

# Chapter 3

## Analysis of Financial Statements

### ANSWERS TO END-OF-CHAPTER QUESTIONS

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- 3-1 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.

3-2 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.

3-3 The inventory turnover ratio is important to a grocery store because of the much larger inventory required and because some of that inventory is perishable. An insurance company would have no inventory to speak of since its line of business is selling insurance policies or other similar financial products--contracts written on paper and entered into between the company and the insured. This question demonstrates the fact that the student should not take a routine approach to financial analysis but rather should examine the particular business he or she is dealing with.

- 3-4 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.
- 3-5 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.
- 3-6 Inflation will cause earnings to increase, even if there is no increase in sales volume. Yet, the book value of the assets that produced the sales and the annual depreciation expense remain at historic values and do not reflect the actual cost of replacing those assets. Thus, ratios that compare current flows with historic values become distorted over time. For example, ROA will increase even though those assets are generating the same sales volume.
- When comparing different companies, the age of the assets will greatly affect the ratios. Companies whose assets were purchased earlier will reflect lower asset values than those that purchased the assets later at inflated prices. Two firms with similar physical assets and sales could have significantly different ROAs. Under inflation, ratios will also reflect differences in the way firms treat inventories. As can be seen, inflation affects both income statement and balance sheet items.
- 3-7 ROE, using the Du Pont equation, is the return on assets multiplied by the equity multiplier. The equity multiplier, defined as total assets divided by owners' equity, is a measure of debt utilization; the more debt a firm uses, the lower its equity, and the higher the equity multiplier. Thus, using more debt will increase the equity multiplier, resulting in a higher ROE.
- 3-8 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, 2001. Profits are earned over time, say during 2001. 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.

3-9 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.

| 3-10   | Total<br>Current<br>Assets | Current<br>Ratio | Effect<br>on Net<br>Income |
|--|----------------------------|------------------|----------------------------|
| a. Cash is acquired through issuance of additional common stock. | +                          | +                | 0                          |
| b. Merchandise is sold for cash.                                 | +                          | +                | +                          |
| c. Federal income tax due for the previous year is paid.         | -                          | +                | 0                          |
| d. A fixed asset is sold for less than book value.               | +                          | +                | -                          |
| e. A fixed asset is sold for more than book value.               | +                          | +                | +                          |
| f. Merchandise is sold on credit.                                | +                          | +                | +                          |
| g. Payment is made to trade creditors for previous purchases.    | -                          | +                | 0                          |
| h. A cash dividend is declared and paid.                         | -                          | -                | 0                          |
| i. Cash is obtained through short-term bank loans.               | +                          | -                | 0                          |
| j. Short-term notes receivable are sold at a discount.           | -                          | -                | -                          |
| k. Marketable securities are sold below cost.                    | -                          | -                | -                          |
| l. Advances are made to employees.                               | 0                          | 0                | 0                          |
| m. Current operating expenses are paid.                          | -                          | -                | -                          |

|   | Total<br>Current<br>Assets | Current<br>Ratio | Effect<br>on Net<br>Income |
|---|----------------------------|------------------|----------------------------|
| n. Short-term promissory notes are issued to trade creditors in exchange for past due accounts payable. | 0                          | 0                | 0                          |
| o. Ten-year notes are issued to pay off accounts payable.   | 0                          | +                | 0                          |
| p. A fully depreciated asset is retired.  | 0                          | 0                | 0                          |
| q. Accounts receivable are collected.   | 0                          | 0                | 0                          |
| r. Equipment is purchased with short-term notes.  | 0                          | -                | 0                          |
| s. Merchandise is purchased on credit.  | +                          | -                | 0                          |
| t. The estimated taxes payable are increased.   | 0                          | -                | -                          |

## SOLUTIONS TO END-OF-CHAPTER PROBLEMS

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

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

$$\begin{aligned} \frac{CA}{CL} &= 1.5 \\ \frac{\$3,000,000}{CL} &= 1.5 \\ 1.5 CL &= \$3,000,000 \\ CL &= \$2,000,000. \end{aligned}$$

$$\begin{aligned} \frac{CA - I}{CL} &= 1.0 \\ \frac{\$3,000,000 - I}{\$2,000,000} &= 1.0 \\ \$3,000,000 - I &= \$2,000,000 \\ I &= \$1,000,000. \end{aligned}$$

$$3-2 \quad DSO = 40 \text{ days}; \quad ADS = \$20,000; \quad AR = ?$$

$$\begin{aligned} DSO &= \frac{AR}{\frac{S}{360}} \\ 40 &= \frac{AR}{\$20,000} \\ AR &= \$800,000. \end{aligned}$$

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

$$\begin{aligned} \frac{D}{A} &= \left( 1 - \frac{1}{\frac{A}{E}} \right) \\ \frac{D}{A} &= \left( 1 - \frac{1}{2.4} \right) \\ \frac{D}{A} &= 0.5833 = 58.33\%. \end{aligned}$$

3-4 ROA = 10%; PM = 2%; ROE = 15%; S/TA = ?; A/E = ?  
 ROA = NI/A; PM = NI/S; ROE = NI/E

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

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

3-5 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%.

$$3-6 \quad \text{Present current ratio} = \frac{\$1,312,500}{\$525,000} = 2.5.$$

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

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

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.

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

$$3-7 \quad 1. \quad \frac{\text{Current assets}}{\text{Current liabilities}} = 3.0\times \quad \frac{\$810,000}{\text{Current liabilities}} = 3.0\times$$

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

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

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

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

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

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

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

$$5. \quad \text{DSO} = \frac{\text{Accounts receivable}}{\text{Sales} / 360} = \frac{\$258,000}{\$2,592,000 / 360} = 36 \text{ days}.$$

3-8 TIE = EBIT/INT, so find EBIT and INT.

$$\text{Interest} = \$500,000 \times 0.1 = \$50,000.$$

$$\text{Net income} = \$2,000,000 \times 0.05 = \$100,000.$$

$$\text{Pre-tax income} = \$100,000 / (1 - T) = \$100,000 / 0.7 = \$142,857.$$

$$\text{EBIT} = \$142,857 + \$50,000 = \$192,857.$$

$$\text{TIE} = \$192,857 / \$50,000 = 3.86\times.$$

3-9 ROE = Profit margin × TA turnover × Equity multiplier  
= NI/Sales × Sales/TA × TA/Equity.

Now we need to determine the inputs for the equation from the data that were given. On the left we set up an income statement, and we put numbers in it on the right:

|               |                   |
|---------------|-------------------|
| Sales (given) | \$10,000,000      |
| Cost          | <u>na</u>         |
| EBIT (given)  | \$ 1,000,000      |
| INT (given)   | <u>300,000</u>    |
| EBT           | \$ 700,000        |
| Taxes (34%)   | <u>238,000</u>    |
| NI            | <u>\$ 462,000</u> |

Now we can use some ratios to get some more data:

Total assets turnover = 2 = S/TA; TA = S/2 = \$10,000,000/2 = \$5,000,000.

D/A = 60%; so E/A = 40%; and, therefore,  
Equity multiplier = TA/E = 1/(E/A) = 1/0.4 = 2.5.

Now we can complete the Du Pont equation to determine ROE:

ROE = \$462,000/\$10,000,000 × \$10,000,000/\$5,000,000 × 2.5 = 0.231 = 23.1%.

3-10 Known data:

TA = \$1,000,000

BEP = 0.2 = EBIT/Total assets, so EBIT = 0.2(\$1,000,000) = \$200,000.

$k_d$  = 8%

T = 40%

D/A = 0.5 = 50%, so Equity = \$500,000.

|           | <u>D/A = 0%</u>  | <u>D/A = 50%</u> |
|-----------|------------------|------------------|
| EBIT      | \$200,000        | \$200,000        |
| Interest  | <u>0</u>         | <u>40,000*</u>   |
| EBT       | \$200,000        | \$160,000        |
| Tax (40%) | <u>80,000</u>    | <u>64,000</u>    |
| NI        | <u>\$120,000</u> | <u>\$ 96,000</u> |

ROE =  $\frac{NI}{Equity} = \frac{\$120,000}{\$1,000,000} = 12\%$ ;  $\frac{\$96,000}{\$500,000} = 19.2\%$ .

Difference in ROE = 19.2% - 12.0% = 7.2%.

\*If D/A = 50%, then half of assets are financed by debt, so Debt = \$500,000. At an 8% interest rate, INT = \$40,000.

3-11 Statement a is correct. Refer to the solution setup for Problem 3-10 and

think about it this way: (1) Adding assets will not affect common equity if the assets are financed with debt. (2) Adding assets will cause expected EBIT to increase by the amount  $EBIT = BEP(\text{added assets})$ . (3) Interest expense will increase by the amount  $k_d(\text{added assets})$ . (4) Pre-tax income will rise by the amount  $(\text{added assets})(BEP - k_d)$ . Assuming  $BEP > k_d$ , if pre-tax income increases so will net income. (5) If expected net income increases but common equity is held constant, then the expected ROE will also increase. Note that if  $k_d > BEP$ , then adding assets financed by debt would lower net income and thus the ROE. Therefore, Statement a is true--if assets financed by debt are added, and if the expected BEP on those assets exceeds the cost of debt, then the firm's ROE will increase.

Statements b and c are false, because the BEP ratio uses EBIT, which is calculated before the effects of taxes or interest charges are felt, and d is false unless  $k_d > BEP$ . Of course, Statement e is also false.

3-12 a. Currently, ROE is  $ROE_1 = \$15,000/\$200,000 = 7.5\%$ .

The current ratio will be set such that  $2.5 = CA/CL$ . CL is \$50,000, and it will not change, so we can solve to find the new level of current assets:  $CA = 2.5(CL) = 2.5(\$50,000) = \$125,000$ . This is the level of current assets that will produce a current ratio of  $2.5\times$ .

At present, current assets amount to \$210,000, so they can be reduced by  $\$210,000 - \$125,000 = \$85,000$ . If the \$85,000 generated is used to retire common equity, then the new common equity balance will be  $\$200,000 - \$85,000 = \$115,000$ .

Assuming that net income is unchanged, the new ROE will be  $ROE_2 = \$15,000/\$115,000 = 13.04\%$ . Therefore, ROE will increase by  $13.04\% - 7.50\% = 5.54\%$ .

- b. 1. Doubling the dollar amounts would not affect the answer; it would still be 5.54%.
2. Common equity would increase by \$25,000 from the Part a scenario, which would mean a new ROE of  $\$15,000/\$140,000 = 10.71\%$ , which would mean a difference of  $10.71\% - 7.50\% = 3.21\%$ .
3. An inventory turnover of 2 would mean inventories of \$100,000, down \$50,000 from the current level. That would mean an ROE of  $\$15,000/\$150,000 = 10.00\%$ , so the change in ROE would be  $10.00\% - 7.5\% = 2.5\%$ .
4. If the company had 10,000 shares outstanding, then its EPS would be  $\$15,000/10,000 = \$1.50$ . The stock has a book value of  $\$200,000/10,000 = \$20$ , so the shares retired would be  $\$85,000/\$20 = 4,250$ , leaving  $10,000 - 4,250 = 5,750$  shares. The new EPS would be  $\$15,000/5,750 = \$2.6087$ , so the increase in EPS would be  $\$2.6087 - \$1.50 = \$1.1087$ , which is a 73.91% increase, the same as the increase in ROE.
5. If the stock was selling for twice book value, or  $2 \times \$20 = \$40$ , then only half as many shares could be retired ( $\$85,000/\$40 = 2,125$ ), so the remaining shares would be  $10,000 - 2,125 = 7,875$ , and

the new EPS would be  $\$15,000/7,875 = \$1.9048$ , for an increase of  $\$1.9048 - \$1.5000 = \$0.4048$ .

- c. We could have started with lower inventory and higher accounts receivable, then had you calculate the DSO, then move to a lower DSO which would require a reduction in receivables, and then determine the effects on ROE and EPS under different conditions. Similarly, we could have focused on fixed assets and the FA turnover ratio. In any of these cases, we could have had you use the funds generated to retire debt, which would have lowered interest charges and consequently increased net income and EPS.

If we had to *increase* assets, then we would have had to finance this increase by adding either debt or equity, which would have lowered ROE and EPS, other things held constant.

Finally, note that we could have asked some conceptual questions about the problem, either as a part of the problem or without any reference to the problem. For example, "If funds are generated by reducing assets, and if those funds are used to retire common stock, will EPS and/or ROE be affected by whether or not the stock sells above, at, or below book value?"

3-13 a. (Dollar amounts in thousands.)

|       |  |   | <u>Firm</u> | <u>Industry<br/>Average</u> |
|-------|--|---|-------------|-----------------------------|
|       | $\frac{\text{Current assets}}{\text{Current liabilities}} = \frac{\$655,000}{\$330,000}$ | = | 1.98x       | 2.0x                        |
| DSO = | $\frac{\text{Accounts receivable}}{\text{Sales}/360} = \frac{\$336,000}{\$4,465.28}$     | = | 75 days     | 35 days                     |
|       | $\frac{\text{Sales}}{\text{Inventory}} = \frac{\$1,607,500}{\$241,500}$                  | = | 6.66x       | 6.7x                        |
|       | $\frac{\text{Sales}}{\text{Fixed assets}} = \frac{\$1,607,500}{\$292,500}$               | = | 5.50x       | 12.1x                       |
|       | $\frac{\text{Sales}}{\text{Total assets}} = \frac{\$1,607,500}{\$947,500}$               | = | 1.70x       | 3.0x                        |
|       | $\frac{\text{Net income}}{\text{Sales}} = \frac{\$27,300}{\$1,607,500}$                  | = | 1.7%        | 1.2%                        |
|       | $\frac{\text{Net income}}{\text{Total assets}} = \frac{\$27,300}{\$947,500}$             | = | 2.9%        | 3.6%                        |

|  |   |                               | <u>Firm</u> | <u>Industry<br/>Average</u> |
|--|---|-------------------------------|-------------|-----------------------------|
| $\frac{\text{Net income}}{\text{Common equity}}$ | = | $\frac{\$27,300}{\$361,000}$  | = 7.6%      | 9.0%                        |
| $\frac{\text{Total debt}}{\text{Total assets}}$  | = | $\frac{\$586,500}{\$947,500}$ | = 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 2001 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 2001 ratios will be misled, and a return to normal conditions in 2002 could hurt the firm's stock price.

3-14 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. Accounts receivable = (Sales/360)(DSO) = ( $\$450,000/360$ )(36)  
=  $\$45,000$ .
7. Cash + Accounts receivable = (0.80)(Accounts payable)  
Cash +  $\$45,000$  = (0.80)( $\$90,000$ )  
Cash =  $\$72,000 - \$45,000 = \$27,000$ .
8. Fixed assets = Total assets - (Cash + Accts rec. + Inventories)  
=  $\$300,000 - (\$27,000 + \$45,000 + \$90,000) = \$138,000$ .
9. Cost of goods sold = (Sales)(1 - 0.25) = ( $\$450,000$ )(0.75) =  $\$337,500$ .

3-15 a. (Dollar amounts in millions.)

|                         |  |                            | <u>Firm</u> | <u>Industry<br/>Average</u> |
|-------------------------|--|----------------------------|-------------|-----------------------------|
| Current ratio           | = $\frac{\text{Current assets}}{\text{Current liabilities}}$ | = $\frac{\$303}{\$111}$    | = 2.73x     | 2x                          |
| Debt to total assets    | = $\frac{\text{Debt}}{\text{Total assets}}$                  | = $\frac{\$135}{\$450}$    | = 30%       | 30%                         |
| Times interest earned   | = $\frac{\text{EBIT}}{\text{Interest}}$                      | = $\frac{\$49.5}{\$4.5}$   | = 11x       | 7x                          |
| EBITDA coverage         | =  | = $\frac{\$61.5}{\$6.5}$   | = 9.46x     | 9x                          |
| Inventory turnover      | = $\frac{\text{Sales}}{\text{Inventory}}$                    | = $\frac{\$795}{\$159}$    | = 5x        | 10x                         |
| DSO                     | = $\frac{\text{Accounts receivable}}{\text{Sales}/360}$      | = $\frac{\$66}{\$795/360}$ | = 30 days   | 24 days                     |
| F.A. Turnover           | = $\frac{\text{Sales}}{\text{Net fixed assets}}$             | = $\frac{\$795}{\$147}$    | = 5.41x     | 6x                          |
| T.A. Turnover           | = $\frac{\text{Sales}}{\text{Total assets}}$                 | = $\frac{\$795}{\$450}$    | = 1.77x     | 3x                          |
| Profit margin           | = $\frac{\text{Net income}}{\text{Sales}}$                   | = $\frac{\$27}{\$795}$     | = 3.40%     | 3%                          |
| Return on total assets  | = $\frac{\text{Net income}}{\text{Total assets}}$            | = $\frac{\$27}{\$450}$     | = 6.00%     | 9%                          |
| Return on common equity | = ROA × EM   | = 6% × 1.43                | = 8.58%     | 12.9%                       |

Alternatively,

$$\text{ROE} = \frac{\text{Net income}}{\text{Equity}} = \frac{\$27}{\$315} = 8.6\%.$$

b. ROE = Profit margin × Total assets turnover × Equity multiplier

$$= \frac{\text{Net income}}{\text{Sales}} \times \frac{\text{Sales}}{\text{Total assets}} \times \frac{\text{Total assets}}{\text{Common equity}}$$

$$= \frac{\$27}{\$795} \times \frac{\$795}{\$450} \times \frac{\$450}{\$315} = 3.4\% \times 1.77 \times 1.43 = 8.6\%.$$

|                       | <u>Firm</u> | <u>Industry</u> | <u>Comment</u> |
|-----------------------|-------------|-----------------|----------------|
| Profit margin         | 3.4%        | 3.0%            | Good           |
| Total assets turnover | 1.77×       | 3.0×            | Poor           |
| Equity multiplier     | 1.43        | 1.43*           | Good           |

$$* 1 - \frac{D}{TA} = \frac{E}{TA}$$

$$1 - 0.30 = 0.7$$

$$\text{EM} = \frac{TA}{E} = \frac{1}{0.7} = 1.43.$$

Alternatively, EM = ROE/ROA = 12.9%/9% = 1.43.

- c. Analysis of the Du Pont equation and the set of ratios shows that the turnover ratio of sales to assets is quite low. Either sales should be increased at the present level of assets, or the current level of assets should be decreased to be more in line with current sales. Thus, the problem appears to be in the balance sheet accounts.
- d. The comparison of inventory turnover ratios shows that other firms in the industry seem to be getting along with about half as much inventory per unit of sales as the firm. If the company's inventory could be reduced, this would generate funds that could be used to retire debt, thus reducing interest charges and improving profits, and strengthening the debt position. There might also be some excess investment in fixed assets, perhaps indicative of excess capacity, as shown by a slightly lower-than-average fixed assets turnover ratio. However, this is not nearly as clear-cut as the overinvestment in inventory.
- e. If the firm had a sharp seasonal sales pattern, or if it grew rapidly during the year, many ratios might be distorted. Ratios involving cash, receivables, inventories, and current liabilities, as well as those based on sales, profits, and common equity, could be biased. It is possible to correct for such problems by using average rather than end-of-period figures.

3-16 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.