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## CHAPTER 4

# Measuring Corporate Performance

## LEARNING OBJECTIVES

**After studying this chapter, you should be able to:**

1. Calculate and interpret market value and market value added for a public corporation.
2. Calculate and interpret some key measures of firm performance, including economic value added, and the rates of return on equity, assets, and capital.
3. Calculate and interpret measures of a firm's efficiency, leverage, and liquidity.
4. Show how profitability depends on efficiency and profit margin.
5. Understand how a company's sustainable growth is related to its payout policy and its return on equity.
6. Compare the company's financial standing with its main competitors and with its own position in earlier years.



**When you need to judge how well management has performed, it is useful to start with some key financial ratios.**

© Getty Images

In Chapter 1 we introduced the basic objective of corporate finance: Maximize the current *market value* of shareholders' investment in the firm. What market values were we talking about? How would you measure them?

For public corporations, value is set by investors in financial markets. Shareholder value equals market price per share multiplied by the number of shares outstanding. Of course, that market value will fluctuate and will always fall short of some maximum theoretical value that could be achieved with perfect financial management. No financial manager is perfect, but the good ones always and everywhere strive to *add value* by good financing and investment decisions.

Value added depends on profitability. Profitability in turn depends on how efficiently the firm uses its assets. There are several standard measures of profitability and efficiency, which we will describe in this chapter.

Value also depends on sound financing. Value is destroyed if the firm is financed recklessly and can't pay its debts or meet its payroll. There are several measures of financial strength, including debt ratios, which measure financial leverage, and the ratio of cash on hand to current liabilities, which measures liquidity.

Thus financial managers and analysts start with value but also examine value added, profitability, efficiency, financial leverage, and liquidity. To do so, they track key ratios from the firm's financial statements. We will describe these ratios, show how they are used, and note the limitations of the accounting data that most ratios are based on.

In Chapter 3 we described Pepsi's financial statements. We will continue with Pepsi in this chapter. We ask whether Pepsi is in good financial shape for surviving and prospering in the future. We explain how financial statements can help you to understand *why* a firm has performed well or badly. Finally, we show how a company's

future growth depends on the amount of money that it reinvests and the return that it earns on these investments.

You have probably heard stories of whizzes who can take a company's accounts apart in minutes, calculate some financial ratios, and divine the company's future. Such people are

like abominable snowmen: often spoken of but never truly seen. Financial ratios are no substitute for a crystal ball. They are just a convenient way to summarize large quantities of financial data and to compare firms' performances. The ratios help you to ask the right questions, but they seldom answer them.

## 4.1 Value and Value Added

It is New Year's Day, 2007. Your New Year's resolutions have sparked an intense financial interest in Pepsi. Perhaps you are a mutual-fund manager trying to decide whether to allocate \$25 million of new money to Pepsi stock. Perhaps you are a major shareholder pondering a sellout. You could be an investment banker seeking business from Pepsi or a bondholder concerned with Pepsi's credit standing. You could be the treasurer or CFO of Pepsi or of one of its competitors. You want to understand PepsiCo's value and financial performance. How would you start?

### market capitalization

Total market value of equity, equal to share price times number of shares outstanding.

Pepsi's common stock closed 2006 at a price of \$62.55 per share. There were 1,638 million shares outstanding, so Pepsi's total **market capitalization** was  $\$62.55 \times 1,638 = \$102,457$  million, just over \$100 billion. This is a big number, of course, but Pepsi is a big company. Pepsi's shareholders have, over the years, invested billions in the company. Therefore, you decide to compare Pepsi's market capitalization to the book value of Pepsi's equity. The book value measures shareholders' cumulative investment in Pepsi.

### market value added

Market capitalization minus book value of equity.

You turn to Pepsi's income statement and balance sheet, which are reproduced in Tables 4-1 and 4-2.<sup>1</sup> At the end of 2006, the book value of Pepsi's equity was \$15,368 million. Therefore, Pepsi's **market value added**, the difference between the market value of the firm's shares and the amount of money that shareholders have invested in the firm, was  $\$102,457 - \$15,368 = \$87,089$  million. In other words, Pepsi shareholders have contributed about \$15 billion and ended up with shares worth about \$102 billion. They have accumulated about \$87 billion in market value added.

The consultancy firm EVA Dimensions calculates market value added for a large sample of U.S. companies. Table 4-3 shows a few of the firms from EVA's list. General Electric heads the group. It has created \$311 billion of wealth for its shareholders.

**TABLE 4-1** CONSOLIDATED STATEMENT OF INCOME FOR PEPSICO, INC., 2006 (millions)

Net sales	\$35,753
Cost of goods sold	15,762
Selling, general, and administrative expenses	11,357
Depreciation	1,406
Earnings before interest and income taxes	7,228
Interest expense	239
Taxable income	6,989
Taxes	1,347
Net income	\$5,642
Allocation of net income	
Dividends	\$1,854
Addition to retained earnings	\$3,788

Source: Derived from PepsiCo Annual Report, 2006.

<sup>1</sup> For convenience the statements are repeated from Chapter 3. We are pretending that you actually had these statements on January 1, 2007. They were not published until March.

**TABLE 4-2** CONSOLIDATED BALANCE SHEET FOR PEPSICO, INC., AS OF DECEMBER 31, 2006 (millions of dollars)

Assets	2006	2005	Liabilities and Shareholders' Equity	2006	2005
Current assets			Current liabilities		
Cash and marketable securities	1,651	1,716	Debt due for repayment	274	2,889
Receivables	3,725	3,261	Accounts payable	5,271	5,357
Inventories	1,926	1,693	Other current liabilities	1,315	1,160
Other current assets	1,828	3,784	Total current liabilities	6,860	9,406
Total current assets	9,130	10,454			
Fixed Assets			Long-term debt	2,550	2,313
Tangible fixed assets			Deferred income taxes	528	1,434
Property, plant, and equipment	19,058	16,646	Other long-term liabilities	4,624	4,323
Less accumulated depreciation	9,371	7,965			
Net tangible fixed assets	9,687	8,681	Total liabilities	14,562	17,476
Intangible fixed assets			Shareholders' equity:		
Goodwill	4,594	4,088	Common stock and other paid-in capital	614	644
Other intangible assets	1,849	1,616	Retained earnings	22,591	18,803
Total intangible fixed assets	6,443	5,704	Treasury stock	(7,837)	(5,196)
			Total shareholders' equity	15,368	14,251
Total fixed assets	16,130	14,385			
Other assets	4,670	6,888	Total liabilities and shareholders' equity	29,930	31,727
Total assets	29,930	31,727			

Note: Column sums subject to rounding error.

Source: Derived from PepsiCo Annual Report, 2006.

Time Warner is near the bottom of the class: The market value of Time Warner's shares is \$21 million *less* than the amount of shareholders' money invested in the firm.

Pepsi and GE are large firms. Their managers have lots of assets to work with. A small firm could not hope to create so much extra value. Therefore, financial managers and analysts also like to calculate how much value has been added *for each dollar that shareholders have invested*. To do this, they compute the *ratio* of market value to book value. For example, Pepsi's **market-to-book ratio** is<sup>2</sup>

### market-to-book ratio

Ratio of market value of equity to book value of equity.

$$\text{Market-to-book ratio} = \frac{\text{market value of equity}}{\text{book value of equity}} = \frac{\$102,457}{\$15,368} = 6.7$$

In other words, Pepsi has multiplied the value of its shareholders' investment 6.7 times.

Table 4-3 also shows market-to-book ratios. Notice that Google has a much higher market-to-book ratio than GE. But GE's market value added is higher because of GE's larger scale.

### Self-Test 4.1

Shares of Notung Cutlery Corp. closed 2010 at \$75 per share. Notung had 14.5 million shares outstanding. The book value of equity was \$610 million. Compute Notung's market capitalization, market value added, and market-to-book ratio.

The market-value performance measures in Table 4-3 have two drawbacks. First, the market value of the company's shares reflects investors' expectations about *future*

<sup>2</sup> The market-to-book ratio can also be calculated by dividing stock price by book value per share.

**TABLE 4-3** Stock market measures of company performance, 2006. Companies are ranked by market value added. (dollar values in millions)

	Market Value Added	Market-to-Book Ratio		Market Value Added	Market-to-Book Ratio
General Electric	\$311,479	3.52	General Motors	\$21,105	1.21
Google	144,145	19.72	FedEx	16,263	1.43
Coca-Cola	105,571	6.43	Harley Davidson	12,034	3.70
Goldman Sachs	54,669	2.61	Xerox	3,375	1.13
Anheuser-Busch	32,915	3.10	Wendy's International	1,473	1.56
Colgate-Palmolive	29,192	4.08	Time Warner	-20,956	0.86

Source: We are grateful to EVA Dimensions for providing these statistics.

performance. Investors pay attention to current profits and investment, of course, but market-value measures can nevertheless be noisy measures of current performance. Second, you can't look up the market value of privately owned companies whose shares are not traded. Nor can you observe the market value of divisions or plants that are parts of larger companies. You may use market values to satisfy yourself that Pepsi as a whole has performed well, but you can't use them to drill down to look at the performance of the beverages division or Pepsi's food businesses. To do this, you need accounting measures of profitability. We start with economic value added (EVA).

## 4.2 Measuring Profitability

When accountants draw up an income statement, they start with revenues and then deduct operating and other costs. But one important cost is *not* included: the cost of the capital that the company has raised from shareholders. Therefore, to see whether the firm has truly created value, we need to measure whether it has earned a profit after deducting *all* costs, including the cost of its equity capital.

Recall from Chapter 2 that the cost of capital is the minimum acceptable rate of return on capital investment. It is an *opportunity* cost of capital, because it equals the expected rate of return on investment opportunities open to shareholders in financial markets. The firm creates value for shareholders only if it can earn more than its cost of equity, that is, more than its shareholders can earn by investing on their own.

The profit after deducting all costs, *including the cost of capital*, is called the company's **economic value added** or **EVA**. The term "EVA" was coined by Stern Stewart & Co., which did much to develop and promote the concept. EVA is also called *residual income*.

At the start of 2006 the total book value of Pepsi's equity capital amounted to \$14,251 million (see shareholders' equity in Table 4-2 for year-end 2005). This was the cumulative investment by Pepsi shareholders, including earnings retained and reinvested. Pepsi's cost of equity was about 9.5%.<sup>3</sup> Therefore, investors who provided the \$14,251 million required that Pepsi earn at least  $.095 \times 14,251 = \$1,354$  million. But in 2006 Pepsi's net income was \$5,642 million. If we deduct the opportunity cost of its equity capital from this figure, we can see that Pepsi earned  $5,642 - 1,354 = \$4,288$  million *more* than investors required. This figure was Pepsi's residual income, or EVA:

$$\begin{aligned} \text{EVA} &= \text{net income} - (\text{cost of equity} \times \text{equity}) \\ &= 5,642 - (.095 \times 14,251) = \$4,288 \text{ million} \end{aligned}$$

### economic value added (EVA)

Net income minus a charge for the cost of capital employed. Also called *residual income*.

<sup>3</sup> Don't worry about how we calculated the cost of equity. We will show how to do this in later chapters. For now, it's enough to recognize that investors will demand higher returns on riskier securities, so the cost of equity will reflect the risk of Pepsi's stock.

**TABLE 4-4** Accounting measures of company performance, 2006. Companies are ranked by return on equity.

	(1) Net income (\$ millions)	(2) Cost of equity, %	(3) Equity capital (\$ millions)	(4) Cost of equity capital (2) + (3)	(5) EVA (\$ millions) (1) – (4)	(6) Return on equity (ROE), % (1)/(3)
Google	2,926	12.9	5,287	681	2,245	55.3%
Goldman Sachs	9,487	10.8	30,603	3,299	6,188	31.0
Harley Davidson	1,129	8.3	4,199	348	781	26.9
Coca-Cola	4,557	6.3	18,814	1,178	3,379	24.2
Colgate-Palmolive	1,884	6.9	9,107	625	1,259	20.7
Anheuser-Busch	2,270	6.0	15,625	930	1,339	14.5
General Electric	17,313	7.3	124,378	9,030	8,284	13.9
FedEx	2,832	7.5	35,802	2,700	132	7.9
Xerox	1,394	7.3	26,070	1,914	–519	5.4
Time Warner	5,202	8.0	139,460	11,185	–5,983	3.7
Wendy's International	98	7.1	3,460	244	–146	2.8
General Motors	–20	6.9	100,465	6,942	–6,962	0.0

Source: We are grateful to EVA Dimensions for providing these statistics.

Table 4-4 shows estimates of EVA for our sample of large companies. Look, for example, at Google and GE. You can see that Google had a much higher return on equity (profit per dollar of equity capital) than GE but fell behind in EVA. This is partly because GE was less risky than Google, and so had a lower cost of equity, but also because GE had far more dollars invested than Google. By contrast, General Motors was a laggard. It earned an accounting profit after deducting out-of-pocket costs. But this profit was calculated before deducting the cost of the equity it employed. After deducting the cost of equity, GM made an EVA loss of \$6.9 billion.

**EVA, or residual income, is a better measure of a company's performance than are accounting profits. Accounting profits are calculated after deducting all costs except the cost of equity. By contrast, EVA recognizes that companies need to cover their cost of equity before they add value.**

EVA makes the cost of capital *visible* to operating managers. There is a clear target: Earn *at least* the cost of capital on assets employed. Evaluating performance by EVA also pushes managers to flush out and dispose of underutilized assets. Therefore, a growing number of firms now calculate EVA and tie managers' compensation to it. A plant or divisional manager can improve EVA by reducing assets.<sup>4</sup>

### Self-Test 4.2

Roman Holidays, Inc., earned \$30 million on a start-of-year book equity value of \$188 million. Its cost of equity was 11.5%. What was its EVA?

### Accounting Rates of Return

EVA measures how many dollars a business is earning after deducting the cost of capital. Other things equal, the more assets the manager has to work with, the greater the opportunity to generate a large EVA. The manager of a small division may be highly competent, but if that division has few assets, she is unlikely to rank high in the EVA stakes. Therefore, for comparing managers, it can be helpful to measure the firm's profits *per dollar of assets*. Return on equity (ROE) is one commonly used

<sup>4</sup> EVA for a plant or division would be based on the total assets, not on equity. The plant or division would not be financed separately or have debt allocated to it. An overall cost of capital would be used, not just the cost of equity. We show how to calculate the overall (weighted-average) cost of capital in Chapter 13.

profitability measure. Two others are return on total capital (ROC) and return on assets (ROA). These are called *book rates of return*, because they are based on accounting information.

**Return on Equity** Think again about how a firm creates value for its shareholders. It can either buy new plant and equipment or pay out cash to the shareholders, who can then invest the money for themselves in financial markets. When the company uses its cash to buy plant and equipment, it deprives shareholders of the opportunity to invest on their own. **The return that shareholders are giving up by keeping their money in the company is therefore called the *opportunity cost of equity capital*. A firm that earns more than the cost of equity makes its shareholders better off: It is earning a higher return than they could obtain for themselves. A firm that earns less than the cost of equity makes its investors worse off: They could earn a higher return simply by investing on their own in financial markets.** So shareholders want the company to invest only in projects for which the return on equity is at least as great as the cost of equity.

**return on equity (ROE)**  
Net income as a percentage of shareholders' equity.

We measure the **return on equity (ROE)** as the income to shareholders per dollar invested. Pepsi had net income of \$5,642 million in 2006 and shareholders' equity of \$14,251 million at the start of the year. So Pepsi's ROE was

$$\text{Return on equity} = \frac{\text{net income}}{\text{equity}} = \frac{5,642}{14,251} = .396, \text{ or } 39.6\%$$

Is 39.6% an adequate return for shareholders? To answer that question, we need to compare it to Pepsi's cost of equity. Pepsi's cost of equity capital in 2006 was about 9.5%, so its return on equity was nearly 30 percentage points higher than its cost of equity.<sup>5</sup>

You will encounter several different ways to calculate return on equity. For example, a company may have reinvested some of its earnings in income-producing assets during the year. It may also have issued new equity during the year and invested the proceeds. Therefore, financial managers and analysts often use the average of the equities at the beginning and end of the year.<sup>6</sup> If we use average equity, Pepsi's ROE changes to

$$\begin{aligned} \text{Return on equity} &= \frac{\text{net income}}{\text{average equity}} \\ &= \frac{5,642}{(14,251 + 15,368)/2} = .381, \text{ or } 38.1\% \end{aligned}$$

Column 6 of Table 4-4 shows the return on average equity capital earned by our sample of large companies. Notice that Google has the highest return at 55.3%, well in excess of its 12.9% cost of equity. General Motors brings up the rear. Its return on equity was almost exactly zero, far below its cost of equity.

**return on capital (ROC)**  
Net income plus Interest as a percentage of long-term capital

**Return on Capital** ROE is a return to shareholders. Financial managers and analysts also look at the return to *all* investors in the company. We measure a company's **return on capital (ROC)** as the income available to debt- and equityholders per dollar of long-term capital. Total long-term capital, sometimes called *total capitalization*, is the sum of long-term debt and shareholders' equity. For example, at the start of 2006 Pepsi's long-term capital totaled \$16,564 million, which was made up of \$2,313 million of long-term debt and \$14,251 million of equity. Pepsi paid its debt investors

<sup>5</sup> You may have noticed that we also used this 9.5% cost of equity to compute Pepsi's economic value added. EVA will be positive whenever ROE is greater than the cost of equity.

<sup>6</sup> Averages are used when a flow figure that builds up over the course of the year (here, net income) is compared with a snapshot figure of assets or liabilities (here, equity capital). Sometimes it's convenient to use a snapshot figure at the end of the year, although this procedure is not strictly correct.

interest of \$239 million in 2006 and earned for its shareholders net income of \$5,642 million. So the company's ROC was

$$\text{Return on capital} = \frac{\text{net income} + \text{interest}}{\text{long-term debt} + \text{equity}} = \frac{5,642 + 239}{16,564} = .355, \text{ or } 35.5\%$$

A successful firm earns a return on capital greater than the return that investors could expect to earn if they invested directly in a similar package of debt and equity securities. Pepsi's cost of capital in 2006 was about 9% on debt and equity combined, slightly lower than its cost of equity of 9.5%.<sup>7</sup> Therefore, Pepsi's investments earned a superior rate of return.

### return on assets (ROA)

Net income plus interest as a percentage of total assets

**Return on Assets** Return on assets (ROA) measures the income available to debt and equity investors per dollar of the firm's *total* assets. Total assets (which equal total liabilities plus shareholders' equity) are greater than total capital because total capital does not include current liabilities. For Pepsi, ROA was<sup>8</sup>

$$\text{Return on assets} = \frac{\text{net income} + \text{interest}}{\text{total assets}} = \frac{5,642 + 239}{31,727} = .185, \text{ or } 18.5\%$$

ROAs and ROCs can also be calculated versus average assets and capital.

We will see shortly how Pepsi's return on assets is determined by the sales that these assets generate and the profit margin that the company earns on its sales.

### Self-Test 4.3

Explain the *differences* between ROE, ROC, and ROA.

### Problems with EVA and Accounting Rates of Return

Rates of return and economic value added have some obvious attractions as measures of performance. Unlike market-value-based measures, they show current performance and are not affected by expectations about future events that are reflected in today's stock market prices. They also can be calculated for an entire company or for a particular plant or division. However, remember that both EVA and accounting rates of return are based on book (balance sheet) values for assets. Debt and equity are also book values. As we noted in the last chapter, accountants do not show every asset on the balance sheet, yet our calculations take accounting data at face value. For example, we ignored the fact that Pepsi has invested large sums in marketing in order to establish its brand name. This brand name is an important asset, but its value is not shown on the balance sheet. If it were shown, the book values of assets, capital, and equity would increase, and Pepsi would not appear to earn such high returns.

EVA Dimensions, which produced the figures in Tables 4-3 and 4-4, does make a number of adjustments to the accounting data.<sup>9</sup> However, it is impossible to include the value of all assets or to judge how rapidly they depreciate. For example, did Google

<sup>7</sup> This is an estimate of the combined cost of Pepsi's debt and equity capital, in other words, the combined return from investments in a package of debt and equity with roughly the same risks as Pepsi's. Since Pepsi has issued little debt, the combined cost of debt and equity is only slightly less than the cost of equity alone. This is not always the case. For now, don't worry about how these numbers were derived. You will learn how to calculate the cost of capital in Chapter 13.

<sup>8</sup> This definition of ROA may be misleading if it is used to compare firms with different mixtures of debt and equity. Interest payments are deducted from the firm's taxable income. So if a firm pays out most of its profits as interest, it will pay less in taxes and have a higher ROA than one that is financed largely by equity. If you want a measure of operating performance alone, you need to subtract the tax savings on the interest. With a tax rate of 35%, Pepsi's ROA would then be  $(5,642 + 239 - .35 \times 239)/31,727 = .183$ , or 18.3%.

<sup>9</sup> EVA Dimension's adjustments to Pepsi's accounts produced substantially lower measures of return on equity and economic value added.



## Economic Value Added

The screenshot shows the EVA Dimensions website interface. At the top, there is a navigation bar with 'LIBRARY', 'EVA INSIGHTS', and a 'SITE SEARCH' field. Below this, the main content area is divided into several sections: 'EVA™ SERVICES' with a numbered list of services (1. EVA ANALYSIS SOFTWARE, 2. EVA METRICS, 3. EVA VALUATION MODELING, 4. EVA EQUITY RESEARCH, 5. EVA FUNDS MANAGEMENT), a 'NEW!' announcement about the 2007 MVA/EVA Ranking, and a 'WELCOME TO OUR COMPANY' section with a quote from the founder. A 'CONTACT' sidebar on the left provides company details and a 'NEWS' section at the bottom left features a recent article snippet.

Log on to [www.evadimensions.com](http://www.evadimensions.com) and find recent data for MVA, EVA, and ROC for America's best wealth creators. The companies with the highest EVA do not always have the highest return on capital or the highest market value added. Can you explain why?

Source: EVA Dimensions Web site

really earn a return on equity of 55%? It's difficult to say, because its investment over the years in search engines and other software is not shown in the balance sheet and cannot be measured exactly.

Remember also that the balance sheet does not show the current market values of the firm's assets. The assets in a company's books are valued at their original cost less any depreciation. Older assets may be grossly undervalued in today's market conditions and prices. So a high return on assets indicates that the business has performed well by making profitable investments in the past, but it does not necessarily mean that you could buy the same assets today at their reported book values. Conversely a low return suggests some poor decisions in the past, but it does not always mean that today the assets could be employed better elsewhere.

### 4.3 Measuring Efficiency

We began our analysis of Pepsi by calculating how much value that company has added for its shareholders and how much profit the company is earning after deducting the cost of the capital that it employs. We examined Pepsi's rates of return on equity, capital, and total assets, which were all impressively high. Our next task is to probe a little deeper to understand the reasons for Pepsi's success. What factors contribute to a firm's overall profitability? One factor clearly must be the efficiency with which it uses its many types of assets.

**Asset Turnover Ratio** The asset turnover, or sales-to-assets, ratio shows how much sales are generated by each dollar of total assets, and therefore it measures how hard the firm's assets are working. For Pepsi, each dollar of assets produced \$1.13 of sales:

$$\text{Asset turnover} = \frac{\text{sales}}{\text{total assets at start of year}} = \frac{35,753}{31,727} = 1.13$$

Like some of our profitability ratios, the sales-to-assets ratio compares a flow measure (sales over the entire year) to a snapshot measure (assets on one day). Therefore, financial managers and analysts often calculate the ratio of sales over the entire year to the *average* level of assets over the same period. In this case,

$$\text{Asset turnover} = \frac{\text{sales}}{\text{average total assets}} = \frac{35,753}{(31,727 + 29,930)/2} = 1.16$$

The asset turnover ratio measures how efficiently the business is using its entire asset base. But you also might be interested in how hard *particular types* of assets are being put to use. Below are a couple of examples.

**Inventory Turnover** Efficient firms don't tie up more capital than they need in raw materials and finished goods. They hold only a relatively small level of inventories of raw materials and finished goods, and they turn over those inventories rapidly.

The balance sheet shows the cost of inventories rather than the amount that the finished goods will eventually sell for. So it is usual to compare the average level of inventories with the cost of goods sold rather than with sales. In Pepsi's case,

$$\text{Inventory turnover} = \frac{\text{cost of goods sold}}{\text{inventory at start of year}} = \frac{15,762}{1,693} = 9.3$$

Another way to express this measure is to look at how many days of output are represented by inventories. This is equal to the level of inventories divided by the daily cost of goods sold:

$$\text{Average days in inventory} = \frac{\text{inventory at start of year}}{\text{daily cost of goods sold}} = \frac{1,693}{15,762/365} = 39 \text{ days}$$

You could say that Pepsi has sufficient inventories to maintain production for 39 days.<sup>10</sup>

In Chapter 20 we will look at how many firms have managed to increase their inventory turnover in recent years. Toyota has been the pioneer in this endeavor. Its just-in-time system ensures that auto parts are delivered exactly when they are needed. Toyota now keeps only about one month's supply of parts and finished cars in inventory and turns over its inventory about 12 times a year.

**Receivables Turnover** Receivables are sales for which you have not yet been paid. The receivables turnover ratio measures the firm's sales as a multiple of its receivables. For Pepsi,

$$\text{Receivables turnover} = \frac{\text{sales}}{\text{receivables at start of year}} = \frac{35,753}{3,261} = 11$$

If customers are quick to pay, unpaid bills will be a relatively small proportion of sales and the receivables turnover will be high. Therefore, a comparatively high ratio often indicates an efficient credit department that is quick to follow up on late payers. Sometimes, however, a high ratio may indicate that the firm has an unduly restrictive credit policy and offers credit only to customers who can be relied on to pay promptly.<sup>11</sup>

Another way to measure the efficiency of the credit operation is by calculating the average length of time for customers to pay their bills. The faster the firm turns over its receivables, the shorter the collection period. Pepsi's customers pay their bills in about 33 days:

$$\text{Average collection period} = \frac{\text{receivables at start of year}}{\text{average daily sales}} = \frac{3,261}{35,753/365} = 33 \text{ days}$$

<sup>10</sup> This is a loose statement, because it ignores the fact that Pepsi may have more than 39 days' supply of some materials and less of others.

<sup>11</sup> Where possible, it makes sense to look only at *credit* sales. Otherwise, a high ratio might simply indicate that a small proportion of sales is made on credit.

### Self-Test 4.4

The average collection period measures the number of days it takes Pepsi to collect its bills. But Pepsi also delays paying its own bills. Use the information in Tables 4–1 and 4–2 to calculate the average number of days that it takes Pepsi to pay its bills.

The receivables turnover ratio and the inventory turnover ratio may help to highlight particular areas of inefficiency, but they are not the only possible indicators. For example, a retail chain might compare its sales per square foot with those of its competitors, a steel producer might calculate the cost per ton of steel produced, an airline might look at revenues per passenger-mile, and a law firm might look at revenues per partner. A little thought and common sense should suggest which measures are likely to produce the most helpful insights into your company's efficiency.

## 4.4 Analyzing the Return on Assets: The Du Pont System

We have seen that every dollar of Pepsi's assets generates \$1.13 of sales. But Pepsi's success depends not only on the volume of its sales but also on how profitable those sales are. This is measured by Pepsi's profit margin.

**Profit Margin** The profit margin measures the proportion of sales that finds its way into profits. It is sometimes defined as

$$\text{Profit margin} = \frac{\text{net income}}{\text{sales}} = \frac{5,642}{35,753} = .158, \text{ or } 15.8\%$$

This definition can be misleading. When companies are partly financed by debt, a portion of the revenue produced by sales must be paid as interest to the firm's lenders. So profits from the firm's operations are divided between the debtholders and the shareholders. We would not want to say that a firm is less profitable than its rivals simply because it employs debt finance and pays out part of its income as interest. Therefore, when we are calculating the profit margin, it is common to add back the debt interest to net income. This gives an alternative measure of profit margin, which is called the **operating profit margin**:<sup>12</sup>

### operating profit margin

Net income plus interest as a percentage of sales.

$$\text{Operating profit margin} = \frac{\text{net income} + \text{interest}}{\text{sales}} = \frac{5,642 + 239}{35,753} = .164, \text{ or } 16.4\%$$

### The Du Pont System

We calculated earlier that Pepsi has earned a return of 18.5% on its assets. The following equation shows that this return depends on two factors—the sales that Pepsi generates from its assets (asset turnover) and the profit that it earns on each dollar of sales (operating profit margin):

$$\text{Return on assets} = \frac{\text{net income} + \text{interest}}{\text{assets}} = \frac{\text{sales}}{\text{assets}} \times \frac{\text{net income} + \text{interest}}{\text{sales}}$$

↑
↑  
asset turnover
operating profit margin

(4.1)

<sup>12</sup> This definition may also be misleading. If a firm pays out most of its profits as interest, it will pay less tax and have a higher operating profit margin than one that is financed solely by equity. If we want a measure of the profit margin that is unaffected by the firm's financial structure, we need to subtract the tax savings on the interest. With a tax rate of 35%, Pepsi's profit margin would then be  $(239 + 5,642 - .35 \times 239)/35,753 = .162$ , or 16.2%.

**Du Pont formula**

ROA equals the product of asset turnover and operating profit margin.

This breakdown of ROA into the product of turnover and margin is often called the **Du Pont formula**, after the chemical company that popularized the procedure. In Pepsi’s case the formula gives the following breakdown of ROA:

$$\begin{aligned} \text{ROA} &= \text{asset turnover} \times \text{operating profit margin} \\ &= 1.13 \times .164 = .185 \end{aligned}$$

The Du Pont formula is a useful way to think about a company’s strategy. For example, a retailer may strive for high turnover at the expense of a low profit margin (a “Wal-Mart strategy”), or it may seek a high profit margin even if that results in low turnover (a “Bloomingdales strategy”). You would naturally prefer both high profit margin and high turnover, but life isn’t that easy. A high-price and high-margin strategy will typically result in lower sales per dollar of assets, so firms must make trade-offs between these goals. The Du Pont formula can help sort out which strategy the firm is pursuing.

All firms would like to earn a higher return on their assets, but their ability to do so is limited by competition. The Du Pont formula helps to identify the constraints that firms face. Fast-food chains, which have high asset turnover, tend to operate on low margins. Classy hotels have relatively low turnover ratios but tend to compensate with higher margins. Table 4–5 illustrates the trade-off. Both the fast-food chain and the hotel have the same return on assets. However, their profit margins and turnover ratios are entirely different.

Firms often seek to improve their profit margins by acquiring a supplier. The idea is to capture the supplier’s profit as well as their own. Unfortunately, unless they have some special skill in running the new business, they are likely to find that any gain in profit margin is offset by a decline in asset turnover.

A few numbers may help to illustrate this point. Table 4–6 shows the sales, profits, and assets of Admiral Motors and its components supplier, Diana Corporation. Both earn a 10% return on assets, though Admiral has a lower operating profit margin (20% versus Diana’s 25%). Since all of Diana’s output goes to Admiral, Admiral’s management reasons that it would be better to merge the two companies. That way, the merged company would capture the profit margin on both the auto components and the assembled car.

The bottom row of Table 4–6 shows the effect of the merger. The merged firm does indeed earn the combined profits. Total sales remain at \$20 million, however, because all the components produced by Diana are used within the company. With higher profits and unchanged sales, the profit margin increases. Unfortunately, the asset turnover is *reduced* by the merger since the merged firm has more assets. This exactly offsets the benefit of the higher profit margin. The return on assets is unchanged.

**TABLE 4-5** Fast-food chains and hotels may have a similar return on assets but different asset turnover ratios and profit margins.

Asset Turnover × Profit Margin = Return on Assets			
Fast-food chains	2.0	5%	10%
Hotels	0.5	20	10

**TABLE 4-6** Merging with suppliers or customers will generally increase the profit margin, but this will be offset by a reduction in asset turnover.

	Millions of Dollars			Asset Turnover	Profit Margin	ROA
	Sales	Profits	Assets			
Admiral Motors	\$20	\$4	\$40	.50	20%	10%
Diana Corp.	8	2	20	.40	25	10
Diana Motors (the merged firm)	20	6	60	.33	30	10

*Self-Test 4.5*

The Du Pont formula (Equation 4.1) seems to suggest that companies with higher asset turnover ratios generally will have high ROAs. Why may this not be so?

## 4.5 Measuring Leverage

When a firm borrows money, it promises to make a series of interest payments and then to repay the amount that it has borrowed. If profits rise, the debtholders continue to receive only the fixed interest payment, so all the gains go to the shareholders. Of course, the reverse happens if profits fall. In this case shareholders bear most of the pain. If times are sufficiently hard, a firm that has borrowed heavily may not be able to pay its debts. The firm is then bankrupt, and shareholders lose most or all of their entire investment.

Because debt increases returns to shareholders in good times and reduces them in bad times, it is said to create *financial leverage*. Leverage ratios measure how much financial leverage the firm has taken on. CFOs keep an eye on leverage ratios to ensure that lenders are happy to continue to take on the firm's debt.

**Debt Ratio** Financial leverage is usually measured by the ratio of long-term debt to total long-term capital. Here “long-term” debt should include not just bonds or other borrowing but also financing from long-term leases.<sup>13</sup> For Pepsi,

$$\text{Long-term debt ratio} = \frac{\text{long-term debt}}{\text{long-term debt} + \text{equity}} = \frac{2,550}{2,550 + 15,368} = .14, \text{ or } 14\%$$

This means that 14 cents of every dollar of long-term capital is in the form of debt.

Leverage is also measured by the debt-equity ratio. For Pepsi,

$$\text{Long-term debt-equity ratio} = \frac{\text{long-term debt}}{\text{equity}} = \frac{2,550}{15,368} = .17, \text{ or } 17\%$$

The difference between these two ratios is small for Pepsi, 14% versus 17%. But the debt-equity ratio climbs dramatically for highly leveraged companies. A company financed two-thirds with debt and one-third with equity has a long-term debt ratio of 67% (2/3) and a debt-equity ratio of 2. Sometimes you see projects such as oil pipelines financed with 90% debt and 10% equity. In that case the debt-equity ratio is 90/10 = 9.

The long-term debt ratio for the average U.S. manufacturing company is about 30%, but some companies deliberately operate at much higher debt levels. For example, in Chapter 21 we will look at leveraged buyouts (LBOs). Firms that are acquired in a leveraged buyout usually issue large amounts of debt. When LBOs first became popular in the 1990s, these companies had average debt ratios of about 90%. Many of them flourished and paid back their debtholders in full; others were not so fortunate.

Notice that debt ratios make use of book (accounting) values rather than market values.<sup>14</sup> In principle, lenders should be more interested in the *market value* of the company, which reflects the actual value of the company's assets and the actual cash flows those assets will produce. If the market value of the company covers its debts, then lenders should get their money back. Thus you would expect to see the debt ratio computed using the market values of debt and equity. Yet book debt ratios are used almost universally.

<sup>13</sup> A finance lease is a long-term rental agreement that commits the firm to make regular payments. This commitment is just like the obligation to make payments on an outstanding loan.

<sup>14</sup> In the case of leased assets, accountants estimate the value of the lease commitments. In the case of long-term debt, they simply show the face value, which can be very different from market value.



## Financial Ratios

Source: PepsiCo Web site

Log on to [www.pepsico.com](http://www.pepsico.com) to find the latest financial statements for PepsiCo. Prepare simplified summary statements like those in Tables 4–1 and 4–2. Then recalculate Pepsi's financial ratios. What have been the main changes from those shown in these tables? If you owned some of Pepsi's debt, would these changes make you feel more or less happy?

Does use of book rather than market leverage ratios matter much? Perhaps not; after all, the market value of the firm includes the value of intangible assets generated by research and development, advertising, staff training, and so on. These assets are not easy to sell, and if the company falls on hard times, their value may disappear altogether. Thus, when banks demand that a borrower keep within a maximum debt ratio, they usually define that ratio in terms of book values and they ignore the intangible assets that are not shown on the balance sheet.

Notice also that these measures of leverage ignore short-term debt. That probably makes sense if the short-term debt is temporary or is matched by similar holdings of cash, but if the company is a regular short-term borrower, it may be preferable to widen the definition of debt to include all liabilities. In this case,

$$\text{Total debt ratio} = \frac{\text{total liabilities}}{\text{total assets}} = \frac{14,562}{29,930} = .49, \text{ or } 49\%$$

Therefore, Pepsi is financed 49% with long- and short-term debt and 51% with equity.<sup>15</sup> We could also say that its ratio of total debt to equity is  $14,562/15,368 = .95$ .

Managers sometimes refer loosely to a company's debt ratio, but we have just seen that the debt ratio may be measured in several different ways. For example, Pepsi has a debt ratio of .14 (the long-term debt ratio) and also .49 (the total debt ratio). This is not the first time we have come across several ways to define a financial ratio. There is no law stating how a ratio should be defined. So be warned: Do not use a ratio without understanding how it has been calculated.

**Times Interest Earned Ratio** Another measure of financial leverage is the extent to which interest obligations are covered by earnings. Banks prefer to lend to firms with earnings that cover interest payments with room to spare. *Interest coverage* is measured by the ratio of earnings before interest and taxes (EBIT) to interest payments. For Pepsi,

$$\text{Times interest earned} = \frac{\text{EBIT}}{\text{interest payments}} = \frac{7,228}{239} = 30.2$$

Pepsi enjoys an extremely high coverage or *times interest earned* ratio because it is conservatively financed. Sometimes lenders are content with coverage ratios as low as 2 or 3.

<sup>15</sup> In this case, the 49% of debt includes other liabilities, including accounts payable and other current liabilities.

The regular interest payment is a hurdle that companies must keep jumping if they are to avoid default. The coverage ratio measures how much clear air there is between hurdle and hurdler. The ratio is only part of the story, however. For example, it doesn't tell us whether Pepsi is generating enough cash to repay its debt as it becomes due.

**Cash Coverage Ratio** In the previous chapter we pointed out that depreciation is deducted when calculating the firm's earnings, even though no cash goes out the door. Suppose we add back depreciation to EBIT in order to calculate operating cash flow. We then calculate a *cash* coverage ratio. For Pepsi,

$$\text{Cash coverage ratio} = \frac{\text{EBIT} + \text{depreciation}}{\text{interest payments}} = \frac{7,228 + 1,406}{239} = 36.1$$

### Self-Test 4.6

A firm repays \$10 million face value of outstanding debt and issues \$10 million of new debt with a lower rate of interest. What happens to its long-term debt ratio? What happens to its times interest earned and cash coverage ratios?

### Leverage and the Return on Equity

When the firm raises cash by borrowing, it must make interest payments to its lenders. This reduces net profits. On the other hand, if a firm borrows instead of issuing equity, it has fewer equityholders to share the remaining profits. Which effect dominates? An extended version of the Du Pont formula helps us answer this question. It breaks down the return on equity (ROE) into four parts:

$$\text{ROE} = \frac{\text{net income}}{\text{equity}} = \frac{\text{assets}}{\text{equity}} \times \frac{\text{sales}}{\text{assets}} \times \frac{\text{net income} + \text{interest}}{\text{sales}} \times \frac{\text{net income}}{\text{net income} + \text{interest}}$$

↑  
leverage  
ratio

↑  
asset  
turnover

↑  
operating  
profit  
margin

↑  
“debt  
burden”

(4.2)

Notice that the product of the two middle terms in Equation 4.2 is the return on assets. It depends on the firm's production and marketing skills and is unaffected by the firm's financing mix.<sup>16</sup> However, the first and fourth terms do depend on the debt-equity mix. The first term, assets/equity, which we call the *leverage ratio*, can be expressed as (equity + liabilities)/equity, which equals 1 + total-debt-to-equity ratio. The last term, which we call the “debt burden,” measures the proportion by which interest expense reduces profits.

Suppose that the firm is financed entirely by equity. In this case, both the leverage ratio and the debt burden are equal to 1, and the return on equity is identical to the return on assets. If the firm borrows, however, the leverage ratio is greater than 1 (assets are greater than equity) and the debt burden is less than 1 (part of the profits is absorbed by interest). Thus leverage can either increase or reduce return on equity. In fact, we will see in Chapter 16 that leverage increases ROE when the firm's return on assets is higher than the interest rate on debt. Since Pepsi's return on capital exceeds the interest rate that it is paying on its debt, return on equity is higher than return on capital.

### Self-Test 4.7

- Sappy Syrup has a profit margin below the industry average, but its ROA equals the industry average. How is this possible?
- Sappy Syrup's ROA equals the industry average, but its ROE exceeds the industry average. How is this possible?

<sup>16</sup> There is a complication here because the amount of taxes paid depends on the financing mix. We suggested in footnote 12 that it would be better to add back any interest tax shields when calculating the firm's profit margin.

## 4.6 Measuring Liquidity

### liquidity

Access to cash or assets that can be turned into cash on short notice.

If you are extending credit to a customer or making a short-term bank loan, you are interested in more than the company's leverage. You want to know whether the company can lay its hands on the cash to repay you. That is why credit analysts and bankers look at several measures of **liquidity**. Liquid assets can be converted into cash quickly and cheaply.

Think, for example, what you would do to meet a large unexpected bill. You might have some money in the bank or some investments that are easily sold, but you would not find it so easy to turn your old sweaters into cash. Companies, likewise, own assets with different degrees of liquidity. For example, accounts receivable and inventories of finished goods are generally quite liquid. As inventories are sold off and customers pay their bills, money flows into the firm. At the other extreme, real estate may be quite *illiquid*. It can be hard to find a buyer, negotiate a fair price, and close a deal at short notice.

Managers have another reason to focus on liquid assets: Their book (balance sheet) values are usually reliable. The book value of a catalytic cracker may be a poor guide to its true value, but at least you know what cash in the bank is worth.

Liquidity ratios also have some *less* desirable characteristics. Because short-term assets and liabilities are easily changed, measures of liquidity can rapidly become outdated. You might not know what the catalytic cracker is worth, but you can be fairly sure that it won't disappear overnight. Cash in the bank can disappear in seconds.

Also, assets that seem liquid sometimes have a nasty habit of becoming illiquid. This happened during the subprime mortgage crisis in 2007. Some financial institutions had set up funds known as *structured investment vehicles (SIVs)* that issued short-term debt backed by residential mortgages. As mortgage default rates began to climb, the market in this debt dried up and dealers became very reluctant to quote a price.

Bankers and other short-term lenders applaud firms that have plenty of liquid assets. They know that when they are due to be repaid, the firm will be able to get its hands on the cash. But more liquidity is not always a good thing. For example, efficient firms do not leave excess cash in their bank accounts. They don't allow customers to postpone paying their bills, and they don't leave stocks of raw materials and finished goods littering the warehouse floor. In other words, high levels of liquidity may indicate sloppy use of capital. Here, EVA can help, because it penalizes managers who keep more liquid assets than they really need.

**Net Working Capital to Total Assets Ratio** Current assets include cash, marketable securities, inventories, and accounts receivable. Current assets are mostly liquid. The difference between current assets and current liabilities is known as *net working capital*. It roughly measures the company's potential net reservoir of cash. Since current assets usually exceed current liabilities, net working capital is usually positive. For Pepsi,

$$\text{Net working capital} = 9,130 - 6,860 = \$2,270 \text{ million}$$

Pepsi's net working capital was 8% of total assets:

$$\frac{\text{Net working capital}}{\text{Total assets}} = \frac{2,270}{29,930} = .08, \text{ or } 8\%$$

**Current Ratio** The current ratio is just the ratio of current assets to current liabilities:

$$\text{Current ratio} = \frac{\text{current assets}}{\text{current liabilities}} = \frac{9,130}{6,860} = 1.33$$

Pepsi has \$1.33 in current assets for every dollar in current liabilities.

Changes in the current ratio can be misleading. For example, suppose that a company borrows a large sum from the bank and invests it in marketable securities. Current liabilities rise and so do current assets. If nothing else changes, net working capital is unaffected but the current ratio changes. For this reason it is sometimes preferable to net short-term investments against short-term debt when calculating the current ratio.

**Quick (Acid-Test) Ratio** Some current assets are closer to cash than others. If trouble comes, inventory may not sell at anything above fire-sale prices. (Trouble typically comes *because* the firm can't sell its inventory of finished products for more than production cost.) Thus managers often exclude inventories and other less liquid components of current assets when comparing current assets to current liabilities. They focus instead on cash, marketable securities, and bills that customers have not yet paid. This results in the quick ratio:

$$\text{Quick ratio} = \frac{\text{cash} + \text{marketable securities} + \text{receivables}}{\text{current liabilities}} = \frac{1,651 + 3,725}{6,860} = .78$$

**Cash Ratio** A company's most liquid assets are its holdings of cash and marketable securities. That is why analysts also look at the cash ratio:

$$\text{Cash ratio} = \frac{\text{cash} + \text{marketable securities}}{\text{current liabilities}} = \frac{1,651}{6,860} = .24$$

A low cash ratio may not matter if the firm can borrow on short notice. Who cares whether the firm has actually borrowed from the bank or whether it has a guaranteed line of credit that lets it borrow whenever it chooses? None of the standard measures of liquidity takes the firm's "reserve borrowing power" into account.

### Self-Test 4.8

- A firm has \$1.2 million in current assets and \$1 million in current liabilities. If it uses \$.5 million of cash to pay off some of its accounts payable, what will happen to the current ratio? What happens to net working capital?
- A firm uses cash on hand to pay for additional inventories. What will happen to the current ratio? To the quick ratio?

## 4.7 Calculating Sustainable Growth

We have looked at some measures of Pepsi's profitability and of the efficiency with which it uses its assets. Pepsi has clearly been a very successful company. It has consistently earned more than 20% on its capital, and dividends and earnings have roughly doubled in the past 5 years. The company's financial statements cannot tell us what the future will bring, but we can ask how fast Pepsi will grow *if it maintains its current level of profitability*.

Mature companies grow mainly by reinvesting earnings. How rapidly they grow depends on the proportion of earnings that is kept in the business and the profits that the company can earn on the new capital.

In 2006 Pepsi earned \$5,642 and paid \$1,854 in dividends. The proportion of earnings paid out as dividends was, therefore,

$$\text{Payout ratio} = \frac{1,854}{5,642} = .33, \text{ or } 33\%$$

The remaining 67% of earnings was reinvested and "plowed back" into the business and added to the firm's equity capital. Thus,

$$\text{Plowback ratio} = 1 - \text{payout ratio} = 1 - .33 = .67$$

Pepsi's return on equity (ROE) was 39.6%. If it continues to reinvest 67% of its earnings and to earn 39.6% on this money, both its earnings and its book equity will increase by  $.67 \times .396 = .265$ , or 26.5% a year:

$$\begin{aligned} \text{Growth in equity from plowback} &= \frac{\text{earnings} - \text{dividends}}{\text{equity}} \\ &= \frac{\text{earnings} - \text{dividends}}{\text{earnings}} \times \frac{\text{earnings}}{\text{equity}} \\ &= \text{plowback ratio} \times \text{ROE} \\ &= .67 \times .396 = .265, \text{ or } 26.5\% \end{aligned}$$

### sustainable rate of growth

Steady rate at which a firm can grow without changing leverage.

This measure is often known as the **sustainable rate of growth**.

Is this a reasonable long-term prospect? Almost certainly not. No company can expect to maintain such high rates of growth forever. While Pepsi may continue to grow rapidly for some years to come, very high returns on new investments are unlikely to persist. If profitable opportunities diminish, Pepsi may also decide to increase its payout rate. As ROE and the plowback ratio both decline, growth must slow.

## 4.8 Interpreting Financial Ratios

We have shown how to calculate some common summary measures of Pepsi's performance and financial condition. These are summarized in Table 4-7.<sup>17</sup>

Now that you have calculated these measures, you need some way to judge whether they are high or low. In some cases there may be a natural benchmark. For example, if a firm has negative value added or a return on capital less than the cost of that capital, it is not creating wealth for its shareholders.

But what about some of our other measures? There is no right level for, say, the asset turnover or profit margin, and if there were, it would almost certainly vary from industry to industry and company to company. For example, you would not expect a soft-drink manufacturer to have the same profit margin as a jeweller or the same leverage as a finance company.

Table 4-8 presents some financial ratios for a sample of industry groups. Notice the large variations between industries. Some of these differences may arise from chance; in 2006 the sun shone more kindly on some industries than on others. But the differences also reflect more fundamental industry factors. For example, notice the high debt ratios of utilities. By contrast, semiconductor producers and software companies scarcely borrow at all. We pointed out earlier that some businesses are able to generate a high level of sales from relatively few assets. For example, you can see that the asset turnover ratio for retailers is more than three times that for pharmaceutical companies. But competition ensures that retailers earn a correspondingly lower margin on their sales. The net effect is that the return on assets is broadly similar for the two groups of companies.

### Self-Test 4.9

Look at the financial ratios shown in Table 4-8. The retail industry has a much higher turnover of receivables (a shorter collection period) than other industries, while software companies have high inventory turnover (low days in inventory). What do you think accounts for these differences?

<sup>17</sup> If you would like to see how we calculated these ratios or to calculate your own, you can use the live Excel spreadsheet available on our Web site at [www.mhhe.com/bmm6e](http://www.mhhe.com/bmm6e).

**TABLE 4-7** Summary of Pepsi's financial ratios

<b>Performance Measures</b>		
Market value added (\$ millions) =	market value of equity – book value of equity	87,089
Market-to-book ratio =	market value of equity/book value of equity	6.7
<b>Profitability Measures</b>		
Return on equity (ROE) =	net income/equity	39.6%
Return on assets (ROA) =	(net income + interest)/total assets	18.5%
Return on capital (ROC) =	(net income + interest)/(long-term debt + equity)	35.5%
EVA (\$ millions) =	net income – cost of capital × (long-term debt + equity)	4,527
Operating profit margin =	(net income + interest)/sales	16.4%
<b>Efficiency Measures</b>		
Asset turnover =	sales/total assets at start of year	1.13
Inventory turnover =	cost of goods sold/inventory at start of year	9.3
Days in inventory =	inventory at start of year/daily cost of goods sold	39
Receivables turnover =	sales/receivables at start of year	11.0
Average collection period (days) =	receivables at start of year/daily sales	33
<b>Leverage Measures</b>		
Long-term debt ratio =	long-term debt/(long-term debt + equity)	14%
Long-term debt-equity ratio =	long-term debt/equity	17%
Total debt ratio =	total liabilities/total assets	49%
Times interest earned =	EBIT/interest payments	30.2
Cash coverage ratio =	(EBIT + depreciation)/interest payments	36.1
<b>Liquidity Measures</b>		
Net working capital to total assets =	net working capital/total assets	0.08
Current ratio =	current assets/current liabilities	1.33
Quick ratio =	(cash + marketable securities + receivables)/ current liabilities	0.78
Cash ratio =	(cash + marketable securities)/current liabilities	0.24
<b>Growth Measures</b>		
Payout ratio =	dividends/earnings	0.33
Sustainable growth =	(1 – payout ratio) × ROE	26.5%

When comparing Pepsi's financial position, it makes sense to limit your comparison to the firm's main competitors. Table 4-9 sets out some key performance measures for Pepsi and Coca-Cola. The two companies are similar in many respects. Pepsi generates a higher level of sales per dollar of assets, but it earns a lower margin on these sales. Pepsi reinvests more of its earnings. That means less dividends today, but the new investment should help Pepsi to grow its earnings faster.

It may also be helpful to compare Pepsi's financial ratios with its equivalent figures in earlier years. For example, you can see in Figure 4-1 that Pepsi's return on assets has generally increased over the past few years. What accounts for this improvement? We know that  $ROA = \text{asset turnover} \times \text{operating profit margin}$ . The figure shows that for the most part, the improvement in Pepsi's ROA came from improvement in the profit margin. The sales that Pepsi has been able to generate per dollar of assets have been roughly constant. Here is where it may be useful to look at the experience of the different divisions.

This concludes our canter through Pepsi's financial statements.

**TABLE 4-8** Selected 2006 financial ratios for industry groups in Standard & Poor's Composite Index

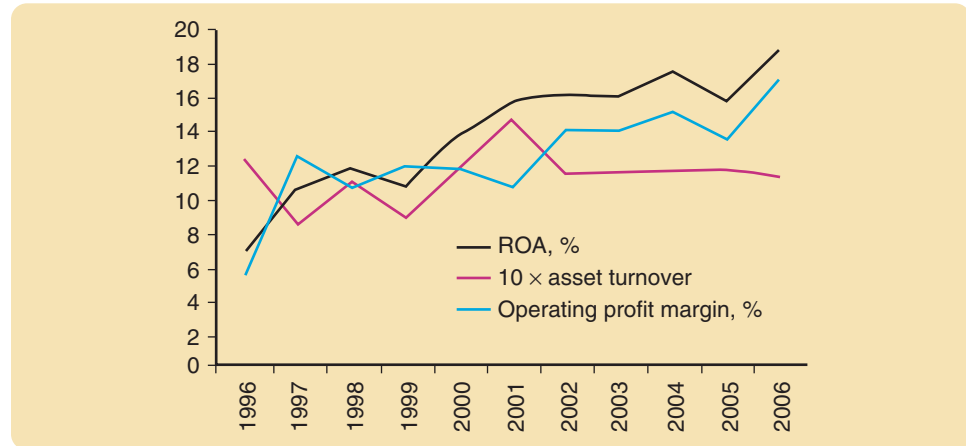
	Return on Capital (ROC)	Return on Assets (ROA)	Operating Profit Margin	Asset Turnover Ratio	Average Collection Period	Average Days in Inventory	Debt Ratio	Current Ratio	Cash Ratio	Quick Ratio
Oil	21.0%	12.6%	8.5%	1.47	30 days	13 days	0.18	1.14	0.33	0.98
Food	14.8	9.0	10.2	0.88	38	60	0.36	1.10	0.21	0.83
Textiles	13.0	9.6	9.2	1.04	45	110	0.20	2.38	0.40	1.49
Paper	12.9	6.8	8.5	0.81	89	59	0.34	1.09	0.14	1.17
Chemicals	16.5	9.1	9.5	0.95	61	63	0.34	1.69	0.27	1.51
Pharmaceuticals	18.0	11.8	19.8	0.60	58	179	0.20	1.75	0.80	0.87
Metals	20.9	12.2	10.5	1.16	39	54	0.32	1.66	0.27	1.18
Machinery	16.4	9.9	10.6	0.94	109	67	0.38	1.70	0.21	1.90
Computers	13.4	7.5	8.6	0.88	72	37	0.18	1.67	0.80	1.05
Semiconductors	11.6	8.9	9.6	0.93	43	61	0.10	2.52	1.33	1.02
Telecoms	9.5	5.4	11.5	0.46	44	12	0.37	0.73	0.15	0.79
Utilities	9.8	5.3	13.2	0.40	57	27	0.54	0.93	0.15	0.64
Retailers	14.0	8.7	3.8	2.26	9	51	0.30	1.23	0.26	0.34
Software	13.7	7.8	12.4	0.63	82	11	0.16	1.47	0.76	1.06

Source: Compustat.

**TABLE 4-9** Selected 2006 financial measures for PepsiCo and Coca-Cola

	Pepsi	Coca-Cola
<b>Performance Measures</b>		
Market value added	\$87,089 million	\$94,937 million
Market to book ratio	6.7	6.6
<b>Profitability Measures</b>		
Return on equity (ROE)	39.6%	31.1%
Return on assets (ROA)	18.5%	18.0%
Return on capital (ROC)	35.5%	30.3%
EVA	\$4,288 million	\$4,003 million
Operating profit margin	16.4%	21.6%
<b>Efficiency Measures</b>		
Asset turnover	1.13	0.84
Inventory turnover	9.3	5.7
Receivables turnover	11.0	10.8
<b>Leverage Measures</b>		
Long-term debt ratio	14%	7%
Total debt ratio	49%	44%
Times interest earned	29.5	30.9
<b>Liquidity Measures</b>		
Net working capital to total assets	0.08	-0.02
Current ratio	1.3	0.9
Quick ratio	0.8	0.6
Cash ratio	0.2	0.3
<b>Growth Measures</b>		
Plowback ratio	0.67	0.43
Sustainable growth	26.5%	13.3%

**FIGURE 4-1** PepsiCo  
Financial Ratios



## 4.9 The Role of Financial Ratios—and a Final Note on Transparency

Whenever two managers get together to talk business and finance, it's a good bet that they will refer to financial ratios. Let's drop in on two conversations.

**Conversation 1** The CEO was musing out loud: “How are we going to finance this expansion? Would the banks be happy to lend us the \$30 million that we need?”

“I've been looking into that,” the financial manager replies. “Our current debt ratio is .3. If we borrow the full cost of the project, the ratio would be about .45. When we took out our last loan from the bank, we agreed that we would not allow our debt ratio to get above .5. So if we borrow to finance this project, we wouldn't have much leeway to respond to possible emergencies. Also, the rating agencies currently give our bonds an investment-grade rating. They too look at a company's leverage when they rate its bonds. I have a table here (Table 4–10) which shows that when firms are highly leveraged, their bonds receive a lower rating. I don't know whether the rating agencies would downgrade our bonds if our debt ratio increased to .45, but they might. That wouldn't please our existing bondholders, and it could raise the cost of any new borrowing.

“We also need to think about our interest cover, which is beginning to look a bit thin. Debt interest is currently covered three times, and if we borrowed the entire \$30 million, interest cover would fall to about two times. Sure, we expect to earn additional profits on the new investment, but it could be several years before they come through. If we run into a recession in the meantime, we could find ourselves short of cash.”

“Sounds to me as if we should be thinking about a possible equity issue,” concluded the CEO.

**Conversation 2** The CEO was not in the best of moods after his humiliating defeat at the company golf tournament by the manager of the packaging division: “I see our stock was down again yesterday,” he growled. “It's now selling below book value, and the stock price is only six times earnings. I work my socks off for this company; you would think that our stockholders would show a little more gratitude.”

“I think I can understand a little of our shareholders' worries,” the financial manager replies. “Just look at our return on assets. It's only 6%, well below the cost of capital. Sure we are making a profit, but that profit does not cover the cost of the funds that investors provide. Our economic value added is actually negative. Of course, this doesn't necessarily mean that the assets could be used better elsewhere, but we should certainly be looking carefully at whether any of our divisions should be sold off or the assets redeployed.

**TABLE 4-10** Financial ratios and default risk by rating class, long-term debt

	Three-Year (2002–2004) Medians						
	AAA	AA	A	BBB	BB	B	CCC
<b>A.</b> EBIT interest coverage multiple	23.8	19.5	8.0	4.7	2.5	1.2	0.4
EBITDA interest coverage multiple	25.5	24.6	10.2	6.5	3.5	1.9	0.9
Funds from operations/total debt (%)	203.3	79.9	48.0	35.9	22.4	11.5	5.0
Free operating cash flow/total debt (%)	127.6	44.5	25.0	17.3	8.3	2.8	(2.1)
Total debt/EBITDA multiple	0.4	0.9	1.6	2.2	3.5	5.3	7.9
Return on capital (%)	27.6	27.0	17.5	13.4	11.3	8.7	3.2
Total debt/(total debt + equity) (%)	12.4	28.3	37.5	42.5	53.7	75.9	113.5
<b>B.</b> Historical 5-year default rate (%)	0.2	0.6	0.6	2.3	5.9	12.9	28.0

Note: EBITDA is earnings before interest, taxes, depreciation, and amortization

Source: Panel A—*Corporate Rating Criteria*, Standard & Poor's, 2006. Reproduced by permission of Standard & Poor's, a division of The McGraw-Hill Companies, Inc. Panel B—Edward Altman, "The Importance and Subtlety of Credit Rating Migration," *Journal of Banking and Finance* 22 (1998), pp. 1231–1247.

"In some ways we're in good shape. We have very little short-term debt, and our current assets are three times our current liabilities. But that's not altogether good news because it also suggests that we may have more working capital than we need. I've been looking at our main competitors. They turn over their inventory 12 times a year compared with our figure of just 8 times. Also, their customers take an average of 45 days to pay their bills. Ours take 67. If we could just match their performance on these two measures, we would release \$300 million that could be paid out to shareholders."

"Perhaps we could talk more about this tomorrow," said the CEO. "In the meantime I intend to have a word with the production manager about our inventory levels and with the credit manager about our collections policy. You've also got me thinking about whether we should sell off our packaging division. I've always worried about the divisional manager there. Spends too much time practicing his backswing and not enough worrying about his return on assets."

## Transparency

Throughout this chapter we have assumed that financial statements are trustworthy. We assumed that accountants are following generally accepted accounting principles (GAAP) and not endorsing misleading numbers. We assumed that managers are not making up good "facts" for the financial statements or covering up bad ones. When these assumptions are correct, we say that the firm is *transparent*, because outsiders can assess its value and performance.

Unfortunately, dishonest managers with creamy compensation packages may seek to hide the truth from investors. When the truth comes out, there can be big trouble. Think back to the Enron scandal. Enron was in many ways an empty shell. Its stock price was supported more by investors' enthusiasm than by profitable operating businesses. The company inflated its apparent performance by borrowing aggressively through so-called *special-purpose entities (SPEs)* and hiding these debts. Much of the SPE borrowing was improperly excluded from Enron's financial statements.

The bad news started to leak out in the last months of 2001. In October, Enron announced a \$1 billion write-off of its water and broadband business. In November, it recognized its SPE debt retroactively, which increased its acknowledged indebtedness by \$658 million and reduced its claims of past earnings by \$591 million. Its public debt was downgraded to junk status, and on December 2 it filed for bankruptcy.

Enron demonstrated the importance of transparency. If Enron had been more transparent to outsiders—that is, if they could have assessed its true profitability and prospects—its problems would have shown up right away in a falling stock price. That in turn would have generated extra scrutiny from security analysts, bond rating agencies, lenders, and investors.

With transparency, corporate troubles generally lead to corrective action. But the top management of a troubled and *opaque* company may be able to maintain its stock price and postpone the discipline of the market. Market discipline caught up with Enron only a month or two before bankruptcy.

Enron was only one in a series of accounting scandals that came to light in 2001 and 2002. A major goal of the Sarbanes-Oxley Act is to increase transparency and ensure that companies and their accountants provide directors, lenders, and shareholders with the information they need to monitor progress. Among other things, the act set up the Public Company Accounting Oversight Board to oversee auditors; it bans accounting firms from offering their services to companies whose accounts they audit; it prohibits any individual from heading a firm's audit for more than 5 years; and it requires that the board's audit committee consist of directors who are independent of the company's management. Sarbanes-Oxley also requires that management (1) certify that the financial statements present a fair view of the firm's financial position and (2) demonstrate that the firm has adequate controls and procedures for financial reporting.

All this comes at a price. The costs of SOX and the burdens of meeting detailed regulations are pushing some corporations to return to private (versus public) ownership. Some observers also believe that these added regulatory demands have hurt the international competitiveness of U.S. financial markets.

We stress that transparency in the United States and other developed economies is usually pretty good. Nevertheless, it pays to be careful and critical even in these countries. Take extra care in developing economies, where accounting standards are often lax.

## SUMMARY

**How do you measure whether a public corporation has delivered value for its shareholders?** (LO1)

For a public corporation, this is relatively easy. Start with **market capitalization**, which equals price per share times the number of shares outstanding. The difference between market capitalization and the book value of equity measures the **market value added** by the firm's investments and operations. The book value of equity is the cumulative investment by shareholders in the company. The ratio of market value to book value is another way of expressing value added.

For private corporations, financial managers and analysts have to turn to other performance measures, because stock prices are not available.

**What measures are used to assess financial performance?** (LO2)

Financial managers and analysts look to the ratio of net income to equity capital (ROE). They compare this profitability measure with the cost of equity capital to see whether the firm is earning more or less than shareholders could earn by investing on their own. They may also look to the return on the total debt and equity capital (ROC) and the return on total assets (ROA). An alternative approach is to deduct the cost of capital from profits to see how much the company has earned after all costs. This measure is called **economic value added (EVA)** or **residual income**. EVA is a useful standard for plant and divisional managers, since EVA rewards managers who do not hold underutilized assets.

**What are the standard measures of profitability, efficiency, leverage, and liquidity?** (LO3)

Financial managers and analysts have to condense the enormous volume of information in a company's financial statements. They rely on a handful of ratios to summarize financial performance, operating efficiency, and financial strength. Look back at Table 4–7, which summarizes the most important ratios. Remember that the ratios sometimes appear under different names and may be calculated differently.



<b>Income Statement</b> (figures in millions of dollars)	
Net sales	13,193
Cost of goods sold	4,060
Other expenses	4,049
Depreciation	2,518
Earnings before interest and taxes (EBIT)	2,566
Interest expenses	685
Income before tax	1,881
Taxes	570
Net income	1,311
Dividends	856

<b>Balance Sheet</b> (figures in millions of dollars)		
	End of Year	Start of Year
<b>Assets</b>		
Cash and marketable securities	89	158
Receivables	2,382	2,490
Inventories	187	238
Other current assets	867	932
Total current assets	3,525	3,818
Net property, plant, and equipment	19,973	19,915
Other long-term assets	4,216	3,770
Total assets	27,714	27,503
<b>Liabilities and shareholders' equity</b>		
Payables	2,564	3,040
Short-term debt	1,419	1,573
Other current liabilities	811	787
Total current liabilities	4,794	5,400
Long-term debt and leases	7,018	6,833
Other long-term liabilities	6,178	6,149
Shareholders' equity	9,724	9,121
Total liabilities and shareholders' equity	27,714	27,503

Calculate the following financial ratios:

- a. Long-term debt ratio
- b. Total debt ratio
- c. Times interest earned
- d. Cash coverage ratio
- e. Current ratio
- f. Quick ratio
- g. Operating profit margin
- h. Inventory turnover
- i. Days in inventory
- j. Average collection period
- k. Return on equity
- l. Return on assets
- m. Payout ratio

2. **Gross Investment.** What was Phone Corp.'s gross investment in plant and other equipment? (LO3)
3. **Market Value Ratios.** If the market value of Phone Corp. stock was \$17.2 billion at the end of the year, what was the market-to-book ratio? If there were 205 million shares outstanding, what were earnings per share? (LO1)
4. **Measuring Firm Performance.** (LO2)
  - a. What would happen to Pepsi's economic value added if its cost of equity were 10% rather than the 9.5% value we assumed?
  - b. Would this have any impact on its accounting profits?
  - c. Which do you think is a better measure of the firm's performance?
5. **Measuring Firm Performance.** Suppose the broad stock market falls 5% in one day and Pepsi's stock price also falls by 5%. (LO1)
  - a. What will happen to our assessment of market value added?
  - b. Should this decline affect our assessment of the performance of Pepsi's managers?
  - c. Would you feel differently about Pepsi's managers if the stock market were unchanged and Pepsi's stock fell by 5%?
6. **Sustainable Growth.** In Table 4–9, we report Pepsi's sustainable growth rate as 26.5%. (LO5)
  - a. What would the sustainable growth rate be if Pepsi's plowback ratio fell to the same value as Coke's?
  - b. What would the sustainable growth rate be if Pepsi's return on equity were only as great as its cost of equity, 9.5%?
7. **Du Pont Analysis.** Use the data for Phone Corp. from Quiz Question 1 to confirm that  $ROA = \text{asset turnover} \times \text{operating profit margin}$ . (LO4)
8. **Du Pont Analysis.** Use the data for Phone Corp. from Quiz Question 1 to do the following: (LO4)
  - a. Calculate the ROE for Phone Corp.
  - b. Demonstrate that  $ROE = \text{leverage ratio} \times \text{asset turnover ratio} \times \text{operating profit margin} \times \text{debt burden}$ .

## PRACTICE PROBLEMS

9. **Asset Turnover.** In each case, choose the firm that you expect to have a higher asset turnover ratio. (LO3)
  - a. Economics Consulting Group or Pepsi.
  - b. Catalog Shopping Network or Neiman Marcus.
  - c. Electric Utility Co. or Standard Supermarkets.
10. **Economic Value Added.** We stated in Footnote 5 that EVA will be positive whenever ROE is greater than the cost of equity. Explain why this is so. (LO2)
11. **Defining Ratios.** There are no universally accepted definitions of financial ratios, but some of the following ratios make no sense at all. Substitute correct definitions. (LO3)
  - a. Debt-equity ratio =  $\frac{\text{long-term debt}}{\text{long-term debt} + \text{equity}}$
  - b. Return on equity =  $\frac{\text{net income}}{\text{average equity}}$
  - c. Operating profit margin =  $\frac{\text{net income} + \text{interest}}{\text{sales}}$
  - d. Inventory turnover =  $\frac{\text{total assets}}{\text{average inventory}}$

- e. Current ratio =  $\frac{\text{current liabilities}}{\text{current assets}}$
- f. Average collection period =  $\frac{\text{sales}}{\text{average receivables}/365}$
- g. Quick ratio =  $\frac{\text{cash} + \text{marketable securities} + \text{receivables}}{\text{current liabilities}}$
12. **Current Liabilities.** Suppose that at year-end Pepsi had unused lines of credit which would have allowed it to borrow a further \$300 million. Suppose also that it used this line of credit to borrow \$300 million and invested the proceeds in marketable securities. Would the company have appeared to be (a) more or less liquid, (b) more or less highly leveraged? Calculate the appropriate ratios. (LO3)
  13. **Current Ratio.** How would the following actions affect a firm's current ratio? (LO3)
    - a. Inventory is sold at cost.
    - b. The firm takes out a bank loan to pay its accounts due.
    - c. A customer pays its accounts receivable.
    - d. The firm uses cash to purchase additional inventories.
  14. **Liquidity Ratios.** A firm uses \$1 million in cash to purchase inventories. What will happen to its current ratio? Its quick ratio? (LO3)
  15. **Receivables.** Chik's Chickens has average accounts receivable of \$6,333. Sales for the year were \$9,800. What is its average collection period? (LO3)
  16. **Inventory.** Salad Daze maintains an inventory of produce worth \$400. Its total bill for produce over the course of the year was \$73,000. How old on average is the lettuce it serves its customers? (LO3)
  17. **Inventory Turnover.** If a firm's inventory level of \$10,000 represents 30 days' sales, what is the annual cost of goods sold? What is the inventory turnover ratio? (LO3)
  18. **Leverage Ratios.** Lever Age pays an 8% rate of interest on \$10 million of outstanding debt with face value \$10 million. The firm's EBIT was \$1 million. (LO3)
    - a. What is times interest earned?
    - b. If depreciation is \$200,000, what is cash coverage?
    - c. If the firm must retire \$300,000 of debt for the sinking fund each year, what is its "fixed-payment cash-coverage ratio" (the ratio of cash flow to interest plus other fixed debt payments)?
  19. **Du Pont Analysis.** Keller Cosmetics maintains an operating profit margin of 5% and asset turnover ratio of 3. (LO4)
    - a. What is its ROA?
    - b. If its debt-equity ratio is 1, its interest payments and taxes are each \$8,000, and EBIT is \$20,000, what is its ROE?
  20. **Du Pont Analysis.** Torrid Romance Publishers has total receivables of \$3,000, which represents 20 days' sales. Average total assets are \$75,000. The firm's operating profit margin is 5%. Find the firm's ROA and asset turnover ratio. (LO4)
  21. **Leverage.** A firm has a long-term debt-equity ratio of .4. Shareholders' equity is \$1 million. Current assets are \$200,000, and the current ratio is 2. The only current liabilities are notes payable. What is the total debt ratio? (LO3)
  22. **Leverage Ratios.** A firm has a debt-to-equity ratio of .5 and a market-to-book ratio of 2. What is the ratio of the book value of debt to the market value of equity? (LO3)
  23. **Times Interest Earned.** In the past year, TVG had revenues of \$3 million, cost of goods sold of \$2.5 million, and depreciation expense of \$200,000. The firm has a single issue of debt outstanding with book value of \$1 million on which it pays an interest rate of 8%. What is the firm's times interest earned ratio? (LO3)

24. **Du Pont Analysis.** CFA Corp. has a debt-equity ratio that is lower than the industry average, but its cash coverage ratio is also lower than the industry average. What might explain this seeming contradiction? (LO3)
25. **Leverage.** Suppose that a firm has both floating-rate and fixed-rate debt outstanding. What effect will a decline in market interest rates have on the firm's times interest earned ratio? On the market-value debt-to-equity ratio? On the basis of these answers, would you say that leverage has increased or decreased? (LO3)
26. **Interpreting Ratios.** In each of the following cases, explain briefly which of the two companies is likely to be characterized by the higher ratio: (LO3)
- Debt-equity ratio: a shipping company or a computer software company.
  - Payout ratio: United Foods Inc. or Computer Graphics Inc.
  - Ratio of sales to assets: an integrated pulp and paper manufacturer or a paper mill.
  - Average collection period: Regional Electric Power Company or Z-Mart Discount Outlets.
27. **Using Financial Ratios.** For each category of financial ratios discussed in this chapter, give some examples of who would be likely to examine these ratios and why. (LO6)

## CHALLENGE PROBLEMS

**Excel**

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28. **Financial Statements.** As you can see, someone has spilled ink over some of the entries in the balance sheet and income statement of Transylvania Railroad. Can you use the following information to work out the missing entries? (LO3)

Long-term debt ratio	0.4
Times interest earned	8.0
Current ratio	1.4
Quick ratio	1.0
Cash ratio	0.2
Return on assets	18%
Return on equity	41%
Inventory turnover	5.0
Average collection period	71.2 days

INCOME STATEMENT (figures in millions of dollars)	
Net sales	•••
Cost of goods sold	•••
Selling, general, and administrative expenses	10
Depreciation	20
Earnings before interest and taxes (EBIT)	•••
Interest expense	•••
Income before tax	•••
Tax	•••
Net income	•••

<b>BALANCE SHEET</b> (figures in millions of dollars)		
	This Year	Last Year
<b>Assets</b>		
Cash and marketable securities	•••	20
Receivables	•••	34
Inventories	•••	26
Total current assets	•••	80
Net property, plant, and equipment	•••	25
Total assets	•••	105
<b>Liabilities and shareholders' equity</b>		
Accounts payable	25	20
Notes payable	30	35
Total current liabilities	•••	55
Long-term debt	•••	20
Shareholders' equity	•••	30
Total liabilities and shareholders' equity	115	105



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29. **Interpreting Financial Ratios.** (LO3)

- Turn back to Table 4–8. For the sample of industries in that table, plot operating profit margin against asset turnover in a scatter diagram. What is the apparent relationship between these two variables? Does this make sense to you?
- Now plot a scatter diagram of the cash ratio versus quick ratio. Do these two measures of liquidity tend to move together? Would you conclude that once you know one of these ratios, there is little to be gained by calculating the other?

STANDARD  
& POOR'S

Go to Market Insight at [www.mhhe.com/edumarketinsight](http://www.mhhe.com/edumarketinsight).

- Lowes (LOW) and The Home Depot (HD) have been in a tremendous race for the homeowner's dollar in the last few years. Who is winning? Review the company profiles (also review the industry information under the Home Improvement Retail link), financial highlights, annual ratios, profitability, and monthly valuation data reports. What company performance information supports your view as to which company is winning the race in the home improvement industry? Has the stock market picked a winner in this race?
- Compare the sources of return on equity (using the Du Pont formula) for Abercrombie & Fitch (ANF) and Gap, Inc. (GPS). Examine both levels and trends in these variables. Review the trends in operating profit margin, total asset turnover, and leverage. What factors tend to explain the performance differential between these competing clothing retailers? How has the market reacted to their operating performance?

## SOLUTIONS TO SELF-TEST QUESTIONS

- Market capitalization is  $\$75 \times 14.5 \text{ million} = \$1,087.5 \text{ million}$ . Market value added is  $\$1,087.5 - \$610 = \$477.5 \text{ million}$ . Market to book is  $1,087.5/610 = 1.78$ . You can also calculate book value per share at  $\$610/14.5 = \$42.07$ , and use price per share to calculate market to book:  $\$75/\$42.07 = 1.78$ .

- 4.2 The cost of equity in dollars is  $.115 \times \$188 \text{ million} = \$21.62 \text{ million}$ . EVA is  $\$30 - \$21.62 = \$8.38 \text{ million}$ .
- 4.3 ROE measures return to equity as net income divided by the book value of equity. ROC and ROA measure the return to all investors, including interest paid as well as net income to shareholders. ROC measures return versus long-term debt and equity. ROA measures return versus total assets.
- 4.4 Average daily expenses are  $(15,762 + 11,357)/365 = \$74.3 \text{ million}$ . Accounts payable at the start of the year are  $\$5,271 \text{ million}$ . The average payment delay is therefore  $5,271/74.3 = 71 \text{ days}$ .
- 4.5 In industries with rapid asset turnover, competition forces prices down, reducing profit margins.
- 4.6 Nothing will happen to the long-term debt ratio computed using book values, since the face values of the old and new debt are equal. However, times interest earned and cash coverage will increase since the firm will reduce its interest expense.
- 4.7
- The firm must compensate for its below-average profit margin with an above-average turnover ratio. Remember that ROA is the *product* of operating margin  $\times$  turnover.
  - If ROA equals the industry average but ROE exceeds the industry average, the firm must have above-average leverage. As long as ROA exceeds the borrowing rate, leverage will increase ROE.
- 4.8
- The current ratio starts at  $1.2/1.0 = 1.2$ . The transaction will reduce current assets to  $\$.7 \text{ million}$  and current liabilities to  $\$.5 \text{ million}$ . The current ratio increases to  $.7/.5 = 1.4$ . Net working capital is unaffected: Current assets and current liabilities fall by equal amounts.
  - The current ratio is unaffected, since the firm merely exchanges one current asset (cash) for another (inventories). However, the quick ratio will fall since inventories are not included among the most liquid assets.
- 4.9 The major portion of retail sales is paid for when the customer purchases the goods. Because credit sales are comparatively uncommon, accounts receivable are a smaller percentage of sales than they are in other industries. This shows up as a low collection period or, equivalently, as high turnover of receivables.

Computer software companies do not have to maintain a large inventory of finished product awaiting sale. Often, they can deliver some product electronically as it is ready. In addition, software development does not require large inventories of inputs that need to be assembled into a final product. Therefore, inventories compared to cost of goods sold will be lower than is the case in other industries, and this is reflected in high inventory turnover ratios.

## MINICASE

Burchetts Green had enjoyed the bank training course, but it was good to be starting his first real job in the corporate lending group. Earlier that morning the boss had handed him a set of financial statements for The Hobby Horse Company, Inc. (HH). “Hobby Horse,” she said, “has a \$45 million loan from us due at the end of September, and it is likely to ask us to roll it over. The company seems to have run into some rough weather recently, and I have asked Furze Platt to go down there this afternoon and see what is happening. It might do you good to go along with her. Before you go, take a look at these financial statements and see what you think the problems are. Here’s a chance for you to use some of that stuff they taught you in the training course.”

Mr. Green was familiar with the HH story. Founded in 1990, it had rapidly built up a chain of discount stores selling materials for crafts and hobbies. However, last year a number of new store openings coinciding with a poor Christmas season had pushed the company into loss. Management had halted all new construction and put 15 of its existing stores up for sale.

Mr. Green decided to start with the 6-year summary of HH’s balance sheet and income statement (Table 4–11). Then he turned to examine in more detail the latest position (Tables 4–12 and 4–13).

What appear to be the problem areas in HH? Do the financial ratios suggest questions that Ms. Platt and Mr. Green need to address?

**TABLE 4-11** Financial highlights for The Hobby Horse Company, Inc., year ending March 31

	2008	2007	2006	2005	2004	2003
Net sales	3,351	3,314	2,845	2,796	2,493	2,160
EBIT	-9	312	256	243	212	156
Interest	37	63	65	58	48	46
Taxes	3	60	46	43	39	34
Net profit	-49	189	145	142	125	76
Earnings per share	-0.15	0.55	0.44	0.42	0.37	0.25
Current assets	669	469	491	435	392	423
Net fixed assets	923	780	753	680	610	536
Total assets	1,592	1,249	1,244	1,115	1,002	959
Current liabilities	680	365	348	302	276	320
Long-term debt	236	159	297	311	319	315
Stockholders' equity	676	725	599	502	407	324
Number of stores	240	221	211	184	170	157
Employees	13,057	11,835	9,810	9,790	9,075	7,825

**TABLE 4-12**

<b>INCOME STATEMENT FOR THE HOBBY HORSE COMPANY, INC., FOR YEAR ENDING MARCH 31, 2008 (all items in millions of dollars)</b>	
Net sales	3,351
Cost of goods sold	1,990
Selling, general, and administrative expenses	1,211
Depreciation expense	159
Earnings before interest and taxes (EBIT)	-9
Net interest expense	37
Taxable income	-46
Income taxes	3
Net income	-49
Allocation of net income	
Addition to retained earnings	-49
Dividends	0

Note: Column sums subject to rounding error.

TABLE 4-13

<b>CONSOLIDATED BALANCE SHEET FOR THE HOBBY HORSE COMPANY, INC.</b> (figures in millions of dollars)		
<b>Assets</b>	<b>Mar. 31, 2008</b>	<b>Mar. 31, 2007</b>
Current assets		
Cash and marketable securities	14	72
Receivables	176	194
Inventories	479	203
Total current assets	669	469
Fixed assets		
Property, plant, and equipment (net of depreciation)	1,077	910
Less accumulated depreciation	154	130
Net fixed assets	923	780
Total assets	1,592	1,249
<b>Liabilities and Shareholders' Equity</b>	<b>Mar. 31, 2008</b>	<b>Mar. 31, 2007</b>
Current liabilities		
Debt due for repayment	484	222
Accounts payable	94	58
Other current liabilities	102	85
Total current liabilities	680	365
Long-term debt	236	159
Stockholders' equity		
Common stock and other paid-in capital	155	155
Retained earnings	521	570
Total stockholders' equity	676	725
Total liabilities and stockholders' equity	1,592	1,249

Note: Column sums subject to rounding error.