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5

Analysis of Financial Statements

“Money is better than poverty, if only for financial reasons.”

—Woody Allen

Financial Statements Tell the Story

On its website, The Scotts Company, headquartered in Ohio for more than 137 years, says it is the world’s leading supplier and marketer of consumer products for do-it-yourself lawn and garden care. Scotts’ brands include Miracle-Gro®, the leading plant fertilizer. In its 2005 Annual Report, the company adds that it is “dedicated to delivering strong, consistent financial results and outstanding shareholder returns.”¹

A few questions:

- On what basis does the company make the claim that it is the “leading” supplier and marketer of lawn- and garden-care products?
- What does the company mean when it says Miracle-Gro® is the “leading” plant fertilizer?
- What constitutes “strong, consistent financial results?”
- How are “shareholder returns” measured and how high do they have to be to be regarded as “outstanding?”

The answers to these questions and more can be found by examining the company’s financial statements. For example, by comparing Scotts’ income statement and balance sheet with those of other companies, you could find out whether the claim that Scotts is the “leading” company is based on its sales, its profits, or its assets. A more in-depth look at the statements would reveal whether Scotts really does deliver strong, consistent financial results and outstanding shareholder returns according to your own investment criteria.

¹Source: The Scotts company website (www.scotts.com) and 2005 Annual Report, page 21.

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Financial statements are like puzzles. When you first look at them, many questions arise. What does the picture look like? How do the pieces fit together? What is a company doing? How are they doing it? As the puzzle is assembled, however, the facts begin to surface. This is what the company did. This is how they did it. This is where the money came from. This is where it went. When the puzzle is complete, the company's financial picture lies before you, and with that picture you can make sound judgments about the company's profitability, liquidity, debt management, and market value.

Chapter Overview

In Chapter 4 we reviewed the major financial statements, the primary sources of financial information about a business. In this chapter we will learn how to interpret these financial statements in greater detail. All business owners, investors, and creditors use financial statements and ratio analysis to investigate the financial health of a firm. We will see how financial managers calculate ratios that measure profitability, liquidity, debt, asset activity, and market performance of a firm. We will then explore how financial experts use ratios to compare a firm's performance to managers' goals, the firm's past and present performance, and the firm's performance to similar firms in the industry. We will also discuss sources of financial information.

Learning Objectives

After reading this chapter, you should be able to:

1. Explain how financial ratio analysis helps financial managers assess the health of a company.
2. Compute profitability, liquidity, debt, asset utilization, and market value ratios.
3. Compare financial information over time and among companies.
4. Locate ratio value data for specific companies and industries.

Assessing Financial Health

Medical doctors assess the health of people. Financial managers assess the health of businesses. When you visit a doctor for an examination, the doctor may check your blood pressure, heart rate, cholesterol, and blood sugar levels. The results of each test should fall within a range of numbers considered “normal” for your age, weight, gender, and height. If they don’t, the doctor will probably run additional tests to see what, if anything, is wrong.

Like doctors, financial managers check the health of businesses by running basic tests—such as a financial ratio analysis—to see whether a firm’s performance is within the normal range for a company of that type. If it is not, the financial manager runs more tests to see what, if anything, is wrong.

Misleading Numbers

Both medical doctors and financial managers must interpret the information they have and decide what additional information they need to complete an analysis. For instance, suppose a doctor examines a six-foot, 230-pound, 22-year-old male named Dirk. The doctor’s chart shows that a healthy male of that age and height should normally weigh between 160 and 180 pounds. Because excess weight is a health risk, the numbers don’t look positive.

Before the doctor prescribes a diet and exercise program for Dirk, she asks follow-up questions and runs more tests. She learns that Dirk, a starting fullback for his college football team, has only 6 percent body fat, can bench-press 380 pounds, runs a 40-yard dash in 4.5 seconds, has a blood pressure rate of 110/65, and a resting heart rate of 52 beats per minute. This additional information changes the doctor’s initial health assessment. Relying on incomplete information would have led to an inaccurate diagnosis.

Like doctors, financial managers need to analyze many factors to determine the health of a company. Indeed, for some firms the financial statements do not provide the entire picture.

In 1998 the attorneys general of many states sued the major tobacco companies alleging liability for smoking-related illness and for advertising allegedly aimed at underage people. Congress also was seeking legislation that would extract hundreds of billions of dollars over several years from these companies. Because the outcome of the pending lawsuits and legislation was uncertain, the (potential) liabilities did not appear on the balance sheet. Financial analysis based only on the financial statements, then, gave a faulty impression of the companies’ health.

As the tobacco company example demonstrates, accounting conventions may prevent factors affecting a firm’s finances from appearing on financial statements. Just as Dirk’s doctor looked beyond the obvious, financial managers using ratio analysis must always seek complete information before completing an analysis. In the sections that follow, we discuss ratios based on financial statements, ratios that use market information, and outside information sources.

Financial Ratios

Financial managers use ratio analysis to interpret the raw numbers on financial statements. A **financial ratio** is a number that expresses the value of one financial variable relative to another. Put more simply, a financial ratio is the result you get when you divide one

financial number by another. Calculating an individual ratio is simple, but each ratio must be analyzed carefully to effectively measure a firm's performance.

Ratios are comparative measures. Because the ratios show relative value, they allow financial analysts to compare information that could not be compared in its raw form.² Ratios may be used to compare:

- one ratio to a related ratio
- the firm's performance to management's goals
- the firm's past and present performances
- the firm's performance to similar firms

For instance, say a company reaped huge revenues from one investment, but the cost of the investment was high. A financial manager could use a ratio to compare that investment to another that did not generate such high revenues but had low cost. Take the 1997 movie, *Titanic*, for example. That blockbuster movie has grossed more than \$1.8 billion to date (the number-one grossing movie of all time). Compare *Titanic*'s total revenues to the \$916 million in revenues that *Shrek 2* has made since it was released in 2004. Looking only at the total revenue figures, *Titanic* looks like a better investment than *Shrek 2*.

However, analysts in the movie industry use a return-on-cost ratio (total revenues divided by total cost) to find a movie's net return per \$1 invested. Using that ratio we see that *Titanic*, at a cost of \$200 million, had a return-on-cost ratio of 9.0 ($\$1,800,000,000 \div \$200,000,000 = 9.0$). *Shrek 2*, at a cost of \$70 million, had a return-on-cost ratio of 13.1 ($\$916,000,000 \div \$70,000,000 = 13.1$). Although *Titanic* made more total revenue, *Shrek 2* made more money relative to its cost than did *Titanic*.³

Financial managers, other business managers, creditors, and stockholders all use financial ratio analysis. Specifically, creditors may use ratios to see whether a business will have the cash flow to repay its debt and interest. Stockholders may use ratios to see what the long-term value of their stock will be. For example, in the first quarter of 2006 Exxon Mobil reported a profit of \$8.4 billion. However, analysts on Wall Street had predicted that the company's profits would be slightly higher than that, so despite the reported profits, Exxon Mobil's stock price fell \$.20 a share.⁴

The Basic Financial Ratios

Financial ratios are generally divided into five categories: profitability, liquidity, debt, asset activity, and market value. The ratios in each group give us insights into different aspects of a firm's financial health.

- *Profitability ratios* measure how much company revenue is eaten up by expenses, how much a company earns relative to sales generated, and the amount earned relative to the value of the firm's assets and equity.

²Financial managers who analyze the financial condition of the firms they work for act as financial analysts. The term *financial analyst*, however, also includes financial experts who analyze a variety of firms.

³Source for movie profitability figures: <http://www.the-numbers.com/movies/records/budgets.html>.

⁴www.Bloomberg.com, April 27, 2006.

- *Liquidity ratios* indicate how quickly and easily a company can obtain cash for its needs.
- *Debt ratios* measure how much a company owes to others.
- *Asset activity ratios* measure how efficiently a company uses its assets.
- *Market value ratios* measure how the market value of a company's stock compares with its accounting values.

Calculating the Ratios

We will use the financial statements for the Acme Corporation presented in Chapter 4 as the basis for our ratio analysis. Figure 5-1 shows Acme Corporation's income statement for 2006, and Figure 5-2 shows its December 31, 2006, balance sheet.

Now let's analyze Acme Corporation's financial health by calculating its profitability, liquidity, debt, asset utilization, and market value ratios.

Profitability Ratios

Profitability ratios measure how the firm's returns compare with its sales, asset investments, and equity. Stockholders have a special interest in the profitability ratios because profit ultimately leads to cash flow, a primary source of value for a firm. Managers, acting on behalf of stockholders, also pay close attention to profitability ratios to ensure that the managers preserve the firm's value.

We will discuss five profitability ratios: gross profit margin, operating profit margin, net profit margin, return on assets, and return on equity. Some of the profitability ratios use figures from two different financial statements.

Figure 5-1
Acme Corporation
Income Statement
for the Year Ended
December 31, 2006

Net Sales	\$15,000,000
Cost of Goods Sold	<u>5,000,000</u>
Gross Profit	10,000,000
Depreciation	2,000,000
S&A Expenses	<u>800,000</u>
Operating Income (EBIT)	7,200,000
Interest Expense	<u>1,710,000</u>
Income before Taxes	5,490,000
Income Taxes	<u>2,306,000</u>
Net Income	<u>\$ 3,184,000</u>
Earnings per Share (4,000,000 shares)	\$ 0.80
Dividends Paid	<u>\$ 400,000</u>
Change in Retained Earnings	<u>\$ 2,784,000</u>

**Acme Corporation Balance Sheet
For the Year Ended December 31, 2006**

Assets:

Cash	\$10,000,000
Marketable Securities	8,000,000
Accounts Receivable	1,000,000
Inventory	10,000,000
Prepaid Expenses	<u>1,000,000</u>
Total Current Assets	30,000,000
Fixed Assets, Gross	28,000,000
Less Accumulated Depreciation	<u>(8,000,000)</u>
Fixed Assets, Net	20,000,000
Total Assets	<u>\$ 50,000,00</u>

Liabilities and Equity:

Accounts Payable	\$ 4,000,000
Notes Payable	3,000,000
Accrued Expenses	<u>2,000,000</u>
Total Current Liabilities	9,000,000
Long-Term Debt	15,000,000
Total Liabilities	24,000,000
Common Stock (\$1 par)	4,000,000
Capital in Excess of Par	12,000,000
Retained Earnings	<u>10,000,000</u>
Total Common Equity	<u>26,000,000</u>
Total Liabilities and Equity	<u>\$50,000,000</u>

Figure 5-2 Acme Corporation Statement of Retained Earnings for the Year Ended December 31, 2006

Gross Profit Margin The *gross profit margin* measures how much profit remains out of each sales dollar after the cost of the goods sold is subtracted. The ratio formula follows:

$$\begin{aligned} \text{Gross Profit Margin} &= \frac{\text{Gross Profit}}{\text{Sales}} \\ &= \frac{\$10,000,000}{\$15,000,000} = .67, \text{ or } 67\% \end{aligned}$$

This ratio shows how well a firm generates revenue compared with its costs of goods sold. The higher the ratio, the better the cost controls compared with the sales revenues.

To find the gross profit margin ratio for Acme, look at Figure 5-1, Acme's income statement. We see that Acme's gross profit for the year was \$10 million and its sales revenue was \$15 million. Dividing \$10 million by \$15 million yields Acme Corporation's gross profit margin of .67 or 67 percent. That ratio shows that Acme's cost of products and services sold was 33 percent of sales revenue, leaving the company with 67 percent of sales revenue to use for other purposes.

Operating Profit Margin The *operating profit margin* measures how much profit remains out of each sales dollar after all the operating expenses are subtracted. This ratio is calculated by dividing earnings before interest and taxes (EBIT or operating income) by sales revenue.

$$\begin{aligned} \text{Operating Profit Margin} &= \frac{\text{EBIT}}{\text{Sales}} \\ &= \frac{\$7,200,000}{\$15,000,000} = .48, \text{ or } 48\% \end{aligned}$$

Acme's EBIT, as shown on its income statement (see Figure 5-1), is \$7,200,000. Dividing \$7.2 million by its sales revenue of \$15 million gives an operating profit margin of 48 percent ($7,200,000 \div 15,000,000 = .48$ or 48%). Acme's operating profit margin indicates that 48 percent of its sales revenues remain after subtracting all operating expenses.

Net Profit Margin The *net profit margin* ratio measures how much profit out of each sales dollar is left after all expenses are subtracted—that is, after all operating expenses, interest, and income tax expense are subtracted. It is computed by dividing net income by sales revenue. Acme's net income for the year 2006 was \$3.184 million. Dividing \$3.184 million by \$15 million in sales yields a 21.2 percent net profit margin. Here's the computation:

$$\begin{aligned} \text{Net Profit Margin} &= \frac{\text{Net Income}}{\text{Sales}} \\ &= \frac{\$3,184,000}{\$15,000,000} = .212, \text{ or } 21.2\% \end{aligned}$$

Net income and the net profit margin ratio are often referred to as “bottom-line” measures. The net profit margin includes adjustments for non-operating expenses, such as interest and taxes, and operating expenses. We see that in 2006 Acme Corporation had just over 21 percent of each sales dollar remaining after all expenses were paid.

Return on Assets The *return on assets* (ROA) ratio indicates how much income each dollar of assets produces on average. It shows whether the business is employing its assets effectively. The ROA ratio is calculated by dividing net earnings available to common stockholders by the total assets of the firm. For Acme Corporation, we calculate this ratio by dividing \$3.184 million in net income (see Figure 5-1, Acme income statement) by \$50 million of total assets (see Figure 5-2, Acme balance sheet), for a return on assets (ROA) of 6.4 percent. Here's the calculation:

$$\begin{aligned} \text{Return on Assets} &= \frac{\text{Net Income}}{\text{Total Assets}} \\ &= \frac{\$3,184,000}{\$50,000,000} = .064, \text{ or } 6.4\% \end{aligned}$$

In 2006, each dollar of Acme Corporation's assets produced, on average, income of just over \$.06. Although this return on assets figure may seem low, it is not unusual for certain types of companies, such as commercial banks, to have low ROA ratios. This is because such firms are asset intensive and therefore the denominator of the ROA ratio is large relative to the numerator.

Return on Equity The *return on equity* (ROE) ratio measures the average return on the firm's capital contributions from its owners (for a corporation, that means the contributions of common stockholders). It indicates how many dollars of income were produced for each dollar invested by the common stockholders.

ROE is calculated by dividing net income by common stockholders' equity. To calculate ROE for Acme Corporation, divide \$3.184 million in net income by \$26 million in total common stockholders' equity (see Figure 5-2, Acme balance statement). Acme's ROE is 12.2 percent, shown as follows:

$$\begin{aligned}\text{Return on Equity} &= \frac{\text{Net Income}}{\text{Common Stockholders' Equity}} \\ &= \frac{\$3,184,000}{\$26,000,000} = .122, \text{ or } 12.2\%\end{aligned}$$

The ROE figure shows that in 2006 Acme Corporation returned, on average, 12.2 percent for every dollar that common stockholders invested in the firm.

Mixing Numbers from Income Statements and Balance Sheets When financial managers calculate the gross profit margin, operating profit margin, and net profit margin ratios, they use only income statement variables. In contrast, analysts use both income statement and balance sheet variables to find the return on assets and return on equity ratios. A mixed ratio is a ratio that uses both income statement and balance sheet variables as inputs.

Because income statement variables show values over a period of time and balance sheet variables show values for one moment in time, using mixed ratios poses the question of how to deal with the different time dimensions. For example, should the analyst select balance sheet variable values from the beginning, the end, or the midpoint of the year? If there is a large change in the balance sheet account during the year, the choice could make a big difference. Consider the following situation:

Total Assets Jan 1, 2006	\$ 1,000,000
Total Assets Dec 31, 2006	\$ 2,000,000
Net Income in 2006	\$ 100,000

Return on assets based on January 1 balance sheet:

$$\$100,000/\$1,000,000 = .10, \text{ or } 10\%$$

Return on assets based on December 31 balance sheet:

$$\$100,000/\$2,000,000 = .05, \text{ or } 5\%$$

Take Note

Do not confuse the ROE ratio with the return earned by the individual common stockholders on their common stock investment. The changes in the market price of the stock and dividends received determine the total return on an individual's common stock investment.

Which figure is correct? There is no black-and-white answer to this problem. Some analysts add the beginning-of-the-year balance sheet figure to the end-of-the-year figure and divide by two to get an average figure.

Logic and common sense suggest that analysts should pick figures that best match the returns to the assets or to the equity. Say that Acme purchased a large amount of assets early in the year. The middle- or end-of-year balance sheet figures would probably match the returns to the assets more effectively than beginning-of-the-year figures because assets can only affect profit if they have been used. For simplicity, we used end-of-year balance sheet figures to calculate Acme's mixed profitability ratios.

Liquidity Ratios

Liquidity ratios measure the ability of a firm to meet its short-term obligations. These ratios are important because failure to pay such obligations can lead to bankruptcy. Bankers and other lenders use liquidity ratios to see whether to extend short-term credit to a firm. Generally, the higher the liquidity ratio, the more able a firm is to pay its short-term obligations. Stockholders, however, use liquidity ratios to see how the firm has invested in assets. Too much investment in current—as compared with long-term—assets indicates inefficiency. The interpretation of liquidity ratio values depends on who is doing the analysis. A banker would likely never see a liquidity ratio value she would view as too high. Very high values might make a stockholder, on the other hand, wonder why more resources were not devoted to higher returning fixed assets instead of more liquid but lower returning current assets.

The two main liquidity ratios are the current ratio and the quick ratio.

The Current Ratio The *current ratio* compares all the current assets of the firm (cash and other assets that can be quickly and easily converted to cash) with all the company's current liabilities (liabilities that must be paid with cash soon). At the end of 2006, Acme Corporation's current assets were \$30 million and its current liabilities were \$9 million. Dividing Acme's current assets by its current liabilities, as follows, we see that:

$$\begin{aligned}\text{Current Ratio} &= \frac{\text{Current Assets}}{\text{Current Liabilities}} \\ &= \frac{\$30,000,000}{\$9,000,000} = 3.33\end{aligned}$$

Acme's current ratio value, then, is 3.33. The ratio result shows that Acme has \$3.33 of current assets for every dollar of current liabilities, indicating that Acme could pay all its short-term debts by liquidating about a third of its current assets.

The Quick Ratio The *quick ratio* is similar to the current ratio but is a more rigorous measure of liquidity because it excludes inventory from current assets. To calculate the quick ratio, then, divide current assets less inventory by current liabilities.

$$\begin{aligned}\text{Quick Ratio} &= \frac{\text{Current Assets Less Inventory}}{\text{Current Liabilities}} \\ &= \frac{(\$30,000,000 - \$10,000,000)}{\$9,000,000} = 2.22\end{aligned}$$

This more conservative measure of a firm's liquidity may be useful for some businesses. To illustrate, suppose a computer retail store had a large inventory of personal computers with out-of-date Intel Pentium III® microprocessors. The computer store would have a tough time selling its inventory for much money.

At the end of 2006, the balance sheet figures show that Acme Corporation's current assets less inventory are worth \$20 million (\$30,000,000 – \$10,000,000). Its current liabilities are \$9 million. Dividing \$20 million by \$9 million, we see that its quick ratio is 2.22. A quick ratio of 2.22 means that Acme could pay off 222 percent of its current liabilities by liquidating its current assets, excluding inventory.

If Acme Corporation's inventory is hard to liquidate, the quick ratio is more important. If the company being analyzed had very liquid inventory, such as a government securities dealer, the quick ratio would not be a useful analysis tool compared with the current ratio.

Debt Ratios

Financial analysts use debt ratios to assess the relative size of a firm's debt load and the firm's ability to pay off the debt. The three primary debt ratios are the debt to total assets, debt to equity, and times interest earned ratios.

Current and potential lenders of long-term funds, such as banks and bondholders, are interested in debt ratios. When a business's debt ratios increase significantly, bondholder and lender risk increases because more creditors compete for that firm's resources if the company runs into financial trouble. Stockholders are also concerned with the amount of debt a business has because bondholders are paid before stockholders.

The optimal debt ratio depends on many factors, including the type of business and the amount of risk lenders and stockholders will tolerate. Generally, a profitable firm in a stable business can handle more debt—and a higher debt ratio—than a firm in a volatile business that sometimes records losses on its income statement.

Debt to Total Assets The *debt to total assets* ratio measures the percentage of the firm's assets that is financed with debt. Acme Corporation's total debt at the end of 2006 was \$24 million. Its total assets were \$50 million. The calculations for the debt to total assets ratio follow:

$$\begin{aligned} \text{Debt to Total Assets} &= \frac{\text{Total Debt}}{\text{Total Assets}} \\ &= \frac{\$24,000,000}{\$50,000,000} = .48, \text{ or } 48\% \end{aligned}$$

Acme's debt to total assets ratio value is 48 percent, indicating that the other 52 percent of financing came from equity investors (the common stockholders).

Times Interest Earned The *times interest earned* ratio is often used to assess a company's ability to service the interest on its debt with operating income from the current period. The times interest earned ratio is equal to earnings before interest and taxes (EBIT) divided by interest expense. Acme Corporation has EBIT of \$7.2 million and interest expense of \$1.71 million for 2006. Acme's times interest earned ratio is as follows:

$$\begin{aligned}\text{Times Interest Earned} &= \frac{\text{EBIT}}{\text{Interest Expense}} \\ &= \frac{\$7,200,000}{\$1,710,000} = 4.2\end{aligned}$$

Acme's times interest earned ratio value of 4.2 means that the company earned \$4.20 of operating income (EBIT) for each \$1 of interest expense incurred during that year.

A high times interest earned ratio suggests that the company will have ample operating income to cover its interest expense. A low ratio signals that the company may have insufficient operating income to pay interest as it becomes due. If so, the business might need to liquidate assets, or raise new debt or equity funds to pay the interest due. Recall, however, that operating income is not the same as cash flow. Operating income figures do not show the amount of cash available to pay interest. Because interest payments are made with cash, the times interest earned ratio is only a rough measure of a firm's ability to pay interest with current funds.

Asset Activity Ratios

Financial analysts use asset activity ratios to measure how efficiently a firm uses its assets. They analyze specific assets and classes of assets. The three asset activity ratios we'll examine here are the average collection period (for accounts receivable), the inventory turnover, and the total asset turnover ratios.

Average Collection Period The *average collection period* ratio measures how many days, on average, the company's credit customers take to pay their accounts. Managers, especially credit managers, use this ratio to decide to whom the firm should extend credit. Slow payers are not welcome customers.

To calculate the average collection period, divide accounts receivable by the company's average credit sales per day. (This in turn, is the company's annual credit sales divided by the number of days in a year, 365.)

$$\begin{aligned}\text{Average Collection Period} &= \frac{\text{Accounts Receivable}}{\text{Average Daily Credit Sales}} \\ &= \frac{\$1,000,000}{(\$15,000,000/365)} \\ &= \frac{\$1,000,000}{\$41,096} = 24.3 \text{ days}\end{aligned}$$

Acme Corporation had \$1 million in accounts receivable and average daily credit sales of \$41,096 (i.e., \$15 million total credit sales divided by 365 days in one year). Dividing \$1 million by \$41,096 gives a value of 24.3. The ratio shows that in 2006 Acme Corporation's credit customers took an average of 24.3 days to pay their account balances.

Notice that, in calculating the ratio, we used Acme Corporation's total sales figure for 2006 in the denominator, assuming that all of Acme's sales for the year were made on credit. We made no attempt to break down Acme's sales into cash sales and credit sales. Financial analysts usually calculate this ratio using the total sales figure when they do not have the credit-sales-only figure.

Inventory Turnover The *inventory turnover* ratio tells us how efficiently the firm converts inventory to sales. If the company has inventory that sells well, the ratio value will be high. If the inventory does not sell well due to lack of demand or if there is excess inventory, the ratio value will be low.

The inventory turnover formula follows:

$$\begin{aligned}\text{Inventory Turnover} &= \frac{\text{Sales}}{\text{Inventory}} \\ &= \frac{\$15,000,000}{\$10,000,000} = 1.5\end{aligned}$$

Acme Corporation had sales of \$15 million and inventory of \$10 million in 2006. Dividing \$15 million by \$10 million, we see that the inventory turnover value is 1.5. This number means that in 2006 Acme “turned” its inventory into sales 1.5 times during the year.⁵

Total Asset Turnover The *total asset turnover* ratio measures how efficiently a firm utilizes its assets. Stockholders, bondholders, and managers know that the more efficiently the firm operates, the better the returns.

If a company has many assets that do not help generate sales (such as fancy offices and corporate jets for senior management), then the total asset turnover ratio will be relatively low. A company with a high asset turnover ratio suggests that its assets help promote sales revenue.

To calculate the asset turnover ratio for Acme, divide sales by total assets as follows:

$$\begin{aligned}\text{Total Asset Turnover} &= \frac{\text{Sales}}{\text{Total Assets}} \\ &= \frac{\$15,000,000}{\$50,000,000} = .30, \text{ or } 30\%\end{aligned}$$

The 2006 total asset turnover ratio for Acme Corporation is its sales of \$15 million divided by its total assets of \$50 million. The result is .30, indicating that Acme’s sales were 30 percent of its assets. Put another way, the dollar amount of sales was 30 percent of the dollar amount of its assets.

Market Value Ratios

The ratios examined so far rely on financial statement figures. But market value ratios mainly rely on financial marketplace data, such as the market price of a company’s common stock. Market value ratios measure the market’s perception of the future earning power of a company, as reflected in the stock share price. The two market value ratios we discuss are the price to earnings ratio and the market to book value ratio.

⁵Many financial analysts define the inventory turnover ratio using cost of goods sold instead of sales in the numerator. They use cost of goods sold because sales is defined in terms of sales price and inventory is defined in terms of cost. We will use sales in the numerator of the inventory turnover ratio to be consistent with the other turnover ratios.

Price to Earnings Ratio The *price to earnings (P/E) ratio* is defined as:

$$\text{P/E Ratio} = \frac{\text{Market Price per Share}}{\text{Earnings per Share}}$$

To calculate earnings per share (EPS), we divide net income by the number of shares of common stock outstanding.

Investors and managers use the P/E ratio to gauge the future prospects of a company. The ratio measures how much investors are willing to pay for claim to one dollar of the earnings per share of the firm. The more investors are willing to pay over the value of EPS for the stock, the more confidence they are displaying about the firm's future growth—that is, the higher the P/E ratio, the higher are investors' growth expectations. Consider the following marketplace data for Acme:

Current Market Price of Acme Corporation's Stock:	\$20.00
2006 EPS	\$0.80

$$\begin{aligned} \text{P/E Ratio} &= \frac{\text{Market Price per Share}}{\text{Earnings per Share}} \\ &= \frac{\$20}{\$0.80} = 25 \end{aligned}$$

We see that the \$20 per share market price of Acme Corporation's common stock is 25 times the level of its 2006 earnings per share (\$0.80 EPS). The result of 25 indicates that stock traders predict that Acme has some growth in its future. It would take 25 years, at Acme's 2006 earnings rate, for the company to accumulate net profits of \$20 per share, the amount an investor would pay today to buy this stock.

Market to Book Value The *market to book value (M/B) ratio* is the market price per share of a company's common stock divided by the accounting book value per share (BPS) ratio. The book value per share ratio is the amount of common stock equity on the firm's balance sheet divided by the number of common shares outstanding.

The book value per share is a proxy for the amount remaining per share after selling the firm's assets for their balance sheet values and paying the debt owed to all creditors and preferred stockholders. We calculate Acme's BPS ratio, based on the following information:

Total Common Stock Equity at Year-End 2006:	\$ 26,000,000
Number of Common Shares Outstanding:	÷ 4,000,000
Book Value per Share	= \$6.50

Now that we know the book value per share of Acme's stock is \$6.50, we can find the market to book value ratio as follows:

$$\begin{aligned} \text{Market to Book Value Ratio} &= \frac{\text{Market Price per Share}}{\text{Book Value per Share}} \\ &= \frac{\$20}{\$6.50} = 3.1 \end{aligned}$$

We see that Acme's M/B ratio is 3.1. That value indicates that the market price of Acme common stock (\$20) is 3.1 times its book value per share (\$6.50).

When the market price per share of stock is greater than the book value per share, analysts often conclude that the market believes the company's future earnings are worth more than the firm's liquidation value. The value of the firm's future earnings minus the liquidation value is the **going concern value** of the firm. The higher the M/B ratio, when it is greater than 1, the greater the going concern value of the company seems to be. In our case, Acme seems to have positive going concern value.

Companies that have a market to book value of less than 1 are sometimes considered to be "worth more dead than alive." Such an M/B ratio suggests that if the company liquidated and paid off all creditors, it would have more left over for the common stockholders than what the common stock could be sold for in the marketplace.

The M/B ratio is useful, but it is only a rough approximation of how liquidation and going concern values compare. This is because the M/B ratio uses an accounting-based book value. The actual liquidation value of a firm is likely to be different than the book value. For instance, the assets of the firm may be worth more or less than the value at which they are currently carried on the company's balance sheet. In addition, the current market price of the company's bonds and preferred stock may also differ from the accounting value of these claims.

Economic Value Added and Market Value Added

Two new financial indicators that have become popular are economic value added (EVA) and market value added (MVA). These indicators were developed by Stern Stewart & Company, a consulting firm in New York City. EVA is a measure of the amount of profit remaining after accounting for the return expected by the firm's investors, whereas MVA compares the firm's current value with the amount the current owners paid for it. According to Stern Stewart, the use of the EVA and MVA indicators can help add value to a company because they help managers focus on rewards to stockholders instead of traditional accounting measures.⁶ In the following paragraphs we discuss EVA and MVA individually.

Economic Value Added (EVA) As we mentioned previously, **EVA** is a measure of the amount of profit remaining after accounting for the return expected by the firm's investors. As such, EVA is said to be an "estimate of true economic profit, or the amount by which earnings exceed or fall short of the required minimum rate of return investors could get investing in other securities of comparable risk."⁷ The formula to calculate EVA is as follows:

$$\text{EVA} = \text{EBIT}(1 - \text{TR}) - (\text{IC} \times \text{Ka})$$

where EBIT = earnings before interest and taxes
(i.e., operating income)
TR = the effective or average income tax rate
IC = invested capital (explained later)
Ka = investors' required rate of return on their
investment (explained later)

⁶<http://www.sternstewart.com>

⁷Ibid.

Invested capital (IC) is the total amount of capital invested in the company. It is the sum of the *market values* of the firm's equity and debt capital. K_a is the weighted average of the rates of return expected by the suppliers of the firm's capital, sometimes called the weighted average cost of capital, or WACC.

To illustrate how EVA is calculated, assume Acme's common stock is currently selling for \$20 a share, and the weighted average return expected by investors (K_a) is 12 percent. Also assume that the book value of debt on Acme's balance sheet is the same as the market values.⁸ Also recall from Figures 5-1 and 5-2 that Acme's EBIT for 2006 is \$7,200,000; its effective income tax rate is 42 percent; and there are 4 million shares of common stock outstanding.

The last term we need before calculating Acme's EVA is invested capital (IC). Remember it is the sum of the *market values* of the firm's equity and debt capital. Acme's IC is found as follows:

$$\begin{aligned}\text{Market Value of Common Equity} &= 4,000,000 \text{ shares} \times \$20 \\ &= \$80,000,000\end{aligned}$$

$$\begin{aligned}\text{Market Value of Debt Capital} &= \text{Book Value} \\ &= \text{Notes Payable} + \text{Long-Term Debt}^9 \\ &= \$3,000,000 + \$15,000,000 \\ &= \$18,000,000\end{aligned}$$

$$\begin{aligned}\text{Total Invested Capital (IC)} &= \$80,000,000 + \$18,000,000 \\ &= \$98,000,000\end{aligned}$$

Now we have all the amounts necessary to solve the EVA equation for Acme in 2006:

$$\begin{aligned}\text{EVA} &= \text{EBIT}(1 - \text{TR}) - (\text{IC} \times K_a) \\ \text{EVA} &= \$7,200,000(1 - .42) - (\$98,000,000 \times .12) \\ \text{EVA} &= \$4,176,000 - \$11,760,000 \\ \text{EVA} &= \$(7,584,000)\end{aligned}$$

Acme's EVA for 2006 is negative, indicating the company did not earn a sufficient amount during the year to provide the return expected by all those who contributed capital to the firm. Even though Acme had \$7,200,000 of operating income and \$3,184,000 of net income in 2006, it was not enough to provide the 12 percent return expected by Acme's creditors and stockholders.

Does the negative EVA result for 2006 indicate that Acme is in trouble? Not necessarily. Remember the negative result is only for one year, whereas it is the trend over the long term that counts. The negative result for this year could be due to any

⁸This assumption is frequently made in financial analysis to ease the difficulties of locating current market prices for debt securities. Because prices of debt securities do not tend to fluctuate widely, the assumption does not generally introduce an excessive amount of error into the EVA calculation.

⁹Take note that total debt capital is not the same as total liabilities. Liabilities that are spontaneously generated, such as accounts payable and accrued expenses, are not generally included in the definition of debt capital. True debt capital is created when a specified amount of money is lent to the firm at a specified interest rate.

number of factors, all of which might be approved of by the creditors and stockholders. As long as Acme's average EVA over time is positive, occasional negative years are not cause for alarm.

Market Value Added (MVA) Market value added (MVA) is the market value of invested capital (IC), minus the book value of IC.¹⁰ MVA is similar to the market to book ratio (M/B). MVA focuses on total market value and total invested capital, whereas M/B focuses on the per share stock price and per share book value. The two measures are highly correlated.

For Acme in 2006:

$$\text{MVA} = \text{market value of debt plus equity} - \text{book value debt plus equity}$$

$$\text{MVA} = (\$18,000,000 + \$80,000,000) - (\$18,000,000 + \$26,000,000)^{11}$$

$$\text{MVA} = \$98,000,000 - \$44,000,000$$

$$\text{MVA} = \$54,000,000$$

Companies that consistently have high EVAs would normally have a positive MVA. If a company consistently has negative EVAs, it should have a negative MVA too.

In this section we examined the key profitability, liquidity, debt, asset activity, and market value ratios. The value of each ratio tells part of the story about the financial health of the firm. Next we explore relationships among ratios.

Relationships among Ratios: The Du Pont System

As we discussed earlier, ratios may be used to compare one ratio to another related ratio. Financial analysts compare related ratios to see what specific activities add to or detract from a firm's performance.

The Du Pont system of ratio analysis is named for the company whose managers developed the general system. It first examines the relationships between net income relative to sales and sales relative to total assets. The product of the net profit margin and the total asset turnover is the return on assets (or ROA). This equation, known as the Du Pont equation, follows:

Du Pont Equation

$$\text{Return on Assets} = \text{Net Profit Margin} \times \text{Total Asset Turnover}$$

$$\frac{\text{Net Income}}{\text{Total Assets}} = \frac{\text{Net Income}}{\text{Sales}} \times \frac{\text{Sales}}{\text{Total Assets}} \quad (5-1)$$

Sales, on the right side of the equation, appears in the denominator of the net profit margin and in the numerator of the total asset turnover. These two equal sales figures would cancel each other out if the equation were simplified, leaving net income over total assets on the right. This, of course, equals net income over total assets, which is on the left side of the equal sign, indicating that the equation is valid.

¹⁰Notice that if you make the simplifying assumption (as we have been doing) that the market value of debt capital equals the book value of debt capital, then the formula for MVA becomes the market value of equity minus the book value of equity..

¹¹Here again we assume the market value of debt equals the book value of debt.

This version of the Du Pont equation helps us analyze factors that contribute to a firm's return on assets. For example, we already know from our basic ratio analysis that Acme Corporation's return on assets for 2006 was 6.4 percent. Now suppose you wanted to know how much of that 6.4 percent was the result of Acme's net profit margin for 2006, and how much was the result of the activity of Acme's assets in 2006. Equation 5-1, the Du Pont equation, provides the following answer:

$$\text{Return on Assets} = \text{Net Profit Margin} \times \text{Total Asset Turnover}$$

$$\frac{\text{Net Income}}{\text{Total Assets}} = \frac{\text{Net Income}}{\text{Sales}} \times \frac{\text{Sales}}{\text{Total Assets}}$$

$$.064 = \frac{\$3,184,000}{\$15,000,000} \times \frac{\$15,000,000}{\$50,000,000}$$

$$.064 = .212 \times .3$$

or

$$6.4\% = 21.2\% \times .3$$

Acme Corporation, we see, has a fairly healthy net profit margin, 21.2 percent, but its total asset turnover is only three-tenths its sales. The .3 total asset turnover has the effect of cutting the 21.2 percent net profit margin by two-thirds, such that ROA is only 6.4 percent.

We might see a low total asset turnover and high net profit margin in a jewelry store, where few items are sold each day but high profit is made on each item sold. A grocery store, however, would have a low net profit margin and a high total asset turnover because many items are sold each day but little profit is made on each dollar of sales.

Another version of the Du Pont equation, called the Modified Du Pont equation, measures how the return on equity (ROE) is affected by net profit margin, asset activity, and debt financing. As shown in Equation 5-2, in the modified Du Pont equation, ROE is the product of net profit margin, total asset turnover, and the equity multiplier (the ratio of total assets to common equity).

Modified Du Pont Equation

$$\text{Return on Equity} = \text{Net profit Margin} \times \text{Total Asset Turnover} \times \text{Equity Multiplier}$$

$$\frac{\text{Net Income}}{\text{Common Stockholders' Equity}} = \frac{\text{Net Income}}{\text{Sales}} \times \frac{\text{Sales}}{\text{Total Assets}} \times \frac{\text{Total Assets}}{\text{Common Stockholders' Equity}} \quad (5-2)$$

Notice that sales and total assets appear in both a numerator and a denominator in the right side of the equation and would cancel out if the equation were simplified, leaving net income over equity on both the right and the left of the equal sign, indicating that the equation is valid.

Solving the Modified Du Pont Equation for Acme Corporation in 2006 produces the following:

Return on Assets = Net Profit Margin \times Total Asset Turnover

$$\frac{\text{Net Income}}{\text{Total Assets}} = \frac{\text{Net Income}}{\text{Sales}} \times \frac{\text{Sales}}{\text{Total Assets}}$$

$$.064 = \frac{\$3,184,000}{\$15,000,000} \times \frac{\$15,000,000}{\$50,000,000}$$

$$.064 = .212 \times .3$$

or

$$6.4\% = 21.2\% \times .3$$

*Note: The two sides of the equation do not exactly balance because of rounding.

Examining the preceding equation, we see that Acme's net profit margin of 21.2 percent is greater than its 12.2 percent ROE. However, Acme's low productivity of assets (\$.30 in sales for every dollar of assets employed) reduces the effect of the profit margin— $21.2\% \times .3 = 6.4\%$. If no other factors were present, Acme's ROE would be 6.4 percent.

Now the equity multiplier comes into play. The equity multiplier indicates the amount of financial leverage a firm has. A firm that uses only equity to finance its assets should have an equity multiplier that equals 1.0. To arrive at this conclusion, recall the basic accounting formula—total assets = liabilities + equity. If a firm had no debt on its balance sheet, its liabilities would equal zero, so equity would equal total assets. If equity equaled total assets, then the equity multiplier would be 1. Multiplying 1 times any other number has no effect, so in such a situation ROE would depend solely on net profit margin and total asset turnover.

If a firm does have debt on its balance sheet (as Acme does), it will have assets greater than equity and the equity multiplier will be greater than 1. This produces a multiplier effect that drives ROE higher (assuming net income is positive) than can otherwise be accounted for by net profit margin and asset turnover.¹²

Acme's equity multiplier of 1.9 indicates that Acme has assets that are 1.9 times its equity. This has the effect (called the leverage effect) of boosting Acme's return on equity from 6.4 percent to 12.2 percent. The leverage effect, caused by debt of \$24 million shown on Acme's balance sheet, significantly alters Acme's ROE.

¹²We will discuss leverage in more detail in Chapter 13.



Interactive Module

Go to Downloadable Companion Material, chapter 5. Then go to the Interactive Spreadsheet for chapter 5. Follow the instructions there. What do the ratios tell us? How are the ratios connected? Note how the numbers are obtained from the financial statements.

In this section we reviewed basic ratios, and analyzed relationships of one ratio to another to assess the firm's financial condition. Next we will investigate how ratio analysis can be used to compare trends in a firm's performance and to compare the firm's performance to other firms in the same industry.

Trend Analysis and Industry Comparisons

Ratios are used to compare a firm's past and present performance and its industry performance. In this section we will examine trend analysis and industry comparison. Comparing a ratio for one year with the same ratio for other years is known as trend analysis. Comparing a ratio for one company with the same ratio for other companies in the same industry is industry comparison.

Trend Analysis

Trend analysis helps financial managers and analysts see whether a company's current financial situation is improving or deteriorating. To prepare a trend analysis, compute the ratio values for several time periods (usually years) and compare them. Table 5-1 shows a five-year trend for Acme Corporation's ROA.

As Table 5-1 shows, Acme Corporation's ROA rose substantially between 2003 and 2006, with the largest growth occurring between 2003 and 2004. Overall, the trend analysis indicates that Acme's 2006 ROA of 6.4 percent is positive, compared to earlier years.

Usually, analysts plot ratio value trends on a graph to provide a picture of the results. Figure 5-3, on the next page, is a graph of Acme's 2002–2006 ROA ratios.

The five-year generally upward trend in ROA, depicted in Figure 5-3, indicates that Acme Corporation increased the amount of profit it generated from its assets.

Trend analysis is an invaluable part of ratio analysis. It helps management spot a deteriorating condition and take corrective action, or identify the company's strengths. By assessing the firm's strengths and weaknesses, and the pace of change in a strength or weakness, management can plan effectively for the future.

Industry Comparisons

Another way to judge whether a firm's ratio is too high or too low is to compare it with the ratios of other firms in the industry (this is sometimes called *cross-sectional analysis*, or *benchmarking*). This type of comparison pinpoints deviations from the norm that may indicate problems.

Table 5-2 shows a comparison between Acme Corporation's ROA ratio and the average ROA in Acme Corporation's industry for 2006. It shows that, compared with other firms in Acme's industry, Acme achieved an above-average ROA in 2006. Only Company B managed to do better than Acme.

Table 5-1 Acme Corporation ROA, 2002–2006

	2002	2003	2004	2005	2006
ROA	-1.8%	-2.2%	2.6%	4.1%	6.4%

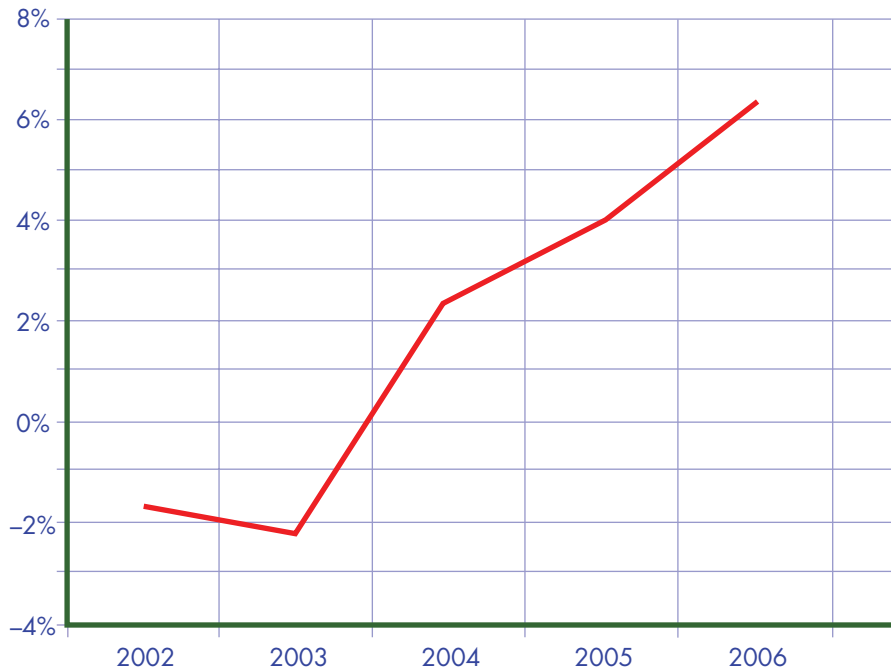


Figure 5-3 Acme Corporation Five-Year Trend in ROA

Benchmarking allows analysts to put the value of a firm's ratio in the context of its industry. For example, Acme's ROA of 6.4% is higher than average for its industry, thus Acme would be looked upon favorably. In another industry, however, the average ROA might be 10 percent, causing Acme's 6.4% to appear much too low. Whether a ratio value is good or bad depends on the characteristics of the industry. By putting the ratio in context, analysts compare apples to apples and not apples to oranges.

Note—do not fall into the trap of thinking that a company does not have problems just because its ratios are equal to the industry averages. Maybe the whole industry is in a slump! When a ratio equals the industry average it simply means the company is average in the area that ratio measures.

Table 5-2 Acme Corporation Cross-Sectional Analysis of ROA 2006

Company	ROA
Acme Corporation	6.4%
Company A	1.0%
Company B	7.1%
Company C	0.9%
Industry Average	3.9%
$(ACME + A + B + C) \div 4 = 3.9$	

Summary Analysis: Trend and Industry Comparisons Together

A complete ratio analysis of a company combines both trend analysis and industry comparisons. Table 5-3 shows all the ratios presented in this chapter for Acme Corporation for 2002 through 2006, along with the industry averages for those ratios. (The industry averages are labeled IND in the table.)

First, let's review Acme's profitability ratios compared with the industry average for 2002 to 2006. In 2002 and 2003, Acme Corporation had negative net income. This gave a negative value to the net profit margin, return on assets, and return on equity for each of these years (because net income is the numerator for each ratio). There was steady improvement, however, in the profit ratios from 2002 to 2006.

Acme Corporation had lower gross profit, operating profit, and net profit margins than the industry norm for that five-year time period except for the 2006 operating and net profit margins. For 2002 and 2003, Acme also had a lower return on assets ratio than the industry average. As the summary analysis shows, the 2002–2006 ROAs are the result of higher asset turnover ratios.

The return on equity figures paint a telling story over this five-year period. From 2002 to 2004, Acme Corporation had a much lower return on equity than the average firm in its industry. In 2002 and 2003, these figures were negative, whereas the industry norms were positive. In 2005 and 2006, however, Acme Corporation had a much higher return on equity than the average firm in its industry.

Next, we examine the liquidity ratios. The current ratio, 2.2, has been rising each year through 2006, when it was 3.3. Having two times or more the amount of current assets as current liabilities is a good target for most companies. Because the industry norm for the current ratio was below the value Acme Corporation had each of these years, Acme had a comparatively high liquidity position.

The quick ratio stayed near the industry norm throughout this period until it spiked to 2.2 in 2006. This means that when inventory is subtracted from total current assets, Acme Corporation's liquidity looked steady. Again, however, 2006's value (2.2 for Acme versus 1.2 for the industry norm) suggests that management should watch liquidity in 2007.

Acme had a high debt load until 2005. The debt to total asset ratio was consistently above 80 percent, whereas the industry norm for this ratio was 62 percent or less from 2002 to 2005. A high debt load magnifies the changes in the return on equity ratio values.

The times interest earned ratio shows that Acme Corporation barely covered its interest expense with its operating income until 2006. The value of this ratio was slightly more than 1, except for 2006, when it jumped to 4.2.

Now let's look at the asset activity ratios. The average collection period has been significantly lower for Acme than for the average firm in its industry. It appears that Acme is doing a better than average job of collecting its accounts receivable.

The inventory turnover ratio was erratic over this five-year period. The fluctuations suggest that Acme did not match its inventory to its demand for products. The numbers suggest that Acme's managers should have studied its inventory control policies to look for ways to match demand and inventory more closely. There was a big increase in 2006. More about this in Chapter 19.

The total asset turnover ratio was consistently just above the industry norm. This helped the return on assets ratio during the years when net income was positive, as described earlier.

Table 5-3 Five-Year Ratio Analysis for Acme Corporation

Ratios		2002	2003	2004	2005	2006
Profitability Ratios						
Gross Profit Margin	Acme	36.2%	38.9%	42.8%	58.9%	66.7%
(Gross Profit ÷ Sales)	Ind	55.7%	58.9%	62.2%	66.0%	68.0%
Operating Profit Margin	Acme	14.3%	16.5%	18.6%	28.9%	48.0%
(EBIT ÷ Sales)	Ind	34.2%	35.1%	37.5%	40.0%	42.0%
Net Profit Margin	Acme	-8.5%	-5.8%	3.4%	7.8%	21.2%
(Net Income ÷ Sales)	Ind	4.3%	6.4%	10.2%	11.5%	13.4%
Return on Assets (ROA)	Acme	-1.8%	-2.2%	2.6%	4.1%	6.4%
(Net Income ÷ Total Assets)	Ind	1.2%	1.8%	2.2%	2.5%	2.1%
Return on Equity (ROE)	Acme	-14.6%	-7.5%	2.8%	8.3%	12.2%
(Net Income ÷ Common Equity)	Ind	3.9%	4.4%	5.1%	5.6%	7.8%
Liquidity Ratios						
Current Ratio	Acme	2.2	2.2	2.3	2.6	3.3
(Current Assets ÷ Current Liabilities)	Ind	2.0	2.0	2.1	2.2	2.2
Quick Ratio	Acme	1.0	1.2	1.3	1.4	2.2
(Current Assets Less Inventory ÷ Current Liabilities)	Ind	1.1	1.0	1.1	1.1	1.2
Debt Management Ratios						
Debt to Total Assets	Acme	81.0%	81.0%	82.0%	55.1%	48.0%
(Total Debt ÷ Total Assets)	Ind	62.0%	59.0%	57.0%	58.0%	60.0%
Times Interest Earned	Acme	1.1	1.2	1.2	1.4	4.2
(EBIT ÷ Interest Expense)	Ind	3.7	3.8	4.0	4.2	4.3
Asset Activity Ratios						
Average Collection Period (days)	Acme	33.8	31.5	30.1	28.4	24.3
(Accounts Receivable ÷ Average Daily Credit Sales)	Ind	40.2	39.8	38.4	37.3	40.0
Inventory Turnover (on sales)	Acme	0.4	0.5	0.8	0.5	1.5
(Sales ÷ Inventory)	Ind	0.6	0.7	0.7	0.7	0.7
Total Asset Turnover	Acme	0.3	0.2	0.2	0.2	0.3
(Sales ÷ Total Assets)	Ind	0.2	0.2	0.1	0.2	0.2
Market Value Ratios						
PE Ratio	Acme	—	—	80.0	36.0	25.0
(Market Price per Share ÷ EPS)	Ind	15.0	17.0	19.0	15.0	16.0
Market to Book Ratio	Acme	1.3	1.6	1.8	2.0	2.3
(Market Price per Share ÷ Book Value per Share)	Ind	2.1	2.2	1.9	2.0	2.0

Finally, we turn to the market value ratios. Acme had no meaningful P/E ratios for 2002 and 2003 because net income and, therefore, EPS, were negative. The P/E ratio of 80 in 2004 shows investors had high expectations about Acme's future growth, but these expectations moderated in the next two years as the company matured. The market to book value ratio shows an upward trend over the five-year period showing that investors increasingly valued Acme's future earnings potential above the company's asset liquidation value.

We have just finished a complete ratio analysis of Acme Corporation, including examinations of the company's profitability, liquidity, debt management, asset activity, and market value ratios. To conduct the analysis, we combined trend and industry analysis so we could see how Acme performed over time and how it performed relative to its industry. Managers inside the company can use the results of the analysis to support proposed changes in operations or organization; and creditors and investors outside the company can use the results to support decisions about lending money to the company or buying its stock.

Locating Information about Financial Ratios

Ratio analysis involves a fair amount of research. Before analysts can calculate all the ratios, they must locate the underlying, raw financial data. Analysts can gather information about publicly traded corporations at most libraries, on CD-ROM databases, and on the Internet.

A number of organizations publish financial data about companies and industries. Many publications contain ratios that are already calculated. Table 5-4 contains a list of publications that financial analysts find useful when they are researching companies and industries. Many of them are available at local libraries.

What's Next

In this chapter we learned how to calculate and apply financial ratios to analyze the financial condition of the firm. In Chapter 6 we will see how to use analyses to forecast and plan for the company's future.

Summary

1. Explain how financial ratio analysis helps assess the health of a company.

Just as doctors assess a patient's health, financial analysts assess the financial health of a firm. One of the most powerful assessment tools is financial ratio analysis. Financial ratios are comparative measures that allow analysts to interpret raw accounting data and identify strengths and weaknesses of the firm.

2. Compute profitability, liquidity, debt, asset activity, and market value ratios.

Profitability, liquidity, debt, asset activity, and market value ratios show different aspects of a firm's financial performance. Profitability, liquidity, debt, and asset activity ratios use information from a firm's income statement or balance sheet to compute the ratios. Market value ratios use market and financial statement information.

Table 5-4 Sources of Financial Information

Business news, articles, market data, stock, bond, mutual fund price quotes	Newspapers	<i>The Wall Street Journal, Barron's, USA Today</i>
Business news, articles	Magazines	<i>Forbes, Fortune, Business Week, Money Magazine</i>
Data on the economy, industries; many financial statistics (interest rates, inflation, etc.)	Bound publications	<i>US Industrial Outlook, Standard & Poor's Statistical Surveys, Standard & Poor's Industry Surveys, Federal Reserve Bulletin, World Almanac, Statistical Abstract of the United States, Business Conditions Digest</i> (contains leading, lagging, and coincident indicators of the economy), <i>Economic Report of the President</i>
Summary data about industries, companies; advice on industries, stocks; analysis and forecasts	Investment advisory publications	<i>Value-Line Investment Survey</i> (each company report appears on one page), <i>Standard & Poor's Outlook</i>
Data on companies and industries	Computer databases	<i>Compustat PC Plus CD-ROM, Value Screen</i>
Company performance: corporate financial data	Bound publications	Annual reports from the company (can often be obtained by phone from the company), <i>Standard & Poor's Stock Reports</i> (versions for the NYSE, AMEX, and OTC markets), <i>Standard & Poor's Corporation Records</i> (contains in-depth reports about companies, including financial statement data), <i>Moody's Handbook of Common Stocks</i> (similar to the <i>S&P Stock Reports</i>), <i>Moody's Industrial Manual</i> , <i>Moody's Bank & Finance Manual</i> , <i>Moody's OTC Manual</i> , <i>Moody's Public Utility Manual</i> , <i>Moody's Transportation Manual</i> , <i>Moody's International Manual</i> (all these Moody's manuals contain in-depth reports on companies)
Information about bonds	Bound publications	<i>Moody's Bond Record, Moody's Bond Survey</i>
Information about mutual funds		<i>Morningstar Mutual Funds</i> (similar to Value-Line but for mutual funds), <i>Weisenberger's Management Results, Weisenberger's Current Performance & Dividend Record</i> (similar to Moody's manuals but covers mutual funds)
Variety of business and financial news and information (some require paid subscriptions)	Web	http://www.bloomberg.com , http://www.compustat.com , http://www.valueline.com , http://www.morningstar.com , http://public.wsj.com/home.html , http://money.cnn.com , http://yahoo.com/Business_and_Economy/Finance_and_Investment , http://www.sec.gov/edgar.shtml , http://www.quicken.com , http://www.wsrn.com

Profitability ratios measure how the firm's returns compare with its sales, asset investments, and equity. Liquidity ratios measure the ability of a firm to meet its short-term obligations. Debt ratios measure the firm's debt financing and its ability to pay off its debt. Asset activity ratios measure how efficiently a firm uses its assets. Finally, market value ratios measure the market's perception about the future earning power of a business.

The Du Pont system analyzes the sources of ROA and ROE. Two versions of the Du Pont equation were covered in this chapter. The first analyzes the contributions of net profit margin and total asset turnover to ROA. The second version analyzes how the influences of net profit margin, total asset turnover, and leverage affect ROE.

3. Compare financial information over time and among companies.

Trend analysis compares past and present financial ratios to see how a firm has performed over time. Industry analysis compares a firm's ratios with the ratios of companies in the same industry. Summary analysis, one of the most useful financial analysis tools, combines trend and industry analysis to measure how a company performed over time in the context of the industry.

4. Locate ratio value data for specific companies and industries.

A number of organizations publish financial data about companies and industries. Many publications contain ratios that are already calculated. Table 5-4 contains a list of publications that financial analysts find useful when they are researching companies and industries.

Equations Introduced in This Chapter

Profitability Ratios:

$$\text{Gross Profit Margin} = \frac{\text{Gross Profit}}{\text{Sales}}$$

$$\text{Operating Profit Margin} = \frac{\text{EBIT}}{\text{Sales}}$$

$$\text{Net Profit Margin} = \frac{\text{Net Income}}{\text{Sales}}$$

$$\text{Return on Assets} = \frac{\text{Net Income}}{\text{Total Assets}}$$

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

Liquidity Ratios:

$$\text{Current Ratio} = \frac{\text{Current Assets}}{\text{Current Liabilities}}$$

$$\text{Quick Ratio} = \frac{\text{Current Assets Less Inventory}}{\text{Current Liabilities}}$$

Debt Ratios:

$$\text{Debt to Total Assets} = \frac{\text{Total Debt}}{\text{Total Assets}}$$

$$\text{Times Interest Earned} = \frac{\text{EBIT}}{\text{Interest Expense}}$$

Asset Activity Ratios:

$$\text{Inventory Turnover} = \frac{\text{Sales}}{\text{Inventory}}$$

$$\text{Total Asset Turnover} = \frac{\text{Sales}}{\text{Total Assets}}$$

Market Value Ratios:

$$\text{P/E Ratio} = \frac{\text{Market Price per Share}}{\text{Earnings per Share}}$$

$$\text{Market to Book Value Ratio} = \frac{\text{Market Price per Share}}{\text{Book Value per Share}}$$

Economic Value Added (EVA) and Market Value Added (MVA):

$$\text{EVA} = \text{EBIT}(1 - \text{TR}) - (\text{IC} \times \text{Ka})$$

$$\text{MVA} = \text{market value of debt plus equity} - \text{book value debt plus equity}$$

Equation 5-1. The Du Pont Formula:

Return on Assets = Net Profit Margin \times Total Asset Turnover

$$\frac{\text{Net Income}}{\text{Total Assets}} = \frac{\text{Net Income}}{\text{Sales}} \times \frac{\text{Sales}}{\text{Total Assets}}$$

Equation 5-2. The Modified Du Pont Formula:

Return on Equity = Net profit Margin \times Total Asset Turnover \times Equity Multiplier

$$\frac{\text{Net Income}}{\text{Common Stockholders' Equity}} = \frac{\text{Net Income}}{\text{Sales}} \times \frac{\text{Sales}}{\text{Total Assets}} \times \frac{\text{Total Assets}}{\text{Common Stockholders' Equity}}$$

Campfire queen Cycling champion Sentimental geologist*

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Self-Test

- ST-1** De Marco Corporation has total assets of \$5 million and an asset turnover ratio of 4. If net income is \$2 million, what is the value of the net profit margin?
- ST-2** Francisco Company has current assets of \$50,000. Total assets are \$200,000; and long-term liabilities and common stock collectively total \$180,000. What is the value of the current ratio?
- ST-3** If one-half the current assets in ST-2 consist of inventory, what is the value of the quick ratio?
- ST-4** Sheth Corporation has a return on assets ratio of 6 percent. If the debt to total assets ratio is .5, what is the firm's return on equity?
- ST-5** Mitra Company has a quick ratio value of 1.5. It has total current assets of \$100,000 and total current liabilities of \$25,000. If sales are \$200,000, what is the value of the inventory turnover ratio?
- ST-6** Yates Corporation has total assets of \$500,000. Its equity is \$200,000. What is the company's debt to total asset ratio?
- ST-7** Pendell Company has total sales of \$4 million. One-fourth of these are credit sales. The amount of accounts receivable is \$100,000. What is the average collection period for the company? Use a 365-day year.

Review Questions

1. What is a financial ratio?
2. Why do analysts calculate financial ratios?
3. Which ratios would a banker be most interested in when considering whether to approve an application for a short-term business loan? Explain.
4. In which ratios would a potential long-term bond investor be most interested? Explain.
5. Under what circumstances would market to book value ratios be misleading? Explain.
6. Why would an analyst use the Modified Du Pont system to calculate ROE when ROE may be calculated more simply? Explain.
7. Why are trend analysis and industry comparison important to financial ratio analysis?

Build Your Communication Skills

- CS-1** Research a publicly traded company that has a presence in your community. Assess the financial health of this company in the areas of profitability, liquidity, debt, and asset activity. Write a report of your findings. Include in your report a discussion of the strengths and weaknesses of the company, key trends, and how the company's ratios compare with other companies in its industry.
- CS-2** You have just been given a job as a loan officer. It is your job to evaluate business loan applications. Your boss would like you to prepare a new set of guidelines to be used by the bank to evaluate loan requests, leading to the approval or denial decision.
- Prepare a loan application packet. Include the specific quantitative and qualitative information you would want an applicant for a loan to provide to you. Explain in a brief report, oral or written, how you would use the requested information to decide whether a loan should be approved.

Problems

5-1. The 2006 income statement for TeleTech is shown here:

Net Sales	\$35,000,000
Cost of Goods Sold	<u>15,000,000</u>
Gross Profit	20,000,000
Selling and Admin. Expenses	1,000,000
Depreciation	<u>3,000,000</u>
Operating Income (EBIT)	16,000,000
Interest Expense	<u>2,500,000</u>
Income before Taxes (EBT)	13,500,000
Taxes (40%)	<u>5,400,000</u>
Net Income	8,100,000

Calculate the following:

- a. Gross profit margin
- b. Operating profit margin
- c. Net profit margin

 **Profitability Ratios**

5-2. Rally's has notes payable of \$500, long-term debt of \$1,900, inventory of \$900, total current assets of \$5,000, accounts payable of \$850, and accrued expenses of \$600. What is Rally's current ratio? What is its quick ratio?

 **Liquidity Ratios**

5-3. XYZ Corporation has annual credit sales equal to \$5 million, and its accounts receivable account is \$500,000. Calculate the company's average collection period.

 **Asset Activity Ratios**

5-4. In 2006, TeleTech had sales of \$35 million. Its current assets are \$15 million, \$12 million is in cash, accounts receivable are \$600,000, and net fixed assets are \$20 million. What is TeleTech's inventory turnover? What is its total asset turnover?

 **Asset Activity Ratios**

5-5. The following data apply to Ramchander Corporation:

Total Common Stock Equity at Year-End 2006	\$4,500,000
Number of Common Shares Outstanding	650,000
Market Price per Share	\$25

Calculate the following:

- a. Book value per share
- b. Market to book value ratio

 **Market Value Ratios**



Problems 5–6 to 5–11 refer to the consolidated income statement and consolidated balance sheet of Pinewood Company and Subsidiaries that follow.

**Pinewood Company and Subsidiaries
Income Statement for 2006 (000 dollars)**

Sales	\$ 94,001
Cost of Goods Sold	46,623
Gross Profit	47,378
Selling and Administrative Expenses	28,685
Depreciation and R&D Expense (both tax deductible)	5,752
EBIT or Operating Income	12,941
Interest Expense	48
Interest Income	427
Earning Before Taxes (EBT)	13,320
Income Taxes	4,700
Net Income (NI)	8,620
Earnings per Share	1.72

**Pinewood Company and Subsidiaries
Balance Sheet as of End of 2006 (000 dollars)**

Assets:

Cash	\$ 5,534
Marketable Securities	952
Accounts Receivable (gross)	14,956
Less: Allowance for Bad Debts	211
Accounts Receivable (net)	14,745
Inventory	10,733
Prepaid Expenses	3,234
Plant and Equipment (gross)	57,340
Less: Accumulated Depreciation	29,080
Plant and Equipment (net)	28,260
Land	1,010
Long-Term Investments	2,503
Total Assets	<u>66,971</u>

Liabilities:

Accounts Payable	3,253
Notes Payable	—
Accrued Expenses	6,821
Bonds Payable	2,389

Stockholders' Equity:

Common Stock	8,549
Retained Earnings	45,959
Total Liabilities and Equity	<u>66,971</u>

5-6. Calculate the following profitability ratios for 2006.

- a. Gross profit margin
- b. Operating profit margin
- c. Net profit margin
- d. Return on assets
- e. Return on equity

Comment on net profit margin and return on assets ratios if the industry average for these two ratios are 5 percent and 14 percent, respectively.

 **Profitability Ratios**

5-7. Calculate the following liquidity ratios for the end of 2006.

- a. Current ratio
- b. Quick ratio

Comment on the company's ability to pay off short-term debts.

 **Liquidity Ratios**

5-8. Calculate the following debt ratios for the end of 2006.

- a. Debt to total assets
- b. Times interest earned

Would a banker agree to extend a loan to Pinewood? Explain.

 **Debt Management Ratios**

5-9. Calculate the following asset activity ratios for the end of 2006.

- a. Average collection period
- b. Inventory turnover
- c. Total asset turnover

Comment on Pinewood's asset utilization.

 **Asset Activity Ratios**

5-10. Construct and solve Pinewood's Modified Du Pont equation for 2006. Use the end of 2006 asset figures. Comment on the company's sources of ROE.

 **Modified Du Pont Equation**

- 5-11.**
- a. Calculate the economic value added (EVA) for Pinewood, assuming that the firm's income tax rate is 35 percent, the weighted average rate of return expected by the suppliers of the firm's capital is 10 percent, and the market price of the firm's stock is \$15. There are 5 million shares outstanding.
 - b. Comment on your results. What does the EVA value that you calculated indicate?
 - c. Calculate the market value added (MVA) for Pinewood.
 - d. Comment on your results. What does the MVA value that you calculated indicate?

 **EVA/MVA**

EVA/MVA 

- 5-12.** Refer to the following financial statements for the Eversharp Drilling Company.

**Eversharp Drilling Company
Income Statement
For the Year Ended Dec. 31, 2006**

Net Sales	\$11,000
Operating Expenses	3,000
Operating Income (EBIT)	8,000

**Balance Sheet
Dec. 31, 2006**

Assets:

Total Assets	\$ 21,000
--------------	-----------

Liabilities and Equity:

Long-Term Debt	\$ 6,000
Total Common Equity	\$ 15,000
Total Liabilities and Equity	\$ 21,000

- a. Calculate the EVA for Eversharp, assuming that the firm's income tax rate is 35 percent, the weighted average rate of return expected by the suppliers of the firm's capital is 12 percent, and the market price of the firm's stock is \$9. There are 3,000 shares outstanding.
- b. Comment on your results. What does the EVA value that you calculated indicate?
- c. Calculate the MVA for the Eversharp Corporation.
- d. Comment on your results. What does the MVA value that you calculated indicate?

EVA/MVA 

- 5-13.** Refer to the following financial statements for the T & J Corporation.



**T & J Corporation
Income Statement
For the Year Ended Dec. 31, 2006**

Net Sales	\$ 10,000
Cost of Goods Sold	3,000
Gross Profit	7,000
Depreciation	200
S&A Expenses	300
Operating Income (EBIT)	6,500
Interest Expense	584
Income before Taxes	5,916
Income Taxes (35%)	2,071
Net Income	\$ 3,845
Earnings per Share (3,000 shares)	\$ 1.28

Balance Sheet
Dec. 31, 2006

Assets:

Cash	\$ 350
Marketable Securities	300
Accounts Receivable	400
Inventory	680
Prepaid Expenses	200
Total Current Assets	1,930
Fixed Assets, Gross	63,000
Less Accumulated Depreciation	(42,000)
Fixed Assets, Net	21,000
Total Assets	\$ 22,930

Liabilities and Equity:

Accounts Payable	\$ 740
Notes Payable	630
Accrued Expenses	350
Total Current Liabilities	1,720
Long-Term Debt	6,000
Total Liabilities	7,720
Common Stock	3,000
Capital in Excess of Par	6,610
Retained Earnings	5,600
Total Common Equity	15,210
Total Liabilities and Equity	\$ 22,930

The total invested capital of the firm is \$33,630.

- a. Calculate the EVA for T & J Corporation, assuming that the firm's income tax rate is 35 percent, the weighted average rate of return expected by the suppliers of the firm's capital is 12 percent, and the market price of the firm's stock is \$9.
- b. Comment on your results. What does the EVA value that you calculated indicate?
- c. Calculate the MVA for the T & J Corporation.
- d. Comment on your results. What does the MVA value that you calculated indicate?

- 5-14.** The following financial data relate to ABC Textile Company's business in 2006.

Sales	\$1,000,000
Net Income	\$80,000
Total Assets	\$500,000
Debt to Total Assets Ratio	0.5 or 50%

 **Du Pont Equation**

- a. Construct and solve the Du Pont and Modified Du Pont equations for ABC.

- b. What would be the value of the ROE ratio if the debt to total asset ratio were 70 percent?
- c. What would be the value of the ROE ratio if the debt to total asset ratio were 90 percent?
- d. What would be the value of the ROE ratio if the debt to total asset ratio were 10 percent?

Financial Relationships

- 5-15. From the values of the different ratios that follow, calculate the missing balance sheet items and complete the balance sheet.

Sales	\$100,000
Average Collection Period	55 days
Inventory Turnover	15
Debt to Assets Ratio	.4 or 40%
Current Ratio	3
Total Asset Turnover	1.6
Fixed Asset Turnover	2.9

Assets		Liabilities + Equity	
Cash	\$6,000	Accounts Payable	\$ 6,000
Accounts Receivable	_____	Notes Payable	_____
Inventory	_____	Accrued Expenses	600
Prepaid Expenses	_____	Total Current Liabilities	_____
Total Current Assets	_____	Bonds Payable	_____
Fixed Assets	_____	Common Stock	16,000
		Retained Earnings	_____
Total Assets	_____	Total Liabilities + Equity	_____

Financial Relationships

- 5-16. Given the partial financial statement information from La Strada Corporation, a circus equipment supplier, calculate the return on equity ratio.

Total Assets	\$10,000
Total Liabilities	6,000
Total Sales	5,000
Net Profit Margin	10%

Liquidity Ratios

- 5-17. What is the current ratio of Ah, Wilderness! Corporation, given the following information from its end of 2006 balance sheet?

Current Assets	\$ 5,000
Long-Term Liabilities	18,000
Total Liabilities	20,000
Total Equity	30,000

Du Pont Equation

- 5-18. Rocinante, Inc., manufactures windmills. What is Rocinante's total asset turnover if its return on assets is 12 percent and its net profit margin is 4 percent?

Use the following information to answer questions 5-19 to 5-25.

In 2006, Iron Jay opened a small sporting goods retail store called Iron Jay's Sports Stuff (IJSS). It immediately became very popular, and growth was only limited by the amount of capital Jay could generate through profits and loans. Jay's financial manager advised him to incorporate. His manager said that by selling stock, Jay would have the necessary capital to expand his business at an accelerated pace.

Answer the following questions relating to Iron Jay's Sports Stuff.

- 5-19.** The management team at IJSS is looking toward the future. They want to maintain a gross profit margin of 50 percent. If the estimate for net sales in 2007 is \$5 million, how much gross profit will be necessary in 2007 to maintain this ratio? **Profitability Ratios**
- 5-20.** Using the data in 5-19, if the management team estimated \$200,000 in selling and administration expenses and \$50,000 in depreciation expenses for 2007, with net sales of \$5 million, what operating profit margin can they expect? **Profitability Ratios**
- 5-21.** What must net income be in 2007 if IJSS also wants to maintain a net profit margin of 20 percent on net sales of \$5 million? **Profitability Ratios**
- 5-22.** What will IJSS's return on assets be if its total assets at the end of 2007 are estimated to be \$20 million? Net sales are \$5 million, and the net profit margin is 20 percent in that year. **Modified Du Pont Equation**
- 5-23.** IJSS management knows the astute owners of IJSS stock will sell their stock if the return on stockholders' equity investment (return on equity ratio) drops below 10 percent. Total stockholders' equity for the end of 2007 is estimated to be \$15 million. How much net income will IJSS need in 2007 to fulfill the stockholders' expectation of the return on equity ratio of 10 percent? **Profitability Ratios**
- 5-24.** Of the \$20 million in total assets estimated for the end of 2007, only \$2 million will be classified as noncurrent assets. If current liabilities are \$4 million, what will IJSS's current ratio be? **Liquidity Ratios**
- 5-25.** Inventory on the balance sheet for the end of 2007 is expected to be \$3 million. With total assets of \$20 million, noncurrent assets of \$2 million, and current liabilities of \$4 million, what will be the value of IJSS's quick ratio? **Liquidity Ratios**
- 5-26.** Given \$20 million in total assets, \$14 million in total stockholders' equity, and a debt to total asset ratio of 30 percent for Folson Corporation, what will be the debt to equity ratio? **Debt Ratios**
- 5-27.** If total assets are \$20 million, noncurrent assets are \$2 million, inventory is \$3 million, and sales are \$5 million for Toronto Brewing Company, what is the inventory turnover ratio? **Asset Activity Ratios**

Du Pont Equation 

5-28. If the net profit margin of Dobie's Dog Hotel is maintained at 20 percent and total asset turnover ratio is .25, calculate return on assets.

Du Pont Equation 

5-29. The following data are from Saratoga Farms, Inc., 2006 financial statements.

Sales	\$2,000,000
Net Income	200,000
Total Assets	1,000,000
Debt to Total Asset Ratio	60%

- Construct and solve the Du Pont and Modified Du Pont equations for Saratoga Farms.
- What would be the impact on ROE if the debt to total asset ratio were 80 percent?
- What would be the impact on ROE if the debt to total asset ratio were 20 percent?

Various Ratios 

5-30. The following financial information is from two successful retail operations in Niagara Falls. Rose and George Loomis own Notoriously Niagara, a lavish jewelry store that caters to the "personal jet-set" crowd. The other store, Niagara's Notions, is a big hit with the typical tourist. Polly and Ray Cutler, the owners, specialize in inexpensive souvenirs such as postcards, mugs, and T-shirts.

Notoriously Niagara		Niagara's Notions	
Sales	\$ 500,000	Sales	\$ 500,000
Net Income	100,000	Net Income	10,000
Assets	5,000,000	Assets	500,000

- Calculate the net profit margin for each store.
- Calculate the total asset turnover for each store.
- Combine the preceding equations to calculate the return on assets for each store.
- Why would you expect Notoriously Niagara's net profit margin to be higher than Niagara's Notions, considering both stores had annual sales of \$500,000 and the same figure for return on assets?

Various Ratios 

5-31. Thunder Alley Corporation supplies parts for Indianapolis-type race cars. Current market price per share of Thunder Alley's common stock is \$40. The latest annual report showed net income of \$2,250,000 and total common stock equity of \$15 million. The report also listed 1,750,000 shares of common stock outstanding. No common stock dividends are paid.

- Calculate Thunder Alley's earnings per share (EPS).
- Calculate Thunder Alley's price to earnings (P/E) ratio.
- Calculate Thunder Alley's book value per share.
- What is Thunder Alley's market to book ratio?
- Based on this information, does the market believe that the future earning power of Thunder Alley justifies a higher value than could be obtained by liquidating the firm? Why or why not?

- 5-32.** Carrie White, the new financial analyst of Golden Products, Inc., has been given the task of reviewing the performance of her company over three recent years against the following industry information (figures in \$000):



Year	Net Income	Current Assets	Current Liabilities	Total Assets	Total Liabilities	Sales
2004	\$400	\$500	\$530	\$3,800	\$2,600	\$4,000
2005	425	520	510	3,900	2,500	4,500
2006	440	550	510	4,000	2,400	4,700

The industry averages are

NI/Sales	Current Ratio	Total Assets Turnover
9.42%	1.13	2.00

Should Carrie be critical of her company's performance?

- 5-33.** Johnny Hooker, another financial analyst of Golden Products, Inc., is working with the same yearly figures shown in 5-32, but he is trying to compare the performance trend using another set of industry averages: The industry averages are



Fixed Asset Turnover	Return on Assets	Debt to Assets Ratio	Return on Equity
1.33	11.00%	0.60	26%

Should Johnny be appreciative of his company's performance?

- 5-34.** Vernon Pinkby, the financial analyst reporting to the chief financial officer of Alufab Aluminum Company, is comparing the performance of the company's four separate divisions based on profit margin and return on assets. The relevant figures follow (figures in \$000):



	Mining	Smelting	Rolling	Extrusion
Net Income	\$ 500	\$ 2,600	\$ 7,000	\$ 2,500
Sales	15,000	30,000	60,000	25,000
Total Assets	12,000	25,000	39,000	18,000

- Compare profit margin ratios of the four divisions.
- Compare return on assets ratios of the four divisions.
- Compute profit margin of the entire company.
- Compute return on assets of the entire company.

Challenge Problem 

- 5-35. From the values of the different ratios given, calculate the missing balance sheet and income statement items of National Glass Company.

Average Collection Period	48.67 days
Inventory Turnover	9x
Debt to Asset Ratio	.4 or 40%
Current Ratio	1.6250
Total Asset Turnover	1.5
Fixed Asset Turnover	2.647
Return on Equity	0.1933 or 19.33%
Return on Assets	0.116 or 11.6%
Operating Profit Margin	13.33%
Gross Profit Margin	48.89%

**National Glass Company Income Statement
for 2006 (000 dollars)**

Sales	\$45,000
Cost of Goods Sold	_____
Gross Profit	_____
Selling and Administrative Expenses	_____
Depreciation	3,000
Operating Income (EBIT)	_____
Interest Expense	_____
Earnings before Taxes (EBT)	_____
Income Taxes (T = 40%)	2,320
Net Income (NI)	_____

**National Glass Company Balance Sheet
as of End 2006**

Assets:	\$
Cash	_____
Accounts Receivable (gross)	_____
Inventory	_____
Plant and Equipment (net)	_____
Land	1,000
Liabilities:	
Accounts Payable	2,000
Notes Payable	_____
Accrued Expenses	3,000
Bonds Payable	_____
Stockholders' Equity:	
Common Stock	4,000
Retained Earnings	_____

- 5-36.** Kingston Tools Company (KTC) manufactures various types of high-quality punching and deep-drawing press tools for kitchen appliance manufacturers. Horner Smith, the finance manager of KTC, has submitted a justification to support the application for a short-term loan from the Queensville Interstate Bank (QIB) to finance increased sales. The consolidated income statement and balance sheet of KTC, submitted with the justification to QIB, follow.

 **Comprehensive Problem**



**Kingston Tools Company Income Statement
for 2006 and 2007 (000 dollars)**

	2006	2007
Sales	\$40,909	\$45,000
Cost of Goods Sold	20,909	23,000
Gross Profit	20,000	22,000
Selling and Administrative Expenses	11,818	13,000
Depreciation	2,000	3,000
Operating Income (EBIT)	6,182	6,000
Interest Expense	400	412
Earnings before Taxes (EBT)	5,782	5,588
Income Taxes (@ 40%)	2,313	2,235
Net Income (NI)	3,469	3,353
Dividends Paid (@ 21.86%)	758	733

**Kingston Tools Company Balance Sheet
as of End of 2006 and 2007 (000 dollars)**

	2006	2007
Assets:		
Cash	\$ 2,000	\$ 1,800
Accounts Receivable (net)	6,000	7,600
Inventory	5,000	5,220
Plant and Equipment (gross)	26,000	31,000
Less: Accumulated Depreciation	10,000	13,000
Plant and Equipment (net)	16,000	18,000
Land	1,000	1,000
Liabilities:		
Accounts Payable	2,000	2,600
Notes Payable	3,000	3,300
Accrued Expenses	3,000	3,100
Bonds Payable	4,000	4,000
Stockholders' Equity:		
Common Stock	4,000	4,000
Retained Earnings	14,000	16,620

You are the loan officer at QIB responsible for determining whether KTC's business is strong enough to be able to repay the loan. To do so, accomplish the following:

- a.** Calculate the following ratios for 2006 and 2007, compare with the industry averages shown in parentheses, and indicate if the company is doing better or worse than the industry and whether the performance is improving or deteriorating in 2007 as compared to 2006.
 - (i)** Gross profit margin (50 percent)
 - (ii)** Operating profit margin (15 percent)
 - (iii)** Net profit margin (8 percent)
 - (iv)** Return on assets (10 percent)
 - (v)** Return on equity (20 percent)
 - (vi)** Current ratio (1.5)
 - (vii)** Quick ratio (1.0)
 - (viii)** Debt to total asset ratio (0.5)
 - (ix)** Times interest earned (25)
 - (x)** Average collection period (45 days)
 - (xi)** Inventory turnover (8)
 - (xii)** Total asset turnover (1.6)
- b.** Calculate the EVA and MVA for Kingston Tools, assuming that the firm's income tax rate is 40 percent, the weighted average rate of return expected by the suppliers of the firm's capital is 10 percent, and the market price of the firm's stock is \$20. There are 1.2 million shares outstanding.
- c.** Discuss the financial strengths and weaknesses of KTC.
- d.** Determine the sources and uses of funds and prepare a statement of cash flows for 2007.
- e.** Compare and comment on the financial condition as evident from the ratio analysis and the cash flow statement.
- f.** Which ratios should you analyze more critically before recommending granting of the loan and what is your recommendation?

5-37. Refer to the following financial statements of Super Dot Com, Inc.

 **Ratio Analysis**

Super Dot Com, Inc.
Income Statements
(In 000's, except EPS)



	2004	2005	2006
Net Sales	\$2,100	\$3,051	\$3,814
Cost of Goods Sold	681	995	1,040
Gross Profit	1,419	2,056	2,774
Selling and Admin. Expenses	610	705	964
Operating Profit	809	1,351	1,810
Interest Expense	11	75	94
Income before Tax	798	1,276	1,716
Income Tax (T = 35%)	279	447	601
Net Income	\$ 519	\$ 829	\$1,115
Dividends Paid	\$ 0	\$ 0	\$ 0
Increase in Retained Earnings	535	855	1,150
Common Shares Outstanding	2,500	2,500	2,500
EPS	\$ 0.21	\$ 0.33	\$ 0.45

Super Dot Com, Inc.
Balance Sheets
(In 000's) as of Dec. 31, Years Ended:

	2004	2005	2006
Assets:			
Cash and Equivalents	\$ 224	\$ 103	\$ 167
Accounts Receivable	381	409	564
Inventories	307	302	960
Other Current Assets	69	59	29
Total Current Assets	981	873	1,720
Prop. Plant, and Equip., Gross	1,901	3,023	3,742
Less Accum. Depr.	(81)	(82)	(346)
Prop. Plant, and Equip., Net	1,820	2,941	3,396
Other Assets	58	101	200
Total Assets	\$2,859	\$3,915	\$5,316
Liabilities and Equity:			
Accounts Payable	\$ 210	\$ 405	\$ 551
Short-Term Debt	35	39	72
Total Current Liabilities	245	444	623
Long-Term Debt	17	19	91
Total Liabilities	262	463	714
Common Stock	2,062	2,062	2,062
Retained Earnings	535	1,390	2,540
Total Equity	2,597	3,452	4,602
Total Liabilities and Equity	\$2,859	\$3,915	\$5,316



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- a. How long, on average, was Super Dot Com taking to collect on its receivable accounts in 2006? (Assume all of the company's sales were on credit.)
- b. Was Super Dot Com more or less profitable in 2006 than in 2004? Justify your answer by examining the net profit margin and return on assets ratios.
- c. Was Super Dot Com more or less liquid at the end of 2006 than it was at the end of 2004? Justify your answer using the current and quick ratios.

Answers to Self-Test

ST-1. $\text{Sales} \div \$5,000,000 = 4$, therefore sales = \$20,000,000

$\$2,000,000 \text{ net income} \div \$20,000,000 \text{ sales} = .1 = 10\% \text{ net profit margin}$

ST-2. $\text{Current liabilities} = \$200,000 \text{ total assets} - \$180,000 \text{ LTD \& CS} = \$20,000$

$\$50,000 \text{ current assets} \div \$20,000 \text{ current liabilities} = 2.5 \text{ current ratio}$

ST-3. $\text{Current assets} - \text{inventory} = \$50,000 - (.5 \times \$50,000) = \$25,000$

$\$25,000 \div \$20,000 \text{ current liabilities} = 1.25 \text{ quick ratio}$

ST-4. $\text{Debt} \div \text{assets} = .5$, therefore $\text{equity} \div \text{assets} = .5$, therefore $\text{assets} \div \text{equity} = 1 \div .5 = 2$

$$\text{ROE} = \text{ROA} \times (\text{A/E})$$

$$= .06 \times 2$$

$$= .12, \text{ or } 12\%$$

ST-5. $(\$100,000 \text{ current assets} - \text{inventory}) \div \$25,000 = 1.5 \text{ quick ratio}$, therefore inventory = \$62,500

$\$200,000 \text{ sales} \div \$62,500 \text{ inventory} = 3.2 \text{ inventory turnover ratio}$

ST-6. $\text{Debt} = \$500,000 \text{ assets} - \$200,000 \text{ equity} = \$300,000$

$\$300,000 \text{ debt} \div \$500,000 \text{ assets} = .6 = 60\% \text{ debt to total asset ratio}$

ST-7. $\text{Credit sales} = \$4,000,000 \div 4 = \$1,000,000$

$\text{Average collection period} = \text{accounts receivable} \div \text{average daily credit sales} = \$100,000$

$\text{Accounts receivable} \div (\$1,000,000 \text{ annual credit sales} \div 365 \text{ days per year}) = 36.5 \text{ days}$

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