Chapter 4
Analysis of Financial Statements

Learning Objectives

After reading this chapter, students should be able to:

- Explain what ratio analysis is.
- List the 5 groups of ratios and identify, calculate, and interpret the key ratios in each group.
- Discuss each ratio's relationship to the balance sheet and income statement.
- Discuss why ROE is the key ratio under management's control, how the other ratios impact ROE, and explain how to use the DuPont equation for improving ROE.
- Compare a firm's ratios with those of other firms (benchmarking) and analyze a given firm's ratios over time (trend analysis).
- Discuss the tendency of ratios to fluctuate over time (which may or may not be problematic), explain how they can be influenced by accounting practices as well as other factors, and why they must be used with care.

Lecture Suggestions

Chapter 4 shows how financial statements are analyzed to determine the firm' strengths and weaknesses. On the basis of this information, management can take actions to exploit the firm's strengths and correct its weaknesses.

At Florida, we find a significant difference in preparation between our accounting and non-accounting students. The accountants are relatively familiar with financial statements, and they have covered in depth in their financial accounting course many of the ratios discussed in Chapter 4. We pitch our lectures to the non-accountants, which means concentrating on the use of statements and ratios, and the "big picture," rather than on details such as seasonal adjustments and the effects of different accounting procedures. Details are important, but so are general principles, and there are courses other than the introductory finance course where details can be addressed.

What we cover, and the way we cover it, can be seen by scanning the slides and Integrated Case solution for Chapter 4, which appears at the end of this chapter's solutions. For other suggestions about the lecture, please see the "Lecture Suggestions" in Chapter 2, where we describe how we conduct our classes.

DAYS ON CHAPTER: 3 OF 56 DAYS (50-minute periods)

Answers to End-of-Chapter Questions

4-1 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 (stockholders) are interested primarily in profitability, but they examine the other ratios to get information on the riskiness of equity commitments. Credit analysts are more interested in the debt, TIE, and EBITDA coverage ratios, as well as the profitability ratios. Short-term creditors emphasize liquidity and look most carefully at the current ratio.

4-2 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 that the student should not take a routine approach to financial analysis but rather should examine the business that he or she is analyzing before conducting a ratio analysis.

4-3 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 cash and equivalents and DSO are unchanged means that the company has increased its inventories. This is also consistent with a decline in the total assets turnover ratio.

4-4 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 high turnover will be associated with a low profit margin, and vice versa.

4-5 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 with assets that were purchased earlier will reflect lower asset values than those that purchased 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.

4-6 ROE is calculated as the return on assets multiplied by the equity multiplier. The equity multiplier, defined as total assets divided by common 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.

4-7 **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, 2012. Profits are earned over time, say during 2012. 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.

4-8 Firms within the same industry may employ different accounting techniques that 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.

4-9 The three components of the DuPont equation are profit margin, assets turnover, and the equity multiplier. One would not expect the three components of the discount merchandiser and high-end merchandiser to be the same even though their ROEs are identical. The discount merchandiser's profit margin would be lower than the high-end merchandiser, while the assets turnover would be higher for the discount merchandiser than for the high-end merchandiser.

4-10 A review of Yahoo! Finance on 9/13/11 showed that the trailing twelve-month P/E ratio for Apple was 15.12 compared to 10.95 for Walmart. The P/E ratio indicates how much investors are willing to pay per dollar of reported profits. Apple's higher P/E ratio indicates that it has strong growth prospects, while Walmart's lower P/E ratio indicates that it is a slower growing firm. Walmart is a mature company in a mature industry so the fact that its P/E ratio is lower than Apple's is not surprising.

4-11

	Total Current Assets	Current Ratio	Effect on Net 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

		Total Current Assets	Current Ratio	Effect on Net Income
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.	–	–	–
n.	Short-term promissory notes are issued to trade creditors in exchange for past due accounts payable.	0	0	0
o.	10-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 of End-of-Chapter Problems

4-1 DSO = 40 days; S = $7,300,000; AR = ?

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

$$40 = \frac{\text{AR}}{\$7{,}300{,}000/365}$$

$$40 = \text{AR}/\$20{,}000$$

$$\text{AR} = \$800{,}000.$$

4-2 A/E = 2.4; D/A = ?

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

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

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

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

$$\text{ROA} = \text{PM} \times \text{S/TA}$$

$$\text{NI/TA} = \text{NI/S} \times \text{S/TA}$$

$$10\% = 2\% \times \text{S/TA}$$

$$\text{S/TA} = 5.$$

$$\text{ROE} = \text{PM} \times \text{S/TA} \times \text{TA/E}$$

$$\text{NI/E} = \text{NI/S} \times \text{S/TA} \times \text{TA/E}$$

$$15\% = 2\% \times 5 \times \text{TA/E}$$

$$15\% = 10\% \times \text{TA/E}$$

$$\text{TA/E} = 1.5.$$

4-4 TA = $10,000,000,000; CL = $1,000,000,000; LT debt = $3,000,000,000; CE = $6,000,000,000; Shares outstanding = 800,000,000; P_0 = $32; M/B = ?

$$\text{Book value} = \frac{\$6{,}000{,}000{,}000}{800{,}000{,}000} = \$7.50.$$

$$\text{M/B} = \frac{\$32.00}{\$7.50} = 4.2667.$$

4-5 EPS = $2.00; BVPS = $20; M/B = 1.2×; P/E = ?

$$\begin{aligned} M/B &= 1.2\times \\ P/\$20 &= 1.2\times \\ P &= \$24.00. \end{aligned}$$

P/E = $24.00/$2.00 = 12.0×.

4-6 NI/S = 2%; TA/E = 2.0; Sales = $100,000,000; Assets = $50,000,000; ROE = ?

$$\begin{aligned} ROE &= NI/S \times S/TA \times TA/E \\ &= 2\% \times \$100,000,000/\$50,000,000 \times 2 \\ &= 8\%. \end{aligned}$$

4-7 Step 1: Calculate total assets from information given.
Sales = $6 million.

$$3.2\times = \text{Sales/TA}$$
$$3.2\times = \frac{\$6,000,000}{\text{Assets}}$$
$$\text{Assets} = \$1,875,000.$$

Step 2: Calculate net income.
There is 50% debt and 50% equity, so Equity = $1,875,000 × 0.5 = $937,500.

$$\begin{aligned} ROE &= NI/S \times S/TA \times TA/E \\ 0.12 &= NI/\$6,000,000 \times 3.2 \times \$1,875,000/\$937,500 \\ 0.12 &= \frac{6.4NI}{\$6,000,000} \\ \$720,000 &= 6.4NI \\ \$112,500 &= NI. \end{aligned}$$

4-8 ROA = 8%; Net income = $600,000; TA = ?

$$ROA = \frac{NI}{TA}$$
$$8\% = \frac{\$600,000}{TA}$$
$$TA = \$7,500,000.$$

To calculate BEP, we still need EBIT. To calculate EBIT construct a partial income statement:

EBIT	$1,148,077	$225,000 + $923,077
Interest	225,000	(Given)
EBT	$ 923,077	$600,000/0.65
Taxes (35%)	323,077	
NI	$ 600,000	

$$BEP = \frac{EBIT}{TA}$$
$$= \frac{\$1{,}148{,}077}{\$7{,}500{,}000}$$
$$= 0.1531 = 15.31\%.$$

4-9 Stockholders' equity = $3,750,000,000; M/B = 1.9; P = ?
Total market value = $3,750,000,000(1.9) = $7,125,000,000.
Market value per share = $7,125,000,000/50,000,000 = $142.50.

Alternative solution:
Stockholders' equity = $3,750,000,000; Shares outstanding = 50,000,000; P = ?
Book value per share = $3,750,000,000/50,000,000 = $75.
Market value per share = $75(1.9) = $142.50.

4-10 We are given ROA = 3% and Sales/Total assets = 1.5×.

From the DuPont equation:
ROA = Profit margin × Total assets turnover
3% = Profit margin(1.5)
Profit margin = 3%/1.5 = 2%.

We can also calculate the company's debt-to-assets 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:

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

Alternatively, using the DuPont equation:

ROE = ROA × TA/E
5% = 3% × TA/E
TA/E = 5%/3% = 5/3.

Take reciprocal: E/TA = 3/5 = 60%; therefore, D/A = 1 – 0.60 = 0.40 = 40%.

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

4-11 TA = $12,000,000,000; T = 40%; EBIT/TA = 15%; ROA = 5%; TIE = ?

$$\frac{\text{EBIT}}{\$12,000,000,000} = 0.15$$

$$\text{EBIT} = \$1,800,000,000.$$

$$\frac{\text{NI}}{\$12,000,000,000} = 0.05$$

$$\text{NI} = \$600,000,000.$$

Now use the income statement format to determine interest so you can calculate the firm's TIE ratio.

EBIT	$1,800,000,000	See above.
INT	800,000,000	
EBT	$1,000,000,000	EBT = $600,000,000/0.6
Taxes (40%)	400,000,000	
NI	$ 600,000,000	See above.

INT = EBIT – EBT
= $1,800,000,000 – $1,000,000,000

TIE = EBIT/INT
= $1,800,000,000/$800,000,000
= 2.25×.

4-12 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 (EBT) = $100,000/(1 – T) = $100,000/0.7 = $142,857.
EBIT = EBT + Interest = $142,857 + $50,000 = $192,857.

TIE = $192,857/$50,000 = 3.86×.

4-13 ROE = Profit margin × TA turnover × Equity multiplier
= NI/Sales × Sales/TA × TA/Equity.

Now we need to determine the inputs for the DuPont equation from the data that were given. On the left we set up an income statement, and we substitute values on the right:

Sales (given)	$10,000,000
– Cost	na
EBIT (given)	$ 1,000,000
– INT (given)	300,000
EBT	$ 700,000
– Taxes (34%)	238,000
NI	$ 462,000

Now we can use some ratios to get additional 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 DuPont equation to determine ROE:

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

4-14 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×.

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%.

The new CA level is \$125,000; CL remain at \$50,000; and the new Inventory level = \$150,000 – \$85,000 = \$65,000. Thus, the new quick ratio is calculated as follows:

$$\text{New quick ratio} = \frac{\text{CA} - \text{Inv}}{\text{CL}} = \frac{\$125,000 - \$65,000}{\$50,000} = 1.2\times.$$

4-15 Known data:

TA = \$1,000,000; Int. rate = 8%; T = 40%; BEP = 0.2 = EBIT/Total assets, so EBIT = 0.2(\$1,000,000) = \$200,000; D/A = 0.5 = 50%, so Equity = \$500,000.

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

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

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

*If D/A = 50%, then half of the assets are financed by debt, so Debt = \$500,000. At an 8% interest rate, INT = \$500,000 × 0.08 = \$40,000.

4-16 Statement a is correct. Refer to the solution setup for Problem 4-15 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(added assets). (3) Interest expense will increase by the amount Int. rate(added assets). (4) Pre-tax income will rise by the amount (added assets)(BEP – Int. rate). Assuming BEP > Int. rate, 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 Int. rate > 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 interest rate on debt, then the firm's ROE will increase.

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

4-17 TA = \$5,000,000,000; T = 40%; EBIT/TA = 10%; ROA = 5%; TIE ?

$$\frac{\text{EBIT}}{\$5,000,000,000} = 0.10$$

$$\text{EBIT} = \$500,000,000.$$

$$\frac{\text{NI}}{\$5,000,000,000} = 0.05$$

$$\text{NI} = \$250,000,000.$$

Now use the income statement format to determine interest so you can calculate the firm's TIE ratio.

EBIT	\$500,000,000	See above.
INT	83,333,333	
EBT	\$416,666,667	EBT = \$250,000,000/0.6
Taxes (40%)	166,666,667	
NI	\$250,000,000	See above.

INT = EBIT – EBT
= \$500,000,000 – \$416,666,667.

TIE = EBIT/INT
= \$500,000,000/\$83,333,333
= 6.0×.

4-18 Present current ratio = $\frac{\$1,312,500}{\$525,000} = 2.5.$

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

$\$1,312,500 + \Delta NP = \$1,050,000 + 2\Delta NP$

$\Delta NP = \$262,500.$

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, and current liabilities will total \$787,500.

4-19 Step 1: Solve for current annual sales using the DSO equation:

$$55 = \$750{,}000/(\text{Sales}/365)$$
$$55\text{Sales} = \$273{,}750{,}000$$
$$\text{Sales} = \$4{,}977{,}272.73.$$

Step 2: If sales fall by 15%, the new sales level will be \$4,977,272.73(0.85) = \$4,230,681.82. Again, using the DSO equation, solve for the new accounts receivable figure as follows:

$$35 = \text{AR}/(\$4{,}230{,}681.82/365)$$
$$35 = \text{AR}/\$11{,}590.91$$
$$\text{AR} = \$405{,}681.82 \approx \$405{,}682.$$

4-20 The current EPS is \$2,000,000/500,000 shares or \$4.00. The current P/E ratio is then \$40/\$4 = 10.00. The new number of shares outstanding will be 650,000. Thus, the new EPS = \$3,250,000/650,000 = \$5.00. If the shares are selling for 10 times EPS, then they must be selling for \$5.00(10) = \$50.

4-21 1. Total debt = (0.50)(Total assets) = (0.50)(\$300,000) = \$150,000.

2. Accounts payable = Total debt – Long-term debt = \$150,000 – \$60,000
= \$90,000.

3. Common stock = $\begin{matrix}\text{Total liabilities}\\ \text{and equity}\end{matrix}$ – Total debt – Retained earnings
= \$300,000 – \$150,000 – \$97,500 = \$52,500.

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

5. Inventories = Sales/5 = \$450,000/5 = \$90,000.

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

7. Cash + Accounts receivable + Inventories = (1.8)(Accounts payable)
Cash + \$45,000 + \$90,000 = (1.8)(\$90,000)
Cash + \$135,000 = \$162,000
Cash = \$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.

4-22 **a.** (Dollar amounts in thousands.)

					Firm	Industry Average
Current ratio	=	$\frac{\text{Current assets}}{\text{Current liabilities}}$	=	$\frac{\$655{,}000}{\$330{,}000}$	= 1.98×	2.0×
Quick ratio	=	$\frac{\text{Current assets} - \text{Inventories}}{\text{Current liabilities}}$	=	$\frac{\$655{,}000 - \$241{,}500}{\$330{,}000}$	= 1.25×	1.3×
DSO	=	$\frac{\text{Accounts receivable}}{\text{Sales}/365}$	=	$\frac{\$336{,}000}{\$4{,}404.11}$	= 76.3 days	35 days
Inventory turnover	=	$\frac{\text{Sales}}{\text{Inventories}}$	=	$\frac{\$1{,}607{,}500}{\$241{,}500}$	= 6.66×	6.7×
T. A. turnover	=	$\frac{\text{Sales}}{\text{Total assets}}$	=	$\frac{\$1{,}607{,}500}{\$947{,}500}$	= 1.70×	3.0×
Profit margin	=	$\frac{\text{Net income}}{\text{Sales}}$	=	$\frac{\$27{,}300}{\$1{,}607{,}500}$	= 1.7%	1.2%
ROA	=	$\frac{\text{Net income}}{\text{Total assets}}$	=	$\frac{\$27{,}300}{\$947{,}500}$	= 2.9%	3.6%
ROE	=	$\frac{\text{Net income}}{\text{Common equity}}$	=	$\frac{\$27{,}300}{\$361{,}000}$	= 7.6%	9.0%
Debt ratio	=	$\frac{\text{Total debt}}{\text{Total assets}}$	=	$\frac{\$586{,}500}{\$947{,}500}$	= 61.9%	60.0%

b. For the firm,

$$\text{ROE} = \text{NI/S} \times \text{S/TA} \times \text{TA/E} = 1.7\% \times 1.7 \times \frac{\$947{,}500}{\$361{,}000} = 7.6\%.$$

For the industry, ROE = 1.2% × 3 × 2.5 = 9%.

Note: To find the industry ratio of assets to common equity, recognize that 1 – (Total debt/Total assets) = Common equity/Total assets. So, Common equity/Total assets = 40%, and 1/0.40 = 2.5 = Total assets/Common equity.

c. The firm's days sales outstanding ratio 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 other firms in the industry.

d. If 2012 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 2012 ratios will be misled, and a return to normal conditions in 2013 could hurt the firm's stock price.

4-23 a.

					Firm	Industry Average
Current ratio	=	$\frac{\text{Current assets}}{\text{Current liabilities}}$	=	$\frac{\$303}{\$111}$	= 2.73×	2×
Total debt to total assets	=	$\frac{\text{Total debt}}{\text{Total assets}}$	=	$\frac{\$135}{\$450}$	= 30.00%	30.00%
Times interest earned	=	$\frac{\text{EBIT}}{\text{Interest}}$	=	$\frac{\$49.5}{\$4.5}$	= 11×	7×
EBITDA coverage	=	$\frac{\text{EBITDA} + \text{Lease pymts}}{\text{INT} + \frac{\text{Princ.}}{\text{pymts}} + \frac{\text{Lease}}{\text{pymts}}}$	=	$\frac{\$61.5}{\$6.5}$	= 9.46×	9×
Inventory turnover	=	$\frac{\text{Sales}}{\text{Inventories}}$	=	$\frac{\$795}{\$159}$	= 5×	10×
DSO	=	$\frac{\text{Accounts receivable}}{\text{Sales}/365}$	=	$\frac{\$66}{\$795/365}$	= 30.3 days	24 days
F. A. turnover	=	$\frac{\text{Sales}}{\text{Net fixed assets}}$	=	$\frac{\$795}{\$147}$	= 5.41×	6×
T. A. turnover	=	$\frac{\text{Sales}}{\text{Total assets}}$	=	$\frac{\$795}{\$450}$	= 1.77×	3×
Profit margin	=	$\frac{\text{Net income}}{\text{Sales}}$	=	$\frac{\$27}{\$795}$	= 3.40%	3.00%
Return on total assets	=	$\frac{\text{Net income}}{\text{Total assets}}$	=	$\frac{\$27}{\$450}$	= 6.00%	9.00%
Return on common equity	=	ROA × EM	=	6% × 1.4286	= 8.57%	12.86%

Alternatively, $\text{ROE} = \frac{\text{Net income}}{\text{Equity}} = \frac{\$27}{\$315} = 8.57\% \approx 8.6\%$.

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

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

$$= \frac{\$27}{\$795} \times \frac{\$795}{\$450} \times \frac{\$450}{\$315} = 3.4\% \times 1.77 \times 1.4286 = 8.6\%.$$

	Firm	Industry	Comment
Profit margin	3.4%	3.0%	Good
Total assets turnover	1.77×	3.0×	Poor
Equity multiplier	1.4286	1.4286*	O.K.

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

$1 - 0.30 = 0.7$

$$EM = \frac{TA}{E} = \frac{1}{0.7} = 1.4286 \approx 1.43.$$

Alternatively, EM = ROE/ROA = 12.86%/9% = 1.4289 ≈ 1.43.

c. Analysis of the DuPont equation and the set of ratios shows that the turnover ratio of sales to assets is quite low. Either sales should be higher given the present level of assets, or the firm is carrying more assets than it needs to support its sales.

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.

Comprehensive/Spreadsheet Problem

Note to Instructors:
The solution to this problem is <u>not</u> provided to students at the back of their text. Instructors can access the *Excel* file on the textbook's website or the Instructor's Resource CD.

4-24

Ratio Analysis	2012	2011	Industry Avg[a]
Liquidity			
Current ratio	2.33	2.11	2.7
Asset Management			
Inventory turnover[b]	4.74	4.47	7.0
Days sales outstanding[c]	37.79	32.94	32
Fixed assets turnover[b]	9.84	7.89	13.0
Total assets turnover[b]	2.31	2.18	2.6
Profitability			
Return on assets	1.00%	5.76%	9.1%
Return on equity	2.22%	11.47%	18.2%
Profit margin	0.43%	2.64%	3.5%
Debt Management			
Debt-to-assets ratio	54.81%	49.81%	50.0%
Market Value			
P/E ratio	15.43	5.65	6.0

[a] **Industry average ratios have been constant for the past 4 years.**

[b] **Based on year-end balance sheet figures.**

[c] **Calculation is based on a 365-day year.**

a. Corrigan's liquidity position has improved from 2011 to 2012; however, its current ratio is still below the industry average of 2.7.

b. Corrigan's inventory turnover, fixed assets turnover, and total assets turnover have improved from 2011 to 2012; however, they are still below industry averages. The firm's days sales outstanding ratio has increased from 2011 to 2012—which is bad. In 2011, its DSO was close to the industry average. In 2012, its DSO is somewhat higher. If the firm's credit policy has not changed, it needs to look at its receivables and determine whether it has any uncollectibles. If it does have uncollectible receivables, this will make its current ratio look worse than what was calculated above.

c. Corrigan's debt ratio has increased from 2011 to 2012, which is bad. In 2011, its debt ratio was right at the industry average, but in 2012 it is higher than the industry average. Given its weak current and asset management ratios, the firm should strengthen its balance sheet by paying down liabilities.

d. Corrigan's profitability ratios have declined substantially from 2011 to 2012, and they are substantially below the industry averages. Corrigan needs to reduce its costs, increase sales, or both.

e. Corrigan's P/E ratio has increased from 2011 to 2012, but only because its net income has declined significantly from the prior year. Its P/E ratio reflects the same information as Corrigan's profitability ratios. Corrigan needs to reduce costs to increase profit, lower its debt ratio, increase sales, and improve its asset management.

f.

	ROE =	PM	×	TA Turnover	×	Equity Multiplier
2012	2.22%	0.43%		2.31		2.21
2011	11.47%	2.64%		2.18		1.99
Industry Avg.	18.20%	3.50%		2.60		2.00

Looking at the DuPont equation, Corrigan's profit margin is significantly lower than the industry average and it has declined substantially from 2011 to 2012. The firm's total assets turnover has improved slightly from 2011 to 2012, but it's still below the industry average. The firm's equity multiplier has increased from 2011 to 2012 and is higher than the industry average. This indicates that the firm's debt ratio is increasing.

Corrigan should increase its net income by reducing costs, lower its debt ratio, and improve its asset management by either using less assets for the same amount of sales or by increasing sales.

g. If Corrigan initiated cost-cutting measures, this would increase its net income. This would improve its profitability ratios and market value ratios. If Corrigan also reduced its inventory levels, this would improve its current ratio—as this would reduce liabilities as well. This would also improve its inventory turnover and total assets turnover ratios. Reducing costs and lowering inventory would also improve its debt ratio.

Integrated Case

4-25

D'Leon Inc., Part II
Financial Statements and Taxes

Part I of this case, presented in Chapter 3, discussed the situation of D'Leon Inc., a regional snack foods producer, after an expansion program. D'Leon had increased plant capacity and undertaken a major marketing campaign in an attempt to "go national." Thus far, sales have not been up to the forecasted level, costs have been higher than were projected, and a large loss occurred in 2012 rather than the expected profit. As a result, its managers, directors, and investors are concerned about the firm's survival.

Donna Jamison was brought in as assistant to Fred Campo, D'Leon's chairman, who had the task of getting the company back into a sound financial position. D'Leon's 2011 and 2012 balance sheets and income statements, together with projections for 2013, are given in Tables IC 4.1 and IC 4.2. In addition, Table IC 4.3 gives the company's 2011 and 2012 financial ratios, together with industry average data. The 2013 projected financial statement data represent Jamison's and Campo's best guess for 2013 results, assuming that some new financing is arranged to get the company "over the hump."

Jamison examined monthly data for 2012 (not given in the case), and she detected an improving pattern during the year. Monthly sales were rising, costs were falling, and large losses in the early months had turned to a small profit by December. Thus, the annual data look somewhat worse than final monthly data. Also, it appears to be taking longer for the advertising program to get the message out, for the new sales offices to generate sales, and for the new manufacturing facilities to operate efficiently. In other words, the lags between spending money and deriving

benefits were longer than D'Leon's managers had anticipated. For these reasons, Jamison and Campo see hope for the company—provided it can survive in the short run.

Jamison must prepare an analysis of where the company is now, what it must do to regain its financial health, and what actions should be taken. Your assignment is to help her answer the following questions. Provide clear explanations, not yes or no answers.

Table IC 4.1. Balance Sheets

	2013E	2012	2011
Assets			
Cash	$ 85,632	$ 7,282	$ 57,600
Accounts receivable	878,000	632,160	351,200
Inventories	1,716,480	1,287,360	715,200
Total current assets	$2,680,112	$1,926,802	$1,124,000
Gross fixed assets	1,197,160	1,202,950	491,000
Less accumulated depreciation	380,120	263,160	146,200
Net fixed assets	$ 817,040	$ 939,790	$ 344,800
Total assets	$3,497,152	$2,866,592	$1,468,800
Liabilities and Equity			
Accounts payable	$ 436,800	$ 524,160	$ 145,600
Notes payable	300,000	636,808	200,000
Accruals	408,000	489,600	136,000
Total current liabilities	$1,144,800	$1,650,568	$ 481,600
Long-term debt	400,000	723,432	323,432
Common stock	1,721,176	460,000	460,000
Retained earnings	231,176	32,592	203,768
Total equity	$1,952,352	$ 492,592	$ 663,768
Total liabilities and equity	$3,497,152	$2,866,592	$1,468,800

Note: "E" indicates estimated. The 2013 data are forecasts.

Table IC 4.2. Income Statements

	2013E	2012	2011
Sales	$7,035,600	$6,034,000	$3,432,000
Cost of goods sold	5,875,992	5,528,000	2,864,000
Other expenses	550,000	519,988	358,672
Total operating costs excluding deprec. & amort.	$6,425,992	$6,047,988	$3,222,672
EBITDA	$ 609,608	($ 13,988)	$ 209,328
Deprec. & amort.	116,960	116,960	18,900
EBIT	$ 492,648	($ 130,948)	$ 190,428
Interest expense	70,008	136,012	43,828
EBT	$ 422,640	($ 266,960)	$ 146,600
Taxes (40%)	169,056	(106,784)[a]	58,640
Net income	$ 253,584	($ 160,176)	$ 87,960
EPS	$ 1.014	($ 1.602)	$ 0.880
DPS	$ 0.220	$ 0.110	$ 0.220
Book value per share	$ 7.809	$ 4.926	$ 6.638
Stock price	$ 12.17	$ 2.25	$ 8.50
Shares outstanding	250,000	100,000	100,000
Tax rate	40.00%	40.00%	40.00%
Lease payments	40,000	40,000	40,000
Sinking fund payments	0	0	0

Note: "E" indicates estimated. The 2013 data are forecasts.

[a] **The firm had sufficient taxable income in 2010 and 2011 to obtain its full tax refund in 2012.**

Table IC 4.3. Ratio Analysis

	2013E	2012	2011	Industry Average
Current		1.2×	2.3×	2.7×
Quick		0.4×	0.8×	1.0×
Inventory turnover		4.7×	4.8×	6.1×
Days sales outstanding (DSO)[a]		38.2	37.4	32.0
Fixed assets turnover		6.4×	10.0×	7.0×
Total assets turnover		2.1×	2.3×	2.6×
Debt-to-assets ratio		82.8%	54.8%	50.0%
TIE		-1.0×	4.3×	6.2×
Operating margin		-2.2%	5.6%	7.3%
Profit margin		-2.7%	2.6%	3.5%
Basic earning power		-4.6%	13.0%	19.1%
ROA		-5.6%	6.0%	9.1%
ROE		-32.5%	13.3%	18.2%
Price/earnings		-1.4×	9.7×	14.2×
Market/book		0.5×	1.3×	2.4×
Book value per share		$4.93	$6.64	n.a.

Note: "E" indicates estimated. The 2013 data are forecasts.

[a] **Calculation is based on a 365-day year.**

A. Why are ratios useful? What are the five major categories of ratios?

Answer: [S4-1 through S4-5 provide background information. Then, show S4-6 and S4-7 here.] Ratios are used by managers to help improve the firm's performance, by lenders to help evaluate the firm's likelihood of repaying debts, and by stockholders to help forecast future earnings and dividends. The five major categories of ratios are: liquidity, asset management, debt management, profitability, and market value.

B. **Calculate D'Leon's 2013 current and quick ratios based on the projected balance sheet and income statement data. What can you say about the company's liquidity positions in 2011, in 2012, and as projected for 2013? We often think of ratios as being useful (1) to managers to help run the business, (2) to bankers for credit analysis, and (3) to stockholders for stock valuation. Would these different types of analysts have an equal interest in these liquidity ratios?**

Answer: [Show S4-8 and S4-9 here.]

$$\text{Current ratio}_{13} = \text{Current assets}/\text{Current liabilities}$$
$$= \$2{,}680{,}112/\$1{,}144{,}800 = 2.34\times.$$

$$\text{Quick ratio}_{13} = (\text{Current assets} - \text{Inventories})/\text{Current liabilities}$$
$$= (\$2{,}680{,}112 - \$1{,}716{,}480)/\$1{,}144{,}800$$
$$= \$963{,}632/\$1{,}144{,}800 = 0.842\times.$$

The company's current and quick ratios are identical to its 2011 current and quick ratios, and they have improved from their 2012 levels. However, both the current and quick ratios are well below the industry averages.

C. **Calculate the 2013 inventory turnover, days sales outstanding (DSO), fixed assets turnover, and total assets turnover. How does D'Leon's utilization of assets stack up against other firms in the industry?**

Answer: [Show S4-10 through S4-15 here.]

$$\text{Inventory turnover}_{13} = \text{Sales}/\text{Inventory}$$
$$= \$7{,}035{,}600/\$1{,}716{,}480 = 4.10\times.$$

$$\text{DSO}_{13} = \text{Receivables}/(\text{Sales}/365)$$
$$= \$878{,}000/(\$7{,}035{,}600/365) = 45.55 \text{ days}.$$

$$\text{Fixed assets turnover}_{13} = \text{Sales}/\text{Net fixed assets}$$
$$= \$7{,}035{,}600/\$817{,}040 = 8.61\times.$$

$$\text{Total assets turnover}_{13} = \text{Sales}/\text{Total assets}$$
$$= \$7{,}035{,}600/\$3{,}497{,}152 = 2.01\times.$$

The firm's inventory turnover and total assets turnover ratios have been steadily declining, while its days sales outstanding has been steadily increasing (which is bad). However, the firm's 2013 total assets turnover ratio is only slightly below the 2012 level. The firm's fixed assets turnover ratio is below its 2011 level; however, it is above the 2012 level.

The firm's inventory turnover and total assets turnover are below the industry average. The firm's days sales outstanding ratio is above the industry average (which is bad); however, the firm's fixed assets turnover is above the industry average. (This might be due to the fact that D'Leon is an older firm than most other firms in the industry, in which case, its fixed assets are older and thus have been depreciated more, or that D'Leon's cost of fixed assets were lower than most firms in the industry.)

D.	**Calculate the 2013 debt-to-assets and times-interest-earned ratios. How does D'Leon compare with the industry with respect to financial leverage? What can you conclude from these ratios?**

Answer: [Show S4-16 and S4-17 here.]

$$\text{Debt ratio}_{13} = \text{Total debt}/\text{Total assets}$$
$$= (\$1{,}144{,}800 + \$400{,}000)/\$3{,}497{,}152 = 44.17\%.$$

$$\text{TIE}_{13} = \text{EBIT}/\text{Interest} = \$492{,}648/\$70{,}008 = 7.04\times.$$

The firm's debt ratio is much improved from 2012 and 2011, and it is below the industry average (which is good). The firm's

TIE ratio is also greatly improved from its 2011 and 2012 levels and is above the industry average.

E. **Calculate the 2013 operating margin, profit margin, basic earning power (BEP), return on assets (ROA), and return on equity (ROE). What can you say about these ratios?**

Answer: **[Show S4-18 through S4-24 here.]**

$$\text{Operating margin}_{13} = \text{EBIT}/\text{Sales} = \$492{,}648/\$7{,}035{,}600 = 7.00\%.$$

$$\text{Profit margin}_{13} = \text{Net income}/\text{Sales} = \$253{,}584/\$7{,}035{,}600 = 3.60\%.$$

$$\text{Basic earning power}_{13} = \text{EBIT}/\text{Total assets} = \$492{,}648/\$3{,}497{,}152 = 14.09\%.$$

$$\text{ROA}_{13} = \text{Net income}/\text{Total assets} = \$253{,}584/\$3{,}497{,}152 = 7.25\%.$$

$$\text{ROE}_{13} = \text{Net income}/\text{Common equity} = \$253{,}584/\$1{,}952{,}352 = 12.99\% \approx 13.0\%.$$

The firm's operating margin is above 2011 and 2012 levels but slightly below the industry average. The firm's profit margin is above 2011 and 2012 levels and slightly above the industry average. While the firm's basic earning power and ROA ratios are above 2011 and 2012 levels, they are still below the industry averages. The firm's ROE ratio is greatly improved over its 2012 level; however, it is slightly below its 2011 level and still well below the industry average.

F. **Calculate the 2013 price/earnings ratio and market/book ratio. Do these ratios indicate that investors are expected to have a high or low opinion of the company?**

Answer: [Show S4-25 and S4-26 here.]

$$\begin{aligned} EPS_{13} &= \text{Net income} / \text{Shares outstanding} \\ &= \$253{,}584 / 250{,}000 = \$1.0143. \end{aligned}$$

$$\begin{aligned} \text{Price} / \text{Earnings}_{13} &= \text{Price per share} / \text{Earnings per share} \\ &= \$12.17 / \$1.0143 = 12.0\times. \end{aligned}$$

Check: $\text{Price} = \text{EPS} \times \text{P/E} = \$1.0143(12.0) = \$12.17.$

$$\begin{aligned} BVPS_{13} &= \text{Common equity} / \text{Shares outstanding} \\ &= \$1{,}952{,}352 / 250{,}000 = \$7.81. \end{aligned}$$

$$\begin{aligned} \text{Market} / \text{Book}_{13} &= \text{Market price per share} / \text{Book value per share} \\ &= \$12.17 / \$7.81 = 1.56\times. \end{aligned}$$

The P/E and M/B ratios are above the 2012 and 2011 levels but below the industry average.

G. Use the DuPont equation to provide a summary and overview of D'Leon's financial condition as projected for 2013. What are the firm's major strengths and weaknesses?

Answer: [Show S4-27 and S4-28 here.]

$$\begin{aligned} \text{DuPont equation} &= \frac{\text{Profit}}{\text{margin}} \times \frac{\text{Total assets}}{\text{turnover}} \times \frac{\text{Equity}}{\text{multiplier}} \\ &= 3.60\% \times 2.01 \times 1/(1 - 0.4417) \\ &= 12.96\% \approx 13.0\%. \end{aligned}$$

Strengths: The firm's fixed assets turnover was above the industry average. However, if the firm's assets were older than other firms in its industry this could possibly account for the higher ratio. (D'Leon's fixed assets would have a lower historical cost and would have been depreciated for longer periods of time.) The firm's profit margin is slightly above the industry average, and its debt ratio has been greatly reduced, so it is now below the

industry average (which is good). This improved profit margin could indicate that the firm has kept operating costs down as well as interest expense (as shown from the reduced debt ratio). Interest expense is lower because the firm's debt ratio has been reduced, which has improved the firm's TIE ratio so that it is now above the industry average.

Weaknesses: The firm's current asset ratio is low; most of its asset management ratios are poor (except fixed assets turnover); most of its profitability ratios are low (except profit margin); and its market value ratios are low.

H. Use the following simplified 2013 balance sheet to show, in general terms, how an improvement in the DSO would tend to affect the stock price. For example, if the company could improve its collection procedures and thereby lower its DSO from 45.6 days to the 32-day industry average without affecting sales, how would that change "ripple through" the financial statements (shown in thousands below) and influence the stock price?

Accounts receivable	$ 878	Debt	$1,545
Other current assets	1,802		
Net fixed assets	817	Equity	1,952
Total assets	$3,497	Liabilities plus equity	$3,497

Answer: [Show S4-29 through S4-32 here.]

Sales per day = $7,035,600/365 = $19,275.62.

Accounts receivable under new policy = $19,275.62 × 32 days
= $616,820.

Freed cash = old A/R – new A/R
= $878,000 – $616,820 = $261,180.

Reducing accounts receivable and its DSO will initially show up as an addition to cash. The freed up cash could be used to repurchase stock, expand the business, and reduce debt. All of these actions would likely improve the stock price.

I.	**Does it appear that inventories could be adjusted? If so, how should that adjustment affect D'Leon's profitability and stock price?**

Answer: **The inventory turnover ratio is low. It appears that the firm either has excessive inventory or some of the inventory is obsolete. If inventory were reduced, this would improve the current asset ratio, the inventory and total assets turnover, and reduce the debt ratio even further, which should improve the firm's stock price and profitability.**

J.	**In 2012, the company paid its suppliers much later than the due dates; also, it was not maintaining financial ratios at levels called for in its bank loan agreements. Therefore, suppliers could cut the company off, and its bank could refuse to renew the loan when it comes due in 90 days. On the basis of data provided, would you, as a credit manager, continue to sell to D'Leon on credit? (You could demand cash on delivery—that is, sell on terms of COD—but that might cause D'Leon to stop buying from your company.) Similarly, if you were the bank loan officer, would you recommend renewing the loan or demand its repayment? Would your actions be influenced if in early 2013 D'Leon showed you its 2013 projections along with proof that it was going to raise more than $1.2 million of new equity?**

Answer: While the firm's ratios based on the projected data appear to be improving, the firm's current asset ratio is low. As a credit manager, you would not continue to extend credit to the firm under its current arrangement, particularly if your firm didn't have any excess capacity. Terms of COD might be a little harsh and might push the firm into bankruptcy. Likewise, if the bank demanded repayment this could also force the firm into bankruptcy.

Creditors' actions would definitely be influenced by an infusion of equity capital in the firm. This would lower the firm's debt ratio and creditors' risk exposure.

K. In hindsight, what should D'Leon have done in 2011?

Answer: Before the company took on its expansion plans, it should have done an extensive ratio analysis to determine the effects of its proposed expansion on the firm's operations. Had the ratio analysis been conducted, the company would have "gotten its financial house in order" before undergoing the expansion.

L. What are some potential problems and limitations of financial ratio analysis?

Answer: [Show S4-33 and S4-34 here.] Some potential problems are listed below:

1. Comparison with industry averages is difficult if the firm operates many different divisions.
2. Different operating and accounting practices distort comparisons.
3. Sometimes hard to tell if a ratio is "good" or "bad."

4. **Difficult to tell whether company is, on balance, in a strong or weak position.**

5. **"Average" performance is not necessarily good.**

6. **Seasonal factors can distort ratios.**

7. **"Window dressing" techniques can make statements and ratios look better than they actually are.**

8. **Inflation has badly distorted many firms' balance sheets, so a ratio analysis for one firm over time, or a comparative analysis of firms of different ages, must be interpreted with judgment.**

M. What are some qualitative factors analysts should consider when evaluating a company's likely future financial performance?

Answer: [Show S4-35 here.] Top analysts recognize that certain qualitative factors must be considered when evaluating a company. These factors, as summarized by the American Association of Individual Investors (AAII), are as follows:

1. **Are the company's revenues tied to one key customer?**

2. **To what extent are the company's revenues tied to one key product?**

3. **To what extent does the company rely on a single supplier?**

4. **What percentage of the company's business is generated overseas?**

5. **How much competition does the firm face?**

6. **Is it necessary for the company to continually invest in research and development?**

7. Are changes in laws and regulations likely to have important implications for the firm?