

Financial Analysis

► **Good financial managers** plan for the future. They check that they will have enough cash to pay the upcoming tax bill or dividend payment. They think about how much investment the firm will need to make over the next few years and about how they might finance that investment. They reflect on whether they are well placed to ride out an unexpected downturn in demand or an increase in the cost of materials.

In Chapter 29 we will describe how the financial manager develops both short- and long-term financial plans. But knowing where you stand today is a necessary prelude to contemplating where you might be in the future. Therefore, in this chapter we show how the firm's financial statements help you to understand the firm's overall performance and how some key financial ratios may alert senior management to potential problem

areas. For example, when the firm needs a loan from the bank, the financial manager can expect some searching questions about the firm's debt ratio and the proportion of profits that is absorbed by interest. Likewise, if a division is earning a low return on its capital or its profit margins are under pressure, you can be sure that management will demand an explanation.

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' performance. The ratios help you to ask the right questions; they seldom answer them.



28-1 Financial Statements

Public companies have a variety of stakeholders, such as shareholders, bondholders, bankers, suppliers, employees, and management. All these stakeholders need to monitor the firm and to ensure that their interests are being served. They rely on the company's financial statements to provide the necessary information. Public companies report to their shareholders quarterly and annually. The annual financial statements are filed with the SEC on form 10-K and the quarterly statements are filed on form 10-Q. Therefore you often hear financial analysts refer loosely to the company's "10-K" or its "10-Q."

When reviewing a company's financial statements, it is important to remember that accountants still have a fair degree of leeway in reporting earnings and book values. For example, they have discretion in the choice of depreciation method and the speed at which the firm's assets are written off.

Although accountants around the world are working toward common practices, there are still considerable variations in the accounting rules of different countries. In Anglo-Saxon

Speaking in Tongues

Forget Esperanto. Too straightforward. The *lingua franca* that is increasingly spanning the globe is a tongue-twisting accounting-speak that is forcing even Americans to rethink some precious notions of financial sovereignty.

International Financial Reporting Standards (IFRS), which aim to harmonize financial reporting in a world of cross-border trade and investment, have made great strides since they were adopted by 7,000 or so listed companies in the European Union. To date, over 100 countries from Canada to China have adopted the rules or say they plan to adopt them. The London-based International Accounting Standards Board (IASB) expects that to swell to 150 in the next four years.

Even America, no ardent internationalist, is working with the IASB to narrow the gap between its own accounting standards and IFRS, which rules foreign companies listed in America could choose by 2009 or possibly sooner. Today such companies must “reconcile” their accounts with American rules—a costly exercise that some believe is driving foreign listings away from the United States.

In 2007 America’s Securities and Exchange Commission (SEC) unexpectedly floated the idea of giving

American, and not just foreign, companies the choice of using IFRS. Critics of the idea claim that this will give companies the option of shopping around for whichever regime best suits their business. Inevitably, however, by opening the door (if only a crack), America’s own accounting regime would be in jeopardy.

Whether pure IFRS or not, all countries are prone to interpret the rules in ways that reflect their old accounting standards. Regulators are working through IOSCO, an international body of securities regulators, to attempt to whittle down these differences. The task is further complicated by the fact that international accounting rules tend to be “principles based,” which means there are no hard-and-fast codes to follow. This is different from America, where accounting principles are accompanied by thousands of pages of prescriptive regulatory guidance and interpretations from auditors and accounting groups, some of it gleaned from SEC speeches. IFRS have no such baggage, leaving more room for judgment.

Source: Adapted from “Speaking in Tongues,” *The Economist*, May 19, 2007, p. 83.

countries such as the U.S. or the U.K., which have large and active equity markets, the rules have been designed largely with the shareholder in mind. By contrast, in Germany the focus of accounting standards is to verify that the creditors are properly protected.

Another difference is the way that taxes are shown in the income statement. For example, in Germany taxes are paid on the published profits, and the depreciation method must therefore be approved by the revenue service. That is not the case in Anglo-Saxon countries, where the numbers shown in the published accounts are generally *not* the basis for calculating the company’s tax payments. For instance, the depreciation method used to calculate the published profits usually differs from the depreciation method used by the tax authorities.

For investors and multinational companies these variations in accounting rules can be irksome. Accounting bodies have therefore been getting together to see whether they can iron out some of the differences. It is not a simple task, as the nearby box illustrates.

28-2 Lowe’s Financial Statements

Your task is to assess the financial standing of Lowe’s, the home improvement retailer. Perhaps you are a mutual fund manager trying to decide whether to allocate \$25 million of new money to Lowe’s stock. Perhaps you are a major shareholder pondering a sellout.

You could be an investment banker seeking business from the company or a bondholder concerned with its credit standing. You could be the financial manager of Lowe's or of one of its competitors.

In each case your first step is to assess the company's *current* condition. You have before you the latest balance sheet and income statement.

The Balance Sheet

Table 28.1 sets out a simplified balance sheet for Lowe's Companies for its fiscal year 2008. It provides a snapshot of the company's assets at the end of that year and the sources of the money that was used to buy those assets.

The assets are listed in declining order of liquidity. For example, the accountant lists first those assets that are most likely to be turned into cash in the near future. They include cash itself, marketable securities and receivables (that is, bills to be paid by the firm's customers), and inventories of raw materials, work in process, and finished goods. These assets are all known as *current assets*.

TABLE 28.1

Balance sheet of Lowe's Companies, fiscal 2007 and 2008 (figures in \$ millions).

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	2008	2007
Assets		
Current assets:		
Cash and marketable securities	661	530
Accounts receivable	166	247
Inventories	8,209	7,611
Other current assets	215	298
Total current assets	9,251	8,686
Fixed assets:		
Tangible fixed assets		
Property, plant, and equipment	31,477	28,836
Less accumulated depreciation	8,755	7,475
Net tangible fixed assets	22,722	21,361
Long-term investments	253	509
Other long-term assets	460	313
Total assets	32,686	30,869
Liabilities and Shareholders' Equity		
Current liabilities:		
Debt due for repayment	1,021	1,104
Accounts payable	4,543	4,137
Other current liabilities	2,458	2,510
Total current liabilities	8,022	7,751
Long-term debt	5,039	5,576
Deferred income taxes	660	670
Other long-term liabilities	910	774
Total liabilities	14,631	14,771
Common stock and other paid-in capital	735	729
Retained earnings and capital surplus	17,320	15,369
Total shareholders' equity	18,055	16,098
Total liabilities and shareholders' equity	32,686	30,869

The remaining assets on the balance sheet consist of long-term, usually illiquid, assets such as warehouses, stores, fixtures, and vehicles. The balance sheet does not show up-to-date market values of these long-term assets. Instead, the accountant records the amount that each asset originally cost and deducts a fixed annual amount for depreciation of buildings, plant, and equipment. The balance sheet does not include all the company's assets. Some of the most valuable ones are intangible, such as reputation, skilled management, and a well-trained labor force. Accountants are generally reluctant to record these assets in the balance sheet unless they can be readily identified and valued.

Now look at the right-hand portion of Lowe's balance sheet, which shows where the money to buy the assets came from.¹ The accountant starts by looking at the liabilities, that is, the money owed by the company. First come those liabilities that need to be paid off in the near future. These *current liabilities* include debts that are due to be repaid within the next year and payables (that is, amounts owed by the company to its suppliers).

The difference between the current assets and current liabilities is known as the *net current assets* or *net working capital*. It roughly measures the company's potential reservoir of cash. For Lowe's in 2008

$$\begin{aligned}\text{Net working capital} &= \text{current assets} - \text{current liabilities} \\ &= 9,251 - 8,022 = \$1,229 \text{ million}\end{aligned}$$

The bottom portion of the balance sheet shows the sources of the cash that was used to acquire the net working capital and fixed assets. Some of the cash has come from the issue of bonds and leases that will not be repaid for many years. After all these long-term liabilities have been paid off, the remaining assets belong to the common stockholders. The company's equity is simply the total value of the net working capital and fixed assets less the long-term liabilities. Part of this equity has come from the sale of shares to investors, and the remainder has come from earnings that the company has retained and invested on behalf of the shareholders.

The Income Statement

If Lowe's balance sheet resembles a snapshot of the firm at a particular point in time, its income statement is like a video. It shows how profitable the firm has been over the past year.

Look at the summary income statement in Table 28.2. You can see that during 2008 Lowe's sold goods worth \$48,230 million. The total cost of purchasing and selling these

	\$ millions
Net sales	48,230
Cost of goods sold	31,729
Selling, general, and administrative expenses	11,158
Depreciation	1,539
Earnings before interest and taxes (EBIT)	3,804
Interest expense	298
Taxable income	3,506
Tax	1,311
Net income	2,195
Dividends	491
Addition to retained earnings	1,704

TABLE 28.2
Income statement of
Lowe's Companies,
2008 (figures in
\$ millions).

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¹ The British and Americans can never agree whether to keep to the left or the right. British accountants list liabilities on the left and assets on the right. (The right-hand side is actually plotted below in the table.)

goods was $\$31,729 + \$11,158 = \$42,887$ million.² In addition to these out-of-pocket expenses, Lowe's also deducted depreciation of \$1,539 million for the value of the fixed assets used up in producing the goods. Thus Lowe's earnings before interest and taxes (EBIT) were

$$\begin{aligned}\text{EBIT} &= \text{total revenues} - \text{costs} - \text{depreciation} \\ &= 48,230 - 42,887 - 1,539 \\ &= \$3,804 \text{ million}\end{aligned}$$

Of this sum \$298 million went to pay the interest on the short- and long-term debt (remember debt interest is paid out of pretax income) and a further \$1,311 million went to the government in the form of taxes. The \$2,195 million that was left over belonged to the shareholders. Lowe's paid out \$491 million as dividends and reinvested the remainder in the business.

28-3 Measuring Lowe's Performance

You want to use Lowe's financial statements to assess its financial performance and current standing. Where do you start?

At the close of fiscal 2008 Lowe's common stock was priced at \$18.19 per share.³ There were 1,470 million shares outstanding, so total **market capitalization** was $1,470 \times \$18.19 = \$26,739$ million. This is a big number, of course, but Lowe's is a sizeable company. Its shareholders have, over the years, invested billions in the company. Therefore, you decide to compare Lowe's market capitalization with the book value of its equity. The book value measures shareholders' cumulative investment in the company.

At the end of fiscal 2008 the book value of Lowe's equity was \$18,055 million. Therefore, the **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 $\$26,739 - \$18,055 = \$8,684$ million. In other words, Lowe's shareholders have contributed about \$18 billion and ended up with shares worth about \$27 billion. They have accumulated about \$9 billion in market value added.

The consultancy firm, EVA Dimensions, calculates market value added for a large sample of U.S. companies. Table 28.3 shows a few of the firms from EVA Dimension's list. Exxon Mobil heads the group. It has created \$154 billion of wealth for its shareholders. AT&T is near the bottom of the class: the market value of AT&T's shares is \$49 billion *less* than the amount of shareholders' money invested in the firm.

Exxon Mobil is a large firm. Its 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, Lowe's **market-to-book ratio** is⁴

$$\begin{aligned}\text{Market-to-book ratio} &= \text{market value of equity} / \text{book value of equity} \\ &= 26,739 / 18,055 = 1.5\end{aligned}$$

In other words, Lowe's has multiplied the value of its shareholders' investment 1.5 times.

² For simplicity we have deducted \$18 million of interest income from the selling, general, and administrative expenses.

³ Lowe's 2008 fiscal year ended on January 30, 2009.

⁴ The market-to-book ratio can also be calculated by dividing stock price by book value per share.

	Market Value Added	Market-to-Book Ratio		Market Value Added	Market-to-Book Ratio
Exxon Mobil	\$154,397	1.69	FedEx	−\$1,538	.96
Wal-Mart	128,159	2.02	J.C. Penney	−3,777	.69
Coca-Cola	106,957	3.46	Xerox	−9,981	.37
Google	96,880	6.82	Dow Chemical	−17,823	.55
Johnson & Johnson	67,645	1.80	AT&T	−49,052	.85

TABLE 28.3 Stock market measures of company performance, 2008 (dollar values in millions). Companies are ranked by market value added.

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

Table 28.3 also shows market-to-book ratios for our sample U.S. companies. Notice that Google has a much higher market-to-book ratio than Exxon Mobil. But Exxon Mobil's market value added is higher because of its larger scale.

The market value performance measures in Table 28.3 have two drawbacks. First, the market value of the company's shares reflects investors' expectations about *future* 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 Lowe's as a whole has performed well, but you can't use them to drill down to look at the performance of, say, its overseas stores or particular U.S. stores. To do this, you need accounting measures of profitability. We start with economic value added (EVA).

Economic Value Added (EVA)

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 investors. 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 its cost of capital.

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 investors in financial markets. The firm creates value for investors only if it can earn more than its cost of capital, that is, more than its investors 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**. We encountered EVA in Chapter 12, where we looked at how firms often link executive compensation to accounting measures of performance. Let's calculate EVA for Lowe's.

Total long-term capital, sometimes called *total capitalization*, is the sum of long-term debt and shareholders' equity. At the end of 2007 Lowe's total capitalization amounted to \$21,674 million, which was made up of \$5,576 million of long-term debt and \$16,098 million of shareholders' equity. This was the cumulative amount that had been invested in the past by the debt and equityholders. Lowe's weighted-average cost of capital was about 7.4%. Therefore, investors who provided the \$21,674 million required the company in 2008 to earn at least $.074 \times 21,674 = \$1,604$ million for its debt and equityholders.

In 2008 Lowe's after-tax interest and net income totaled $(1 - .35) \times 298 + 2,195 = \$2,389$ million (we assume a 35% tax rate). If you deduct the total cost of Lowe's capital from this figure, you can see that the company earned $\$2,389 - 1,604 = \785 million *more* than investors required. This was Lowe's residual income, or EVA:

$$\begin{aligned} \text{EVA} &= (\text{after-tax interest} + \text{net income}) - (\text{cost of capital} \times \text{capital}) \\ &= 2,389 - 1,604 = \$785 \text{ million} \end{aligned}$$

Sometimes it is helpful to re-express EVA as follows:

$$\begin{aligned} \text{EVA} &= \left(\frac{\text{after-tax interest} + \text{net income}}{\text{total capital}} - \text{cost of capital} \right) \times \text{total capital} \\ &= (\text{return on capital} - \text{cost of capital}) \times \text{total capital} \end{aligned}$$

The **return on capital** (or **ROC**) is equal to the total profits that the company has earned for its debt and equityholders, divided by the amount of money that they have contributed. If the company earns a higher return on its capital than investors require, EVA is positive.

In the case of Lowe's, the return on capital was

$$\frac{\text{after-tax interest} + \text{net income}}{\text{total capital}} = \frac{(1 - .35) \times 298 + 2,195}{21,674} = .1102, \text{ about } 11\%$$

Lowe's cost of capital was about 7.4%. So,

$$\begin{aligned} \text{EVA} &= (\text{return on capital} - \text{cost of capital}) \times \text{total capital} \\ &= (.1102 - .074) \times 21,674 = \$785 \text{ million} \end{aligned}$$

The first four columns of Table 28.4 show measures of EVA for our sample of large companies. Exxon Mobil again heads the list. In 2008 it earned \$33 billion more than was needed to satisfy investors. By contrast, AT&T was a laggard. Although it earned an accounting profit of nearly \$16 billion, this figure was calculated before deducting the cost of the capital that was employed. After deducting the cost of the capital, AT&T made an EVA *loss* of \$11.8 billion.

	1. After-tax interest + net income	2. Cost of Capital (WACC), %	3. Total Long-term Capital	4. EVA = 1 - (2 × 3)	5. Return on Capital (ROC), % (1 ÷ 3)
Exxon Mobil	\$46,378	6.0	\$224,051	\$33,006	20.7
Wal-Mart	14,169	5.7	125,059	7,286	11.3
Johnson & Johnson	11,964	7.5	84,848	5,529	14.1
Google	5,128	12.3	16,644	3,143	30.8
Coca-Cola	4,900	5.8	33,246	3,031	14.7
J.C. Penney	553	7.0	12,191	-302	4.5
FedEx	1,898	6.7	37,067	-583	5.1
Dow Chemical	1,420	6.1	39,458	-1,004	3.6
Xerox	583	9.9	15,876	-1,047	3.7
AT&T	15,745	8.6	321,320	-11,779	4.9

TABLE 28.4 Accounting measures of company performance, 2008 (dollar values in millions). Companies are ranked by economic value added (EVA).

Note: EVAs do not compute exactly because of rounding in column 2.

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

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, when comparing managers, it can also be helpful to measure the firm's return *per dollar of investment*.

Three common return measures are the return on capital (ROC), the return on equity (ROE), and the return on assets (ROA). All are based on accounting information and are therefore known as *book rates of return*.

Return on Capital (ROC)⁵ We have already calculated Lowe's return on capital in 2008:

$$\text{ROC} = \frac{\text{after-tax interest} + \text{net income}}{\text{total capital}} = \frac{(1 - .35) \times 298 + 2,195}{21,674} = .11, \text{ or } 11.0\%$$

You will encounter a variety of alternative ways to calculate any book rate of return. For example, a company may have issued new capital during the year and invested the proceeds. If that is the case, it may be better to use the average of the capital at the beginning and end of the year.⁶ If we do so, Lowe's ROC changes to

$$\text{ROC} = \frac{\text{after-tax interest} + \text{net income}}{\text{average total capital}} = \frac{(1 - .35) \times 298 + 2,195}{(21,674 + 23,094)/2} = .107, \text{ or } 10.7\%$$

Here is another technical point. When we calculated Lowe's return on capital we summed the company's *after-tax* interest and net income.⁷ The reason that we subtracted the tax shield on debt interest was that we wished to calculate the income that the company would have earned with all-equity financing. The tax advantages of debt financing are picked up when we compare the company's return on capital with its weighted-average cost of capital (WACC).⁸ WACC already includes an adjustment for the interest tax shield.⁹ More often than not, financial analysts ignore this refinement and use the gross interest payment to calculate ROC. It is only approximately correct to compare this measure with the weighted-average cost of capital.

The last column in Table 28.4 shows the return on capital for our sample of well-known companies. Notice that Google's return on capital was 30.8%, over 18 percentage points above its cost of capital. Although Google had a higher return on capital than Exxon Mobil, it had a lower EVA. This was partly because Google was more risky than Exxon Mobil, and so had a higher cost of capital, but also because it had far fewer dollars invested than Exxon.

⁵ The expression, *return on capital*, is commonly used when calculating the profitability of an entire firm. When measuring the profitability of an individual plant, the equivalent measure is generally called *return on investment* (or *ROI*).

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

⁷ This figure is called the company's Net Operating Profit After Tax or NOPAT:

$$\text{NOPAT} = \text{after-tax interest} + \text{net income}$$

In the case of Lowe's

$$\text{NOPAT} = (1 - .35) \times 298 + 2,195 = \$2,389 \text{ million}$$

⁸ For the same reason we used the after-tax interest payment when we calculated Lowe's EVA.

⁹ Remember WACC is a weighted average of the *after-tax* rate of interest and the cost of equity.

Return on Equity (ROE) We measure the **return on equity (ROE)** as the income to shareholders per dollar invested. Lowe's had net income of \$2,195 million in 2008 and stockholders' equity of \$16,098 million at the start of the year. So its return on equity was

$$\text{ROE} = \frac{\text{net income}}{\text{equity}} = \frac{2,195}{16,098} = .136, \text{ or } 13.6\%$$

If we recalculate ROE using average equity, then the return was

$$\text{ROE} = \frac{\text{net income}}{\text{average equity}} = \frac{2,195}{(16,098 + 18,055)/2} = .129, \text{ or } 12.9\%$$

Has Lowe's provided an adequate return for shareholders? To answer that question, we need to compare it with the company's cost of equity. Lowe's cost of equity capital in 2008 was about 8.7%, so its return on equity was about 4 percentage points higher than its cost of equity.

Return on Assets (ROA) **Return on assets** 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 Lowe's, return on assets was

$$\text{ROA} = \frac{(\text{after-tax interest} + \text{net income})}{\text{total assets}} = \frac{(1 - .35) \times 298 + 2,195}{30,869} = .077, \text{ or } 7.7\%$$

When we subtract the tax shield on Lowe's interest payments, we are asking how much the company would have earned if all-equity-financed. This adjustment is helpful when comparing the profitability of firms with very different capital structures. Again, this refinement is ignored more often than not, and ROA is calculated using the gross interest payment.¹⁰ Sometimes analysts take no account of interest payments and measure ROA as the income for equityholders divided by total assets. This measure ignores entirely the income that the assets have generated for debtholders.

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

Problems with EVA and Accounting Rates of Return

Rate 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 the expectations about future events that are reflected in today's stock market prices. Rate of return and economic value added can also be calculated for an entire company or for a particular plant or division. However, remember that both measures are based on book (balance sheet) values for assets. Debt and equity are also book values. 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 Lowe's has invested large sums in marketing 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 Lowe's would not appear to earn such high returns.

EVA Dimensions, which produced the data in Tables 28.3 and 28.4, does make a number of adjustments to the accounting data. However, it is impossible to include the value of all assets or to judge how rapidly they depreciate. For example, did Google really earn a return of 30.8% and add \$3.1 billion of economic value? It's difficult to say, because its investment over the years in search engines and other software is not shown on the balance sheet and cannot be measured exactly.

¹⁰ Again, when calculating ROA, financial analysts sometimes use an average of the assets at the start and end of the year.

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.

28-4 Measuring Efficiency

We began our analysis of Lowe's by calculating how much value the company has added for its shareholders and how much profit it is earning after deducting the cost of the capital that it employs. We examined Lowe's rates of return on capital, equity, and total assets and found that its return has been higher than the cost of capital. Our next task is to probe a little deeper to understand the reasons for the company'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 Lowe's, each dollar of assets produced \$1.56 of sales:

$$\text{Asset turnover} = \frac{\text{sales}}{\text{total assets at start of year}} = \frac{48,230}{30,869} = 1.56$$

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,

$$\text{Asset turnover} = \frac{\text{sales}}{\text{average total assets}} = \frac{48,230}{(30,869 + 32,686)/2} = 1.52$$

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 Lowe's case,

$$\text{Inventory turnover} = \frac{\text{cost of goods sold}}{\text{inventory at start of year}} = \frac{31,729}{7,611} = 4.2$$

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:

$$\text{Average days in inventory} = \frac{\text{inventory at start of year}}{\text{daily cost of goods sold}} = \frac{7,611}{31,729/365} = 88 \text{ days}$$

Receivables Turnover Receivables are sales for which the company has not yet been paid. The receivables turnover ratio measures the firm's sales as a proportion of its receivables. For Lowe's,

$$\text{Receivables turnover} = \frac{\text{sales}}{\text{receivables at start of year}} = \frac{48,230}{247} = 195.3$$

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 indicates that the firm has an unduly restrictive credit policy and offers credit only to customers who can be relied on to pay promptly.¹¹

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. Lowe's customers pay their bills in about 1.9 days:

$$\text{Average collection period} = \frac{\text{receivables at start of year}}{\text{average daily sales}} = \frac{247}{48,230/365} = 1.9 \text{ days}$$

If you are thinking that this is a remarkably short time to wait before Lowe's customers pay, you are right. There are two reasons for the unusually short collection period. First, only a small proportion of Lowe's sales are made on credit. Second, the notes to Lowe's financial statements reveal that the company finances most of its unpaid bills by selling them to GE at a discount. This prompts us to warn you not to mindlessly compute financial ratios without checking whether there are good reasons for an unusually high or low figure. The notes to the financial statements often provide that reason.

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, Lowe's 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.

28-5 Analyzing the Return on Assets: The Du Pont System

We have seen that every dollar of Lowe's assets generates \$1.56 of sales. But a company's success depends not only on the volume of its sales but also on how profitable those sales are. This is measured by the profit margin.

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

$$\text{Profit margin} = \frac{\text{net income}}{\text{sales}} = \frac{2,195}{48,230} = .0455, \text{ or } 4.55\%$$

This definition can be misleading. When companies are partly financed by debt, a portion of the profits from the sales must be paid as interest to the firm's lenders. 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 profits as interest. Therefore, when we are calculating the

¹¹ 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.

profit margin, it is useful to add back the debt interest to net income. This gives an alternative measure of profit margin, which is called the **operating profit margin**:¹²

$$\begin{aligned}\text{Operating profit margin} &= \frac{\text{after-tax interest} + \text{net income}}{\text{sales}} \\ &= \frac{(1 - .35) \times 298 + 2,195}{48,230} \\ &= .0495, \text{ or } 4.95\%\end{aligned}$$

The Du Pont System

We calculated earlier that Lowe's has earned a return of 7.7% on its assets. The following equation shows that this return depends on two factors—the sales that the company generates from its assets (asset turnover) and the profit that it earns on each dollar of sales (operating profit margin):

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

↑
↑
asset turnover
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 Lowe's case the formula gives the following breakdown of ROA:

$$\text{ROA} = \text{asset turnover} \times \text{operating profit margin} = 1.56 \times .0495 = .077$$

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.

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 28.5 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.

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

TABLE 28.5
Merging with suppliers or customers generally increases the profit margin, but this increase is offset by a reduction in asset turnover.

¹² 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. To obtain 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.

The bottom row of Table 28.5 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.

28-6 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 the greater part 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 investment.

Because debt increases the 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.)¹³ For Lowe's,

$$\text{Long-term debt ratio} = \frac{\text{long-term debt}}{\text{long-term debt} + \text{equity}} = \frac{5,039}{5,039 + 18,055} = .22, \text{ or } 22\%$$

This means that 22 cents of every dollar of long-term capital is in the form of debt.

Leverage is also measured by the debt–equity ratio. For Lowe's,

$$\text{Long-term debt–equity ratio} = \frac{\text{long-term debt}}{\text{equity}} = \frac{5,039}{18,055} = .28, \text{ or } 28\%$$

Lowe's long-term debt ratio is fairly typical of U.S. nonfinancial companies, but some companies deliberately operate at much higher debt levels. For example, in Chapter 32 we 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 (i.e., accounting) values rather than market values.¹⁴ The market value of the company finally determines whether the debtholders get their money back, so you might expect analysts to look at the face amount of the debt as a proportion of the total market value of debt and equity. On the other hand, the market value includes the value of intangible assets generated by research and development, advertising, staff training, and so on. These assets are not readily salable and, if the company falls

¹³ 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. See Chapter 25.

¹⁴ 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. For example, the present value of low-coupon debt may be only a fraction of its face value. The difference between the book value of equity and its market value can be even more dramatic.

on hard times, their value may disappear altogether. For some purposes, it may be just as good to follow the accountant and ignore these intangible assets. This is what lenders do when they insist that the borrower should not allow the book debt ratio to exceed a specified limit.

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,

$$\text{Total debt ratio} = \frac{\text{total liabilities}}{\text{total assets}} = \frac{14,631}{32,686} = .45, \text{ or } 45\%$$

Therefore, Lowe's is financed 45% with long- and short-term debt and 55% with equity.¹⁵ We could also say that its ratio of total debt to equity is $14,631/18,055 = .81$.

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, Lowe's has a debt ratio of .28 (the long-term debt ratio) and also .45 (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 whose earnings 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 Lowe's,¹⁶

$$\text{Times-interest-earned} = \frac{\text{EBIT}}{\text{interest payments}} = \frac{3,804}{298} = 12.8$$

Lowe's enjoys a comfortable interest coverage or *times-interest-earned* ratio. Sometimes lenders are content with coverage ratios as low as 2 or 3.

The regular interest payment is a hurdle that companies must keep jumping if they are to avoid default. Times-interest-earned 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 Lowe's is generating enough cash to repay its debt as it comes 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 to calculate operating cash flow. We can then calculate a *cash* coverage ratio. For Lowe's,

$$\text{Cash coverage} = \frac{\text{EBIT} + \text{depreciation}}{\text{interest payments}} = \frac{3,804 + 1,539}{298} = 17.9$$

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

¹⁵ In this case, the debt consists of all liabilities, including current liabilities.

¹⁶ The numerator of times-interest-earned can be defined in several ways. Sometimes depreciation is excluded. Sometimes it is just earnings plus interest, that is, earnings before interest but *after* tax. This last definition seems nutty to us, because the point of times-interest-earned is to assess the risk that the firm won't have enough money to pay interest. If EBIT falls below interest obligations, the firm won't have to worry about taxes. Interest is paid before the firm pays taxes.

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*. Since current assets usually exceed current liabilities, net working capital is generally positive. For Lowe's,

$$\text{Net working capital} = 9,251 - 8,022 = \$1,229 \text{ million}$$

Net working capital was 3.8% of total assets:

$$\frac{\text{Net working capital}}{\text{total assets}} = \frac{1,229}{32,686} = .038, \text{ or } 3.8\%$$

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

$$\text{Current ratio} = \frac{\text{current assets}}{\text{current liabilities}} = \frac{9,251}{8,022} = 1.15$$

Lowe's has \$1.15 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:

$$\text{Quick ratio} = \frac{\text{cash} + \text{marketable securities} + \text{receivables}}{\text{current liabilities}} = \frac{661 + 166}{8,022} = .103$$

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:

$$\text{Cash ratio} = \frac{\text{cash} + \text{marketable securities}}{\text{current liabilities}} = \frac{661}{8,022} = .082$$

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 so it can borrow whenever it chooses? None of the standard measures of liquidity takes the firm's "reserve borrowing power" into account.

28-8 Interpreting Financial Ratios

We have shown how to calculate some common summary measures of Lowe's performance and financial condition. These are summarized in Table 28.6.¹⁷ 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 economic 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 jeweler or the same leverage as a finance company.

The alternative is to confine your comparison to companies that are in a similar business. A good starting point is to prepare *common-size financial statements* for each of these firms. In this case all items in the balance sheet are expressed as a percentage of total assets and all items in the income statement are expressed as a percentage of revenues.

We have not calculated here common-size statements for Lowe's, but Tables 28.7 and 28.8 provide summary common-size statements for a sample of U.S. industries. Notice the large variations. For example, retail firms have a major investment in inventory; software companies have almost none. High-tech businesses, such as semiconductors, hold huge amounts of cash; utilities hold very little.¹⁸ Oil companies and utilities invest principally in fixed assets; software companies and computer manufacturers have mainly current assets.

TABLE 28.6
Summary of Lowe's
financial ratios.

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Performance Measures:		
Market value added (\$ millions)	market value of equity – book value of equity	8,684
Market-to-book ratio	market value of equity/book value of equity	1.5
EVA (\$ millions)	(after-tax interest + net income) – (cost of capital × capital)	785
Return on capital (ROC)	(after-tax interest + net income)/total capital	11.0%
Return on equity (ROE)	net income/equity	13.6%
Return on assets (ROA)	(after-tax interest + net income)/(total assets)	7.7%
Efficiency Measures:		
Asset turnover	sales/total assets at start of year	1.56
Inventory turnover	cost of goods sold/inventory at start of year	4.17
Days in inventory	inventory at start of year/daily cost of goods sold	87.6
Receivables turnover	sales/receivables at start of year	195.3
Average collection period (days)	receivables at start of year/daily sales	1.9
Profit margin	net income/sales	4.55
Operating profit margin	(after-tax interest + net income)/sales	4.95
Leverage Measures:		
Long-term debt ratio	long-term debt/(long-term debt + equity)	.22
Long-term debt–equity ratio	long-term debt/equity	.28
Total debt ratio	total liabilities/total assets	.45
Times-interest-earned	EBIT/interest payments	12.8
Cash coverage ratio	(EBIT + depreciation)/interest payments	17.9
Liquidity Measures:		
Net-working-capital-to-total-assets	net working capital/total assets	.038
Current ratio	current assets/current liabilities	1.15
Quick ratio	(cash + marketable securities + receivables)/current liabilities	.103
Cash ratio	(cash + marketable securities)/current liabilities	.082

¹⁷If 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/bma.

¹⁸We return to this difference in Chapter 30.

	Industrials	Paper	Oil	Chemicals	Metals	Machinery	Pharmaceuticals	Computers	Software	Semiconductors	Telecoms	Utilities	Food	Retail
Assets:														
Cash & securities	11	4	6	5	7	13	19	35	21	31	31	2	3	6
Receivables	12	13	11	13	12	16	10	13	12	7	14	6	11	4
Inventories	9	11	5	11	15	15	9	4	1	6	7	3	12	26
Other current assets	4	3	2	2	3	5	5	7	12	5	3	4	4	3
Total current assets	36	30	24	31	37	49	44	58	46	49	55	15	30	38
Fixed assets	57	77	104	111	61	38	35	18	20	60	21	94	61	81
Depreciation	26	42	42	69	31	21	16	10	12	31	13	32	33	30
Net fixed assets	31	35	62	42	30	17	19	8	8	29	8	62	28	51
Other long-term assets	33	35	14	26	33	34	37	34	46	22	37	23	43	11
Total assets	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Liabilities:														
Short-term debt	4	4	1	5	3	5	5	0	1	2	2	5	8	3
Payables	8	7	13	7	7	6	4	10	3	4	5	4	9	14
Other current liabilities	12	10	8	10	10	13	12	20	29	10	12	7	11	12
Total current liabilities	24	21	22	22	20	23	21	30	32	16	18	16	28	28
Long-term debt	23	31	12	25	22	15	18	9	20	27	19	33	34	22
Other long-term liabilities	15	16	20	23	18	10	10	10	12	8	8	27	15	9
Total liabilities	62	69	54	71	61	48	49	49	65	51	46	75	77	60
Stockholders' equity	37	30	45	28	38	52	51	51	34	49	54	24	23	40
Total liabilities and equity	100	100	100	100	100	100	100	100	100	100	100	100	100	100

TABLE 28.7 Common-size balance sheets for U.S. companies in Standard & Poor's Composite Index, 2008. Entries for each company are expressed as a percentage of total assets and averaged by industry.

Note: Some columns do not add up because of rounding.

Source: Wharton Research Data Services (WRDS), <http://wrds.wharton.upenn.edu>.

	Industrials	Paper	Oil	Chemicals	Metals	Machinery	Pharmaceuticals	Computers	Software	Semiconductors	Telecoms	Utilities	Food	Retail
Sales	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Costs	80.8	86.4	85.8	84.7	84.6	80.9	69.2	87.2	74.9	75.0	87.5	72.7	86.7	93.1
Depreciation	5.5	4.6	3.4	5.0	3.1	4.2	6.3	4.0	5.7	11.9	4.9	9.2	2.7	2.6
EBIT	13.6	9.1	10.8	10.3	12.3	14.9	24.5	8.8	19.4	13.1	7.6	18.1	10.6	4.3
Interest	1.8	2.2	0.4	1.7	1.3	1.2	1.6	0.3	1.9	1.8	1.0	7.1	2.1	0.8
Other items	0.0	0.6	1.7	0.8	0.2	0.5	2.4	1.8	1.0	0.4	0.5	2.1	0.3	0.0
Pretax income	11.8	6.2	8.6	7.8	10.8	13.2	20.6	6.7	16.5	11.0	6.1	8.9	8.2	3.5
Tax	7.0	1.7	5.3	1.8	3.2	3.9	5.7	3.9	4.7	2.2	2.0	3.7	2.2	1.1
Net income	4.8	4.5	3.4	6.0	7.6	9.4	14.9	2.7	11.8	8.8	4.0	5.2	6.1	2.3

TABLE 28.8 Common-size income statements for U.S. companies in Standard & Poor's Composite Index, 2008. Entries for each company are expressed as a percentage of revenues and averaged by industry.

Note: Some columns do not add up because of rounding.

Source: Wharton Research Data Services (WRDS), <http://wrds.wharton.upenn.edu>.

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	Industrials	Paper	Oil	Chemicals	Metals	Machinery	Pharmaceuticals	Computers	Software	Semiconductors	Telecoms	Utilities	Food	Retail
Return on equity, %*	12.8	15.2	7.4	21.6	20.5	17.9	29.2	5.4	34.4	18.9	7.4	21.3	26.9	5.8
Return on assets, %*	5.9	5.9	7.9	7.4	10.1	8.6	10.1	2.7	9.7	7.3	3.3	4.1	10.5	6.4
Sales-to-assets ratio*	.98	.98	2.19	1.04	1.19	.85	.63	.92	.75	.74	.71	.42	1.4	2.2
Operating profit margin %	6.0	6.0	3.6	7.1	8.5	10.1	15.9	2.9	13.1	9.9	4.7	9.8	7.4	2.9
Sales to net working capital*	8.0	11.2	137.7	11.6	7.2	3.2	2.7	3.3	5.4	2.3	1.9	**	104.4	23.3
Receivables turnover*	8.5	7.7	20.3	8.1	10.0	5.1	6.2	7.1	6.4	10.5	5.2	7.4	12.9	63.2
Inventory turnover*	6.4	66.6	15.1	6.6	5.1	3.8	3.2	15.4	64.0	6.4	8.3	20.8	5.6	2.7
Long-term debt ratio %	37.9	51.1	21.0	47.6	37.6	22.1	25.8	14.8	37.2	36.9	26.1	57.0	60.4	35.2
Current ratio	1.5	1.4	1.1	1.4	1.8	2.1	2.1	1.9	1.4	3.0	3.0	0.9	1.0	1.3
Quick ratio	1.0	0.8	0.7	0.8	0.9	1.3	1.4	1.6	1.0	2.3	2.5	0.5	0.5	0.3
Cash ratio	.5	.6	.5	.6	.6	.7	.5	.4	.4	.4	.8	.4	.4	.1

TABLE 28.9 Financial ratios for U.S. companies in Standard & Poor's Composite Index, 2008.

* Computed using end-year balance sheet data (see footnote 6).

** Negative working capital.

Source: Wharton Research Data Services (WRDS), <http://wrds.wharton.upenn.edu>.

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Table 28.9 lists some financial ratios for these companies. The variation between industries also shows up in many of the ratios. The differences arise partly from chance; sometimes the sun shines more kindly on some industries than on others. But the differences also reflect some fundamental industry factors. For example, notice the high debt ratios of utilities. By contrast, computer 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 sales-to-assets 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. In the recession of 2008 retailers earned a lower return on assets than pharmaceutical firms.

When comparing Lowe's financial position, it makes sense to limit your comparison to the firm's main competitors. Table 28.10 sets out some key performance measures for Lowe's and The Home Depot. The Home Depot is a larger company and this extra scale allowed it to add more economic value. But in many other respects the two companies are similar. They generated a similar level of sales per dollar of assets, but Lowe's was able to realize a higher profit margin on these sales. As a result, Lowe's had a somewhat higher return on assets. Lowe's was also somewhat more conservatively financed than The Home Depot and had a higher cash ratio.

	Lowe's	The Home Depot
Performance Measures:		
Market value added (\$ millions)	8,684	17,856
Market-to-book ratio	1.5	2.0
EVA (\$ millions)	785	1,882
Return on capital (ROC) %	11.0	9.3
Return on equity (ROE) %	13.6	13.1
Return on assets (ROA) %	7.7	6.1
Efficiency Measures:		
Asset turnover	1.56	1.61
Inventory turnover	4.2	4.0
Days in inventory	87.6	90.5
Receivables turnover *	195.3	56.5
Average collection period (days) *	1.9	6.5
Profit margin %	4.55	3.2
Operating profit margin %	4.95	3.82
Leverage Measures:		
Long-term debt ratio	.22	.35
Total debt ratio	.45	.57
Times-interest-earned	12.8	6.8
Cash coverage ratio	17.9	9.6
Liquidity Measures:		
Net-working-capital-to-total-assets ratio	.038	.054
Current ratio	1.15	1.20
Quick ratio	.103	.134
Cash ratio	.082	.047

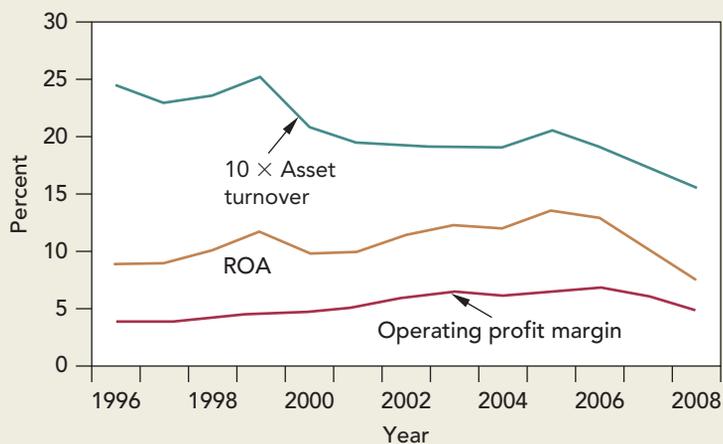
TABLE 28.10
Selected financial ratios
for Lowe's and The
Home Depot, 2008.

* Both companies sell
most of their receivables
to a third party.

It may also be helpful to compare Lowe's financial ratios in 2008 with the equivalent figures in earlier years. For example, you can see in Figure 28.1 that, until 2006, Lowe's had been successful in increasing its return on assets. What accounts for this improvement? We know that $ROA = \text{asset turnover} \times \text{operating profit margin}$. The figure shows that the improvement in ROA came from an increase in the profit margin. The sales that the company generated per dollar of assets declined. Here is where it may be useful to look at any changes in the makeup of the business.

FIGURE 28.1

Lowe's financial ratios,
1996–2008



SUMMARY

Managers use financial statements to monitor their own company's performance, to help understand the policies of a competitor, and to check on the financial health of customers. But there is a danger of being overwhelmed by the sheer volume of data in the company's Annual Report.¹⁹ That is why managers use a few salient ratios to summarize the firm's market valuation, profitability, efficiency, capital structure, and liquidity. We have described some of the more popular financial ratios.

We offer the following general advice to users of these ratios:

1. Financial ratios seldom provide answers, but they do help you to ask the right questions.
2. There is no international standard for financial ratios. A little thought and common sense are worth far more than blind application of formulas.
3. You need a benchmark for assessing a company's financial position. It is generally useful to compare the company's current financial ratios with the equivalent ratios in the past and with the ratios of other firms in the same business.

FURTHER READING

There are some good general texts on financial statement analysis. See, for example:

K. G. Palepu, V. L. Bernard, and P. M. Healy, *Business Analysis and Valuation*, 4th ed. (Cincinnati, OH: South-Western Publishing, 2008).

¹⁹ HSBC's 2007 *Annual Report* totaled 454 pages. The *Financial Times* reported that Britain's postal service was obliged to limit the number that its postmen carried in order to prevent back injuries.

L. Revsine, D. Collins, B. Johnson, and F. Mittelstaedt, *Financial Reporting and Analysis*, 4th ed. (New York: McGraw-Hill/Irwin, 2008).

S. Penman, *Financial Statement Analysis and Security Valuation*, 4th ed. (New York: McGraw-Hill/Irwin, 2009).



Select problems are available in McGraw-Hill Connect. Please see the preface for more information.

BASIC

PROBLEM SETS

- Construct a balance sheet for Galactic Enterprises given the following data:

Cash balances	\$25,000
Inventories	\$30,000
Net plant and equipment	\$140,000
Accounts receivable	\$35,000
Accounts payable	\$24,000
Long-term debt	\$130,000

What is shareholders' equity?

- Table 28.11 on the following page gives abbreviated balance sheets and income statements for Estée Lauder Companies. Calculate the following ratios:
 - Return on assets.
 - Operating profit margin.
 - Sales-to-assets ratio.
 - Inventory turnover.
 - Debt–equity ratio.
 - Current ratio.
 - Quick ratio
- Look again at Table 28.11. Calculate a common-size balance sheet and income statement for Estée Lauder.
- Look again at Table 28.11. At the end of fiscal 2008 Estée Lauder had 195 million shares outstanding²⁰ with a share price of \$45.50. The company's weighted-average cost of capital was about 10%. Calculate
 - Market value added.
 - Market-to-book ratio.
 - Economic value added.
 - Return on capital.
- There are no universally accepted definitions of financial ratios, but five of the following ratios are clearly incorrect. Substitute the correct definitions.
 - Debt–equity ratio = (long-term debt + value of leases)/(long-term debt + value of leases + equity)
 - Return on equity = (EBIT – tax)/average equity

²⁰ The shares outstanding include a relatively small number of class B shares.

TABLE 28.11

Balance sheets and income statement for Estée Lauder Companies, fiscal 2008 (figures in \$ millions).



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	End of Year	Start of Year
Balance Sheet		
Assets		
Current assets:		
Cash and marketable securities	402	254
Accounts receivable	1,039	861
Inventories	987	856
Other current assets	360	269
Total current assets	2,787	2,239
Fixed assets:		
Tangible fixed assets		
Property, plant, and equipment	2,394	2,113
Less accumulated depreciation	1,351	1,232
Net tangible fixed assets	1,043	881
Long-term investments		
Other long-term assets	24	22
Total assets	5,011	4,126
Liabilities and Shareholders' Equity		
Current liabilities:		
Debt due for repayment	119	60
Accounts payable	1,581	1,440
Total current liabilities	1,699	1,501
Long-term debt		
Other long-term liabilities	1,078	1,028
Total liabilities	3,358	2,927
Total shareholders' equity		
Total liabilities and shareholders' equity	5,011	4,126
Income Statement		
Net sales	7,911	
Cost of goods sold	1,997	
Selling, general, and administrative expenses	4,852	
Depreciation	251	
Earnings before interest and taxes (EBIT)	811	
Interest expense	67	
Taxable income	744	
Tax	260	
Minority interest	10	
Net income	474	
Dividends		
Addition to retained earnings	107	
	367	

- c. Profit margin = net income/sales
 - d. Days in inventory = sales/(inventory/365)
 - e. Current ratio = current liabilities/current assets
 - f. Sales-to-net-working-capital = average sales/average net working capital
 - g. Quick ratio = (current assets – inventories)/current liabilities
 - h. Times-interest-earned = interest earned × long-term debt
6. True or false?
- a. A company's debt–equity ratio is always less than 1.
 - b. The quick ratio is always less than the current ratio.
 - c. The return on equity is always less than the return on assets.

7. Keller Cosmetics maintains an operating profit margin of 8% and a sales-to-assets ratio of 3. It has assets of \$500,000 and equity of \$300,000. Interest payments are \$30,000 and the tax rate is 35%.
 - a. What is the return on assets?
 - b. What is the return on equity?
8. A firm has a long-term debt–equity ratio of .4. Shareholders' equity is \$1 million. Current assets are \$200,000, and total assets are \$1.5 million. If the current ratio is 2.0, what is the ratio of debt to total long-term capital?
9. Magic Flutes has total receivables of \$3,000, which represent 20 days' sales. Total assets are \$75,000. The firm's operating profit margin is 5%. Find the firm's sales-to-assets ratio and return on assets.
10. Consider this simplified balance sheet for Geomorph Trading:

Current assets	\$100	\$ 60	Current liabilities
Long-term assets	500	280	Long-term debt
		70	Other liabilities
		190	Equity
	\$600	\$600	

- a. Calculate the ratio of debt to equity.
 - b. What are Geomorph's net working capital and total long-term capital? Calculate the ratio of debt to total long-term capital.
11. Look again at the balance sheet for Geomorph in Problem 10. Suppose that at year-end Geomorph had \$30 in cash and marketable securities. Immediately after the year-end it used a line of credit to borrow \$20 for one year, which it invested in additional marketable securities. Would the company appear to be (a) more or less liquid, (b) more or less highly leveraged? Make any additional assumptions that you need.
12. Airlux Antarctica has current assets of \$300 million, current liabilities of \$200 million and a crash—sorry—*cash* ratio of .05. How much cash and marketable securities does it hold?
13. On average, it takes Microlimp's customers 60 days to pay their bills. If Microlimp has annual sales of \$500 million, what is the average value of unpaid bills?

INTERMEDIATE

14. This question reviews some of the difficulties encountered in interpreting accounting numbers.
 - a. Give four examples of important assets, liabilities, or transactions that may not be shown on the company's books.
 - b. How does investment in intangible assets, such as research and development, distort accounting ratios? Give at least two examples.
15. Describe some alternative measures of a firm's overall performance. What are their advantages and disadvantages? In each case discuss what benchmarks you might use to judge whether performance is satisfactory.
16. Discuss alternative measures of financial leverage. Should the market value of equity be used or the book value? Is it better to use the market value of debt, the book value, or the book value discounted at the risk-free interest rate? How should you treat off-balance-sheet obligations such as pension liabilities? How would you treat preferred stock?
17. Suppose that a firm has both fixed-rate and floating-rate debt outstanding. What effect will a decline in interest rates have on the firm's times-interest-earned ratio? What about the ratio of the market value of debt to that of equity? Would you judge that leverage has increased or decreased?

18. How would the following actions affect a firm's current ratio?
- Inventory is sold.
 - The firm takes out a bank loan to pay its suppliers.
 - The firm arranges a line of credit with a bank that allows it to borrow at any time to pay its suppliers.
 - A customer pays its overdue bills.
 - The firm uses cash to purchase additional inventories.
19. Sara Togas sells all its output to Federal Stores. The following table shows selected financial data, in millions, for the two firms:

	Sales	Interest Payment	Net Income	Assets at Start of Year
Federal Stores	\$100	\$4	\$10	\$50
Sara Togas	20	1	4	20

Calculate the sales-to-assets ratio, the operating profit margin, and the return on assets for the two firms. Now assume that the two companies merge. If Federal continues to sell goods worth \$100 million, how will the three ratios change?

20. As you can see, someone has spilled ink over some of the entries in the balance sheet and income statement of Transylvania Railroad (Table 28.12). Can you use the following information to work out the missing entries?
- Debt ratio: .4.
 - Times-interest-earned: 6.25.
 - Current ratio: 1.4.
 - Quick ratio: 1.0.
 - Cash ratio: .2.
 - Return on equity: 24%.
 - Inventory turnover: 5.0.
 - Receivables collection period: 71.2 days.
21. Here are some data for five companies in the same industry:

	Company Code				
	A	B	C	D	E
EBIT	10	30	100	-3	80
Interest expense	5	15	50	2	1

You have been asked to calculate a measure of times-interest-earned for the industry. Discuss the possible ways that you might calculate such a measure. Does changing the method of calculation make a significant difference to the end result?

22. How would rapid inflation affect the accuracy and relevance of a manufacturing company's balance sheet and income statement? Does your answer depend on how much debt the firm has issued?
23. Suppose that you wish to use financial ratios to estimate the risk of a company's stock. Which of those that we have described in this chapter are likely to be helpful? Can you think of other accounting measures of risk?
24. Look up some firms that have been in trouble. Plot the changes over the preceding years in the principal financial ratios. Are there any patterns?

	December 2009	December 2008
Balance Sheet		
Cash	20	20
Accounts receivable	34	34
Inventory	26	26
Total current assets	80	80
Fixed assets, net	110	110
Total	190	190
Notes payable	30	20
Accounts payable	25	15
Total current liabilities	35	35
Long-term debt	55	55
Equity	100	100
Total	235	190
Income Statement		
Sales	100	100
Cost of goods sold	40	40
Selling, general, and administrative expenses	10	10
Depreciation	20	20
EBIT	30	30
Interest	10	10
Earnings before tax	20	20
Tax	10	10
Earnings available for common stock	10	10

TABLE 28.12
Balance sheet and
income statement of
Transylvania Railroad
(figures in \$ millions).

CHALLENGE

- We noted that, when calculating EVA, you should calculate income as the sum of the after-tax interest payment and net income. Why do you need to deduct the tax shield? Would an alternative be to use a different measure of the cost of capital? Or would you get the same result if you simply deducted the cost of equity from net income (as is often done)?
- Sometimes analysts use the average of capital at the start and end of the year to calculate return on capital. Provide some examples to illustrate when this does and does not make sense. (*Hint:* Start by assuming that capital increases solely as a result of retained earnings.)
- Take another look at Geomorph Trading's balance sheet in Problem 10 and consider the following additional information:

Current Assets		Current Liabilities		Other Liabilities	
Cash	\$15	Payables	\$35	Deferred tax	\$32
Inventories	35	Taxes due	10	Unfunded pensions	22
Receivables	50	Bank loan	15	R&R reserve	16
	<u>\$100</u>		<u>\$60</u>		<u>\$70</u>

The “R&R reserve” covers the future costs of removal of an oil pipeline and environmental restoration of the pipeline route.

There are many ways to calculate a debt ratio for Geomorph. Suppose you are evaluating the safety of Geomorph’s debt and want a debt ratio for comparison with the ratios of other companies in the same industry. Would you calculate the ratio in terms of total liabilities or total capitalization? What would you include in debt—the bank loan, the deferred tax account, the R&R reserve, the unfunded pension liability? Explain the pros and cons of these choices.



REAL-TIME DATA ANALYSIS

STANDARD
& POOR'S

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& POOR'S

Use data from the Standard & Poor’s Market Insight Database (www.mhhe.com/edumarketinsight) or Yahoo! Finance (<http://finance.yahoo.com>) to answer the following questions.

1. Find financial ratios for five different industries. Can you account for some of the differences between industries?
2. Select two companies that are in a similar line of business and find their simplified balance sheets and income statements. Then draw up common-size statements for each company and compute the principal financial ratios. Compare and contrast the companies based on these data.
3. Look up the latest financial statements for a company of your choice and calculate the following ratios for the latest year:
 - a. Return on capital.
 - b. Return on equity.
 - c. Operating profit margin.
 - d. Days in inventory.
 - e. Debt ratio.
 - f. Times-interest-earned.
 - g. Current ratio.
 - h. Quick ratio.
4. Select five companies and, using their financial statements, compare the days in inventory and average collection period for receivables. Can you explain the differences between the companies?