

Chapter 10

Analysis of Financial Statements

ANSWERS TO END-OF-CHAPTER QUESTIONS

- 10-1 a. A liquidity ratio is a ratio that shows the relationship of a firm's cash and other current assets to its current liabilities. The current ratio is found by dividing current assets by current liabilities. It indicates the extent to which current liabilities are covered by those assets expected to be converted to cash in the near future. The quick, or acid test, ratio is found by taking current assets less inventories and then dividing by current liabilities.
- b. Asset management ratios are a set of ratios which measure how effectively a firm is managing its assets. The inventory turnover ratio is sales divided by inventories. Days sales outstanding is used to appraise accounts receivable and indicates the length of time the firm must wait after making a sale before receiving cash. It is found by dividing receivables by average sales per day. The fixed assets turnover ratio measures how effectively the firm uses its plant and equipment. It is the ratio of sales to net fixed assets. Total assets turnover ratio measures the turnover of all the firm's assets; it is calculated by dividing sales by total assets.
- c. Financial leverage ratios measure the use of debt financing. The debt ratio is the ratio of total debt to total assets, it measures the percentage of funds provided by creditors. The times-interest-earned ratio is determined by dividing earnings before interest and taxes by the interest charges. This ratio measures the extent to which operating income can decline before the firm is unable to meet its annual interest costs. The EBITDA coverage ratio is similar to the times-interest-earned ratio, but it recognizes that many firms lease assets and also must make sinking fund payments. It is found by adding EBITDA and lease payments then dividing this total by interest charges, lease payments, and sinking fund payments over one minus the tax rate.
- d. Profitability ratios are a group of ratios which show the combined effects of liquidity, asset management, and debt on operations. The profit margin on sales, calculated by dividing net income by sales, gives the profit per dollar of sales. Basic earning power is calculated by dividing EBIT by total assets. This ratio shows the raw earning power of the firm's assets, before the influence of taxes and leverage. Return on total assets is the ratio of net income to total assets. Return on common equity is found by dividing net income into common equity.

- e. Market value ratios relate the firm's stock price to its earnings and book value per share. The price/earnings ratio is calculated by dividing price per share by earnings per share--this shows how much investors are willing to pay per dollar of reported profits. The price/cash flow is calculated by dividing price per share by cash flow per share. This shows how much investors are willing to pay per dollar of cash flow. Market-to-book ratio is simply the market price per share divided by the book value per share. Book value per share is common equity divided by the number of shares outstanding.
- f. Trend analysis is an analysis of a firm's financial ratios over time. It is used to estimate the likelihood of improvement or deterioration in its financial situation. Comparative ratio analysis is when a firm compares its ratios to other leading companies in the same industry. This technique is also known as benchmarking.
- g. The Du Pont chart is a chart designed to show the relationships among return on investment, asset turnover, the profit margin, and leverage. The Du Pont equation is a formula which shows that the rate of return on assets can be found as the product of the profit margin times the total assets turnover.
- h. Window dressing is a technique employed by firms to make their financial statements look better than they really are. Seasonal factors can distort ratio analysis. At certain times of the year a firm may have excessive inventories in preparation of a "season" of high demand. Therefore an inventory turnover ratio taken at this time as opposed to after the season will be radically distorted.

10-2 The emphasis of the various types of analysts is by no means uniform nor should it be. *Management* is interested in all types of ratios for two reasons. First, the ratios point out weaknesses that should be strengthened; second, management recognizes that the other parties are interested in all the ratios and that financial appearances must be kept up if the firm is to be regarded highly by creditors and equity investors. *Equity investors* are interested primarily in profitability, but they examine the other ratios to get information on the riskiness of equity commitments. *Long-term creditors* are more interested in the debt ratio, TIE, and fixed-charge coverage ratios, as well as the profitability ratios. *Short-term creditors* emphasize liquidity and look most carefully at the liquidity ratios.

10-3 Given that sales have not changed, a decrease in the total assets turnover means that the company's assets have increased. Also, the fact that the fixed assets turnover ratio remained constant implies that the company increased its current assets. Since the company's current ratio increased, and yet, its quick ratio is unchanged means that the company has increased its inventories.

- 10-4 Differences in the amounts of assets necessary to generate a dollar of sales cause asset turnover ratios to vary among industries. For example, a steel company needs a greater number of dollars in assets to produce a dollar in sales than does a grocery store chain. Also, profit margins and turnover ratios may vary due to differences in the amount of expenses incurred to produce sales. For example, one would expect a grocery store chain to spend more per dollar of sales than does a steel company. Often, a large turnover will be associated with a low profit margin, and vice versa.
- 10-5 a. Cash, receivables, and inventories, as well as current liabilities, vary over the year for firms with seasonal sales patterns. Therefore, those ratios that examine balance sheet figures will vary unless averages (monthly ones are best) are used.
- b. Common equity is determined at a point in time, say December 31, 2002. Profits are earned over time, say during 2002. If a firm is growing rapidly, year-end equity will be much larger than beginning-of-year equity, so the calculated rate of return on equity will be different depending on whether end-of-year, beginning-of-year, or average common equity is used as the denominator. Average common equity is conceptually the best figure to use. In public utility rate cases, people are reported to have deliberately used end-of-year or beginning-of-year equity to make returns on equity appear excessive or inadequate. Similar problems can arise when a firm is being evaluated.
- 10-6 Firms within the same industry may employ different accounting techniques which make it difficult to compare financial ratios. More fundamentally, comparisons may be misleading if firms in the same industry differ in their other investments. For example, comparing Pepsico and Coca-Cola may be misleading because apart from their soft drink business, Pepsi also owns other businesses such as Frito-Lay, Pizza Hut, Taco Bell, and KFC.

SOLUTIONS TO END-OF-CHAPTER PROBLEMS

$$10-1 \quad CA = \$3,000,000; \quad \frac{CA}{CL} = 1.5; \quad \frac{CA - I}{CL} = 1.0;$$

$$CL = ?; \quad I = ?$$

$$\frac{CA}{CL} = 1.5$$
$$\frac{\$3,000,000}{CL} = 1.5$$

$$1.5 CL = \$3,000,000$$

$$CL = \$2,000,000.$$

$$\frac{CA - I}{CL} = 1.0$$

$$\frac{\$3,000,000 - I}{\$2,000,000} = 1.0$$

$$\$3,000,000 - I = \$2,000,000$$

$$I = \$1,000,000.$$

$$10-2 \quad DSO = 40 \text{ days}; \quad ADS = \$20,000; \quad AR = ?$$

$$DSO = \frac{AR}{\frac{S}{365}}$$

$$40 = \frac{AR}{\$20,000}$$

$$AR = \$800,000.$$

$$10-3 \quad A/E = 2.4; \quad D/A = ?$$

$$\frac{D}{A} = \left(1 - \frac{1}{\frac{A}{E}} \right)$$

$$\frac{D}{A} = \left(1 - \frac{1}{2.4} \right)$$

$$\frac{D}{A} = 0.5833 = 58.33\%.$$

Mini Case: 10 - 4

10-4 ROA = 10%; PM = 2%; ROE = 15%; S/TA = ?; A/E = ?
 ROA = NI/A; PM = NI/S; ROE = NI/E

$$\begin{aligned} \text{ROA} &= \text{PM} \times \text{S/TA} \\ \text{NI/A} &= \text{NI/S} \times \text{S/TA} \\ 10\% &= 2\% \times \text{S/TA} \\ \text{S/TA} &= 5. \end{aligned}$$

$$\begin{aligned} \text{ROE} &= \text{PM} \times \text{S/TA} \times \text{TA/E} \\ \text{NI/E} &= \text{NI/S} \times \text{S/TA} \times \text{TA/E} \\ 15\% &= 2\% \times 5 \times \text{TA/E} \\ 15\% &= 10\% \times \text{TA/E} \\ \text{TA/E} &= 1.5. \end{aligned}$$

10-5 We are given ROA = 3% and Sales/Total assets = 1.5x.

From Du Pont equation: ROA = Profit margin \times Total assets turnover
 $3\% = \text{Profit margin} (1.5)$
 Profit margin = $3\%/1.5 = 2\%$.

We can also calculate the company's debt ratio in a similar manner, given the facts of the problem. We are given ROA(NI/A) and ROE(NI/E); if we use the reciprocal of ROE we have the following equation:

$$\begin{aligned} \frac{\text{E}}{\text{A}} &= \frac{\text{NI}}{\text{A}} - \frac{\text{E}}{\text{NI}} \text{ and } \frac{\text{D}}{\text{A}} = 1 - \frac{\text{E}}{\text{A}}, \text{ so} \\ \frac{\text{E}}{\text{A}} &= 3\% - \frac{1}{0.05} \\ \frac{\text{E}}{\text{A}} &= 60\%. \\ \frac{\text{D}}{\text{A}} &= 1 - 0.60 = 0.40 = 40\%. \end{aligned}$$

Alternatively,

$$\begin{aligned} \text{ROE} &= \text{ROA} \times \text{EM} \\ 5\% &= 3\% \times \text{EM} \\ \text{EM} &= 5\%/3\% = 5/3 = \text{TA/E}. \end{aligned}$$

Take reciprocal:

$$\text{E/TA} = 3/5 = 60\%;$$

therefore,

$$\text{D/A} = 1 - 0.60 = 0.40 = 40\%.$$

Thus, the firm's profit margin = 2% and its debt ratio = 40%.

$$10-6 \quad \text{Present current ratio} = \frac{\$1,312,500}{\$525,000} = 2.5.$$

$$\text{Minimum current ratio} = \frac{\$1,312,500 + \Delta \text{NP}}{\$525,000 + \Delta \text{NP}} = 2.0.$$

$$\begin{aligned} \$1,312,500 + \Delta \text{NP} &= \$1,050,000 + 2\Delta \text{NP} \\ \Delta \text{NP} &= \$262,500. \end{aligned}$$

Short-term debt can increase by a maximum of \$262,500 without violating a 2 to 1 current ratio, assuming that the entire increase in notes payable is used to increase current assets. Since we assumed that the additional funds would be used to increase inventory, the inventory account will increase to \$637,500, and current assets will total \$1,575,000.

$$\text{Quick ratio} = (\$1,575,000 - \$637,500) / \$787,500 = \$937,500 / \$787,500 = 1.19\times.$$

$$10-7 \quad 1. \quad \frac{\text{Current assets}}{\text{Current liabilities}} = 3.0\times \quad \frac{\$810,000}{\text{Current liabilities}} = 3.0\times$$

$$\text{Current liabilities} = \$270,000.$$

$$2. \quad \frac{\text{Current assets} - \text{Inventories}}{\text{Current liabilities}} = 1.4\times \quad \frac{\$810,000 - \text{Inventories}}{\$270,000} = 1.4\times$$

$$\text{Inventories} = \$432,000.$$

$$3. \quad \text{Current assets} = \text{Cash} + \text{Marketable Securities} + \text{Accounts receivable} + \text{Inventories}$$

$$\begin{aligned} \$810,000 &= \$120,000 + \text{Accounts receivable} + \$432,000 \\ \text{Accounts receivable} &= \$258,000. \end{aligned}$$

$$4. \quad \frac{\text{Sales}}{\text{Inventory}} = 6.0\times \quad \frac{\text{Sales}}{\$432,000} = 6.0\times$$

$$\text{Sales} = \$2,592,000.$$

$$5. \quad \text{DSO} = \frac{\text{Accounts receivable}}{\text{Sales}/365} = \frac{\$258,000}{\$2,592,000/365} = 36.33 \text{ days.}$$

10-8 TIE = EBIT/INT, so find EBIT and INT.
 Interest = \$500,000 × 0.1 = \$50,000.
 Net income = \$2,000,000 × 0.05 = \$100,000.
 Pre-tax income = \$100,000/(1 - T) = \$100,000/0.7 = \$142,857.

EBIT = \$142,857 + \$50,000 = \$192,857.
 TIE = \$192,857/\$50,000 = 3.86×

10-9 a. (Dollar amounts in thousands.)

		<u>Firm</u>	<u>Industry Average</u>
<u>Current assets</u>	=		
Current liabilities	=	1.98×	2.0×
DSO = <u>Accountsreceivable</u>	=		
Sales/365	=	76 days	35 days
<u>Sales</u>	=		
Inventory	=	6.66×	6.7×
<u>Sales</u>	=		
Fixed assets	=	5.50×	12.1×
<u>Sales</u>	=		
Total assets	=	1.70×	3.0×
<u>Net income</u>	=		
Sales	=	1.7%	1.2%
<u>Net income</u>	=		
Total assets	=	2.9%	3.6%
		<u>Firm</u>	<u>Industry Average</u>
<u>Net income</u>	=		
Common equity	=	7.6%	9.0%
<u>Total debt</u>	=		
Total assets	=	61.9%	60.0%

b. For the firm,

$$\text{ROE} = \text{PM} \times \text{T.A. turnover} \times \text{EM} = 1.7\% \times 1.7 \times \frac{\$947,500}{\$361,000} = 7.6\%.$$

For the industry, $\text{ROE} = 1.2\% \times 3 \times 2.5 = 9\%$.

Note: To find the industry ratio of assets to common equity, recognize that $1 - (\text{total debt}/\text{total assets}) = \text{common equity}/\text{total assets}$. So, $\text{common equity}/\text{total assets} = 40\%$, and $1/0.40 = 2.5 = \text{total assets}/\text{common equity}$.

- c. The firm's days sales outstanding is more than twice as long as the industry average, indicating that the firm should tighten credit or enforce a more stringent collection policy. The total assets turnover ratio is well below the industry average so sales should be increased, assets decreased, or both. While the company's profit margin is higher than the industry average, its other profitability ratios are low compared to the industry--net income should be higher given the amount of equity and assets. However, the company seems to be in an average liquidity position and financial leverage is similar to others in the industry.
- d. If 2002 represents a period of supernormal growth for the firm, ratios based on this year will be distorted and a comparison between them and industry averages will have little meaning. Potential investors who look only at 2002 ratios will be misled, and a return to normal conditions in 2003 could hurt the firm's stock price.

10-10 1. $\text{Debt} = (0.50)(\text{Total assets}) = (0.50)(\$300,000) = \$150,000.$

2. $\text{Accounts payable} = \text{Debt} - \text{Long-term debt} = \$150,000 - \$60,000 = \$90,000$

3. $\text{Common stock} = \frac{\text{Total liabilities and equity}}{\text{and equity}} - \text{Debt} - \text{Retained earnings} = \$300,000 - \$150,000 - \$97,500 = \$52,500.$

4. $\text{Sales} = (1.5)(\text{Total assets}) = (1.5)(\$300,000) = \$450,000.$

5. $\text{Inventory} = \text{Sales}/5 = \$450,000/5 = \$90,000.$

6. $\text{Accounts receivable} = (\text{Sales}/365)(\text{DSO}) = (\$450,000/365)(36.5) = \$45,000.$

7. $\text{Cash} + \text{Accounts receivable} = (0.80)(\text{Accounts payable})$
 $\text{Cash} + \$45,000 = (0.80)(\$90,000)$
 $\text{Cash} = \$72,000 - \$45,000 = \$27,000.$

8. $\text{Fixed assets} = \text{Total assets} - (\text{Cash} + \text{Accts rec.} + \text{Inventories}) = \$300,000 - (\$27,000 + \$45,000 + \$90,000) = \$138,000.$

9. $\text{Cost of goods sold} = (\text{Sales})(1 - 0.25) = (\$450,000)(0.75) = \$337,500.$

10-11 a. Here are the firm's base case ratios and other data as compared to the industry:

	<u>Firm</u>	<u>Industry</u>	<u>Comment</u>
Quick	0.8×	1.0×	Weak
Current	2.3	2.7	Weak
Inventory turnover	4.8	7.0	Poor
Days sales outstanding	37 days	32 days	Poor
Fixed assets turnover	10.0×	13.0×	Poor
Total assets turnover	2.3	2.6	Poor
Return on assets	5.9%	9.1%	Bad
Return on equity	13.1	18.2	Bad
Debt ratio	54.8	50.0	High
Profit margin on sales	2.5	3.5	Bad
EPS	\$4.71	n.a.	--
Stock Price	\$23.57	n.a.	--
P/E ratio	5.0×	6.0×	Poor
P/CF ratio	2.0×	3.5×	Poor
M/B ratio	0.65	n.a.	--

The firm appears to be badly managed--all of its ratios are worse than the industry averages, and the result is low earnings, a low P/E, P/CF ratio, a low stock price, and a low M/B ratio. The company needs to do something to improve.

- b. A decrease in the inventory level would improve the inventory turnover, total assets turnover, and ROA, all of which are too low. It would have some impact on the current ratio, but it is difficult to say precisely how that ratio would be affected. If the lower inventory level allowed the company to reduce its current liabilities, then the current ratio would improve. The lower cost of goods sold would improve all of the profitability ratios and, if dividends were not increased, would lower the debt ratio through increased retained earnings. All of this should lead to a higher market/book ratio and a higher stock price.