It measures the degree of safety enjoyed by the creditors of a company. The ratio indicates the extent to which the company will be able to continue borrowing. This ratio is especially useful to creditors, such as bankers, when they are determining whether or not to grant a loan request.

A relatively high debt-to-equity ratio indicates the company may not be able to take on additional liabilities. At the same time, however, a high debt-to-equity ratio can increase the rate of return on stockholders' equity through the use of favorable financial leverage, because interest on debt is generally fixed in amount, regardless of the amount of earnings. Consequently, there is no ideal debt-to-equity ratio. Rather, each investor and creditor must define a satisfactory debt-to-equity ratio on the basis of a desired degree of risk.

The debt-to-equity ratio is computed by dividing total debt by stockholders' equity. Debt may be defined as only external debt or include all the obligations of the business. Total liabilities is used as debt in the ratios computed below. The debt-to-equity ratio for 2012 and 2013 is computed as follows:

$$\begin{aligned}\text{Debt-to-equity ratio (2012)} &= \frac{\$162,000}{\$251,000} \\ &= 0.65\end{aligned}$$

$$\begin{aligned}\text{Debt-to-equity ratio (2013)} &= \frac{\$192,000}{\$333,000} \\ &= 0.58\end{aligned}$$

Although there are different average levels of debt-to-equity ratios for each industry, a comparison of the debt-to-equity ratios of companies in the same industry is not as useful as one might first suspect. There are several reasons for this. First, the market value of the debt—sometimes a more important measure of debt level—is not customarily reflected in the debt-to-equity ratio. For example, if a company borrowed money years ago at what are now very high rates, the present burden of the debt would be very high by today's standards. On the books, the debt is stated at the amount that will be repaid at maturity or when the company retires it. However, the market value of the debt obligation may be other than the stated amount. Also, the profit potential of the company is an important consideration in determining debt level. A very profitable company can service substantially more debt out of operational cash flows than can a less profitable one.

The 2012 debt-to-equity ratios for the nine companies presented in Exhibit 3–6 range from a high of 990.21 (Lockheed Martin) to a low of 0.75 (Dow Chemical). As discussed earlier, the Lockheed Martin result is unusual.

Times-Interest-Earned Ratio (TIE)

The number of times interest charges are earned is calculated in order to determine the degree of safety to long-term creditors. It is an indicator of the company's ability to cover the payment of interest to holders of interest-bearing obligations. A common measure of this margin is the ratio of net income available for interest payments to annual interest expense. The ratio is computed as follows:

$$\text{Times-interest-earned ratio} = \frac{\text{Earnings before Interest and Taxes}}{\text{Interest Expense}}$$

**Exhibit 3-6****Debt and Equity Ratios for Nine Companies for 2012**

Company	Debt-to-Equity Ratio	Times-Interest-Earned Ratio	Book Value per Share of Common Stock
Coca-Cola	1.60	22.89	\$7.42
Pfizer	1.27	8.93	11.22
Dow Chemical	0.75	2.28	14.85
ExxonMobil	0.94	241.75	38.13
Microsoft*	0.83	N/M	7.92
Procter & Gamble**	1.07	17.28	22.87
Kellogg's	5.12	5.98	6.85
Lockheed Martin***	990.21	11.58	0.12
Wal-Mart****	0.61	13.47	24.23

*Microsoft's fiscal year ended on June 30, 2012. Its TIE is not meaningful because it reported no net interest expense.

**Procter & Gamble's fiscal year ended on June 30, 2012.

***Lockheed Martin reported a very substantial Other Comprehensive Loss, principally for postretirement benefits, as part of shareholders' equity.

****Wal-Mart's fiscal year ended on January 31, 2013.

The times-interest-earned ratio for 2012 and 2013 are computed as follows:

$$\begin{aligned} \text{Times-interest-earned ratio (2012)} &= \frac{\$88,000}{\$4,000} \\ &= 22 \end{aligned}$$

$$\begin{aligned} \text{Times-interest-earned ratio (2013)} &= \frac{\$136,000}{\$9,000} \\ &= 15 \end{aligned}$$

As in the case of the debt-to-equity ratio, there is no ideal amount for the number of times interest is earned. Obviously, the higher the ratio, the greater the protection for the creditors. At the same time, however, a higher ratio indicates a decreased potential for favorable leverage accruing to the common stockholders.

The 2012 times-interest-earned ratios for the nine companies shown in Exhibit 3-6 range from a high of 241.75 (ExxonMobil) (ignoring Microsoft, which had no interest expense) to a low of 2.28 (Dow Chemical). Note that Lockheed Martin which had a D/E ratio of 990.21 because of its extremely low net equity level, had a comfortable TIE, demonstrating its ability to cover its debt service obligations.



Think About It . . .

The times-interest-earned (TIE) ratio would seem to be of interest to the banker. After all, the banker counts on borrowers to be able to pay interest when it is due. But TIE is also interesting to suppliers because, when the ratio is low, the borrower will always pay the banker first. Therefore, payments to the supplier may be delayed, or perhaps not paid at all.

Book Value per Share of Common Stock

The book value per share of common stock is the amount of common stockholders' equity applicable to each share of common stock. Data on book value per share of a corporation's common stock often are included in corporate annual reports and in the financial press. If a corporation has only common stock outstanding, book value per share is computed by dividing total stockholders' equity by the number of shares outstanding at the end of the period.

When a corporation has both preferred and common stock outstanding, the stockholders' equity must be divided between the classes of stock by subtracting the liquidation value of the preferred stock from total stockholders' equity. Assuming that 15,000 shares of common stock were outstanding at the end of 2012 and 17,000 shares were outstanding at the end of 2013, the book value per share of common stock for 2012 and 2013 is as follows:

$$\begin{aligned} \text{Book value per share of common stock (2012)} &= \frac{\$251,000}{15,000} \\ &= \$16.73 \end{aligned}$$

$$\begin{aligned} \text{Book value per share of common stock (2013)} &= \frac{\$333,000}{17,000} \\ &= \$19.59 \end{aligned}$$

The book value per share does not indicate the amount to be distributed to each common share on the liquidation of the company. Also, book value does not correspond to the market value, which is influenced by such factors as expected earnings and general economic conditions. However, some analysts measure market value to book value to assess the market's confidence in the company and its management.

The 2012 book values per share of common stock for the nine companies shown in Exhibit 3–6 range from a high of \$38.13 (ExxonMobil) to a low of \$0.12 (Lockheed Martin).

USING FINANCIAL RATIOS

By surveying the entire set of financial ratios outlined so far, the manager or analyst may obtain a reasonably detailed view of the company's financial sit-

uation. To identify specific strengths and weaknesses, however, the manager must compare the ratios against a standard or norm. There are three commonly used bases for comparisons in financial analysis: (1) comparisons with other ratios within the statements themselves; (2) comparisons of the same ratios over time; and (3) comparisons of the same ratios with those of other firms, within the company's particular industry, including industry averages.

Intracompany Analysis

Basically, intracompany analysis is the computation of various ratios using stated amounts from the company's own balance sheet and income statement. The financial manager looks for consistencies or inconsistencies among the ratios. For instance, if the profit margin is low, the manager may look for a high total asset turnover (this is consistent with the DuPont model explained earlier in this chapter). Or, if the firm issued stock and paid back its debt, we would expect the times-interest-earned ratio to increase. If the ratios are not consistent with prior expectations, the financial manager would delve deeper into the financial statements and talk with managers of other departments to try to obtain an explanation.

Trend Analysis

Trend analysis basically consists of comparing corporate ratios from one year to similar ratios of prior years. Besides comparing similar ratios, trend analysis also could show, for example, the income statements of a company for the past five years, permitting a visual comparison of revenues and expenses to offer the analyst a qualitative evaluation. Usually, the information is presented side by side in columns to facilitate analysis. This type of comparative presentation allows the manager to pinpoint rapidly trends and rates of change that might indicate various strengths and weaknesses.

Industry Comparison

A company in a particular industry can compare its ratios with those of others in that same industry. For example, the ratios for Coca-Cola can be compared with those of PepsiCo; however, the analyst must be aware that much of PepsiCo's business is not related to beverages.

Industry average ratios are a good way for managers to compare the performance of their companies to that of others in their industry. There are two widely used sources of industry average ratios. RMA, the Risk Management Association (formerly known as Robert Morris Associates) is the national association of bank loan and credit officers. RMA annually publishes a set of 16 major ratios for over 300 industries. Dun & Bradstreet annually publishes a set of 14 key ratios for each of 125 lines of businesses. It must be noted, however, that industry averages are necessarily outdated because of the time it takes to collect the information. Thus, the published industry averages are only approximates, but many analysts find them very valuable.

Predicting Financial Problems

Using ratios to analyze financial statements is essential if you are to understand how a firm operated in the past. Such an analysis also may help in predicting how the firm will fare in the future. Beaver (1966) attempted to make predictions by comparing the financial ratios of 79 firms that failed with the ratios of 79 firms that remained solvent. In general, the ratios of Beaver's sample of failed firms indicated what you would expect—they had more debt than the solvent firms, a lower rate of return on sales and assets, less cash but more receivables, and, therefore, had substantially less liquidity.

As you would expect, the failed firms appeared to be in a weaker financial condition than the healthy firms, and they continued to deteriorate as they moved closer to bankruptcy. These signs of deterioration were evident as early as four years before the firms' actual failure. From this and other work, particularly by Altman (1968), models have been developed that use historical financial data and ratios to predict the probability of bankruptcy as far as three or four years in the future.

While these studies are old, they are still valid, and the Altman Z Formula, (described earlier) which is used to predict business bankruptcy, is still widely used today. The original Altman Z formula uses five financial ratios to determine a score that is used as a bankruptcy predictor for manufacturing companies and asset intensive businesses. The original Altman Z formula is dominated by the Asset Turnover ratio. Altman has developed some other variants for privately held companies and for service businesses. In addition, more recent studies show that net liquid balance is very useful in predicting financial distress.

Ratio analysis and trend data are useful also in producing financial forecasts and developing valuation models. These applications will be discussed later in the course. Intracompany ratio analysis, trend analysis, and comparative industry analysis are not ends in themselves. They are valuable analytical tools that must be used according to each company's situation. For your information, Exhibit 3–7 contains a checklist for financial analysis. It lists some of the questions that managers should ask when doing a financial analysis of their companies and their industries.

USING FINANCIAL RATIOS IN ANALYSIS

In this section, we analyze the company introduced in Exhibits 3–1 and 3–2 using the ratios we have discussed. For your convenience, the ratios are listed in Exhibit 3–8, which also shows 2013 ratios for another company in that industry and the industry averages that will be used in the analysis.

An intracompany, intercompany, and industry comparison analysis are presented below.

An Example of Intracompany Analysis

In intracompany analysis, different ratios for the same company are compared with each other. We will use the ratios for both years. The example company

E**Exhibit 3–7
Questions for a Financial Statement Analyst***Company Questions*

1. Will the company be able to finance growth from internally generated cash flows? Funds flows?
2. To what extent is the firm dependent on external sources of funds such as debt and equity?
3. Are any developmental plans constrained due to a shortage of available funds or cash?
4. Are internal sources of cash sufficient to meet interest and principal payments in a timely manner?
5. Are internal sources of cash sufficient to handle dividend payments? What is the likelihood that the payments can be increased?
6. Is an appropriate level of debt being employed by the company?
7. Why have sales followed the growth pattern indicated? How can the response of profits to changes in sales be explained?
8. Do the messages of the income statement, balance sheet, and statement of cash flows lead to the same conclusions the same conclusions?
9. Are the cash flow trends favorable or unfavorable? Will the trend change in the near future?
10. How close is the company to its operating break-even point? How much of the company's expenses are fixed rather than variable?

General Strategy and Industry Analysis Questions

1. Is the company vulnerable to foreign competition?
2. Does the company possess any particular advantages that allow or would allow it to consistently win over its competition? (These advantages could be obtained through such things as patents, brand names, production efficiency, dominant advertising, and market position.)
3. What is the strategic thrust of the company? Has it been winning? Is it likely to win in the future?
4. How responsive and adaptable have the managers been?
5. Are there important labor problems?
6. How do the company's sales and profits respond to increases in the rate of inflation?
7. Is the basic service provided by the industry commanding an increasing or a decreasing share of the nation's budget?
8. What is the competitive environment? Are there barriers to competition that help one company or several companies dominate? Is competitive pressure increasing?
9. How cyclical are the industry sales?
10. Is government regulation and purchasing important?
11. Is the growth in industry sales in the pioneering, rapid success, or mature stage? Is there a chance of a shift from one stage to another in the near future?

in Exhibit 3–8 is the one whose financial statements were presented in Exhibits 3–1 and 3–2 at the beginning of the chapter.

Profitability Ratios

The company's net profit margin and net operating margin have held steady at 17 percent and 27 percent, respectively. The return on equity exceeds the return on assets in both years, and because ROE is increasing it indicates that the company is improving its profitability, perhaps by using debt financing. In addition, both ratios improved from 2012 to 2013. Earnings per share increased from 2012 to 2013, although the price-earnings ratio increased only slightly. Remember that the price-earnings ratio encompasses the market's evaluation of future performance as well as current performance.

Liquidity and Activity Ratios

The current ratio and quick ratio improved from 2012 to 2013. The current ratio of 2.6 and the quick ratio of 1.18 indicate a good liquidity position for the company. It probably will have no problem paying off its short-term obligations or obtaining short-term financing. Both the average collection period and the inventory turnover have improved. This is a good sign, but more improvement may be needed, particularly for inventory.

Debt and Equity Ratios

The debt-to-equity ratio declined and remains below 1. If it were greater than 1, the company might face problems if it needs to borrow more funds. It may have to raise more equity capital before creditors would lend more money. The decrease in the times-interest-earned ratio may also be a warning sign to creditors, although at 15 there appears to be ample coverage of the company's interest obligation.

E**Exhibit 3-8****Financial Ratios Computed in the Text for the Company and Ratios for Another Company in the Same Industry and Industry Average**

<i>Ratio</i>	<i>For Company</i>		<i>For Another Company</i>	<i>Industry Average</i>
	<i>2013</i>	<i>2012</i>	<i>2013</i>	<i>2013</i>
Net profit margin	17.0%	17.0%	15.0%	14.0%
Net operating margin	27.0%	27.0%	24.0%	21.0%
Return on assets	16.4%	13.3%	16.2%	19.2%
Return on equity	25.8%	21.9%	25.5%	25.3%
Earnings per share	\$5.21	\$3.67	\$4.83	\$4.88
Price-earnings ratio	3.5	3.3	3.2	3.1
Dividend yield	7.8%	8.3%	8.5%	8.5%
Dividend payout	27.9%	27.3%	32.2%	35.2%
Current ratio	2.6	2.3	2.5	2.4
Quick ratio	1.18	0.92	1.1	1.1
Average collection period	32.9 days	57.0 days	31 days	30 days
Inventory turnover	2.1 times	1.3 times	3.9 times	3.5 times
Debt-to-equity ratio	0.65	0.58	0.83	1.02
Times-interest-earned	15 times	22 times	18 times	16 times
Book value per share	\$19.59	\$16.73	\$18.50	\$18.76

An Example of Industry Comparison

The ratios listed in Exhibit 3–8 become even more representative of the company's strengths and weaknesses when they are compared with another company in the same industry and the industry average ratios. Before beginning this comparison, a brief discussion about company and industry average ratios is appropriate.

Exhibit 3–9 presents a comparison of three of the companies whose ratios have been computed in this chapter with the corresponding ratios from Dun & Bradstreet. Typical industry averages for each ratio are oftentimes quite different. Quick ratios and current ratios for pharmaceuticals are higher than for soft drinks or department stores. The median and upper quartile figures for return on sales (net profit margin) and return on net worth (return on equity) are lower for department stores than for soft drinks or pharmaceuticals. Average collection periods are also lower for department stores. While the liquidity ratios for Pfizer fit between the median and upper quartile figures for pharmaceuticals, Coca-Cola's quick and current ratios are below the median figures in its industry and return on equity is well above the upper quartile figures. Ratios for specific companies, particularly industry leaders, help analysts understand the characteristics of all the companies in an industry.

Profitability Ratios

While the return on assets for the company, as shown in Exhibit 3–8, is about the same as for the industry, it exceeds the return for the other company. The return on equity (25.8 percent) is slightly higher than the industry average (25.3 percent) or the other company (25.5 percent). Furthermore, the company has a net profit margin of 17 percent compared to an industry average of only 14 percent and the other company's 15 percent. The company's earnings per share and price-earnings ratio exceed the industry average and the other company, although the dividend yield and dividend payout are lower.

Liquidity and Activity Ratios

The liquidity position of the company is good; its current ratio and quick ratio are higher than the industry average and the other company's ratios.

It appears that the company's average collection period (34.7 days) is somewhat longer than the other company and the industry, but not by a lot. Depending on the sales terms we can assume that customers, on the average, have not paid their bills on time, thereby impairing the financial liquidity of the company. The company's collection period has significantly improved and currently the company is receiving payments on time, so it can use this cash for new investments. It should be noted also that the average collection period is much closer to the industry average in 2013 than it was in 2012.

The inventory turnover is very low, which would suggest that the company holds excessive stocks of inventory. This is a very unproductive practice because it is an investment with a zero rate of return. One might wonder if the company is holding damaged or obsolete materials.

E**Exhibit 3-9**
Industry Averages Compared with Three Companies

<i>Ratio</i>	<i>Pharmaceuticals</i>				<i>Soft Drinks</i>				<i>Department Stores</i>			
	<i>UQ*</i>	<i>Median</i>	<i>LQ**</i>	<i>Pfizer</i>	<i>UQ*</i>	<i>Median</i>	<i>LQ**</i>	<i>Coca-Cola</i>	<i>UQ*</i>	<i>Median</i>	<i>LQ**</i>	<i>Wal-Mart</i>
Current	4.9	2.7	1.5	2.2	3.4	1.8	1.1	1.1	4.4	2.5	1.7	0.8
Quick	2.8	1.4	0.7	1.6	1.9	1.3	0.5	0.8	0.9	0.5	0.2	0.2
Net profit margin	3.5	1.4	(100.9)	24.7	9.4	2.7	(9.7)	18.8	4.9	3.3	1.0	3.7
Return on equity	19.0	5.0	(36.3)	17.8	31.9	17.3	(2.2)	27.2	19.9	9.3	4.7	22.3
Collection period	26.7	44.2	61.7	76.6	23.7	32.1	38.7	36.2	2.0	4.8	10.4	5.3

*Upper quartile

**Lower quartile

Debt and Equity Ratios

In terms of leverage, the company does not appear to be very much in debt. With a lower debt ratio than the industry average or the other company, the company may not have difficulty borrowing more capital. On the negative side, however, the times-interest-earned figure is lower than the industry average or other company. The importance of any borrowing difficulties may be lessened, because the profitability ratios of the company are higher than the industry averages or the other company.

In summary, the company is highly profitable compared with the industry average. Therefore, it should not have too many difficulties raising more external financing. The company could increase sources of internal financing or reduce its indebtedness through better management of its assets—by shortening its average collection period or decreasing its investment in inventories.

Other Commonly Used Analytical Ratios

In addition to the various ratios explained in this chapter, there are other commonly used analytical ratios. Exhibit 3–10 lists these other ratios.

The ratios obtained from financial statements are an essential aid to decision making, not only for lenders and investors, but also, and more importantly, for low to high level managers who must run profitable and liquid companies.

IMPORTANT CONSIDERATIONS CONCERNING FINANCIAL STATEMENT INFORMATION

Financial statements, especially published financial statements, must be reviewed critically. Most of the time analysts review financial statements prepared at the end of the fiscal year. While these are usually audited statements and should represent reliable and usable information, there are several important characteristics regarding these financial statements that must be acknowledged. The end of the fiscal year usually occurs just after the peak period of business activity and just before the slowest period of the year. The company is going to try to clean up the business before it slows down because it is always harder to improve performance when activity is slow. Additionally, the company management is aware that investors, analysts, creditors, and all stakeholders will be reviewing their year-end financial statements. Just as you, as a professional, want to look your best when others will be judging you critically, so too, do companies want to look their best when viewers are looking at them critically. Therefore, managers want their financial statements to look as good as possible at the end of the fiscal year.

Because, after the end of their fiscal year, they are going into their slowest period, companies will try to minimize those assets that will be less effective in the slower period. Similarly, they will try to improve their apparent credit worthiness at the end of the year. They will address all balances to be sure that they are as clean and valid as possible. They will review tax planning and adjust reserves and asset levels to take advantage of any tax benefits.

E**xhibit 3-10
Other Commonly Used Analytic Ratios**

<i>Name</i>	<i>Source</i>	<i>Formula</i>	<i>What It Indicates</i>	<i>User</i>
Current liabilities to stockholders' equity	Balance sheet	$\frac{\text{Current liabilities}}{\text{Stockholders' equity}}$	A measure of the degree of protection the owners provide to short-term creditors.	Short-term creditors
Fixed assets to owners' equity	Balance sheet	$\frac{\text{Fixed assets}}{\text{Stockholders' equity}}$	Indicates the extent to which owner-contributed capital has been invested in fixed assets, thus reducing working capital.	Creditors
Long-term debt to working capital	Balance sheet	$\frac{\text{Long-term debt}}{\text{Working capital}}$	Indicates the creditor contribution to liquid assets.	Creditors
Inventory to working capital	Balance sheet	$\frac{\text{Inventory}}{\text{Working capital}}$	Indicates the desirable inventory level for the working capital employed.	Creditors and investors
Proprietary or equity ratio	Balance sheet	$\frac{\text{Total assets}}{\text{Stockholders' equity}}$	Indicates the long-term financial strength and solvency of the company.	Long-term creditors
Long-term debt to total capitalization	Balance sheet	$\frac{\text{Long-term debt}}{\text{Total capitalization}}$	Indicates the ratio of long-term borrowed capital to the permanent capital contribution.	Long-term creditors and investors
Fixed assets to long-term debt	Balance sheet	$\frac{\text{Fixed assets}}{\text{Long-term debt}}$	Indicative of the security for funded debt.	Long-term creditors
Operating ratio	Income statement	$\frac{\text{Total operating costs}}{\text{Net sales}}$	The most general measure of operating efficiency.	Internal management and investors
Stockholders' equity turnover	Income statement and balance sheet	$\frac{\text{Net sales}}{\text{Stockholders' equity}}$	Measures the efficiency of the employment of net worth.	Investors
Net working capital turnover	Income statement and balance sheet	$\frac{\text{Net sales}}{\text{Working capital}}$	Measures the efficient use of working capital.	Investors and internal management
Return on investment	Income statement and balance sheet	<ol style="list-style-type: none"> 1. $\frac{\text{Operating income}}{\text{Total assets}}$ 2. $\frac{\text{Operating income}}{\text{Capitalization}}$ 3. $\frac{\text{Net income after interest and tax}}{\text{Stockholders' equity}}$ 	Provides the most comprehensive ratio for measuring the use of capital.	Internal management and investors

Furthermore, there are alternative accounting treatments for many financial accounts that will affect the appearance of the financial statements. In the following sections some of these considerations will be highlighted. However, when examining a particular company, the analyst must also review the specific characteristics of the particular industry or industries the company participates in, must read and assess the footnotes to the financial statements of the company, and add to the analysis the unique perspective of the analyst in their analytical role. The company management strives to present the best possible picture; the analyst must be equally diligent.

ALTERNATIVE ASSET MANAGEMENT TREATMENTS

A further look at the accounts and ratios we have considered may bring a number of new insights, depending on the circumstances. The financial analyst must be alert to anomalous situations or external information when reviewing the financial information of a company. Many times some seemingly unreasonable amounts or complicated explanation will need further examination for the analyst to be fully satisfied. The example of Lockheed Martin included in this chapter offers just such an unusual picture.

Cash and Marketable Securities

One would think that analyzing cash would be quite straightforward, but it may not be. When looking at financial statements, cash usually is the lead asset. However, cash is often interpreted to include marketable securities (short-term), short-term investments, and even long-term liquid and marketable investments, such as Treasury bonds.

Consider Apple, Inc., which was reported to hold as much as \$146 billion in cash. (In August 2011 Apple was reported to have more liquid cash than the U.S. Government.) However, in April 2013, Apple borrowed \$17 billion. While the interest rate was very low, Apple was reported to need to borrow in order to pay dividends to its shareholders and repurchase some of its stock because much of its cash was held overseas and could not be repatriated without triggering a very substantial tax penalty. The analyst considering cash must be cognizant of the positioning and availability of that cash.

During the financial crisis of 2007–2009, marketable securities took on unusual significance. Because market rates of interest were low, holders of marketable securities in some cases took an excess risk in an effort to raise yields. The rise of exotic financial instruments, often held as current assets, led, in this volatile period, to dramatic changes in valuation and diminished liquidity, adding to the overall distress of the period, and calling into question the values on the balance sheets of many companies. At the same time the markets for short-term debt instruments declined dramatically, making it virtually impossible for a time for companies that had routinely borrowed in the short-term credit market to obtain the funds they needed.

Accounts Receivable

As noted earlier, critically analyzing accounts receivables can lead to some very important insights. Consider a company with a very low average collection period. Perhaps they are very efficient at collecting receivable. Perhaps they do not sell on credit or sell as Wal-Mart does, only for cash or general credit cards (such as VISA, MasterCard or similar cards). Alternatively, perhaps they sell (factor) their receivables. In many cases such an action increases cash in the short term (which they may have spent) and reduces accounts receivable. Without careful consideration, an analyst might view this result as exceptionally good receivables management when it may be a consequence of poor expense control and desperation.

The examination of balances and credit terms will add to the value of the analysis. The accounts receivable of retailers in general are very low, reflecting a dramatic change in the credit market over the last fifty years as retailers have almost entirely moved away from direct credit relationships with consumers. The rise of the general credit cards has meant that consumers still purchase on credit, delaying paying for purchases until some future date—while retailers get the sales benefit of credit, for a manageable fee, without the risks of bad debts or the higher costs of credit management and collection efforts.

In commercial credit transactions, the average collection period assessment may be more meaningful. It offers the opportunity for further analysis. If a company offers discount terms (common in business-to-business sales) and customers do not pay within the discount period (measured by ACP), the analyst should register concern. Likewise, if a company buys in industries offering discounts and their accounts payable indicate a failure to take discounts offered (as long as they are financially attractive), the analyst needs to note the issue and delve into the causes of it.

The previous paragraph used the words “may be” because there is a recent movement that may necessitate a review of accounts receivable and accounts payable management. Some major companies now are negotiating extended payment terms with their suppliers. In order to not inflict too great a hardship on the suppliers, they also arrange low-interest bank credit for the suppliers, secured by the purchasing company's commitment to pay the obligations. This finances the increased cash resulting from the higher payables. There is a reasonable possibility that this practice will affect commercial credit the way the general credit cards have transformed consumer credit.

Inventory

Like accounts receivable, inventory assets may be more complicated than they first appear to be. Inventory turnover provides an abundance of clues, with many analytical opportunities below the surface. If turnover is high, it may be good, reflecting efficient operations, or it may result in fewer goods, suggesting a high potential for stockouts and missed orders or partial shipments. A low turnover may reflect poor inventory managements or a carefully expanded inventory that assures available spare parts for older equipment in the hands of valued customers.

Further examination of inventory raises the issues of FIFO (first-in, first-out), LIFO (last-in, first-out), or other valuation methods. Valuation methods affect cost of goods sold, profits, income, and possibly property taxes. The analyst must also think about competition, particularly in a global context, where the International Financial Reporting Standards (IFRS) limit valuation choices to FIFO only for companies that must comply with IFRS. LIFO inventory values enable companies, in periods of rising costs, to reserve profits in inventory by passing the rising costs through the income statement, thereby lowering profits and taxes. This reserving of profits is one reason many major U.S. companies have resisted pressures to adopt IFRS.

Consideration of inventories also raises the fundamental question: What is inventory, really? The cars Hertz rents are recognized as depreciable fixed assets, but the various products that Rent-A-Center rents are not treated as fixed assets and are not subject to depreciation. Other companies, while clearly not holding inventory per se, must manage their activities as if they did. For example, when airlines refer to inventory, they mean seats on airplanes, and hotels mean rooms. The analyst, in assessing such companies, needs to review the effectiveness of asset management, however it is categorized or classified.



Think About It . . .

Service companies do not report inventory, but may have to manage some other aspect of their business as if it were inventory. Service companies may sell time (consultants), space (trucking companies), seats (airlines), rooms (hotels), or other products or services that have costs and that must be managed similarly to physical goods.

Fixed Assets

When considering fixed assets, in addition to reviewing what they are, the analyst needs to recognize the valuation the analyzed company applies. Depreciation methods, lives, and reporting affect the apparent financial performance of a company. Companies have some leeway in choosing the depreciable lives of certain assets; furthermore, under GAAP there are a number of available depreciation methods (such as straight line, sum-of-the-years digits, or declining balance). Therefore, company policy regarding depreciation may affect reported levels of profits in a given year. This triggers a range of accounting and tax reporting challenges that complicate the financial statements and various ratio and other performance measurements. Depreciation methods can affect depreciation expenses as well as property taxes on fixed assets. On the other hand, some assets—notably land and buildings—appreciate in value over time, although no recognition of this increased value appears in the financial statements.

Fixed assets are used to generate revenues and profits. If a company holds excessive or underutilized fixed assets, that ability to produce those revenues and profits is jeopardized. Just as with holding excess inventories, the costs

associated with holding fixed assets are distributed through several parts of the company, adversely affecting expenses profits, cash, and overall operating efficiency. While most analysts are conscious of the costs of carrying inventories and the potential for consuming profits in inventory carrying costs, the cost of carrying excess fixed assets may be more significant than that of carrying inventory; because it may be much more difficult to dispose of excess fixed assets, it may be more detrimental as well. In service businesses, the product sold is often time; in that case, carrying extra or underutilized employees results in similar, or even greater, carrying costs, resulting in significant pressures on profits.

Goodwill and Other Intangible Assets

The valuation of intangible assets (patents, trademarks, goodwill) is often arbitrary and subject to managerial decision-making. Some clearly valuable investments never get recognized at all, while others have a material impact on the balance sheet. For example, no acknowledgement of human resource values occurs in the financial statements, although many companies publicly extol the virtues and tout the investments they have made in their personnel. One major manufacturer has advertised their investment of more than half a billion dollars in employee education. Such an investment is treated as an expense passed through the income statement, with no attempt to recognize any asset value or measure any return on investment from this use of investors' funding.

Other assets, most notably goodwill, have been increasing on balance sheets as acquisitions have become a primary source of company growth and expansion. Goodwill, the excess amount paid over the value of assets acquired, has expanded as companies have accumulated cash and as the exchange of stock has increased with the increases in stock prices. The amount of goodwill on the balance sheet in recent years has grown by epic proportions. Consider Exhibit 3–11, which shows the amounts of cash and goodwill on the 2012 balance sheets of the nine companies evaluated in this chapter. Many lenders and other analysts and evaluators will deduct goodwill, and perhaps other intangible assets, from assets and from equity when calculating debt management and other related ratios. This is because goodwill cannot be converted to cash and may not have anywhere near the same valuation to others as it does to the management of the company. It does not reflect any discernible collateral value to secure any debt they borrowed.

ALTERNATIVE LIABILITY AND EQUITY TREATMENT

Similar to the asset accounts and ratios just discussed, the liability and equity accounts and ratios need careful, extended examination. Many of these accounts hold valuable insights that may not be readily visible, but to the astute analyst offer a window into the realities of the company.

E xhibit 3–11 Comparison of Cash and Goodwill

Company	Total Assets	Cash	% of Total Assets	Goodwill	% of Total Assets
Coca-Cola	\$86,174	\$13,459	15.62%	\$12,255	14.22%
Pfizer	\$185,798	\$32,558	17.52%	\$44,672	24.04%
Dow Chemical	\$69,605	\$4,318	6.20%	\$12,739	18.30%
ExxonMobil	\$333,795	\$9,923	2.97%	\$7,668	2.30%
Microsoft	\$121,271	\$63,040	51.98%	\$13,452	11.09%
Procter & Gamble	\$132,244	\$4,436	3.35%	\$53,773	40.66%
Kellogg's	\$15,184	\$281	1.85%	\$5,053	33.28%
Lockheed Martin	\$38,657	\$1,898	4.91%	\$10,370	26.83%
Wal-Mart	\$203,105	\$7,781	3.83%	\$20,497	10.09%

*Microsoft's fiscal year ended on June 30, 2012.

**Procter & Gamble/s fiscal year ended on June 30, 2012.

***Lockheed Martin reported a very substantial Other Comprehensive Loss, principally for postretirement benefits, as part of shareholders' equity.

****Wal-Mart's fiscal year ended on January 31, 2013.

Current Liabilities

Accounts payable would seem to be clear, but there may be nuances that the analyst needs to consider when judging the financial condition of a company. The cash conversion cycle takes Days Purchases in Payables into account in calculating the time it takes from cash out to cash in, the time that the balance sheet needs financing. However, recently, as noted earlier, companies have begun actively treating accounts payable as a source of cash, stretching them longer than was previously deemed reasonable, and even arranging secured short-term credit for their suppliers to enable them to not have to pay their payables. This process, when implemented, was recently estimated to provide Procter & Gamble up to \$2 billion in cash to be used for other purposes. The analyst must stay current on such developments which may, over time, change the financial landscape dramatically.

With the pressure to close the books sooner and report results earlier, there has been an increase in Accruals and other unusual Current Liabilities, adding a bit more uncertainty to the balances in the Current Liabilities. Some companies use accruals as a source of funds, deferring payments, even for wages, by changing payment policies. Many companies collect revenues from customers in advance of incurring expenses to earn those revenues. Accounting for extended subscriptions, warranty payments, gift card sales, and deferred service contracts increases current liabilities and increases cash that the company reports. The sale of gift cards during the holidays has exploded in recent years, with a corresponding recognition of unearned revenues appearing in Current Liabilities. The distorting effects of gift cards and the management's desire to clean up the balance sheet has led retailers to push the sale of gift cards for the holidays, and then push equally hard for recipients of

those gift cards to use them during the after-holiday period to purchase left-over inventory that is on sale. This action helps retailers clear the deferred revenue liability as well as their leftover inventory. Gift cards dramatically reduce the post-holiday returns and all of the costs associated with handling them. The sale of gift cards, however, significantly increases the deferred revenue account, a current liability, until the gift card is used. As a result, the period after the holidays sees an extraordinary increase in advertising to persuade the holder of the gift card to redeem it in the time between the end of the holidays and the end of the fiscal year. Redeemed gift cards become sales, increasing revenue and decreasing the deferred revenue.

Leasing Assets Rather Than Buying Them

When a company buys an asset, it must arrange to pay for it. If it chooses to pay cash directly, the accounting and financial statement impact are obvious. However, if cash is not on hand, the buyer must borrow the funds. With fixed assets, such borrowing is usually long-term debt. However, frequently the asset is leased and the treatment of the lease complicates the analysis.

Capital leases are treated as long-term debt; this is not complicated, although a capital lease may be structured to involve little or no initial payment, in order to make the acquisition of the asset easier. If, however, the lease is carefully structured as an operating lease, and there are explicit accounting and tax rules that must be followed, neither the asset nor the obligation appear on the balance sheet. Such accounting and reporting may have a significant impact on many of the analytical measurements an analyst undertakes. The analyst needs to review financial statement notes to understand all the obligations to which the company is committed.

Such leases, particularly operating leases for such equipment as might otherwise be characterized as fixed assets, are a form of off-balance-sheet financing, an area of financing that has taken on more importance and prominence in light of the Enron scandal. Structures such as Special Purpose Entities (SPEs) and Special Investment Vehicles (SIVs) played a major role in the financial scandals of the early 2000s and the financial crisis later in the decade. It is important for the analyst to be aware of such non-traditional financial structures.

Pensions and Other Post-Retirement Benefits

Another area that is part of a comprehensive financial analysis is recognition of commitments by a company to fund pensions and other post-retirement benefits. These obligations have played a major role in numerous high-profile corporate bankruptcies in recent years; examples include the pension obligations of United Airlines, the pensions and post-retirement health benefit obligations of General Motors, and other enormous obligations. Among the nine companies mentioned in this chapter, recognized costs of pensions and post-retirement benefits ranged from \$0 (Microsoft, Wal-Mart) to \$3.2 billion (Lockheed Martin). The impact of these obligations has been most evident in the ratios and results for Lockheed Martin.

E**xhibit 3–12****Recognized Pension and Post-Retirement Benefits**

<i>Company</i>	<i>2012</i>
Coca-Cola	\$668
Pfizer	1,597
Dow Chemical	1,861
ExxonMobil	1,179
Microsoft	0
Procter & Gamble	2,010
Kellogg's	21
Lockheed Martin	3,204
Wal-Mart	0

Stockholders' Equity

Beyond Common Stock, Additional Paid-in Capital, and Retained Earnings, several other equity accounts contain important information. Treasury stock represents the cost to the company of repurchased shares. It appears as a negative amount, reducing the value owned by the remaining shareholders. The amount of treasury stock may be quite substantial and frequently reflects payment for stock that far exceeds the value of the corresponding shares in the Common Stock and Additional Paid-in Capital lines. Also included in Stockholders' Equity, as a negative number, is the value of deferred compensation owed to senior executives. This represents committed compensation that will be paid to these executives upon retirement or severance. It also detracts from the value owned by the shareholders. Other adjustments may be reported for changes in currency valuations for internationally held assets and investments, and any other adjustments that may be made. Still another source of adjustment may be the accounting for post-retirement benefit obligations as we have seen in the ratios for Lockheed Martin.



Adjustments such as those discussed, if recognized in the financial statements, could significantly change the financial picture from the view that management would like analysts to perceive. Is financial analysis simply taking numbers off the financial statements and plugging them into an array of formulas? Clearly not. Financial analysis means studying the financial statements, including footnotes, and applying judgment and interpretive skills to obtain financial information that is comprehensive and useful for decision-making by managers, creditors, and investors.

This expansive chapter describes how ratio analysis is used to evaluate a company's operating, investing, and financing strategies. The key profitability ratios considered were net profit margin, net operating margin, return on assets, return on equity, earnings per share, price-to-earnings ratio, dividend yield, and payout. The key liquidity and activity ratios considered were the current ratio, the quick ratio, average collection period, and inventory turnover. Net liquid balance has often proved helpful in predicting financial problems. The debt-to-equity ratio and times-interest-earned ratio measure the degree of safety enjoyed by the creditors of a company. Profitability ratios, liquidity and activity ratios, and debt and equity ratios are commonly used for intracompany analysis and industry comparisons.



Review Questions

1. The following are all profitability ratios except: 1. (b)
 - (a) return on assets ratio.
 - (b) debt-to-equity ratio.
 - (c) net operating margin.
 - (d) net profit margin.

2. In general, _____ ratios are used to measure a company's ability to pay its bills on time. 2. (d)
 - (a) profitability
 - (b) activity
 - (c) leverage
 - (d) liquidity

Use the information given in Exhibits RQ 3–1 and RQ 3–2 to answer Questions 3 through 5.

E

Exhibit RQ 3–1

Income Statement for Firm A for the Year Ended December 31, 2013

Net sales	\$25,940
Cost and expenses	
Cost of goods sold	14,520
Selling and administrative expenses	1,540
Delivery expenses	620
Depreciation	1,000
Total Costs and Expenses	17,680
Operating income	8,260
Interest expense	3,240
Income before taxes	5,020
Income taxes (t=0.5)	2,510
Net income	\$2,510

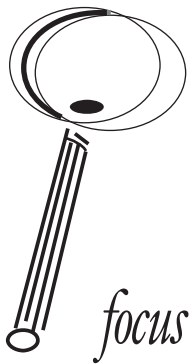
E**Exhibit RQ 3-2****Financial Information from A's Balance Sheet for the Year Ended December 31, 2013**

Current assets	\$13,720
Net plant and equipment	2,540
Total assets	<u>\$16,260</u>
Current liabilities	\$8,548
Long-term debt	1,410
Equity	6,302
Total liabilities and equity	<u>\$16,260</u>

3. What is the current ratio for Firm A? 3. (b)
- (a) 1.0
 (b) 1.6
 (c) 2.1
 (d) 1.4
4. What is the times-interest-earned ratio for Firm A? 4. (c)
- (a) 3.61 times
 (b) 9.20 times
 (c) 2.55 times
 (d) 1.01 times
5. What is the quick ratio for Firm A? 5. (d)
- (a) 1.45 times
 (b) 1.04 times
 (c) 0.95 times
 (d) The ratio cannot be calculated because the exhibits do not give sufficient information

4

Analyzing Current Asset Management



Learning Objectives

By the end of this chapter, you should be able to:

- Describe the risk/return tradeoff in managing current assets and liabilities.
- Explain the role of cash management in a business.
- List the four basic motives for holding cash.
- Identify three cash collection techniques.
- Analyze three cash disbursement techniques.
- List the key issues for a financial analyst when evaluating credit and collection policies.
- Discuss the role of inventory management in working capital assets management.

Getting Ahead of the Question

“As I was reviewing last month’s report for my division, I saw something that caught my attention,” said Jose at the start of the monthly meeting. “Our inventory turnover seems to have slowed down over the last year. What should I do with this information?”

“Well, obviously, you shouldn’t keep it to yourself,” Franz commented. “What caused the change? Higher inventory? Lower sales? Both?”

“I’m not sure,” Jose responded.

“That’s just the kind of development I expected when I initiated these meetings,” said Al. “When you see an issue, a change, you need to look further. Merely telling your boss that turnover slowed will only get you another assignment. If you can get ahead of the question, you can manage the tasks better and add valuable insights as well.”

“Understanding the cause of a problem often points to its solution, and may also highlight what some people call traps for the unwary. The comparison of balances and performance measures increases the value of the analysis. Identifying the causes and the consequences of the statistical anomalies raises the value of our contributions to our operations and to the company as a whole. I think all of these discoveries are exciting and are making a real difference.”

Among the responsibilities of the financial analyst is analyzing the management of current assets—cash, marketable securities, accounts receivable, and inventory. Current assets reflect the essence of a company’s operations, but, if they are not managed carefully, they can consume all of the firm’s operating funds and managerial attention. In this chapter, we will provide an overview of how financial managers oversee some of the current assets and how they manage the tradeoff between risk and return. Recognizing that risk is really “uncertainty” acknowledges that most people find uncertainty uncomfortable. To endure that discomfort the average individual wants to be rewarded; the greater the uncertainty, the greater the reward must be to persuade us to take on the risk. If there were no possibility of reward, few of us would take on any risk.

Examining this risk-return relationship helps the analyst gain insight into the strengths of a company and both the philosophies and attitudes of management. For example, a higher current ratio would appear to make it easier for a company to pay its bills, reducing the risk to management. However, if the current ratio is greater than 1, some of the short-term assets have been financed with long-term, higher cost money, resulting in a lower return for the shareholders. Therefore, the analyst, when considering risk and return, needs to clearly understand and explain the perspectives used in the analysis.

As shown in the previous examination of nine companies, the current and quick ratios are often lower than might seem prudent. Therefore, a closer examination of the management of current assets will give greater insight into what management sees in its daily operations.

CASH MANAGEMENT

Consider cash, for example. High levels of cash provide high levels of liquidity, but when interest rates are low, the company realizes low earnings on that cash. Since the cash belongs to the shareholders, the management, if it is not the owners of the business, has decided to forgo shareholder earnings in order to reduce the pressure on themselves. Conversely, a low level of cash may raise earnings, but impose pressure on management to generate sufficient cash every day to pay bills and meet obligations.

Financial analysts need to be able to identify proper cash management techniques so that they can take full advantage of their firm's cash position while balancing the interests of the shareholders and those of management. The following sections describe the primary motives for holding cash as well as cash collection and disbursement techniques that make the cash system more efficient. Finally, this chapter discusses possible uses of excess cash, such as investment in marketable securities or taking advantage of trade discounts.



Think About It . . .

The saying “cash is king” makes cash seem and sound important, and implies that “more is better.” Is that true? Your answer says a lot about you and your view of risk and security. Explain why you answered as you did.

Motives for Holding Cash

There are four basic motives for holding cash—the transaction motive, the precautionary motive, the speculative motive, and the compensating balance requirement motive. The precise level of cash differs among firms and industries, depending on the ease of predicting cash flows, the availability of investment opportunities, and the number and degree of risks that financial managers are willing to take.

The Transaction Motive

Most firms maintain a predetermined, minimum amount of cash to meet day-to-day transaction needs. How much this minimum amount is depends in part on the ability of the financial manager to forecast the expected cash inflows and outflows accurately. Consequently, by forecasting cash flows and billing customers so that cash receipts coincide as much as possible with cash payments, companies can reduce their cash balances for transactions. As a rule, firms that have highly irregular cash flows can be expected to maintain higher levels of cash or marketable securities than firms with predictable cash flow patterns. Similarly, firms that have seasonal fluctuations in sales can be expected to maintain larger amounts of cash during peak periods.

The Precautionary Motive

Precautionary balances act as protection from emergencies or unexpected requirements. Usually, the financial manager wants to maintain a cushion of cash so that financial embarrassment resulting from a failure to meet obligations rarely occurs. The size of the cushion depends on the confidence the financial manager has in the cash flow projections and on their aggressiveness in assuming financial risks. The more predictable the firm's cash flows, the less precautionary cash the firm will feel compelled to hold. Because the emergency cash requirement is unknown, precautionary balances are often quite high. An alternative to holding large precautionary balances is arranging for available short-term, short-notice credit, recognizing that the interest expense which might be incurred will be less than the opportunity cost lost by holding large amounts unnecessarily.

The Speculative Motive

Some financial managers like to maintain an extra reserve of cash to capitalize on attractive investment opportunities. These opportunities might include the acquisition of other companies or speculation in inventory purchases. For example, some firms might accumulate cash in anticipation of a drop in raw material prices. In addition, having a ready supply of cash enables the firm to take advantage of valuable trade discounts more easily. However, taking discounts should be part of the normal operations. The better job the firm does of its overall and focused planning, the more predictable these unusual opportunities become. As with precautionary balances, if the size of the prospective opportunity is unknown, the firm would need either a substantial speculative cash balance or available, short-term, short-notice credit to fund unexpected opportunities until appropriate longer term financing could be arranged.

The Compensating Balance Requirement Motive

Corporations also hold cash for the purpose of meeting bank obligations. In fact, compensating balance requirements often determine a large percentage of a company's cash holdings. Banks perform a number of important services for the corporation in addition to lending funds. The bank expects reimbursement in the form of either direct fees or compensating balances. A compensating balance (which is an indirect cost) is a predetermined amount of cash that the firm agrees to keep in a demand account in lieu of other charges. The compensating balance is often stated as a percentage of a loan and really is designed to increase the effective rate of interest on that loan. However, if the firm normally maintains a minimum balance in its demand deposit account, it is possible for some of its money to perform a double duty. Sometimes a minimum demand deposit account balance can serve both as a precautionary balance and also as a way to meet a compensating balance requirement.

Collection and Disbursement Techniques

In the past many firms employed sophisticated cash-management techniques designed to accelerate cash inflows and delay cash outflows most effectively.

The complexities of these systems depend on the size of the firm and the scope of its operations. Small firms had comparatively simple systems, while large firms had more elaborate, expensive systems. However, the rapid and dramatic increase in electronic payments has reduced the use of checks and the availability of any float—the difference in time between the moment a check is written and the moment the cash balance in the bank is actually reduced. During 2003 and 2004 the Federal Reserve System reduced the number of regional check processing centers by approximately half, reflecting the sharply reduced use of checks to make payments, whether commercial or individual. Since that time the use of checks has continued to decline and the use of electronic payments has continued to increase.

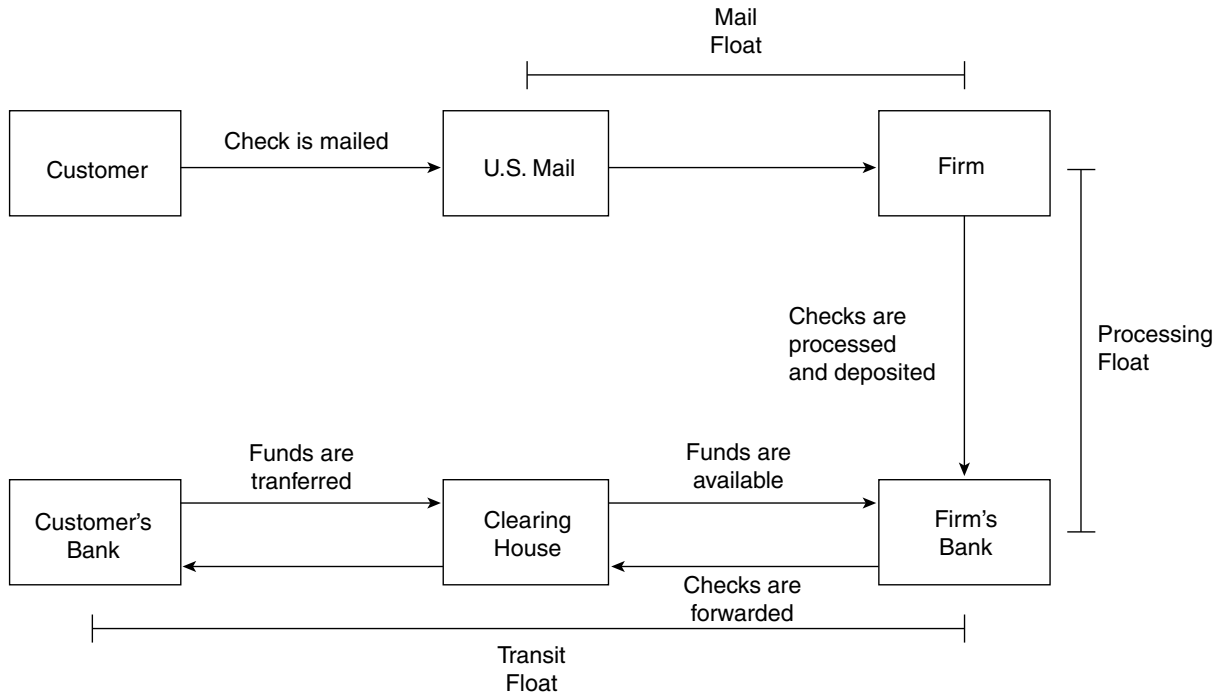
Cash Collections and the Concept of Float

Float is the length of time and amount of money between payment of funds and their availability to the counter party. Traditionally, paying companies sought to maximize float while receiving companies sought to minimize it. While the Federal Reserve has been trying to reduce absolute float for years, and the rise of funds transfer technologies in recent years has dramatically reduced overall float, it remains a significant cash management consideration, although it will continue to decrease going forward. That said, the reduction of float is still a central concept in expediting cash collections. Float is considered to be positive when the firm has written checks and still has use of the funds; it is considered to be negative when the firm is waiting to use the funds. The three types of float are illustrated in Exhibit 4–1 and discussed in the text that follows.

1. *Mail float* is the time lapse between the moment a customer mails a check and the moment the selling firm begins to process it. As more and more companies and individuals pay electronically, mail float is diminishing.
2. *Processing float* is the time it takes the selling firm to deposit a check into the bank after receiving it. As we will see, the use of lockboxes and electronic payments reflect efforts to reduce processing float as well as mail float.
3. *Transit float* is the time required for a check to clear through the banking system and become a usable source of funds for the firm. Checks are processed either through the Federal Reserve System or a local clearinghouse. Checks cleared through the Federal Reserve System require a maximum of two days, but only one day if the paying bank and the collecting bank are located in the same Federal Reserve district. The use of Check 21 and other electronic transmission technologies has reduced transit float significantly.

With electronic banking, virtually all of the float is eliminated. Cash balances are more accurately reported throughout the financial system. The decline in float has led to changes in payment practices and broadened payment negotiations. Consider the following scenario.

In the past when a company paid its bills by check, the combination of mail float, processing float, and transit float equalled seven days. Today, an

E**xhibit 4-1
Types of Float**

electronic payment reaches the vendor in seconds. The customer has lost seven days of cash usage and the vendor has gained that seven days. The alert customer could negotiate a longer credit period, adding perhaps five days, in return for making electronic payments. Both companies benefit by splitting the float and reducing their processing and accounting expenses, taking advantage of the benefits of electronic transactions and sharing the benefits more equitably.

While check float still exists, it is decreasing every day. With the decreased use of checks as payments, all check-based collection improvement technologies are declining as well. For many years, companies have used lockboxes to accelerate the payment from the customers into their accounts. A lockbox is a post office box arrangement between a company's bank and a post office in a regionally advantageous location, to reduce the amount of time from when the customer mails a payment until it is received and can be processed. The bank collects the mail and processes it into the company's bank account, reducing the mail float and the processing float. Lockbox services have become increasingly efficient, facilitating the transition to electronic receipts, processing, and mapping into the company's accounts receivable system, without the intervention of the company, reducing the internal processing time to zero, and collapsing the benefits of attempting to manage float.

Bank Transfer Techniques

Recognizing that larger balances increase the earning power and negotiating power, companies with multiple locations often employ centralized cash management with professional cash managers as part of the corporate staff. They bring cash receipts from their various collection points to a central banking facility for short-term investment and for cash disbursement control purposes. Both banks and large firms that have many offices use a variety of transfer techniques for moving funds between banks. The most popular transfer techniques include the electronic depository transfer check, the depository transfer check (DTC), the wire transfer, and the preauthorized check.

1. *Electronic depository transfer checks* clear in one day. An electronic DTC may cost less than an ordinary DTC (see #2 below) and avoids the uncertainty associated with mailing. Deposit information is transferred through a communications network by magnetic tape or direct computer links to the concentration bank several times during the day. The concentration bank then completes a DTC and credits it to the firm's account. An electronic DTC is then sent to the firm's local bank requesting funds.
2. *Depository transfer checks* are used when electronic transfers are unavailable or, for some reason, inappropriate. These are preprinted, nonnegotiable instruments payable only to the bank of deposit (the regional or concentration bank). Customer payments are processed and deposited in local banks used by the subsidiaries or divisions, and a DTC is mailed to the firm's concentration bank. The local bank processes the checks and transfers the funds to the concentration bank while the DTC is in the mail. The corporate account will have the use of the funds once the DTC has been received and cleared. This usually takes several days. These DTCs are decreasing in use due to the advent of electronic DTCs.
3. *Wire transfers* are another means of transferring funds between banks. Wire transfers may be sent through a bank wire system or the Federal Reserve System. In either case, funds are made available on the same day. The cost, however, is quite high compared with other transfer techniques. Financial managers need to consider the trade-off between decreasing float and increasing transfer costs. Wire transfers are generally suitable only for transferring large amounts on a periodic basis.
4. *Preauthorized checks* are sometimes used by firms that receive a large number of regular payments. A preauthorized check appears to be an ordinary check, but it does not require the signature of the person on whose account it is being drawn. Thus, the customer authorizes the firm to draw checks directly from the customer's demand deposit account. This procedure reduces mail and processing float and ensures consistency and certainty of payment. Today, these preauthorized checks usually take the form of electronic transactions, authorized by the payer and conducted routinely bank to bank. An example would be the regular monthly mortgage payment processed automatically.

Cash Disbursement Techniques

Financial managers of many firms not only are interested in accelerating cash inflows, but also are attempting to postpone payments as long as they can legally do so without harming the reputation of the firm. These managers

need to be concerned about inefficiencies in dispensing cash and should attempt to minimize excess account balances and control disbursements whenever possible. The following cash disbursement techniques are designed to improve control over payments and minimize the amount of idle money.

Zero Balance Accounts

Providing centralized cash control at the main corporate office, the zero balance account (ZBA) also permits flexibility in divisional cash disbursing. A ZBA system requires all accounts to be included in the same concentration bank. Authorized employees are still able to make payments from their individual accounts, but no funds are maintained in these accounts. Divisional employees make payments and accumulate a negative bank balance daily. The daily negative balance is cleared by the release of funds from a corporate master account. If the master account has insufficient funds, the remainder needed is obtained by using a line of credit with the bank, by issuing commercial paper, or by selling Treasury bills. Consequently, each day the divisional bank balances are restored to zero. The zero balance account offers the firm with many operating divisions several benefits:

- Greater centralized control over disbursements can be maintained.
- Redundant compensating balances can be reduced.

Cash management can be more efficient because it becomes easier to invest idle cash, reconcile aggregate account balances, save on cash transfer expenses, and reduce cash management time.

Controlled Disbursement

Some financial managers may try to extend disbursement float by engaging a small bank in a distant location, so as to increase the mail float. Additional float may be gained by choosing a disbursement bank in a city that is also distant from a Federal Reserve bank. For example, when refunds are paid by check, they are often processed by Young America Corporation in Norwood Young America, Minnesota. The firm thereby receives transit float in addition to mail float. These remote disbursement techniques may serve to delay payments. However, the issuing firm must weigh the benefits of added float against the ill will that it may generate from those awaiting payment. The paying firm may well realize that reputation is a paramount concern that should not be taken lightly.

In 1979 the Federal Reserve recognized an increase in remote disbursement use and issued a statement that requested banks to discourage this practice. It forbade companies from issuing checks from banks in locations where it had no operations. However, continued use of controlled disbursement banks appears to be prevalent, since slow check-clearing bank locations are publicized on a regular basis.

Drafts

Drafts are similar to checks in that they are a written order to pay and have the physical appearance of checks. An employee of the company writes a draft, but it is not drawn on a bank. Rather, a draft is drawn on the issuing firm and presented to the issuing firm's bank. After the bank receives a draft, it sends

the draft back to the issuing firm and awaits approval (the employee has the authority to write a draft, but not a check). Funds are not released until the corporate issuer has approved those drafts that he or she wishes to pay. The bank will generally withhold payment for one business day and will then cover the payment automatically unless otherwise directed. The issuing firm generally inspects the draft for inaccuracies in signatures, amounts, and dates. Payment on an issued draft can be cancelled easily if any discrepancies are found.

Although drafts may give the firm extra float time, their main advantage lies in ensuring effective control over field payments. Draft payments are popular in the insurance industry, for instance, where field agents are able to settle claims quickly even though they lack the authority to issue checks. By using drafts, the central office improves efficiency in field operations yet still exercises the option to eliminate any payments deemed inappropriate. A summary of cash collection and disbursement techniques is shown in Exhibit 4-2.

In considering all these cash management techniques, the analyst should bear in mind the tradeoff of the limited and decreasing benefits of float and the costs incurred to achieve them. The improvements in electronic banking services have reduced costs throughout the invoicing, billing, and accounts receivable functions in the seller and the accounts payable validation, approval, and payment systems of the buyer, and can be expected to continue to do so. Other cash management tools will be more valuable in the future.

Other Aspects of Cash Management

While the average financial analyst's responsibilities do not typically include managing a marketable securities portfolio, analyzing bank compensation, or calculating the effective cost of trade discounts, it is important for the analyst to maintain a general awareness of these areas in light of future promotions. In a similar vein, all managers should be cognizant of the levels and availability of liquidity (cash and cash equivalents) in their company. A firm with substantial liquidity is more flexible and able to respond to opportunities, facilitating managerial actions that will enhance shareholder value. The following sections provide a basic overview of these and other aspects of cash management.

Evaluating a Marketable Securities Portfolio

Once a firm has implemented the appropriate means to accelerate inflows and delay outflows, the next step is to identify the timing of the cash flows through the implementation of a cash budget. Firms with a cash surplus can invest in marketable securities, while those with a cash shortage need to borrow from external sources. Larger companies usually invest directly in highly-liquid, low- or no-risk short-term securities such as Treasury bills, commercial paper, certificates of deposit, Eurodollar time certificates, and floating rate and market auction preferred stock. Smaller companies do not invest enough to justify the employment of a trained manager of marketable securities portfolios and a financial analyst to evaluate the many investment objectives. Instead, smaller companies tend to invest surplus cash in money market mutual funds.

Marketable securities are sometimes held instead of larger cash balances to be used when the need for cash arises due to increases in accounts receivable and inventories. Holding marketable securities rather than cash is directly

E xhibit 4-2 Summary of Cash Collection and Disbursement Techniques

<i>Technique</i>	<i>Purpose</i>	<i>Description</i>
<i>Cash Collection</i>		
Electronic depository transfer check	Reduces the mail float of a depository transfer check.	A means of transmitting deposit information electronically to a bank.
Lockbox	Reduces mail, processing, and transit float.	A separate depository account that permits the firm's bank to collect and process receipts
Depository transfer check	Promotes efficient utilization of funds.	A preprinted, nonnegotiable check that transfers funds between banks.
Wire transfer	Eliminates mail, processing, and transit float.	A vehicle for transferring funds between banks immediately.
Preauthorized check	Reduces processing and mail float.	A check written by the firm and drawn on the customer's account that by mutual agreement does not require the customer's signature.
<i>Cash Disbursement</i>		
Zero balance accounts	Increases the efficient use of cash payments, cash balances, and float.	Checks are drawn on accounts in a concentration banking network, and the balance of each account is restored to \$0 on a daily basis.
Controlled disbursement	Increases positive float.	Checks are issued from banks that are geographically distant from the receiver.
Draft	Increases control over payments and increases positive float.	Drafts require an approval from the firm prior to release of funds.

correlated to interest rates (higher interest rates increase securities holdings) and inversely related to the time needed to convert the securities to cash (longer liquidation times decrease securities holdings). Many companies prefer to borrow via bank loans to meet such seasonal needs instead of buying and then liquidating marketable securities as needed. Other considerations for investment in marketable securities include price, risk, liquidity, and yield. Exhibit 4–3 summarizes many of the available marketable securities and briefly describes the various characteristics of each.

Analyzing Bank Compensation

On occasion, financial analysts need to evaluate bank compensation in order to best determine which banks to use for a given set of services. Compensation can be achieved through idle balances left in a demand deposit account (compensating balances) or through payment of fees. The bank should advise a

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xhibit 4–3 Characteristics of Money Market Instruments

<i>Instrument</i>	<i>Description</i>	<i>Denomination</i>	<i>Maturity</i>	<i>Basis</i>	<i>Marketability</i>
U.S. Treasury bills	Direct obligation of the U.S. government. Exempt from state and local income tax.	\$10,000 and up	91 days to 1 year	Discount	Excellent secondary market
Federal agency securities	Obligations of corporations and agencies created by the U.S. government.	\$1,000 and up	5 days to more than 10 years	Discount or coupon	Good to excellent secondary market
Banker's acceptances	Time drafts issued by a business firm and accepted by a banking institution.	\$25,000 and up	30 to 180 days	Discount	Good secondary market for large money market banks
Negotiable time certificates of deposit	Receipts for funds deposited at commercial banks for a fixed period of time.	\$25,000 and up	30 days or more	Interest bearing	Fair to good
Short-term tax-exempts	Notes of local agencies (e.g., housing, state, and municipal) that are exempt from federal income tax.	\$1,000 and up	60 days to 1 year	Interest bearing or discount	Good secondary market
Commercial paper	Short-term unsecured promissory notes issued by large finance companies or industrial firms.	\$5,000 and up	3 to 270 days	Interest bearing or discount	No secondary market; buy-back arrangement may be negotiated through dealer
Eurodollars	Dollar-denominated time deposits at foreign banks.	\$1,000,000 and up	1 day to 1 year	Interest bearing	No secondary market
Repurchase agreements	Simultaneous sales and repurchase of government securities.	\$500,000 and up	1 day or more	Not applicable	Limited secondary market
Money market mutual funds	Diversified portfolio of short-term money market instruments.	\$1,000 and up	1 day or more	Accrued on net asset value	Excellent secondary market

company of the costs charged for servicing the company's account, and the exact amount of the balances or fees can be negotiated. For years, banks were hesitant to provide this information, but today most are willing to provide a listing of the costs of their services (these costs do include some element of profit) and a monthly accounting of activities in the company's account. Exhibit 4-4 is one form that banks use for the latter purpose.

Taking Trade Discounts

One of the benefits of maintaining a healthy cash position (in the form of cash or its equivalent, and marketable securities) is that it allows the firm to take advantage of trade discounts. Many commercial transactions involve a discount for prompt payment, often 2 percent if the bill is paid within ten days (terms stated as 2/10, net 30). Consider the advantages of being able to take this discount. If the firm takes the full thirty days instead of paying in ten days, it is, in effect, borrowing from the vendor for twenty days. For every \$100 in purchases, the buyer is paying \$2 (by forgoing the 2 percent discount)



xhibit 4-4 **Monthly Checking Account Analysis**

Account Earnings

Average daily balance	\$408,201.67	
Less average daily uncollected funds	49,870.00	(1.0 days)
Average daily collected balance	\$358,331.67	
Less reserve requirement 13.5 percent	48,374.77	
Less compensating balance 0.00 percent	0.00	
Average daily investable funds	\$309,956.90	
Income/(cost) of funds @ 2.5 percent per annum	\$309,956.90	\$645.74
<i>Total earnings (or cost) of funds</i>		<u>\$645.74</u>

Account Services

Account maintenance	2 @ \$5.00	\$ 10.00
Checks paid	657 @ \$0.10	\$ 65.70
Deposits	32 @ \$0.20	\$ 6.40
Deposited items	267 @ \$0.02	\$ 5.34
Stop payments	1 @ \$10.00	\$ 10.00
Transfer of funds	0 @ \$2.00	\$ 0.00
Return deposited items	1 @ \$5.00	\$ 5.00
Overdraft assessment	0 \$0.00	\$ 0.00
Other miscellaneous charges	0 \$0.00	\$ 0.00
<i>Total cost of regular services</i>		<u>\$(102.44)</u>
<i>Profit (or loss) on regular services</i>		<u>\$ 543.30</u>

Other Services Provided

<i>Total cost of other services</i>	
<i>Profit (or loss) on all services</i>	<u>\$543.30</u>

for the additional twenty days. If the firm makes payments in 30 rather than 10 days throughout the year, it will lose effectively the discount 18 times (because there are that number of full 20-day periods in a year). The following equation shows the effective cost of not taking the discount:

$$\begin{aligned} \text{Annual cost (rate)} &= \frac{\text{Cost}}{\text{Amount borrowed}} \times \frac{365 \text{ days in year}}{\text{Number of extra days in not taking discount}} \\ &= \frac{\$ 2}{\$98} \times \frac{365}{20} \\ &= .0204 \times 18.25 \\ &= 37.2\% \end{aligned}$$

Even in the late 1970s, when the prime rate reached 20 percent, any solvent firm could borrow at a rate lower than the cost of not taking discounts.

QUICK QUIZ 4-1

Answers to QUICK QUIZ questions can be found starting on page 191.

Bankers frequently require borrowers to maintain a minimum balance on deposit with the bank as one of the conditions for approving a loan. The real purpose of the compensating balance is to:

- (a) Assure that the borrower has at least a minimum level of liquidity at all times.
 - (b) Raise the effective rate of interest on the loan.
 - (c) Provide a level of security for the borrower.
 - (d) Increase the assets of the borrower to compensate for the increased level of liabilities represented by the loan.
-

ACCOUNTS RECEIVABLE: CREDIT AND COLLECTION POLICIES

Periodically, a financial analyst may be called upon to help evaluate a corporate credit policy. Credit policies include credit quality standards, credit terms, and collection efforts. The financial analyst's task is usually to compare the calculated benefits and costs associated with a new policy. The following sections illustrate how these calculations and decisions might be made regarding these three policy areas.

Credit Quality Standards

Assume that Acme Manufacturing receives an order from a new customer who wants to buy \$5,000 worth of goods under the usual terms of 2/10, net 30 (2 percent discount if the bill is paid in 10 days, full amount due in 30 days).

Acme's first step will be to request credit information on the prospective buyer. The two leading sources of commercial credit information are the reporting services Dun & Bradstreet and TRW. These services use their computerized information systems to provide fragmentary information regarding the buyer's financial condition (current ratio, net worth, and so forth), but the most important information they offer describes the customer's bill-paying habits. For example, does the buyer usually take discounts, pay in 30 days, or pay in 60 days? If the selling firm is willing to accept slow-paying customers, it will have greater sales volume. On the other hand, slow-paying customers mean higher financing costs to carry higher receivables, greater collection efforts and higher credit management and collection costs, and higher bad-debt losses.

Acme usually extends credit only to firms that pay their bills within 60 days. However, Acme is currently experiencing excess capacity and would like to sell the additional \$5,000 worth of goods to the new customer. Both Dun & Bradstreet and TRW report that the customer is experiencing some liquidity problems but does pay its bills in 60 to 90 days, with one recent exception when it took 100 days. To decide whether or not to sell to the new, slow-paying customer, Acme must quantify the cost of carrying the account for the additional days and weigh the probability that it may never be paid. Assume the gross profit on the \$5,000 order is \$500; the cost of the inventory is \$4,500. Acme estimates the probability that its customers will not pay their bills is 5 percent, so the allowance for bad debt expense is \$250 (5 percent of \$5,000). Acme estimates this customer will take 75 days to pay its bill, so the likely interest carrying costs are \$140 (Acme borrows from its bank at 15 percent; $75/365 \times .15 = .031$; estimated interest cost of $.031 \times \$4,500 = \140). Acme's analysis to determine potential profit would be shown as:

Expected increase in gross profit	\$500
Cost of probability of bad debt	(250)
Increased carrying cost	(140)
Incremental profit	<u>\$110</u>

In this case, the incremental profit from the order is \$110, so Acme should probably take it, assuming there are no additional negative factors to consider. (Note: The facts in this case are skewed to make the decision closer. Usually, gross profit is higher and interest rates are lower, which would make this opportunity even more attractive.)

Some analysts use variable margin rather than gross profit margin in conducting this analysis, recognizing that, if Acme has excess capacity, its fixed costs are not relevant to this calculation. In doing so, the analyst will make taking this new order even more attractive. The analyst needs to determine which calculation is more appropriate to use. He or she must also assure that this marginal order, or its continuation, will not force out some more profitable regular order that will return to the production schedule in the near future.

Credit Terms

By instituting a more liberal discount policy, a firm may increase its volume of business but will also cut into its gross profit margin. For example, if Acme Manufacturing customarily extends a 2/10, net 30 discount policy, it would probably get more business by switching to a 3/10, net 30 or a 2/15, net 30 policy. However, Acme should be careful about making such a move because it could set off competition from similar firms, which could permanently lower the profit margin in the industry. It should be noted that, once offered, discount terms are very difficult to rescind for later sales. A change in terms to facilitate sales is a long-term decision.

Changing credit terms to a net 45, or even net 60, policy might increase business as well. Again, Acme would want to take care to weigh the potential benefits of such a move against additional carrying costs, particularly since many of its current prompt-paying (30-day) customers might also lengthen their payment periods. When interest rates are high, Acme does not want to become a banker to its customers.

Collection Efforts

How should Acme deal with its chronically slow-paying customers? When should a letter be sent to notify a customer that payment has not been received? When should there be follow-up telephone calls? When should the account be turned over to a collection agency? Each of these actions involves some cost, not to mention possible loss of the customer's goodwill and business. On the other hand, if the customer who typically pays bills in 60 days can be encouraged to pay in 45 days, Acme will realize considerable savings in carrying costs.

Accounts receivable constitutes a large portion of the working capital of the average firm. The financial analyst and the credit manager should work together to establish credit policies that balance the trade-off between the business gained through extension of more liberal credit and the costs of extending it. In general, neither a very liberal nor a very strict credit policy is desired. If a firm experiences no bad-debt write-offs, it is probably being too strict in its credit policies and is shutting out quite a bit of business. On the other hand, a firm's percentage of bad-debt write-offs, as measured against sales revenues, should not exceed industry norms.

INVENTORY MANAGEMENT CONSIDERATIONS

Another, larger component of working capital assets is inventory. Financial analysts must incorporate an understanding of inventory management into their analytical skillsets.

For many companies, inventory is the largest account in their current assets. For some, inventory is the largest account on the entire balance sheet. Clearly, inventory is of major importance, and it frequently gets only limited management attention. Yet, because it represents such a significant use of fi-

nancial resources, it demands focused analyst and managerial attention. All managers, whether in finance or any other discipline, should pay close attention to inventory, whether in the form of saleable goods or other resources, because the effective management of these resources supports the generation of revenue, but less effective management creates high costs that can rapidly drain cash and operational capacity.

Inventory for manufacturers is comprised of raw materials, work in process, and finished goods, and may also include supplies. Inventory is carried at the lower of cost or market, usually cost; the inventory balance, because it is material to the company, must be confirmed at least annually. Most companies maintain detailed records of inventory on hand and in process, taking a complete physical count of all inventory everywhere it may be and frequently shutting down all business activity during the time of the count.

Raw Material

Raw material is the basic building block of a product. Sometimes it is a natural product purchased, stored, and processed in bulk, but sometimes the raw material of a complex and expensive technical product is comprised of high-cost, sensitive, fragile components requiring very careful handling and control.

As products evolve, materials in their content change. The consequence may result in raw material that has been designed out of the product, leaving excess, obsolete, unneeded inventory. The market for this abandoned material may be small or even nonexistent, so managing this inventory is crucial. A financial analyst focusing attention on raw material inventory can make an exceptional contribution to the financial control of the raw material inventory investment.

Work in Process

Work in process inventory is just what it sounds like, but to a financial analyst it is a repository of cost with no immediate value. It cannot be sold as is and will require more cost before it can be converted to realizable value. Many companies hold partially completed product in order to be able to convert the partially completed product into a customer order quickly. In other cases the work in process is staged to assure that the production workers always have product to work on or to serve as a store of cost in order to minimize unabsorbed cost that would otherwise flow through to cost on the income statement not associated with the generation of revenues, resulting in lower or eliminated profits in slow volume months. However, as will be apparent when the cost of carrying inventory is discussed shortly, the effect of carrying inventory, in any form, is much higher than many managers understand. The development of cost-focused managerial accounting techniques has served to bring the issue of wasted expense to the attention of managers and commentators.

Finished Goods

Most managerial attention to inventory is concentrated on finished goods. Finished goods have the most value, but also should represent the easiest op-

portunity to turn the inventory investment into revenues and cash. In addition, inventory in nonmanufacturing companies is usually confined to finished goods.

If finished goods are current and of good quality, they represent a valuable critical asset. However, if the finished goods are old, obsolete or out of season, or excessive, they represent an exceptional drain on company resources. Think about alternative ways to deal with excessive or obsolete finished goods. Whether it is to discount the price deeply, to write off and dispose of the product, stop producing and try to work off the excess, or some combination of these, the cost incurred and the management time and effort involved to bring the finished goods inventory back to the desired level makes careful inventory management an imperative.



Think About It . . .

Inventory is frequently described as “goods available for sale,” which sounds favorable, but it can also be described as “unsold goods,” which does not sound as positive. How do you view inventory?

Over the past fifty years, inventory management and production control have been transformed, reflecting the influence of Japanese manufacturing and control techniques, coupled with a heightened awareness of the cost of carrying inventory. A number of Japanese management techniques have become mainstream, including terms such as:

- Jodoka – stopping the line – addressing the problem immediately
- Kaizen – continuous incremental improvement
- Kanban signal card – pull system demanding stock, the essence of just-in-time
- Keiretsu – vertical integration – having supply close at hand
- Muda – waste – measured in all forms and eliminated absolutely

All have become a regularly used part of the business and cost management lexicon.

In the 1970s and 1980s, Japanese manufacturing techniques became a major influence in the U.S. manufacturing environment and a sequence of cost focused techniques, including activity-based costing (ABC), target costing, lean processing, and the balanced scorecard that have helped many companies reduce costs, improve operations, and become more competitive globally. The application of inventory management and demand forecasting tools, such as economic order quantity, focused attention on inventory carrying costs specifics, and the information was startling.

With high interest rates in the early 1980s, the managerial focus on inventory management intensified, triggering a revolution in the attention on cost management overall. With the rapid evolution of cost management tech-

E**Exhibit 4–5
Representative Inventory Carrying Costs**

- Space
 - Interest or Opportunity Cost
 - Handling (Personnel)
 - Property Taxes
 - Utilities
 - Insurance
 - Obsolescence
 - Theft
 - Security
 - Inventory Control Systems
 - Damage
-

niques, attention on the cost of carrying inventory increased dramatically. Exhibit 4–5 provides a representative list of inventory carrying costs.

A number of analysts have estimated that these costs often equal 30% to 40% of the average inventory value on an annual basis. Some analysts have even suggested that, particularly because inventory is often lost or unusable, the costs could be as much as 100% of the average inventory value annually.

The focus on inventory carrying cost has led to a concerted effort to reduce inventory levels which has driven up inventory turnover rates dramatically. In the early 2000s Dell Computer reported inventory turnover (COGS/Inventory) as high as 97. More recently, Apple, Inc. (2012) reported inventory turnover at 111, equal to about 3.25 days of stock. Such turnover rates have reinforced company efforts to lower and better control inventories, contributing to the reduction in the cash conversion cycle and to improvements in profitability and business performance. The financial analyst must be comfortable analyzing all aspects of working capital management, and must be facile at linking parts of the analysis to other parts and one ratio or group of ratios to another ratio or part of the analysis. It is the development of the whole picture, and the ability to translate it into forward projections and expectations that will make the analysis most valuable.

**Think About It . . .**

What does it cost to carry idle or underutilized fixed assets? The carrying costs may be similar to those for excess inventory.



This chapter began with a discussion of the alternative current asset strategies available to the firm. The four basic motives for holding cash were explained: the transaction motive, the precaution motive, the speculative motive, and the compensating balance requirement motive. In the examples dealing with cash management and credit policies, we attempted to show that the cost of an extremely lean or aggressive current asset level probably outweighs its benefits. By the same token, an extremely high level of current assets is very expensive, especially in an inflationary environment. We examined key inventory management considerations, including new material, work in process, and finished goods. Several ways to evaluate the trade-offs involved in current asset and working capital management were suggested.



Review Questions

1. One method of improving accounts receivable turnover is to institute: 1. (d)
 - (a) a checking account system.
 - (b) a savings account system.
 - (c) an accounts payable system.
 - (d) a lockbox system.

2. If a firm is unable to take a trade discount (2/10, net 30), the effective annual cost, assuming the firm pays the bill on time, is: 2. (d)
 - (a) usually lower than the prime rate.
 - (b) about 10 percent.
 - (c) about 25 percent.
 - (d) about 37 percent.

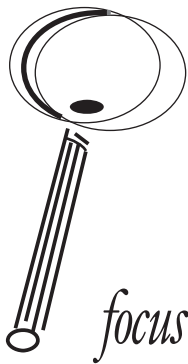
3. If a company has a current ratio of 1.2, a quick ratio of .8, and current assets of \$600,000, what is their investment in inventory? 3. (a)
 - (a) \$200,000
 - (b) \$400,000
 - (c) \$500,000
 - (d) \$720,000

4. The cost of carrying inventory is estimated to be: 4. (c)
 - (a) 10 to 20 percent.
 - (b) 20 to 30 percent.
 - (c) 30 to 40 percent.
 - (d) 100 percent.

5. Treasury bills are popular money market instruments even though they do not offer: 5. (a)
 - (a) high yield.
 - (b) price stability.
 - (c) flexible maturities.
 - (d) good marketability.

5

Evaluating Capital Investment Proposals



Learning Objectives

By the end of this chapter, you should be able to:

- List the elements in the capital budgeting process and the key issues to consider.
- Define the cost of capital or discount rate.
- Determine the cash flow from an investment.
- Describe the steps for assessing and measuring risk when making investment decisions.
- Evaluate capital investment proposals using at least six techniques.
- Describe the strengths and weaknesses of payback.
- Explain the role of the post-audit in the capital budgeting process.

Collaborating to Improve Investment Strategies

“As the next meeting began, Susan, who had not spoken up at any previous meetings, said, “I like these meetings. It helps me feel less isolated and helps to know that my issues are not unique to my business. I was wondering: Can we use these techniques in other areas of our jobs?”

Alfredo responded, “It’s great that you asked. I wanted to explore our investment programs and your question offers a perfect introduction.”

“We have usually focused our analysis of capital expenditures on how quickly we recover our investment. Our management has always felt that if we got our money back quickly, it was probably a good investment. While that makes sense, we recently realized that not everybody has used the same definition of investment, and some members of management have wondered if we have missed some good opportunities that might not develop as fast as we’d like.”

“Investment is how much we spend, right?” asked Ellen.

“It depends on what you mean by spend,” Steve responded, Al smiled approvingly and said, “Some parts of the spending come back when you are finished and some parts don’t. You need more specificity to really judge an investment.”

In addition to performance analysis, another responsibility of the financial analyst is the evaluation of proposals for company investment. Capital investment involves a current cash outlay for benefits that are expected in the future. When making the decision to invest, an important consideration is whether the investment provides a return equal to or greater than that required by investors. There are myriad factors influencing the evaluation of and final decision for an investment. Because operating managers are frequently the source of capital investment recommendations, all managers need to understand the analysis and decision making that capital investments entail. Understanding the process will enable these managers to limit recommendations to those that will be most beneficial—and to provide the information needed to get their recommendations approved and funded. This chapter will first discuss the variables or inputs needed for an evaluation—such as the cost of capital, the cash flow from an investment, and the risk factors. Second, it will examine the techniques used to evaluate capital investment proposals. The importance of evaluation is underscored by the large amounts involved, the long-term commitment involved, and the far-reaching consequences that characterize capital investments.

THE CAPITAL BUDGETING PROCESS

The capital budgeting process includes: (1) the generation of investment proposals, (2) the evaluation of cash flows, (3) the selection of investments based on some criteria, and (4) the continued reevaluation of investments. This chapter deals primarily with the evaluation process but will also describe how se-

lections are made and what criteria are applied in most investment decisions.

When evaluating capital investments, there are several components that must be considered. These include the amounts of cash flows and their timing, the return necessary to assure that the investment is satisfactory to the owners of the business, the risks that affect the attractiveness of the investment, and the consistency of the investment with the interests and activities of the business. In the following pages, we look at all of these issues and then consider some investment examples. To do this we need to establish some evaluation criteria. We will begin with the cost of capital.



Think About It . . .

Because of the inherent optimism included in a manager's recommendation of an investment, some financial analysts believe they should incorporate some conservatism in their evaluation of those recommendations. Do you think such an analytical action is appropriate? If so, how would you effect that? If not, is there some other action you would suggest?

DETERMINING THE COST OF CAPITAL OR DISCOUNT RATE

The cost of capital may be defined as the *minimum acceptable rate of return on new investments from the viewpoint of a company's creditors and investors*. As the firm's risk increases, so does the return demanded by creditors and shareholders. Consequently, there is a direct correlation between the perceived risk of the firm, the required rate of return demanded by the creditors and investors, and the resultant cost of capital borne by the firm. The cost of capital to the firm is comprised of the marginal rates of return the company must pay to investors for its different sources of long-term funds.

After a company's debt holders are paid interest and preferred stockholders are paid preferred dividends, the remaining earnings are available for the common stockholders. These earnings can either be paid as dividends or reinvested in the company. In either case, the earnings of the company belong to the common shareholders. Therefore, it is necessary to compare the return from the investment to the return expected by the shareholders, the opportunity cost. The calculation of the return that meets this requirement, after satisfying the sources of capital that claim a priority, is the cost of capital.

A common value for the marginal cost of capital is the weighted average of the marginal costs of the types of capital used to finance the company. This average is found by multiplying the cost for each type of capital by its proportion of the total amount of all capital issued by the companies. The cost of debt that is used must be the after-tax cost of debt. For example, if a company uses debt costing 11.65 percent and the effective tax rate is 40 percent, then the after-tax cost of debt is 7 percent ($11.65 \times [1 - .40]$). Suppose this

company finances 30 percent of its projects with debt and the balance, or 70 percent, with stocks requiring a 15 percent return. The weighted average cost of capital is:

$$\begin{aligned}
 \text{Weighted average cost of capital} &= (\text{Debt proportion} \times \text{After-tax debt rate}) \\
 &+ (\text{Stock proportion} \times \text{Stock rate}) \\
 &= (0.30 \times 7\%) + (0.70 \times 15\%) \\
 &= 2.1\% + 10.5\% \\
 &= 12.6\%
 \end{aligned}$$

The weighted average cost of capital should be used regardless of how a specific investment is to be financed. Using debt for an investment now may preclude its use for a subsequent investment. Also, a current investment financed solely with debt may be accepted if only the cost of debt is considered, while an investment earning a greater return financed solely through retained earnings may be rejected if only the cost of equity is considered; however, if the weighted average cost of capital had been used for both investments, it is possible that both would have been accepted.

Two basic assumptions are necessary in order for the marginal cost of capital to be used in evaluating new investments: (1) the new investments should have the same risk as the typical or average investments undertaken by the company, and (2) the financing policies of the company should be specified and they should not be affected by the investments under consideration. Given these two assumptions, the rates of return that investors in the company's securities currently require reflect the current business and financial risks of the company and its investments. However, as we will see, not all investments have average risk, so it is necessary to adjust the required rate of return to address this variability.

Determining the actual cost rates for different financing sources is very difficult, especially for common stocks. However, some appropriate assumptions, as well as application of finance theory, will provide a logical approach. First, we must recognize the relative riskiness of different sources of capital, measured through the eyes of the provider of that capital. Because debt service has a priority over dividends, debt is less risky to the investor than is equity. The cost of debt, determined by the current market rate of interest, will be lower than the cost of either preferred stock or common stock. Second, because dividends on preferred stock must be paid only after interest on debt has been paid (but must be paid before dividends on common stock) preferred stock is of higher risk than debt, but is lower risk to investors than common stock. Therefore the cost of preferred stock is lower than the cost of common stock. Beyond the relative costs of these sources of capital, the cost of common equity can be estimated using the Capital Asset Pricing Model (CAPM) that considers the firm's riskiness relative to market alternatives. The CAPM formula is:

$$k_e = k_{rf} + \beta_e^*(k_m - k_{rf})$$

Where

$$k_e = \text{cost of equity.}$$

k_{rf} = the risk-free rate, frequently equal to the average 10 year Treasury bond rate over time.

β = the beta coefficient, β_e , represents the riskiness of the firm relative to that of the stock market as a whole. For public companies there are several sources of estimated beta coefficients.

k_m = the rate of return of the market, equal to the expected average rate of return over time of a known portfolio of securities, representing the market. In this calculation, beta reflects the relative riskiness and the CAPM is the formula for a line with beta as the slope, rising as risk rises.

A company and its board often sets the required return on equity at a rate higher than the CAPM to promote a greater than market return for the company's investments. The cost of equity capital calculated this way (which will be higher than the calculated cost of capital) serves as the minimum required rate of return for profitable investments the company may choose to make. Calculating the weighted average cost of capital (WACC), described earlier, will be discussed in more depth later in this chapter.

QUICK QUIZ 5-1

Answers to QUICK QUIZ questions can be found starting on page 191.

Based on the following information, calculate the weighted average cost of capital:

<u>Capital type</u>	<u>Cost Before Tax</u>	<u>Amount</u>
Long Term Debt	12.625%	\$18,575,000
Preferred Stock	14.75%	2,137,500
Common Stock	16.25%	3,757,000
Retained Earnings	16.25%	24,105,500
	WACC?	\$48,575,000

The projected tax rate is 37%.

THE CASH FLOW FROM AN INVESTMENT

The economic value of an investment to a firm is derived from the effect of the investment on the firm's cash flow. Cash flow may be defined as money paid or received by the company as a result of undertaking the investment. It represents the true inflow and outflow of the company's purchasing power over the years of the life of the asset and is the measure of the asset's productivity.

Determining cash flow—quantitatively and/or intuitively—is difficult. Cash flow for any period may be expressed in terms of the relevant costs and

benefits associated with the investment for that period. Net cash flow due to an investment can be described as:

$$\begin{array}{r} \text{Cash benefits} \\ - \text{Cash costs} \\ - \text{Initial cash outlay} \\ \hline = \text{Net cash flow} \end{array}$$

While this measure accounts for cash, the timing of the cash flows may be a very significant consideration when making investment decisions. Net cash flow measured this way ignores the time value of money and may result in a loss of real value for the shareholders.

Cash inflows or benefits consist of revenues generated by introducing the new product or equipment as well as cash receipts obtained through salvage value or sale of replaced equipment. Cash outflows include cash expenses such as materials, labor, overhead, administrative costs, and taxes. Some expenses, such as depreciation, are not cash outflows; rather, they act as a tax shield. Increasing depreciation for tax purposes increases cash flow, because the amount of taxes paid is reduced. However, increased depreciation should not be the justification for making a capital investment. Another important consideration from the standpoint of cash flow is that the purchase price of the capital expenditure is recorded as a cash outflow at the time the asset is acquired and not over the life of the asset, even if it is paid for over time.

In evaluating capital investments, depreciation and salvage value require special consideration. For the purposes of evaluating capital investments, depreciation is determined without calculating any expected salvage value. This differs from the accounting treatment of depreciation and recognizes the uncertainty of the amount that may be recovered in the disposition of the asset. Additionally, depreciation expense should be based on the tax-mandated depreciation method rather than the accounting or reporting-based method, because the analysis is based on the after-tax cash flow from the investment, not the profit.

To be consistent, then, the salvage value expected (if any) is assumed to be received after the usefulness of the investment is ended and is taxed at the ordinary income tax rate, treating the salvage value as recovery of previously recorded depreciation. If the salvage value exceeds the original cost of the asset, any excess would be taxed at capital gains rates.

All cash flow effects must be taken into account. Some of the variables needed for cash flow projections include: estimates of equipment requirements, price estimates, analysis of replacement patterns, manpower requirements, wage rate projections, market size, and market share projections. An investment will affect the cash flow of various companies differently. As a manager, you should be aware of all aspects of the various costs and cash revenues associated with a new investment and include them in your cash flow projections.

One method of evaluating a capital investment is to treat it as a stand-alone calculation. To do this, the analyst constructs a time series of annual cash flows comprised only of elements directly related to the investment. The

calculation will use incremental revenues or savings less incremental expenses (including depreciation) to determine incremental operating profit. This profit is taxed at the company's normal income tax rate. The depreciation expense is then added to the after-tax operating profit to determine the relevant cash flow. These cash flows, from all of the years of the investment (including those related to the terminal values after the end of the investment's useful life) are prepared in a time series to be evaluated using one or several of the methods described later in this chapter.

Another method for determining the cash flow from an investment is to compare the cash flows of a company with and without the investment. This is appropriate when the investment being considered will replace existing equipment or technology that is still functional. These incremental cash flows are computed by determining the company's cash budget or cash flow over a specific period of time—usually the life of the existing investment. The next step is to project what the company's cash flow would be with the proposed investment, taking into account all of the investment's effects on the company. The difference in the cash flows with and without the investment equals the added net cash flow due to the investment. It is this net cash flow, or net cash benefit, (NCB) that is used in the analytical techniques presented later in this chapter.

To illustrate this example, suppose that a company wants to invest in a new machine for production. The new investment costs \$2,000, has a life of ten years, has a salvage value of \$500 at the end of ten years, and is depreciated on a straight-line basis for tax purposes. The effective tax rate is 40 percent. In this initial example we will use straight-line depreciation so that it is easy to follow. In reality and in later examples we will recognize tax depreciation which follows the Modified Accelerated Cost Recovery System (MACRS) rules. The table in Exhibit 5–1 determines the added cash flow due to the investment.

In this hypothetical case, the net cash benefit due to the new investment is \$530 per year, assuming that revenues and expenses are going to be the same for the next ten years. If this assumption cannot be made, then a separate net cash flow analysis would have to be made for each productive year of the asset. Note that the salvage value of \$500, before adjustment for tax, is also calculated in year 10 because that is the year the company would sell the machine and thereby increase cash flow. If this were a standalone project, the cash flows of the investment would be all that would be applicable. When evaluating capital investments, cash flow is very important, but it must be accompanied by assessments of risk, cash flow timing issues, and other uses for the funds involved.

RISK AND CAPITAL INVESTMENTS

Each investment has its own level of risk for a company. This section considers how to handle risk when making investment decisions. Risk is defined in terms of the uncertainty of future returns from an investment.

E**xhibit 5-1****Determining the Annual Added Cash Flow**

	Cash Flow without Investment	Cash Flow with Investment	Added Cash Flow Due to Investment
Annual Revenues	\$5,000	\$6,000	\$1,000
Annual Expenses Other than Depreciation	<u>3,000</u>	<u>3,250</u>	<u>250</u>
Taxes			
Revenue less Expenses	2,000	2,750	750
Less Depreciation	<u>200</u>	<u>400</u>	<u>200</u>
Taxable Income	1,800	2,350	550
Tax (40%)	<u>720</u>	<u>940</u>	<u>220</u>
After-tax Operating Profit	1,080	1,410	330
Depreciation	<u>200</u>	<u>400</u>	<u>200</u>
Cash Flow	\$1,280	\$1,810	\$530
Salvage Value			\$500
Tax (40%)			200
Profit After Tax			\$300

Assumes all revenues are received in cash and all expenses other than depreciation are paid in cash.

NET CASH FLOW FROM THE NEW INVESTMENT

<i>Time</i>	<i>Net Cash Flow</i>
0 (When asset is acquired)	-\$2,000
Each year for years 1-10	\$ 530
Year 10 Salvage	\$ 300

Types of Risk

The risk of investment proposals may be defined from two different standpoints: (1) project risk and (2) company risk. While many theorists are concerned about the portfolio risk to the investor of actions taken by management, it is not really the responsibility of a company's management to manage the portfolio risk of the investor. Too many companies make diversifying investments to try to reduce the risk to investors and, as a result, divert managerial attention from what they know to acquisitions and diversification decisions that dilute focus and damage performance.

Project Risk

Project risk, or the investment risk of an individual asset, exists whenever there is the possibility that the realized return on an investment will be different from that which is expected. All the possible returns from an investment, or the net cash benefits accruing from an investment along with their associated probabilities, comprise the probability distribution of returns on the investment. As shown later, the continuous probability distribution of returns from an investment may be used to determine total dispersion or variability of returns.

Of course the normal issues of risk, such as the current state of the economy and the industry, apply and must be recognized; however, it is more important to consider the riskiness of the investment project itself. The riskiness of the business, industry, and economy are incorporated into the required rate of return expected by the business investors, as explained in the cost of capital discussion later in this chapter.

The nature of the project highlights another important consideration. Think about the following types of investments:

Types of Investments

Replacement

Expansion

Productivity Improvement

Development

Mandatory

Other

Each of these project categories raises issues of risk or return that need to be taken into account:

- **Replacement Projects:** These projects, replacing existing equipment, technology, or capability the company already has, are the least risky types of investments.
- **Expansion Projects:** These projects, which enable the company to do more of what it already knows how to do, include more risk than the Replacement Projects because the expansion requires incremental sales and service. Frequently, these added sales take time to achieve. Further, they often involve taking market share from competitors; since competitors are likely to resist this, the goal can be difficult to achieve.
- **Productivity Improvement Projects:** These projects, which reduce costs or improve processes, are riskier still. They add two kinds of risk. The first involves changes in process or behavior, which are often difficult to implement successfully. Second, any increases in capacity or expansion that may arise from improved productivity, bring the additional challenges of expansion.
- **Development Projects:** These projects involve new products, new markets, or new technologies. These are the most difficult to accomplish and are the least predictable.

The dotted line separates projects that are expected to be profitable from those that are not.

- **Mandatory Projects:** These projects, required by law or contract, are not necessarily risky in the normal sense. However, the decision to undertake the mandatory projects has nothing to do with return on investment or cash flow. There may be no return or beneficial cash flow at all. These may involve compliance with a law or may be required by a union contract, for example.
- **Other Projects:** Similar to mandatory projects, these projects are undertaken for reasons other than return or cash flow. They may offer no return or discernible beneficial cash flow, but may be deemed desirable by management.

This list shows the least risky projects first, with progressively riskier projects down to the dotted line. Below the dotted line are types of projects that offer no financial returns. However, the projects with no returns create a challenge for management charged with providing an adequate return to the company's investors. As you will see, this problem can be addressed by having the profitable projects pay for those projects that do not offer a return themselves.

Company Risk

The perceived riskiness of the company can be addressed by considering its cost of capital. Companies develop a reputation for consistency and reliability of performance, and investors often choose their investments based on the marketplace perception of the company's performance volatility or uncertainty. The cost of capital calculation, which we use as a basis for determining the required rate of return on investments, is partially predicated on this risk perception first mentioned when describing the capital asset pricing model and the cost of equity. The overall cost of capital for the company will incorporate that cost of equity in the final calculation.

The Cost of Capital

The cost of capital, which was defined earlier, can also be defined as the minimum rate of return necessary to satisfy all of the sources of capital. It addresses the proportional requirements, the weighted average, of all classes of investors in the company: long-term debt, preferred stock (if any), and equity. Note that short-term debt is not included. First, the cost of capital is used in the evaluation of long-term investments, so short-term debt should not be the basis for investment evaluation. Second, short-term debt is less risky to the investor and requires a lower rate of return than long-term debt. Therefore, it would lower the weighted average cost of capital. Thus, excluding short-term debt will provide a more conservative basis for evaluating investments. The weighted average cost of capital (WACC) can be expressed as:

$$K = k_d * wt_d * (1-T) + k_p * wt_p + k_e * wt_e$$

Where:

K = the overall weighted average cost of capital

K_d = the cost of debt

Wt_d = the proportion that debt is to the sum of long-term debt + preferred stock + common equity

T = the tax rate

K_p = the cost of preferred stock

Wt_p = the proportion that preferred stock is to the sum of long-term debt + preferred stock + common equity

K_e = the cost of equity, determined by the CAPM

Wt_e = the proportion that common equity is to the sum of long-term debt + preferred stock + common equity

The weighted average cost of capital serves as the basis for the discount rate that will permit the evaluation of capital investments, by comparing the value of the cash flows from the original investment, which are received in time periods after the investment is made, with the value of the original investment, measured on the same basis.

The required rate of return on debt is determined by the current market rate of interest for debt issued by companies similar to the one being analyzed. Interest rates are usually fairly well known or easily determined. There is a formula for the interest rate:

$$K_d = R + drp + irp + mrp + lrp$$

Where:

K = the cost of debt

R = the basic rental cost of money, approximately 2 percent

drp = the default risk premium, reflecting the risk the debt will not be repaid

irp = the inflation risk premium, reflecting the inflation rate

mrp – the maturity risk premium, reflecting a premium for the time the money is tied up

lrp = the liquidity risk premium, reflecting the exchange risk of the debt

This formula is most useful in recognizing that the greater the risk ($drp + irp + mrp + lrp$), the greater is the return required. The interest rate is determined by the lender, but can usually be estimated quite accurately.

The required rate of preferred stock, K_p , is higher than the interest rate (K_d), because preferred stock is riskier to the investor than long-term debt.

The required rate of return on equity, K_e , is higher than the cost of preferred stock, because equity is riskier to the investor than preferred stock.

As we will see, the WACC serves as the starting point for setting, and then adjusting, the required rates of return for the different classifications of projects.



Think About It . . .

The value of a business can be increased by lowering the cost of capital. The cost of capital can be reduced by decreasing the overall riskiness of the business or by increasing the proportion of its financing provided by debt. Consider the implications for management.

Risk Measurement and Cash Flow Uncertainty

There are a variety of ways to measure project risk. One approach is the informal assessment of risk. This procedure is more qualitative than quantitative. The assessment of the risk associated with a new project or investment is based on the nature of the new project itself and on the experience of the company or the decision maker. Depending on the nature of the new project (in other words, whether it is a replacement for existing assets, an expansion of existing assets, an expansion of existing market areas, or an expansion into an entirely new area) the decision maker will include it in a particular risk class. Then, basing his or her decision on beliefs and intuition, the decision maker will put the project in a certain subclass of the major risk class. No attempt is made to measure the risk precisely, and thus the value of this type of risk measurement depends on the decision maker's ability to select the appropriate classifications for individual projects.

However, the categorization of projects by type (shown in the list from replacement to other) permits the analyst to adjust the WACC-based required rate of return for the riskiness of the project. This is presented in Exhibit 5-2. As you can see, the riskier the project type, the higher the required rate of return. The rates presented are arbitrary, but present a reasonable example. They also raise a question: What should we do about the Mandatory and Other projects that do not offer a return?

One reasonable solution is to require the profitable projects to pay for the projects that are not expected to earn a profit. This can be achieved by adjusting the required rate of return using a process akin to the markup process used for pricing.

Assume that in the example in Exhibit 5-2, the WACC = 10%.

For many companies, having differing project return requirements (as determined by perceived riskiness) is very uncomfortable and difficult to manage, particularly because advocates for different projects will seek lower return requirements or less risky project type designations. Many companies address this problem by setting a single project hurdle rate a bit above the mid-range of the risk-adjusted, mix-adjusted required rate of return. Frequently, the hurdle rate is in the 17-18 percent range, high enough to satisfy the investors while qualifying a reasonable array of capital investment projects for the company to consider. Having a single hurdle rate also avoids having managers lobby for a favorable classification for their pet project.

E**xhibit 5–2
Risk and Mix Adjusted Required Rates of Return**

<i>Type of Project</i>	<i>Required Rate of Return</i> (WACC = 10%)
Replacement	10%
Expansion	12%
Productivity Improvement	14%
Development	16%
Mandatory	0%
Other	0%

If we assume that 80% of the Capital Projects are profitable and 20% of the projects do not generate a return, the required rate of return must be adjusted so that the profitable projects provide the return necessary to compensate

<i>Type of Project</i>	<i>Adjusted Required</i>
Rate of Return (an increase of 25%)	
Replacement	12.50%
Expansion	15.00%
Productivity Improvement	17.50%
Development	20.00%
Mandatory	0.00%
Other	0.00%

Alternative Ways to Measure Risk and Cash Flow Uncertainty

The previous discussion may seem too informal and unscientific, particularly for analysis of projects or investments that are material to a company. The following pages contain a number of statistical approaches to risk measurement and cash flow predictions.

Probability Distributions

Another approach to determining risk—a much more powerful technique—considers the evident cash flow uncertainty. This technique uses subjective probability distributions of the projected cash flows. The expected cash flow is at best an educated guess. Given the probability that various levels of cash flow will occur for a certain period of time, a probability distribution curve may be constructed for the projected cash flow. The various possible levels of cash flow and their probabilities are determined by what the decision maker believes to be applicable at the time. The manager/decision maker knows specific variables that affect a project's future cash flow for his or her specific

company, although assessing all factors in a given cash flow situation is extremely difficult. The objective, then, is to pose a single probability distribution that the decision maker believes typifies the expected cash flow of an investment for each year of its life, given due consideration to all possible factors that could have an impact on the cash flow. Then the mean of this probability distribution may be used as the expected cash flow for the investment.

Part A of Exhibit 5-3 gives the visual representation of the mean and the standard deviation of two projects, A and B. Comparing the projects, we see that project A has the same expected return as project B (the means are both 10 percent), but A has a much smaller variability or standard deviation than B. Even though project B has the chance of some very high returns, it also has the chance of some losses. Project A, on the other hand, has a very small range of outcomes, all of which are positive. If forced to choose between A and B, the risk-averse person would select project A, because it involves a lot less risk for the same expected return.

In Part B of Exhibit 5-3, projects C and D have expected returns with unequal means and equal standard deviations. In this case, the risk-averse investor would clearly select project D, because it offers more return for the same amount of risk as project C.

The last two graphs (Part C) in the exhibit show an interesting problem. While project F is illustrated as having a higher expected return than project E (mean return of 20 percent versus mean return of 10 percent), project F is also illustrated as having more variability in expected return (illustrated by F having a wider, flatter curve). If the two projects cost the same amount of money, the financial manager would prefer project E. Although project F has returns with greater variability than project E, the lowest possible return from project F (approximately 15 percent) is still higher than the greatest possible return from project E. If the projects had slightly different returns and different risk levels, a manager might consider using the coefficient of variation technique. This technique (discussed in detail below) measures the amount of risk per unit of return each project offers. Although the coefficient of variation gives a numerical measure of the magnitudes of risk and return involved in the decision, it does not indicate categorically which project is better.

Quantitative Measures

The standard deviation measures the likelihood that cash flow levels different from the expected value will be attained. The greater the standard deviation of distribution, the more spread out the distribution. Thus, the standard deviation measures the degree of uncertainty of a cash flow and is a measure of risk. The standard deviation may be calculated by using the following formula:

$$\text{Standard deviation} = \sqrt{\sum (\overline{\text{NCB}}_i - \text{NCB})^2 p_i}$$

where

$\overline{\text{NCB}}_i$ = each of the n possible levels of cash flow for the investment project i

$\overline{\text{NCB}}$ = the mean or expected net cash flow

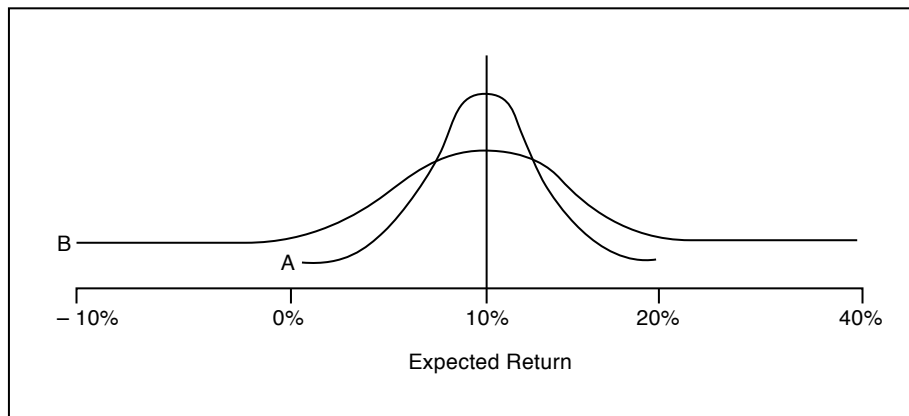
p = the probability of each possible level of cash flow

If two cash flows have the same expected level, or \overline{NCB} , the one with the greater standard deviation will be more spread out and will have a higher degree of uncertainty. Consequently, the manager would select projects offering expected returns comparable with the lowest possible standard deviation.

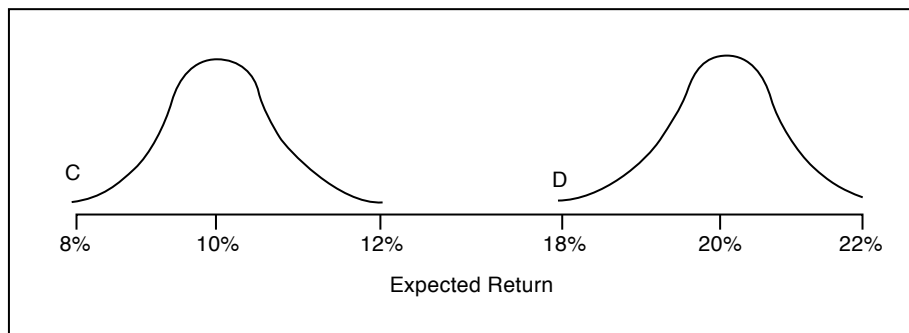
The standard deviation measures risk in terms of the total variability of the probability distribution. However, in many instances, the manager/decision maker is more interested in comparing the relative risks of various proj-

E**xhibit 5-3**

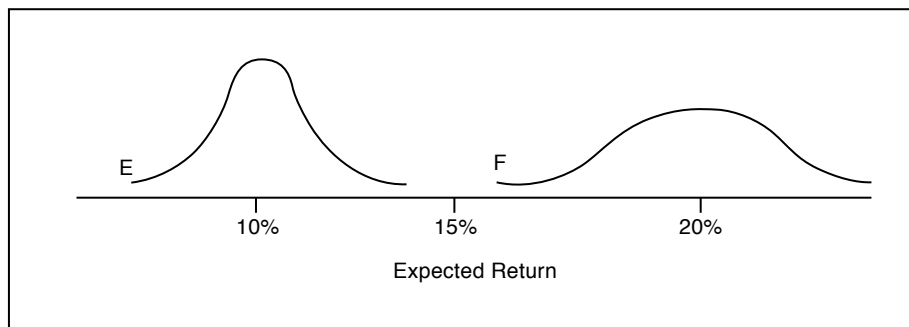
Individual Project Risk. Part A: Equal Means, Different Standard Deviations. Part B: Different Means, Equal Standard Deviations. Part C: Unequal Means, Unequal Standard Deviations.



A



B



C

E**Exhibit 5-4****Calculations for the Standard Deviation and the Coefficient of Variation**

<i>State of the Economy</i>	<i>Probability (p)</i>	<i>Net Cash Benefit (NCB)</i>	<i>Mean (p × NCB)</i>	<i>Variance from Mean (NCB – NCB)</i>	<i>Variance Squared (NCB – NCB)²</i>	<i>Variance Squared Times Probability p(NCB – NCB)²</i>
Depression	0.10	\$(400)	(40)	-\$1,320	\$1,742,400	\$174,240
Recession	0.20	400	80	-520	270,400	54,080
Normal	0.40	1,000	400	80	6,400	2,560
Good	0.20	1,500	300	580	336,400	67,280
Boom	0.10	1,800	180	\$880	\$774,400	\$77,440
			<u>\$920</u>			<u>\$375,600</u>

$$\text{Mean} = \$ 920$$

$$\text{Variance} = 375,600$$

$$\text{Standard Deviation} = 612.86$$

$$\text{Coefficient of Variation} = 612.86/920 = .666$$

ects. For this, the manager may use the coefficient of variation. This measure adjusts for the scale problem among alternatives by dividing the standard deviation by the expected value of cash flow:

$$\text{Coefficient of variation} = \frac{\text{Standard deviation}}{\text{Expected cash flow}}$$

As with the standard deviation, the higher the coefficient of variation, the higher the relative risk of the investment. Exhibit 5-4 gives the calculations for the standard deviation and coefficient of variation based on a hypothetical investment project.

When using the standard deviation and the coefficient of variation to rank investments according to their risk, an important consideration is that the two measures may result in different rankings. Exhibit 5-5 gives an example of such a case: Project A has a lower standard deviation but a higher

E**Exhibit 5-5****When the Standard Deviation and the Coefficient of Variation Conflict**

	<i>Mean NCB</i>	<i>Standard Deviation</i>	<i>Coefficient of Variation</i>
Project A (from Exhibit 5-4)	\$ 920	\$612.86	0.666
Project B	\$1,500	\$850	0.567

coefficient of variation than Project B. The decision maker must choose one project or the other and must base the choice on the need to evaluate the amount of risk per unit of return.

The Level of Risk and the Project's Discount Rate

The preceding discussion used surrogate measures of uncertainty to rank investments according to risk. The coefficient of variation or the standard deviation is not sufficient in itself to measure risk. Also needed are estimates of how the cash flow varies with the economy. The risk of a single asset depends on its impact on the overall risk of the investor's portfolio, and this impact depends on two factors: the standard deviation (or the coefficient of variation) of the asset's returns and the correlation of the asset's returns with the returns from the other assets in the investor's portfolio. This correlation may be approximated by correlating the asset's returns with the economy. This will, in a sense, integrate the project risk and the company risk determinations.

The Correlation Coefficient

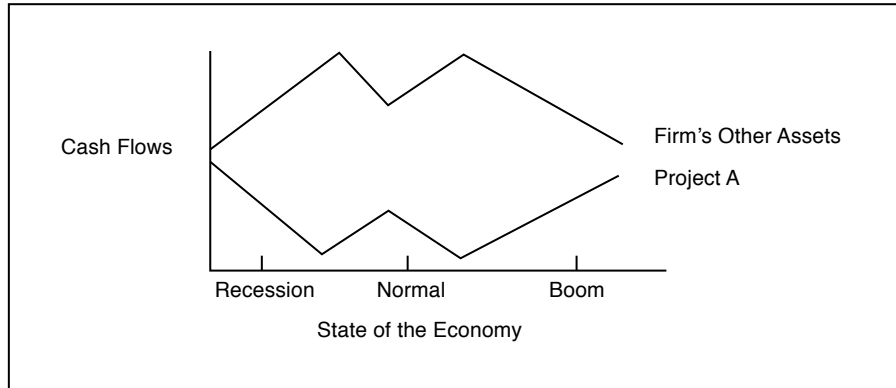
The estimation of the correlation between the project's returns and the general economy or the returns of the company's other assets is often difficult to determine. Still, an attempt should be made to determine the correlation coefficient and include it, along with the coefficient of variation, in the process of ranking projects by risk.

The correlation coefficient can have any value from minus one to plus one. To understand the meaning of this coefficient, let us look at three values—minus one (perfect negative correlation), zero (no correlation), and plus one (perfect positive correlation). Exhibit 5–6 shows the correlation between the cash flows of Project A and those of the firm's other assets when the coefficient is minus one, zero, and plus one.

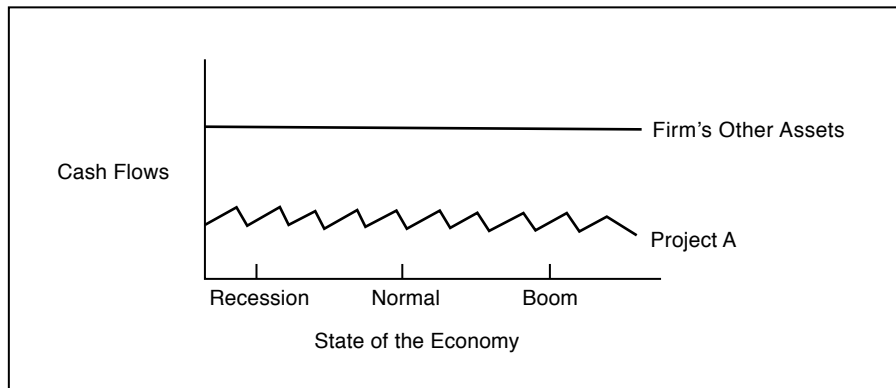
When two investments have perfect negative correlation, the cash flows of one project are high and the cash flows of the other are low. In fact, they move in completely opposite directions. An example might be a manufacturer that makes umbrellas and sunglasses. On bright sunny days, sunglasses will unquestionably sell better than umbrellas, while on cold, rainy days the opposite will hold true. When projects have zero correlation, there is no discernible pattern between the cash flows of each investment—they seem to be random. An example might be sales of scented candles and baseball gloves. The cash flows may each move up together, down together, or perhaps one may move up while the other moves down. In other words, there is no predictable pattern. Finally, when projects have perfect positive correlation, their cash flows move in perfect step with each other. An example might be a comparison of gasoline sales to motor oil sales—as automobile owners drive more miles, they consume more gasoline and more oil. For the purpose of risk reduction through diversification, any projects that are not perfectly correlated with each other may be combined in portfolios that have less overall risk than either project by itself. The proof of this phenomenon is beyond the scope of this course.

E**Exhibit 5-6**

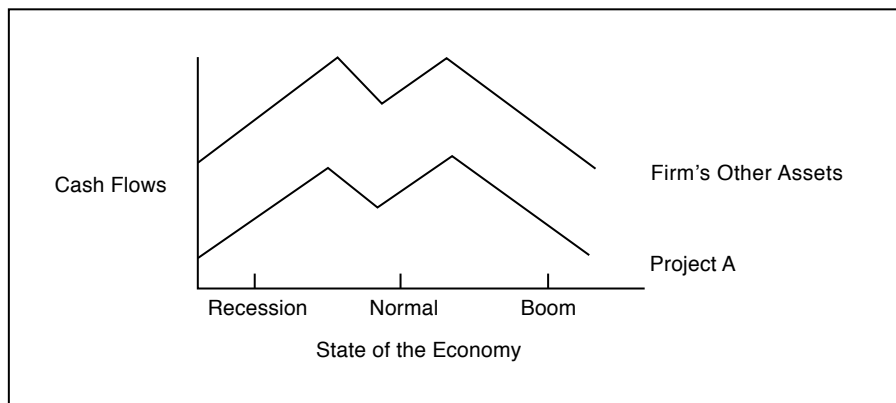
Examples of the Correlation Coefficient. Part A: When Correlation Coefficient between Cash Flows = -1 . Part B: Correlation Coefficient between Cash Flows = 0 . Part C: Correlation Coefficient between Cash Flows = $+1$.



A



B



C

The Discount Rate

For the decision maker, even more important than ranking projects by their individual risk is using those probability distributions and measures for the coefficient of variation and correlation with the economy to determine the

appropriate discount rate to use for further evaluation. As discussed earlier, the cost of capital for the company is the appropriate measure to use for the discount rate when the risk of the project is equal to the average risk of the company's investments. However, the company's cost of capital relative to its old assets cannot be used as the cost of capital for a new investment if the risk of the new investment differs from the risk of the old assets. Instead, a risk-adjusted discount rate should be determined, but this time not tied to the project risk. This rate must be commensurate with the project's level of risk as determined by the coefficient of variation and the correlation with the economy or with the firm's other assets. The risk-adjusted discount rate is the cost of capital—or minimum acceptable rate of return on a new investment—that is the going rate in the economy for that risk class of investment. The earlier discussion of types of investments in the Project Risk section is another presentation of the Risk Adjusted Discount Rate. Generally, the higher the risk of a project, the higher its required rate of return. Thus, the discount rate is adjusted for risk (specifically, it is increased to compensate for greater risk).

Estimating the risk-adjusted discount rate is difficult, both quantitatively and qualitatively. The approach described earlier provides one approach for assessing projects. Another approach is to find a company with financing similar to that used for the project and with similar cash flow risk properties. The cost of capital can then be computed for this company using the procedures previously outlined. If another company cannot be found that exactly fits these criteria, then it may be necessary to estimate a range of cost of capital. Generally, though, decision makers have to use their intuition along with the surrogate measures of risk (such as the coefficient of variation and correlation with the economy) to determine the risk-adjusted discount rate for various projects. The more practice and experience an analyst has, the more effective the estimation of risk-adjusted discount rates will become.

In addition, if the riskiness of a project varies between future periods, it might be appropriate to adjust the discount rate from one period to the next. Furthermore, the financial manager needs to consider the time value of money. Future cash flows in five years are more risky than cash flows projected one year in advance. While present value tables and calculators can easily adjust for timing differences, the financial manager might want to include an additional adjustment to allow for conservativeness or uncertainty. Again, the financial manager should realize that future cash flows will already be reduced due to adjustments made for opportunity costs (delays in consumption). Therefore, no additional adjustment should be made unless the manager believes that cash flows in the future have more business risk than current cash flows.

It should be clear from this discussion that there is a lot of discretion in evaluating projects and investments, largely because predicting outcomes is quite difficult. The analyst has license to use their best judgment, but must be prepared to explain and justify the judgment they use.

The Certainty Equivalent Approach

An alternative to using risk-adjusted discount rates to account for project risk in capital investment decisions is the certainty equivalent approach. Basically, this approach discounts cash flows twice. Rather than forecasting cash flows

into the future and discounting at a cost of capital rate, the financial manager forecasts riskless cash flows, and then discounts them at a risk-free or riskless rate of return. While the former technique is more controversial on the discount rate, the latter is more controversial on the riskiness of the cash flow stream. Because a riskless rate is relatively easy to derive—for instance, most analysts use the short-term Treasury bill rate—the difficulty of the certainty equivalent procedure is to calculate a riskless cash flow stream. The formula, which uses present value discounting explained in the next section, is illustrated in the following equation.

$$\begin{aligned} \left[\begin{array}{l} \text{Present value of risky cash flow} \\ \text{discounted at risk-adjusted rate } k \end{array} \right] &= \sum_t \frac{NCB_t}{(1+k)^t} \\ &= \sum_t \frac{a_t NCB_t}{1+(1+i)^t} \\ &= \left[\begin{array}{l} \text{Present value of the riskless} \\ \text{amount discounted at} \\ \text{the riskless rate } i \end{array} \right] \end{aligned}$$

where

NCB_t = net cash benefits, the expected cash flow for the period t

k = the risk-adjusted discount rate

$a_t NCB_t$ = the riskless amount that would be as desirable as the risky cash flow from the asset

i = the rate of return for the economy on riskless assets

Notice that the principal difference between the two techniques is that the certainty equivalent has a smaller numerator (due to the adjustment for risky cash flows) and is divided by a smaller denominator (because the riskless discount rate is less than the cost of capital for risky cash flows). The final solution for either technique is the same.

EVALUATING CAPITAL INVESTMENTS

The preceding sections have laid the groundwork for an explanation of the techniques and tools used to evaluate capital investment proposals. Companies currently use a wide variety of such techniques. Some techniques ignore the value of money over time, while others judiciously account for time adjustments of cash flows. The techniques examined in this section include: the payback method, average rate of return (AR), accounting rate of return (ARR), net present value (NPV), internal rate of return (IRR), modified internal rate of return (MIRR), and the profitability index (PI). The section will conclude with a comparison of these techniques.

Evaluation Methods Excluding the Time Value of Money

The first group of techniques we will examine exclude the time value of money.

The Payback Method

Conceptually, the payback method is the simplest approach to capital investment analysis. Because it is so easy to calculate and understand, most companies that do any investment analysis include the payback period as one of their measures. Basically, the payback period is the length of time it takes to recover the initial investment on a project. For example, if an initial investment of \$2,000 returns an after-tax cash flow per year of \$500 for eight years, the payback period is four years. An investment would be accepted only if it has a lower payback period than some level prescribed by management. This technique is commonly used to compare various projects of uncertain risk. Even though it does not measure risk explicitly, the payback period has an inherent risk measurement: the shorter the payback period, the lower the project risk. The project with the shortest payback period would be accepted if it is below the level specified by management.

Projects may either be mutually exclusive or independent. If projects are considered mutually exclusive, only one project is accepted. For example, a firm may consider five different copier machines and plan on accepting only the one with the fastest payback; in other words, the firm needs only one copier machine. Alternatively, the firm may be considering five different independent projects, whereby the acceptance of one project does not preclude or impact the acceptance of another.

The payback method has some serious weaknesses. First, it is not a measure of profitability or valuation. Second, it ignores cash flows after the payback period. In the example in the previous paragraph, the payback period was four years while the cash flows were for eight years. The analysis ignored the cash flow values for the last four years. If the analysis had compared various proposals, this weakness would have more important consequences. Third, the payback method does not consider the time value of cash flows, even within the payback period. For example, consider two investments, each with a payback period of three years and each with an initial outlay of \$12,000. Assume that for investment A the cash flow for the next three years is \$1,000, \$4,000, and \$7,000, respectively, and for investment B the cash flow for the next three years is \$6,000, \$4,000, and \$2,000, respectively. Although both investments have a payback of three years, investment B is obviously preferable because the cash flows are larger in the early stages than those for project A. As a result, the time value for B's cash flow stream is higher.

Despite major flaws in design, the payback technique continues to enjoy widespread appeal. One substantial benefit is its ease in application. Furthermore, analysts argue that the payback period, if short enough, factors in an implicit high rate of return; however, this is true only if the overall cash flows significantly exceed the original investment. Advocates of this technique suggest that the payback technique is particularly useful in industries where cash flows after three or four years are highly uncertain. Needless to say, the pay-

back technique, if applied, should not be used as the only measure. Rather, payback should be considered an additional measure in a portfolio of evaluation techniques.

Average Rate of Return

Another technique that does not account for the time value of money is the average rate of return on an investment (AR). There are several methods of calculating the average rate of return. One of the most common formulas is:

$$AR = \frac{AN}{I/2}$$

where

I = the investment outlay

AN = the expected average annual net income from the project

This formula assumes that the asset is depreciated on a straight-line basis with a salvage value of zero, because I/2 is an estimate of the average investment in the asset over the asset's life.

There are two major weaknesses in this formula for calculating the average rate of return. First, it uses net income rather than the net cash benefits of an investment. Second, the averaging process used to determine the net income figure in the numerator ignores the time value of money.

Accounting Rate of Return

The accounting rate of return (ARR) equals the average annual accounting profit from an investment divided by the cost of the investment.

$$ARR = \frac{\text{Average annual profit from investment}}{I}$$

The ARR method is a misleading measure of the benefits from an asset. First, it ignores the time value of money. Second, profit generally does not equal the asset's cash flow; profit may have a different pattern altogether.

Evaluation Methods Recognizing the Time Value of Money

As noted earlier, the recognition of the time value of money is important in more sophisticated methods of capital investment analysis. Time value of money recognizes that the timing of cash flows can have a material effect in the relative attractiveness of a particular investment. Time value of money applies interest rate compounding and recognizes the earning power of cash flow.

Measurements of time value of money involve present value (what amounts in the future are worth at an earlier point in time) and future value (what amounts in an early period will be worth later), based on a measured time period and an interest rate. For example, if an interest rate of 10 percent is applied to investments A and B described in the payback example, we can see the effect very clearly.

E**xhibit 5-7
Comparison of Present Values**

	Project A		Project B	
	<i>Cash Flow</i>	<i>Present Value</i>	<i>Cash Flow</i>	<i>Present Value</i>
Year 1	\$1,000	\$909.09	\$6,000	\$5,454.55
Year 2	4,000	3,305.79	4,000	3,305.79
Year 3	7,000	5,259.20	2,000	1,502.63
		<u>\$9,474.08</u>		<u>\$10,262.97</u>

Exhibit 5-7 shows the time value of money for the two investments described in the Payback Method discussion. These two investments of the same size with different cash flow timings have distinctly different present values. If you are an investor, this is very important.

There are a wide variety of financial calculators on the market, some quite inexpensive, that all have the algorithms for the time value of money based investment evaluations built in. There is also a very clear and thorough tutorial website, www.tvmcalcs.com, which offers clear training and explanation of several of the most popular financial calculators.

The following evaluation methods all use time value of money techniques to evaluate capital investment opportunities. Each has some advantage and some disadvantage vis-à-vis the others. You, as the analyst, need to decide which will serve your needs best. Some companies have established evaluation policies that specify one or more of these techniques.

QUICK QUIZ 5-2

Answers to QUICK QUIZ questions can be found starting on page 191.

Consider the following scenario:

You are interested in investing in some artwork for your living room. You visit a local art gallery where you see a painting that you really like. As you are looking at it, the gallery owner comes by and says, "That's really good, isn't it? That painting will be worth \$5,000 in five years, and I'll sell it to you today for \$2,500." You have determined that art is a risky investment, so you think any investment in art should yield a 15% compound annual rate of return. Is the painting a good deal at \$2,500?



Think About It . . .

After you have calculated the return on this investment, think about the following: The answer to the question is close. How you respond reflects your evaluation of risk and return, as well as and your firmness or flexibility in investment evaluation. Many corporate capital investments are similarly close. How should you manage such evaluations and recommendations for your company?

Net Present Value (NPV)

The net present value (NPV) technique for evaluating investment choices is a time-adjusted technique, meaning that the time value of money is accounted for in the calculations. Before we use this technique, some definitions are necessary. The present value of cash flows describes the value of future cash flows in today's dollars. For instance, \$100 in ten years is not the same as \$100 today. The present value technique incorporates the time-value principle by discounting future dollars (computing their present value), using the appropriate discount or interest rate. The net effect is that, by discounting future cash flows in today's terms, an investor can reasonably determine whether or not an investment (using today's dollars) is worth the risk. The present value technique allows an investor to calculate the indifference point between a sum of money today or a larger sum of money in the future. As explained earlier, the discount rate that is applied is equal to the firm's calculated cost of capital.

The net present value technique discounts future cash flows at the predetermined discount rate—which is usually based on the cost of capital—and then subtracts the net outlay cost from the accumulated discounted benefits. The basic rule of the NPV technique is that an investment should be undertaken only if the sum of the discounted cash flows is greater than the net cost of the investment. In other words, the NPV should be positive. The formula for the NPV technique follows:

NPV = Present value of future cash flows—Initial cost

$$NPV = \frac{NCB_1}{1+k} + \frac{NCB_2}{(1+k)^2} + \dots + \frac{NCB_t}{(1+k)^t} - I$$

where

NCB_1 = net cash benefit or expected cash flow for period 1

NCB_2 = net cash benefit or expected cash flow for period 2

I = initial outlay or cost

k = cost of capital

t = number of time periods

Using this formula, a positive net present value means that the project yields a rate of return greater than the cost of capital k . The net present value

is the total value in current dollars of the return earned above the value of the original investment. If a project's NPV equals zero, it is earning just the cost of capital and its acceptance would depend on other factors. If the NPV is negative, the project will earn less than the cost of capital and therefore should be rejected, unless there are other mitigating factors such as environmental or legal considerations.

In cases where there are several mutually exclusive projects, then the project with the highest positive NPV would be accepted. Note that if all the projects had a negative NPV, then no project would be accepted.

To illustrate the NPV method, assume that a bakery wants to invest \$5,000 in a new bread mixer. The new mixer will increase net cash flow by decreasing labor costs and increasing output and sales. The mixer is estimated to last seven years, with an estimated \$1,000 increase in net cash flow for each of the next seven years. Assuming the cost of capital k to be 8 percent, the NPV equals:

$$\begin{aligned}
 \text{NPV} &= \frac{\$1,000}{(1 + 0.08)} + \frac{\$1,000}{(1 + 0.08)^2} + \frac{\$1,000}{(1 + 0.08)^7} - \$5,000 \\
 &= \$1,000 (P/A, 8\%, 7) - \$5,000 \\
 &= \$1,000 (5.21) - \$5,000 \\
 &= \$5,210 - \$5,000 \\
 &= \$210
 \end{aligned}$$

Because the NPV of \$210 is positive, the mixer should be purchased. In this example, the net cash benefit is constant over the seven years of the life of the asset and, therefore, the present value of an annuity is used to determine the present value of the net cash benefits. In the equation, “(PVA, 8%, 7)” means the present value of an annuity of one dollar with an interest rate of 8 percent over seven years.

Exhibit 5–8 displays a table showing the present value factors resulting from the discounting of different interest rates for a number of periods and Exhibit 5–9 shows the resultant present values applied to specific cash flows. Look at Exhibit 5–8, which lists the present value of a future amount (PVF) and the present value of annuity (PVA) for various years and interest rates. The letter n represents the number of years. The percentages listed above the columns are the discount rates. In our equation, the PVA 5.21 is found in Exhibit 5–9 by starting at $n = 7$ years and reading across to the PVA column under 8 percent. The present value figure of 5.2064 is rounded up to 5.21. In simple terms, \$5.21 represents the amount you would have to put into an account today, earning interest at 8 percent for 7 years, to be able to withdraw \$1 at the end of each year and leave zero dollars in the account.

E **xhibit 5–8**
The Present Value of a Future Amount (PVF) and the Present Value of an Annuity (P/A) for n = 1 through 10

<i>n</i>	5%		6%		7%		8%		9%		10%	
	<i>PVF</i>	<i>P/A</i>	<i>PVF</i>	<i>P/A</i>	<i>PVF</i>	<i>P/A</i>	<i>PVF</i>	<i>P/A</i>	<i>PVF</i>	<i>P/A</i>	<i>PVF</i>	<i>P/A</i>
1	0.9524	0.9524	0.9434	0.9434	0.9345	0.9346	0.9259	0.9259	0.9174	0.9174	0.9091	0.9091
2	0.9070	1.8594	0.8900	1.8334	0.8734	1.8080	0.8573	1.7833	0.8417	1.7591	0.8264	1.7355
3	0.8638	2.7232	0.8396	2.6730	0.8163	2.6243	0.7938	2.5771	0.7722	2.5313	0.7513	2.4869
4	0.8227	3.5460	0.7921	3.4651	0.7629	3.3872	0.7350	3.3121	0.7084	3.2397	0.6830	3.1699
5	0.7835	4.3295	0.7473	4.2124	0.7130	4.1002	0.6806	3.9927	0.6499	3.8897	0.6209	3.7908
6	0.7462	5.0757	0.7050	4.9173	0.6663	4.7665	0.6302	4.6229	0.5963	4.4859	0.5645	4.3553
7	0.7107	5.7864	0.6651	5.5824	0.6227	5.3893	0.5835	5.2064	0.5470	5.0330	0.5132	4.8684
8	0.6768	6.4632	0.6274	6.2098	0.5820	5.9713	0.5403	5.7466	0.5019	5.5348	0.4665	5.3349
9	0.6446	7.1078	0.5919	6.8017	0.5439	6.5152	0.5002	6.2469	0.4604	5.9952	0.4241	5.7590
10	0.6139	7.7217	0.5584	7.3601	0.5083	7.0236	0.4631	6.7101	0.4224	6.4177	0.3855	6.1446
<i>n</i>	11%		12%		13%		14%		15%		16%	
	<i>PVF</i>	<i>P/A</i>	<i>PVF</i>	<i>P/A</i>	<i>PVF</i>	<i>P/A</i>	<i>PVF</i>	<i>P/A</i>	<i>PVF</i>	<i>P/A</i>	<i>PVF</i>	<i>P/A</i>
1	0.9009	0.9009	0.8929	0.8929	0.8850	0.8850	0.8772	0.8772	0.8696	0.8696	0.8621	0.8621
2	0.8116	1.7125	0.7972	1.6901	0.7831	1.6681	0.7965	1.6467	0.7561	1.6257	0.7432	1.6052
3	0.7312	2.4437	0.7118	2.4018	0.6931	2.3612	0.6750	2.3216	0.6575	2.2832	0.6407	2.2459
4	0.6587	3.1024	0.6355	3.0373	0.6133	3.9745	0.5921	3.9137	0.5718	2.8550	0.5523	2.7982
5	0.5934	3.6959	0.5674	3.6048	0.5428	3.5172	0.5194	3.4331	0.4972	3.3522	0.4761	3.2743
6	0.5346	4.2305	0.5066	4.1114	0.4803	3.9975	0.4556	3.8887	0.4323	3.7845	0.4104	3.6847
7	0.4817	4.7122	0.4523	4.5638	0.4251	4.4226	0.3996	4.2883	0.3759	4.1604	0.3538	4.0286
8	0.4339	5.1461	0.4039	4.9676	0.3762	4.7988	0.3506	4.6389	0.3269	4.4873	0.3050	4.6065
9	0.3909	5.5370	0.3606	5.3282	0.3329	5.1317	0.3075	4.9464	0.2843	4.7716	0.2360	4.3436
10	0.3522	5.8892	0.3220	5.6502	0.2946	5.4262	0.2697	5.2161	0.2472	5.0188	0.2267	4.8332

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E**xhibit 5-9****Calculation of the Estimated Net Present Value of a Proposed New Investment**

Year	Cash Revenues Less Cash Expenses	Tax Depreciation	Taxable Income	Income Tax	NCB*	Present Value Factor (10%)	Present Value of Cash Flows
0					\$(7,000.00)	1.0000	\$(7,000.00)
1	\$2,200	\$1,000.30	\$1,199.70	\$479.88	\$1,720.12	0.9091	\$1,563.76
2	2,100	1,714.30	385.70	154.28	1,945.72	0.8264	1,607.94
3	2,000	1,224.30	775.70	310.28	1,689.72	0.7513	1,269.49
4	1,800	874.30	925.70	370.28	1,429.72	0.6830	976.50
5	1,500	625.10	874.90	349.96	1,150.04	0.6209	714.06
6	1,000	624.40	375.60	150.24	849.76	0.5645	479.69
7	800	625.10	174.90	69.96	730.04	0.5132	374.66
8	700	312.20	387.80	155.12	544.88	0.4665	<u>254.19</u>
							\$ 240.29

*Column 1 minus column 4

A calculator uses five defined variables to provide the same calculations:

n = the number of periods to be considered, usually years

I = interest rate

PV = present value, the amount at the beginning

PMT = an annuity payment, applicable only when periodic cash flows are all the same

FV = future value

Note: most calculators require that inflows be distinguished from outflows. This is usually done by applying the change sign key to the outflow, making it appear to be negative.

Using a financial calculator in the example in the previous paragraph, the inputs would be $n = 7$, $I = 8$, $PV = 0$ (because you will be solving for the present value), $PMT = 1000$ (It is an annuity.), and $FV = 0$. The result, shown on the calculator as $(-)$ 5206.47, with the amount shown as a negative. To receive an annuity of \$1,000 for five years, you would need to invest \$5,206.47, the same result as from the table. Subtracting \$5,000 original investment would yield the NPV or \$206.47 on the calculator, or \$210 applying the table. The difference is due to rounding in the table.

In the calculator there is an NPV function, which automatically deducts the initial investment, providing the computed NPV solution. It should be noted that, if you use Excel to compute the NPV, you must compute the present value of the cash flows and deduct the original investment as a separate

step. Otherwise, you will get an incorrect result because of the imputed timing of the cash flows in the Excel algorithm.

Exhibit 5–9 illustrates a case where the net cash benefits are not equal over time and the net present value is found by using present value factors (also given in Exhibit 5–8). The assumptions in this case are as follows:

1. Machinery is purchased costing \$7,000. The machine has a seven-year life for tax purposes and is depreciated for tax purposes as follows:

Year	IRS Mandated Depreciation Rate	Depreciation Amount
1	0.1429	\$1,000.30
2	0.2449	1,714.30
3	0.1749	1,224.30
4	0.1249	874.30
5	0.0893	625.10
6	0.0892	624.40
7	0.0893	625.10
8	0.0446	312.20

In computing this example using a calculator, you would create list of the cash flows in the calculator, and the internal processing in the calculator would yield the correct result far more quickly than calculating it one value at a time.

2. Cash revenues less cash expenses (excluding taxes) due to the use of this machinery are expected to be:

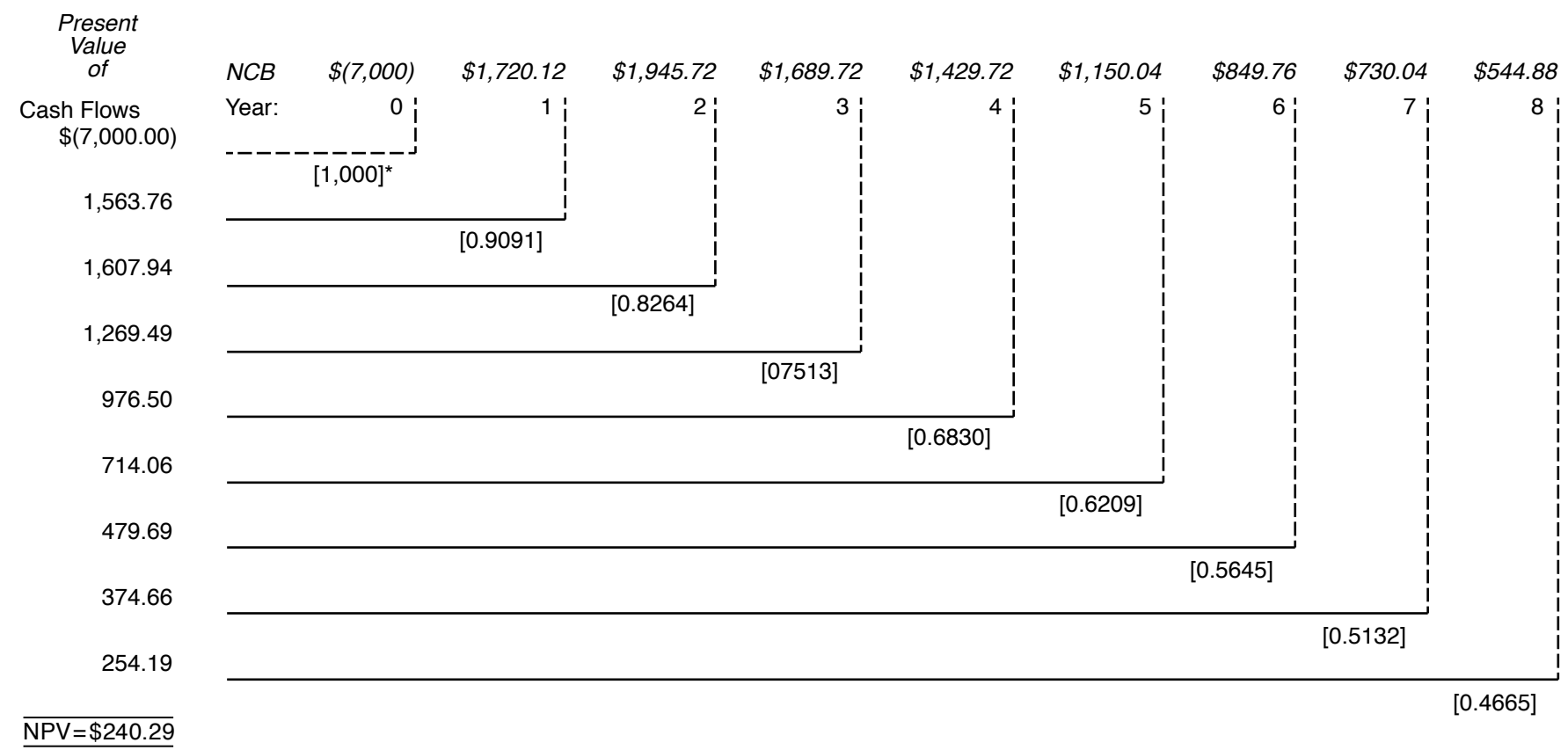
Year	
1	\$2,200
2	2,100
3	2,000
4	1,800
5	1,500
6	1,000
7	800
8	700

3. The tax rate is 40 percent (includes federal and state).
4. The cost of capital is 10 percent
5. The machinery has no salvage value at the end of eight years.

The net cash benefits and the present value of the cash flows are computed in Exhibit 5–9. In the example in Exhibit 5–9, the net present value is positive and the investment should be made. A chart for the calculations for the net present value figures in Exhibit 5–9 is given in Exhibit 5–10.

The importance of using the correct discount rate or cost of capital must be emphasized here. The earlier sections discussed finding the company's cost of capital and adjusting it for risk, if necessary. This is the discount rate used in the NPV technique; its importance is shown by Exhibit 5–11, which is based on our example of nonconstant cash flow shown in Exhibit 5–9.

E xhibit 5-10
Chart of the Estimated Net Present Value Calculations



Note: Figures in brackets are the present value factors (PVF) at 10 percent.

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E**Exhibit 5-11****Estimation of the NPV of Cash Flows in Exhibit 6-7 Given Various Discount Rates**

<i>Discount Rate</i>	<i>Net Present Value</i>
10%	\$240.29
11%	14.66
12%	(168.34)

As Exhibit 5-11 shows, the use of a discount rate of 10 percent or 11 percent yields a positive net present value (\$240.29 and \$14.66, respectively), while discount rates above 11 percent result in negative net present values (for example, a 12 percent discount rate results in an NPV of negative \$168.34). Consequently, the selection of an appropriate discount rate can make a great deal of difference in the final decision.

The importance of the discount rate is less crucial when choosing among mutually exclusive projects because they are being compared with the same discount rate. Furthermore, if a project has a large NPV, either positive or negative, small adjustments in the discount rate will probably be inconsequential. Regardless, a financial manager would probably be wise to calculate the NPV using several different discount rates in order to gauge the sensitivity of the discount rates on the firm's cash flows.

Internal Rate of Return (IRR)

The internal rate of return (IRR) method approaches the capital investment problem in a different way. Instead of discounting the cash flows at the determined required rate of return to arrive at the net present value, the IRR method determines the discount rate that causes the NPV to be equal to zero. This discount rate then becomes the firm's IRR or the implicit rate of return earned by the project under consideration. The selection criterion is relatively straightforward. If the IRR exceeds the firm's cost of capital, that is, the discount rate, the project is accepted. If the project earns less than the discount rate, it is rejected. The formula for the internal rate of return shows that the IRR occurs when the project's NPV equals zero. Calculating IRR enables an analyst to rank dissimilar projects on the basis of their percentage rate of return. Because the rate of return is a clearly understood measure, many companies have adopted IRR as their preferred investment evaluation technique. The formula is:

$$0 = \frac{NCB_1}{1+r} + \frac{NBC_2}{(1+r)^2} + \dots + \frac{NCB_n}{(1+r)^n} - I$$

$$0 = NCB_1 (PVF_{1r}) + NCB_2 (PVF_{2r}) + \dots + NCB_n (PVF_{nr}) - I$$

Where:

r = the IRR

(PVF_{nr}) = the present value factor of \$1 for period n given the interest rate of r

I = the original investment

If the cash flow returns are constant over time, the formula becomes:

$$0 = NCB (P/A, r, n) - I \text{ or } \frac{1}{NCB} = (P/A, r, n)$$

Where:

NCB = the constant cash flow

(PVA, r, n) = the annuity present value for r interest rate and n time periods (see Exhibit 5-8)

There are two methods used for determining the IRR:

1. If the cash flows from an investment are constant over time, the above formula, $I/NCB = (PVA, r, n)$, may be used. As an illustration, assume that a company is considering investing in a new machine. The machine costs \$10,000 and the net cash benefits from the machine are estimated to be \$2,000 for seven years. Dividing the initial investment by the net cash benefit gives a present value annuity figure of 5.00, which must equal (PVA, r, n) . Looking at Exhibit 5-8 and referring to $n = 7$, we find the discount rate r whereby $(PVA, r, 7) = 5.00$ to be approximately 9 percent. Therefore, the IRR would be 9 percent and the investment would be rejected if the cost of capital is greater than 9 percent.
2. If the investment does not have a constant cash flow over time, a trial and error procedure may be used to determine the IRR. In this procedure, the net present value of the investment is computed using various arbitrarily selected discount rates until the NPV equals or is close to zero. Then the IRR may be extrapolated from the figures. A financial calculator will do all the work for you, very quickly solving for the IRR directly, using a list of the cash flows as seen with the NPV calculation.

As an illustration, consider a potential investment opportunity, having an initial cost of \$15,000 and a net cash benefit starting at \$6,000 and decreasing every year by \$1,000 for the next five years. Exhibit 5-12 illustrates the calculations using an initial guess of 10 percent for the discount rate and finding an NPV of \$882.60. To obtain an NPV equal to zero, the discount rate would have to be greater than 10 percent. The discount rate of 13 percent was tried and an NPV of -\$76.60 was found. From this trial and error we can conclude that the IRR for this investment is very close to the 13 percent level.

Excel and financial calculators will compute the IRR using the built-in algorithm, making them far more efficient in doing the IRR calculation. The financial calculator will tell you that the IRR for the project is 12.74 percent (Exhibit 5-12).

Modified Internal Rate of Return (MIRR)

The ability to rank dissimilar projects by their rates of return is an attractive analytical and managerial capability. However, an underlying assumption in the IRR calculation raises an informational concern. The mathematics on which IRR is based assumes that the cash flows of the project can all be reinvested at the IRR rate. For marginally acceptable projects, this may not be a problematic assumption. However, if a project offers a high internal rate of return, the assumption that the generated cash flows can all be reinvested at that high IRR rate may result in an unreasonably aggressive performance expectation. To address this issue, while preserving the ranking capability, a less aggressive alternative (MIRR) has been developed.

The Modified Internal Rate of Return (MIRR) assumes that cash flows are reinvested at the required rate of return rather than the internal rate of return, reducing the resultant return percentage, but preserving the ranking capability. If there are no outflows after the first inflow, the MIRR can be calculated by computing the present value of the cash flows, using the required rate of return as the discount rate and then calculating the future value of this result out to the end of the project, using the required rate of return as the interest rate. The future value is then used to compute the interest rate that equates the future value just calculated to the original investment. The resultant interest rate is the MIRR and will fall between the required rate of return and the internal rate of return. Exhibit 5-13 demonstrates several of these techniques.

E

xhibit 5-12

Calculation of the Estimated IRR of a Proposed New Investment

<i>Year</i>	<i>Cash Flows NCB</i>	<i>PVF at 10%*</i>	<i>Present Value of Cash Flows</i>	<i>PVF at 13%*</i>	<i>Present Value of Cash Flows</i>
0	\$(15,000)	1.0000	\$(15,000.00)	1.0000	\$(15,000.00)
1	6,000	.9091	5,454.60	0.8850	5,310.00
2	5,000	.8264	4,132.00	0.7831	3,915.50
3	4,000	.7513	3,005.20	0.6931	2,772.40
4	3,000	.6830	2,049.00	0.6133	1,839.90
5	2,000	.6209	<u>1,241.80</u>	0.5428	<u>1,085.60</u>
			\$ 882.60 NPV		\$ -76.60 NPV

*Taken from Exhibit 5-8.

**Exhibit 5-13****Calculation of MIRR and Comparison to Other Evaluation Techniques**

Assume the Required Rate of Return is 10%

Investment amount is \$100,000

<i>Years</i>	<i>Cash Flow</i>	<i>Present Value</i>	<i>Future Value</i>
1	\$40,000	\$36,364	\$64,420
2	30,000	24,793	43,923
3	30,000	22,539	39,930
4	20,000	13,660	24,200
5	20,000	12,418	22,000
6	10,000	5,645	10,000
		<u>\$115,419</u>	<u>\$204,473</u>

Payback Period = 3 years

NPV = \$115,419 – \$100,000 = \$15,419

IRR = 16.309%

MIRR = 12.66%

Compute Future Value

N = 6

I = 10

PV = (-)100000

Pmt = 0

FV = 0 – Solve for FV

FV = 204473

Compute MIRR

N = 6

I = 0 – Solve for I

PV = 100000

Pmt = 0

FV = 204473

I = 12.66

In this example the investment is \$100,000; the required rate of return is 10%; and the cash flows shown are Year 1 = \$40,000, Year 2 = \$30,000, Year 3 = \$30,000, Year 4 = \$20,000, Year 5 = \$20,000, and Year 6 = \$10,000. The results of this investment are a payback period of 3 years, a Net Present Value of \$15,419, an Internal Rate of Return of 16.31%, and an MIRR of 12.66%.

With the data given, we cannot measure the Average Rate of Return or the Accounting Rate of Return. The Profitability Index is 1.15.

**Think About It . . .**

Time value of money is based on the principle that “a dollar today is worth more than a dollar tomorrow.” This is obviously true with regard to capital investments. Think about how it applies generally in everyday life.

Profitability Index

The profitability index (PI), or the benefit-cost ratio, is another time-adjusted method for evaluating investment proposals. Its formula is as follows:

$$PI = \frac{PV \text{ Benefits}}{I}$$

In this equation, PV benefits equal the present value of the total amount of net cash benefits over the life of the investment. The PI shows the relative profitability of a project, or the present value of benefits per dollar of cost. If the PI is greater than 1, the project is accepted; if the PI is less than 1, the project is rejected. The calculations involved are relatively straightforward and use the same figures as those used in the calculations for NPV.

Comparing the NPV, IRR, MIRR, and PI Methods

In response to the question of whether an investment considered by itself should be accepted or rejected, the four time-adjusted approaches—NPV, IRR, MIRR, and PI—will provide the same conclusion. The consistency of the NPV, IRR, MIRR, and PI in accepting or rejecting investment proposals may be summarized in the following relationships:

1. If the IRR is larger than the required rate of return, the MIRR always will be higher than the required rate of return but lower than the IRR, the NPV always will be positive and the PI always will be greater than 1.
2. If the IRR is less than the required rate of return, the MIRR always will be less than the required rate of return but greater than the IRR, the NPV always will be negative and the PI always will be less than 1.
3. If the IRR is equal to the required rate of return, the MIRR will also be equal to the required rate of return, the NPV always will be zero and the PI always will be exactly 1.
4. The MIRR will mirror the IRR results, but with a more conservative percentage.

These relationships hold true for independent projects that each involve, in effect, an accept-reject decision.

On the other hand, there are two basic conditions under which the IRR/MIRR and NPV methods would rank mutually exclusive projects differently:

1. When there are scale effects that cause the cost of one project to be considerably larger than that of the other.
2. When there are timing effects that cause the cash flows from the two projects to differ, with one producing higher cash flows in the early years and the other producing higher cash flows in the later years.

Although these are the conditions that lead to differences in rankings, the basic cause of differences is that the NPV and IRR methods make different assumptions about the rate at which cash flows may be reinvested. The NPV method implicitly assumes that the cash flows of a project are reinvested at the required rate of return, while the IRR assumes that the cash flows are reinvested at the internal rate of return. While MIRR assumes reinvestment at the required rate of return, it ranks projects the same way as IRR, not NPV. Although reinvestment itself is not necessarily assumed, the opportunity for reinvestment is assumed because the IRR and NPV calculations use the present value tables, the very construction of which is based on this assumption.

Under ordinary circumstances, the reinvestment rate assumptions of the NPV method are more correct than those of the IRR, providing that a correct discount rate is used making MIRR more conservative than IRR. Also, for some projects, the IRR method may not be applicable because there is more than one internal rate of return when outflows occur after the first inflow. MIRR can address this situation—either by simply including the outflows as normal transactions or by treating the inflows as part of the original investment and discounts to outflows back to period 0, then adding the result to the original investment before making any other calculations. The results will be different, but defensible. The analyst must decide which methodology to use. Thus, even though conceptually the IRR method is easier to use and understand, under certain conditions where the IRR and NPV rankings may differ, the NPV or MIRR method may be easier to explain.

THE POST-AUDIT

The post-audit is an important part of the capital budgeting process, because (1) it compares actual results with those forecast and explains the reasons for differences and (2) it facilitates a decision on whether the project should be continued or terminated. Differences between actual and projected results may be due to changes in the economy (such as higher unemployment or a decrease in oil prices) or forecasting errors (which may or may not average out for all projects accepted at a specific time). Investigating these differences may improve forecasts in the future due to new methods being developed or just the knowledge that people are being held responsible for their projections. In addition, it may be possible to reallocate resources from those investments doing worse than expected to those doing better than expected.



This chapter provided the groundwork for evaluating capital intensive projects using seven different techniques (payback method, AR, ARR, NPV, IRR, MIRR, and PI). In addition, it provided a discussion and examples of risk analysis and cost of capital calculations.

Four time-adjusted techniques—NPV, IRR, MIRR, and PI—provide the most reliable measures of evaluating projects. Other measures, such as payback, ARR, and AR provide simple, but perhaps misleading, results.

While the techniques are useful for evaluating different projects, the financial manager should recognize that a very important part of the analysis is the projected cash flow. Without a realistic cash flow projection, the analysis will not be very useful.

Because world events and risks are not certain, any projection into the future will be subject to uncertainty. This should not imply that future projections and analyses are a waste of time. Rather, proper evaluation of investment proposals will increase the knowledge with which managers make financial decisions and enable managers to make better financial decisions.



Review Questions

1. A company uses debt to finance 30 percent of its operations and uses stocks to finance the remaining 70 percent. If the cost of the stock averages 15 percent and the after-tax cost of the debt is 10 percent, what is the average cost of capital for the company? 1. (a)
- (a) 13.5 percent
 (b) 15.2 percent
 (c) 18.5 percent
 (d) 19.0 percent

2. The Herford Candy Company was evaluating the option of buying a machine to increase production. The cost of the new machine was \$2,400, it had a life of eight years, had zero salvage value, and was depreciated for tax purposes on a straight-line basis over the life of the machine. The corporate income tax was 40 percent and the company had a depreciation amount of \$200 on its existing assets. The company implemented a thorough analysis of revenues and benefits both before and after the purchase. Find the annual incremental net cash flow resulting from the investment in the new machine for the company. 2. (d)

	<i>Without New Machine</i>	<i>With New Machine</i>
Revenues	\$10,000	\$12,500
Expenses other than depreciation	6,000	7,500

- (a) \$420
 (b) \$550
 (c) \$600
 (d) \$640
3. The Acme Trading Company is considering the option of installing light manufacturing systems for the first time. The investment has a different risk than its current investments and the possible net cash benefits from the investment have different probabilities. Using the following chart in your calculations, what is the standard deviation of the probability distribution? 3. (b)

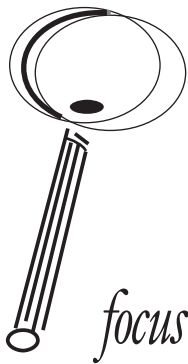
<i>NCB</i>	<i>Probability</i>
(100)	0.10
100	0.30
500	0.40
900	0.20

- (a) 204.1
 (b) 325.6
 (c) 329.4
 (d) 368.4

4. Why might a company choose a required rate of return higher than the cost of equity? 4. (b)
- (a) To penalize the investment manager
 - (b) To offset the optimism bias of the investment manager
 - (c) To limit the benefit to shareholders
 - (d) To reduce the number of projects accepted
5. Assume that a company is considering an investment that costs \$50,000, has a life span of ten years, and has a calculated NCB of \$7,000 for each of those years. Assuming a 9 percent discount rate, what is the NPV of the investment? 5. (a)
- (a) \$(5,076.1)
 - (b) \$(848.8)
 - (c) \$245.2
 - (d) \$4,145.5

6

Forecasting and Valuation



Learning Objectives

By the end of this chapter, you should be able to:

- Identify the possible uses of a financial forecast.
- Describe the processes of line-by-line estimating, regression analysis and projection, and linear estimating.
- Identify the basic forecasting equation.
- List the techniques for calculating a robust financial forecast.
- Define the theory behind a valuation model.
- Describe the process for projecting future income statements and discounting future cash flows.

Looking at Ratios, Forecasting, and Integrated Financial Outcomes

As the next meeting began, Susan, who had opened the last meeting, said, “Last month’s discussion of capital investments and capital budgeting, and especially the methods of evaluating capital projects was very helpful, but I am still having trouble with the projections of future cash flows. Can we talk about that aspect of our new focus?”

“Absolutely,” Al responded, picking up on the nods of the other participants. “It fits well with our whole thrust of using what we already do and the information we already have to improve our operations. Think about the ratios and relationships you now report on every month.”

“They tell us what happened and where we are,” said Jose. “How do we use that information?”

Chris, who was fairly new to the group, said, “I’ve noticed that most of the ratios don’t seem to change much from month to month, or even year to year. Can we use them as a forecasting tool?”

“It’s a good starting point,” Al replied, “but it doesn’t stop there. Remember, where you are may or may not be where you want to be. If the ratios need to be improved, that can also be part of the forecasting process. And, there’s another critical issue to consider. When you forecast, the results must still produce integrated financial outcomes, leading to more decisions and actions. Let’s explore this subject further.”

The logical extension for financial analysis is extrapolation of that analysis into the future, in the form of forecasts and projections, strategic plans and even annual budgets. This will properly lead to strategic decisions and the action plans to implement them. By understanding what has happened, how those events are manifested in financial statements, and the resulting ratios and relationships, the analyst should be able to construct projected financial statements and to identify issues and challenges that come out of those projections. As we will see, the initial forecasts and projections often yield balance sheets that do not balance. This requires immediate decisions about additional financing or alternative operating actions to close the balance sheet gap—also known as the financing gap or as additional financing needed (AFN). Forecasts and projections can be expanded and extended from near-term estimates, with a focus on short-term decisions and actions, to longer periods and strategic planning. They can also lead to valuation analyses of the business and its equity, and ultimately to preparations for making acquisitions or planning to be acquired.

FORECASTING THE FUTURE

Let’s start by examining the factors involved in developing a financial forecast, then review the elements required to construct a valuation model.

The Financial Forecast

Preparing a financial forecast does several very important things for management. It presents a plausible scenario for future performance, enabling management to decide whether such a projection is reasonable and acceptable, or whether it needs to be modified through managerial action. If it is reasonable, then management gets to determine what it will take to bring it to fruition. Often, such a forecast incorporates a number of actions that need to be taken, the first of which is how to make the balance sheet of such a forecast balance.

Corporate growth often creates a need for new financing, a need to adjust expected new assets, a change in current management practices, or a combination of all of these. Most financial textbooks describe these needs at length in the financial planning chapters.

Estimating the balances in the balance sheet can be done in a number of ways.

Detailed Line-By-Line Estimates

The most thorough (but also the most time-consuming) forecasting process is to estimate the income statement and the balance sheet element by element. This involves several steps:

- Building a detailed sales forecast
- Using the forecast to estimate costs of sales
- Projecting operating expenses in detail
- Continuing to build the income statement, making assumptions for any needed financing being provided by new debt and estimating the resulting interest expense

The result usually becomes the basis for a budget and is supported by detailed schedules of its components.

This detailed forecast will result in a forecasted balance sheet that is also carefully constructed, with all the attendant assumptions applied to all accounts. The linkages between the projected income statement and the projected balance sheet are carefully determined, so that all accounts are supported by backup schedules, as well as detailed and explicitly recorded assumptions.

Adjustments needed to bring ratios into line with management goals or requirements will refine the balance sheet accounts. Any necessary funding assumptions are addressed as the forecast is constructed, and management can see clearly when there is a need for a specific action.

Regression Analysis and Projection

Some analysts and managements believe that statistics built on historic relationships will be more reliable than the projections and estimates made by managers—particularly those with a vested interest in the results. A somewhat less detailed, but still quite complex and time-consuming method of forecasting is to build a regression model of the company's financial statements based on historic patterns, smoothed and calculated to develop a predictive model of the company based on past results. Individual regressions can be developed

for each line of the balance sheet, with adjustments made to accommodate earnings retention, debt payments, and similar known items. Regression-based estimates of key accounts in the income statement will permit a statistically consistent projection of the income statement, which serves to support the earnings retention estimate. These may be modified by managerial decisions when management sees estimates that deviate from preferred results. These modifications obviously require decisions to identify actions to help assure that the adjusted results are deliverable. To the extent that results and financial statement line items display a volatile pattern, regression models may be easily defended as reasonable; by being modeled on a computer, such programs reduce the time, effort, and risk of errors that could be introduced by manual estimates.

Linear Estimates

A simpler option is to estimate the future by applying a growth assumption to the most recent income statement, developing specific proportional changes to the relevant balance sheet accounts, and then stipulating actions to yield the target end result. This linear estimate is easy to calculate and easy to explain, and the result leads to a forecast that, because it is easy, provides the analyst and the management with a flexible model around which to develop plans and strategies.

Calculating the Forecast

As you review ratios, it quickly becomes obvious that companies are quite consistent from year to year, unless there is a significant action or change in the company, the industry, or the economy. Therefore, it is reasonable to assume as a starting point that, within the context of predicted sales growth, income statement and balance sheet relationships will be consistent. We know, for example, that customers will pay the same way they have paid in the past, and, therefore, the average collection period is very consistent from year to year. As a result, the change in accounts receivable, absent a conscious management decision to change behavior, will be proportional to sales growth.

It is similar with inventory. Every time you sell a unit of inventory you need to replace it, and if sales are expected to grow, you will need more inventory to support the increase in sales. Therefore, you can consider inventory, again absent a conscious managerial decision to change behavior—to be similarly responsive to sales.

To carry this logic further, you can assume that vendors want customers to purchase more. Therefore, it is reasonable to expect vendors will allow customer accounts to rise in proportion to the customer's sales growth. Therefore, accounts payable on the company's books can be reasonably expected to change in proportion to sale growth.

In addition, margins and therefore profits will generally follow similar patterns. You can use this logic to develop a simple, sales-proportional forecasting model that is clear to everyone. It is easy to use, and easy to modify if you choose.

The last piece of this simplified forecasting model is the investment in new capital assets. These are usually known in advance because capital assets require large amounts of money as well as extended planning and order lead time. Either they are included in the capital budget, or, if there is no capital budget, they can be estimated based on the needs that are evident to the company's managers. Therefore, estimates of increases in capital investment can be easily incorporated into the forecasting model.

Because the income statement and the balance sheet have a consistent relationship, it is really quite easy to project forward and prepare a comparably formatted set of financial statements that provides a useful basis for forecasting future performance. Because the model is easy to understand, it can be structured reasonably into a formula that will provide an exceptionally important piece of information: the amount needed to balance the balance sheet and pay for the projected sales growth.

QUICK QUIZ 6-1

Answers to QUICK QUIZ questions can be found starting on page 191.

ABC Corp. is expecting to have sales increase next year from \$3,000,000 to \$4,000,000. They expect accounts receivable (which are currently equal to 54 days sales) and inventories (which turn over 4 times based on sales) to increase proportionately. All other assets are expected to remain at current levels except Plant and Equipment (Fixed Assets), which will require an investment of \$150,000. They expect accounts payable, which are currently \$600,000, to increase at the same rate as sales. Profits, which have been at 5% of sales, are expected to remain at 5% of sales next year. There are no dividends. When ABC projects next year's balance sheet, how much financing will be required to balance their balance sheet? Use a 360-day year.

The Additional Financing Needed (AFN) Calculation

This amount of funding—known by some as the financing gap and by others as additional financing needed (AFN)—equals the incremental assets, accounts receivable and inventories, and also the additional fixed assets necessitated by the percentage increase in sales less the incremental sales-related liabilities and also less the incremental retained earnings resulting from the profits on the new year's sales.

Note: when using the change in retained earnings in the Exhibit 6-1, we are really recognizing all the profit from the forecast year less any dividends, not just the difference in the last line of the income statement from year to year. Remember, when the books close, all of the profits from the income statement (less any dividends committed) close to the balance sheet. This formula can be easily expressed as the equation in Exhibit 6-1.

If the analyst or management feels that cash would change in proportion to sales, then cash would be included in the spontaneous assets. While the ex-

planation in Exhibit 6–1 includes accruals in spontaneous liabilities, sometimes changes in accruals will need to be predicted specifically. The SDA and SDL are described as sales dependent because they are assumed to be directly proportional to sales. This assumption simplifies the forecasting model and recognizes that there is no managerial intervention assumed in building the forecast. Managerial intervention, as you will see, is reserved for addressing the funding need identified, keeping everything consistent in the initial estimation process.

It should be noted that, although often necessitated by sales growth, the incremental capital assets—either physical assets or other significant investments—do *not* change proportionately with sales. Capital expenditures are specific and fixed assets and other such investments must be acquired in their entirety, even if only a portion of their capacity is needed. To make this model more general, you can add a plus-or-minus miscellaneous expression to recognize other balance sheet requirements such as debt repayment or other known changes not explained by the rest of the formula.

AFN calculated using this formula yields the amount of funding needed to balance the balance sheet and finance the projected sales growth. A negative AFN means that the company generates free cash, and will have funds to use for other purposes.

E

Exhibit 6–1 The Basic AFN Forecasting Equation

$$\text{AFN} = \frac{\Delta S}{S} \text{SDA} + \Delta \text{CA} - \frac{\Delta S}{S} \text{SDL} - \Delta \text{RE} \pm \text{MISC}$$

Where

AFN = Additional Funds Needed (also referred to as EFN, External Funds Needed).

SDA = Sales Dependent Assets (usually accounts receivable and inventories and possibly cash, as shown below). These are the assets directly proportional to sales. In the equation, they are from the current year.

S = Sales, from the current year.

ΔS = The change in sales in the forecast year.

ΔCA = The change in capital assets in the forecast year.

SDL = Sales Dependent Liabilities (usually accounts payable and accruals). These are the liabilities directly proportional to sales. In the equation, they are from the current year.

ΔRE = The change in retained earnings expected in the forecast year.

$\pm \text{MISC}$ = Any changes to balance sheet accounts not included in the earlier terms.

Closing the Gap

Once the analyst knows how much it will take to balance the balance sheet, the next task is to determine how to close the financing gap and address the need identified. To do this, a company can either add funding through debt or equity, or reduce the funding need by taking actions to offset or reduce the need.

Such action can include lowering costs or raising prices to increase profits, lowering assets or increasing liabilities, or undertaking one or some of several other operating improvements. If the analyst has calculated ratios and examined the different aspects of the company's operations, he or she should be in a position to offer substantive suggestions as to how to address the need. If it turns out that operating actions are not sufficient to address the entire need, the analysis will still prove beneficial. By identifying the operating actions and developing an implementation plan for them, the company will find that negotiations for a loan or other external funding are more likely to be successful.

Versatility of the AFN Relationship

Depending on the structure of the AFN equation, the analyst can see, and therefore address, different areas of concern. For example, the equation and discussion that opened this section focused on $\frac{\Delta S}{S}$, the sales growth rate. Obviously, growth will, by itself, necessitate increases in assets and may demand a variety of managerial responses to satisfy those increases.



xhibit 6-2 **Closing the Funding Gap**

This is a list of some of the actions to be considered by management.

Additional Funding:

- Short-Term Debt
- Long-Term Debt
- Preferred Stock
- Common Stock

Operating Actions:

- Lower Costs, through
 - Process improvements
 - Negotiating lower material or outsource prices
- Reduce Average Collection Period
- Increase Inventory Turnover
- Negotiate or Take Extended Payables Terms
- Reduce Idle Cash or Marketable Securities

Other Actions:

- Reduce or Eliminate Dividends
- Lengthen Payroll Periods, increasing Accruals

However, if the analyst exchanges the elements in the equation to emphasize the spontaneous assets and liabilities instead of the sales growth, he or she clearly changes the emphasis. Consider this version:

$$\text{AFN} = \frac{\text{SDA}}{\text{S}} \Delta\text{S} + \Delta\text{CA} - \frac{\text{SDL}}{\text{S}} \Delta\text{S} - \Delta\text{RE} \pm \text{MISC}$$

In this case the analyst can highlight the company's investment in and management of working capital assets (principally accounts receivable and inventories) and the contribution of spontaneous liabilities to paying for them. By doing so the analyst can focus attention on issues or management actions needed in this critical area of financial management.

Carrying this aspect of planning and control one step further, if one considers the sales proportional forecasting model, projecting future incremental retained earnings is easy. That said, estimating the financing required for several years is as simple as incorporating the sum of the incremental retained earnings with (1) the sales-proportional working capital assets and liabilities, and (2) the previously estimated investments in new fixed assets. The result will be the amount of additional financing needed to support the proportional activity over a defined future planning period such as the strategic planning period.

The AFN relationship is an extraordinarily powerful financial planning tool. It permits senior management to focus on future actions rather than on the detailed planning process. The details can be left to the operating managers who are best equipped to address them. The AFN estimates are conservative in that an almost unlimited array of specific management actions are available to reduce the real amount of funding needed, making the AFN-based forecast an estimate that almost certainly exceeds the amount of funding that will be needed. This assures that there will be funds available to enable the firm to achieve its goals.

Refining the Forecasts

Because the whole sales-proportional forecasting process is so uncomplicated, identifying any needed or desired adjustments is also uncomplicated. If the forecast requires more funding than management deems reasonable, the forecasted balance sheet(s) can be modified. For example, if the investment in accounts receivable seems too high when using the proportionality, changes in collection practices can be defined; the resultant reduction in accounts receivable and needed financing can be incorporated into the forecast and the AFN estimate by changing the to recognize the effects of the decision. Such adjustments would then be continued until the forecast agrees with management's action plan. If the process is fully integrated into the operating groups in the company, it will lead to a budget that is compatible with the forecast and consistent with those actions that operating management will take.

Once the forecasts and plans have been completed and integrated, the analyst can calculate ratios and relationships that set benchmarks against which to track performance. Because the whole process is transparent, any movement away from the plan can be easily addressed, either by corrective

action or by acknowledging that the movement is headed in a desirable direction. In either case, it is straightforward to develop an updated forecast and plan.



Think About It . . .

In the EFN equation we have assumed sales proportionality for some key assets and liabilities, as well as for most—if not all—of the elements of the Income Statement. Is this assumption reasonable for the company you are most familiar with? If not, what method or methods should be used to estimate the critical Balance Sheet and Income Statement accounts?

From Forecasting to Valuation

It is not a long leap from the forecasting process to the development of estimates of the value of the business. Such estimates are useful for measuring reward to shareholders as well as for positioning the company as an acquirer or an acquisition candidate. As noted earlier, the value of stock, the unit of company ownership, is defined as the present value of future cash flows, measured in terms of a unit of ownership. Therefore, it is logical to conclude that the value of the whole company is the present value of future cash flows, measured at the aggregate enterprise level.

CONSTRUCTING A VALUATION MODEL

Recognizing that valuation involves estimating cash flows rather than estimating profits, the forecasts do require some further refinements, but the refinements are limited and mostly involve distinguishing debt from equity financing. If future funding involves additions to debt, the final enterprise value must take the total debt into account. If the financing will involve equity, the additional shares required will have an impact on the value that the current shareholders could expect.

Defining the Valuation Theory

The most important consideration regarding valuation relates to what is known as the terminal value. The terminal value is an estimate of the present value of the future cash flows expected to occur after the end of the specific forecasting period is reached. Just because forecasting further and further out becomes less and less reasonable does not mean that the business will stop then. Therefore, it is necessary to establish an estimate of the value related to the time beyond. One way to accomplish that is to use a variant of what is known as the dividend discount model. This model has many other names as well. The dividend discount model,

$$V = D_1 / (k - g)$$

says that the value of a share of stock (or, cumulatively, of the company) can be estimated as the amount the shareholder will receive in the next year, divided by the cost of capital minus the growth rate. However, since the shareholder owns all the earnings, whether distributed or not, one should redefine this relationship as the future earnings discount model,

$$V = E_1 / (k - g)$$

but that is not as catchy. The future earnings could be estimated as the final forecast year's earnings increased by the growth percentage expected (drawn from the sequential forecasts already prepared and usually refined to a constant growth rate employed throughout the years of the forecast, certainly the later years of the forecast.) and divided by the cost of capital minus that growth rate. There needs to be an assumption that the terminal growth rate is stable and significantly less than the cost of capital. Otherwise the terminal value, even when discounted back to the beginning of the forecast model, will skew the whole valuation result, making the value of the business unreasonable.



Think About It . . .

Value is what someone is willing to pay for, and the value of something is how much they are willing to pay. The value of a company is based on the price of its stock (or in the case of a private company, what someone would pay to acquire the company). Therefore, management needs to increase the value of the company (the price of its stock). Think about how management decisions affect the value of the company. Think also about how to assess the value impact of decisions or actions before they are implemented.

Projecting the Future Years

Using the linear percentage of sales model described in the AFN discussion, it is easy to project future income statements. By simply assuming a reasonable and constant growth rate (projecting sales, expenses, profits, and dividends, if any), the changes in retained earnings can be quickly estimated. The analyst can then adjust balance sheet accounts or identify financing requirements for the entire forecast period.

The next step is to create a spreadsheet or other visual model to see the results of the forecast clearly. A summary model might be:

Operating Income

Less	Taxes
Equals	After Tax Operating Income
Less	Projected Capital Expenditures (ΔFA)
Less	Projected Changes in Working Capital ($\frac{\Delta S}{S} SDA - \frac{\Delta S}{S} SDL$)
Equals	Estimated Cash Flows

This model is projected for a reasonable future period, such as ten years. To the tenth year, then, the analyst would add a terminal value:

$$V = E_1/(k-g)$$

Where:

E_1 = the tenth year's cash flow multiplied by one plus the growth rate
(1 + g)

Then,

E_1 is divided by the cost of capital minus the growth rate ($k - g$)

$E_1/(k-g)$ is identified as the terminal value for the model.

Discounting the Future Cash Flows

The cash flows resulting from the whole forecast are then discounted back to the present (defined as the beginning of the forecast), using the cost of capital or an investor's required rate of return, to determine the enterprise value at the time of measurement. That result, reduced by the amount of debt outstanding, including any additional debt anticipated in the forecast, results in an estimate of the current value of the business. This can serve as a starting point for negotiations if management anticipates seeking a buyer for the business, or as the basis for valuing stock if the management anticipates using stock as the currency for an acquisition.

If the business is generally successful and has or is expected to establish a strong market presence or identity, management will then build a premium on top of the valuation and use the whole process as a preparation for negotiation. This acquisition discussion is expanded in Chapter 8; however, this chapter clearly illustrates one of the major strengths of financial analysis using ratios and relationships that are thoroughly understood: the analysis can readily be extended into projections and plans for the future.



The extension of the techniques of financial analysis and capital budgeting evaluation can be extended to projections of future performance, financing requirements, and valuation determination. This means the analytical process is even more valuable than just a tool for understanding what has happened. By applying the analytical techniques to estimates and projections, the analyst has the opportunity to guide the business into the future. The key is to recognize the applicability of ratios and relationships to anticipated results, identifying opportunities to change practices or policies and to improve future performance.



Review Questions

1. Sales driven assets are: 1. (c)
 - (a) all assets on the balance sheet.
 - (b) fixed asset increases necessitated by sales growth.
 - (c) those assets expected to change in proportion to the sales change.
 - (d) those assets that are converted to sales quickly.

2. Sales forecasts are: 2. (b)
 - (a) best determined by statistical analysis of past performance.
 - (b) best drawn from those responsible for sales.
 - (c) best drawn from those responsible for managing the sales force.
 - (d) best if developed after extensive market research.

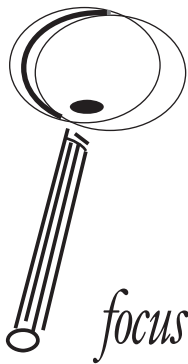
3. Incremental fixed assets included in the financial forecast are: 3. (b)
 - (a) proportional to incremental sales, in the same proportion as base fixed assets are to base year sales.
 - (b) drawn from the capital budget which is prepared before the financial forecast.
 - (c) the result of a complex proposal and approval process.
 - (d) forecasts based on the results of the completed annual budget.

4. The value of the firm is derived from: 4. (c)
 - (a) the current profit and loss forecast.
 - (b) the current price/earnings ratio of a company's principal competitors.
 - (c) the present value of projected future cash flows.
 - (d) competitive bidding of potential acquirers.

5. Additional financing needed reflects the: 5. (a)
 - (a) amount needed to balance the balance sheet.
 - (b) amount that must be raised in the next year.
 - (c) cost of the fixed assets needed to produce next year's sales.
 - (d) amount needed from shareholders to preserve their ownership share.

7

Capital Structure and Dividend Policy



Learning Objectives

By the end of this chapter, you should be able to:

- Discuss the importance of capital structure.
- Define trading on the equity.
- Compute the financial leverage index.
- Define business risk.
- Define financial risk.
- List the critical factors in determining the optimal capital structure for a company.
- Describe the key factors in developing a dividend policy.

Sharing Ideas on Financing Expansion

As the group convened for the next monthly get-together, the pre-meeting conversation focused on funding the major capital investment program the company had just announced. Al opened the meeting by saying, "As you all know, the company has just announced a major capital investment program intended to move us strongly toward the next stage in our company's development. I thought it would be interesting to talk about how to finance this kind of expenditure. While the CFO and the Board of Directors will make the final decisions, we should understand the implications of the choices. It is possible that some of us, including any of you, may be asked to participate in the analysis and support process for this program.

Franz spoke up, "While debt is cheaper than equity, a lot of debt makes me nervous."

"Yes, but," Jose interjected, "equity dilutes everyone's ownership and share of the earnings. Shareholders resent companies issuing new equity, and it often lowers the stock price."

Susan responded, "A smaller share of a bigger pie is better than a bigger share of a smaller pie."

"It's exciting to me to hear everyone involved in the discussion," Al said. "Let's talk about the choices and develop an approach to thinking about how to finance our expansion."

Companies can acquire capital from two sources—debt and equity. The mix of these two sources is called the company's capital structure. Each source has its advantages and disadvantages. What is the optimum capital structure for a company? We will explore this question in our discussion of debt and equity financing.

Dividends are an important consideration for a company. The issues involved are whether funds available for dividends should be paid to stockholders rather than being reinvested or used to repurchase the company's stock and whether dividends should be stable or related to earnings.

ISSUES IN CAPITAL STRUCTURE AND DIVIDEND POLICY

Debt, unlike equity capital, must be repaid. Even if the company suffers losses, interest and principal payments must be made. Debt payment requirements may be augmented by covenants, which define default in terms of such measures of financial condition or performance as the current ratio and debt-to-equity ratio. Debtors may also be constrained by covenants limiting their ability to pay dividends or bonuses or make investments (sometimes by a restriction on retained earnings). Additionally, some debt has collateral, specified assets that are pledged as security to protect the creditors against default.

Companies may issue debt to increase earnings per share or return on equity. Such use of debt financing is called financial leverage or trading on

the equity. The company is trying to earn a greater return on assets than the after-tax cost of the debt.

Unlike dividends, interest for a business is tax-deductible. Consequently, the after-tax cost of debt is equal to the interest expense multiplied by one minus the tax rate ($1-T$). The higher the tax rate, the lower the after-tax cost of debt. As we know, debt has a lower cost than equity because it is perceived to be less risky to the investor. Therefore, more debt relative to equity will lower the weighted average cost of capital and the deductibility of interest before computing taxes will lower the cost of debt on an after-tax basis and the overall weighted average cost of capital even more.

To illustrate financial leverage, assume that a company has the following information concerning its income, debt, and assets:

Income before interest and taxes	\$ 400,000
Debt	500,000
Total assets	1,500,000
Stockholders' equity	800,000

Assume that the tax rate is 34 percent, and interest at 8 percent for the year is \$40,000 ($\$500,000 \times .08$). Income before taxes is \$360,000 ($\$400,000 - \$40,000$). Taxes are \$122,400 ($\$360,000 \times .34$). Therefore, net income is \$237,600.

One measure of a company's profitability is its return on assets. The return for this company can be computed as follows:

$$\begin{aligned}
 \text{Return on assets} &= \frac{\text{Net income} + \text{Interest expense} (1 - \text{tax rate})}{\text{Total assets}} \\
 &= \frac{\$237,600 + \$40,000 (1 - .34)}{\$1,500,000} \\
 &= \frac{\$264,000}{\$1,500,000} \\
 &= 0.176 = 17.6\%
 \end{aligned}$$

The after-tax cost of debt is 0.053 [$0.08 \times (1 - .34)$].

The return on equity is another measure of a company's profitability. The return on equity for this company can be computed as follows:

$$\begin{aligned}
 \text{Return on equity} &= \frac{\text{Net income}}{\text{Stockholders' equity}} \\
 &= \frac{\$237,600}{\$800,000} \\
 &= 0.297 = 29.7\%
 \end{aligned}$$

E xhibit 7-1 Financial Leverage Indices for Nine Companies for 2012

<i>Company</i>	<i>Return on Equity*</i>	<i>Return on Assets*</i>	<i>Financial Leverage Index</i>
Coca-Cola	27.19%	10.47%	2.60
Pfizer	17.84	7.84	2.27
Dow Chemical	5.42	1.70	3.19
ExxonMobil	27.78	14.28	1.94
Microsoft**	25.58	14.00	1.83
Procter & Gamble***	16.80	8.13	2.07
Kellogg's	38.75	6.33	6.12
Lockheed Martin****	7038.46	7.10	991.21
Wal-Mart*****	22.27	8.37	2.66*

* From Exhibit 3-3.

** Microsoft's fiscal year ended on June 30, 2012.

*** Procter & Gamble/s fiscal year ended on June 30, 2012.

**** Lockheed Martin reported a very substantial other comprehensive loss, principally for postretirement benefits, as part of shareholders' equity.

***** Wal-Mart's fiscal year ended on January 31, 2013.

The return on equity exceeds the return on assets. This company is being successful in trading on the equity. To further make this point, if there were \$100,000 more debt and less stockholders' equity, the results would be different. Interest would be \$48,000; income before tax would be \$352,000; taxes would be \$119,680; and net income would be \$232,320. As a result, ROA would be

$$= \frac{\$232,320}{1,500,000} = 15.5\%$$

but ROE would be 33.2%. While the net income is lower because of the increased interest, and, therefore, the ROA is lower, the use of debt instead of equity spreads the profit over less investor funding, resulting in a higher ROE. The impact of financial leverage on return to the shareholders is obvious.

Exhibit 7-1 shows the effects of financial leverage for nine companies for 2012. The measure of financial leverage used is the financial leverage index, which is computed as follows:

$$\text{Financial leverage index} = \frac{\text{Return on Equity}}{\text{Return on Assets}}$$

If the financial leverage index is greater than one, as in our example above, there are favorable effects from leverage; if the financial leverage index is less than one, there are unfavorable effects from leverage. The nine companies presented in Exhibit 7-1 all have favorable financial leverage.

Using the earlier example, what would the return on equity have been if the company in the example had not issued any debt, but instead had issued common stock for \$500,000? The net income would have been \$264,000 [$\$400,000 \times (1 - .34)$]; the stockholders' equity would have been \$1,300,000 ($\$800,000 + \$500,000$). The return on equity would have been 20.3 percent rather than 29.7 percent.

In recent years the use of debt rather than equity has increased, and as interest rates have dropped and stayed low, return on equity has become a more significant benchmark of success. This trend has been increased also by the market perception that issuing additional equity to provide funds for a company is interpreted as evidence of unsuccessful management, and also by the increasing activity of private equity firms acquiring companies or facilitating leveraged buyouts of companies by management. This has increased the riskiness of many businesses, contributing to more frequent bankruptcies and restructurings.

An analyst must be sensitive to the level of debt on a company's balance sheet and to increases in this level from period to period. As debt increases, the risk of not having sufficient cash to make the required payments increases. Not paying interest and principal requirements when due can result in default on the debt. Even if payments are being made on time, the ability of the company to obtain funds by issuing more debt may be reduced. This situation may result in lost opportunities for profitable investments.

As a company's debt increases, the probability of bankruptcy increases. This increased risk reduces the company's credit rating and therefore increases the interest rate it must pay on its debt. Even without debt, a company can face the probability of bankruptcy if it cannot pay its accounts payable. Higher debt in such a circumstance increases the probability of financial distress. A company that has a high risk in its business operations should have less debt than a firm with a small risk in its business operations. Such risk can be measured by the volatility of the company's income.

What are the costs of bankruptcy? There are direct costs such as payments for legal and administrative costs. Also, there are indirect costs such as customers taking their business elsewhere, higher turnover of management personnel, and more stringent terms by suppliers. Equity holders lose their investments and lenders and creditors are severely penalized as well. Even if a company emerges from bankruptcy and is able to operate profitably, it takes a very long time to restore its reputation and to qualify for the trust and credit from the customers and suppliers that it needs to be really successful.

The challenge of debt vs. equity financing has a wide array of consequences. An analyst must be sensitive to this range of issues. For example, the interests of different stakeholders create a potential conflict of interest. When managers are hired to run the operations, their actions may benefit themselves rather than those of either the shareholders or the lenders. These give rise to agency costs, the added expense incurred to incentivize managers to do what shareholders or lenders expect. Agency risks also arise, for example, because stockholders and lenders do not always agree on decisions pertaining to operations, growth, and financing. Stockholders want to increase the value of their stock; creditors want to increase the probability that they will receive

promised payments. If a company invests in ventures that are riskier than those entered into at the time the debt was issued, the debt loses value as interest rates rise. Stockholders win; debtholders lose. If a company issues new debt that has priority over the claims of existing debtholders, stockholders win and existing debtholders lose. Increasing dividends benefits stockholders but may be injurious to debtholders.

Managers who own little or no stock may be more interested in their own well-being on the job than in maximizing the value of the company's stock. Additionally, managers may not invest in risky but potentially very profitable projects because failure could result in being fired. This potential conflict of interest has led to a dramatic increase in the inclusion of stock and stock options in the compensation arrangements for senior executives. It is expected that such arrangements will more nearly align the interests of the managers with those of the shareholders. However, in recent years there have been a number of executives who have negotiated compensation arrangements that have enabled them to benefit exceptionally without a corresponding increase in share prices or shareholders' wealth.

The whole area of debt levels and the overall use of debt has drawn a great deal of attention in recent years. With the exceptionally low interest rates that have prevailed for the last several years, companies have taken on much higher levels of debt than in the past to finance their growth. At the same time banks and other financial investors have created a number of debt-based derivative securities to facilitate the availability of funds to lend and to increase returns to replace the low interest yields on traditional loan portfolios. All of this has increased the risk levels in the market place. Analysts need to be attentive to changes in debt levels in the financial structure of the companies they examine.

Exhibit 7-2 presents the debt (short-term debt plus long-term debt) to equity ratios for nine companies for 2012. The ratios range from a low of 0.61 (Wal-Mart), which means that for every dollar of equity capital there is 61 cents of debt, to a high of 990.21 (Lockheed Martin), which means that for every dollar of equity capital there is \$990.21 of debt. Excluding Lockheed Martin (which really is an exception in this example) the highest debt to equity ratio is 5.12 (Kellogg's). Also presented in Exhibit 7-2 is the ratio of long-term debt to equity. Short-term debt is excluded in this ratio on the basis that short-term debt is not usually used for financing property, plant and equipment, or other long-term investments. The ratios range from a low of 0.05 (ExxonMobil) to a high of 2.95 (Kellogg's), again excluding Lockheed Martin.

BUSINESS AND FINANCIAL RISK

Brigham and Houston (2013) discuss two types of risk in connection with capital structure—business risk and financial risk. Business risk is the risk inherent in a company's operations when the company does not use debt. Financial risk is the additional risk to the common stockholders when the company uses debt.

E**Exhibit 7-2
Debt-to-Equity Ratio for Nine Companies for 2012**

<i>Company</i>	<i>Debt-to-Equity Ratio*</i>	<i>Long-Term Debt-to-Equity Ratio</i>
Coca-Cola	1.60	0.45
Pfizer	1.27	0.38
Dow Chemical	0.75	0.91
ExxonMobil	0.94	0.05
Microsoft**	0.93	0.16
Procter & Gamble***	1.07	0.33
Kellogg's	5.12	2.45
Lockheed Martin****	990.21	157.90
Wal-Mart*****	0.61	0.47

* From Exhibit 3-5.

** Microsoft's fiscal year ended on June 30, 2012.

*** Procter & Gamble/s fiscal year ended on June 30, 2012.

**** Lockheed Martin reported a very substantial Other Comprehensive Loss, principally for postretirement benefits, as part of shareholders' equity.

***** Wal-Mart's fiscal year ended on January 31, 2013.

Business Risk

Business risk is the risk a company faces in projecting its future return on assets. Return on assets can vary due to factors such as the business cycle, actions by the company and its competitors, and unforecasted events. Business risk varies over time among industries and among companies in a particular industry. Business risk is higher if a company has high variability in its sales, sales prices, or input costs. The higher fixed costs are as a percentage of total costs, as is generally the case with capital-intensive firms, the higher is a company's business risk. The extent to which fixed costs are a percentage of total costs in a company's operations is called operating leverage. A company with high fixed costs cannot adjust as easily to a decrease in demand as can a company with few fixed costs. However, for those firms, when their fixed costs have been absorbed by sales margins, further sales generate profits at an accelerating rate.

Financial Risk

Financial risk is the additional risk, beyond business risk, that arises because a company uses debt. Although sales volume and operating costs are not affected by debt financing, the interest must be paid. Debt financing usually increases the expected return on equity but also increases the risk to the common stockholders. Expected return on equity is increased because the lower income due to the interest expense is more than offset by a smaller amount of equity. Riskiness of the investment by the common stockholders is increased because the interest charges may turn a profit into a loss if sales

demand is weak. Therefore, the use of debt results in a trade-off between higher expected returns and higher risk. This was demonstrated in the discussion of return on equity at the beginning of this chapter.

OPTIMAL CAPITAL STRUCTURE

The discussion of capital structure in companies has been the focus of scholars and analysts for many years. Capital structure reflects managerial attitudes and risk tolerance, perceptions of managerial responsibility, and a broad range of influences affecting performance, policy decisions, and factors impacting broad economic patterns. Levy (2001) believes that the following factors are important in determining the relative amounts of a company's debt and equity:

1. Companies with more volatile operating income have less debt in their capital structures because the value of the interest tax shield is less (there are few tax benefits to compensate for interest charges if income is low or negative) and the probability of financial distress and bankruptcy is greater.
2. Companies that have higher amounts of fixed assets have more debt; companies that have higher amounts of intangible assets or engage in higher amounts of research and development and advertising have less debt.
3. Companies with greater amounts of cash flows from operations tend to have more debt (so as to control overinvestment).
4. Companies with greater profits tend to have less debt (internal financing is preferred to external financing).

On the basis of a survey of financial managers, Pinegar and Wilbricht (1989) ranked the following factors that are considered in making capital structure decisions:

1. Maintaining financial flexibility
2. Ensuring long-term survivability
3. Maintaining a predictable source of funds
4. Maximizing security prices
5. Maintaining financial independence
6. Maintaining a high debt rating
7. Maintaining comparability with other firms in the industry

While this list is still appropriate, current financial management decisions suggest that maximizing security prices has moved up the list. In the same study, financial managers ranked six different sources of financing from most preferred to least preferred. The results are as follows:

1. Retained earnings
2. Straight debt
3. Convertible debt
4. External common equity
5. Straight preferred stock
6. Convertible preferred

Is there an optimal capital structure? There generally seems to be agreement that there is, but determining the optimal capital structure is not easy. Most discussion of optimal capital structure is traceable to the 1958 article by Modigliani and Miller. Based on a number of examples, companies act to preserve a capital structure that is comfortable for management. When there is a change in capital structure, it is often traceable to a change in management.

Damodaran (2001) believes that only in exceptional cases will the marginal benefits of debt (tax benefits and added discipline) be less than the marginal costs (bankruptcy costs, agency costs, and lost flexibility). Consequently, there is an optimal capital structure that maximizes the value of a company.

Levy (2001) believes that finding a formula to determine the optimal capital structure for a company is difficult. While the interest tax shield can be measured, estimating the costs of financial distress and increases in its probability on market values is not easy. While management may believe that increased debt will draw a favorable market reaction, investors may react unfavorably. Management can know only after the debt has been issued—did the stock price increase or decrease? If the stock price increases, the optimal capital structure has not been reached.

Palepu, Peek, and Healy (2013) believe that it is difficult to quantify the benefits and costs of issuing more debt. Estimating the costs of financial distress or management-incentive benefits from financial leverage is not easy. A qualitative assessment of a company's free cash flow situation, business risks, and types of assets can be made and then used to adjust the quantified tax benefits from debt to determine how high the company's debt should be.

Brigham and Houston (2013) state that a company's capital structure should contain the amount of debt that maximizes the price of its stock. A company could keep increasing its debt so as to increase its earnings per share and consequently its stock price. But issuing more debt increases the cost of debt because of greater risk, which raises the cost of equity and reduces the stock price. The optimal capital structure can be computed theoretically, but not estimated as an exact point. Therefore, the optimal capital structure should be considered to be a range.



Think About It . . .

The discussion of capital structure highlights the pros and cons associated with levels of debt and equity. Because increased debt lowers the overall cost of capital, the optimum capital structure reflects the risk tolerance of management. Very often a change in capital structure of a company is traceable to a change in senior management. Think about the cause and effect aspects of leadership decisions in companies.

Brigham and Ehrhardt (2010) discuss some judgmental issues to consider in determining a company's optimal capital structure. These factors, which vary in importance from situation to situation, are as follows:

- Companies that provide vital services (such as telephone) need to provide continuous service; therefore, they must not issue debt to the point where long-run viability is threatened.
- Managers, who are concerned about their careers, might be more conservative in their use of leverage than stockholders, who are well-diversified in their investments.
- Lenders' and rating agencies' attitudes about proper leverage are frequently important in determining financial structures. The times-interest-earned ratio is often used to measure financial risk.
- A company may keep its debt low so as to obtain greater flexibility to issue debt when interest rates are low—or when stock prices are currently low but are expected to increase at a later time.
- The percentage of stock owned by management may influence the decision on whether more debt or more stock should be used to obtain additional financing. Management may not want to lose majority control by issuing more stock. Management that is not concerned with control may decide to issue more stock to avoid risking financial distress and an assumption of control by creditors. A company with too little debt risks a takeover attempt by a group of stockholders. In fact, companies threatened with takeover frequently issue debt and distribute the proceeds to shareholders to thwart the takeover bid.
- A company's assets influence capital structure decisions. Companies with assets that are suitable as security for loans tend to have higher percentages of debt in their capital structures; companies involved in technological research or that have high business risk tend to use less debt.
- Companies with rapid growth rates tend to use more debt than slower-growing companies that finance growth with retained earnings.
- Very profitable companies use less debt because their retained earnings satisfy their financing needs.

DIVIDEND POLICY

When companies earn income, they can invest the money in plant and equipment, retire debt, or pay money to the stockholders. If they choose to distribute cash to stockholders, companies can pay dividends or repurchase shares. If firms choose to pay dividends, they must decide whether the dividends should be steady or should vary with income or cash flow.

Historically, when earnings increase, dividends increase; when earnings decrease, dividends may decrease, but management is often reluctant to decrease dividends because it sends a negative signal to the market. To avoid reducing dividends in times of poor performance, companies increase dividends only if the management believes that the new levels can be maintained.

The payment of dividends oftentimes depends on whether a firm has many opportunities for profitable investments. A company that is rapidly growing and has intentions to continue to do so may not pay any dividends. Paying dividends would mean that the company would have to issue either debt or stock, and incur flotation costs to finance the projects. On the other hand, a stable company with a large amount of free cash may pay out more in dividends, because it can finance its investment opportunities with internal funds. Increasingly, companies are repurchasing shares rather than paying or increasing dividends. This alternative is discussed later in this chapter.

Information on earnings and dividends for nine companies for 2008-2012 is presented in Exhibit 7-3. During this time period all of the cited companies increased their dividends, while in some cases EPS rose and fell. In fact, there are examples (Pfizer and Dow Chemical) where the dividend payout exceeded the earnings per share. Clearly, the managements of these companies wanted to reassure their shareholders that better results were anticipated.

Preferences of Stockholders

What are the preferences of stockholders? Do stockholders want dividends now or do they want profits to be reinvested in the business so as to earn capital gains when they sell the stock later? Receiving dividends now is sure; receiving capital gains later is probabilistic. In 2003, President Bush initiated a change in tax rates that lowered the tax rate on dividends to the capital gains rate, promoting an increase in dividends among dividend-paying companies.

Investors can be classified as to whether they invest in stocks for dividends or for capital gains. Investors in low tax brackets (such as retired persons) and tax-exempt institutions invest in stocks of companies that pay high dividends. These groups want cash now. Conversely, investors in high tax brackets do not want dividends now. They would rather have the company reinvest its earnings. If these individuals receive dividends, they would buy more stock, but with after-tax dollars. The tendency for investors to buy stocks in accordance with their preferences for receiving dividends is called the clientele effect. Investors buy stocks in companies that have dividend policies they like. Consequently, it is difficult for a company to change its dividend policy.

Investors may regard dividend increases or decreases as signals about a company's future earnings expectations. If dividends are increased, investors may believe that management expects higher earnings that can sustain the higher level of dividends. A company may forecast higher earnings and its current income statement may present increased earnings, but raising the dividend rate is a more tangible signal that increased earnings are expected. A commitment has been made. If dividends are decreased, investors may believe that the company's future prospects concerning earnings are bleak, especially since companies are so reluctant to cut dividends, often doing so only as a last resort. Dividends may remain at the same level at a time of decreased earnings or loss, to signal investors that this is a temporary situation. Some companies sell additional stock or issue more debt at a time when they continue to pay dividends, to avoid sending a negative signal to investors about future expected earnings.

E**xhibit 7-3****Dividend Information for Nine Companies, 2008-2012**

<i>Company</i>	<i>2012</i>	<i>2011</i>	<i>2010</i>	<i>2009</i>	<i>2008</i>
Coca-Cola					
Basic EPS	\$1.97	\$1.85	\$2.53	\$1.46	\$1.24
Cash dividends per share	\$1.02	\$.94	\$.88	\$.82	\$.76
Dividend payout	51.3%	50.8%	34.8%	56.0%	61.0%
Pfizer					
Basic EPS	\$1.94	\$1.27	\$1.02	\$1.23	\$1.20
Cash dividends per share	\$.88	\$.80	\$.72	\$.80	\$1.28
Dividend payout	45.4%	63.0%	70.6%	65.0%	106.7%
Dow Chemical					
Basic EPS	\$.70	\$2.05	\$1.72	\$.32	\$.62
Cash dividends per share	\$1.21	\$.90	\$.60	\$.60	\$1.68
Dividend payout	171.4%	43.9%	34.9%	187.5%	271.0%
ExxonMobil					
Basic EPS	\$9.70	\$8.42	\$6.22	\$3.98	\$8.69
Cash dividends per share	\$2.18	\$1.85	\$1.74	\$1.66	\$1.55
Dividend payout	22.5%	22.0%	28.0%	41.7%	17.8%
Microsoft*					
Basic EPS	\$2.00	\$2.96	\$2.10	\$1.62	\$1.8787
Cash dividends per share	\$.83	\$.68	\$.55	\$.52	\$.46
Dividend payout	41.5%	23.0%	26.2%	32.1%	29.7%
Procter & Gamble**					
Basic EPS	\$3.66	\$3.93	\$4.11	\$4.26	\$3.64
Cash dividends per share	\$2.10	\$2.06	\$1.88	\$1.72	\$1.55
Dividend payout	57.5%	70.2%	45.9%	40.4%	42.2%
Kellogg's					
Basic EPS	\$2.67	\$2.38	\$3.40	\$3.16	\$2.99
Cash dividends per share	\$1.74	\$1.67	\$1.56	\$1.43	\$1.30
Dividend payout	57.5%	52.3%	45.9%	45.3%	43.5%
Lockheed Martin***					
Basic EPS	\$8.36	\$7.81	\$7.81	\$7.64	\$7.86
Cash dividends per share	\$4.15	\$3.25	\$2.64	\$2.34	\$1.83
Dividend payout	49.6%	41.6%	33.8%	30.6%	23.3%
Wal-Mart****					
Basic EPS	\$4.52	\$4.47	\$3.17	\$3.37	\$3.13
Cash dividends per share	\$1.59	\$1.46	\$1.21	\$1.09	\$.95
Dividend payout	35.2%	32.7%	38.2%	32.3%	30.4%

* Microsoft's fiscal year ended on June 30, 2012.

** Procter & Gamble/s fiscal year ended on June 30, 2012.

*** Lockheed Martin reported a very substantial Other Comprehensive Loss, principally for postretirement benefits, as part of shareholders' equity.

**** Wal-Mart's fiscal year ended on January 31, 2013.



Think About It . . .

Dividends make shareholders feel good. Dividends require shareholders to pay taxes based on their dividend income. Dividends cause stock prices to rise. Dividends consume cash resources that companies could otherwise use for capital investments and operations. Are dividends a good idea?

Factors Affecting Dividend Policy

Many factors can affect a company's dividend policy. Decisions on dividends require judgment; there are no precise rules or formulas to follow.

Dividends should be set at an amount that can be maintained over time. If dividends are steady or rising, investors believe that the company has good investment opportunities and is in little or no danger of experiencing financial distress. On the other hand, a decrease in dividends sends a negative signal to potential investors and current stockholders. In some circumstances, however, cutting dividends may seem to be the right thing for a company to do.

If a company has many profitable investment opportunities, it may be prudent to pay low dividends in order to have the necessary internal financing available. However, reducing dividends—even to take advantage of superior investment opportunities—often results in a significant drop in the stock price. In 1994, Florida Power and Light needed to increase their generating capacity to serve its increasing demand for electricity. Because interest rates were unattractive, the management and board of directors decided to decrease dividends to fund the new capacity, which was expected to significantly increase profits, dividends, and shareholder wealth in the coming years. Even though the expectations were all very positive and publicly announced and explained, the immediate result was a substantial drop in the share price of FPL stock. Investors are very sensitive to changes in their immediate cash flow.

If dividends are too high, either more debt or more stock may have to be issued. More debt means greater risk and the possibility of debt covenants that may limit future dividends. More common stock issued signals low expectations by management about the company's future earnings (if future earnings were forecast to be high, management would not want to share the benefits from increased market prices with new stockholders).

A company with few profitable investment opportunities is better off paying higher dividends. Accumulating cash may tempt management to invest in projects with too high a risk or too low a return. Additionally, a company in such a condition may find that it is the target of a hostile takeover.

QUICK QUIZ 7-1

Answers to QUICK QUIZ questions can be found starting on page 191.

Dividends are deducted from profits after taxes to determine the change in retained earnings for a given year. Which of the following statements is correct?

- (a) Issuing dividends increases return on equity.
 - (b) Issuing dividends decreases return on equity.
 - (c) Issuing dividends has no effect on return on equity.
 - (d) The effect of issuing dividends on return on equity cannot be determined without additional information.
-

Stock Dividends and Stock Splits

A stock dividend results in an increased number of shares for existing stockholders. A stockholder who owns 1,000 shares (representing 10 percent of the outstanding stock) and then receives a 5 percent stock dividend now owns 1,050 shares (still representing 10 percent of the outstanding stock). A stock dividend may be given as an extra dividend, a supplement to the cash dividend when earnings have been particularly good or in lieu of cash dividends. Many investors believe that the issuance of a stock dividend signals good times ahead for the company. Most investors do not, however, consider a stock dividend to be a substitute for a cash dividend.

Stock splits, like stock dividends, increase the number of shares outstanding, but by a large proportion. For example, in a two-for-one stock split, a stockholder owning 1,000 shares before the stock split owns 2,000 shares after the stock split. If the stock was selling for \$130 before the stock split, the stock sells for about half that price after the stock split. Investors look upon stock splits as favorable. Management often prefers that the stock price does not exceed a certain range. The stock is split to lower the price, to keep the price within a desirable range, and to send a sign to investors that future earnings prospects are good.

Because dividends, including stock dividends, and stock splits are perceived favorably by the market, there is a positive impact on stock prices whenever a company announces and enacts any of these actions. As a consequence, companies often promote the announcements of these actions, creating a positive buzz for the company and for its stock.

Stock Repurchases

Increasingly, companies have been offering stock repurchase programs, sometimes instead of offering dividends. A stock repurchase program enables a stockholder to receive cash if they so choose, but does not require a shareholder who does not want dividends to pay taxes on dividend income—or the possible dividend income even if the shareholder elects to have the dividends reinvested in the company.

One of the consequences of share repurchases is to reduce the number of shares outstanding, thereby increasing earnings per share; as we have seen, this usually increases the stock price. Another consequence of share repurchase is to concentrate the ownership in the hands of management. As a result, management rarely sells its share back when the company offers a repurchase opportunity.



Decisions concerning optimal capital structure and dividends are not independent. Companies may issue debt to increase earnings, but interest and principal payments must be made and dividends may be limited by covenants. Issuing common stock often signals investors that future prospects for earnings may be unfavorable. The optimum mix of debt and equity depends on such factors as the marginal tax rate, the proportion of fixed assets held, the magnitude of cash flows from operations, and the amount of earnings. Dividend payments depend on investment opportunities, stability of earnings, access to capital markets, and the preferences of stockholders.



Review Questions

1. Trading on the equity refers to: 1. (c)
 - (a) the cost of debt exceeding the return on assets.
 - (b) the after-tax cost of debt being lower if the tax rate is lower.
 - (c) the return on assets being greater than the after-tax-cost of debt.
 - (d) unfavorable financial leverage.

2. Financial leverage increases return on equity because the: 2. (a)
 - (a) cost of debt is lower than the cost of equity.
 - (b) cost of equity is lower than the cost of debt.
 - (c) interest expense lowers the profit.
 - (d) interest rate is lower than the tax rate.

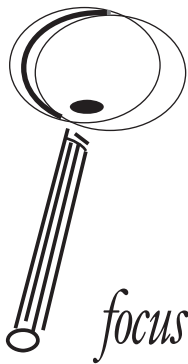
3. Stockholders and managers not always agreeing on decisions pertaining to a company's activities is called: 3. (d)
 - (a) business risk.
 - (b) leverage.
 - (c) financial risk.
 - (d) agency risk.

4. Companies tend to have more debt if they have: 4. (b)
 - (a) more volatile operating income.
 - (b) higher amounts of fixed assets.
 - (c) lower cash flows.
 - (d) lower profits.

5. After a two-for-one stock split, a shareholder who had twenty shares with a market value of \$70 per share is more likely to have: 5. (a)
 - (a) forty shares with a market value of \$35 per share.
 - (b) forty shares with a market value of \$70 per share.
 - (c) twenty shares with a market value of \$35 per share.
 - (d) twenty shares with a market value of \$140 per share.

8

Mergers and Acquisitions



Learning Objectives

By the end of this chapter, you should be able to:

- Describe at least three situations that would make a merger attractive.
- List and explain the five key elements in the search and screening process.
- Describe the five critical variables for measuring the financial impact of a merger.
- Explain the impact on earnings per share of a potential merger.
- Explain the impact on the price-earnings ratio of a potential merger.
- List two valid and two invalid motives for pursuing a merger.
- Evaluate the significance of an acquisition on a firm's future performance.

The Benefits of Changing Perspective

"I was just thinking," Louise said, "We started looking at a lot of business decisions differently over the past few months. These discussions have been terrific. I hope they will continue."

"They will," Al responded. "We've come a long way."

Louise continued: "When we first met as a group, I was tired of my job. I found it boring. It's not boring anymore."

"That's terrific," said Al enthusiastically. "It's just what I hoped would happen. There is so much more to finance and controllership than just preparing the same old financial statements every month. I'm glad you see it."

"Since we started, task after task has opened new areas where we can contribute. Joan, our division manager, asked me to look at the acquisition of Jones Tool the other day," said Franz. "I tried to treat the acquisition analysis like a capital investment, asking for revenue and expense information. She was very pleased at the approach and I found it to be quite enlightening, but I wondered if that was really appropriate. I'd like the group to weigh in on this. While it opened up a number of additional areas to consider, I also wondered if I missed any other important stuff."

"That's a great topic to discuss," Steve said. "I sure hope these meetings continue. I've learned so much."

"They will," Al said. "They will."

Over the past twenty-five years the number of megamergers has escalated, with very large companies being acquired by other very large companies, often through the exchange of large amounts of stock. Some of these have been very successful, such as Exxon's acquisition of Mobil Oil for \$85.1 billion in 1999 and Procter & Gamble's acquisition of Gillette for \$57 billion in 2005. Others have been spectacular failures, such as AOL's acquisition of Time Warner for \$181.6 billion in 2007, and Daimler-Benz's acquisition of Chrysler for \$38.6 billion in 1998. There have been numerous other combinations for similar amounts of value almost every year. As the stock market has risen and stock prices have reached higher and higher values, managements have seen that issuing stock to effect an acquisition is a very attractive way to increase the size, profitability, and market presence of their companies.

At the same time that these supermergers were occurring, many large divestitures and spin-offs were becoming common. Some of these involved similar amounts. Still other companies were the subject of leveraged buyouts, where members of management, usually in conjunction with a private equity firm, arrange to acquire the stock of a company, making it a privately held company after many years of being publicly owned. The financial landscape of mergers and acquisitions, spin-offs and divestitures, and leveraged buyouts has been very active, and has opened an important new area of financial analysis.

MOTIVES FOR MERGERS

A merger is a strategic, long-term investment and therefore, should be analyzed in the context of net present value. (It should be noted here that some acquisitions are made for other reasons, including managerial ego, pride, and spite, but these will not be explored here.) As a result, a merger should be pursued only if it creates real economic value. Value may be created from corporate synergy (economies of scale often referred to as $2 + 2 = 5$), tax benefits, or some other outcome that will increase overall cash flows. Consequently, a financial manager needs to assess the value of the two firms involved, both separately, and together. Presumably, the sum of the parts will be worth more than the separate pieces. This creates the incentive for the merger. Another issue is how the gains or premiums will be allocated between the buying firm (the acquirer) and the firm that is sold (the acquired or target firm).

QUICK QUIZ 8-1

Answers to QUICK QUIZ questions can be found starting on page 191.

A good example of synergy occurs when:

- (a) Redundant management positions can be eliminated, reducing costs.
- (b) The products of the acquired company serve the needs of the customers of the acquiring company.
- (c) The acquired company and the acquiring company serve the same market.
- (d) The acquired company and the acquiring company serve different markets.

A model or technique used to evaluate a merger or acquisition relies on a number of financial principles. The acquiring firm must screen potential merger candidates to identify the best opportunities. To come up with a rational basis for analysis, the analyst must estimate prospective cash flows and earnings from alternative merger combinations as well as financing alternatives. Although historical data may be used as inputs, the key to the analysis is the forecast for the combined firm after the merger or acquisition has taken place.

Forecasting the prospective cash flows, earnings, and risks for various post-merger combinations is critical to a successful analysis of merger alternatives. The estimates of net operating earnings and cash flows may be used as inputs to the net present value model. The growth and synergistic effects of the new combined company must be estimated by the decision maker. An analysis of the relevant products and markets and the resultant organization also must be performed. A bargaining position must be established by the acquiring firm with regard to the maximum amount it can afford to offer in exchange for the securities of the acquired firm. Finally, a forecast of the resulting earnings per share and price-earnings ratio must be considered.



Think About It . . .

Numerous studies have shown that many acquisitions, perhaps even a majority, do not add shareholder value for the acquiring company's shareholders. How do you think acquisition opportunities should be evaluated?

SEARCH AND SCREENING

A company beginning the search for an acquisition should be alerted at the onset to the lures and traps that are set along the way. Both quantitative and qualitative features of candidate firms may be altered. A good screening procedure will help management to recognize potentially superficial qualities.

Prospective acquisitions have divergent dimensions that must be measured. Historical growth and return measures may shed light on what might be expected in the future. In addition, areas of vulnerability need to be identified. Stock price levels also need to be taken into consideration. Profitability, risk, and stock price may be studied together in seemingly endless ways to produce differing pictures of various candidate firms.

Screening Criteria

There are various screening criteria to be used. Some typical financial screens are:

1. A price-earnings ratio less than or equal to management determined percent of the average highs of the last three years.
2. A market capitalization less than or equal to some determined percentage of the tangible book value per share.
3. A debt-to-equity ratio less than or equal to one.
4. A compound growth of earnings per share of at least 10 percent compounded annually over the past decade.

The list of requirements must be constructed with some care. The individual screens, if not properly set, may have unanticipated and undesired results. Take, for example, item number 1 in the above list. No single indicator of a potentially good stock buy has been more often mentioned over time than a low price-earnings ratio. Despite this, many stock prices fall, and low price-earnings ratios result for genuinely valid reasons. On one hand, a price-earnings ratio may be low because the future growth potential also is low. On the other hand, the market may be overstating temporarily bad times. Although a low price-earnings ratio may indicate a good buy, it provides little real information about an individual company. It is critically important to look beyond a single or even a few favorable indicators.

Qualitative Criteria

In addition to the financial screens, qualitative criteria often are employed. Qualitative criteria can include turnaround situations, protective barriers, complementary fit, supplementary fit, tax benefits, horizontal mergers, and/or vertical mergers.

Turnaround Situations

A company whose recent poor financial performance does not at all reflect its far better future potential is called a turnaround situation. Several things may signal such an opportunity. For example, consider a company whose profits recently have lagged behind those of its industry. The problems that it is facing may be internal and temporary. A change of ownership and a fortification of management may control the troubles that have been decreasing its earnings.

In another situation, the industry as well as the company, may be hurt by economic factors. For instance, a highly cyclical industry, such as leisure-oriented goods or real estate development, may be hurt by a recession. History may suggest that, while such a decline customarily happens two or three times a decade, things can be expected to improve. In this case, it may make sense to acquire strong companies that are out of favor for cyclical reasons.

Another turnaround situation occurs when there has been a break in the management of a company for reasons that a merger could resolve. The managers who are leaving may see a better way to run the company or a better direction for the allocation of assets, but may be frustrated by the present owners or managers. New owners would provide ideas, incentive, and freedom for managers, thereby allowing the company that is currently disintegrating to greatly increase its profits and performance in the future.

Protective Barriers

Competitive pressures in an industry can put constant pressure on company profits. Sustained high returns require some protection from the assaults of others. Patents, market domination, trademarks, advertising, and low production costs all may provide such shelter.

Special consideration should be given to purchasing companies that could strengthen a company's competitive position in an industry. Furthermore, companies that are already protected should be considered. Legal monopolies, though regulated, may provide reliable streams of income. Nonregulated companies may well find that the acquisition of similar companies leads to more harmony than the acquisition of those that are more competitive and unfamiliar.

Complementary Fit

A company that helps to compensate for a present weakness in the acquiring firm is a complementary fit. A company with a poor overall record may have a special strength. It may have a sales force, an advertising program, or a research and development staff that could provide real support in a needed area. Similarly, one company with a forceful marketing capability and an excess of funds may acquire another with strong creative or production capability (for

example, Pfizer's acquisition of Wyeth Labs in 2009). Together, they could produce products quickly and market them effectively. The profits resulting from the merged company might be many times the earnings that could be expected from the two separate companies.

A company in the rapid growth stage of its life cycle is in need of funds. Expansion tends to eat up all the cash generated from the company's operations, and the company will require additional funds. Typically, such a company might consider acquiring another firm with similar growth potential, but such a move would not solve the financing pinch and any shortage of skilled manpower would be further taxed. On the other hand, a company in a mature or declining state might very well be a complementary acquisition. Such a company not only might give needed cash at a reasonable rate, but also might provide excellent middle and top management from time to time.

Finally, there is a possibility of a seasonal complement. For example, an ice cream manufacturer might acquire a candy and nut line to use surplus storage space in the fall, winter, and spring. Coal and ice businesses might be combined. A good fit in this area can be difficult to achieve, but it may be worth a try.

Supplementary Fit

A supplement is a company that helps to further strengthen an area where the acquiring company already is strong. It is compatible with the unique service or product that the acquiring company provides. A supplement can use the opportunities and talents that are available in the acquiring company; it can employ unexploited assets. In general, it is consistent with the overall strategic thrust of the acquiring company.

A good fit occurs when management knows something about the industry it is entering. Compatibility in management styles also enhances fit. Financial people, for example, might find it difficult to work with movie producers. A company will achieve highest fit in those areas that are similar to the areas where it has already succeeded.

A good fit is achieved when the new product line may be easily added on to the line that the sales personnel already carry. In addition, the product of a candidate firm may be compatible with an already successful advertising program. A sharing of a trademark may enhance the marketing image of both the present and the acquired line.

Tax Benefits

Certain types of mergers can result in significant tax benefits to corporations and their shareholders. Called tax-free acquisitions, selling corporations and shareholders are not required to pay a tax at the time of the transaction. Any gain or loss is deferred. A common form of tax-free acquisition is a statutory merger. This occurs where much of the payment to the seller's shareholders is through an exchange of voting or nonvoting stock (in other words, little "boot" such as cash or other property is transferred). Furthermore, a buyer may acquire a firm that has accumulated a large tax-loss carryforward. Tax-loss carryforwards arise from continued losses and have little value to a firm that is not optimistic about near-term performance. However, these losses have considerable value to a profitable firm and will provide an added incen-

tive for a prospective acquirer. Tax losses should not be the primary motivation for an acquisition since the IRS imposes penalties for transactions that are structured solely for the purpose of tax avoidance. Net operating losses and other tax attributes are limited where: (1) the reorganization causes a greater than 50 percent change in the ownership of the target, or (2) the ownership change resulting from the reorganization, when combined with other recent ownership changes of the target corporation, creates a greater than 50 percent change in ownership. There are other statutory limitations on the ability of an acquirer to offset future taxable income against gains and losses of the target (and vice versa) within five years of the acquisition.

Horizontal Mergers

A horizontal merger occurs whenever the acquired and acquiring firms are in the same industry. For instance, when Exxon acquired Mobil Oil in 1999 for \$85.1 billion, they were both in the oil and gas industry. Usually, a horizontal merger creates economies of scale. A common consequence occurs in the ranks of top management where the combined forces are too large and redundant. In a move to improve efficiency, many managers in lofty positions are often fired. Even middle and lower-level positions are not insulated from risk, because duplicate production and distribution channels may also be eliminated.

One big problem associated with horizontal mergers is that they may potentially restrict trade or result in monopolies. This may be in direct violation of the Sherman Act of 1890 or the Clayton Act of 1914, which restrict mergers that result in a restraint of trade or reduced competition.

Vertical Mergers

A vertical merger occurs whenever two companies that specialize in different parts of the same production chain join together. Economies of scale result from vertical integration. For example, a manufacturing firm may acquire a firm that specializes in the raw materials used for the final product, such as the DuPont acquisition of Conoco in the early 1970s. The petroleum products produced domestically by Conoco assured DuPont of available critical raw materials during a period of international conflict involving oil-producing countries. The merger between these two firms may create a more efficient firm that brings more of the production chain within its control.

Risk Assessment

In analyzing potential merger or acquisition candidates, it is important to assess risk. Three important factors to evaluate in assessing risk are:

1. *Dependency on key customers.* The candidate firm may have a particular marketing vulnerability if its total number of customers is very small. This may especially be the case if the dominant customer is a government agency whose funding is not assured or a manufacturer or retailer that is subject to cyclical changes in demand. Screens that can identify both types and numbers of customers may be helpful here; however, in the cyclical cases, measures of sales volatility may be just as descriptive.

2. *Dependency on key suppliers.* In a situation similar to that of key customers, a company may have a serious vulnerability if a key supplier becomes an acquisition target of a major competitor. The resultant supplier-customer relationship between competitors may raise a wide range of strategic and operational challenges.
3. *Dependency on key employees.* A key employee can be in a comfortable position in a company, especially when that company is in an industry where the employee would not have difficulty finding a new job. In closely held firms, key employees often assume that they have first right of refusal when their business is to be sold. They justify their position by contending that the future of the company depends largely on their services. If they are bypassed in a sale or merger, they almost certainly will leave, taking with them vital customers or technical expertise. They even may open up shop in direct and effective competition against their former employer.

A similar situation occurred during the mergers of major brokerage houses during the mid-1970s and law firms in the 2000s. Immediately after the announcement of a merger, competitors quietly offered jobs to key managers and sales personnel. Such raids emptied the houses being joined of critical strength. Identification of sensitivity in this area is an important screening objective.

Price Assessment

Finally, the price of a merger or acquisition must be assessed. Some of the factors to consider in assessing price are net price, price of an undermanaged company, and required premiums.

Net Price

A candidate firm may have excess cash or marketable securities balances. Furthermore, the investments made in accounts receivable or in inventories may be too high, given industry standards. Proper management of working capital after acquisition may be expected to almost immediately generate funds that can be used in other more profitable areas. To reflect this, the analysis can adjust purchase price for the funds expected to be received from working capital.

Price of an Undermanaged Company

Companies that are managed poorly sell for lower prices than do those that are well managed. Shareholders might very well recognize this fact and desire change. But the proxy vote is a weak device for removing incompetent managers. It rarely is effective, although there have been a few examples where shareholders have forced management changes.

In this area, mergers and acquisitions play a vital economic role. Acquiring firms might do well to consider companies selling at values that reflect their current state but that are markedly below what they would be worth if they were run well. Rapid changes can be effected once these companies are acquired and renovated. Screening should indicate the companies that are selling for lower than their potential values.

Required Premiums

A merger premium represents the difference between the premerger value of the acquired firm and the acquisition price. Shareholders of an acquired firm not in a distressed condition almost always receive a merger premium in order to have a smooth and quick exchange of ownership. The premium paid represents the seller's share of the merger benefits. However, the buyer will be careful not to offer a premium that exceeds the total merger benefits. Some of the largest merger premiums paid in recent years have been in the oil industry. For example, Gulf shareholders in 1984 received \$6 billion in premiums; Getty Oil shareholders in 1984 received \$4.5 billion in premiums; Conoco shareholders in 1981 received a \$ 3.3 billion premium; and Marathon Oil shareholders in 1981 received a \$2.4 billion premium. More often, today, merger premiums are reported as percents of value, and those percentages are rising rapidly as stock prices rise.

Several factors affect the size of the premium. For instance, was the merger a friendly, negotiated takeover in which the terms of the merger were negotiated and agreed upon between the acquirer and the management of the target firm? Or was the merger attempt made through a tender offer—where the acquiring firm attempts to gain control of the target firm by directly approaching the shareholders of the target firm and asking them to sell their shares to the acquiring firm? Often, a company will offer a significant premium in order to deter other potential suitors from entering into a contest. In contested takeovers and acquisitions, the price rises very high very quickly.

Management Defenses

There are three basic defenses that the management of a target firm can use to try to avoid a merger with a specific acquirer. The first is a “poison pill.” A poison pill is a technique whereby the target firm destroys the attractiveness of the firm to the acquirer. For instance, some target firms that are rich in cash may find that they are much less desirable as takeover candidates if they dispose of their excess cash. Other firms may incorporate provisions in the corporate bylaws to provide unattractive results for the acquiring firm in the event the potential acquirer exceeds a certain threshold of ownership. For example, voting rights or stock dilution may change after an acquirer purchases 20 percent of the stock.

A second defense is to pay “greenmail.” Occasionally, the management of a target firm will pay a premium price for outsiders' shares, coupled with an agreement from them not to acquire additional stock for an agreed-upon period of time. The target firm absorbs the cost of this payment, and the stock price usually drops after the outside threat is removed. Some examples of greenmail payments include: Chesebrough-Pond paying Carl Icahn a \$95 million premium; Blue Bell paying Bass Brothers a \$60 million premium; and St. Regis paying James Goldsmith a \$50 million premium.

A third defense is to find a “white knight.” In this alternative the target firm seeks a friendly acquirer in order to escape a hostile takeover threat. While the target firm will still lose its independence, management may be more comfortable with the management style of the white knight. Frequently,

the white knight is a private equity firm specializing in leveraged buyouts that agrees to support and include the operating management in the surviving company.

In addition, companies have lobbied for and subsequently obtained anti-takeover legislation in many states. For example, an Indiana law states that when an investor purchases at least twenty percent of a company's outstanding shares, such shares have voting rights only after approval by a majority of the other stockholders (excluding officers and directors of the company and associates of the investor). A Pennsylvania law is similar but restricts voting on approval to those shareholders who have held their stock for at least twelve months.



Think About It . . .

A number of studies have shown that a large percentage of major acquisitions have been quite unsuccessful. Think about ways to strengthen the likelihood of success when evaluating an acquisition candidate.

MEASURING THE FINANCIAL IMPACT OF AN ACQUISITION

After the screening process and the analysis of the financial statements are done, it is time to take a close look at the trade-offs associated with a specific merger.

A typical measure of the impact of a merger is the short-term earnings-per-share standard. An acquisition causing an immediate increase in earnings is considered to be attractive. Conversely, an acquisition causing a decline is considered to be unattractive. The short-term earnings-per-share standard indicates only a fraction of the total effects of a merger. It is not only very incomplete in its coverage, but also it is myopic in its ignorance of long-range trade-offs. The merger's impact on the acquiring firm's stock value, not earnings per share, is the valid final test for the potential gains from a merger. The critical variables for an analysis of the financial impact of a merger are:

1. The exchange ratio.
2. The purchase with cash.
3. The purchase with the acquiring firm's stock.
4. The respective rates of earnings-per-share growth for the two companies.
5. The combined company's price-earnings ratio.

The traditional analytical framework that employs each of these variables is presented in the following sections. Using this framework will enhance the analyst's ability to identify the trade-offs associated with and the probable results of a proposed merger.

The Exchange Ratio

It is likely that, in the end, the focus of the negotiations will be on the exchange ratio between the shares of the acquiring and acquired companies. Even if an exchange of common stock in one company for common stock in the other company is not involved, the exchange ratio is important. Cash price equivalents provided by the acquiring company may be used to form an exchange ratio. In terms of current stock prices, the exchange ratio may be defined as:

$$\text{Exchange ratio} = \frac{\text{Market price of acquired firm's stock} \times \left[\frac{\text{Percentage premium offered to acquired firm}}{1 + \text{offered to acquired firm}} \right]}{\text{Market price of acquiring firm's stock}}$$

Consider as an example the ARC Corporation, whose stock is selling for \$60 a share. ARC seeks to acquire AMAP, Inc., whose stock is selling for \$20 a share. If no premium is involved, the exchange ratio is:

$$\frac{\$20 \times 1}{\$60} = 0.33$$

This implies that 0.33 shares of ARC will be given for each AMAP share.

Ordinarily, an enticement of a premium of 20 to 30 percent is added in the computation of the exchange ratio to increase the probability that the acquisition will occur in a timely manner and without substantial opposition. A premium changes the exchange ratio. For example, if a 20 percent premium is added to the terms that ARC is offering to the shareholders of AMAP, the exchange ratio is changed to:

$$\frac{\$20 \times 1.20}{\$60} = 0.40$$

Thus, the AMAP shareholders would receive 40 shares of ARC Corporation for each 100 AMAP shares they hold.

If the exchange involves something other than common stock, the value of the package being offered may be used to estimate the size of the premium being offered. Suppose that ARC is offering one share of its convertible preferred stock, with an estimated value of \$125, in exchange for every five shares of AMAP stock. In this case, a computation of the premium compares the current value of five shares of AMAP stock (\$20 a share) to the estimated market value of the ARC convertible preferred stock:

$$\text{Premium} = \frac{\$125}{5(\$20)} = 1.25$$

The equivalent exchange ratio in common-for-common terms would be:

$$\frac{\$20 (1.25)}{\$60} = 0.42$$

Purchase with Cash

If cash is offered for a company, then, from the standpoint of the acquiring company, the decision making involved is the same as for any new investment and utilizes capital budgeting techniques. The net present value of the net cash flows from the new asset must be positive for the acquiring firm to buy the other company.

As an illustration, assume that Blue Company wants to acquire Red Company for cash. The transaction would involve Blue taking on Red's liabilities as well as its assets. The acquisition would be acceptable to Blue only if the present value of the future after-tax cash flow from Red exceeds the cash paid to the seller's stockholders plus the present value of the debts that are assumed. Let us say that Blue offers to acquire Red by paying Red's stockholders \$1.2 million in cash and by assuming Red's liabilities of \$200,000. Let us also say that the assets of Red will generate an after-tax cash flow of \$230,000 per year for ten years and that the cost of capital on the new investment is 8 percent. The cost of capital depends on the risk of the new company and how it compares with the acquiring company's debt-to-equity ratio. Exhibit 8-1 computes the net present value of the net after-tax cash flow due to the acquisition of Red. The positive net present value of \$143,323 found in this exhibit indicates that the merger would be profitable for Blue. For Red's stockholders to agree to the merger, they would have to feel they are gaining more or will gain more in the future for their shares of stock.

Purchase with Acquiring Company's Stock

A cash flow analysis may be used when companies use their stock to acquire another firm or when a new company's securities are issued under a consolidation to stockholders of both the companies that are being combined. The shareholders of the target firm examine the amount and value of the stock offered by the acquiring firm and then compare the value of this stock to the

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Exhibit 8-1

Calculation of the Net Present Value of the Net Cash Benefit from the Blue and Red Merger

After-tax cash flow	\$ 230,000
Payment to Red's stockholders	\$1,200,000
Assumption of Red's debt	200,000

Net present value (NPV) of net cash flow from merger:

$$\begin{aligned}
 \text{NPV} &= \$ 230,000 (P/A, 8\%, 10) - \text{Initial outlay} \\
 &= \$ 230,000 (6.7101) - (\$1,200,000 + \$200,000) \\
 &= \$1,543,323 - \$1,400,000 \\
 &= \$ 143,323
 \end{aligned}$$

Note: Using a financial calculator, the NPV = \$143,319.

current value of their stock. If the acquiring firm is sincere in its bid to acquire the target firm, it is likely that the offer includes a premium to the shareholders of the target firm. The number of shares being offered by the acquiring firm depends upon the current market value of the target firm's stock as well as the current market price of the acquiring firm's stock. The exchange of shares offered to the target firm's shareholders is greater than the current market price and has a premium that reflects the increased value of the combined firms. The target firm's shareholders evaluate the premium offered and try to assess how much of the total merger benefit is included in the stock offering.

An Analysis of the Bargaining Position of Both Companies

Generally, for any merger to take place, the shareholders of both the buying and the acquired companies have to anticipate some benefit from the merger. The number of shares that the stockholders of the buying company are willing to pay and the number of shares that the stockholders of the candidate firm will accept for the merger creates a range of values that will determine the ultimate bargaining position of both companies. These positions are analyzed in the following simple example.

Assume that X Company is interested in acquiring Y Company through a stock transfer. The financial information for X and Y and the anticipated post-merger X is shown in Exhibit 8-2. The annual earnings of the post-merger X would be more than the two companies' combined earnings due to the economies generated by the merger. Various synergies would benefit both companies (i.e., in lower costs of production, research, management, and marketing). The value of X after the merger would be \$2 million. The number of shares outstanding for the post-merger X would depend on how many shares X offered to the shareholders of Y. The managements of both companies can find what could be called the indifference point for the number of shares exchanged, so that after the merger stockholders would not own stocks that were less in value than the stocks they owned before the merger.

Exhibit 8-3 illustrates a method of finding the range of possible shares exchanged in order to benefit the stockholders of both companies. If 6,667 new X shares were issued to acquire Y, the stockholders of Y would subse-

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Exhibit 8-2

Premerger and Postmerger Financial Information

	X	Y	Postmerger X
Current earnings per year	\$ 100,000	\$ 50,000	\$ 200,000
Shares outstanding	\$ 20,000	\$ 5,000	?
Earnings per share	\$ 5	\$ 10	?
Price per share	\$ 50	\$ 100	?
Price-earnings ratio	10 Times	10 Times	?
Value of company	\$1,000,000	\$500,000	\$2,000,000

E**xhibit 8-3****An Analysis of the Indifference Points for Shares Issued to Y's Stockholders**

<i>Number of X's Share Issued to Y's Stockholders</i>	<i>Number of X's Share Outstanding after Merger</i>	<i>Share of X Owned by Y's Shareholders after Merger</i>	<i>Value of Shares Owned by Y's Shareholders after Merger</i>	<i>Value of Shares Owned by X's Shareholders after Merger</i>
6,667	26,667	1/4	\$ 500,000	\$1,500,000
20,000	40,000	1/2	\$1,000,000	\$1,000,000

quently own one-fourth of the post-merger X. Consequently, the value of the shares owned by Y after the merger is \$500,000 (\$2 million \times one-fourth). Since Y's shareholders would have a post-merger stock value equal to the pre-merger stock value, the holders of Y's stock would be indifferent to the merger. The stockholders of X, on the other hand, would not be indifferent because the value of their post-merger stock would increase from \$1 million to \$1.5 million. Alternatively, if 20,000 shares of X were issued to Y's shareholders, then Y's stockholders would own one-half of the post-merger X, and the value of their stock would double from \$.5 million to \$1 million. The shareholders of X would be indifferent to the merger at this price, because the X value of their stock would continue to be \$1 million after the merger. Consequently, since Y's shareholders are indifferent to the merger at 6,667 shares and are pleased with more, and X's shareholders are indifferent at 20,000 shares and are pleased with less, then both groups of shareholders can gain from a negotiated settlement of somewhere between 6,667 and 20,000 shares.

Negotiations depend on the relative bargaining positions of each company at the time a merger is being proposed. Bargaining positions can hinge on the availability of companies for acquisition, the actual desire of one or the other firm for a merger, the market position of the acquired firm, or the talented personnel of the candidate firm.

The example of X and Y was simplified in many respects. For example, the stockholders of the two companies may have different expectations regarding the futures of the companies if they did or did not merge. Also, earnings may be growing at a greater rate for one company than for the other, which would change the analysis. In addition, the two companies in this example had the same price-earnings ratio, which is not usually the case. In the following sections, we will analyze some aspects of mergers when the situation is not so simple and when different assumptions are made.

THE IMPACT ON EARNINGS PER SHARE

In most cases, a merger will have an impact on two dimensions of future earnings per share. First, the immediate level of the earnings per share will be in-

creased or decreased. Second, the future expected rate of change in the earnings per share will be altered in a direction opposite to the immediate change in level.

The Level of Earnings Per Share

When common shares are used in the exchange, a simple rule determines whether a merger will cause immediate accretion or dilution in the earnings per share of the acquiring firm. If the price-earnings ratio of the acquired firm is lower than the price-earnings ratio of the acquiring firm, earnings per share will be higher after the merger than before it. Conversely, acquisition of a company with a higher price-earnings ratio will dilute the earnings per share of the merged company.

During the 1960s, many firms with a high price-earnings ratio (P/E) played the earnings per share merger game. The basic technique was to acquire a firm with a lower P/E and to convince the market that the combined firm was worthy of the same high P/E as the acquiring firm. If the acquiring firm was successful in its attempt to keep the same high P/E as before, then the merger created instant wealth for all shareholders as the stock price increased. However, sophisticated investors of the 2010s are presumably interested in increases in operational earnings and cash flows. Consequently, shareholders' wealth is assumed to be maximized when the cash flow stream of a combined entity is maximized, not necessarily when earnings per share are maximized.

The Growth in Earnings per Share

Aside from indicating differences in risk, a price-earnings ratio that is higher for one company than for another must reflect its more favorable earnings per-share growth prospects. The effect of acquiring a company with a higher price-earnings ratio than the acquiring company will be not only to dilute current earnings per share but also to raise the average rate of future growth in the earnings of the combined companies. Consequently, there is a basic trade-off in the financial effects of a merger. If earnings per share are immediately diluted by a merger, then they can be expected to grow more rapidly than before the merger and ultimately reach levels higher than would have been achieved without a merger. Alternatively, if earnings per share are initially increased by a merger, then they probably will grow less rapidly. At some point in time, the lower rate of growth of the earnings per share will offset their initially higher levels.

THE IMPACT ON THE PRICE-EARNINGS RATIO

It is valuation, not earnings per share alone that is the valid test for the potential gains from a merger. Both changes in the level of earnings per share and in their rate of growth must be considered. However, as these changes occur, the level of the price-earnings ratio will be altered as well. The size of

the P/E ratio after the merger will determine how the stock price will be affected.

When properly adjusted, price-earnings ratios will reflect increases or decreases in growth prospects following a merger. Sometimes, though, stockholders of the acquiring firm may expect to benefit from something “special” about the event—that is, something not necessarily reflected by the price-earnings ratio. Stock prices could be enhanced, for example, if the merger strengthens the strategic thrust or the competitive position of the resulting merged companies beyond the profit levels reflected in the mere adding of their net incomes and above the amount already anticipated in the purchase price. In addition, if the acquisition is just a good buy, the stock price should be increased by the merger. In this event, the acquiring company had correctly identified in the candidate something that other investors and analysts did not see and that was not reflected in the purchase price. Finally, any synergistic benefits that might result would put an extra blessing on the marriage. Without such effects, no congratulations may be due at the announcement of the merger. Accordingly, both the impact on earnings per share and the special effects or circumstances that may affect post-merger price-earnings ratios must be analyzed for each proposed merger.



Think About It . . .

Since an acquisition will frequently absolutely increase revenues and earnings significantly, but if achieved through an exchange of stock, have minimal impact on earnings per share, how should they be evaluated in assessing management performance?

VALID AND INVALID MOTIVES FOR MERGING

In summary, there are at least two valid and two invalid motives for pursuing a merger.

Valid motives include:

1. *Synergistic benefits.* Through horizontal or vertical mergers, a firm can enjoy economies of scale in purchasing, distribution, and access to markets. In addition, the firm may gain greater control and efficiency in the entire production and management chain.
2. *Tax considerations.* Some target firms bring tax benefits that create additional incentives for the acquiring firms.

Invalid motives include:

1. *Earnings-per-share increase.* Most shareholders in the 2010s ignore the transparent increase in earnings per share created when a firm with a high P/E

acquires a firm with a low P/E. Shareholders are more concerned with quality cash flows than with artificial increases in earnings.

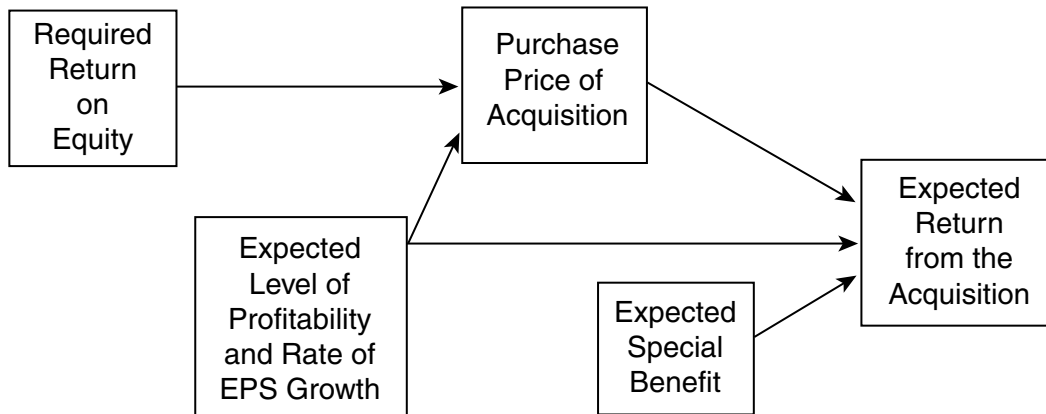
2. *Diversification.* Many of the mergers in the 1960s were performed by large conglomerates hoping to diversify the risk associated with a single industry, as well as to inflate earnings per share. It should be noted that most of the conglomerates of the 1960s are no longer around in the 2010s. In many cases they were gone remarkably soon after their acquisition frenzy ended. The diversification they sought resulted in the diversion of management to businesses that they did not understand and to the decline in overall performance until they either failed or were broken up. As a result, most investors of the 2010s are unimpressed by the diversification tactics of acquiring firms, because investors can easily diversify their own risk by investing in a number of unrelated companies. Because an investor can trade shares of stock more efficiently than a firm can buy another firm, diversification by itself creates no wealth for the shareholder—in fact, the reverse may be true. Shareholders today do not support efforts by management to create portfolio diversification through mergers and acquisitions. They would prefer to manage their own portfolios and undertake diversification only if they so choose. They want company management to concentrate on managing the business the company is best at.

EXPECTED RETURN FROM AN ACQUISITION OR MERGER

The relationship of the several factors that determine the attractiveness of a merger is illustrated in Exhibit 8–4. Purchase price is set in anticipation of future anticipated financial performance and in light of required returns. The price of an acquisition and its expected level and rate of earnings-per-share growth combine to set the basic returns that can be expected by the purchaser. The price paid for a target firm is a compromise, based on the improved cash flow stream of the combined entity and the split of this benefit between the acquired and acquiring firms. The acquisition of a new company alters expected earnings and changes both the levels and rates of growth of EPS.

Establishing a Valuation from the Acquiree's Perspective

If your company is an acquisition target, it is important to have an estimate of the value of your business. After all, a negotiation will be one-sided if you are not prepared. In determining the value of your business, as an analyst, you will employ all the analytical tools and judgments that the acquiring analyst will. Using the ratios we have considered, the forecasting tools available, the time value of money techniques applied to the forecasted future cash flows of a business viewed objectively, but applying the inside knowledge of plans and expected actions, you should be able to determine a valuation, including a premium, that will serve as a starting point for negotiations. To consummate the acquisition, the management of the target then needs to establish a basis for further premium valuation, predicated on an estimate of the incremental

E**Exhibit 8-4****Factors Influencing the Expected Return from an Acquisition or Merger**

benefit the company will bring to the acquirer, in order to assure that the acquisition will be attractive to the shareholders of the target company. To have a chance to be successful, both the acquirer and the acquiree need to feel that their shareholders are getting a good deal as was discussed in Chapter 6.



As this chapter has shown, merger analysis involves the basic tenets of financial theory. To simplify the theoretical tenets and put them into practice, financial models are used. Using such models as net present value, future earnings, and price-earnings ratios allows the decision maker to analyze a very complex situation in an organized fashion. Through financial analysis, decision makers determine completely and reasonably the proposed merger's value, which may be used as justification for or proof against the combination.



Review Questions

1. When evaluating any financial problem, the analyst must consider the worth of the proposed investment: 1. (b)
 - (a) before considering the method of financing.
 - (b) and the method of financing simultaneously.
 - (c) after the method of financing has been determined.
 - (d) without considering the method of financing.

2. If a merger immediately increases a company's net income and earnings per share, one may conclude that: 2. (d)
 - (a) a successful merger has occurred.
 - (b) things will only get better in the future.
 - (c) earnings per share will never be diluted.
 - (d) earnings per share will decrease in the future.

3. Mound Company is considering acquiring Ground Company. The market prices of the common stock of the two companies are \$60 and \$15 respectively. If an exchange of stock is made at these prices, Ground stockholders will receive approximately how many shares of Mound for every 100 of their shares? 3. (b)
 - (a) 4
 - (b) 25
 - (c) 240
 - (d) 400

Use the following information to answer Questions 4 and 5: The shareholders of Goodwin Tool have voted to accept one third of a Mott share for each of their Goodwin shares. The following is additional information about the merging companies:

	Mott Electronics	Goodwin Tool
Price/earnings ratio	23.1	5.6
Shares outstanding	8,000,000	4,000,000
Net income	\$25,000,000	\$12,000,000
Earnings per share	\$ 3.13	\$ 3.00
Market price of stock	\$ 72.50	\$ 16.825

4. The accretion in shares for Mott stockholders will be from 8,000,000 to: 4. (c)
- (a) 12,000,000 shares.
 - (b) 6,666,667 shares.
 - (c) 9,333,333 shares.
 - (d) 10,666,667 shares.
5. The accretion in EPS for Mott stockholders will be from \$3.13 a share to: 5. (d)
- (a) \$3.20.
 - (b) \$3.40.
 - (c) \$3.68.
 - (d) \$3.97.

Answers to Quick Quiz Questions

QUICK QUIZ 1–1

The financial analyst is responsible for:

- (a) Managing the recording and reporting of transactions.
- (b) Implementing the financial management policies of the company.
- (c) Directing the functions of the accounting staff.
- (d) Assessing the impact of management decisions.

Answer: d. The financial analyst diagnoses the financial effects of management's decisions.

QUICK QUIZ 2–1

Can a company operate if its liabilities exceed its assets—that is, if its equity is negative?

Answer: Yes, provided it can pay its obligations to the satisfaction of its creditors. Amazon operated this way for several years before (and even after) it began to make profits.

QUICK QUIZ 3–1

ABC Company has \$5,000,000 in sales and an average collection period of 50 days. If the interest rate is 10 percent, and the industry average collection period is 36 days, how much do ABC's excess receivables cost on an annual basis?

Answer: \$19,178.08, calculated as follows:

Excess A/R = $13698.63 * 14 = \$191,780.82$

Opportunity cost = $191780.82 * .10 = \$19,178.08$

QUICK QUIZ 3–2

If a company's current ratio is unchanged from one period to the next, but the quick ratio has increased, what has happened to the inventory?

Answer: It has decreased. The lower inventory amount, subtracted from total current assets, will yield a higher numerator for the quick ratio.

QUICK QUIZ 3–3

When a company has a low total asset turnover, it needs to:

- (a) Increase its leverage.
- (b) Cut its costs.
- (c) Improve its sales.

Answer: c. Improve its sales.

So sales, the numerator, must increase.

QUICK QUIZ 4–1

Bankers frequently require borrowers to maintain a minimum balance on deposit with the bank as one of the conditions for approving a loan. The real purpose of the compensating balance is to:

- (a) Assure that the borrower has at least a minimum level of liquidity at all times.
- (b) Raise the effective rate of interest on the loan.
- (c) Provide a level of security for the borrower.
- (d) Increase the assets of the borrower to compensate for the increased level of liabilities represented by the loan.

Answer: b. By effectively reducing the amount available to the borrower, the compensating balance increases the effective interest rate on the loan.

QUICK QUIZ 5–1

Based on the following information, calculate the weighted average cost of capital:

<u>Capital type</u>	<u>Cost Before Tax</u>	<u>Amount</u>
Long Term Debt	12.625%	\$18,575,000
Preferred Stock	14.75%	2,137,500
Common Stock	16.25%	3,757,000
Retained Earnings	16.25%	24,105,500
	<u>WACC?</u>	<u>\$48,575,000</u>

The projected tax rate is 37%.

Answer: 13.01%

	<u>Rate</u>	<u>Tax Effect</u>	<u>Weight</u>	<u>Weighted Cost</u>
Long Term Debt	12.625	.63	.3824	.0304 = 3.04%
Preferred Stock	14.75	1	.0440	.0065 = 0.65%
Common Stock	16.25	1	.0773	.0126 = 1.26%
Retained Earnings	16.25	1	.4963	.0806 = 8.06%
Total			1.000	.1301 = 13.01%

Note: Preferred stock is a separate element of the equity section of the balance sheet.

Note: Common stock and retained earnings equal the amount of common equity.

Another approach to the answer can be computed as follows:

Long Term Debt	\$18,575,000 ×	.12625 ×	.63 =	\$ 1,477,409
Preferred Stock	2,137,500 ×	.1475 ×	1 =	315,281
Common Stock	3,757,000 ×	.1625 ×	1 =	610,512
Retained Earnings	24,105,500 ×	.1625 ×	1 =	3,917,144
Total	\$48,575,000			<u>\$6,320,346</u>
				48,575,000
			= .1301	= 13.01%

QUICK QUIZ 5-2

Consider the following scenario:

You are interested in investing in some artwork for your living room. You visit a local art gallery where you see a painting that you really like. As you are looking at it, the gallery owner comes by and says, "That's really good, isn't it? That painting will be worth \$5,000 in five years, and I'll sell it to you today for \$2,500." You have determined that art is a risky investment, so you think any investment in art should yield a 15% compound annual rate of return. Is the painting a good deal at \$2,500?

Using a financial calculator and the time value of money structure:

N = 5	N = 5	N = 5
I = X	I = 15	I = 15
PV = (-) 2500	PV = (-) 2500	PV = X
PMT = 0	PMT = 0	PMT = 0
FV = 5000	FV = X	FV = 5000
I = 14.87%	FV = \$5028.39	PV = (-) 2485.88

The compound annual rate of return on the painting is just under 15%. To achieve the 15% rate of return, the painting should cost no more than \$2,485.88, or it should be worth at least \$5,028.39 in 5 years.

QUICK QUIZ 6-1

ABC Corp. is expecting to have sales increase next year from \$3,000,000 to \$4,000,000. They expect accounts receivable, which are currently equal to 54 days sales, and inventories, which turn over four times based on sales, to increase proportionately. All other assets are expected to remain at current levels except plant and equipment (fixed assets), which will require an investment of \$150,000. They expect accounts payable, which are currently \$600,000, to increase at the same rate as sales. Profits, which have been at 5% of sales, are expected to remain at 5% of sales next year. There are no dividends. When ABC projects next year's balance sheet, how much financing will be required to balance their balance sheet? (Use a 360-day year.)

Answer: \$150,000

Sales growth is from \$3,000,000 to \$4,000,000, an increase of one-third.

A/R = 54 DSO = \$450,000, equal to 8333.33 per day * 54 days

Inventory = \$750,000 = \$3,000,000/4

	<u>Begin</u>	<u>Ending</u>	<u>Change</u>
Accounts Receivable	450000	600000	150000
Inventory	750000	1000000	250000
Fixed Assets			150000
Change in Assets			<u>550000</u>
Accounts Payable	600000	800000	200000
Retained Earnings	= 4000000	× .05 =	<u>200000</u>
EFN =		150000 =	\$150,000

QUICK QUIZ 7-1

Dividends are deducted from profits after taxes to determine the change in retained earnings for a given year. Which of the following statements is correct?

- (a) Issuing dividends increases return on equity.
- (b) Issuing dividends decreases return on equity.
- (c) Issuing dividends has no effect on return on equity.
- (d) The effect of issuing dividends on return on equity cannot be determined without additional information.

Answer: a. Return on equity is determined by profit after tax divided by equity. Therefore, since the issuing of dividends reduces the equity from what it would be if no dividends were issued, they effectively increase the return on equity even though they have no effect on earnings per share.

QUICK QUIZ 8-1

A good example of synergy is when:

- (a) Redundant management positions can be eliminated, reducing costs.
- (b) The products of the acquired company serve the needs of the customers of the acquiring company.
- (c) The acquired company and the acquiring company serve the same market.
- (d) The acquired company and the acquiring company serve different markets.

Answer: b. Synergy occurs when the combined company offers opportunity for sales beyond the capabilities of either company individually.

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Online Resources

The following resources can be found online to help support the writing of a business plan and the topics covered in this text.

The Balanced Scorecard Institute provides training, certification, and consulting services to help clients build their own balanced scorecard-based strategic management systems. www.balancedscorecard.org

Business Plan Pro is a software program developed by PaloAlto Software Inc. (www.paloalto.com/)

Creating a Written Business Plan

(www.bizfilings.com/toolkit/sbg/startup/planning/creating-a-written-business-plan.aspx) (2012). Bizfilings offers articles on how to develop business plans for small to medium sized companies

Gartner (www.gartner.com) is an information company that delivers technology research to global technology business leaders to make informed decisions on key initiatives.

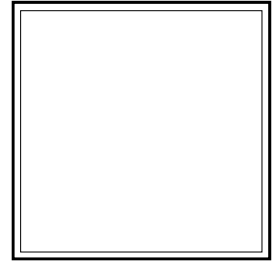
Google Analytics is an e-commerce and Web analytics product that “measures sales and conversions, but also gives you fresh insights into how visitors use your site, how they arrived on your site, and how you can keep them coming back.” (source: www.google.com/analytics/index.html)

Kickstarter.com is a crowdsourcing site geared to entrepreneurs’ creative projects that need funding.

OfficeReady Business Plans is published by Templatezone.com (www.templatezone.com)

Risk Management Associates, The Risk Management Association (RMA) is a not-for-profit professional association serving the financial services industry. Its purpose is to advance the use of sound risk principles in the financial services industry. RMA was originally founded in 1914 and was known as Robert Morris Associates. RMA has approximately 2,500 institutional members. (www.rmahq.org)

Stanford Center for Entrepreneurial Studies is a graduate center at Stanford University. One of their publications is the Search Fund Primer, which can be downloaded at [/www.gsb.stanford.edu/ces/resources/search_fund_primer.html](http://www.gsb.stanford.edu/ces/resources/search_fund_primer.html)



Glossary

Accounting analysis and evaluation of past events and results, showing how we arrived at the current financial position; also the entire recording and reporting responsibility within a business.

Accounting System the bookkeeping portion of financial management.

Accounts Payable, also known as Trade Payables amounts owed to others for goods or services previously purchased on credit.

Accounts Receivable amounts due to the organization of goods or services or as the result of a contractual agreement.

Accrual a record of a transaction, attributable to a period that is ended, for which the actual completion of the transaction occurs later, such as accrued payroll, accrued revenues, accrued expenses, accrued taxes.

Accrual Accounting the accounting system that records transactions as they occur, without regard for whether they have been completed. See *Cash Accounting*.

Accruals accounting transactions that estimate revenues and expenses not yet recorded, so that the period's financial reports reflect that period's results properly; amounts that will be owed to others based on the calendar date of the statement but not yet due as of the date of the statement, such as payroll or taxes.

Activity Ratios company financial ratios that assess the effectiveness of the company's utilization of assets.

Amortization a cost allowance that permits a company to recover the dollars of investment in an asset over its useful life, usually applied to an intangible asset.

Annual Budget, also known as Operative Plan a detailed prediction of revenues, expenses, and results.

Annuity equal periodic payments.

Annuity Due equal periodic payments, when the payments occur at the beginning of each period.

Balance Sheet the financial statement that describes the financial condition of a business at a point in time.

Bookkeeping the accurate and timely recording of transactions, providing the reader with clear financial information; also the function that performs the tasks associated with that recording.

Book Value comprises the common stock, additional paid-in capital and retained earnings, equal to the net worth of the company. Book value per share is this total divided by the number of shares outstanding.

Bottom Line a term generally relating to the net profit of a business. "Adding to the bottom line" or "dropping to the bottom line" refer to actions that directly affect the profitability of the business.

Business Plan an overview of the company, its vision, people, products, markets, customers, and competition.

Capacity in credit management, the ability of the borrower to utilize the amount of credit requested effectively.

Capital in credit management, the investment of the owners in the company; provides some security to the lenders.

Capital Budget the identification and evaluation of major investments in equipment and resources.

Capitalize record as an asset on the balance sheet.

Capital Rationing in capital budgeting, the recognition that funds available are not adequate to fund all available acceptable projects; the necessity to rank projects to determine those that are most beneficial to the company.

Cash liquid resources to be spent on goods and services or additional assets for the organization.

Cash Accounting the accounting system that records transactions only when they have had a cash component. Therefore, sales and expenses are only recorded when they have actually been paid for.

Cash Budget the conversion of the operating budget (developed to reflect its accounting treatment) to reflect the timing of cash outflows and inflows.

Cash Conversion Cycle an estimate of the time it takes for a company to recover the money it has paid out to acquire inventory, estimates as the sum of days' sales outstanding plus days' sales in inventory less days' purchases in payables ($DSO + DSI - DPP = CCC$). It is an estimate of the time and level of activity that the company must finance.

Cash Flow in credit management, the ability of the business to generate the funds to service the debt.

Cash Management concentrated attention on the attraction, management, and disbursement of cash.

Centralization combining specific functions for the company into one center in order to improve company efficiency, enabling the company to take advantage of combined resources.

Character in credit management, the integrity and reputation of the borrower.

Chart of Accounts a listing of the accounts included in the accounting system that enables the accountant to record transactions accurately and effectively.

Collateral in credit management, assets that provide security for the loan.

Common Stock represents the actual ownership of the company, based on the number of shares held as a percentage of the total number of shares outstanding; investment in the company in return for an ownership position, with the right to participate in the election of directors, in certain distributions, and in certain company decisions.

Communications in credit management, the relationship and transfer of information from the company to the lender.

Company Stakeholders people and organizations that have a financial interest in the company.

Comparative Analysis the comparison of a company's financial results for a period to the same company's results from a prior period or to industry statistics or a competitive company's financial results for the same period. The former is known as trend or historical analysis; the latter is also known as competitive analysis or cross-sectional analysis.

Competence in credit management, the ability of management to manage the company effectively.

Competition in credit management, in the lending marketplace, the competitive environment of the lender.

Competitive Analysis See *Comparative Analysis*.

Concentration Account a centralized account into which balances from small accounts are swept.

Conditions in credit management, the economic circumstances of the market in general and of the company.

Consolidation drawing together the financial results of all parts of the company and eliminating any transactions that are strictly internal to the company as a whole.

Convertible Preferred Stock enables the shareholder to convert the preferred stock into common stock at a defined rate, sometimes offering the shareholder a guaranteed return until the company succeeds in raising its stock price to a level offering the shareholder a significant profit.

Corporate Governance in the management of corporations, the structure that is intended to make sure that the right questions get asked and that checks and balances are in place to make sure that the answers reflect what is best for the creation of long-term, sustainable value.

Corporation a business having a legal identity separate from its owners, who may or may not be actively involved in the business, operated as an entity with its own life, structure, and essence.

Cost of Capital the return required to satisfy the provider of a particular type of capital.

Cost of Equity Capital the expected or required rate of return on equity.

Cost of Sales those costs and expenses expended to generate revenues, including expenses specifically incurred in the production or acquisition of goods to be sold.

Covenants requirements imposed by a lender to assure that a borrower manages credit properly, protecting the interests of the lender.

Coverage maintenance of certain financial statistics to assure that operating earnings or assets are sufficient to meet credit related obligations.

Credibility in credit management, a measure of reliability provided by outside professionals, particularly applicable to information related to the borrower.

Credit an entry that decreases an asset or increases a liability on the Balance Sheet or decreases an expense or increases revenue on the Income Statement.

Cross-Sectional Analysis another name for competitive or industry analysis.

Current Assets those assets expected to be converted into cash or used within one year; those assets that individually are expected to be turned into cash within a year, including cash, marketable securities, accounts receivable, inventories, and prepaid expenses.

Current Liabilities the sum of all obligations expected to be converted to cash or paid within one year.

Debit an entry that increases an asset or decreases a liability on the balance sheet or increases an expense or decreases revenue on the income statement.

Debt Ratios company financial ratios that assess the management of borrowed funds.

Default Risk the risk that you will not get your money, your principal, back on time or, perhaps, at all.

Depreciation a cost allowance that permits a company to recover the dollars of investment in an asset over its useful life, usually applied to a tangible asset.

Derivative an investment security whose value is derived from other assets; for example, a future contract derives its value from the product on which it is based.

Discounted Payback Period the time it takes to recover the value of an invested using discounted cash flows. May also be described as the time it takes to recover the value of an investment.

Dividends amounts paid out to shareholders, a distribution of after-tax earnings.

Elimination when reporting consolidated results, the removal of the effects of any transactions that are strictly within the company as a whole.

Equity a synonym for net worth that is also used to describe what an investor gets when investing in the stock of a company.

Federal Funds Rate the interest rate that banks charge other banks for overnight loans; set by the Federal Reserve.

Finance managing money on behalf of owners and creditors.

Financial Accounting Standards Board (FASB) the principal accounting rule-making body overseeing the accounting profession; some FASB power was relinquished to the PCAOB under the Sarbanes-Oxley Act of 2002.

Financial Analysis interpretation of financial results and positions to guide the future actions of the company.

Financial Leverage the use of debt to increase revenues, profits, and return on equity.

Financial Management the management of a plan of action guiding the attraction, spending, or investing of money on behalf of owners and creditors.

Fixed Assets those assets and resources owned by the organization expected to last more than one year, including such assets as land, buildings, furniture and fixtures, machinery and equipment, leasehold improvements, vehicles, and similar physical assets.

Free Cash Flow the amount of money generated during an accounting period that can be withdrawn from a business, whether for dividends or for repayment of debt.

Future Value the value, in terms of some future time, of an amount to be paid today, based on a specific interest rate.

Generally Accepted Accounting Principles (GAAP) guidelines established to help assure that financial statements are prepared and presented consistently and can, therefore, be understood and used by informed readers without requiring special knowledge.

Gross Profit the difference between sales and cost of sales.

Income Statement also known as the profit and loss statement, summarizes all of the financial activity that took place during the captioned statement period.

Industry Analysis another name for comparative or cross-sectional analysis.

Inflation Risk the risk that, when you do get your money back, it will have lost some buying power.

Initial Public Offering (IPO) the first time the stock of a company is sold to the public; a complex and exhilarating time for the management.

Intangible Assets valuable nonphysical assets owned by the organization, such as trademarks and patents.

Interdependence in capital budgeting, the recognition that choosing one project automatically requires choosing another, that both projects must be done or the one chosen will be unsuccessful; eliminates the possibility that a manager can circumvent investment authority limitations.

Interest expenses incurred in support of debt undertaken by the organization to finance its activities or the acquisition of assets and resources.

Internal Rate of Return determines the rate of return that exactly equates the present value of the future cash flows with the value of the investment.

Intracompany Profit profit recorded in one part of a company from transactions conducted with another part of the same company.

Inventory if the organization sells product, stocks of product to be sold.

Inverted Yield Curve when short-term rates are higher than long-term rates.

Journal a book of transactions, all of the same type, recording business activity as it occurs. The monthly journals are summarized, now generally automatically by the computerized accounting system, to produce the financial records and statements at the end of the accounting period.

Journal Entry the bookkeeping record of a financial transaction or adjustment, including both debit(s) and credit(s).

Just-in-Time (JIT) method of managing inventory that, through the use of sound sales forecasts, enables management to minimize stocks held while meeting customer requirements.

Liquidity Ratios company financial ratios that assess the company's ability to meet maturing obligations.

Liquidity Risk the risk incurred if you have to liquidate the loan before it matures. It is a measure of the potential penalty that would be imposed by the market.

Long-Term Assets sometimes known as fixed assets, are assets with a useful life in excess of one year, will include property assets as well as long-term investments and intangibles such as patents, trademarks, and goodwill.

Long-Term Debt usually bank debt, reflects money borrowed for longer than one year.

Material, Materiality an assessment that an activity will or will not significantly affect the accuracy or usefulness of the final results. Those that will are material; those that will not are not material.

Maturity Risk the recognition that if you have loaned your money to someone else you cannot use it yourself, even if a better opportunity arises; maturity premium may also be considered an opportunity premium.

Mezzanine Lender usually a nonbank lender that provides medium-term (5-7 years) loans to help a borrowing company that is transitioning from small to large and from traditional bank loans to bonds or major financing arrangements.

Mutual Funds funds that invest investor deposits in a portfolio of corporate stocks, bonds, and other investments.

Mutually Exclusive in capital budgeting, the recognition that among capital project alternatives may be some that, if chosen, automatically eliminate others from consideration; that is, choosing one project excludes one or more others.

Net Present Value (NPV) the sum of the present values of all cash outflows and inflows associated with a capital project discounted by the weighted average cost of capital or some other interest rate; a positive NPV denotes an acceptable project from a financial return perspective.

Net Worth the difference between total assets and total liabilities, reflecting the book value of what the owners own after all bills and obligations have been accounted for.

Normal Yield Curve when long-term rates are higher than short-term rates.

Notes Payable short-term funds borrowed, generally from banks, either as a one-time loan or as a revolving line of credit; amounts borrowed by the organization and due within one year.

Open Book Management an approach to financial management where a company provides detailed financial information to all employees and helps them understand how their actions and efforts affect company results.

Operating Expenses expenses incurred to support the general activities of the company, excluding investments in capitalized assets.

Ordinary Annuity equal periodic payments, when the payments occur at the end of each period. Also known as a regular annuity.

Par Value the actual value of a share of stock in a company, the legal amount a shareholder is obligated to invest into the company to purchase a share.

Partnership a business owned and operated by two or more people who work together and share in the ownership, operation, and responsibility for the business.

Payback Period the time elapsed from the start of the project until the investment dollars have been recovered by the project's cash inflows.

Planning building on past financial information to direct the future; planning encompasses all levels of budgeting, strategic planning, and financial planning.

Preemptive Right a provision in the stockholders' agreement that gives a stockholder the right to purchase more shares in a company to preserve an ownership position if the company offers to sell additional shares to the public.

Preferred Stock investment in the company that generally does not represent ownership, but that gains the investor a right to preferences in distribution of dividends and in certain other situations.

Prepaid Expenses expenditures made in anticipation of future services or obligations, often interest, advertising, or insurance.

Present Value the value, in today's terms, of money to be received or paid in the future, determined based on a specified interest rate.

Prime Interest Rate the short term-interest rate that banks charge their most creditworthy customers; referenced from the Federal Funds Rate.

Private Placement the issuance of debt or equity to a single investor directly by the company.

Profit the amount of money earned by a business after all expenses of the period have been accounted for.

Profit and Loss Statement See *Income Statement*.

Profitability Ratios company financial ratios that assess operating performance.

Proprietorship a business owned and actively operated by one person.

Proxy Statement a document provided to shareholders describing issues and votes that shareholder should consider and vote on, providing guidance to the company management.

Public Company Accounting Oversight Board (PCAOB) an administrative agency created by the Sarbanes-Oxley Act of 2002 to assure proper accounting practices and standards in the accounting and auditing of public corporations.

Regular Annuity an ordinary annuity.

Repurchase Certificates (Repos) overnight or very short-term interest-bearing loans from companies with temporary excess funds to banks and other financial institutions, usually secured by government securities, and enabling the companies to earn some income while permitting the banks to meet reserve obligations or other commitments.

Retained Earnings the cumulative earnings of the company less any dividends distributed to preferred and common stock holders.

Revolving Loan a loan, generally from a bank, the terms for which permit the borrower to borrow funds, repay them, and later borrow the amounts again.

Risk Adjusted Discount Rate the required rate of return on a capital asset including an adjustment to compensate for the risk of the specific type of investment.

Sales revenues received or to be received from the sale of the products or services offered by the business.

Special Purpose Entities tangentially related companies that serve special situations related to primary corporations (Enron).

Standard Industrial Classification (SIC) a classification system used by the United States Department of Commerce to categorize companies by the type of business they do.

Replaced by the North American Industrial Classification System (NAICS).

Statement of Retained Earnings a formal reconciliation of the transactions affecting the retained earnings of a company from the end of one fiscal period to the next. Also known as the statement of stockholders equity.

Statement of Stockholders' Equity another name for the statement of retained earnings.

Strategic Objectives what we want to accomplish.

Strategic Plan the long-range view of the company.

Strategy the basic business approach a company follows.

Subordinated Debt amounts owed by a company but that may not be paid until senior obligations have been satisfied.

Sweeping bank initiated transfers of company funds from numerous small accounts into a centralized concentration account, where, due to the larger consolidated balances, the company can earn a higher return or otherwise manage the cash assets better.

Tactics the explicitly identified action steps that will be employed to succeed.

Taxes amounts required by the governmental authorities holding jurisdiction over the company, applied to profits earned by the company.

Term Loan a loan, generally from a bank, the terms for which specify that the funds, when repaid, may not be borrowed again and the whole loan must be repaid by a certain date.

Total Assets the sum of all assets owned by the organization.

Total Liabilities the sum of all amounts owed to creditors by the organization.

Total Liabilities and Equity a total equal to the total assets that confirms that all obligations of the organization have been identified.

Trading Ratio another name for Sales to Net Worth, measures business risk when a company's sales are growing faster than the equity to support them.

Treasury Bill a short-term security issued by the U. S. Treasury; the least risky security, a Treasury Note is medium-term, a Treasury Bond is long-term.

Treasury Stock an account in the Equity section of the Balance Sheet reflecting the amount of money paid by a company to repurchase company stock when the repurchased stock has not then been retired from the number of shares available

Trend Analysis a comparison of a company's financial statistics to similarly computed statistics from a prior period to determine the direction of company financial trends. Usually, trend analysis requires at least three years of data to be useful.

Trial Balance a listing of all of the accounts in the chart of accounts with their respective balances presented in a single sequential statement. The net total of all of these balances when added together will equal zero, that is, the debit balances will equal the credit balances but with opposite signs.

Weighted Average Cost of Capital (WACC) the rate of return that will exactly and adequately compensate all providers of capital to a business, the minimum required rate of return for a capital investment.

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Post-Test

A Manager's Guide to Financial Analysis

Sixth Edition

Course Code 95084

INSTRUCTIONS: *To take this test and have it graded, please email AMASelfStudy@amanet.org. You will receive an email back with details on taking your test and getting your grade.*

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1. The short-term lenders of a firm would be most interested in looking at _____ ratios.
 - (a) profitability
 - (b) liquidity
 - (c) activity
 - (d) leverage
2. An increasing debt-to-equity ratio indicates that the:
 - (a) level of stockholders' equity is increasing in relation to debt.
 - (b) level of debt is increasing in relation to stockholders' equity.
 - (c) level of total assets is increasing.
 - (d) amount of long-term debt is increasing.

3. Short-term unsecured promissory notes that are issued by large industrial firms are called:
- repurchase agreements.
 - negotiable certificates of deposit.
 - commercial paper.
 - short-term tax-exempts.

Use Exhibit Pre-/Post-Test-1 to answer Questions 4 through 7.

E

Exhibit Pre-/Post-Test-1

Apple Apparel's Balance Sheet as of December 31, 2013 (in 000s)

Current Assets:

Cash	\$10,000
Accounts receivable	34,000
Inventories	172,000
Other	18,000
Total Current Assets	\$234,000

Net Plant and Equipment	66,000
Total Assets	\$300,000

Current Liabilities:

Notes payable	\$14,000
Accounts payable	65,000
Salaries and wages	22,000
Taxes payable	15,000
Total Current Liabilities	\$116,000

Long-Term Debt	\$70,000
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Shareholder's Equity

Common stock	14,000
Additional paid-in capital	60,000
Retained earnings	40,000
Total Liabilities and Equity	\$300,000

Additional Information:

Sales	\$489,000
Cost of goods sold	366,000
Accounts receivable, December 31, 2012	37,000
Inventories, December 31, 2012	161,000

4. What was its average collection period during 2013?
- 26 days
 - 53 days
 - 25 days
 - 14 days

-
5. The debt-to-equity ratio for year 2013 is:
 - (a) 0.62.
 - (b) 1.16.
 - (c) 1.63.
 - (d) 2.01.

 6. The inventory turnover of Apple Apparel is:
 - (a) 2.13.
 - (b) 2.84.
 - (c) 2.20.
 - (d) 0.91.

 7. Each of the following is concerned with the ability to pay current debts as they become due except:
 - (a) quick ratio.
 - (b) net liquid balance.
 - (c) working capital.
 - (d) times-interest-earned.

 8. The investors of a company would be most interested in examining which type of ratio?
 - (a) Profitability
 - (b) Liquidity
 - (c) Activity
 - (d) Leverage

 9. The denominator for the price-earnings ratio is:
 - (a) net income.
 - (b) operating income.
 - (c) earnings per share.
 - (d) net income less preferred stock dividends.

 10. The percentage changes in certain elements in the financial statements over time are studied in:
 - (a) horizontal analysis.
 - (b) cash flow analysis.
 - (c) vertical analysis.
 - (d) component analysis.

 11. Financial analysts are most concerned with:
 - (a) assuring the accuracy of the financial statements.
 - (b) identifying opportunities for financial improvement.
 - (c) increasing the profitability of short-term investments.
 - (d) protecting the current market price of the company's stock.

12. Decentralizing the financial analysis function:
- (a) localizes the focus of the analyst.
 - (b) increases the neutrality and objectivity of analyses.
 - (c) facilitates the broadest perspective in analyses.
 - (d) increases the promotability of the analyst.
13. If the cash conversion cycle is negative, it means that:
- (a) the company cannot pay its bills until it collects its accounts receivable.
 - (b) the company's cash balance is negative and the company is insolvent.
 - (c) the company's average payment period exceeds the sum of its average collection period and its inventory holding period.
 - (d) the company's average payment period is less than the sum of its average collection period and its inventory holding period.
14. A zero balance account:
- (a) indicates that the company has no cash.
 - (b) permits flexibility in divisional cash disbursing practices.
 - (c) results in maintaining redundant compensating balances.
 - (d) guarantees local control over receipts and disbursements.
15. The weighted average cost of capital reflects:
- (a) the minimum level of dividends a company is required to pay its shareholders.
 - (b) the average of all amounts paid out to all investors.
 - (c) the lowest interest rate applicable to corporate debt from any source.
 - (d) the minimum rate of return necessary to satisfy all of the sources of capital.
16. The beta coefficient, β , can be described as:
- (a) the relative riskiness that a company has to the market as a whole.
 - (b) the critical component in determining the cost of debt.
 - (c) the determinant of an investment's attractiveness.
 - (d) the standard deviation included in the estimated return on a project's profitability.
17. Risk is best described as:
- (a) the probability of financial loss.
 - (b) the cause of a high return.
 - (c) uncertainty of an outcome, which may be positive or negative.
 - (d) the likelihood of an unfavorable outcome.

-
18. The net present value tells an analyst:
- (a) the expected rate of return on an investment.
 - (b) the time it takes to recover the investment amount.
 - (c) the financial benefit of an investment measured in current value.
 - (d) the financial recovery from an investment measured after the end of the life of the assets involved.
19. The internal rate of return is that percentage rate of return that:
- (a) equates the present value of the future cash flows of an investment to the original value of the investment.
 - (b) exactly meets the requirements of management.
 - (c) falls between the required rate of return and the modified internal rate of return.
 - (d) satisfies the lender's security requirements.
20. Sales-dependent assets:
- (a) determine the level of sales in the coming year.
 - (b) must be held, even during the lowest part of an operating cycle.
 - (c) rise or fall in proportion to the change in sales.
 - (d) turn into cash when sales goals are achieved.
21. A company's optimal capital structure:
- (a) minimizes the company's cost of debt.
 - (b) maximizes the company's share price.
 - (c) equates the company's debt and equity.
 - (d) maximizes the company's return on equity.
22. A stock dividend, which is defined as additional shares granted in proportion to shares held:
- (a) increases the percentage ownership of a shareholder.
 - (b) creates a capital gain.
 - (c) decreases the percentage owned by a shareholder.
 - (d) is perceived favorably even though a shareholder receives no financial benefit.
23. Goodwill on the balance sheet is an indication that:
- (a) the company has paid more for an acquisition than the value of the assets it has acquired.
 - (b) the company has established a very good reputation for itself in the marketplace.
 - (c) the company has made a substantial contribution to the city in which it is headquartered.
 - (d) the company has negotiated a real bargain in an acquisition it has completed.

24. When a company acquires another company for stock:
- (a) the total number of shares outstanding is decreased, raising the value of all shares.
 - (b) the stock must be offered in a public offering to the market at a price that equals the agreed-to purchase price for the target company.
 - (c) the absolute number of shares in the acquiring company will double.
 - (d) the number of shares needed to effect the acquisition will usually reflect a premium in value over the current market price of the acquired company's shares.
25. Comparing the current ratio to the quick ratio tells an analyst:
- (a) how current assets relate to current liabilities.
 - (b) how accounts receivable relate to current liabilities.
 - (c) how accounts receivable relate to accounts payable.
 - (d) how inventory relates to current liabilities.

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