

# FINANCIAL STATEMENTS AND ANALYSIS

## LEARNING GOALS

LG1

Review the contents of the stockholders' report and the procedures for consolidating international financial statements.

LG2

Understand who uses financial ratios, and how.

LG3

Use ratios to analyze a firm's liquidity and activity.

LG4

Discuss the relationship between debt and financial leverage and the ratios used to analyze a firm's debt.

LG5

Use ratios to analyze a firm's profitability and its market value.

LG6

Use a summary of financial ratios and the DuPont system of analysis to perform a complete ratio analysis.

## *Across the Disciplines* WHY THIS CHAPTER MATTERS TO YOU

**Accounting:** You need to understand the stockholders' report and preparation of the four key financial statements; how firms consolidate international financial statements; and how to calculate and interpret financial ratios for decision making.

**Information systems:** You need to understand what data are included in the firm's financial statements in order to design systems that will supply such data to those who prepare the statements and to those in the firm who use the data for ratio calculations.

**Management:** You need to understand what parties are interested in the annual report and why; how the financial statements will be analyzed by those both inside and outside the firm to assess various aspects of performance; the caution that

should be exercised in using financial ratio analysis; and how the financial statements affect the value of the firm.

**Marketing:** You need to understand the effects your decisions will have on the financial statements, particularly the income statement and the statement of cash flows, and how analysis of ratios, especially those involving sales figures, will affect the firm's decisions about levels of inventory, credit policies, and pricing decisions.

**Operations:** You need to understand how the costs of operations are reflected in the firm's financial statements and how analysis of ratios, particularly those involving assets, cost of goods sold, or inventory, may affect requests for new equipment or facilities.



## HOME DEPOT

### BUILDING STRONG FINANCIALS



Financial reporting is no longer the primary responsibility of the chief financial officer (CFO). The role of today's CFO, a key member of the executive team, has broadened to include strategic planning and, at many companies, information management. Managing a company's financial operations takes many different skills. Financial planning, operations, and analysis; treasury operations (raising funds and managing cash); business acquisition and valuation; tax planning; and investor relations are also under his or her control.

**Home Depot** CFO and treasurer Carol Tomé reports directly to chief executive officer Robert L. Nardelli. She works closely with him and with Dennis J. Carey, an executive vice president and the chief strategy officer, to guide the giant home improvement retailer's future growth. Along with her strategic responsibilities, Tomé chooses the key financial measurements on which she wants managers to focus. These are tied to the economic climate. When the economy was strong, her objective was improving the company's return on investment (ROI). By late 2001, Home Depot's ROI was 16.0 percent, compared to 14.7 percent for the home improvement retail industry, 6.7 percent for the services sector, and 10.2 percent for the S&P 500.

In 2001's slower economy, the emphasis shifted to activity ratios that measure how quickly accounts are converted into cash. Particularly important to a retail chain are inventory turnover, receivables collection period, and accounts payable periods. Home Depot hired consultants to benchmark its financial operations with other best-in-class companies. "We're looking for processing efficiencies," Tomé says. Improved new-store productivity and lower pre-opening costs per store, together with attention to cost control, are boosting margins. In the third quarter of 2001, when many companies reported earnings drops, Home Depot's net income and earnings per share rose over the same period in 2000.

The company's measures of debt also indicate a strong financial position. Its ratio of debt to total capital indicates that only about 10 percent of its total long-term financing is debt, a very low degree of indebtedness. This strong position gives Home Depot more flexibility to pursue new projects, such as its new high-end line of stores called Expo, and more opportunities to raise funds from banks, which use ratio analysis to assess creditworthiness.

In this chapter you will learn how to analyze financial statements using financial ratios.



## 2.1 The Stockholders' Report

**generally accepted accounting principles (GAAP)**  
The practice and procedure guidelines used to prepare and maintain financial records and reports; authorized by the *Financial Accounting Standards Board (FASB)*.

**Financial Accounting Standards Board (FASB)**  
The accounting profession's rule-setting body, which authorizes *generally accepted accounting principles (GAAP)*.

**Securities and Exchange Commission (SEC)**  
The federal regulatory body that governs the sale and listing of securities.

**stockholders' report**  
Annual report that publicly owned corporations must provide to stockholders; it summarizes and documents the firm's financial activities during the past year.



**letter to stockholders**  
Typically, the first element of the annual stockholders' report and the primary communication from management.

**income statement**  
Provides a financial summary of the firm's operating results during a specified period.

Every corporation has many and varied uses for the standardized records and reports of its financial activities. Periodically, reports must be prepared for regulators, creditors (lenders), owners, and management. The guidelines used to prepare and maintain financial records and reports are known as **generally accepted accounting principles (GAAP)**. These accounting practices and procedures are authorized by the accounting profession's rule-setting body, the **Financial Accounting Standards Board (FASB)**.

*Publicly owned corporations* with more than \$5 million in assets and 500 or more stockholders<sup>1</sup> are required by the **Securities and Exchange Commission (SEC)**—the federal regulatory body that governs the sale and listing of securities—to provide their stockholders with an annual **stockholders' report**. The annual report summarizes and documents the firm's financial activities during the past year. It begins with a letter to the stockholders from the firm's president and/or chairman of the board.

### The Letter to Stockholders

The **letter to stockholders** is the primary communication from management. It describes the events that are considered to have had the greatest impact on the firm during the year. It also generally discusses management philosophy, strategies, and actions, as well as plans for the coming year. Links at this book's Web site ([www.aw.com/gitman](http://www.aw.com/gitman)) will take you to some representative letters to stockholders.

### The Four Key Financial Statements

The four key financial statements required by the SEC for reporting to shareholders are (1) the income statement, (2) the balance sheet, (3) the statement of retained earnings, and (4) the statement of cash flows.<sup>2</sup> The financial statements from the 2003 stockholders' report of Bartlett Company, a manufacturer of metal fasteners, are presented and briefly discussed.

#### Income Statement

The **income statement** provides a financial summary of the firm's operating results during a specified period. Most common are income statements covering a 1-year period ending at a specified date, ordinarily December 31 of the calendar year.

1. Although the Securities and Exchange Commission (SEC) does not have an official definition of *publicly owned*, these financial measures mark the cutoff point it uses to require informational reporting, regardless of whether the firm publicly sells its securities. Firms that do not meet these requirements are commonly called "closely owned" firms.

2. Whereas these statement titles are consistently used throughout this text, it is important to recognize that in practice, companies frequently use different titles. For example, General Electric uses "Statement of Earnings" rather than "Income Statement" and "Statement of Financial Position" rather than "Balance Sheet." Bristol Myers Squibb uses "Statement of Earnings and Retained Earnings" rather than "Income Statement." Pfizer uses "Statement of Shareholders' Equity" rather than "Statement of Retained Earnings."

**Hint** Some firms, such as retailers and agricultural firms, end their fiscal year at the end of their operating cycle rather than at the end of the calendar year—for example, retailers at the end of January and agricultural firms at the end of September.

Many large firms, however, operate on a 12-month financial cycle, or *fiscal year*, that ends at a time other than December 31. In addition, monthly income statements are typically prepared for use by management, and quarterly statements must be made available to the stockholders of publicly owned corporations.

Table 2.1 presents Bartlett Company's income statements for the years ended December 31, 2003 and 2002. The 2003 statement begins with *sales revenue*—the total dollar amount of sales during the period—from which the *cost of goods sold* is deducted. The resulting *gross profits* of \$986,000 represent the amount remaining to satisfy operating, financial, and tax costs. Next, *operating expenses*, which include selling expense, general and administrative expense, lease expense,

**TABLE 2.1 Bartlett Company Income Statements (\$000)**

	For the years ended December 31	
	2003	2002
Sales revenue	\$3,074	\$2,567
Less: Cost of goods sold	<u>2,088</u>	<u>1,711</u>
Gross profits	\$ 986	\$ 856
Less: Operating expenses		
Selling expense	\$ 100	\$ 108
General and administrative expenses	194	187
Lease expense <sup>a</sup>	35	35
Depreciation expense	<u>239</u>	<u>223</u>
Total operating expense	\$ 568	\$ 553
Operating profits	\$ 418	\$ 303
Less: Interest expense	<u>93</u>	<u>91</u>
Net profits before taxes	\$ 325	\$ 212
Less: Taxes (rate = 29%) <sup>b</sup>	<u>94</u>	<u>64</u>
Net profits after taxes	\$ 231	\$ 148
Less: Preferred stock dividends	<u>10</u>	<u>10</u>
Earnings available for common stockholders	<u>\$ 221</u>	<u>\$ 138</u>
Earnings per share (EPS) <sup>c</sup>	\$ 2.90	\$ 1.81
Dividend per share (DPS) <sup>d</sup>	\$ 1.29	\$ 0.75

<sup>a</sup>Lease expense is shown here as a separate item rather than being included as part of interest expense, as specified by the FASB for financial-reporting purposes. The approach used here is consistent with tax-reporting rather than financial-reporting procedures.

<sup>b</sup>The 29% tax rate for 2003 results because the firm has certain special tax write-offs that do not show up directly on its income statement.

<sup>c</sup>Calculated by dividing the earnings available for common stockholders by the number of shares of common stock outstanding—76,262 in 2003 and 76,244 in 2002. Earnings per share in 2003:  $\$221,000 \div 76,262 = \$2.90$ ; in 2002:  $\$138,000 \div 76,244 = \$1.81$ .

<sup>d</sup>Calculated by dividing the dollar amount of dividends paid to common stockholders by the number of shares of common stock outstanding. Dividends per share in 2003:  $\$98,000 \div 76,262 = \$1.29$ ; in 2002:  $\$57,183 \div 76,244 = \$0.75$ .

and depreciation expense, are deducted from gross profits.<sup>3</sup> The resulting *operating profits* of \$418,000 represent the profits earned from producing and selling products; this amount does not consider financial and tax costs. (Operating profit is often called *earnings before interest and taxes*, or *EBIT*.) Next, the financial cost—*interest expense*—is subtracted from operating profits to find *net profits* (or *earnings*) *before taxes*. After subtracting \$93,000 in 2003 interest, Bartlett Company had \$325,000 of net profits before taxes.

Next, taxes are calculated at the appropriate tax rates and deducted to determine *net profits* (or *earnings*) *after taxes*. Bartlett Company's net profits after taxes for 2003 were \$231,000. Any preferred stock dividends must be subtracted from net profits after taxes to arrive at *earnings available for common stockholders*. This is the amount earned by the firm on behalf of the common stockholders during the period.

Dividing earnings available for common stockholders by the number of shares of common stock outstanding results in *earnings per share* (*EPS*). *EPS* represents the number of dollars earned during the period on behalf of each outstanding share of common stock. In 2003, Bartlett Company earned \$221,000 for its common stockholders, which represents \$2.90 for each outstanding share. The actual cash **dividend per share (DPS)**, which is the dollar amount of cash distributed during the period on behalf of each outstanding share of common stock, paid in 2003 was \$1.29.

**dividend per share (DPS)**  
The dollar amount of cash distributed during the period on behalf of each outstanding share of common stock.

## Balance Sheet

The **balance sheet** presents a summary statement of the firm's financial position at a given point in time. The statement balances the firm's *assets* (what it owns) against its financing, which can be either *debt* (what it owes) or *equity* (what was provided by owners). Bartlett Company's balance sheets as of December 31 of 2003 and 2002 are presented in Table 2.2. They show a variety of asset, liability (debt), and equity accounts.

**balance sheet**  
Summary statement of the firm's financial position at a given point in time.

**current assets**  
Short-term assets, expected to be converted into cash within 1 year or less.

**current liabilities**  
Short-term liabilities, expected to be paid within 1 year or less.

An important distinction is made between short-term and long-term assets and liabilities. The **current assets** and **current liabilities** are *short-term* assets and liabilities. This means that they are expected to be converted into cash (current assets) or paid (current liabilities) within 1 year or less. All other assets and liabilities, along with stockholders' equity, which is assumed to have an infinite life, are considered *long-term*, or *fixed*, because they are expected to remain on the firm's books for more than 1 year.

As is customary, the assets are listed from the most liquid—*cash*—down to the least liquid. *Marketable securities* are very liquid short-term investments, such as U.S. Treasury bills or certificates of deposit, held by the firm. Because they are highly liquid, marketable securities are viewed as a form of cash ("near cash"). *Accounts receivable* represent the total monies owed the firm by its customers on credit sales made to them. *Inventories* include raw materials, work in process (partially finished goods), and finished goods held by the firm. The entry for *gross fixed assets* is the original cost of all fixed (long-term) assets owned by the

3. Depreciation expense can be, and frequently is, included in manufacturing costs—cost of goods sold—to calculate gross profits. Depreciation is shown as an expense in this text to isolate its impact on cash flows.

**TABLE 2.2 Bartlett Company Balance Sheets (\$000)**

Assets	December 31	
	2003	2002
<b>Current assets</b>		
Cash	\$ 363	\$ 288
Marketable securities	68	51
Accounts receivable	503	365
Inventories	289	300
Total current assets	<u>\$1,223</u>	<u>\$1,004</u>
<b>Gross fixed assets (at cost)<sup>d</sup></b>		
Land and buildings	\$2,072	\$1,903
Machinery and equipment	1,866	1,693
Furniture and fixtures	358	316
Vehicles	275	314
Other (includes financial leases)	98	96
Total gross fixed assets (at cost)	<u>\$4,669</u>	<u>\$4,322</u>
Less: Accumulated depreciation	<u>2,295</u>	<u>2,056</u>
Net fixed assets	<u>\$2,374</u>	<u>\$2,266</u>
Total assets	<u>\$3,597</u>	<u>\$3,270</u>
<b>Liabilities and Stockholders' Equity</b>		
<b>Current liabilities</b>		
Accounts payable	\$ 382	\$ 270
Notes payable	79	99
Accruals	159	114
Total current liabilities	<u>\$ 620</u>	<u>\$ 483</u>
Long-term debt (includes financial leases) <sup>b</sup>	<u>\$1,023</u>	<u>\$ 967</u>
Total liabilities	<u>\$1,643</u>	<u>\$1,450</u>
<b>Stockholders' equity</b>		
Preferred stock—cumulative 5%, \$100 par, 2,000 shares authorized and issued <sup>c</sup>	\$ 200	\$ 200
Common stock—\$2.50 par, 100,000 shares authorized, shares issued and outstanding in 2003: 76,262; in 2002: 76,244	191	190
Paid-in capital in excess of par on common stock	428	418
Retained earnings	<u>1,135</u>	<u>1,012</u>
Total stockholders' equity	<u>\$1,954</u>	<u>\$1,820</u>
Total liabilities and stockholders' equity	<u>\$3,597</u>	<u>\$3,270</u>

<sup>a</sup>In 2003, the firm has a 6-year financial lease requiring annual beginning-of-year payments of \$35,000. Four years of the lease have yet to run.

<sup>b</sup>Annual principal repayments on a portion of the firm's total outstanding debt amount to \$71,000.

<sup>c</sup>The annual preferred stock dividend would be \$5 per share (5% × \$100 par), or a total of \$10,000 annually (\$5 per share × 2,000 shares).

## In Practice

### FOCUS ON PRACTICE Extraordinary? Not to the FASB!

To most of us, the events of September 11, 2001, would certainly qualify as extraordinary. The plane crashes that took thousands of lives, destroyed the World Trade Center Towers, and damaged part of the Pentagon were circumstances well outside what we consider “ordinary.” Yet, several weeks after the tragedy the Financial Accounting Standards Board (FASB) announced that the terrorist attack did not constitute an extraordinary event—at least not in accounting terms.

As a result, companies will not be able to separate costs and expenses related to the disaster as extraordinary on their financial statements. Those expenses will show up as normal operating costs in the continuing operations section of the income statement.

Explained Tim Lucas, chair of the FASB Emerging Issues Task Force, “The task force understood that this was an extraordinary event in the English-language sense of the word. But in the final analysis, we decided it wasn’t going to improve the financial reporting system to show it [separately].”

The FASB task force had prepared a draft document with guidelines on accounting for disaster-related costs as extraordinary. As they considered how to apply these recommendations, they realized that the impact of the attack was so far-ranging that it was almost impossible to divide direct financial and economic effects from the weakening economic conditions prior to September 11. Nor was it possible to develop one set of guidelines

appropriate for all industries. FASB members were concerned that companies would blame negative financial performance on the attacks when in fact the costs were unrelated. As one member pointed out, almost every company was affected in some way. Because the whole business climate changed, “it almost made it ordinary.”

Companies will, however, be able to separate costs they believe to be attributable to September 11 in the footnotes to financial statements and in management’s discussion of financial results.

*Sources:* Jennifer Davies, “Will Attacks Cover Up Weak Earnings?” *San Diego Union-Tribune* (October 14, 2001), pp. H1, H6; Steve Liesman, “Accountants, in a Reversal, Say Costs from the Attack Aren’t ‘Extraordinary,’” *Wall Street Journal* (October 1, 2001), pp. C1-2; Keith Naughton, “Out of the Ordinary,” *Newsweek* (October 15, 2001), p. 9.

**Hint** Another interpretation of the balance sheet is that on one side are the assets that have been purchased to be used to increase the profit of the firm. The other side indicates how these assets were acquired, either by borrowing or by investing the owner’s money.

#### long-term debt

Debts for which payment is not due in the current year.

#### paid-in capital in excess of par

The amount of proceeds in excess of the par value received from the original sale of common stock.

firm.<sup>4</sup> *Net fixed assets* represent the difference between gross fixed assets and *accumulated depreciation*—the total expense recorded for the depreciation of fixed assets. (The net value of fixed assets is called their *book value*.)

Like assets, the liabilities and equity accounts are listed from short-term to long-term. Current liabilities include *accounts payable*, amounts owed for credit purchases by the firm; *notes payable*, outstanding short-term loans, typically from commercial banks; and *accruals*, amounts owed for services for which a bill may not or will not be received. (Examples of accruals include taxes due the government and wages due employees.) **Long-term debt** represents debt for which payment is not due in the current year. *Stockholders’ equity* represents the owners’ claims on the firm. The *preferred stock* entry shows the historical proceeds from the sale of preferred stock (\$200,000 for Bartlett Company).

Next, the amount paid by the original purchasers of common stock is shown by two entries: common stock and paid-in capital in excess of par on common stock. The *common stock* entry is the *par value* of common stock. **Paid-in capital in excess of par** represents the amount of proceeds in excess of the par value received from the original sale of common stock. The sum of the common stock

4. For convenience the term *fixed assets* is used throughout this text to refer to what, in a strict accounting sense, is captioned “property, plant, and equipment.” This simplification of terminology permits certain financial concepts to be more easily developed.

and paid-in capital accounts divided by the number of shares outstanding represents the original price per share received by the firm on a single issue of common stock. Bartlett Company therefore received about \$8.12 per share [(\$191,000 par + \$428,000 paid-in capital in excess of par) ÷ 76,262 shares] from the sale of its common stock.

#### retained earnings

The cumulative total of all earnings, net of dividends, that have been retained and reinvested in the firm since its inception.

Finally, **retained earnings** represent the cumulative total of all earnings, net of dividends, that have been retained and reinvested in the firm since its inception. It is important to recognize that retained earnings *are not cash* but rather have been utilized to finance the firm's assets.

Bartlett Company's balance sheets in Table 2.2 show that the firm's total assets increased from \$3,270,000 in 2002 to \$3,597,000 in 2003. The \$327,000 increase was due primarily to the \$219,000 increase in current assets. The asset increase in turn appears to have been financed primarily by an increase of \$193,000 in total liabilities. Better insight into these changes can be derived from the statement of cash flows, which we will discuss shortly.

### Statement of Retained Earnings

#### statement of retained earnings

Reconciles the net income earned during a given year, and any cash dividends paid, with the change in retained earnings between the start and the end of that year.

The **statement of retained earnings** reconciles the net income earned during a given year, and any cash dividends paid, with the change in retained earnings between the start and the end of that year. Table 2.3 presents this statement for Bartlett Company for the year ended December 31, 2003. The statement shows that the company began the year with \$1,012,000 in retained earnings and had net profits after taxes of \$231,000, from which it paid a total of \$108,000 in dividends, resulting in year-end retained earnings of \$1,135,000. Thus the net increase for Bartlett Company was \$123,000 (\$231,000 net profits after taxes minus \$108,000 in dividends) during 2003.

### Statement of Cash Flows

#### statement of cash flows

Provides a summary of the firm's operating, investment, and financing cash flows and reconciles them with changes in its cash and marketable securities during the period.

The **statement of cash flows** is a summary of the cash flows over the period of concern. The statement provides insight into the firm's operating, investment, and financing cash flows and reconciles them with changes in its cash and marketable securities during the period. Bartlett Company's statement of cash flows for the year ended December 31, 2003, is presented in Table 2.4. Further insight into this statement is included in the discussion of cash flow of in Chapter 3.

**TABLE 2.3** Bartlett Company Statement of Retained Earnings (\$000) for the Year Ended December 31, 2003

Retained earnings balance (January 1, 2003)	\$1,012
Plus: Net profits after taxes (for 2003)	231
Less: Cash dividends (paid during 2003)	
Preferred stock	(\$10)
Common stock	( 98)
Total dividends paid	( 108)
Retained earnings balance (December 31, 2003)	<u>\$1,135</u>



**TABLE 2.4** Bartlett Company Statement of Cash Flows (\$000) for the Year Ended December 31, 2003

<b>Cash Flow from Operating Activities</b>		
Net profits after taxes	\$231	
Depreciation	239	
Increase in accounts receivable	( 138) <sup>a</sup>	
Decrease in inventories	11	
Increase in accounts payable	112	
Increase in accruals	<u>45</u>	
Cash provided by operating activities		\$500
<b>Cash Flow from Investment Activities</b>		
Increase in gross fixed assets	(\$347)	
Change in business interests	<u>0</u>	
Cash provided by investment activities		( 347)
<b>Cash Flow from Financing Activities</b>		
Decrease in notes payable	(\$ 20)	
Increase in long-term debts	56	
Changes in stockholders' equity <sup>b</sup>	11	
Dividends paid	( 108)	
Cash provided by financing activities		( 61)
Net increase in cash and marketable securities		<u>\$ 92</u>

<sup>a</sup>As is customary, parentheses are used to denote a negative number, which in this case is a cash outflow.

<sup>b</sup>Retained earnings are excluded here, because their change is actually reflected in the combination of the "net profits after taxes" and "dividends paid" entries.

**notes to the financial statements**  
Footnotes detailing information on the accounting policies, procedures, calculations, and transactions underlying entries in the financial statements.

## Notes to the Financial Statements

Included with published financial statements are explanatory notes keyed to the relevant accounts in the statements. These **notes to the financial statements** provide detailed information on the accounting policies, procedures, calculations, and transactions underlying entries in the financial statements. Common issues addressed by these notes include revenue recognition, income taxes, breakdowns of fixed asset accounts, debt and lease terms, and contingencies. Professional securities analysts use the data in the statements and notes to develop estimates of the value of securities that the firm issues, and these estimates influence the actions of investors and therefore the firm's share value.

## Consolidating International Financial Statements

So far, we've discussed financial statements involving only one currency, the U.S. dollar. The issue of how to consolidate a company's foreign and domestic financial statements has bedeviled the accounting profession for many years. The cur-

**Financial Accounting Standards Board (FASB) Standard No. 52** Mandates that U.S.-based companies translate their foreign-currency-denominated assets and liabilities into dollars, for consolidation with the parent company's financial statements. This is done by using the *current rate (translation) method*.



**current rate (translation) method**  
Technique used by U.S.-based companies to translate their foreign-currency-denominated assets and liabilities into dollars, for consolidation with the parent company's financial statements, using the exchange rate prevailing at the fiscal year ending date (the current rate).

rent policy is described in Financial Accounting Standards Board (FASB) Standard No. 52, which mandates that U.S.-based companies translate their foreign-currency-denominated assets and liabilities into dollars, for consolidation with the parent company's financial statements. This is done by using a technique called the **current rate (translation) method**, under which all of a U.S. parent company's foreign-currency-denominated assets and liabilities are converted into dollar values using the exchange rate prevailing at the fiscal year ending date (the current rate). Income statement items are treated similarly. Equity accounts, on the other hand, are translated into dollars by using the exchange rate that prevailed when the parent's equity investment was made (the historical rate). Retained earnings are adjusted to reflect each year's operating profits or losses. Further details on this procedure can be found at the book's Web site at [www.aw.com/gitman](http://www.aw.com/gitman) or in an intermediate accounting text.

## Review Questions

- 2-1 Describe the purpose of each of the four major financial statements.
- 2-2 Why are the notes to the financial statements important to professional securities analysts?
- 2-3 How is the *current rate (translation) method* used to consolidate a firm's foreign and domestic financial statements?



## 2.2 Using Financial Ratios

### ratio analysis

Involves methods of calculating and interpreting financial ratios to analyze and monitor the firm's performance.

The information contained in the four basic financial statements is of major significance to various interested parties who regularly need to have relative measures of the company's operating efficiency. *Relative* is the key word here, because the analysis of financial statements is based on the use of *ratios* or *relative values*. **Ratio analysis** involves methods of calculating and interpreting financial ratios to analyze and monitor the firm's performance. The basic inputs to ratio analysis are the firm's income statement and balance sheet.

**Hint** Management should be the most interested party of this group. Managers not only have to worry about the financial situation of the firm, but they are also critically interested in what the other parties think about the firm.

### Interested Parties

Ratio analysis of a firm's financial statements is of interest to shareholders, creditors, and the firm's own management. Both present and prospective shareholders are interested in the firm's current and future level of risk and return, which directly affect share price. The firm's creditors are interested primarily in the short-term liquidity of the company and its ability to make interest and principal payments. A secondary concern of creditors is the firm's profitability; they want assurance that the business is healthy. Management, like stockholders, is concerned with all aspects of the firm's financial situation, and it attempts to produce financial ratios that will be considered favorable by both owners and creditors. In addition, management uses ratios to monitor the firm's performance from period to period.

## Types of Ratio Comparisons

Ratio analysis is not merely the calculation of a given ratio. More important is the *interpretation* of the ratio value. A meaningful basis for comparison is needed to answer such questions as “Is it too high or too low?” and “Is it good or bad?” Two types of ratio comparisons can be made: cross-sectional and time-series.

### Cross-Sectional Analysis

**cross-sectional analysis**  
Comparison of different firms' financial ratios at the same point in time; involves comparing the firm's ratios to those of other firms in its industry or to industry averages.

**benchmarking**  
A type of *cross-sectional analysis* in which the firm's ratio values are compared to those of a key competitor or group of competitors that it wishes to emulate.

**Hint** Industry averages are not particularly useful for analyzing firms with multiproduct lines. In the case of multiproduct firms, it is difficult to select the appropriate benchmark industry.

Cross-sectional analysis involves the comparison of different firms' financial ratios at the same point in time. Analysts are often interested in how well a firm has performed in relation to other firms in its industry. Frequently, a firm will compare its ratio values to those of a key competitor or group of competitors that it wishes to emulate. This type of cross-sectional analysis, called **benchmarking**, has become very popular.

Comparison to industry averages is also popular. These figures can be found in the *Almanac of Business and Industrial Financial Ratios*, *Dun & Bradstreet's Industry Norms and Key Business Ratios*, *Business Month*, *FTC Quarterly Reports*, *Robert Morris Associates Statement Studies*, *Value Line*, and industry sources.<sup>5</sup> A sample from one available source of industry averages is given in Table 2.5.

Many people mistakenly believe that as long as the firm being analyzed has a value “better than” the industry average, it can be viewed favorably. However, this “better than average” viewpoint can be misleading. Quite often a ratio value that is far better than the norm can indicate problems that, on more careful analysis, may be more severe than had the ratio been worse than the industry average. It is therefore important to investigate significant deviations *to either side* of the industry standard.

### EXAMPLE ▼

In early 2004, Mary Boyle, the chief financial analyst at Caldwell Manufacturing, a producer of heat exchangers, gathered data on the firm's financial performance during 2003, the year just ended. She calculated a variety of ratios and obtained industry averages. She was especially interested in inventory turnover, which reflects the speed with which the firm moves its inventory from raw materials through production into finished goods and to the customer as a completed sale. Generally, higher values of this ratio are preferred, because they indicate a quicker turnover of inventory. Caldwell Manufacturing's calculated inventory turnover for 2003 and the industry average inventory turnover were as follows:

Inventory turnover, 2003	
Caldwell Manufacturing	14.8
Industry average	9.7

5. Cross-sectional comparisons of firms operating in several lines of business are difficult to perform. The use of weighted-average industry average ratios based on the firm's product-line mix or, if data are available, analysis of the firm on a product-line basis can be performed to evaluate a multiproduct firm.

**TABLE 2.5 Industry Average Ratios (2001) for Selected Lines of Business<sup>a</sup>**

Line of business (number of concerns reporting) <sup>b</sup>	Current ratio (X)	Quick ratio (X)	Sales to inventory (X)	Collection period (days)	Total assets to sales (%)	Total liabilities to net worth (%)	Return on sales (%)	Return on total assets (%)	Return on net worth (%)
Department stores (167)	6.2	1.9	6.0	2.9	34.3	19.7	4.0	8.5	14.6
	3.0	0.8	4.7	8.0	50.9	62.0	1.8	3.3	6.5
	1.9	0.3	3.3	34.7	68.2	164.9	0.6	0.9	2.0
Electronic computers (91)	3.6	1.8	19.0	34.7	36.4	121.4	7.1	11.7	23.9
	1.8	1.0	9.1	55.9	59.7	230.4	1.8	3.5	9.8
	1.3	0.6	5.3	85.4	102.3	428.4	(0.8)	(3.1)	2.0
Grocery stores (541)	2.5	0.9	31.0	1.1	14.4	46.2	2.2	9.9	24.3
	1.5	0.4	19.7	2.9	20.3	128.4	0.8	3.9	11.1
	1.0	0.2	14.0	5.8	31.3	294.2	0.3	1.0	3.8
Motor vehicles (38)	2.0	1.0	11.2	18.5	27.9	95.9	3.7	9.7	24.1
	1.5	0.7	8.7	26.7	39.0	174.3	1.9	3.7	15.6
	1.2	0.3	5.8	47.5	59.2	393.9	0.6	1.4	3.4

<sup>a</sup>These values are given for each ratio for each line of business. The center value is the median, and the values immediately above and below it are the upper and lower quartiles, respectively.

<sup>b</sup>Standard Industrial Classification (SIC) codes for the lines of business shown are, respectively: SIC #5311, SIC #3571, SIC #5411, SIC #3711.

Source: "Industry Norms and Key Business Ratios," Copyright © 2001 Dun & Bradstreet, Inc. Reprinted with permission.

Mary's initial reaction to these data was that the firm had managed its inventory significantly *better than* the average firm in the industry. The turnover was nearly 53% faster than the industry average. Upon reflection, however, she realized that a very high inventory turnover could also mean very low levels of inventory. The consequence of low inventory could be excessive stockouts (insufficient inventory). Discussions with people in the manufacturing and marketing departments did in fact uncover such a problem: Inventories during the year were extremely low, the result of numerous production delays that hindered the firm's ability to meet demand and resulted in lost sales. What had initially appeared to reflect extremely efficient inventory management was actually the symptom of a major problem.

### Time-Series Analysis

**time-series analysis**  
Evaluation of the firm's financial performance over time using financial ratio analysis.

Time-series analysis evaluates performance over time. Comparison of current to past performance, using ratios, enables analysts to assess the firm's progress. Developing trends can be seen by using multiyear comparisons. As in cross-sectional analysis, any significant year-to-year changes may be symptomatic of a major problem.

### Combined Analysis

The most informative approach to ratio analysis combines cross-sectional and time-series analyses. A combined view makes it possible to assess the trend in the behavior of the ratio in relation to the trend for the industry. Figure 2.1 depicts this type of approach using the average collection period ratio of Bartlett Company, over the years 2000–2003. This ratio reflects the average amount of time it takes the firm to collect bills, and lower values of this ratio generally are preferred. The figure quickly discloses that (1) Bartlett’s effectiveness in collecting its receivables is poor in comparison to the industry, and (2) Bartlett’s trend is toward longer collection periods. Clearly, Bartlett needs to shorten its collection period.

### Cautions About Using Ratio Analysis

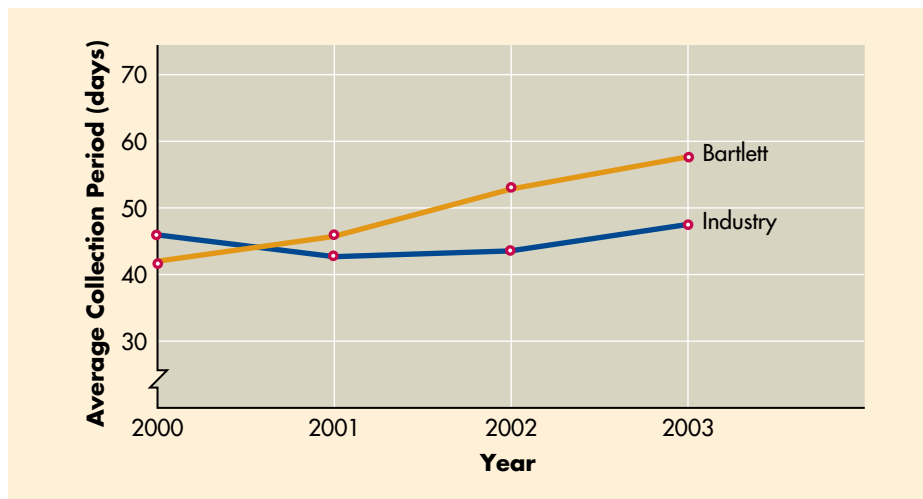
Before discussing specific ratios, we should consider the following cautions about their use:

1. Ratios with large deviations from the norm only indicate *symptoms* of a problem. Additional analysis is typically needed to isolate the *causes* of the problem. The fundamental point is this: Ratio analysis merely directs attention to potential areas of concern; it does not provide conclusive evidence as to the existence of a problem.
2. A single ratio does not generally provide sufficient information from which to judge the *overall* performance of the firm. Only when a group of ratios is used can reasonable judgments be made. However, if an analysis is concerned only with certain *specific* aspects of a firm’s financial position, one or two ratios may be sufficient.
3. The ratios being compared should be calculated using financial statements dated at the same point in time during the year. If they are not, the effects of

**FIGURE 2.1**

#### Combined Analysis

Combined cross-sectional and time-series view of Bartlett Company’s average collection period, 2000–2003



*seasonality* may produce erroneous conclusions and decisions. For example, comparison of the inventory turnover of a toy manufacturer at the end of June with its end-of-December value can be misleading. Clearly, the seasonal impact of the December holiday selling season would skew any comparison of the firm's inventory management.

4. It is preferable to use *audited financial statements* for ratio analysis. If the statements have not been audited, the data contained in them may not reflect the firm's true financial condition.
5. The financial data being compared should have been developed in the same way. The use of differing accounting treatments—especially relative to inventory and depreciation—can distort the results of ratio analysis, regardless of whether cross-sectional or time-series analysis is used.
6. Results can be distorted by *inflation*, which can cause the book values of inventory and depreciable assets to differ greatly from their true (replacement) values. Additionally, inventory costs and depreciation write-offs can differ from their true values, thereby distorting profits. Without adjustment, inflation tends to cause older firms (older assets) to appear more efficient and profitable than newer firms (newer assets). Clearly, in using ratios, care must be taken to compare older to newer firms or a firm to itself over a long period of time.

## Categories of Financial Ratios

Financial ratios can be divided for convenience into five basic categories: liquidity, activity, debt, profitability, and market ratios. Liquidity, activity, and debt ratios primarily measure risk. Profitability ratios measure return. Market ratios capture both risk and return.

As a rule, the inputs necessary to an effective financial analysis include, at a minimum, the income statement and the balance sheet. We will use the 2003 and 2002 income statements and balance sheets for Bartlett Company, presented earlier in Tables 2.1 and 2.2, to demonstrate ratio calculations. Note, however, that the ratios presented in the remainder of this chapter can be applied to almost any company. Of course, many companies in different industries use ratios that focus on aspects peculiar to their industry.

## Review Questions

- 2-4 With regard to financial ratio analysis, how do the viewpoints held by the firm's present and prospective shareholders, creditors, and management differ?
- 2-5 What is the difference between *cross-sectional* and *time-series* ratio analysis? What is *benchmarking*?
- 2-6 What types of deviations from the norm should the analyst pay primary attention to when performing cross-sectional ratio analysis? Why?
- 2-7 Why is it preferable to compare ratios calculated using financial statements that are dated at the same point in time during the year?



## 2.3 Liquidity Ratios

### liquidity

A firm's ability to satisfy its short-term obligations as they come due.

The **liquidity** of a firm is measured by its ability to satisfy its short-term obligations *as they come due*. Liquidity refers to the solvency of the firm's *overall* financial position—the ease with which it can pay its bills. Because a common precursor to financial distress and bankruptcy is low or declining liquidity, these ratios are viewed as good leading indicators of cash flow problems. The two basic measures of liquidity are the current ratio and the quick (acid-test) ratio.

### Current Ratio

#### current ratio

A measure of liquidity calculated by dividing the firm's current assets by its current liabilities.

The **current ratio**, one of the most commonly cited financial ratios, measures the firm's ability to meet its short-term obligations. It is expressed as follows:

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

The current ratio for Bartlett Company in 2003 is

$$\frac{\$1,223,000}{\$620,000} = 1.97$$

Generally, the higher the current ratio, the more liquid the firm is considered to be. A current ratio of 2.0 is occasionally cited as acceptable, but a value's acceptability depends on the industry in which the firm operates. For example, a current ratio of 1.0 would be considered acceptable for a public utility but might be unacceptable for a manufacturing firm. The more predictable a firm's cash flows, the lower the acceptable current ratio. Because Bartlett Company is in a business with a relatively predictable annual cash flow, its current ratio of 1.97 should be quite acceptable.

### Quick (Acid-Test) Ratio

#### quick (acid-test) ratio

A measure of liquidity calculated by dividing the firm's current assets minus inventory by its current liabilities.

The **quick (acid-test) ratio** is similar to the current ratio except that it excludes inventory, which is generally the least liquid current asset. The generally low liquidity of inventory results from two primary factors: (1) many types of inventory cannot be easily sold because they are partially completed items, special-purpose items, and the like; and (2) inventory is typically sold on credit, which means that it becomes an account receivable before being converted into cash. The quick ratio is calculated as follows:<sup>6</sup>

$$\text{Quick ratio} = \frac{\text{Current assets} - \text{Inventory}}{\text{Current liabilities}}$$

The quick ratio for Bartlett Company in 2003 is

$$\frac{\$1,223,000 - \$289,000}{\$620,000} = \frac{\$934,000}{\$620,000} = 1.51$$

6. Sometimes the quick ratio is defined as (cash + marketable securities + accounts receivable) ÷ current liabilities. If a firm were to show as current assets items other than cash, marketable securities, accounts receivable, and inventories, its quick ratio might vary, depending on the method of calculation.

A quick ratio of 1.0 or greater is occasionally recommended, but as with the current ratio, what value is acceptable depends largely on the industry. The quick ratio provides a better measure of overall liquidity only when a firm's inventory cannot be easily converted into cash. If inventory is liquid, the current ratio is a preferred measure of overall liquidity.

## Review Question

2–8 Under what circumstances would the current ratio be the preferred measure of overall firm liquidity? Under what circumstances would the quick ratio be preferred?



## 2.4 Activity Ratios

### activity ratios

Measure the speed with which various accounts are converted into sales or cash—inflows or outflows.

Activity ratios measure the speed with which various accounts are converted into sales or cash—inflows or outflows. With regard to current accounts, measures of liquidity are generally inadequate because differences in the *composition* of a firm's current assets and current liabilities can significantly affect its “true” liquidity. It is therefore important to look beyond measures of overall liquidity and to assess the activity (liquidity) of specific current accounts. A number of ratios are available for measuring the activity of the most important current accounts, which include inventory, accounts receivable, and accounts payable.<sup>7</sup> The efficiency with which total assets are used can also be assessed.

### Inventory Turnover

#### inventory turnover

Measures the activity, or liquidity, of a firm's inventory.

Inventory turnover commonly measures the activity, or liquidity, of a firm's inventory. It is calculated as follows:

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

Applying this relationship to Bartlett Company in 2003 yields

$$\text{Inventory turnover} = \frac{\$2,088,000}{\$289,000} = 7.2$$

The resulting turnover is meaningful only when it is compared with that of other firms in the same industry or to the firm's past inventory turnover. An inventory

7. For convenience, the activity ratios involving these current accounts assume that their end-of-period values are good approximations of the average account balance during the period—typically 1 year. Technically, when the month-end balances of inventory, accounts receivable, or accounts payable vary during the year, the average balance, calculated by summing the 12 month-end account balances and dividing the total by 12, should be used instead of the year-end value. If month-end balances are unavailable, the average can be approximated by dividing the sum of the beginning-of-year and end-of-year balances by 2. These approaches ensure a ratio that on the average better reflects the firm's circumstances. Because the data needed to find averages are generally unavailable to the external analyst, year-end values are frequently used to calculate activity ratios for current accounts.



**average age of inventory**  
Average number of days' sales in inventory.

turnover of 20.0 would not be unusual for a grocery store, whereas a common inventory turnover for an aircraft manufacturer is 4.0.

Inventory turnover can be easily converted into an **average age of inventory** by dividing it into 360—the assumed number of days in a year.<sup>8</sup> For Bartlett Company, the average age of inventory in 2003 is 50.0 days ( $360 \div 7.2$ ). This value can also be viewed as the average number of days' sales in inventory.

## Average Collection Period

**average collection period**  
The average amount of time needed to collect accounts receivable.

The **average collection period**, or average age of accounts receivable, is useful in evaluating credit and collection policies.<sup>9</sup> It is arrived at by dividing the average daily sales<sup>10</sup> into the accounts receivable balance:

$$\begin{aligned} \text{Average collection period} &= \frac{\text{Accounts receivable}}{\text{Average sales per day}} \\ &= \frac{\text{Accounts receivable}}{\frac{\text{Annual sales}}{360}} \end{aligned}$$

The average collection period for Bartlett Company in 2003 is

$$\frac{\$503,000}{\$3,074,000} = \frac{\$503,000}{\$8,539} = 58.9 \text{ days}$$

On the average, it takes the firm 58.9 days to collect an account receivable.

The average collection period is meaningful only in relation to the firm's credit terms. If Bartlett Company extends 30-day credit terms to customers, an average collection period of 58.9 days may indicate a poorly managed credit or collection department, or both. It is also possible that the lengthened collection period resulted from an intentional relaxation of credit-term enforcement in response to competitive pressures. If the firm had extended 60-day credit terms, the 58.9-day average collection period would be quite acceptable. Clearly, additional information is needed to evaluate the effectiveness of the firm's credit and collection policies.

## Average Payment Period

**average payment period**  
The average amount of time needed to pay accounts payable.

The **average payment period**, or average age of accounts payable, is calculated in the same manner as the average collection period:

$$\text{Average payment period} = \frac{\text{Accounts payable}}{\text{Average purchases per day}}$$

8. Unless otherwise specified, a 360-day year consisting of twelve 30-day months is assumed throughout this textbook. This assumption simplifies the calculations used to illustrate key concepts.

9. The average collection period is sometimes called the *days' sales outstanding (DSO)*. A discussion of the evaluation and establishment of credit and collection policies is presented in Chapter 14.

10. The formula as presented assumes, for simplicity, that all sales are made on a credit basis. If this is not the case, *average credit sales per day* should be substituted for average sales per day.

$$= \frac{\text{Accounts payable}}{\frac{\text{Annual purchases}}{360}}$$

The difficulty in calculating this ratio stems from the need to find annual purchases,<sup>11</sup> a value not available in published financial statements. Ordinarily, purchases are estimated as a given percentage of cost of goods sold. If we assume that Bartlett Company's purchases equaled 70 percent of its cost of goods sold in 2003, its average payment period is

$$\frac{\$382,000}{\frac{0.70 \times \$2,088,000}{360}} = \frac{\$382,000}{\$4,060} = 94.1 \text{ days}$$

This figure is meaningful only in relation to the average credit terms extended to the firm. If Bartlett Company's suppliers have extended, on average, 30-day credit terms, an analyst would give Bartlett a low credit rating. Prospective lenders and suppliers of trade credit are most interested in the average payment period because it provides insight into the firm's bill-paying patterns.

## Total Asset Turnover

**total asset turnover**  
Indicates the efficiency with which the firm uses its assets to generate sales.

The **total asset turnover** indicates the efficiency with which the firm uses its assets to generate sales. Total asset turnover is calculated as follows:

$$\text{Total asset turnover} = \frac{\text{Sales}}{\text{Total assets}}$$

The value of Bartlett Company's total asset turnover in 2003 is

$$\frac{\$3,074,000}{\$3,597,000} = 0.85$$

**Hint** The higher the cost of the new assets, the larger the denominator and thus the smaller the ratio. Therefore, because of inflation and the use of historical costs, firms with newer assets will tend to have lower turnovers than those with older assets.

This means the company turns over its assets 0.85 times a year.

Generally, the higher a firm's total asset turnover, the more efficiently its assets have been used. This measure is probably of greatest interest to management, because it indicates whether the firm's operations have been financially efficient.

## Review Question

2-9 To assess the firm's average collection period and average payment period ratios, what additional information is needed, and why?

11. Technically, annual *credit* purchases—rather than annual purchases—should be used in calculating this ratio. For simplicity, this refinement is ignored here.



## 2.5 Debt Ratios

The *debt position* of a firm indicates the amount of other people's money being used to generate profits. In general, the financial analyst is most concerned with long-term debts, because these commit the firm to a stream of payments over the long run. Because creditors' claims must be satisfied before the earnings can be distributed to shareholders, present and prospective shareholders pay close attention to the firm's ability to repay debts. Lenders are also concerned about the firm's indebtedness. Management obviously must be concerned with indebtedness.

In general, the more debt a firm uses in relation to its total assets, the greater its *financial leverage*. **Financial leverage** is the magnification of risk and return introduced through the use of fixed-cost financing, such as debt and preferred stock. The more fixed-cost debt a firm uses, the greater will be its expected risk and return.

### financial leverage

The magnification of risk and return introduced through the use of fixed-cost financing, such as debt and preferred stock.

### EXAMPLE ▼

Patty Akers is in the process of incorporating her new business. After much analysis she determined that an initial investment of \$50,000—\$20,000 in current assets and \$30,000 in fixed assets—is necessary. These funds can be obtained in either of two ways. The first is the *no-debt plan*, under which she would invest the full \$50,000 without borrowing. The other alternative, the *debt plan*, involves investing \$25,000 and borrowing the balance of \$25,000 at 12% annual interest.

Regardless of which alternative she chooses, Patty expects sales to average \$30,000, costs and operating expenses to average \$18,000, and earnings to be taxed at a 40% rate. Projected balance sheets and income statements associated with the two plans are summarized in Table 2.6. The no-debt plan results in after-tax profits of \$7,200, which represent a 14.4% rate of return on Patty's \$50,000 investment. The debt plan results in \$5,400 of after-tax profits, which represent a 21.6% rate of return on Patty's investment of \$25,000. The debt plan provides Patty with a higher rate of return, but the risk of this plan is also greater, because the annual \$3,000 of interest must be paid before receipt of earnings.

The example demonstrates that *with increased debt comes greater risk as well as higher potential return*. Therefore, the greater the financial leverage, the greater the potential risk and return. A detailed discussion of the impact of debt on the firm's risk, return, and value is included in Chapter 12. Here, we emphasize the use of financial debt ratios to assess externally a firm's debt position.

There are two general types of debt measures: measures of the degree of indebtedness and measures of the ability to service debts. The **degree of indebtedness** measures the amount of debt relative to other significant balance sheet amounts. A popular measure of the degree of indebtedness is the debt ratio.

The second type of debt measure, the **ability to service debts**, reflects a firm's ability to make the payments required on a scheduled basis over the life of a debt.<sup>12</sup> The firm's ability to pay certain fixed charges is measured using **coverage ratios**. Typically, higher coverage ratios are preferred, but too high a ratio (above

### degree of indebtedness

Measures the amount of debt relative to other significant balance sheet amounts.

### ability to service debts

The ability of a firm to make the payments required on a scheduled basis over the life of a debt.

### coverage ratios

Ratios that measure the firm's ability to pay certain fixed charges.

12. The term *service* refers to the payment of interest and repayment of principal associated with a firm's debt obligations. When a firm services its debts, it pays—or fulfills—these obligations.

**TABLE 2.6** Financial Statements Associated with Patty's Alternatives

	No-debt plan	Debt plan
<b>Balance Sheets</b>		
Current assets	\$20,000	\$20,000
Fixed assets	30,000	30,000
Total assets	<u>\$50,000</u>	<u>\$50,000</u>
Debt (12% interest)	\$ 0	\$25,000
(1) Equity	<u>50,000</u>	<u>25,000</u>
Total liabilities and equity	<u>\$50,000</u>	<u>\$50,000</u>
<b>Income Statements</b>		
Sales	\$30,000	\$30,000
Less: Costs and operating expenses	<u>18,000</u>	<u>18,000</u>
Operating profits	\$12,000	\$12,000
Less: Interest expense	<u>0</u>	$0.12 \times \$25,000 =$ <u>3,000</u>
Net profit before taxes	\$12,000	\$ 9,000
Less: Taxes (rate = 40%)	<u>4,800</u>	<u>3,600</u>
(2) Net profit after taxes	<u>\$ 7,200</u>	<u>\$ 5,400</u>
Return on equity [(2) ÷ (1)]	$\frac{\$7,200}{\$50,000} =$ <u>14.4%</u>	$\frac{\$5,400}{\$25,000} =$ <u>21.6%</u>

industry norms) may result in unnecessarily low risk and return. In general, the lower the firm's coverage ratios, the less certain it is to be able to pay fixed obligations. If a firm is unable to pay these obligations, its creditors may seek immediate repayment, which in most instances would force a firm into bankruptcy. Two popular coverage ratios are the times interest earned ratio and the fixed-payment coverage ratio.<sup>13</sup>

## Debt Ratio

**debt ratio**  
Measures the proportion of total assets financed by the firm's creditors.

The **debt ratio** measures the proportion of total assets financed by the firm's creditors. The higher this ratio, the greater the amount of other people's money being used to generate profits. The ratio is calculated as follows:

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

13. Coverage ratios use data that are derived on an *accrual basis* (discussed in Chapter 1) to measure what in a strict sense should be measured on a *cash basis*. This occurs because debts are serviced by using cash flows, not the accounting values shown on the firm's financial statements. But because it is difficult to determine cash flows available for debt service from the firm's financial statements, the calculation of coverage ratios as presented here is quite common thanks to the ready availability of financial statement data.

The debt ratio for Bartlett Company in 2003 is

$$\frac{\$1,643,000}{\$3,597,000} = 0.457 = 45.7\%$$

This value indicates that the company has financed close to half of its assets with debt. The higher this ratio, the greater the firm's degree of indebtedness and the more financial leverage it has.

## Times Interest Earned Ratio

**times interest earned ratio**  
Measures the firm's ability to make contractual interest payments; sometimes called the *interest coverage ratio*.

The **times interest earned ratio**, sometimes called the *interest coverage ratio*, measures the firm's ability to make contractual interest payments. The higher its value, the better able the firm is to fulfill its interest obligations. The times interest earned ratio is calculated as follows:

$$\text{Times interest earned ratio} = \frac{\text{Earnings before interest and taxes}}{\text{Interest}}$$

The figure for *earnings before interest and taxes* is the same as that for *operating profits* shown in the income statement. Applying this ratio to Bartlett Company yields the following 2003 value:

$$\text{Times interest earned ratio} = \frac{\$418,000}{\$93,000} = 4.5$$

The times interest earned ratio for Bartlett Company seems acceptable. A value of at least 3.0—and preferably closer to 5.0—is often suggested. The firm's earnings before interest and taxes could shrink by as much as 78 percent  $[(4.5 - 1.0) \div 4.5]$ , and the firm would still be able to pay the \$93,000 in interest it owes. Thus it has a good margin of safety.

## Fixed-Payment Coverage Ratio

**fixed-payment coverage ratio**  
Measures the firm's ability to meet all fixed-payment obligations.

The **fixed-payment coverage ratio** measures the firm's ability to meet all fixed-payment obligations, such as loan interest and principal, lease payments, and preferred stock dividends.<sup>14</sup> As is true of the times interest earned ratio, the higher this value, the better. The formula for the fixed-payment coverage ratio is

$$\text{Fixed-payment coverage ratio} = \frac{\text{Earnings before interest and taxes} + \text{Lease payments}}{\text{Interest} + \text{Lease payments} + \{(\text{Principal payments} + \text{Preferred stock dividends}) \times [1/(1 - T)]\}}$$

where  $T$  is the corporate tax rate applicable to the firm's income. The term  $1/(1 - T)$  is included to adjust the after-tax principal and preferred stock dividend payments back to a before-tax equivalent that is consistent with the before-

14. Although preferred stock dividends, which are stated at the time of issue, can be "passed" (not paid) at the option of the firm's directors, it is generally believed that the payment of such dividends is necessary. *This text therefore treats the preferred stock dividend as a contractual obligation, to be paid as a fixed amount, as scheduled.*

tax values of all other terms. Applying the formula to Bartlett Company's 2003 data yields

$$\begin{aligned}\text{Fixed-payment coverage ratio} &= \frac{\$418,000 + \$35,000}{\$93,000 + \$35,000 + \{(\$71,000 + \$10,000) \times [1/(1 - 0.29)]\}} \\ &= \frac{\$453,000}{\$242,000} = 1.9\end{aligned}$$

Because the earnings available are nearly twice as large as its fixed-payment obligations, the firm appears safely able to meet the latter.

Like the times interest earned ratio, the fixed-payment coverage ratio measures risk. The lower the ratio, the greater the risk to both lenders and owners; the greater the ratio, the lower the risk. This ratio allows interested parties to assess the firm's ability to meet additional fixed-payment obligations without being driven into bankruptcy.

## Review Questions

- 2-10 What is *financial leverage*?
- 2-11 What ratio measures the firm's *degree of indebtedness*? What ratios assess the firm's *ability to service debts*?



## 2.6 Profitability Ratios

There are many measures of profitability. As a group, these measures enable the analyst to evaluate the firm's profits with respect to a given level of sales, a certain level of assets, or the owners' investment. Without profits, a firm could not attract outside capital. Owners, creditors, and management pay close attention to boosting profits because of the great importance placed on earnings in the marketplace.

### Common-Size Income Statements

**common-size income statement**  
An income statement in which each item is expressed as a percentage of sales.

A popular tool for evaluating profitability in relation to sales is the **common-size income statement**.<sup>15</sup> Each item on this statement is expressed as a percentage of sales. Common-size income statements are especially useful in comparing performance across years. Three frequently cited ratios of profitability that can be read directly from the common-size income statement are (1) the gross profit margin, (2) the operating profit margin, and (3) the net profit margin.

Common-size income statements for 2003 and 2002 for Bartlett Company are presented and evaluated in Table 2.7. These statements reveal that the firm's

15. This statement is sometimes called a *percent income statement*. The same treatment is often applied to the firm's balance sheet to make it easier to evaluate changes in the asset and financial structures of the firm. In addition to measuring profitability, these statements in effect can be used as an alternative or supplement to liquidity, activity, and debt-ratio analysis.

**TABLE 2.7 Bartlett Company Common-Size Income Statements**

	For the years ended December 31		Evaluation <sup>a</sup>
	2003	2002	
Sales revenue	100.0%	100.0%	same
Less: Cost of goods sold	<u>67.9</u>	<u>66.7</u>	worse
(1) Gross profit margin	<u>32.1%</u>	<u>33.3%</u>	worse
Less: Operating expenses			
Selling expense	3.3%	4.2%	better
General and administrative expenses	6.8	6.7	better
Lease expense	1.1	1.3	better
Depreciation expense	<u>7.3</u>	<u>9.3</u>	better
Total operating expense	<u>18.5%</u>	<u>21.5%</u>	better
(2) Operating profit margin	13.6%	11.8%	better
Less: Interest expense	<u>3.0</u>	<u>3.5</u>	better
Net profits before taxes	10.6%	8.3%	better
Less: Taxes	<u>3.1</u>	<u>2.5</u>	worse <sup>b</sup>
Net profits after taxes	7.5%	5.8%	better
Less: Preferred stock dividends	<u>0.3</u>	<u>0.4</u>	better
(3) Net profit margin	<u>7.2%</u>	<u>5.4%</u>	better

<sup>a</sup>Subjective assessments based on data provided.

<sup>b</sup>Taxes as a percent of sales increased noticeably between 2002 and 2003 because of differing costs and expenses, whereas the average tax rates (taxes ÷ net profits before taxes) for 2002 and 2003 remained about the same—30% and 29%, respectively.

cost of goods sold increased from 66.7 percent of sales in 2002 to 67.9 percent in 2003, resulting in a worsening gross profit margin. However, thanks to a decrease in total operating expenses, the firm's net profit margin rose from 5.4 percent of sales in 2002 to 7.2 percent in 2003. The decrease in expenses more than compensated for the increase in the cost of goods sold. A decrease in the firm's 2003 interest expense (3.0 percent of sales versus 3.5 percent in 2002) added to the increase in 2003 profits.

## Gross Profit Margin

**gross profit margin**  
Measures the percentage of each sales dollar remaining after the firm has paid for its goods.

The **gross profit margin** measures the percentage of each sales dollar remaining after the firm has paid for its goods. The higher the gross profit margin, the better (that is, the lower the relative cost of merchandise sold). The gross profit margin is calculated as follows:

$$\text{Gross profit margin} = \frac{\text{Sales} - \text{Cost of goods sold}}{\text{Sales}} = \frac{\text{Gross profits}}{\text{Sales}}$$

## In Practice

### FOCUS ON e-FINANCE ShopKo's Software Solution

Specialized financial analysis tools can help companies achieve significant improvements in ratio measures of performance. With assistance from sophisticated new software programs, for example, companies can convert masses of historical sales data into useful information that guides pricing strategy and improves operating efficiency.

Like many of its rivals, ShopKo Stores, a Fortune 500 discount chain based in Green Bay, Wisconsin, had no underlying strategy to sell slow-moving items. It used "guesstimates" to reduce prices a bit at a time, until eventually the merchandise sold. However, total sales suffered from the company's having no way to determine the maximum price at which goods would sell. Because the dollar volume of sales enters into both the numerator and the denominator in the gross profit

margin, when sales numbers were down, the ShopKo's gross profit margin also suffered.

Software from Spotlight Solutions, a Cincinnati company, applied information technology to ShopKo's decisions about markdowns. Company research indicated that multiple markdowns are not so profitable as properly timed single markdowns. It developed a program (Markdown Optimizer) to automate optimal price change actions so that retailers can achieve higher sales and margins from existing merchandise inventories. The program analyzes several years of sales figures on similar products and develops a demand pattern, taking into account the sensitivity of customer demand to price changes (price elasticity). The software is dynamic—that is, it "learns" retail customers' preferences and incorporates that information into its models.

During a six-month pilot project, ShopKo provided three years of sales data on 300 apparel, home, and other products. Markdown Optimizer ran through a series of mathematical models to arrive at optimal timing for and amount of price cuts. ShopKo tracked and compared sales for these clearance items using the recommended markdowns. Sales on those products were 14 percent higher than the prior year. The company's gross profit margin rose 24 percent, despite flat same-store sales in one quarter. ShopKo now uses Markdown Optimizer for all products.

*Sources:* Amy Merrick, "Retailers Try to Get Leg Up on Markdowns with New Software," *Wall Street Journal* (August 7, 2001), pp. A1, A6; "ShopKo Uses Spotlight Solutions Price Optimization Software," downloaded from Spotlight Solutions Web site, [www.spotlightsolutions.com/cshopko.html](http://www.spotlightsolutions.com/cshopko.html), November 6, 2001.

**Hint** This is a very significant ratio for small retailers, especially during times of inflationary prices. If the owner of the firm does not raise prices when the cost of sales is rising, the gross profit margin will erode.

Bartlett Company's gross profit margin for 2003 is

$$\frac{\$3,074,000 - \$2,088,000}{\$3,074,000} = \frac{\$986,000}{\$3,074,000} = 32.1\%$$

This value is labeled (1) on the common-size income statement in Table 2.7.

## Operating Profit Margin

**operating profit margin**  
Measures the percentage of each sales dollar remaining after all costs and expenses *other than* interest, taxes, and preferred stock dividends are deducted; the "pure profits" earned on each sales dollar.

The **operating profit margin** measures the percentage of each sales dollar remaining after all costs and expenses *other than* interest, taxes, and preferred stock dividends are deducted. It represents the "pure profits" earned on each sales dollar. Operating profits are "pure" because they measure only the profits earned on operations and ignore interest, taxes, and preferred stock dividends. A high operating profit margin is preferred. The operating profit margin is calculated as follows:

$$\text{Operating profit margin} = \frac{\text{Operating profits}}{\text{Sales}}$$



Bartlett Company's operating profit margin for 2003 is

$$\frac{\$418,000}{\$3,074,000} = 13.6\%$$

This value is labeled (2) on the common-size income statement in Table 2.7.

## Net Profit Margin

### net profit margin

Measures the percentage of each sales dollar remaining after all costs and expenses, including interest, taxes, and preferred stock dividends, have been deducted.

The **net profit margin** measures the percentage of each sales dollar remaining after all costs and expenses, *including* interest, taxes, and preferred stock dividends, have been deducted. The higher the firm's net profit margin, the better. The net profit margin is calculated as follows:

$$\text{Net profit margin} = \frac{\text{Earnings available for common stockholders}}{\text{Sales}}$$

Bartlett Company's net profit margin for 2003 is

$$\frac{\$221,000}{\$3,074,000} = 7.2\%$$

This value is labeled (3) on the common-size income statement in Table 2.7.

The net profit margin is a commonly cited measure of the firm's success with respect to earnings on sales. "Good" net profit margins differ considerably across industries. A net profit margin of 1 percent or less would not be unusual for a grocery store, whereas a net profit margin of 10 percent would be low for a retail jewelry store.

## Earnings per Share (EPS)

**Hint** EPS represents the dollar amount earned *on behalf* of each share—not the amount of earnings *actually distributed* to shareholders.

The firm's *earnings per share (EPS)* is generally of interest to present or prospective stockholders and management. As we noted earlier, EPS represents the number of dollars earned during the period on behalf of each outstanding share of common stock. Earnings per share is calculated as follows:

$$\text{Earnings per share} = \frac{\text{Earnings available for common stockholders}}{\text{Number of shares of common stock outstanding}}$$

Bartlett Company's earnings per share in 2003 is

$$\frac{\$221,000}{76,262} = \$2.90$$

This figure represents the dollar amount earned on behalf of each share. The dollar amount of cash *actually distributed* to each shareholder is the *dividend per share (DPS)*, which, as noted in Bartlett Company's income statement (Table 2.1), rose to \$1.29 in 2003 from \$0.75 in 2002. EPS is closely watched by the investing public and is considered an important indicator of corporate success.

**return on total assets (ROA)**  
Measures the overall effectiveness of management in generating profits with its available assets; also called the *return on investment (ROI)*.

## Return on Total Assets (ROA)

The **return on total assets (ROA)**, often called the *return on investment (ROI)*, measures the overall effectiveness of management in generating profits with its available assets. The higher the firm's return on total assets, the better. The return on total assets is calculated as follows:

$$\text{Return on total assets} = \frac{\text{Earnings available for common stockholders}}{\text{Total assets}}$$

Bartlett Company's return on total assets in 2003 is

$$\frac{\$221,000}{\$3,597,000} = 6.1\%$$

This value indicates that the firm earned 6.1 cents on each dollar of asset investment.

**return on common equity (ROE)**  
Measures the return earned on the common stockholders' investment in the firm.

## Return on Common Equity (ROE)

The **return on common equity (ROE)** measures the return earned on the common stockholders' investment in the firm. Generally, the higher this return, the better off are the owners. Return on common equity is calculated as follows:

$$\text{Return on common equity} = \frac{\text{Earnings available for common stockholders}}{\text{Common stock equity}}$$

This ratio for Bartlett Company in 2003 is

$$\frac{\$221,000}{\$1,754,000} = 12.6\%$$

Note that the value for common stock equity (\$1,754,000) was found by subtracting the \$200,000 of preferred stock equity from the total stockholders' equity of \$1,954,000 (see Bartlett Company's 2003 balance sheet in Table 2.2). The calculated ROE of 12.6 percent indicates that during 2003 Bartlett earned 12.6 cents on each dollar of common stock equity.

## Review Questions

- 2-12 What three ratios of profitability are found on a *common-size income statement*?
- 2-13 What would explain a firm's having a high gross profit margin and a low net profit margin?
- 2-14 Which measure of profitability is probably of greatest interest to the investing public? Why?



## 2.7 Market Ratios

### market ratios

Relate a firm's market value, as measured by its current share price, to certain accounting values.

Market ratios relate the firm's market value, as measured by its current share price, to certain accounting values. These ratios give insight into how well investors in the marketplace feel the firm is doing in terms of risk and return. They tend to reflect, on a relative basis, the common stockholders' assessment of all aspects of the firm's past and expected future performance. Here we consider two popular market ratios, one that focuses on earnings and another that considers book value.

### price/earnings (P/E) ratio

Measures the amount that investors are willing to pay for each dollar of a firm's earnings; the higher the P/E ratio, the greater is investor confidence.

### Price/Earnings (P/E) Ratio

The **price/earnings (P/E) ratio** is commonly used to assess the owners' appraisal of share value.<sup>16</sup> The P/E ratio measures the amount that investors are willing to pay for each dollar of a firm's earnings. The level of the price/earnings ratio indicates the degree of confidence that investors have in the firm's future performance. The higher the P/E ratio, the greater is investor confidence. The P/E ratio is calculated as follows:

$$\text{Price/earnings (P/E) ratio} = \frac{\text{Market price per share of common stock}}{\text{Earnings per share}}$$

If Bartlett Company's common stock at the end of 2003 was selling at \$32.25, using the EPS of \$2.90, the P/E ratio at year-end 2003 is

$$\frac{\$32.25}{\$2.90} = 11.1$$

This figure indicates that investors were paying \$11.10 for each \$1.00 of earnings. The P/E ratio is most informative when applied in cross-sectional analysis using an industry average P/E ratio or the P/E ratio of a benchmark firm.

### market/book (M/B) ratio

Provides an assessment of how investors view the firm's performance. Firms expected to earn high returns relative to their risk typically sell at higher M/B multiples.

### Market/Book (M/B) Ratio

The **market/book (M/B) ratio** provides an assessment of how investors view the firm's performance. It relates the market value of the firm's shares to their book—strict accounting—value. To calculate the firm's M/B ratio, we first need to find the *book value per share of common stock*:

$$\text{Book value per share of common stock} = \frac{\text{Common stock equity}}{\text{Number of shares of common stock outstanding}}$$

Substituting the appropriate values for Bartlett Company from its 2003 balance sheet, we get

$$\text{Book value per share of common stock} = \frac{\$1,754,000}{76,262} = \$23.00$$

16. Use of the price/earnings ratio to estimate the value of the firm is part of the discussion of "Other approaches to common stock valuation" in Chapter 7.

The formula for the market/book ratio is

$$\text{Market/book (M/B) ratio} = \frac{\text{Market price per share of common stock}}{\text{Book value per share of common stock}}$$

Substituting Bartlett Company's end of 2003 common stock price of \$32.25 and its \$23.00 book value per share of common stock (calculated above) into the M/B ratio formula, we get

$$\text{Market/book (M/B) ratio} = \frac{\$32.25}{\$23.00} = 1.40$$

This M/B ratio means that investors are currently paying \$1.40 for each \$1.00 of book value of Bartlett Company's stock.

The stocks of firms that are expected to perform well—improve profits, increase their market share, or launch successful products—typically sell at higher M/B ratios than the stocks of firms with less attractive outlooks. Simply stated, firms expected to earn high returns relative to their risk typically sell at higher M/B multiples. Clearly, Bartlett's future prospects are being viewed favorably by investors, who are willing to pay more than its book value for the firm's shares. Like P/E ratios, M/B ratios are typically assessed cross-sectionally, to get a feel for the firm's risk and return compared to peer firms.

### Review Question

2–15 How do the *price/earnings (P/E) ratio* and the *market/book (M/B) ratio* provide a feel for the firm's risk and return?



## 2.8 A Complete Ratio Analysis

Analysts frequently wish to take an overall look at the firm's financial performance and status. Here we consider two popular approaches to a complete ratio analysis: (1) summarizing all ratios and (2) the DuPont system of analysis. The summary analysis approach tends to view *all aspects* of the firm's financial activities to isolate key areas of responsibility. The DuPont system acts as a search technique aimed at finding the *key areas* responsible for the firm's financial condition.

### Summarizing All Ratios

We can use Bartlett Company's ratios to perform a complete ratio analysis using both cross-sectional and time-series analysis approaches. The 2003 ratio values calculated earlier and the ratio values calculated for 2001 and 2002 for Bartlett Company, along with the industry average ratios for 2003, are summarized in Table 2.8, which also shows the formula used to calculate each ratio. Using these data, we can discuss the five key aspects of Bartlett's performance—liquidity, activity, debt, profitability, and market.

**TABLE 2.8 Summary of Bartlett Company Ratios (2001–2003, Including 2003 Industry Averages)**

Ratio	Formula	Year		Industry average 2003 <sup>c</sup>	Cross-sectional 2003	Time-series 2001–2003	Overall
		2001 <sup>a</sup>	2002 <sup>b</sup>				
<b>Liquidity</b>							
Current ratio	$\frac{\text{Current assets}}{\text{Current liabilities}}$	2.04	2.08	2.05	OK	OK	OK
Quick (acid-test) ratio	$\frac{\text{Current assets} - \text{Inventory}}{\text{Current liabilities}}$	1.32	1.46	1.51	1.43	OK	good
		good					
<b>Activity</b>							
Inventory turnover	$\frac{\text{Cost of goods sold}}{\text{Inventory}}$	5.1	5.7	6.6	good	good	good
poor	Average collection period	$\frac{\text{Accounts receivable}}{\text{Average sales per day}}$	43.9 days	51.2 days	58.9 days	44.3 days	poor
Average payment period	$\frac{\text{Accounts payable}}{\text{Average purchases per day}}$	75.8 days	81.2 days	66.5 days	poor	poor	poor
	Total asset turnover	$\frac{\text{Sales}}{\text{Total assets}}$	0.94	0.79	0.85	0.75	OK
		OK					
<b>Debt</b>							
Debt ratio	$\frac{\text{Total liabilities}}{\text{Total assets}}$	36.8%	44.3%	40.0%	OK	OK	OK
Times interest earned ratio	$\frac{\text{Earnings before interest and taxes}}{\text{Interest}}$	5.6	3.3	4.3	good	OK	OK
1.9	Fixed-payment coverage ratio	$\frac{\text{Earnings before interest and taxes} + \text{Lease payments}}{\text{Int.} + \text{Lease pay.} + \{(\text{Prim.} + \text{Pref. div.}) \times [1/(1 - T)]\}}$		2.4		2.4	1.4
OK	good	good					

Ratio	Formula	Year		Industry average 2003 <sup>c</sup>	Cross-sectional 2003	Time-series 2001–2003	Overall
		2001 <sup>a</sup>	2002 <sup>b</sup>				
<b>Profitability</b>							
Gross profit margin	$\frac{\text{Gross profits}}{\text{Sales}}$	31.4%	33.3%	30.0%	OK	OK	OK
Operating profit margin	$\frac{\text{Operating profits}}{\text{Sales}}$	14.6%	11.8%	13.6%	11.0%	good	OK
Net profit margin	$\frac{\text{Earnings available for common stockholders}}{\text{Sales}}$	8.2%	5.4%	6.2%	good	OK	good
\$2.90 OK	$\frac{\text{Earnings per share (EPS)}}{\text{Number of shares of common stock outstanding}}$	\$3.26					\$1.81
Return on total assets (ROA)	$\frac{\text{Earnings available for common stockholders}}{\text{Total assets}}$	7.8%	4.2%	4.6%	good	OK	good
Return on common equity (ROCE) good	$\frac{\text{Earnings available for common stockholders}}{\text{Common stock equity}}$	13.7%	8.5%	8.5%	12.6%	8.5%	8.5%
<b>Market</b>							
Price/earnings (P/E) ratio	$\frac{\text{Market price per share of common stock}}{\text{Earnings per share}}$	10.5	10.0 <sup>e</sup>	12.5	OK	OK	OK
1.40 OK	$\frac{\text{Market/book (M/B) ratio}}{\text{Book value per share of common stock}}$	1.25					0.85 <sup>e</sup>

<sup>a</sup>Calculated from data not included in the chapter.

<sup>b</sup>Calculated by using the financial statements presented in Tables 2.1 and 2.2.

### Liquidity

The overall liquidity of the firm seems to exhibit a reasonably stable trend, having been maintained at a level that is relatively consistent with the industry average in 2003. The firm's liquidity seems to be good.

### Activity

Bartlett Company's inventory appears to be in good shape. Its inventory management seems to have improved, and in 2003 it performed at a level above that of the industry. The firm may be experiencing some problems with accounts receivable. The average collection period seems to have crept up above that of the industry. Bartlett also appears to be slow in paying its bills; it pays nearly 30 days slower than the industry average. This could adversely affect the firm's credit standing. Although overall liquidity appears to be good, the management of receivables and payables should be examined. Bartlett's total asset turnover reflects a decline in the efficiency of total asset utilization between 2001 and 2002. Although in 2003 it rose to a level considerably above the industry average, it appears that the pre-2002 level of efficiency has not yet been achieved.

### Debt

Bartlett Company's indebtedness increased over the 2001–2003 period and is currently above the industry average. Although this increase in the debt ratio could be cause for alarm, the firm's ability to meet interest and fixed-payment obligations improved, from 2002 to 2003, to a level that outperforms the industry. The firm's increased indebtedness in 2002 apparently caused a deterioration in its ability to pay debt adequately. However, Bartlett has evidently improved its income in 2003 so that it is able to meet its interest and fixed-payment obligations at a level consistent with the average in the industry. In summary, it appears that although 2002 was an off year, the company's ability to pay debts in 2003 compensates for its increased degree of indebtedness.

### Profitability

Bartlett's profitability relative to sales in 2003 was better than the average company in the industry, although it did not match the firm's 2001 performance. Although the *gross* profit margin was better in 2002 and 2003 than in 2001, higher levels of operating and interest expenses in 2002 and 2003 appear to have caused the 2003 *net* profit margin to fall below that of 2001. However, Bartlett Company's 2003 net profit margin is quite favorable when compared to the industry average.

The firm's earnings per share, return on total assets, and return on common equity behaved much as its net profit margin did over the 2001–2003 period. Bartlett appears to have experienced either a sizable drop in sales between 2001 and 2002 or a rapid expansion in assets during that period. The exceptionally high 2003 level of return on common equity suggests that the firm is performing quite well. The firm's above-average returns—net profit margin, EPS, ROA, and ROE—may be attributable to the fact that it is more risky than average. A look at market ratios is helpful in assessing risk.

## Market

Investors have greater confidence in the firm in 2003 than in the prior two years, as reflected in the price/earnings (P/E) ratio of 11.1. However, this ratio is below the industry average. The P/E ratio suggests that the firm's risk has declined but remains above that of the average firm in its industry. The firm's market/book (M/B) ratio has increased over the 2001–2003 period, and in 2003 it exceeds the industry average. This implies that investors are optimistic about the firm's future performance. The P/E and M/B ratios reflect the firm's increased profitability over the 2001–2003 period: Investors expect to earn high future returns as compensation for the firm's above-average risk.

In summary, the firm appears to be growing and has recently undergone an expansion in assets, financed primarily through the use of debt. The 2002–2003 period seems to reflect a phase of adjustment and recovery from the rapid growth in assets. Bartlett's sales, profits, and other performance factors seem to be growing with the increase in the size of the operation. In addition, the market response to these accomplishments appears to have been positive. In short, the firm seems to have done well in 2003.

## DuPont System of Analysis

**DuPont system of analysis**  
System used to dissect the firm's financial statements and to assess its financial condition.

The **DuPont system of analysis** is used to dissect the firm's financial statements and to assess its financial condition. It merges the income statement and balance sheet into two summary measures of profitability: return on total assets (ROA) and return on common equity (ROE). Figure 2.2 depicts the basic DuPont system with Bartlett Company's 2003 monetary and ratio values. The upper portion of the chart summarizes the income statement activities; the lower portion summarizes the balance sheet activities.

The DuPont system first brings together the *net profit margin*, which measures the firm's profitability on sales, with its *total asset turnover*, which indicates how efficiently the firm has used its assets to generate sales. In the **DuPont formula**, the product of these two ratios results in the *return on total assets (ROA)*:

$$\text{ROA} = \text{Net profit margin} \times \text{Total asset turnover}$$

Substituting the appropriate formulas into the equation and simplifying results in the formula given earlier,

$$\text{ROA} = \frac{\text{Earnings available for common stockholders}}{\text{Sales}} \times \frac{\text{Sales}}{\text{Total assets}} = \frac{\text{Earnings available for common stockholders}}{\text{Total assets}}$$

When the 2003 values of the net profit margin and total asset turnover for Bartlett Company, calculated earlier, are substituted into the DuPont formula, the result is

$$\text{ROA} = 7.2\% \times 0.85 = 6.1\%$$

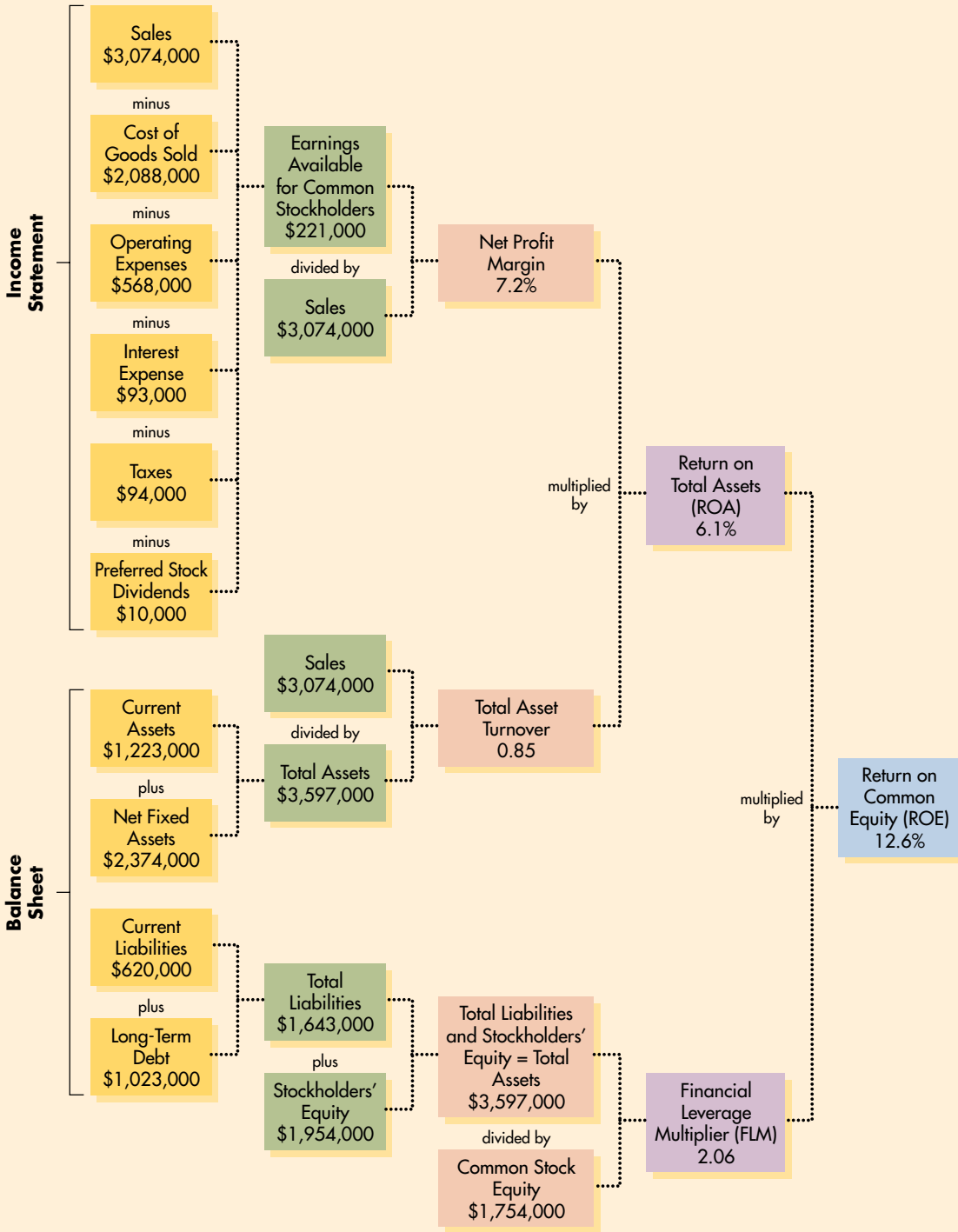
This value is the same as that calculated directly in an earlier section (page 65). The DuPont formula enables the firm to break down its return into profit-on-sales and efficiency-of-asset-use components. Typically, a firm with a low net profit margin has a high total asset turnover, which results in a reasonably good return on total assets. Often, the opposite situation exists.

**DuPont formula**  
Multiplies the firm's *net profit margin* by its *total asset turnover* to calculate the firm's *return on total assets (ROA)*.



**FIGURE 2.2 DuPont System of Analysis**

The DuPont system of analysis with application to Bartlett Company (2003)



**modified DuPont formula**

Relates the firm's return on total assets (ROA) to its return on common equity (ROE) using the financial leverage multiplier (FLM).

**financial leverage multiplier (FLM)**

The ratio of the firm's total assets to its common stock equity.

The second step in the DuPont system employs the **modified DuPont formula**. This formula relates the firm's return on total assets (ROA) to its return on common equity (ROE). The latter is calculated by multiplying the return on total assets (ROA) by the **financial leverage multiplier (FLM)**, which is the ratio of total assets to common stock equity:

$$\text{ROE} = \text{ROA} \times \text{FLM}$$

Substituting the appropriate formulas into the equation and simplifying results in the formula given earlier,

$$\text{ROE} = \frac{\text{Earnings available for common stockholders}}{\text{Total assets}} \times \frac{\text{Total assets}}{\text{Common stock equity}} = \frac{\text{Earnings available for common stockholders}}{\text{Common stock equity}}$$

Use of the financial leverage multiplier (FLM) to convert the ROA into the ROE reflects the impact of financial leverage on owners' return. Substituting the values for Bartlett Company's ROA of 6.1 percent, calculated earlier, and Bartlett's FLM of 2.06 (\$3,597,000 total assets ÷ \$1,754,000 common stock equity) into the modified DuPont formula yields

$$\text{ROE} = 6.1\% \times 2.06 = 12.6\%$$

The 12.6 percent ROE calculated by using the modified DuPont formula is the same as that calculated directly (page 65).

The advantage of the DuPont system is that it allows the firm to break its return on equity into a profit-on-sales component (net profit margin), an efficiency-of-asset-use component (total asset turnover), and a use-of-financial-leverage component (financial leverage multiplier). The total return to owners therefore can be analyzed in these important dimensions.

The use of the DuPont system of analysis as a diagnostic tool is best explained using Figure 2.2. Beginning with the rightmost value—the ROE—the financial analyst moves to the left, dissecting and analyzing the inputs to the formula in order to isolate the probable cause of the resulting above-average (or below-average) value. For the sake of discussion, let's assume that Bartlett's ROE of 12.6 percent is actually below the industry average. Moving to the left, we would examine the inputs to the ROE—the ROA and the FLM—relative to the industry averages. Let's assume that the FLM is in line with the industry average, but the ROA is below the industry average. Moving farther to the left, we examine the two inputs to the ROA—the net profit margin and total asset turnover. Assume that the net profit margin is in line with the industry average, but the total asset turnover is below the industry average. Moving still farther to the left, we find that whereas the firm's sales are consistent with the industry value, Bartlett's total assets have grown significantly during the past year. Looking farther to the left, we would review the firm's activity ratios for current assets. Let's say that whereas the firm's inventory turnover is in line with the industry average, its average collection period is well above the industry average.

Clearly, we can trace the possible problem back to its cause: Bartlett's low ROE is primarily the consequence of slow collections of accounts receivable, which resulted in high levels of receivables and therefore high levels of total assets. The high total assets slowed Bartlett's total asset turnover, driving down its ROA, which then drove down its ROE. By using the DuPont system of analysis

to dissect Bartlett's overall returns as measured by its ROE, we found that slow collections of receivables caused the below-industry-average ROE. Clearly, the firm needs to manage its credit operations better.

## Review Questions

- 2-16 Financial ratio analysis is often divided into five areas: *liquidity*, *activity*, *debt*, *profitability*, and *market* ratios. Differentiate each of these areas of analysis from the others. Which is of the greatest concern to creditors?
- 2-17 Describe how you would use a large number of ratios to perform a complete ratio analysis of the firm.
- 2-18 What three areas of analysis are combined in the *modified DuPont formula*? Explain how the *DuPont system of analysis* is used to dissect the firm's results and isolate their causes.

# SUMMARY

## FOCUS ON VALUE

Financial managers review and analyze the firm's financial statements periodically, both to uncover developing problems and to assess the firm's progress toward achieving its goals. These actions are aimed at **preserving and creating value for the firm's owners**. Financial ratios enable financial managers to monitor the pulse of the firm and its progress toward its strategic goals. Although financial statements and financial ratios rely on accrual concepts, they can provide useful insights into important aspects of risk and return (cash flow) that affect share price, which management is attempting to maximize.

## REVIEW OF LEARNING GOALS

**LG1** Review the contents of the stockholders' report and the procedures for consolidating international financial statements. The annual stockholders' report, which publicly owned corporations are required to provide to stockholders, documents the firm's financial activities during the past year. It includes the letter to stockholders and various subjective and factual information, as well as four key financial statements: the income statement, the balance sheet, the statement of retained earnings, and the statement of cash flows. Notes describing the technical aspects of the financial statements follow them. Financial statements of companies that have operations whose cash flows are denominated in one or more foreign currencies must be trans-

lated into dollars in accordance with *FASB Standard No. 52*.

**LG2** Understand who uses financial ratios, and how. Ratio analysis enables present and prospective stockholders and lenders and the firm's management to evaluate the firm's financial performance. It can be performed on a cross-sectional or a time-series basis. Benchmarking is a popular type of cross-sectional analysis. Key cautions for applying financial ratios are: (1) Ratios with large deviations from the norm only indicate symptoms of a problem. (2) A single ratio does not generally provide sufficient information. (3) The ratios being compared should be calculated using financial state-

ments dated at the same point in time during the year. (4) Audited financial statements should be used. (5) Data should be checked for consistency of accounting treatment. (6) Inflation and different asset ages can distort ratio comparisons.

**LG3** Use ratios to analyze a firm's liquidity and activity. Liquidity, or ability of the firm to pay its bills as they come due, can be measured by the current ratio and the quick (acid-test) ratio. Activity ratios measure the speed with which accounts are converted into sales or cash—inflows or outflows. The activity of inventory can be measured by its turnover, that of accounts receivable by the average collection period, and that of accounts payable by the average payment period. Total asset turnover measures the efficiency with which the firm uses its assets to generate sales. Formulas for these liquidity and activity ratios are summarized in Table 2.8.

**LG4** Discuss the relationship between debt and financial leverage and the ratios used to analyze a firm's debt. The more debt a firm uses, the greater its financial leverage, which magnifies both risk and return. Financial debt ratios measure both the degree of indebtedness and the ability to service debts. A common measure of indebtedness is the debt ratio. The ability to pay fixed charges can be measured by times interest earned and fixed-payment

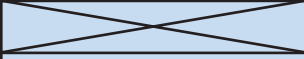

coverage ratios. Formulas for these debt ratios are summarized in Table 2.8.

**LG5** Use ratios to analyze a firm's profitability and its market value. The common-size income statement, which shows all items as a percentage of sales, can be used to determine gross profit margin, operating profit margin, and net profit margin. Other measures of profitability include earnings per share, return on total assets, and return on common equity. Market ratios include the price/earnings ratio and the market/book ratio. Formulas for these profitability and market ratios are summarized in Table 2.8.

**LG6** Use a summary of financial ratios and the DuPont system of analysis to perform a complete ratio analysis. A summary of all ratios—liquidity, activity, debt, profitability, and market—as shown in Table 2.8 can be used to perform a complete ratio analysis using cross-sectional and time-series analysis approaches. The DuPont system of analysis, summarized in Figure 2.2, is a diagnostic tool used to find the key areas responsible for the firm's financial performance. It enables the firm to break the return on common equity into three components: profit on sales, efficiency of asset use, and use of leverage. The DuPont system of analysis makes it possible to assess all aspects of the firm's activities in order to isolate key areas of responsibility.

## SELF-TEST PROBLEMS (Solutions in Appendix B)

**LG3** **LG4** **LG5** **ST 2-1 Ratio formulas and interpretations** Without referring to the text, indicate for each of the following ratios the formula for calculating it and the kinds of problems, if any, the firm is likely to have if that ratio is too high relative to the industry average. What if the ratio is too low relative to the industry? Create a table similar to the one that follows and fill in the empty blocks.

Ratio	Too high	Too low
Current ratio =		
Inventory turnover =		
Times interest earned =		
Gross profit margin =		
Return on total assets =		



**ST 2–2 Balance sheet completion using ratios** Complete the 2003 balance sheet for O’Keefe Industries using the information that follows it.

O’Keefe Industries Balance Sheet December 31, 2003			
Assets		Liabilities and Stockholders’ Equity	
Cash	\$30,000	Accounts payable	\$120,000
Marketable securities	25,000	Notes payable	<u>          </u>
Accounts receivable	<u>          </u>	Accruals	<u>20,000</u>
Inventories	<u>          </u>	Total current liabilities	<u>          </u>
Total current assets	<u>          </u>	Long-term debt	<u>          </u>
Net fixed assets	<u>          </u>	Stockholders’ equity	<u>\$600,000</u>
Total assets	<u>\$          </u>	Total liabilities and stockholders’ equity	<u>\$          </u>

The following financial data for 2003 are also available:

- |  |  |
|--|--|
| (1) Sales totaled \$1,800,000.                 | (6) The current ratio was 1.60.              |
| (2) The gross profit margin was 25%.           | (7) The total asset turnover ratio was 1.20. |
| (3) Inventory turnover was 6.0.                | (8) The debt ratio was 60%.                  |
| (4) There are 360 days in the year.            |  |
| (5) The average collection period was 40 days. |  |

## PROBLEMS



**2–1 Reviewing basic financial statements** The income statement for the year ended December 31, 2003, the balance sheets for December 31, 2003 and 2002, and the statement of retained earnings for the year ended December 31, 2003, for Technica, Inc., are given here. Briefly discuss the form and informational content of each of these statements.

Technica, Inc. Income Statement for the Year Ended December 31, 2003	
Sales revenue	\$600,000
Less: Cost of goods sold	<u>460,000</u>
Gross profits	\$140,000
Less: Operating expenses	
General and administrative expense	\$30,000
Depreciation expense	<u>30,000</u>
Total operating expense	<u>60,000</u>
Operating profits	\$ 80,000
Less: Interest expense	<u>10,000</u>
Net profits before taxes	\$ 70,000
Less: Taxes	<u>27,100</u>
Earnings available for common stockholders	<u>\$ 42,900</u>
Earnings per share (EPS)	\$2.15

<b>Technica, Inc. Balance Sheets</b>			
Assets	December 31		
	2003	2002	
Cash	\$ 15,000	\$ 16,000	
Marketable securities	7,200	8,000	
Accounts receivable	34,100	42,200	
Inventories	<u>82,000</u>	<u>50,000</u>	
Total current assets	<u>\$138,300</u>	<u>\$116,200</u>	
Land and buildings	\$150,000	\$150,000	
Machinery and equipment	200,000	190,000	
Furniture and fixtures	54,000	50,000	
Other	<u>11,000</u>	<u>10,000</u>	
Total gross fixed assets	\$415,000	\$400,000	
Less: Accumulated depreciation	<u>145,000</u>	<u>115,000</u>	
Net fixed assets	<u>\$270,000</u>	<u>\$285,000</u>	
Total assets	<u>\$408,300</u>	<u>\$401,200</u>	
<b>Liabilities and Stockholders' Equity</b>			
Accounts payable	\$ 57,000	\$ 49,000	
Notes payable	13,000	16,000	
Accruals	<u>5,000</u>	<u>6,000</u>	
Total current liabilities	<u>\$ 75,000</u>	<u>\$ 71,000</u>	
Long-term debt	<u>\$150,000</u>	<u>\$160,000</u>	
Stockholders' equity			
Common stock equity (shares outstanding: 19,500 in 2003 and 20,000 in 2002)	\$110,200	\$120,000	
Retained earnings	<u>73,100</u>	<u>50,200</u>	
Total stockholders' equity	<u>\$183,300</u>	<u>\$170,200</u>	
Total liabilities and stockholders' equity	<u>\$408,300</u>	<u>\$401,200</u>	

<b>Technica, Inc. Statement of Retained Earnings for the Year Ended December 31, 2003</b>	
Retained earnings balance (January 1, 2003)	\$50,200
Plus: Net profits after taxes (for 2003)	42,900
Less: Cash dividends (paid during 2003)	( 20,000)
Retained earnings balance (December 31, 2003)	<u>\$73,100</u>



- 2-2 Financial statement account identification** Mark each of the accounts listed in the following table as follows:
- a. In column (1), indicate in which statement—income statement (IS) or balance sheet (BS)—the account belongs.

- b. In column (2), indicate whether the account is a current asset (CA), current liability (CL), expense (E), fixed asset (FA), long-term debt (LTD), revenue (R), or stockholders' equity (SE).

Account name	(1) Statement	(2) Type of account
Accounts payable	_____	_____
Accounts receivable	_____	_____
Accruals	_____	_____
Accumulated depreciation	_____	_____
Administrative expense	_____	_____
Buildings	_____	_____
Cash	_____	_____
Common stock (at par)	_____	_____
Cost of goods sold	_____	_____
Depreciation	_____	_____
Equipment	_____	_____
General expense	_____	_____
Interest expense	_____	_____
Inventories	_____	_____
Land	_____	_____
Long-term debts	_____	_____
Machinery	_____	_____
Marketable securities	_____	_____
Notes payable	_____	_____
Operating expense	_____	_____
Paid-in capital in excess of par	_____	_____
Preferred stock	_____	_____
Preferred stock dividends	_____	_____
Retained earnings	_____	_____
Sales revenue	_____	_____
Selling expense	_____	_____
Taxes	_____	_____
Vehicles	_____	_____



**2-3 Income statement preparation** On December 31, 2003, Cathy Chen, a self-employed certified public accountant (CPA), completed her first full year in business. During the year, she billed \$180,000 for her accounting services. She had two employees: a bookkeeper and a clerical assistant. In addition to her *monthly* salary of \$4,000, Ms. Chen paid *annual* salaries of \$24,000 and \$18,000 to the bookkeeper and the clerical assistant, respectively. Employment taxes and benefit costs for Ms. Chen and her employees totaled \$17,300 for the year. Expenses for office supplies, including postage, totaled \$5,200 for the year. In addition, Ms. Chen spent \$8,500 during the year on tax-deductible travel and entertainment associated with client visits and new business development. Lease payments for

the office space rented (a tax-deductible expense) were \$1,350 *per month*. Depreciation expense on the office furniture and fixtures was \$7,800 for the year. During the year, Ms. Chen paid interest of \$7,500 on the \$60,000 borrowed to start the business. She paid an average tax rate of 30 percent during 2003.

- Prepare an income statement for Cathy Chen, CPA, for the year ended December 31, 2003.
- Evaluate her 2003 financial performance.



LG1

**2-4 Calculation of EPS and retained earnings** Philagem, Inc., ended 2003 with net profit *before* taxes of \$218,000. The company is subject to a 40% tax rate and must pay \$32,000 in preferred stock dividends before distributing any earnings on the 85,000 shares of common stock currently outstanding.

- Calculate Philagem's 2003 earnings per share (EPS).
- If the firm paid common stock dividends of \$0.80 per share, how many dollars would go to retained earnings?



LG1

**2-5 Balance sheet preparation** Use the *appropriate items* from the following list to prepare in good form Owen Davis Company's balance sheet at December 31, 2003.

Item	Value (\$000) at December 31, 2003
Accounts payable	\$ 220
Accounts receivable	450
Accruals	55
Accumulated depreciation	265
Buildings	225
Cash	215
Common stock (at par)	90
Cost of goods sold	2,500
Depreciation expense	45
Equipment	140
Furniture and fixtures	170
General expense	320
Inventories	375
Land	100
Long-term debts	420
Machinery	420
Marketable securities	75
Notes payable	475
Paid-in capital in excess of par	360
Preferred stock	100
Retained earnings	210
Sales revenue	3,600
Vehicles	25





- 2-6 **Impact of net income on a firm's balance sheet** Conrad Air, Inc., reported net income of \$1,365,000 for the year ended December 31, 2003. Show the effect of these funds on the firm's balance sheet for the previous year (below) in each of the scenarios following the balance sheet.

Conrad Air, Inc. Balance Sheet as of December 31, 2003			
Assets		Liabilities and Stockholders' Equity	
Cash	\$ 120,000	Accounts payable	\$ 70,000
Marketable securities	35,000	Short-term notes	<u>55,000</u>
Accounts receivable	45,000	Current liabilities	\$ 125,000
Inventories	<u>130,000</u>	Long-term debt	<u>\$2,700,000</u>
Current assets	<u>\$ 330,000</u>	Total liabilities	<u>\$2,825,000</u>
Equipment	\$2,970,000	Common stock	\$ 500,000
Buildings	<u>1,600,000</u>	Retained earnings	<u>1,575,000</u>
Fixed assets	<u>\$4,570,000</u>	Stockholders' equity	<u>\$2,075,000</u>
Total assets	<u>\$4,900,000</u>	Total liabilities and equity	<u>\$4,900,000</u>

- Conrad paid no dividends during the year and invested the funds in marketable securities.
- Conrad paid dividends totaling \$500,000 and used the balance of the net income to retire (pay off) long-term debt.
- Conrad paid dividends totaling \$500,000 and invested the balance of the net income in building a new hangar.
- Conrad paid out all \$1,365,000 as dividends to its stockholders.



- 2-7 **Initial sale price of common stock** Beck Corporation has one issue of preferred stock and one issue of common stock outstanding. Given Beck's stockholders' equity account that follows, determine the original price per share at which the firm sold its single issue of common stock.

Stockholders' Equity (\$000)	
Preferred stock	\$ 125
Common stock (\$0.75 par, 300,000 shares outstanding)	225
Paid-in capital in excess of par on common stock	2,625
Retained earnings	<u>900</u>
Total stockholders' equity	<u>\$3,875</u>



- 2-8 **Statement of retained earnings** Hayes Enterprises began 2003 with a retained earnings balance of \$928,000. During 2003, the firm earned \$377,000 after taxes. From this amount, preferred stockholders were paid \$47,000 in dividends. At year-end 2003, the firm's retained earnings totaled \$1,048,000. The firm had 140,000 shares of common stock outstanding during 2003.

- Prepare a statement of retained earnings for the year ended December 31, 2003, for Hayes Enterprises. (*Note:* Be sure to calculate and include the amount of cash dividends paid in 2003.)
- Calculate the firm's 2003 earnings per share (EPS).
- How large a per-share cash dividend did the firm pay on common stock during 2003?



- 2-9 **Changes in stockholders' equity** Listed are the equity sections of balance sheets for years 2002 and 2003 as reported by Mountain Air Ski Resorts, Inc. The overall value of stockholders' equity has risen from \$2,000,000 to \$7,500,000. Use the statements to discover how and why this happened.

Mountain Air Ski Resorts, Inc. Balance Sheets (partial)			
Stockholders' Equity	2002	2003	
Common stock (\$1.00 par)			
Authorized—5,000,000 shares			
Outstanding—1,500,000 shares 2003			\$1,500,000
— 500,000 shares 2002	\$ 500,000		
Paid-in capital in excess of par	500,000		4,500,000
Retained earnings	<u>1,000,000</u>		<u>1,500,000</u>
Total stockholders' equity	<u>\$2,000,000</u>		<u>\$7,500,000</u>

The company paid total dividends of \$200,000 during fiscal 2003.

- What was Mountain Air's net income for fiscal 2003?
- How many new shares did the corporation issue and sell during the year?
- At what average price per share did the new stock sold during 2003 sell?
- At what price per share did Mountain Air's original 500,000 shares sell?



- 2-10 **Ratio comparisons** Robert Arias recently inherited a stock portfolio from his uncle. Wishing to learn more about the companies that he is now invested in, Robert performs a ratio analysis on each one and decides to compare them to each other. Some of his ratios are listed below.

Ratio	Island Electric Utility	Burger Heaven	Fink Software	Roland Motors
Current ratio	1.10	1.3	6.8	4.5
Quick ratio	0.90	0.82	5.2	3.7
Debt ratio	0.68	0.46	0	0.35
Net profit margin	6.2%	14.3%	28.5%	8.4%

Assuming that his uncle was a wise investor who assembled the portfolio with care, Robert finds the wide differences in these ratios confusing. Help him out.

- What problems might Robert encounter in comparing these companies to one another on the basis of their ratios?
- Why might the current and quick ratios for the electric utility and the fast-food stock be so much lower than the same ratios for the other companies?
- Why might it be all right for the electric utility to carry a large amount of debt, but not the software company?
- Why wouldn't investors invest all of their money in software companies instead of in less profitable companies? (Focus on risk and return.)



**2–11 Liquidity management** Bauman Company's total current assets, total current liabilities, and inventory for each of the past 4 years follow:

Item	2000	2001	2002	2003
Total current assets	\$16,950	\$21,900	\$22,500	\$27,000
Total current liabilities	9,000	12,600	12,600	17,400
Inventory	6,000	6,900	6,900	7,200

- Calculate the firm's current and quick ratios for each year. Compare the resulting time series for these measures of liquidity.
- Comment on the firm's liquidity over the 2000–2003 period.
- If you were told that Bauman Company's inventory turnover for each year in the 2000–2003 period and the industry averages were as follows, would this information support or conflict with your evaluation in part b? Why?

Inventory turnover	2000	2001	2002	2003
Bauman Company	6.3	6.8	7.0	6.4
Industry average	10.6	11.2	10.8	11.0



**2–12 Inventory management** Wilkins Manufacturing has sales of \$4 million and a gross profit margin of 40%. Its *end-of-quarter inventories* are

Quarter	Inventory
1	\$ 400,000
2	800,000
3	1,200,000
4	200,000

- Find the average quarterly inventory and use it to calculate the firm's inventory turnover and the average age of inventory.
- Assuming that the company is in an industry with an average inventory turnover of 2.0, how would you evaluate the activity of Wilkins' inventory?

- LG3** 2-13 **Accounts receivable management** An evaluation of the books of Blair Supply, which follows, gives the end-of-year accounts receivable balance, which is believed to consist of amounts originating in the months indicated. The company had annual sales of \$2.4 million. The firm extends 30-day credit terms.

Month of origin	Amounts receivable
July	\$ 3,875
August	2,000
September	34,025
October	15,100
November	52,000
December	<u>193,000</u>
Year-end accounts receivable	<u>\$300,000</u>

- Use the year-end total to evaluate the firm's collection system.
- If 70% of the firm's sales occur between July and December, would this affect the validity of your conclusion in part a? Explain.

- LG3** 2-14 **Interpreting liquidity and activity ratios** The new owners of Bluegrass Natural Foods, Inc., have hired you to help them diagnose and cure problems that the company has had in maintaining adequate liquidity. As a first step, you perform a liquidity analysis. You then do an analysis of the company's short-term activity ratios. Your calculations and appropriate industry norms are listed.

Ratio	Bluegrass	Industry norm
Current ratio	4.5	4.0
Quick ratio	2.0	3.1
Inventory turnover	6.0	10.4
Average collection period	73 days	52 days
Average payment period	31 days	40 days

- What recommendations relative to the amount and the handling of inventory could you make to the new owners?
- What recommendations relative to amount and handling of accounts receivable could you make to the new owners?
- What recommendations relative to amount and handling of accounts payable could you make to the new owners?
- What results, overall, would you hope your recommendations would achieve? Why might your recommendations not be effective?



- 2-15 **Debt analysis** Springfield Bank is evaluating Creek Enterprises, which has requested a \$4,000,000 loan, to assess the firm's financial leverage and financial risk. On the basis of the debt ratios for Creek, along with the industry averages and Creek's recent financial statements (which follow), evaluate and recommend appropriate action on the loan request.

**Creek Enterprises  
Income Statement  
for the Year Ended December 31, 2003**

Sales revenue		\$30,000,000
Less: Cost of goods sold		<u>21,000,000</u>
Gross profits		\$ 9,000,000
Less: Operating expenses		
Selling expense	\$3,000,000	
General and administrative expenses	1,800,000	
Lease expense	200,000	
Depreciation expense	<u>1,000,000</u>	
Total operating expense		<u>6,000,000</u>
Operating profits		\$ 3,000,000
Less: Interest expense		<u>1,000,000</u>
Net profits before taxes		\$ 2,000,000
Less: Taxes (rate = 40%)		<u>800,000</u>
Net profits after taxes		\$ 1,200,000
Less: Preferred stock dividends		<u>100,000</u>
Earnings available for common stockholders		<u><u>\$ 1,100,000</u></u>

**Creek Enterprises  
Balance Sheet  
December 31, 2003**

Assets	Liabilities and Stockholders' Equity
Current assets	Current liabilities
Cash	\$ 8,000,000
\$ 1,000,000	Accounts payable
Marketable securities	8,000,000
3,000,000	Notes payable
Accounts receivable	<u>500,000</u>
12,000,000	Accruals
Inventories	Total current liabilities
<u>7,500,000</u>	<u>\$16,500,000</u>
Total current assets	Long-term debt (includes financial leases) <sup>b</sup>
<u>\$23,500,000</u>	<u>\$20,000,000</u>
Gross fixed assets (at cost) <sup>a</sup>	Stockholders' equity
Land and buildings	Preferred stock (25,000 shares,
\$11,000,000	\$4 dividend)
Machinery and equipment	\$ 2,500,000
20,500,000	Common stock (1 million shares at \$5 par)
Furniture and fixtures	5,000,000
<u>8,000,000</u>	Paid-in capital in excess of par value
Gross fixed assets	4,000,000
\$39,500,000	Retained earnings
Less: Accumulated depreciation	<u>2,000,000</u>
<u>13,000,000</u>	Total stockholders' equity
Net fixed assets	<u>\$13,500,000</u>
<u>\$26,500,000</u>	Total liabilities and stockholders' equity
Total assets	<u><u>\$50,000,000</u></u>
<u>\$50,000,000</u>	

<sup>a</sup>The firm has a 4-year financial lease requiring annual beginning-of-year payments of \$200,000. Three years of the lease have yet to run.

<sup>b</sup>Required annual principal payments are \$800,000.

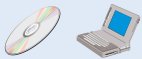
*Note:* Industry averages appear at the top of the following page.

Industry averages	
Debt ratio	0.51
Times interest earned ratio	7.30
Fixed-payment coverage ratio	1.85



- 2-16 Common-size statement analysis** A common-size income statement for Creek Enterprises' 2002 operations follows. Using the firm's 2003 income statement presented in Problem 2-15, develop the 2003 common-size income statement and compare it to the 2002 statement. Which areas require further analysis and investigation?

Creek Enterprises Common-size Income Statement for the Year Ended December 31, 2002	
Sales revenue (\$35,000,000)	100.0%
Less: Cost of goods sold	<u>65.9</u>
Gross profits	34.1%
Less: Operating expenses	
Selling expense	12.7%
General and administrative expenses	6.3
Lease expense	0.6
Depreciation expense	<u>3.6</u>
Total operating expense	<u>23.2</u>
Operating profits	10.9%
Less: Interest expense	<u>1.5</u>
Net profits before taxes	9.4%
Less: Taxes (rate = 40%)	<u>3.8</u>
Net profits after taxes	5.6%
Less: Preferred stock dividends	<u>0.1</u>
Earnings available for common stockholders	<u>5.5%</u>



- 2-17 The relationship between financial leverage and profitability** Pelican Paper, Inc., and Timberland Forest, Inc., are rivals in the manufacture of craft papers. Some financial statement values for each company follow. Use them in a ratio analysis that compares their financial leverage and profitability.

Item	Pelican Paper, Inc.	Timberland Forest, Inc.
Total assets	\$10,000,000	\$10,000,000
Total equity (all common)	9,000,000	5,000,000
Total debt	1,000,000	5,000,000
Annual interest	100,000	500,000
Total sales	\$25,000,000	\$25,000,000
EBIT	6,250,000	6,250,000
Net income	3,690,000	3,450,000

- a. Calculate the following debt and coverage ratios for the two companies. Discuss their financial risk and ability to cover the costs in relation to each other.
  - (1) Debt ratio
  - (2) Times interest earned ratio
- b. Calculate the following profitability ratios for the two companies. Discuss their profitability relative to each other.
  - (1) Operating profit margin
  - (2) Net profit margin
  - (3) Return on total assets
  - (4) Return on common equity
- c. In what way has the larger debt of Timberland Forest made it more profitable than Pelican Paper? What are the risks that Timberland's investors undertake when they choose to purchase its stock instead of Pelican's?



- 2-18 **Ratio proficiency** McDougal Printing, Inc., had sales totaling \$40,000,000 in fiscal year 2003. Some ratios for the company are listed below. Use this information to determine the dollar values of various income statement and balance sheet accounts as requested.

McDougal Printing, Inc. Year Ended December 31, 2003	
Sales	\$40,000,000
Gross profit margin	80%
Operating profit margin	35%
Net profit margin	8%
Return on total assets	16%
Return on common equity	20%
Total asset turnover	2
Average collection period	62.2 days

Calculate values for the following:

- a. Gross profits
- b. Cost of goods sold
- c. Operating profits
- d. Operating expenses
- e. Earnings available for common stockholders
- f. Total assets
- g. Total common stock equity
- h. Accounts receivable



- 2-19 **Cross-sectional ratio analysis** Use the following financial statements for Fox Manufacturing Company for the year ended December 31, 2003, along with the industry average ratios also given in what follows, to:
- a. Prepare and interpret a complete ratio analysis of the firm's 2003 operations.
  - b. Summarize your findings and make recommendations.

Fox Manufacturing Company Income Statement for the Year Ended December 31, 2003	
Sales revenue	\$600,000
Less: Cost of goods sold	<u>460,000</u>
Gross profits	\$140,000
Less: Operating expenses	
General and administrative expenses	\$30,000
Depreciation expense	<u>30,000</u>
Total operating expense	<u>60,000</u>
Operating profits	\$ 80,000
Less: Interest expense	<u>10,000</u>
Net profits before taxes	\$ 70,000
Less: Taxes	<u>27,100</u>
Net profits after taxes (earnings available for common stockholders)	<u>\$ 42,900</u>
Earnings per share (EPS)	\$2.15

Fox Manufacturing Company Balance Sheet December 31, 2003	
<b>Assets</b>	
Cash	\$ 15,000
Marketable securities	7,200
Accounts receivable	34,100
Inventories	<u>82,000</u>
Total current assets	\$138,300
Net fixed assets	<u>\$270,000</u>
Total assets	<u>\$408,300</u>
<b>Liabilities and Stockholders' Equity</b>	
Accounts payable	\$ 57,000
Notes payable	13,000
Accruals	<u>5,000</u>
Total current liabilities	\$ 75,000
Long-term debt	<u>\$150,000</u>
Stockholders' equity	
Common stock equity (20,000 shares outstanding)	\$110,200
Retained earnings	<u>73,100</u>
Total stockholders' equity	<u>\$183,300</u>
Total liabilities and stockholders' equity	<u>\$408,300</u>

*Note:* Industry averages appear at the top of the following page.



Ratio	Industry average, 2003
Current ratio	2.35
Quick ratio	0.87
Inventory turnover <sup>a</sup>	4.55
Average collection period <sup>a</sup>	35.3 days
Total asset turnover	1.09
Debt ratio	0.300
Times interest earned ratio	12.3
Gross profit margin	0.202
Operating profit margin	0.135
Net profit margin	0.091
Return on total assets (ROA)	0.099
Return on common equity (ROE)	0.167
Earnings per share (EPS)	\$3.10

<sup>a</sup>Based on a 360-day year and on end-of-year figures.



**2–20 Financial statement analysis** The financial statements of Zach Industries for the year ended December 31, 2003, follow.

Zach Industries Income Statement for the Year Ended December 31, 2003	
Sales revenue	\$160,000
Less: Cost of goods sold	<u>106,000</u>
Gross profits	<u>\$ 54,000</u>
Less: Operating expenses	
Selling expense	\$ 16,000
General and administrative expenses	10,000
Lease expense	1,000
Depreciation expense	<u>10,000</u>
Total operating expense	<u>\$ 37,000</u>
Operating profits	\$ 17,000
Less: Interest expense	<u>6,100</u>
Net profits before taxes	\$ 10,900
Less: Taxes	<u>4,360</u>
Net profits after taxes	<u><u>\$ 6,540</u></u>

Zach Industries Balance Sheet December 31, 2003	
<b>Assets</b>	
Cash	\$ 500
Marketable securities	1,000
Accounts receivable	25,000
Inventories	<u>45,500</u>
Total current assets	<u>\$ 72,000</u>
Land	\$ 26,000
Buildings and equipment	90,000
Less: Accumulated depreciation	<u>38,000</u>
Net fixed assets	<u>\$ 78,000</u>
Total assets	<u><u>\$150,000</u></u>
<b>Liabilities and Stockholders' Equity</b>	
Accounts payable	\$ 22,000
Notes payable	<u>47,000</u>
Total current liabilities	<u>\$ 69,000</u>
Long-term debt	\$ 22,950
Common stock <sup>a</sup>	\$ 31,500
Retained earnings	<u>\$ 26,550</u>
Total liabilities and stockholders' equity	<u><u>\$150,000</u></u>

<sup>a</sup>The firm's 3,000 outstanding shares of common stock closed 2003 at a price of \$25 per share.

- a. Use the preceding financial statements to complete the following table. Assume that the industry averages given in the table are applicable for both 2002 and 2003.

Ratio	Industry average	Actual 2002	Actual 2003
Current ratio	1.80	1.84	_____
Quick ratio	0.70	0.78	_____
Inventory turnover <sup>a</sup>	2.50	2.59	_____
Average collection period <sup>a</sup>	37 days	36 days	_____
Debt ratio	65%	67%	_____
Times interest earned ratio	3.8	4.0	_____
Gross profit margin	38%	40%	_____
Net profit margin	3.5%	3.6%	_____
Return on total assets	4.0%	4.0%	_____
Return on common equity	9.5%	8.0%	_____
Market/book ratio	1.1	1.2	_____

<sup>a</sup>Based on a 360-day year and on end-of-year figures.

- b. Analyze Zach Industries' financial condition as it is related to (1) liquidity, (2) activity, (3) debt, (4) profitability, and (5) market. Summarize the company's overall financial condition.



- 2-21 **Integrative—Complete ratio analysis** Given the following financial statements, historical ratios, and industry averages, calculate Sterling Company's financial ratios for the most recent year. Analyze its overall financial situation from both a cross-sectional and a time-series viewpoint. Break your analysis into evaluations of the firm's liquidity, activity, debt, profitability, and market.

Sterling Company Income Statement for the Year Ended December 31, 2003	
Sales revenue	\$10,000,000
Less: Cost of goods sold	<u>7,500,000</u>
Gross profits	\$ 2,500,000
Less: Operating expenses	
Selling expense	\$300,000
General and administrative expenses	650,000
Lease expense	50,000
Depreciation expense	<u>200,000</u>
Total operating expense	<u>1,200,000</u>
Operating profits	\$ 1,300,000
Less: Interest expense	<u>200,000</u>
Net profits before taxes	\$ 1,100,000
Less: Taxes (rate = 40%)	<u>440,000</u>
Net profits after taxes	\$ 660,000
Less: Preferred stock dividends	<u>50,000</u>
Earnings available for common stockholders	<u>\$ 610,000</u>
Earnings per share (EPS)	\$3.05

**Sterling Company**  
**Balance Sheet**  
**December 31, 2003**

Assets		Liabilities and Stockholders' Equity	
Current assets		Current liabilities	
Cash	\$ 200,000	Accounts payable <sup>b</sup>	\$ 900,000
Marketable securities	50,000	Notes payable	200,000
Accounts receivable	800,000	Accruals	<u>100,000</u>
Inventories	<u>950,000</u>	Total current liabilities	<u>\$ 1,200,000</u>
Total current assets	<u>\$ 2,000,000</u>	Long-term debt (includes financial leases) <sup>c</sup>	<u>\$ 3,000,000</u>
Gross fixed assets (at cost) <sup>a</sup>	\$12,000,000	Stockholders' equity	
Less: Accumulated depreciation	<u>3,000,000</u>	Preferred stock (25,000 shares, \$2 dividend)	\$ 1,000,000
Net fixed assets	\$ 9,000,000	Common stock (200,000 shares at \$3 par) <sup>d</sup>	600,000
Other assets	<u>\$ 1,000,000</u>	Paid-in capital in excess of par value	5,200,000
Total assets	<u><u>\$12,000,000</u></u>	Retained earnings	<u>1,000,000</u>
		Total stockholders' equity	<u>\$ 7,800,000</u>
		Total liabilities and stockholders' equity	<u><u>\$12,000,000</u></u>

<sup>a</sup>The firm has an 8-year financial lease requiring annual beginning-of-year payments of \$50,000. Five years of the lease have yet to run.

<sup>b</sup>Annual credit purchases of \$6,200,000 were made during the year.

<sup>c</sup>The annual principal payment on the long-term debt is \$100,000.

<sup>d</sup>On December 31, 2003, the firm's common stock closed at \$39.50 per share.

**Historical and Industry Average Ratios for Sterling Company**

Ratio	Actual 2001	Actual 2002	Industry average, 2003
Current ratio	1.40	1.55	1.85
Quick ratio	1.00	0.92	1.05
Inventory turnover	9.52	9.21	8.60
Average collection period	45.0 days	36.4 days	35.0 days
Average payment period	58.5 days	60.8 days	45.8 days
Total asset turnover	0.74	0.80	0.74
Debt ratio	0.20	0.20	0.30
Times interest earned ratio	8.2	7.3	8.0
Fixed-payment coverage ratio	4.5	4.2	4.2
Gross profit margin	0.30	0.27	0.25
Operating profit margin	0.12	0.12	0.10
Net profit margin	0.062	0.062	0.053
Return on total assets (ROA)	0.045	0.050	0.040
Return on common equity (ROE)	0.061	0.067	0.066
Earnings per share (EPS)	\$1.75	\$2.20	\$1.50
Price/earnings (P/E) ratio	12.0	10.5	11.2
Market/book (M/B) ratio	1.20	1.05	1.10



LG6

- 2-22 Dupont system of analysis** Use the following ratio information for Johnson International and the industry averages for Johnson's line of business to:
- Construct the DuPont system of analysis for both Johnson and the industry.
  - Evaluate Johnson (and the industry) over the 3-year period.
  - Indicate in which areas Johnson requires further analysis. Why?

	2001	2002	2003
<b>Johnson</b>			
Financial leverage multiplier	1.75	1.75	1.85
Net profit margin	0.059	0.058	0.049
Total asset turnover	2.11	2.18	2.34
<b>Industry Averages</b>			
Financial leverage multiplier	1.67	1.69	1.64
Net profit margin	0.054	0.047	0.041
Total asset turnover	2.05	2.13	2.15

LG6

- 2-23 Complete ratio analysis, recognizing significant differences** Home Health, Inc., has come to Jane Ross for a yearly financial checkup. As a first step, Jane has prepared a complete set of ratios for fiscal years 2002 and 2003. She will use them to look for significant changes in the company's situation from one year to the next.

<b>Home Health, Inc. Financial Ratios</b>		
Ratio	2002	2003
Current ratio	3.25	3.00
Quick ratio	2.50	2.20
Inventory turnover	12.80	10.30
Average collection period	42 days	31 days
Total asset turnover	1.40	2.00
Debt ratio	0.45	0.62
Times interest earned ratio	4.00	3.85
Gross profit margin	68%	65%
Operating profit margin	14%	16%
Net profit margin	8.3%	8.1%
Return on total assets	11.6%	16.2%
Return on common equity	21.1%	42.6%
Price/earnings ratio	10.7	9.8
Market/book ratio	1.40	1.25

- a. In order to focus on the degree of change, calculate the year-to-year proportional change by subtracting the year 2002 ratio from the year 2003 ratio, then dividing the difference by the year 2002 ratio. Multiply the result by 100. Preserve the positive or negative sign. The result is the percentage change in the ratio from 2002 to 2003. Calculate the proportional change for the ratios shown here.
- b. For any ratio that shows a year-to-year difference of 10% or more, state whether the difference is in the company's favor or not.
- c. For the most significant changes (25% or more), look at the other ratios and cite at least one other change that may have contributed to the change in the ratio that you are discussing.

## CHAPTER 2 CASE

### Assessing Martin Manufacturing's Current Financial Position

Terri Spiro, an experienced budget analyst at Martin Manufacturing Company, has been charged with assessing the firm's financial performance during 2003 and its financial position at year-end 2003. To complete this assignment, she gathered the firm's 2003 financial statements, which follow. In addition, Terri obtained the firm's ratio values for 2001 and 2002, along with the 2003 industry average ratios (also applicable to 2001 and 2002). These are presented in the table on page 94.

Martin Manufacturing Company Income Statement for the Year Ended December 31, 2003		
Sales revenue		\$5,075,000
Less: Cost of goods sold		<u>3,704,000</u>
Gross profits		\$1,371,000
Less: Operating expenses		
Selling expense	\$650,000	
General and administrative expenses	416,000	
Depreciation expense	<u>152,000</u>	
Total operating expense		<u>1,218,000</u>
Operating profits		\$ 153,000
Less: Interest expense		<u>93,000</u>
Net profits before taxes		\$ 60,000
Less: Taxes (rate = 40%)		<u>24,000</u>
Net profits after taxes		\$ 36,000
Less: Preferred stock dividends		<u>3,000</u>
Earnings available for common stockholders		<u>\$ 33,000</u>
Earnings per share (EPS)		\$0.33

Martin Manufacturing Company Balance Sheets		
Assets	December 31	
	2003	2002
<b>Current assets</b>		
Cash	\$ 25,000	\$ 24,100
Accounts receivable	805,556	763,900
Inventories	700,625	763,445
Total current assets	<u>\$1,531,181</u>	<u>\$1,551,445</u>
Gross fixed assets (at cost)	\$2,093,819	\$1,691,707
Less: Accumulated depreciation	<u>500,000</u>	<u>348,000</u>
Net fixed assets	<u>\$1,593,819</u>	<u>\$1,343,707</u>
<b>Total assets</b>	<u><u>\$3,125,000</u></u>	<u><u>\$2,895,152</u></u>
<b>Liabilities and Stockholders' Equity</b>		
<b>Current liabilities</b>		
Accounts payable	\$ 230,000	\$ 400,500
Notes payable	311,000	370,000
Accruals	<u>75,000</u>	<u>100,902</u>
Total current liabilities	\$ 616,000	\$ 871,402
Long-term debt	<u>\$1,165,250</u>	<u>\$ 700,000</u>
Total liabilities	<u>\$1,781,250</u>	<u>\$1,571,402</u>
<b>Stockholders' equity</b>		
Preferred stock (2,500 shares, \$1.20 dividend)	\$ 50,000	\$ 50,000
Common stock (100,000 shares at \$4 par) <sup>a</sup>	400,000	400,000
Paid-in capital in excess of par value	593,750	593,750
Retained earnings	<u>300,000</u>	<u>280,000</u>
Total stockholders' equity	<u>\$1,343,750</u>	<u>\$1,323,750</u>
<b>Total liabilities and stockholders' equity</b>	<u><u>\$3,125,000</u></u>	<u><u>\$2,895,152</u></u>

<sup>a</sup>The firm's 100,000 outstanding shares of common stock closed 2003 at a price of \$11.38 per share.

*Note:* Industry historical ratios appear at the top of the following page.

Martin Manufacturing Company Historical ratios				
Ratio	Actual 2001	Actual 2002	Actual 2003	Industry average 2003
Current ratio	1.7	1.8	_____	1.5
Quick ratio	1.0	0.9	_____	1.2
Inventory turnover (times)	5.2	5.0	_____	10.2
Average collection period	50 days	55 days	_____	46 days
Total asset turnover (times)	1.5	1.5	_____	2.0
Debt ratio	45.8%	54.3%	_____	24.5%
Times interest earned ratio	2.2	1.9	_____	2.5
Gross profit margin	27.5%	28.0%	_____	26.0%
Net profit margin	1.1%	1.0%	_____	1.2%
Return on total assets (ROA)	1.7%	1.5%	_____	2.4%
Return on common equity (ROE)	3.1%	3.3%	_____	3.2%
Price/earnings (P/E) ratio	33.5	38.7	_____	43.4
Market/book (M/B) ratio	1.0	1.1	_____	1.2

### Required

- Calculate the firm's 2003 financial ratios, and then fill in the preceding table.
- Analyze the firm's current financial position from both a cross-sectional and a time-series viewpoint. Break your analysis into evaluations of the firm's liquidity, activity, debt, profitability, and market.
- Summarize the firm's overall financial position on the basis of your findings in part b.

### WEB EXERCISE



Go to Web site [www.yahoo.com](http://www.yahoo.com). On the left side of the Yahoo! home page screen, click on the Finance category under **Business and Economy**. On the next screen click on **Y! Finance**.

Using this screen, click on **Symbol Lookup** and find the symbol for Southwest Airlines. Click on this symbol to find the latest trading data for Southwest Airlines.

- What was the selling price for the last sale of Southwest's common stock? How much in dollars per share was the change?
- What was the number of shares sold in this trade?

In the **More Info** box, you will see **Profile**. Click on it, and scroll down to **Statistics at a Glance**.

- What was the amount of Southwest's sales? What was its after-tax income?
- What were Southwest's earnings per share? What was its book value per share?

5. How many shares of stock does Southwest have outstanding?
6. What were the values of the following ratios for Southwest?
  - a. Current ratio
  - b. Operating profit margin
  - c. Debt/equity ratio
  - d. Return on equity
  - e. What other information would you need to evaluate Southwest's financial performance on the basis of these ratios?
7. Find **More from Market Guide** and click on **Ratio Comparisons**. Using these data, summarize Southwest's performance.

**Remember to check the book's Web site at**

**[www.aw.com/gitman](http://www.aw.com/gitman)**

**for additional resources, including additional Web exercises.**