3 Financial Statements and Ratio Analysis

Learning Goals

- **LG 1** Review the contents of the stockholders' report and the procedures for consolidating international financial statements.
- **LG 2** Understand who uses financial ratios and how.
- **LG 3** Use ratios to analyze a firm's liquidity and activity.
- **LG 4** Discuss the relationship between debt and financial leverage and the ratios used to analyze a firm's debt.
- **LG 5** Use ratios to analyze a firm's profitability and its market value.
- **LG 6** Use a summary of financial ratios and the DuPont system of analysis to perform a complete ratio analysis.

Why This Chapter Matters to You

In your *professional* life

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 so as 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 stockholders' 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.

In your *personal* life

A routine step in personal financial planning is to prepare and analyze personal financial statements so that you can monitor progress toward your financial goals. Also, to build and monitor your investment portfolio, you need to understand and analyze corporate financial statements.

General Dynamics

Ratios Tell the Story of a Well-Managed Firm

The stock of defense contractor General Dynamics (GD) reached a 52-week high on May 14, 2013. An article published by the investment research web site **Zacks.com** sought to explain why the company's stock was performing so well. To tell that story, Zacks turned to an analysis of several of the firm's key financial ratios.

For example, Zacks observed that GD managed to turn its inventory 9.6 times per year compared with just 2.8 for the typical firm in that industry. Faster inventory turnover means that the company has more cash to invest in other types of assets or to return to shareholders. The report praised GD for a strong liquidity position as evidenced by the firm's current ratio of 1.39, which was also above the industry average. A high current ratio suggests that the firm should have no problem paying any bills that come due in the short term. The report went on to praise GD for the high rate of return it earned on its assets and the relatively low level of debt on its balance sheet.

Financial statements contain a wealth of information, but digesting that information is not easy. One way analysts put financial data into perspective is by calculating a variety of financial ratios. These ratios help give analysts an idea of how a firm is performing, not only in an absolute sense, but also relative to its peers and its competitors. In this chapter, you'll learn how to use financial ratios to assess how well a firm is performing.

LG 1 3.1 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).

Public Company Accounting Oversight Board (PCAOB) A not-for-profit corporation established by the Sarbanes-Oxley Act of 2002 to protect the interests of investors and further the public interest in the preparation of informative, fair, and independent audit reports.

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.

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).**

In addition, the *Sarbanes-Oxley Act of 2002,* enacted in an effort to eliminate the many disclosure and conflict-of-interest problems of corporations, established the **Public Company Accounting Oversight Board (PCAOB),** a not-for-profit corporation that oversees auditors of public corporations. The PCAOB is charged with protecting the interests of investors and furthering the public interest in the preparation of informative, fair, and independent audit reports. The expectation is that it will instill confidence in investors with regard to the accuracy of the audited financial statements of public companies.

Publicly owned corporations with more than $5 million in assets and 500 or more stockholders are required by the U.S. 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 stockholders' 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 chief executive officer 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 effect on the firm during the year. It also typically discusses management philosophy,

GLOBAL focus

More Countries Adopt International Financial Reporting Standards

in practice In the United States, public companies are required to report financial results using GAAP. However, accounting standards vary around the world, and that makes comparing the financial results of firms located in different countries quite challenging. In recent years, many countries have adopted a system of accounting principles known as International Financial Reporting Standards (IFRS), which are established by an independent standards-setting body known as the International Accounting Standards Board (IASB). These standards are designed with the goal of making financial statements everywhere understandable, reliable, comparable, and accurate. More than 80 countries now require listed firms to comply with IFRS, and dozens more permit or require firms to follow IFRS to some degree.

Why hasn't the United States followed the global trend of IFRS adoption? Some argue that GAAP is still the "gold standard" and that a movement to IFRS would lower the overall quality of financial reporting made by U.S. firms. It is true that IFRS generally requires less detail than GAAP. Even so, the Securities and Exchange Commission has expressed its view that U.S. investors will benefit as GAAP and IFRS converge, although there is no expectation that firms in the United States will be required to switch to IFRS in the near future.

▶ *What costs and benefits might be associated with a switch to IFRS in the United States?*

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

corporate governance issues, strategies, and actions as well as plans for the coming year.

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 stockholders' equity, and (4) the statement of cash flows. The financial statements from the 2015 stockholders' report of Bartlett Company, a manufacturer of metal fasteners, are presented and briefly discussed in this section. Most likely, you have studied these four financial statements in an accounting course, so the purpose of looking at them here is to refresh your memory of the basics rather than provide an exhaustive review.

Income Statement

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

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.

focus on **ETHICS**

Taking Earnings Reports at Face Value

in practice Near the end of each quarter, Wall Street's much anticipated "earnings season" arrives. During earnings season, many companies unveil their quarterly performance. Interest is high, as media outlets rush to report the latest announcements, analysts slice and dice the numbers, and investors buy and sell based on the news. The most anticipated performance metric for most companies is earnings per share (EPS), which is typically compared to the estimates of the analysts who cover a firm. Firms that beat analyst estimates often see their share prices jump, whereas those that miss estimates, by even a small amount, tend to suffer price declines.

Many investors are aware of the pitfalls of judging firms based on reported earnings. Specifically, the complexity of financial reports makes it easy for managers to mislead investors. Sometimes, the methods used to mislead investors are within the rules, albeit not the spirit, of acceptable accounting practices. Other times, firms break the rules to make their numbers. The practice of manipulating earnings to mislead investors is known as earnings management.

Some firms are notorious for consistently beating analysts' estimates. For example, for one 10-year period (1995–2004), General Electric Co. (GE) beat Wall Street earnings estimates every quarter, often by only a penny or two per share. However, in 2009, the Securities and Exchange Commission (SEC) fined GE $50 million for improper accounting practices, including recording sales that had not yet occurred. When GE went back to correct the problems identified by the SEC, it found that net earnings between 2001 and 2007 were a total of $280 million lower than originally reported.

In one of his famous letters to the shareholders of Berskshire Hathaway, Warren Buffett offers three bits of advice regarding financial reporting.[a] First, he warns that weak visible accounting practices are typically a sign of bigger problems. Second, he suggests that, when you can't understand management, the reason is probably that management doesn't want you to understand them. Third, he warns that investors should be suspicious of projections because earnings and growth do not typically progress in an orderly fashion. Finally, Buffett notes that "Managers that always promise to 'make the numbers' will at some point be tempted to *make up* the numbers."

▶ *Why might financial managers be tempted to manage earnings?*

▶ *Is it unethical for managers to manage earnings if they disclose their activities to investors?*

[a] www.berkshirehathaway.com/letters/2002pdf.pdf

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 3.1 presents Bartlett Company's income statements for the years ended December 31, 2015 and 2014. The 2015 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 profit* of $986,000 represents the amount remaining to satisfy operating, financial, and tax costs. Next, *operating expenses*—which include selling expense, general and administrative expense, lease expense, and depreciation expense—are deducted from gross profits. 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

TABLE 3.1 Bartlett Company Income Statements ($000)

	For the years ended December 31	
	2015	2014
Sales revenue	$3,074	$2,567
Less: Cost of goods sold	2,088	1,711
Gross profits	$ 986	$ 856
Less: Operating expenses		
Selling expense	$ 100	$ 108
General and administrative expenses	194	187
Lease expense[a]	35	35
Depreciation expense	239	223
Total operating expense	$ 568	$ 553
Operating profits	$ 418	$ 303
Less: Interest expense	93	91
Net profits before taxes	$ 325	$ 212
Less: Taxes	94	64
Net profits after taxes	$ 231	$ 148
Less: Preferred stock dividends	10	10
Earnings available for common stockholders	$ 221	$ 138
Earnings per share (EPS)[b]	$2.90	$1.81
Dividend per share (DPS)[c]	$1.29	$0.75

[a]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.

[b]Calculated by dividing the earnings available for common stockholders by the number of shares of common stock outstanding: 76,262 in 2015 and 76,244 in 2014. Earnings per share in 2015: $221,000 ÷ 76,262 = $2.90 ; in 2014: $138,000 ÷ 76,244 = $1.81.

[c]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 2015: $98,000 ÷ 76,262 = $1.29; in 2014: $57,183 ÷ 76,244 = $0.75.

to find *net profits* (or *earnings*) *before taxes*. After subtracting $93,000 in 2015 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,* also referred to as *net income*. Bartlett Company's net profits after taxes for 2015 were $231,000. Any preferred stock dividends must be subtracted from net profits after taxes to arrive at *earnings available for common stockholders,* which 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 represent the number of dollars earned during the period on behalf of each outstanding share of common stock. In 2015, 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 2015 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.

Personal Finance Example 3.1 ► Jan and Jon Smith, a mid-30s married couple with no children, prepared a personal income and expense statement, which is similar to a corporate income statement. A condensed version of their income and expense statement follows.

Jan and Jon Smith's Income and Expense Statement for the Year Ended December 31, 2015

Income	
Salaries	$72,725
Interest received	195
Dividends received	120
(1) Total income	73,040
Expenses	
Mortgage payments	$16,864
Auto loan payments	2,520
Utilities	2,470
Home repairs and maintenance	1,050
Food	5,825
Car expense	2,265
Health care and insurance	1,505
Clothes, shoes, accessories	1,700
Insurance	1,380
Taxes	16,430
Appliance and furniture payments	1,250
Recreation and entertainment	4,630
Tuition and books for Jan	1,400
Personal care and other items	2,415
(2) Total expenses	$61,704
(3) Cash surplus (or deficit) [(1) − (2)]	$11,336

During the year, the Smiths had total income of $73,040 and total expenses of $61,704, which left them with a cash surplus of $11,336. They can use the surplus to increase their savings and investments.

Balance Sheet

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

The **balance sheet** presents a summary statement of the firm's financial position at a given 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 2015 and 2014 are presented in Table 3.2. They show a variety of asset, liability (debt), and equity accounts.

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, which 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. *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 firm.[1] *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).

long-term debt
Debt for which payment is not due in the current year.

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 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.

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.

1. 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.

TABLE 3.2 Bartlett Company Balance Sheets ($000)

	December 31	
Assets	**2015**	**2014**
Cash	$ 363	$ 288
Marketable securities	68	51
Accounts receivable	503	365
Inventories	289	300
Total current assets	$1,223	$1,004
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)	$4,669	$4,322
Less: Accumulated depreciation	2,295	2,056
Net fixed assets	$2,374	$2,266
Total assets	$3,597	$3,270
Liabilities and Stockholders' Equity		
Accounts payable	$ 382	$ 270
Notes payable	79	99
Accruals	159	114
Total current liabilities	$ 620	$ 483
Long-term debt (includes financial leases)	1,023	967
Total liabilities	$1,643	$1,450
Preferred stock: cumulative 5%, $100 par, 2,000 shares authorized and issued	$ 200	$ 200
Common stock: $2.50 par, 100,000 shares authorized, shares issued and outstanding in 2015: 76,262; in 2014: 76,244	191	190
Paid-in capital in excess of par on common stock	428	418
Retained earnings	1,135	1,012
Total stockholders' equity	$1,954	$1,820
Total liabilities and stockholders' equity	$3,597	$3,270

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 used to finance the firm's assets.

Bartlett Company's balance sheets in Table 3.2 show that the firm's total assets increased from $3,270,000 in 2014 to $3,597,000 in 2015. 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.

Personal Finance Example 3.2 ► The following personal balance sheet for Jan and Jon Smith—the couple introduced earlier, who are married, in their mid-30s, and have no children—is similar to a corporate balance sheet.

Jan and Jon Smith's Balance Sheet: December 31, 2015

Assets		Liabilities and Net Worth	
Cash on hand	$ 90	Credit card balances	$ 665
Checking accounts	575	Utility bills	120
Savings accounts	760	Medical bills	75
Money market funds	800	Other current liabilities	45
Total liquid assets	$ 2,225	Total current liabilities	$ 905
Stocks and bonds	$ 2,250	Real estate mortgage	$ 92,000
Mutual funds	1,500	Auto loans	4,250
Retirement funds, IRA	2,000	Education loan	3,800
Total investments	$ 5,750	Personal loan	4,000
Real estate	$120,000	Furniture loan	800
Cars	14,000	Total long-term liabilities	$104,850
Household furnishings	3,700	Total liabilities	$105,755
Jewelry and artwork	1,500	Net worth (N/W)	41,420
Total personal property	$139,200	Total liabilities and net worth	
Total assets	$147,175		$147,175

The Smiths have total assets of $147,175 and total liabilities of $105,755. Personal net worth (N/W) is a "plug figure"—the difference between total assets and total liabilities—which in the case of Jan and Jon Smith is $41,420.

statement of stockholders' equity
Shows all equity account transactions that occurred during a given year.

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. An abbreviated form of the *statement of stockholders' equity.*

Statement of Retained Earnings

The *statement of retained earnings* is an abbreviated form of the statement of stockholders' equity. Unlike the **statement of stockholders' equity,** which shows all equity account transactions that occurred during a given year, the **statement of retained earnings** reconciles the net income earned during a given year, and any

TABLE 3.3 Bartlett Company Statement of Retained Earnings ($000) for the Year Ended December 31, 2015

Retained earnings balance (January 1, 2015)	$1,012
Plus: Net profits after taxes (for 2015)	231
Less: Cash dividends (paid during 2015)	
Preferred stock	10
Common stock	98
Total dividends paid	$ 108
Retained earnings balance (December 31, 2015)	$1,135

cash dividends paid, with the change in retained earnings between the start and the end of that year. Table 3.3 presents this statement for Bartlett Company for the year ended December 31, 2015. 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 2015.

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, 2015, is presented in Table 3.4 (see page 114). Further insight into this statement is included in the discussion of cash flow in Chapter 4.

NOTES TO THE FINANCIAL STATEMENTS

notes to the financial statements
Explanatory notes keyed to relevant accounts in the statements; they provide detailed information on the accounting policies, procedures, calculations, and transactions underlying entries in 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. Since passage of Sarbanes-Oxley, notes to the financial statements have also included some details about compliance with that law. 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.

TABLE 3.4 Bartlett Company Statement of Cash Flows ($000) for the Year Ended December 31, 2015

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

[a]As is customary, parentheses are used to denote a negative number, which in this case is a cash outflow.

[b]Retained earnings are excluded here because their change is actually reflected in the combination of the "net profits after taxes" and "dividends paid" entries.

Financial Accounting Standards Board (FASB) Standard No. 52
Mandates that U.S.–based companies translate their foreign-currency-denominated assets and liabilities into U.S. dollars, for consolidation with the parent company's financial statements. This process 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 U.S. dollars, for consolidation with the parent company's financial statements, using the year-end (current) exchange rate.

The current 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 U.S. dollars for consolidation with the parent company's financial statements. This process is done by using a technique called the **current rate (translation) method,** under which all 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.

→ REVIEW QUESTIONS

3–1 What roles do GAAP, the FASB, and the PCAOB play in the financial reporting activities of public companies?

3–2 Describe the purpose of each of the four major financial statements.

3–3 Why are the notes to the financial statements important to professional securities analysts?

3–4 How is the *current rate (translation) method* used to consolidate a firm's foreign and domestic financial statements?

LG 2 3.2 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 a variety of interested parties who regularly need to have relative measures of the company's performance. *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.

INTERESTED PARTIES

Ratio analysis of a firm's financial statements is of interest to shareholders, creditors, and the firm's own management. Both current 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?" Both cross-sectional and time-series ratio comparisons can be made.

Cross-Sectional Analysis

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

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

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 with those of a key competitor or with a 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, RMA Annual Statement Studies, Value Line,* and industry sources. It is also possible to derive financial ratios for yourself using financial information reported in financial databases, such as Compustat. Table 3.5 illustrates a brief cross-sectional ratio analysis by comparing several

TABLE 3.5 Financial Ratios for Select Firms and Their Industry Median Values

	Current ratio	Quick ratio	Inventory turnover	Average collection period (days)	Total asset turnover	Debt ratio	Net profit margin (%)	Return on total assets (%)	Return on common equity (%)
Dell	1.3	1.2	40.5	58.9	1.6	0.8	2.7	4.3	25.4
Hewlett-Packard	1.2	1.1	13.8	80.6	1.0	0.6	6.7	6.7	18.9
Computers	2.5	2.1	5.8	61.3	0.9	0.4	−3.1	−2.2	−2.6
Home Depot	1.3	0.4	4.3	5.3	1.6	0.5	4.0	6.5	13.7
Lowe's	1.3	0.2	3.7	0.0	1.4	0.4	3.7	5.4	9.3
Building materials	2.8	0.8	3.7	5.3	1.6	0.3	4.0	6.5	13.7
Kroger	1.0	0.3	12.0	4.3	3.3	0.8	0.1	0.3	1.4
Whole Foods Market	1.3	1.0	25.6	7.0	3.6	0.4	2.3	8.0	14.5
Grocery stores	1.3	0.7	11.1	7.5	2.4	0.6	2.1	3.1	9.8
Sears	1.3	0.3	3.7	5.4	1.8	0.6	0.5	0.9	2.6
Wal-Mart	0.9	0.3	9.0	3.7	2.4	0.6	3.5	8.4	20.3
Merchandise stores	1.7	0.6	4.1	3.7	2.3	0.5	1.5	4.9	10.8

The data used to calculate these ratios are drawn from the Compustat North American database.

ratios for pairs of firms that compete with each other as well as for the industry median value.

Analysts have to be very careful when drawing conclusions from ratio comparisons. It's tempting to assume that if one ratio for a particular firm is above the industry norm, it is a sign that the firm is performing well, at least along the dimension measured by that ratio. However, ratios may be above or below the industry norm for both positive and negative reasons, and it is necessary to determine why a firm's performance differs from its industry peers. *Thus, ratio analysis on its own is probably most useful in highlighting areas for further investigation.*

Example 3.3 ▸

MyFinanceLab Solution Video

In early 2016, Mary Boyle, the chief financial analyst at Caldwell Manufacturing, a producer of heat exchangers, gathered data on the firm's financial performance during 2015, 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 and more efficient inventory management. Caldwell Manufacturing's calculated inventory turnover for 2015 and the industry average inventory turnover were as follows:

	Inventory Turnover, 2015
Caldwell Manufacturing	14.8
Industry average	9.7

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. On reflection, however, she realized that a very high inventory turnover could be a sign that the firm is not holding enough inventories. The consequence of low inventory could be excessive stockouts (insufficient inventory to meet customer needs). Discussions with people in the manufacturing and marketing departments did, in fact, uncover such a problem: Inventories during the year were extremely low, resulting in numerous production delays that hindered the firm's ability to meet demand and resulted in disgruntled customers and lost sales. A ratio that 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.

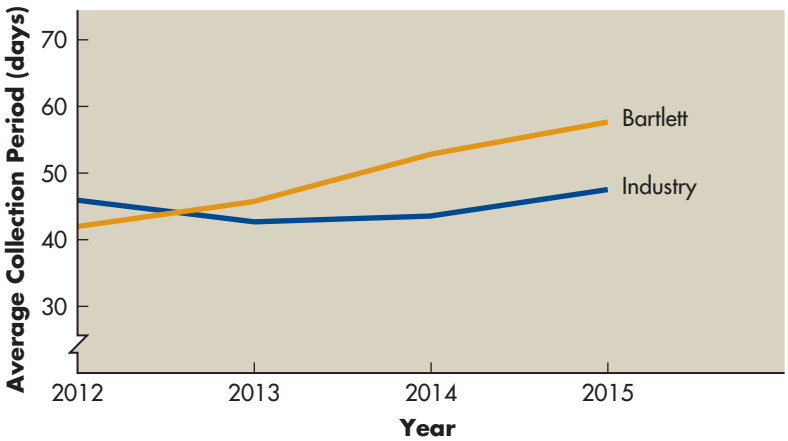
Time-series analysis evaluates performance over time. Comparison of current to past performance, using ratios, enables analysts to assess the firm's progress. Developing trends can be seen by using multiyear comparisons. Any significant year-to-year changes may be symptomatic of a problem, especially if the same trend is not an industry-wide phenomenon.

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 3.1 depicts this type of approach using the average collection period ratio of Bartlett Company over the years 2012–2015. This ratio reflects the average amount of time (in days) 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.

FIGURE 3.1

Combined Analysis
Combined cross-sectional and time-series view of Bartlett Company's average collection period, 2012–2015



CAUTIONS ABOUT USING RATIO ANALYSIS

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

1. Ratios that reveal large deviations from the norm merely indicate *the possibility* of a problem. Additional analysis is typically needed to determine whether there is a problem and to isolate the *causes* of the problem.
2. A single ratio does not generally provide sufficient information from which to judge the *overall* performance of the firm. However, if an analysis is concerned only with certain *specific* aspects of a firm's financial position, one or two ratios may suffice.
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 *seasonality* may produce erroneous conclusions and decisions.
4. It is preferable to use *audited financial statements* for ratio analysis. If they have not been audited, the data 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 comparisons, 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 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, you must be careful when comparing older with newer firms or comparing a firm to itself over a long period of time.

CATEGORIES OF FINANCIAL RATIOS

Financial ratios can be divided for convenience into five general 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 for an effective financial analysis include, at a minimum, the income statement and the balance sheet. We will use the 2015 and 2014 income statements and balance sheets for Bartlett Company, presented earlier in Tables 3.1 and 3.2, 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

3–5 With regard to financial ratio analysis, how do the viewpoints held by the firm's present and prospective shareholders, creditors, and management differ?

3–6 What is the difference between *cross-sectional* and *time-series* ratio analysis? What is *benchmarking*?

3–7 To what types of deviations from the norm should the analyst pay primary attention when performing cross-sectional ratio analysis? Why?

3–8 Why is it preferable to compare ratios calculated using financial statements that are dated at the same point in time during the year?

LG 3 3.3 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, or 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 can provide early signs of cash flow problems and impending business failure. Clearly, it is desirable that a firm is able to pay its bills, so having enough liquidity for day-to-day operations is important. However, liquid assets, like cash held at banks and marketable securities, do not earn a particularly high rate of return, so shareholders will not want a firm to *overinvest* in liquidity. Firms have to balance the need for safety that liquidity provides against the low returns that liquid assets generate for investors. 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

$$\text{Current ratio} = \text{Current assets} \div \text{Current liabilities} \quad (3.1)$$

The current ratio for Bartlett Company in 2015 is

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

A higher current ratio indicates a greater degree of liquidity. How much liquidity a firm needs depends on a variety of factors, including the firm's size, its access to short-term financing sources like bank credit lines, and the volatility of its business. For example, a grocery store whose revenues are relatively predictable may not need as much liquidity as a manufacturing firm who faces sudden and unexpected shifts in demand for its products. 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.

Matter of fact

Determinants of Liquidity Needs

Glance back at the first column of data in Table 3.5 which shows the current ratio for a variety of companies and industries. Notice that the industry with the highest current ratio (that is, most liquidity) is building materials, a business that is notoriously sensitive to business cycle swings. The current ratio for that industry is 2.8, indicating that the typical firm in that business has almost three times as much in current assets as in current liabilities. Two of the largest competitors in that industry, The Home Depot and Lowe's, operate with a current ratio of 1.3, less than half the industry average. Does this ratio mean that these firms have a liquidity problem? Not necessarily. Large enterprises generally have well-established relationships with banks that can provide lines of credit and other short-term loan products in the event that the firm has a need for liquidity. Smaller firms may not have the same access to credit and therefore tend to operate with more liquidity.

Personal Finance Example 3.4 ▶

MyFinanceLab Solution Video

Individuals, like corporations, can use financial ratios to analyze and monitor their performance. Typically, personal finance ratios are calculated using the personal income and expense statement and personal balance sheet for the period of concern. Here we use these statements, presented in the preceding personal finance examples, to demonstrate calculation of Jan and Jon Smith's liquidity ratio for calendar year 2015.

The personal *liquidity ratio* is calculated by dividing total liquid assets by total current debt. It indicates the percent of annual debt obligations that an individual can meet using current liquid assets. The Smiths' total liquid assets were $2,225. Their total current debts are $21,539 (total current liabilities of $905 + mortgage payments of $16,864 + auto loan payments of $2,520 + appliance and furniture payments of $1,250). Substituting these values into the ratio formula, we get

$$\text{Liquidity ratio} = \frac{\text{Total liquid assets}}{\text{Total current debts}} = \frac{\$2{,}225}{\$21{,}539} = 0.103, \text{ or } 10.3\%$$

That ratio indicates that the Smiths can cover only about 10% of their existing 1-year debt obligations with their current liquid assets. Clearly, the Smiths plan to meet these debt obligations from their income, but this ratio suggests that their liquid funds do not provide a large cushion. One of their goals should probably be to build up a larger fund of liquid assets to meet unexpected expenses.

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. An additional problem with inventory as a liquid asset is that the times when companies face the most dire need for liquidity, when business is bad, are precisely the times when it is most difficult to convert inventory into cash by selling it. The quick ratio is calculated as

$$\text{Quick ratio} = \frac{\text{Current assets} - \text{Inventory}}{\text{Current liabilities}} \tag{3.2}$$

The quick ratio for Bartlett Company in 2015 is

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

As with the current ratio, the quick ratio level that a firm should strive to achieve depends largely on the nature of the business in which it operates. 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.

Matter of fact

The Importance of Inventories

Turn again to Table 3.5 and examine the columns listing current and quick ratios for different firms and industries. Notice that Dell has a current ratio of 1.3, as do The Home Depot and Lowe's. However, although the quick ratios for The Home Depot and Lowe's are dramatically lower than their current ratios, for Dell the current and quick ratios have nearly the same value. Why? For many years, Dell operated on a "built-to-order" business model that allowed it to hold very little inventory. In contrast, all it takes is a trip to your local Home Depot or Lowe's store to see that the business model in this industry requires a massive investment in inventory, which implies that the quick ratio will be much less than the current ratio for building materials firms.

→ REVIEW QUESTIONS

3–9 Under what circumstances would the current ratio be the preferred measure of overall firm liquidity? Under what circumstances would the quick ratio be preferred?

3–10 In Table 3.5, most of the specific firms listed have current ratios that fall below the industry average. Why? The exception to this general pattern is Whole Foods Market, which competes at the very high end of the retail grocery market. Why might Whole Foods Market operate with greater-than-average liquidity?

LG 3 3.4 Activity Ratios

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

Activity ratios measure the speed with which various accounts are converted into sales or cash, or inflows or outflows. In a sense, activity ratios measure how efficiently a firm operates along a variety of dimensions such as inventory management, disbursements, and collections. A number of ratios are available for measuring the activity of the most important current accounts, which include inventory, accounts receivable, and accounts payable. 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

$$\text{Inventory turnover} = \text{Cost of goods sold} \div \text{Inventory} \quad (3.3)$$

Applying this relationship to Bartlett Company in 2015 yields

$$\$2{,}088{,}000 \div \$289{,}000 = 7.2$$

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 turnover of 20 would not be unusual for a grocery store, whose goods are highly perishable and must be sold quickly, whereas an aircraft manufacturer might turn its inventory just four times per year.

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

Another inventory activity ratio measures how many days of inventory the firm has on hand. Inventory turnover can be easily converted into an **average age of inventory** by dividing it into 365. For Bartlett Company, the average age of inventory in 2015 is 50.7 days (365 ÷ 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. It is arrived at by dividing the average daily sales into the accounts receivable balance:[2]

$$\text{Average collection period} = \frac{\text{Accounts receivable}}{\text{Average sales per day}} = \frac{\text{Accounts receivable}}{\frac{\text{Annual sales}}{365}} \quad (3.4)$$

The average collection period for Bartlett Company in 2015 is

$$\frac{\$503{,}000}{\frac{\$3{,}074{,}000}{365}} = \frac{\$503{,}000}{\$8{,}422} = 59.7 \text{ days}$$

On average, it takes the firm 59.7 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 59.7 days may indicate a poorly managed credit department, 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 59.7-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.

Matter of fact

Who Gets Credit?

Notice in Table 3.5 the vast differences across industries in the average collection periods. Companies in the building materials, grocery, and merchandise store industries collect in just a few days, whereas firms in the computer industry take roughly 2 months to collect on their sales. The difference is primarily because these industries serve very different customers. Grocery and retail stores serve individuals who pay cash or use credit cards (which, to the store, are essentially the same as cash). Computer manufacturers sell to retail chains, businesses, and other large organizations that negotiate agreements that allow them to pay for the computers they order well after the sale is made.

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

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:

$$\text{Average payment period} = \frac{\text{Accounts payable}}{\text{Average purchases per day}} = \frac{\text{Accounts payable}}{\frac{\text{Annual purchases}}{365}} \quad (3.5)$$

The difficulty in calculating this ratio stems from the need to find annual purchases,[3] 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 2015, its average payment period is

$$\frac{\$382{,}000}{\frac{0.70 \times \$2{,}088{,}000}{365}} = \frac{\$382{,}000}{\$4{,}004} = 95.4 \text{ days}$$

The 95.4 days 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 because it was taking too long to pay its bills. Prospective lenders and suppliers of trade credit are 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

$$\text{Total asset turnover} = \text{Sales} \div \text{Total assets} \quad (3.6)$$

The value of Bartlett Company's total asset turnover in 2015 is

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

which means that the company turns over its assets 0.85 times per year.

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

Matter of fact

Sell It Fast

Observe in Table 3.5 that the grocery business turns over assets faster than any of the other industries listed. That makes sense because inventory is among the most valuable assets held by these firms, and grocery stores have to sell baked goods, dairy products, and produce quickly or throw such items away when they spoil. It's true that some items in a grocery store have a shelf life longer than anyone really wants to know (think Twinkies), but on average a grocery store has to replace its entire inventory in just a few days or weeks, and that practice contributes to the rapid turnover of the firm's total assets.

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

3–11 To assess the firm's average collection period and average payment period ratios, what additional information is needed, and why?

LG 4 3.5 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 contractual payments over the long run. The more debt a firm has, the greater its risk of being unable to meet its contractual debt payments. Because creditors' claims must be satisfied before the earnings can be distributed to shareholders, current and prospective shareholders pay close attention to the firm's ability to repay debts. Lenders are also concerned about the firm's indebtedness.

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

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 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.

Example 3.5 ▸ 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.

Patty expects $30,000 in sales, $18,000 in operating expenses, and a 40% tax rate. Projected balance sheets and income statements associated with the two plans are summarized in Table 3.6. 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.

TABLE 3.6 Financial Statements Associated with Patty's Alternatives

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

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 whether Patty's business is profitable or not.

The previous 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 effect of debt on the firm's risk, return, and value is included in Chapter 12. Here, we emphasize the use of financial leverage ratios to assess externally a firm's debt position.

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.

There are two general types of leverage 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. Two popular measures of the degree of indebtedness are the debt ratio and the debt-to-equity ratio.

The second type of leverage measures, the **ability to service debts,** reflect a firm's ability to make the payments required on a scheduled basis over the life of a debt. The term *to service debts* simply means to pay debts on time. The firm's ability to pay certain fixed charges is measured using **coverage ratios.** Typically, higher coverage ratios are preferred (especially by the firm's lenders), but a very high ratio might indicate that the firm's management is too conservative and might be able to earn higher returns by borrowing more. 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.

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

$$\text{Debt ratio} = \text{Total liabilities} \div \text{Total assets} \quad (3.7)$$

The debt ratio for Bartlett Company in 2015 is

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

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.

DEBT-TO-EQUITY RATIO

debt-to-equity ratio
Measures the relative proportion of total liabilities and common stock equity used to finance the firm's total assets.

The **debt-to-equity ratio** measures the relative proportion of total liabilties to common stock equity used to finance the firm's assets. As with debt ratio, the higher this ratio, the greater the firm's use of financial leverage. The debt-to-equity ratio is calculated as

$$\text{Debt to equity ratio} = \text{Total liabilities} \div \text{Common stock equity} \quad (3.8)$$

The debt-to-equity ratio for Bartlett Company in 2015 is

$$\$1{,}643{,}000 \div \$1{,}754{,}000 = 0.937 = 93.7\%$$

This result tells us that for every $1.00 common stockholders have invested in Bartlett Company, the company owes about 94 cents to creditors. 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. It is important to note that several methods exist for calculating the debt-to-equity ratio. A common alternative uses only long-term debt in the numerator. In that case, the ratio in 2015 for Bartlett Company is

$$\$1{,}023{,}000 \div \$1{,}754{,}000 = 0.583 = 58.3\%$$

When conducting ratio analyses, some financial analysts choose to focus on all stockholders rather than only common stockholders, in which case they use values relevant to all stockholders such as net profits after taxes (instead of earnings available for common stockholders) and total stockholders' equity (instead of common stock equity). Clearly, different methods can lead to very different results. Regardles of which method is used, however, a low debt-to-equity ratio is often viewed as an indication that a company is not taking sufficient advantage of financial leverage to increase profits, whereas a high debt-to-equity ratio is often viewed as an indication that a company may not be able to generate enough cash to satisfy its debt obligations.

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

$$\text{Times interest earned ratio} = \text{Earnings before interest and taxes} \div \text{Interest} \quad (3.9)$$

The figure for *earnings before interest and taxes (EBIT)* is the same as that for *operating profits* shown in the income statement. Applying this ratio to Bartlett Company yields the 2015 value of

$$\text{Time interest earned ratio} = \$418{,}000 \div \$93{,}000 = 4.49$$

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 [(4.49 − 1.0) ÷ 4.49] and the firm would still be able to pay the $93,000 in interest it owes. Thus, the firm has a large margin of safety.

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

FIXED-PAYMENT COVERAGE RATIO

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. As is true of the times interest earned ratio, the higher this value, the better. The formula for the fixed-payment coverage ratio is

$$\text{Fixed-payment coverage ratio} = \frac{\text{Earnings before interest and taxes} + \text{Lease payments}}{\text{Interest} + \text{Lease payments} + \{(\text{Principal payments} + \text{Preferred stock dividends}) \times [1/(1-T)]\}} \quad (3.10)$$

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-tax values of all other terms. Applying the formula to Bartlett Company's 2015 data yields

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

$$= \frac{\$453{,}000}{\$242{,}000} = 1.87$$

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, and 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

3–12 What is *financial leverage?*

3–13 What ratio measures the firm's *degree of indebtedness?* What ratios assess the firm's *ability to service debts?*

LG 5

3.6 Profitability Ratios

There are many measures of profitability. As a group, these measures enable analysts 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 the market places on earnings.

COMMON-SIZE INCOME STATEMENTS

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

A useful tool for evaluating profitability in relation to sales is the **common-size income statement.** Each item on this statement is expressed as a percentage of sales. Common-size income statements are especially useful when comparing performance across years because it is easy to see if certain categories of expenses are trending up or down as a percentage of the total volume of business that the company transacts. Three frequently cited ratios of profitability that come 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 2015 and 2014 for Bartlett Company are presented and evaluated in Table 3.7 on page 129. These statements reveal that the firm's cost of goods sold increased from 66.7 percent of sales in 2014 to 67.9 percent in 2015, 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 2014 to 7.2 percent in 2015. The decrease in expenses more than compensated for the increase in the cost of goods sold. A decrease in the firm's 2015 interest expense (3.0 percent of sales versus 3.5 percent in 2014) added to the increase in 2015 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

$$\text{Gross profit margin} = \frac{\text{Sales} - \text{Cost of goods sold}}{\text{Sales}} = \frac{\text{Gross profits}}{\text{Sales}} \quad (3.11)$$

Bartlett Company's gross profit margin for 2015 is

$$\frac{\$3{,}074{,}000 - \$2{,}088{,}000}{\$3{,}074{,}000} = \frac{\$986{,}000}{\$3{,}074{,}000} = 0.321 = 32.1\%$$

This value is labeled (1) on the common-size income statement in Table 3.7.

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.

OPERATING PROFIT MARGIN

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

TABLE 3.7 Bartlett Company Common-Size Income Statements

	For the years ended December 31		Evaluation[a]
	2015	2014	2014–2015
Sales revenue	100.0%	100.0%	Same
Less: Cost of goods sold	67.9	66.7	Worse
(1) Gross profit margin	32.1%	33.3%	Worse
Less: Operating expenses			
Selling expense	3.3%	4.2%	Better
General and administrative expenses	6.8	6.7	Worse
Lease expense	1.1	1.3	Better
Depreciation expense	7.3	9.3	Better
Total operating expense	18.5%	21.5%	Better
(2) Operating profit margin	13.6%	11.8%	Better
Less: Interest expense	3.0	3.5	Better
Net profits before taxes	10.6%	8.3%	Better
Less: Taxes	3.1	2.5	Worse[b]
Net profits after taxes	7.5%	5.8%	Better
Less: Preferred stock dividends	0.3	0.4	Better
(3) Net profit margin	7.2%	5.4%	Better

[a]Subjective assessments based on data provided.

[b]Taxes as a percentage of sales increased noticeably between 2014 and 2015 because of differing costs and expenses, whereas the average tax rates (taxes ÷ net profits before taxes) for 2014 and 2015 remained about the same: 30% and 29%, respectively.

on operations and ignore interest, taxes, and preferred stock dividends. A high operating profit margin is preferred. The operating profit margin is calculated as

$$\text{Operating profit margin} = \text{Operating profits} \div \text{Sales} \quad (3.12)$$

Bartlett Company's operating profit margin for 2015 is

$$\$418{,}000 \div \$3{,}074{,}000 = 0.136 = 13.6\%$$

This value is labeled (2) on the common-size income statement in Table 3.7.

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

$$\text{Net profit margin} = \text{earnings available for common stockholders} \div \text{Sales} \quad (3.13)$$

Bartlett Company's net profit margin for 2015 is

$$\$221{,}000 \div \$3{,}074{,}000 = 0.072 = 7.2\%$$

This value is labeled (3) on the common-size income statement in Table 3.7.

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)

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

$$\text{Earnings per share} = \frac{\text{Earnings available for common stockholders}}{\text{Number of shares of common stock outstanding}} \quad (3.14)$$

Bartlett Company's earnings per share in 2015 is

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

This figure represents the dollar amount earned *on behalf of* each outstanding share of common stock. 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 3.1), rose to $1.29 in 2015 from $0.75 in 2014. EPS is closely watched by the investing public and is considered an important indicator of corporate success.

RETURN ON TOTAL ASSETS (ROA)

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).*

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

$$\text{ROA} = \text{Earnings available for common stockholders} \div \text{Total assets} \quad (3.15)$$

Bartlett Company's return on total assets in 2015 is

$$\$221{,}000 \div \$3{,}597{,}000 = 0.061 = 6.1\%$$

This value indicates that the company earned 6.1 cents on each $1.00 of common stockholders' asset investment. When a firm has preferred stock outstanding, the return on assets can be calculated for all stockholders by dividing the net profits after taxes by total assets. In this case, you would arrive at an ROA of 6.4 percent.

RETURN ON EQUITY (ROE)

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

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

$$\text{ROE} = \text{Earnings available for common stockholders} \div \text{Common stock equity} \quad (3.16)$$

The ROE for Bartlett Company in 2015 is

$$\$221{,}000 \div \$1{,}754{,}000 = 0.126 = 12.6\%$$

The calculated ROE of 12.6 percent indicates that during 2015 Bartlett earned 12.6 cents on each $1.00 of common stock equity. Here again, some analysts will elect to calculate ROE across stockholders when preferred stock is outstanding. In this case, net profits after taxes ($231,000) is divided by total stockholders' equity ($1,954,000) to arrive at return on total stockholders' equity of 11.8 percent. More often than not, publicly traded companies will not have preferred stock, so the return on total stockholders' equity will, more often than not, be the same as the ROE for common equity. The same can be said for the ROA calculations.

→ REVIEW QUESTIONS

3–14 What three ratios of profitability are found on a *common-size income statement?*

3–15 What would explain a firm's having a high gross profit margin and a low net profit margin?

3–16 Which measure of profitability is probably of greatest interest to the investing public? Why?

LG 5 3.7 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 investors in the marketplace believe that 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 widely quoted market ratios, one that focuses on earnings and another that considers book value.

PRICE/EARNINGS (P/E) RATIO

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 the investor confidence.

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

$$\text{P/E ratio} = \text{Market price per share of common stock} \div \text{Earnings per share} \quad (3.17)$$

If Bartlett Company's common stock at the end of 2015 was selling at $32.25, the P/E ratio, using the EPS of $2.90, at year-end 2015 is

$$\$32.25 \div \$2.90 = 11.12$$

This figure indicates that investors were paying $11.12 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

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.

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 its 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:*

$$\text{Book value per share of common stock} = \frac{\text{Common stock equity}}{\text{Number of shares of common stock outstanding}} \quad (3.18)$$

Substituting the appropriate values for Bartlett Company from its 2015 balance sheet, we get

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

The formula for the market/book ratio is

$$\text{Market/book (M/B) ratio} = \frac{\text{Market price per share of common stock}}{\text{Book value per share of common stock}} \quad (3.19)$$

Substituting Bartlett Company's end of 2015 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

$$\$32.25 \div \$23.00 = 1.40$$

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 their 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 return and risk compared to peer firms.

→ REVIEW QUESTION

3–17 How do the *price/earnings (P/E) ratio* and the *market/book (M/B) ratio* provide a feel for the firm's return and risk?

LG 6 3.8 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 2015 ratio values calculated earlier and the ratio values calculated for 2013 and 2014 for Bartlett Company, along with the industry average ratios for 2015, are summarized in Table 3.8 (see pages 134 and 135), 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.

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 2015. 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 2015 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, which 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 2013 and 2014. Although in 2015 it rose to a level considerably above the industry average, it appears that the pre-2014 level of efficiency has not yet been achieved.

Debt

Bartlett Company's indebtedness increased over the 2013–2015 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 2014 to 2015, to a level that outperforms the industry. The firm's increased indebtedness in 2014 apparently caused deterioration in its ability to pay debt adequately. However, Bartlett has evidently improved its income in 2015 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 2014 was an off year, the company's improved ability to pay debts in 2015 compensates for its increased degree of indebtedness.

Profitability

Bartlett's profitability relative to sales in 2015 was better than the average company in the industry, although it did not match the firm's 2013 performance. Although the *gross* profit margin was better in 2014 and 2015 than in 2013, higher levels of operating and interest expenses in 2014 and 2015 appear to have caused the 2015 *net* profit margin to fall below that of 2013. However, Bartlett Company's 2015 net profit margin is quite favorable when compared with 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 2013–2015 period. Bartlett appears to have experienced either a sizable drop in sales between 2013 and 2014 or a rapid expansion in assets during that period. The exceptionally

TABLE 3.8 Summary of Bartlett Company Ratios (2010–2015, Including 2015 Industry Averages)

Ratio	Formula	Year			Industry average	Evaluation[d]		
		2013[a]	2014[b]	2015[b]	2015[c]	Cross-sectional 2015	Time-series 2013–2015	Overall
Liquidity								
Current ratio	$\frac{\text{Current assets}}{\text{Current liabilities}}$	2.04	2.08	1.97	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
Activity								
Inventory turnover	$\frac{\text{Cost of goods sold}}{\text{Inventory}}$	5.1	5.7	7.2	6.6	Good	Good	Good
Average collection period	$\frac{\text{Accounts receivable}}{\text{Average sales per day}}$	43.9 days	51.2 days	59.7 days	44.3 days	Poor	Poor	Poor
Average payment period	$\frac{\text{Accounts payable}}{\text{Average purchases per day}}$	75.8 days	81.2 days	95.4 days	66.5 days	Poor	Poor	Poor
Total assets turnover	$\frac{\text{Sales}}{\text{Total assets}}$	0.94	0.79	0.85	0.75	OK	OK	OK
Debt								
Debt ratio	$\frac{\text{Total liabilities}}{\text{Total assets}}$	36.8%	44.3%	45.7%	40.0%	OK	OK	OK
Times interest earned ratio	$\frac{\text{Earnings before interest and taxes}}{\text{Interest}}$	5.6	3.3	4.5	4.3	Good	OK	OK
Fixed-payment coverage ratio	$\frac{\text{Earnings before interest and taxes} + \text{Lease payments}}{\text{Int.} + \text{Lease pay.} + \{(\text{Prin.} + \text{Pref. div.}) \times [1/(1-T)]\}}$	2.4	1.4	1.9	1.5	Good	OK	Good
Profitability								
Gross profit margin	$\frac{\text{Gross profits}}{\text{Sales}}$	31.4%	33.3%	32.1%	30.0%	OK	OK	OK
Operating profit margin	$\frac{\text{Operating profits}}{\text{Sales}}$	14.6%	11.8%	13.6%	11.0%	Good	OK	Good
Net profit margin	$\frac{\text{Earnings available for common stockholders}}{\text{Sales}}$	8.2%	5.4%	7.2%	6.2%	Good	OK	Good

Ratio	Formula	Year 2013[a]	Year 2014[b]	Year 2015[b]	Industry average 2015[c]	Evaluation[d] Cross-sectional 2015	Evaluation[d] Time-series 2013–2015	Evaluation[d] Overall
Profitability (cont.)								
Earnings per share (EPS)	$\frac{\text{Earnings available for common stockholders}}{\text{Number of shares of common stock outstanding}}$	$3.26	$1.81	$2.90	$2.26	Good	OK	Good
Return on total assets (ROA)	$\frac{\text{Earnings available for common stockholders}}{\text{Total assets}}$	7.8%	4.2%	6.1%	4.6%	Good	OK	Good
Return on equity (ROE)	$\frac{\text{Earnings available for common stockholders}}{\text{Common stock equity}}$	13.7%	8.5%	12.6%	8.5%	Good	OK	Good
Market								
Price/earnings (P/E) ratio	$\frac{\text{Market price per share of common stock}}{\text{Earnings per share}}$	10.5	10.0[e]	11.1	12.5	OK	OK	OK
Market/book (M/B) ratio	$\frac{\text{Market price per share of common stock}}{\text{Book value per share of common stock}}$	1.25	0.85[e]	1.40	1.30	OK	OK	OK

[a]Calculated from data not included in this chapter.

[b]Calculated by using the financial statements presented in Tables 3.1 and 3.2.

[c]Obtained from sources not included in this chapter.

[d]Subjective assessments based on data provided.

[e]The market price per share at the end of 2014 was $18.06.

high 2015 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 it being more risky than average. A look at market ratios is helpful in assessing risk.

Market

Investors have greater confidence in the firm in 2015 than in the prior 2 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 2013–2015 period, and in 2015 it exceeds the industry average, which 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 2013–2015 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 2014–2015 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 2015.

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 3.2 depicts the basic DuPont system with Bartlett Company's 2015 monetary and ratio values. The upper portion of the chart summarizes the income statement activities, and the lower portion summarizes the balance sheet activities.

DuPont Formula

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

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 for net profit margin and total asset turnover into the equation and simplifying results in the formula for ROA given earlier,

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

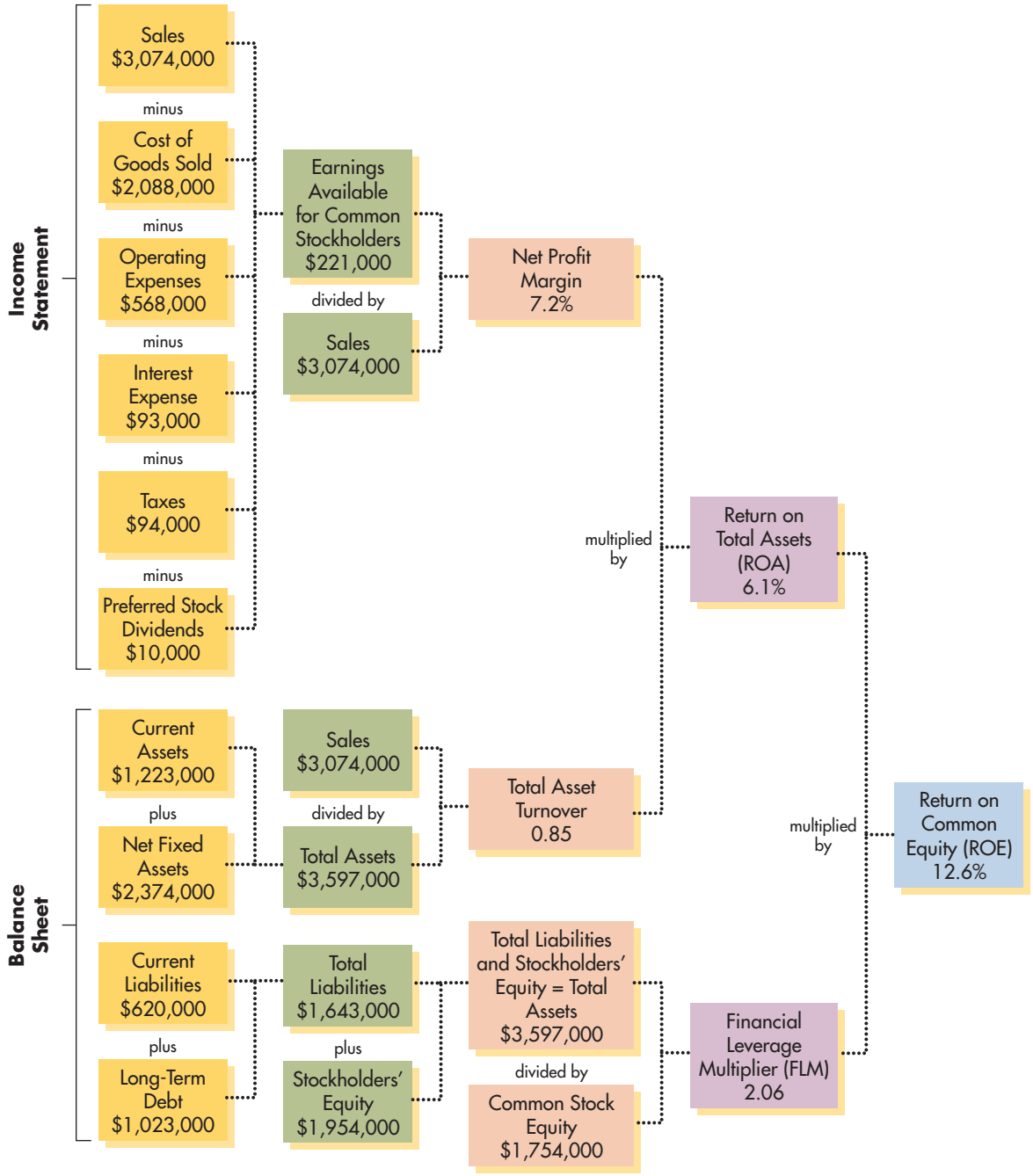
When the 2015 values of the net profit margin and total asset turnover for Bartlett Company, calculated earlier, are substituted into the DuPont formula, the result is

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

FIGURE 3.2

DuPont System of Analysis

The DuPont system of analysis with application to Bartlett Company (2015)



This value is the same as that calculated directly in Section 3.6 (page 130). 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.

Modified DuPont Formula

modified DuPont formula
Relates the firm's *return on total assets (ROA)* to its *return on 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 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 for ROA and FLM into the equation and simplifying results in the formula for ROE 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 FLM to convert the ROA into the ROE reflects the effect 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 2.051 ($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 131).

The FLM is also often referred to as the equity multiplier, and it is sometimes calculated using total stockholder's equity in the denominator. Regardless of whether one chooses to use common stock equity or total stockholders' equity, it is important to realize that the multiplier, the debt ratio, and debt-to-equity ratio are all related such that any one of them can be directly calculated from the other two. For example, using the debt-to-equity and debt ratios shown on page 126, we can calculate the multiplier as

$$0.937 \div 0.457 = 2.05$$

In this case, we see that the debt-to-equity ratio divided by the debt ratio provides us with the financial leverage multiplier. Just be sure that your choices of liabilities and stockholder equity are consistent across the three measures when relating them to one another.

Matter of fact

Dissecting ROA

Return to Table 3.5, and examine the total asset turnover figures for Dell and The Home Depot. Both firms turn their assets 1.6 times per year. Now look at the return on assets column. Dell's ROA is 4.3 percent, but The Home Depot's is significantly higher at 6.5 percent. If the two firms are equal in terms of the efficiency with which they manage their assets (that is, equal asset turns), why is The Home Depot more profitable relative to assets? The answer lies in the DuPont formula. Notice that Home Depot's net profit margin is 4.0 percent compared with Dell's 2.7 percent. That difference drives the superior ROA figures for The Home Depot.

Applying the DuPont System

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 can therefore be analyzed in these important dimensions.

The use of the DuPont system of analysis as a diagnostic tool is best explained using Figure 3.2. Beginning with the rightmost value—the ROE—the financial

analyst moves to the left, dissecting and analyzing the inputs to the formula to isolate the probable cause of the resulting above-average (or below-average) value.

Example 3.6 ▸

MyFinanceLab Solution Video

For the sake of demonstration, let's ignore all industry average data in Table 3.8 and assume that Bartlett's ROE of 12.6% is actually below the industry average. Moving to the left in Figure 3.2, 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.

We can readily 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

3–18 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?

3–19 Describe how you would use a large number of ratios to perform a complete ratio analysis of the firm.

3–20 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.

REVIEW OF LEARNING GOALS

LG 1 **Review the contents of the stockholders' report and the procedures for consolidating international financial statements.** The annual stockholders' report, which publicly owned corporations must provide to stockholders, documents the firm's financial activities of the past year. It includes the letter to stockholders and various subjective and factual information. It also contains four key financial statements: the income statement, the balance sheet, the statement of stockholders' equity (or its abbreviated form, the statement of retained earnings), and the statement of cash flows. Notes describing the technical aspects of the financial statements follow. Financial statements of companies that have operations whose cash flows are denominated in one or more foreign currencies must be translated into U.S. dollars in accordance with *FASB Standard No. 52*.

LG 2 **Understand who uses financial ratios and how.** Ratio analysis enables stockholders, lenders, and the firm's managers 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. Users of ratios should understand the cautions that apply to their use.

LG 3 **Use ratios to analyze a firm's liquidity and activity.** Liquidity, or the 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, or 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.

LG 4 **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.

LG 5 **Use ratios to analyze a firm's profitability and its market value.** The common-size income statement, which shows each item 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.

LG 6 **Use a summary of financial ratios and the DuPont system of analysis to perform a complete ratio analysis.** A summary of all ratios can be used to perform a complete ratio analysis using cross-sectional and time-series analysis. The DuPont system of analysis 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 financial leverage.

Opener-in-Review

For the year ended December 31, 2012, General Dynamics reported sales of $31.5 million and cost of goods sold of $26.4 million. What was the company's gross profit margin that year?

Self-Test Problems (Solutions in Appendix)

LG 3 LG 4 LG 5

ST3–1 **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 may have if that ratio is too high relative to the industry average. What if the ratio is too low relative to the industry average? 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 =		
Price/earnings (P/E) ratio =		

LG 3 LG 4 LG 5

ST3–2 **Balance sheet completion using ratios** Complete the 2015 balance sheet for O'Keefe Industries using the information that follows it.

O'Keefe Industries Balance Sheet December 31, 2015

Assets		Liabilities and Stockholders' Equity	
Cash	$32,720	Accounts payable	$120,000
Marketable securities	25,000	Notes payable	_____
Accounts receivable	_____	Accruals	20,000
Inventories	_____	Total current liabilities	_____
Total current assets	_____	Long-term debt	_____
Net fixed assets	_____	Stockholders' equity	$600,000
Total assets	$_____	Total liabilities and stockholders' equity	$_____

The following financial data for 2015 are also available:

1. Sales totaled $1,800,000.
2. The gross profit margin was 25%.
3. Inventory turnover was 6.0.
4. There are 365 days in the year.
5. The average collection period was 40 days.
6. The current ratio was 1.60.
7. The total asset turnover ratio was 1.20.
8. The debt ratio was 60%.

Warm-Up Exercises

All problems are available in MyFinanceLab.

LG 1 **E3–1** You are a summer intern at the office of a local tax preparer. To test your basic knowledge of financial statements, your manager, who graduated from your alma mater 2 years ago, gives you the following list of accounts and asks you to prepare a simple income statement using those accounts.

Accounts	($000,000)
Depreciation	25
General and administrative expenses	22
Sales	345
Sales expenses	18
Cost of goods sold	255
Lease expense	4
Interest expense	3

a. Arrange the accounts into a well-labeled income statement. Make sure you label and solve for gross profit, operating profit, and net profit before taxes.
b. Using a 35% tax rate, calculate taxes paid and net profit after taxes.
c. Assuming a dividend of $1.10 per share with 4.25 million shares outstanding, calculate EPS and additions to retained earnings.

LG 1 **E3–2** Explain why the income statement can also be called a "profit-and-loss statement." What exactly does the word *balance* mean in the title of the balance sheet? Why do we balance the two halves?

LG 1 **E3–3** Ocean Terminal Company Limited started its business in 2014 with retained earnings of $68,450,000. It paid two semiannual dividends of $0.23 per share to 3,250,000 preferred stockholders during the year. Common stockholders, holding 9,800,000 common shares, were paid four quarterly dividends of $0.25 per share. The company had a net profit after taxes of $6,340,000. Prepare the statement of retained earnings for the year ended December 31, 2014.

LG 3 **E3–4** Bluestone Metals, Inc., is a metal fabrication firm that manufactures prefabricated metal parts for customers in a variety of industries. The firm's motto is "If you need it, we can make it." The CEO of Bluestone recently held a board meeting during which he extolled the virtues of the corporation. The company, he stated

confidently, had the capability to build any product and could do so using a lean manufacturing model. The firm would soon be profitable, claimed the CEO, because the company used state-of-the-art technology to build a variety of products while keeping inventory levels low. As a business press reporter, you have calculated some ratios to analyze the financial health of the firm. Bluestone's current ratios and quick ratios for the past 6 years are shown in the following table:

	2010	2011	2012	2013	2014	2015
Current ratio	1.2	1.4	1.3	1.6	1.8	2.2
Quick ratio	1.1	1.3	1.2	0.8	0.6	0.4

What do you think of the CEO's claim that the firm is lean and soon to be profitable? (*Hint:* Is there a possible warning sign in the relationship between the two ratios?)

LG 6 **E3–5** If we know that a firm has a net profit margin of 4.5%, total asset turnover of 0.72, and a financial leverage multiplier of 1.43, what is its ROE? What is the advantage to using the DuPont system to calculate ROE over the direct calculation of earnings available for common stockholders divided by common stock equity?

Problems

All problems are available in MyFinanceLab.

LG 1 **P3–1** **Reviewing basic financial statements** The income statement for the year ended December 31, 2015, the balance sheets for December 31, 2015 and 2014, and the statement of retained earnings for the year ended December 31, 2015, for Technica, Inc., are given below and on the following page. Briefly discuss the form and informational content of each of these statements.

Technica, Inc., Income Statement for the Year Ended December 31, 2015

Sales revenue	$600,000
Less: Cost of goods sold	460,000
Gross profits	$140,000
Less: Operating expenses	
General and administrative expenses	$ 30,000
Depreciation expense	30,000
Total operating expense	$ 60,000
Operating profits	$ 80,000
Less: Interest expense	10,000
Net profits before taxes	$ 70,000
Less: Taxes	27,100
Earnings available for common stockholders	$ 42,900
Earnings per share (EPS)	$2.15

Technica, Inc., Balance Sheets

	December 31	
Assets	**2015**	**2014**
Cash	$ 15,000	$ 16,000
Marketable securities	7,200	8,000
Accounts receivable	34,100	42,200
Inventories	82,000	50,000
Total current assets	$138,300	$116,200
Land and buildings	$150,000	$150,000
Machinery and equipment	200,000	190,000
Furniture and fixtures	54,000	50,000
Other	11,000	10,000
Total gross fixed assets	$415,000	$400,000
Less: Accumulated depreciation	145,000	115,000
Net fixed assets	$270,000	$285,000
Total assets	$408,000	$401,200
Liabilities and Stockholders' Equity		
Accounts payable	$ 57,000	$ 49,000
Notes payable	13,000	16,000
Accruals	5,000	6,000
Total current liabilities	$ 75,000	$ 71,000
Long-term debt	$150,000	$160,000
Common stock equity (shares outstanding: 19,500 in 2015 and 20,000 in 2014)	$110,200	$120,000
Retained earnings	73,100	50,200
Total stockholders' equity	$183,300	$170,200
Total liabilities and stockholders' equity	$408,300	$401,200

Technica, Inc., Statement of Retained Earnings for the Year Ended December 31, 2015

Retained earnings balance (January 1, 2015)	$50,200
Plus: Net profits after taxes (for 2015)	42,900
Less: Cash dividends (paid during 2015)	20,000
Retained earnings balance (December 31, 2015)	$73,100

LG 1

P3–2 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		

LG 1

P3–3 **Income statement preparation** David Chan operates Speedy Delivery Service Company, a fleet of delivery trucks in a large metropolitan area, and has just completed his first full year in business. During the year, the company billed $420,000 for delivery services. David has a total of 11 employees (10 truck drivers and a clerical assistant). In addition to his own *monthly* salary of $5,000, David paid *annual* salaries of $12,100 and $10,000 to each of the truck drivers and the clerical assistant, respectively. Employment taxes and benefit costs for David and his employees totaled $42,600 for the year. Sundry expenses, including office supplies, totaled $12,400 for the year. In addition, David spent $22,000 during the year on tax-deductible travel and entertainment associated with client visits and new business development. Lease payments for the rented office space (a tax-deductible expense) were $2,800 *per month*. Depreciation expense on the office furniture and delivery trucks was $16,300 for the year. During the year, David paid an interest of $18,000 on the $150,000 borrowed to start the business. The company was subject to an average tax rate of 40% during 2014.

a. Prepare an income statement for Speedy Delivery Service Company for the year ended December 31, 2014.

b. Evaluate the financial performance of the company in 2014.

Personal Finance Problem

LG 1

P3–4 Income statement preparation Adam and Arin Adams have collected their personal income and expense information and have asked you to put together an income and expense statement for the year ended December 31, 2015. The following information is received from the Adams family.

Adam's salary	$45,000	Utilities	$ 3,200
Arin's salary	30,000	Groceries	2,200
Interest received	500	Medical	1,500
Dividends received	150	Property taxes	1,659
Auto insurance	600	Income tax, Social Security	13,000
Home insurance	750	Clothes and accessories	2,000
Auto loan payment	3,300	Gas and auto repair	2,100
Mortgage payment	14,000	Entertainment	2,000

a. Create a personal *income and expense statement* for the period ended December 31, 2015. It should be similar to a corporate income statement.
b. Did the Adams family have a cash surplus or cash deficit?
c. If the result is a surplus, how can the Adams family use that surplus?

LG 1

P3–5 Calculation of EPS and retained earnings Zerbel Company Limited ended the year with a net profit *before* taxes of $361,000 in 2015. The company is subject to a 40% tax rate, and committed to pay $52,000 in preferred stock dividends before distributing any earnings on the 200,000 shares of common stock currently outstanding.
a. Calculate Zerbel's 2015 earnings per share (EPS).
b. If the firm paid common stock dividends of $0.60 per share, how many dollars would go to retained earnings?

LG 1

P3–6 Balance sheet preparation Use the *appropriate items* from the following list to prepare in good form Mellark's Baked Goods balance sheet at December 31, 2015.

Item	Value ($000) at December 31, 2015	Item	Value ($000) at December 31, 2015
Accounts payable	$ 220	Inventories	$ 375
Accounts receivable	450	Land	100
Accruals	55	Long-term debts	420
Accumulated depreciation	265	Machinery	420
Buildings	225	Marketable securities	75
Cash	215	Notes payable	475
Common stock (at par)	90	Paid-in capital in excess of par	360
Cost of goods sold	2,500		
Depreciation expense	45	Preferred stock	100
Equipment	140	Retained earnings	210
Furniture and fixtures	170	Sales revenue	3,600
General expense	320	Vehicles	25

Personal Finance Problem

LG 1 **P3–7 Balance sheet preparation** Adam and Arin Adams have collected their personal asset and liability information and have asked you to put together a balance sheet as of December 31, 2015. The following information is received from the Adams family.

Cash	$ 300	Retirement funds, IRA	$ 2,000
Checking	3,000	2014 Sebring	15,000
Savings	1,200	2010 Jeep	8,000
IBM stock	2,000	Money market funds	1,200
Auto loan	8,000	Jewelry and artwork	3,000
Mortgage	100,000	Net worth	76,500
Medical bills payable	250	Household furnishings	4,200
Utility bills payable	150	Credit card balance	2,000
Real estate	150,000	Personal loan	3,000

a. Create a personal balance sheet as of December 31, 2015. It should be similar to a corporate balance sheet.
b. What must the total assets of the Adams family be equal to by December 31, 2015?
c. What was their *net working capital (NWC)* for the year? (*Hint:* NWC is the difference between total liquid assets and total current liabilities.)

LG 1 **P3–8 Effect of net income on a firm's balance sheet** Relaxing Resort Group reported net income of $1,736,000 for the year ended December 31, 2015. Show how Relaxing Resort Group's balance sheet would change from 2014 to 2015 depending on how Relaxing Resort Group "spent" those earnings as described in the situations that appear below.

Relaxing Resort Group Balance Sheet as of December 31, 2014

Assets		Liabilities and Stockholders' Equity	
Cash	$ 120,000	Accounts payable	$ 170,000
Marketable securities	56,000	Short-term notes	76,000
Accounts receivable	66,000	Current liabilities	$ 246,000
Inventories	$ 130,000	Long-term debt	$3,210,500
Current assets	$ 372,000	Total liabilities	$3,456,500
Equipment	$3,928,000	Common stock	$ 500,000
Buildings	$1,600,000	Retained earnings	$1,964,500
Fixed assets	$5,528,000	Stockholders' equity	$2,464,500
Total assets	$5,900,000	Total liabilities and equity	$5,921,000

a. Relaxing Resort Group paid no dividends during the year and invested the funds in marketable securities.
b. Relaxing Resort Group paid dividends totaling $800,000 and used the balance of the net income to retire (pay off) long-term debt.
c. Relaxing Resort Group paid dividends totaling $800,000 and invested the balance of the net income in building a new coffee lounge.
d. Relaxing Resort Group paid out all $1,736,000 as dividends to its stockholders.

LG 1 **P3–9 Initial sale price of common stock** B&J Dental Group has one issue of preferred stock and one issue of common stock outstanding. Given B&J'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	$ 375
Common stock ($0.50 par, 500,000 shares outstanding)	250
Paid-in capital in excess of par on common stock	2,376
Retained earnings	950
Total stockholders' equity	$3,951

LG 1 **P3–10 Statement of retained earnings** Hayes Enterprises began 2015 with a retained earnings balance of $1,151,000. During 2015, the firm earned $528,000 after taxes. From this amount, preferred stockholders were paid $98,000 in dividends. At year-end 2015, the firm's retained earnings totaled $1,324,000. The firm had 100,000 shares of common stock outstanding during 2015.

a. Prepare a statement of retained earnings for the year ended December 31, 2015, for Hayes Enterprises. (*Note:* Be sure to calculate and include the amount of cash dividends paid in 2015.)

b. Calculate the firm's 2015 earnings per share (EPS).

c. How large a per-share cash dividend did the firm pay on common stock during 2015?

LG 1 **P3–11 Changes in stockholders' equity** Listed are the equity sections of balance sheets for years 2014 and 2015 as reported by Golden Mine, Inc. The overall value of stockholders' equity has risen from $2,370,000 to $9,080,000. Use the statements to discover how and why that happened.

Golden Mine, Inc. Balance Sheets (partial)		
Stockholders' equity	**2014**	**2015**
Common stock ($1.00 par)		
Authorized: 5,000,000 shares		
Outstanding: 1,200,000 shares 2015		$1,200,000
600,000 shares 2014	$ 600,000	
Paid-in capital in excess of par	250,000	5,500,000
Retained earnings	1,520,000	2,380,000
Total stockholders' equity	$2,370,000	$9,080,000

The company paid total dividends of $240,000 during fiscal 2015.

a. What was Golden Mine's net income for fiscal 2015?

b. How many new shares did the corporation issue and sell during 2015?

c. What was the average price per share of the new stock sold during 2015?

d. At what average price per share did Golden Mine's original 600,000 shares sell?

LG 2 LG 3 LG 4 LG 5

P3–12 Ratio comparisons Robert Arias recently inherited a stock portfolio from his uncle. Wishing to learn more about the companies in which he is now invested, Robert performs a ratio analysis on each one and decides to compare them to one another. 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	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.

a. What problems might Robert encounter in comparing these companies to one another on the basis of their ratios?

b. 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?

c. Why might it be all right for the electric utility to carry a large amount of debt, but not the software company?

d. Why wouldn't investors invest all their money in software companies instead of in less profitable companies? (Focus on risk and return.)

LG 3

P3–13 Liquidity management Bauman Company's total current assets, total current liabilities, and inventory for each of the past 4 years follow:

Item	2012	2013	2014	2015
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

a. Calculate the firm's current and quick ratios for each year. Compare the resulting time series for these measures of liquidity.

b. Comment on the firm's liquidity over the 2012–2013 period.

c. If you were told that Bauman Company's inventory turnover for each year in the 2012–2015 period and the industry averages were as follows, would this information support or conflict with your evaluation in part **b**? Why?

Inventory turnover	2012	2013	2014	2015
Bauman Company	6.3	6.8	7.0	6.4
Industry average	10.6	11.2	10.8	11.0

Personal Finance Problem

LG 3 **P3–14** **Liquidity ratio** Joyce Cheung has compiled some of her personal financial data to determine her liquidity position. The data are as follows.

Account	Amount
Cash	$5,300
Marketable securities	1,800
Checking account	2,500
Credit card payables	2,300
Short-term notes payable	1,090

a. Calculate Joyce's *liquidity ratio*.
b. Several of Joyce's friends have told her that they have liquidity ratios of about 1.9. How would you analyze Joyce's liquidity relative to her friends?

LG 3 **P3–15** **Inventory management** Efficient Production Incorporation has annual sales of $5.8 million and a gross profit margin of 30%. Its *end-of-quarter inventories* are

Quarter	Inventory
1	$ 300,000
2	570,000
3	890,000
4	430,000

a. Find the average quarterly inventory, and use it to calculate the firm's inventory turnover and the average age of inventory.
b. Assuming that the company is in an industry with an average inventory turnover of 4.8, how would you evaluate the activity of Efficient Production's inventory?

LG 3 **P3–16** **Accounts receivable management** Speedy Manufacturing Company's end-of-year accounts receivable balance consists of amounts originating in the months indicated below. The company had annual sales of $3.2 million. The company extends 30-day credit terms.

Month of origin	Accounts receivable
July	$ 2,500
August	3,600
September	63,250
October	21,100
November	54,000
December	298,000
Year-end accounts receivable	$442,450

a. Use the year-end total to evaluate the company's collection system.
b. If 75% of the company's sales occur between July and December, would this information affect the validity of your conclusion in part **a**? Explain.

LG 3 **P3–17** **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

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

LG 4 **P3–18** **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 (see the top of the next page) and Creek's recent financial statements (following), evaluate and recommend appropriate action on the loan request.

Creek Enterprises Income Statement for the Year Ended December 31, 2015	
Sales revenue	$30,000,000
Less: Cost of goods sold	21,000,000
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	1,000,000
Total operating expense	$ 6,000,000
Operating profits	$ 3,000,000
Less: Interest expense	1,000,000
Net profits before taxes	$ 2,000,000
Less: Taxes (rate = 40%)	800,000
Net profits after taxes	$ 1,200,000
Less: Preferred stock dividends	100,0000
Earnings available for common stockholders	$ 1,100,000

Creek Enterprises Balance Sheet December 31, 2015

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

[a]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.

[b]Required annual principal payments are $800,000.

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

LG 5 **P3–19** **Profitability analysis** In early 2013, Pepsi reported revenues of $65.64 billion with earnings available for common stockholders of $6.12 billion. Pepsi's total assets at the time were $74.64 billion. Meanwhile, one of Pepsi's competitors, Dr. Pepper, reported sales of $6.01 billion with earnings of $0.63 billion. Dr. Pepper had assets of $8.87 billion. Which company was more profitable? Why is it hard to get a clear answer to this question?

LG 5 **P3–20** **Common-size statement analysis** A common-size income statement for Creek Enterprises' 2014 operations follows. Using the firm's 2015 income statement presented in Problem 3–18, develop the 2015 common-size income statement and compare it with the 2014 statement. Which areas require further analysis and investigation?

Creek Enterprises Common-Size Income Statement for the Year Ended December 31, 2014

Sales revenue ($35,000,000)	100.0%
Less: Cost of goods sold	65.9
Gross profits	34.1%
Less: Operating expenses	
Selling expense	12.7%
General and administrative expenses	6.3
Lease expense	0.6
Depreciation expense	3.6
Total operating expense	23.2
Operating profits	10.9%
Less: Interest expense	1.5
Net profits before taxes	9.4%
Less: Taxes (rate = 40%)	3.8
Net profits after taxes	5.6%
Less: Preferred stock dividends	0.1
Earnings available for common stockholders	5.5%

LG 4 LG 5 **P3–21** **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 the firms' 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
Earnings available for common stockholders	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 one another.
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?

LG 6 **P3–22** **Ratio proficiency** McDougal Printing, Inc., had sales totaling $40,000,000 in fiscal year 2015. 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, 2015	
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

LG 6 **P3–23** **Cross-sectional ratio analysis** Use the financial statements below and on the next page for Fox Manufacturing Company for the year ended December 31, 2015, along with the industry average ratios below to do the following:

a. Prepare and interpret a complete ratio analysis of the firm's 2015 operations.
b. Summarize your findings and make recommendations.

Fox Manufacturing Company Income Statement for the Year Ended December 31, 2015

Sales revenue	$600,000
Less: Cost of goods sold	460,000
Gross profits	$140,000
Less: Operating expenses	
General and administrative expenses	$ 30,000
Depreciation expense	30,000
Total operating expense	60,000
Operating profits	$ 80,000
Less: Interest expense	10,000
Net profits before taxes	$ 70,000
Less: Taxes	27,100
Net profits after taxes (*Hint:* Earnings available for common stockholders as there are no preferred stockholders)	$ 42,900
Earnings per share (EPS)	$2.15

Ratio	Industry average, 2015
Current ratio	2.35
Quick ratio	0.87
Inventory turnover[a]	4.55
Average collection period[a]	35.8 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

[a]Based on a 365-day year and on end-of-year figures.

Fox Manufacturing Company Balance Sheet December 31, 2015	
Assets	
Cash	$ 15,000
Marketable securities	7,200
Accounts receivable	34,100
Inventories	82,000
Total current assets	$138,300
Net fixed assets	270,000
Total assets	$408,300
Liabilities and Stockholders' Equity	
Accounts payable	$ 57,000
Notes payable	13,000
Accruals	5,000
Total current liabilities	$ 75,000
Long-term debt	$150,000
Common stock equity (20,000 shares outstanding)	$110,200
Retained earnings	73,100
Total stockholders' equity	$183,300
Total liabilities and stockholders' equity	$408,300

LG 6 **P3–24 Financial statement analysis** The financial statements of Zach Industries for the year ended December 31, 2015, follow.

Zach Industries Income Statement for the Year Ended December 31, 2015	
Sales revenue	$160,000
Less: Cost of goods sold	106,000
Gross profits	$ 54,000
Less: Operating expenses	
Selling expense	$ 16,000
General and administrative expenses	10,000
Lease expense	1,000
Depreciation expense	10,000
Total operating expense	$ 37,000
Operating profits	$ 17,000
Less: Interest expense	6,100
Net profits before taxes	$ 10,900
Less: Taxes	4,360
Net profits after taxes	$ 6,540

Zach Industries Balance Sheet December 31, 2015	
Assets	
Cash	$ 500
Marketable securities	1,000
Accounts receivable	25,000
Inventories	45,500
Total current assets	$ 72,000
Land	$ 26,000
Buildings and equipment	90,000
Less: Accumulated depreciation	38,000
Net fixed assets	$ 78,000
Total assets	$150,000
Liabilities and Stockholders' Equity	
Accounts payable	$ 22,000
Notes payable	47,000
Total current liabilities	$ 69,000
Long-term debt	22,950
Common stock[a]	31,500
Retained earnings	26,550
Total liabilities and stockholders' equity	$ 150,000

[a]The firm's 3,000 outstanding shares of common stock closed 2015 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 2014 and 2015.

Ratio	Industry average	Actual 2014	Actual 2015
Current ratio	1.80	1.84	_____
Quick ratio	0.70	0.78	_____
Inventory turnover[a]	2.50	2.59	_____
Average collection period[a]	37.5 days	36.5 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	_____

[a]Based on a 365-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.

LG 6 **P3–25** **Integrative: Complete ratio analysis** Given the following financial statements (following and on the next page), historical ratios, and industry averages, calculate Sterling Company's financial ratios for the most recent year. (Assume a 365-day year.)

Sterling Company Income Statement for the Year Ended December 31, 2015

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

Sterling Company Balance Sheet December 31, 2015

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

[a] Annual credit purchases of $6,200,000 were made during the year.

[b] On December 31, 2015, the firm's common stock closed at $39.50 per share.

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.

Historical and Industry Average Ratios for Sterling Company

Ratio	Actual 2013	Actual 2014	Industry average, 2015
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	45.6 days	36.9 days	35.5 days
Average payment period	59.3 days	61.6 days	46.4 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

LG 6

P3–26 DuPont system of analysis Use the following ratio information for Johnson International and the industry averages for Johnson's line of business to:

a. Construct the DuPont system of analysis for both Johnson and the industry.

b. Evaluate Johnson (and the industry) over the 3-year period.

c. Indicate in which areas Johnson requires further analysis. Why?

Johnson	2013	2014	2015
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
Industry averages			
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

LG 6

P3–27 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 2014 and 2015. She will use them to look for significant changes in the company's situation from one year to the next.

Home Health, Inc., Financial Ratios		
Ratio	2014	2015
Current ratio	3.25	3.00
Quick ratio	2.50	2.20
Inventory turnover	12.80	10.30
Average collection period	42.6 days	31.4 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. To focus on the degree of change, calculate the year-to-year proportional change by subtracting the year 2014 ratio from the year 2015 ratio and then dividing the difference by the year 2014 ratio. Multiply the result by 100. Preserve the positive or negative sign. The result is the percentage change in the ratio from 2014 to 2015. 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.

LG 1 **P3–28** **ETHICS PROBLEM** Do some reading in periodicals or on the Internet to find out more about the Sarbanes-Oxley Act's provisions for companies. Select one of those provisions, and indicate why you think financial statements will be more trustworthy if company financial executives implement this provision of SOX.

Spreadsheet Exercise

The income statement and balance sheet are the primary reports that a firm constructs for use by management and for distribution to stockholders, regulatory bodies, and the general public. They are the primary sources of historical financial information about the firm. Dayton Products, Inc., is a moderate-sized manufacturer. The company's management has asked you to perform a detailed financial statement analysis of the firm.