

Understanding Financial Management: A Practical Guide

Problems and Answers

Chapter 3

Interpreting Financial Ratios

3.2 Liquidity Ratios

1. Ink Inc. has had a stable current ratio over the past three years that is consistent with the industry average. Its quick ratio, however, has declined and is now substantially below the industry average. What is the likely cause for this decline?
2. Mirabela Textiles Inc. has current assets of \$25 million, a current ratio of 2.5 and a target current ratio of 1.75. During the past few months, Mirabela has experienced difficulty financing its expanding sales. How much additional short-term funding can Mirabela obtain before it reaches the target current ratio constraint? Assume that Mirabela expands its receivables and inventories using its short-term line of credit.

3.3 Debt Management Ratios

3. Taylor Sporting Goods Company had earnings before interest and taxes (EBIT) of \$100 million last year and interest expense of \$35 million. The firm forecasts weakening demand for its products that will likely cause a 10% decline in EBIT for each of the next two years. The firm's chief financial officer believes the firm's BBB credit rating will be jeopardized if the interest coverage ratio falls below 2.5. What level of interest expense on debt can the firm maintain two years from now to keep its interest coverage ratio at 2.5?

3.4 Asset Management Ratios

4. The Edelweis Company has \$1 million in accounts receivable and its receivables collection period is 50 days. Last year's accounts receivable amount was also \$1 million. The firm's president has mandated that the receivables collection period be reduced to the industry average of 38 days. The chief financial officer (CFO) estimates the firm's net sales would fall by 10% if the firm instituted a tighter credit policy to reduce its receivables collection period. Assuming the CFO's sales estimate is correct, what is the firm's new level of accounts receivable if it adopts the tighter credit policy?
5. The Williamson Company had net sales and average total assets of \$50 million and \$22.5 million, respectively.
 - A. What is the firm's total asset turnover ratio?
 - B. Assuming average total assets remains constant, what percentage increase in sales would be needed for the firm to meet a target total asset turnover ratio of 2.5?

3.5 Profitability Ratios

6. Pickett Company and Levitt Company are in the same industry. Both firms had sales of \$200 million, total assets of \$100 million, and EBIT of \$20 million last year. Pickett is financed entirely by equity; but Levitt has equal amounts of debt and equity. Levitt's annual interest expense is \$5 million. Both firms have a 40% marginal tax rate.
- Compute the net profit margin, ROA, and ROE for each firm.
 - Perform a DuPont analysis of ROE for both firms. Explain the differences in ratios obtained in part A.
 - Compute an *adjusted* net profit margin (NPM) and ROA for Levitt by adding [interest expense x (1 - t)] to the net income in the numerator. Discuss the advantage of this adjustment.
7. *Integrative Problem:* Marinek Marine Company has the following balance sheet and income statement for fiscal 2007:

Balance Sheet (\$000)	
Cash	\$1,000
Accounts receivable	4,000
Inventories	3,000
Current assets	<u>8,000</u>
Net fixed assets	12,000
Total assets	<u>20,000</u>
Accounts payable	3,000
Notes payable	1,600
Current liabilities	<u>4,600</u>
Long-term debt	5,400
Owners' equity	10,000
Total liabilities and owners' equity	<u>\$20,000</u>

Income Statement (\$000)	
Net credit sales	\$20,000
Cost of goods sold	<u>8,000</u>
Gross profit	12,000
Operating expenses	<u>7,500</u>
Operating income	4,500
Interest expense	<u>1,167</u>
Earnings before tax	3,333
Income taxes	1,333
Net income	<u>\$2,000</u>

- Calculate the following ratios for Marinek.
 - Current ratio
 - Quick ratio
 - Debt ratio
 - Interest coverage ratio
 - Accounts receivable turnover
 - Inventory turnover ratio
 - Accounts payable turnover

- Fixed asset turnover
- Total asset turnover
- Inventory turnover
- Receivables collection period
- Net profit margin
- Operating profit margin
- Gross profit margin
- Return on assets
- Return on equity

B. Perform a DuPont analysis of ROE for Marinek.

3.6 Market Value Ratios

8. A firm with 75 million shares of common stock outstanding has a price/earnings (P/E) ratio of 3.25, a price-to-book value (P/B) ratio of 1.75, and stockholders' equity of \$5.5 billion. What is the market price per share of the firm's stock?
9. *Integrative Problem:* The balance sheet, income statement, and some miscellaneous information for Gamma Inc., a computer chip manufacturer, are given below for 2006 and 2007.

Balance Sheet (amounts in millions of \$)		
Assets	12/31/2007	12/31/2006
Cash	\$300	\$400
Accounts Receivable	850	900
Inventory	1,250	1,100
Total current assets	2,400	2,400
Plant and equipment, net	2,800	2,400
Total assets	\$5,200	\$4,800
Liabilities and Equity		
Accounts payable	\$700	\$700
Notes payable	400	400
Other current liabilities	200	200
Total current liabilities	1,500	1,300
Long-term debt outstanding	1,400	1,200
Total common equity	2,500	2,300
Total liabilities and equity	\$5,200	\$4,800
Income Statement amounts in millions of \$)		
	2007	2006
Sales	\$2,900	\$2,400
Cost of sales	1,700	1,500
Depreciation	480	400
EBIT	720	500
Interest expense	120	100
EBT	600	400
Taxes	240	160
Net Income	\$360	\$240
Miscellaneous Information		
Common stock price, 12/31/07		\$54.75
Number of common shares outstanding, 12/31/07		80 million
Weighted average number of common shares outstanding in 2007		80 million
Common dividends paid in 2007		\$8 million

A. Compute the ratios for Gamma Inc. for 2007.

Ratio	Gamma Inc.	Industry Average
Current ratio		1.72 x
Quick ratio		1.05 x
Debt ratio		52.61%
Long-term debt ratio		18.44%
Interest coverage ratio		9.55 x
Cash flow coverage ratio		16.84 x
Accounts receivable turnover		3.45 x
Inventory turnover		2.15 x
Accounts payable turnover		2.41 x
Fixed asset turnover		1.25 x
Total asset turnover ratios		0.71 x
Net profit margin		13.94%
Gross profit margin		42.21%
Operating profit margin		26.15%
Return on assets		8.45%
Return on equity		15.12%
Price-earnings ratio		14.82 x

B. Compare the ratios for Gamma with the industry averages and make a brief assessment of the firm's financial position.

Answers

1. Since the quick ratio subtracts inventories from the current assets in the numerator, Ink Inc. has likely had an excess build-up of inventories.
2. Compute the firm's current liabilities amount.

$$\text{Current ratio} = \frac{\text{Current assets}}{\text{Current liabilities}}$$

$$\text{Current liabilities} = \frac{\text{Current assets}}{\text{Current ratio}} = \frac{\$25 \text{ million}}{2.5} = \$10 \text{ million}$$

Compute the amount of current assets and current liabilities that give a current ratio of 1.75.

$$\text{Current ratio} = \frac{\$25 \text{ million} + X}{\$10 \text{ million} + X} = 1.75 \quad \text{Solve for X (amount of funding)}$$

$$X = \$10 \text{ million}$$

3. The expected EBIT level in two years will be $(\$100 \text{ million})(0.9)(0.9) = \81 million .

$$\text{Interest coverage ratio} = \frac{\text{EBIT}}{\text{Interest expense}}$$

$$2.5 = \frac{\$81 \text{ million}}{\text{Interest expense}}$$

Solving the above equation, interest expense = \$32.4 million.

4. Substituting the accounts receivable turnover ratio into the receivables collection period formula gives:

$$\text{Receivables collection period} = \frac{365}{\left[\frac{\text{Net credit sales}}{\text{Average accounts receivable}} \right]}$$

$$= \frac{365}{\left[\frac{\text{Net credit sales}}{\$1 \text{ million}} \right]} = 50 \text{ days}$$

Therefore, current net credit sales = \$7.3 million, but the CFO projected that the credit sales will drop by 10%, so the new amount of credit sales will be $\$7.3 \text{ m}(0.9) = \$ 6.57 \text{ million}$.

With net credit sales of \$6.57 million, solve for the average accounts receivable that would provide a collection period of 38 days:

$$\text{Receivables collection period} = 38 \text{ days} = \frac{365}{\frac{\$6.57}{\text{Average accounts receivable}}}$$

The average accounts receivable = \$ 684,000.

5A. Total asset turnover is computed as follows:

$$\text{Total asset turnover ratio} = \frac{\text{Net sales}}{\text{Average total assets}} = \frac{\$50 \text{ million}}{\$22.5 \text{ million}} = 2.22 \text{ times}$$

5B. The net sales amount that would yield a total asset turnover ratio of 2.5 is as follows:

$$\text{Net sales} = \text{Total asset turnover} \times \text{Average total assets} = (2.5)(\$22.5 \text{ million}) = \$56.25 \text{ million}$$

$$\text{Percentage increase in sales} = \frac{\$6.25 \text{ million}}{\$50 \text{ million}} = 0.125 \text{ or } 12.5\%$$

6A. The net profit margin, ROA, and ROE for each firm are as follows:

Pickett

$$\text{Net profit margin} = \frac{\text{Net income}}{\text{Net sales}} = \frac{\$12 \text{ million}}{\$200 \text{ million}} = 0.060 = 6.0\%$$

$$\text{Return on assets} = \frac{\text{Net income}}{\text{Average total assets}} = \frac{\$12 \text{ million}}{\$100 \text{ million}} = 0.120 = 12.0\%$$

$$\text{Return on equity} = \frac{\text{Net income}}{\text{Average total equity}} = \frac{\$12 \text{ million}}{\$100 \text{ million}} = 0.120 = 12.0\%$$

Levitt

$$\text{Net profit margin} = \frac{\text{Net income}}{\text{Net sales}} = \frac{\$9 \text{ million}}{\$200 \text{ million}} = 0.045 = 4.5\%$$

$$\text{Return on assets} = \frac{\text{Net income}}{\text{Average total assets}} = \frac{\$9 \text{ million}}{\$100 \text{ million}} = 0.090 = 9.0\%$$

$$\text{Return on equity} = \frac{\text{Net income}}{\text{Average total equity}} = \frac{\$9 \text{ million}}{\$50 \text{ million}} = 0.180 = 18.0\%$$

6B. The DuPont analysis of ROE shows the following:

Company	Net profit margin		Total asset turnover		Equity multiplier		ROE
Pickett	6.0%	x	2.0	x	1.0	=	12.0%
Levitt	4.5%	x	2.0	x	2.0	=	18.0%

Both firms have total asset turnovers (net sales/total assets) of 2.0. Pickett has an equity multiplier (total assets/total equity) of 1.0 versus 2.0 for Levitt. The DuPont analysis shows that Levitt's higher ROE is attributed to its higher equity multiplier. Levitt's debt financing has levered the returns to the equity shareholders.

6C. The adjusted net profit margin (NPM) for Levitt is computed as follows:

$$\text{Adjusted NPM} = \frac{\text{Net income} + \text{interest expense}(1 - t)}{\text{Net sales}}$$

$$\text{Adjusted NPM} = \frac{\$9 \text{ million} + \$5 \text{ million}(1 - 0.4)}{\$200 \text{ million}} = 0.060 = 6.0\%$$

The adjusted ROA for Levitt is computed as follows:

$$\text{Adjusted ROA} = \frac{\text{Net income} + \text{interest expense}(1 - t)}{\text{Average total assets}}$$

$$\text{Adjusted ROA} = \frac{\$9 \text{ million} + \$5 \text{ million}(1 - 0.4)}{\$100 \text{ million}} = 0.120 = 12.0\%$$

After the adjustment, both companies now have the same NPM and ROA. This adjustment removes the bias in the NPM and ROA ratios from the reduced net income caused by debt financing. These NPM and ROA ratios are attempting to indicate a firm's profitability from sales and from total assets, respectively, and therefore should not be affected by how the firm is financed. The *adjustment* provides a better basis for comparing two similar firms with different relative amounts of debt financing.

7A. The ratios for Marinek are computed as follows:

$$\text{Current ratio} = \frac{\text{Current assets}}{\text{Current liabilities}} = \frac{8,000}{4,600} = 1.74$$

$$\text{Quick ratio} = \frac{\text{Current assets} - \text{inventory}}{\text{Current liabilities}} = \frac{8,000 - 3,000}{4,600} = 1.09$$

$$\text{Debt ratio} = \frac{\text{Total liabilities}}{\text{Total assets}} = \frac{4,600 + 5,400}{20,000} = 0.50$$

$$\text{Interest coverage ratio} = \frac{\text{EBIT}}{\text{Interest expense}} = \frac{4,500}{1,167} = 3.86$$

$$\text{Accounts receivable turnover ratio} = \frac{\text{Net credit sales}}{\text{Average accounts receivable}} = \frac{20,000}{4,000} = 5.00$$

$$\text{Fixed asset turnover ratio} = \frac{\text{Net sales}}{\text{Average net fixed assets}} = \frac{20,000}{12,000} = 1.67$$

$$\text{Total asset turnover ratio} = \frac{\text{Net sales}}{\text{Average total assets}} = \frac{20,000}{20,000} = 1.00$$

$$\text{Net profit margin} = \frac{\text{Net income}}{\text{Net sales}} = \frac{2,000}{20,000} = 0.10 = 10.0\%$$

$$\text{Gross profit margin} = \frac{\text{Gross income}}{\text{Net sales}} = \frac{12,000}{20,000} = 0.60 = 60.0\%$$

$$\text{Operating profit margin} = \frac{\text{Operating income}}{\text{Net sales}} = \frac{4,500}{20,000} = 0.225 = 22.5\%$$

$$\text{Return on assets} = \frac{\text{Net income}}{\text{Average total assets}} = \frac{2,000}{20,000} = 0.10 = 10.0\%$$

$$\text{Return on equity} = \frac{\text{Net income}}{\text{Average total equity}} = \frac{2,000}{10,000} = 0.20 = 20.0\%$$

7B. DuPont analysis of ROE for Marinek follows:

Net profit margin		Total asset turnover		Equity multiplier		ROE
10.0%	x	1.0	x	2.0	=	20.0%

8. Use the market-to-book value ratio to solve for the market price per share:

$$\text{Market-to-book value ratio} = \frac{\text{Market value of equity}}{\text{Book value of equity}}$$

$$\text{Market-to-book value ratio} = \frac{\text{No. of shares} \times \text{Equity price per share}}{\text{Book value of equity}}$$

$$\text{Equity price per share} = \frac{\text{Market-to-book value ratio} \times \text{Book value of equity}}{\text{No. of shares}}$$

$$\text{Equity price per share} = \frac{1.75 \times \$5.5 \text{ billion}}{75 \text{ million}} = \$128.33$$

9. The ratios for Gamma are computed as follows:

$$\text{Current ratio} = \frac{\text{Current assets}}{\text{Current liabilities}} = \frac{2,400}{1,500} = 1.60$$

$$\text{Quick ratio} = \frac{\text{Current assets} - \text{inventory}}{\text{Current liabilities}} = \frac{2,400 - 1,250}{1,500} = 0.77$$

$$\text{Debt ratio} = \frac{\text{Total liabilities}}{\text{Total assets}} = \frac{1,500 + 1,400}{5,200} = 0.5577 = 55.77\%$$

$$\text{Long-term debt ratio} = \frac{\text{Long-term debt}}{\text{Total assets}} = \frac{1,400}{5,200} = 0.2692 = 26.92\%$$

$$\text{Interest coverage ratio} = \frac{\text{EBIT}}{\text{Interest expense}} = \frac{720}{120} = 6.00$$

$$\text{Cashflow coverage ratio} = \frac{\text{EBIT} + \text{depreciation}}{\text{Interest expense}} = \frac{720 + 480}{120} = 10.00$$

$$\text{Accounts receivable turnover} = \frac{\text{Net credit sales}}{\text{Average accounts receivable}} = \frac{2,900}{875} = 3.31$$

$$\text{Inventory turnover ratio} = \frac{\text{Cost of goods sold}}{\text{Average inventory}} = \frac{1,700}{1,175} = 1.45$$

$$\text{Accounts payable turnover} = \frac{\text{Cost of goods sold}}{\text{Average accounts payable}} = \frac{1,700}{700} = 2.43$$

$$\text{Fixed asset turnover ratio} = \frac{\text{Net sales}}{\text{Average net fixed assets}} = \frac{2,900}{2,600} = 1.12$$

$$\text{Total asset turnover ratio} = \frac{\text{Net sales}}{\text{Average total assets}} = \frac{2,900}{5,000} = 0.58$$

$$\text{Net profit margin} = \frac{\text{Net income}}{\text{Net sales}} = \frac{360}{2,900} = 0.1241 = 12.41\%$$

$$\text{Gross profit margin} = \frac{\text{Gross profit}}{\text{Net sales}} = \frac{2,900 - 1,700}{2,900} = 0.4138 = 41.38\%$$

$$\text{Operating profit margin} = \frac{\text{Operating income}}{\text{Net sales}} = \frac{720}{2,900} = 0.2483 = 24.83\%$$

$$\text{Return on assets} = \frac{\text{Net income}}{\text{Average total assets}} = \frac{360}{5,000} = 0.0720 = 7.20\%$$

$$\text{Return on equity} = \frac{\text{Net income}}{\text{Average total equity}} = \frac{360}{2,400} = 0.1500 = 15.00\%$$

$$\text{Price-earnings ratio} = \frac{\text{Market price per share}}{\text{Earnings per share}} = \frac{54.75}{\left[\frac{360}{80} \right]} = 12.17$$

Ratios	Gamma Inc.	Industry Average
Current ratio	1.60 x	1.72 x
Quick ratio	0.77 x	1.09 x
Debt ratio	55.77%	49.61%
Long-term debt ratio	26.92%	18.44%
Interest coverage ratio	6.00 x	9.55 x
Cash flow coverage ratio	10.00 x	16.84 x
Accounts receivable turnover	3.31 x	3.45 x
Inventory turnover	1.45 x	2.15 x
Accounts payable turnover	2.43 x	2.41 x
Fixed asset turnover	1.12 x	1.25 x
Total asset turnover ratios	0.58 x	0.71 x
Net profit margin	12.41%	13.94%
Gross profit margin	41.38%	42.21%
Operating profit margin	24.83%	26.15%
Return on assets	7.20%	8.45%
Return on equity	15.00%	15.02%
Price-earnings ratio	12.17 x	14.82 x

- 9B. Gamma's liquidity position is below the industry averages. The firm's quick ratio is substantially lower than the industry average while the current ratio is only slightly lower. This suggests that Gamma carries more inventories on its balance sheet than its competitors. Some of this difference, however, could be caused by different inventory valuation methods.

Gamma uses relatively more long-term debt than its competitors, with a long-term debt ratio of 26.92% versus an industry average of 18.44%. Accordingly, Gamma also has interest coverage and cash flow coverage ratios that are lower than the industry average. Yet, the cash flow coverage ratio of 10.00 suggests that default is not likely or imminent.

Except for inventory turnover, Gamma's asset management ratios are just slightly below or on par with industry averages. Inventory turnover is substantially below the industry average, and may confirm a possible problem with inventory management. Recall that Gamma has a low quick ratio.

In terms of profitability, Gamma has a net profit margin, gross profit margin, and operating profit margin that are slightly below industry averages. These differences could be attributed to the higher use of debt financing that lowers net income. The return on equity for Gamma is on par with industry average. Given the greater use of leverage, one would expect that Gamma's ROE would exceed the industry average ROE.