

# Chapter 3

## Problem 1

Calculate all of the ratios listed in the industry table for East Coast Yachts.

### Step-by-step solution

step 1 of 1

The calculations for the ratios listed are:

$$\text{Current ratio} = \$14,651,000 / \$19,539,000$$

$$\text{Current ratio} = 0.75 \text{ times}$$

$$\text{Quick ratio} = (\$14,651,000 - 6,136,000) / \$19,539,000$$

$$\text{Quick ratio} = 0.44 \text{ times}$$

$$\text{Total asset turnover} = \$167,310,000 / \$108,615,000$$

$$\text{Total asset turnover} = 1.54 \text{ times}$$

$$\text{Inventory turnover} = \$117,910,000 / \$6,136,000$$

$$\text{Inventory turnover} = 19.22 \text{ times}$$

$$\text{Receivables turnover} = \$167,310,000 / \$5,473,000$$

$$\text{Receivables turnover} = 30.57 \text{ times}$$

$$\text{Total debt ratio} = (\$108,615,000 - 55,341,000) / \$108,615,000$$

$$\text{Total debt ratio} = 0.49 \text{ times}$$

$$\text{Debt-equity ratio} = (\$19,539,000 + 33,735,000) / \$55,341,000$$

$$\text{Debt-equity ratio} = 0.96 \text{ times}$$

$$\text{Equity multiplier} = \$108,615,000 / \$55,341,000$$

$$\text{Equity multiplier} = 1.96 \text{ times}$$

Interest coverage =  $\$23,946,000 / \$3,009,000$

Interest coverage = 7.96 times

Profit margin =  $\$12,562,200 / \$167,310,000$

Profit margin = 7.51%

Return on assets =  $\$12,562,200 / \$108,615,000$

Return on assets = 11.57%

Return on equity =  $\$12,562,000 / \$55,341,000$

Return on equity = 22.70%

## Problem 1CTQ

Financial Ratio Analysis A financial ratio by itself tells us little about a company because financial ratios vary a great deal across industries. There are two basic methods for analyzing financial ratios for a company: Time trend analysis and peer group analysis. In time trend analysis, you find the ratios for the company over some period, say five years, and examine how each ratio has changed over this period. In peer group analysis, you compare a company's financial ratios to those of its peers. Why might each of these analysis methods be useful? What does each tell you about the company's financial health?

## Step-by-step solution

step 1 of 1

Time trend analysis gives a picture of changes in the company's financial situation over time. Comparing a firm to itself over time allows the financial manager to evaluate whether some aspects of the firm's operations, finances, or investment activities have changed. Peer group analysis involves comparing the financial ratios and operating performance of a particular firm to a set of peer group firms in the same industry or line of business. Comparing a firm to its peers allows the financial manager to evaluate whether some aspects of the firm's operations, finances, or investment activities are out of line with the norm, thereby providing some guidance on appropriate actions to take to adjust these ratios if appropriate. Both allow an investigation into what is different about a company from a financial perspective, but neither method gives an indication of whether the difference is positive or negative. For example, suppose a company's current ratio is increasing over time. It could mean that the company had been facing liquidity problems in the past and is rectifying those problems, or it could mean the company has become less efficient in managing its current accounts.

Similar arguments could be made for a peer group comparison. A company with a current ratio lower than its peers could be more efficient at managing its current accounts, or it could be facing liquidity problems. Neither analysis method tells us whether a ratio is good or bad, both simply show that something is different, and tells us where to look.

## Problem 1PQ

Du Pont Identity If Roten, Inc., has an equity multiplier of 1.35, total asset turnover of 2.15, and a profit margin of 5.8 percent, what is its ROE?

### Step-by-step solution

step 1 of 1

$$\text{ROE} = (\text{PM}) (\text{TAT}) (\text{EM})$$

$$\text{ROE} = (.058) (2.15) (1.35) = .1683 \text{ or } 16.83\%$$

## Problem 2

Compare the performance of East Coast Yachts to the industry as a whole. For each ratio, comment on why it might be viewed as positive or negative relative to the industry. Suppose you create an inventory ratio calculated as inventory divided by current liabilities. How do you interpret this ratio? How does East Coast Yachts compare to the industry average?

### Step-by-step solution

step 1 of 1

Regarding the liquidity ratios, East Coast Yachts current ratio is below the median industry ratio. This implies the company has less liquidity than the industry in general. However, the current ratio is above the lower quartile, so there are companies in the industry with lower liquidity than East Coast Yachts. The company may have more predictable cash flows, or more access to short-term borrowing.

The turnover ratios are all higher than the industry median; in fact, all three turnover ratios are above the upper quartile. This may mean that East Coast Yachts is more efficient than the industry in using its assets to generate sales.

The financial leverage ratios are all below the industry median, but above the lower quartile. East Coast Yachts generally has less debt than comparable companies, but is still within the normal range.

The profit margin for the company is about the same as the industry median, the ROA is slightly higher than the industry median, and the ROE is well above the industry median. East Coast Yachts seems to be performing well in the profitability area.

Overall, East Coast Yachts' performance seems good, although the liquidity ratios indicate that a closer look may be needed in this area.

Below is a list of possible reasons it may be good or bad that each ratio is higher or lower than the industry. Note that the list is not exhaustive, but merely one possible explanation for each ratio.

Ratio	Good	Bad
Current ratio	Better at managing current accounts.	May be having liquidity problems.
Quick ratio	Better at managing current accounts.	May be having liquidity problems.
Total asset turnover	Better at utilizing assets.	Assets may be older and depreciated, requiring extensive investment soon.
Inventory turnover	Better at inventory management, possibly due to better procedures.	Could be experiencing inventory shortages.
Receivables turnover	Better at collecting receivables.	May have credit terms that are too strict. Decreasing receivables turnover may increase sales.
Total debt ratio	Less debt than industry median means the company is less likely to experience credit problems.	Increasing the amount of debt can increase shareholder returns. Especially notice that it will increase ROE.
Debt-equity ratio	Less debt than industry median means the company is less likely to experience credit problems.	Increasing the amount of debt can increase shareholder returns. Especially notice that it will increase ROE.
Equity multiplier	Less debt than industry median means the company is less likely to experience credit problems.	Increasing the amount of debt can increase shareholder returns. Especially notice that it will increase ROE.
Interest coverage	Less debt than industry median means the company is less likely to experience credit problems.	Increasing the amount of debt can increase shareholder returns. Especially notice that it will increase ROE.
Profit margin	The PM is slightly above the industry median, so it is performing better than many peers.	May be able to better control costs.
ROA	Company is performing above many of its peers.	Assets may be old and depreciated relative to industry.
ROE	Company is performing above many of its	Profit margin and EM could still be increased,

peers.

which would further increase ROE.

If you created an Inventory / Current liabilities ratio, East Coast Yachts would have a ratio that is lower than the industry median. The current ratio is below the industry median, while the quick ratio is above the industry median. This implies that East Coast Yachts has less inventory to current liabilities than the industry median. Because the cash ratio is lower than the industry median, East Coast Yachts has less inventory than the industry median, but more accounts receivable.

## Problem 2CTQ

Industry-Specific Ratios So-called “same-store sales” are a very important measure for companies as diverse as McDonald’s and Sears. As the name suggests, examining same-store sales means comparing revenues from the same stores or restaurants at two different points in time. Why might companies focus on same-store sales rather than total sales?

## Step-by-step solution

step 1 of 1

If a company is growing by opening new stores, then presumably total revenues would be rising. Comparing total sales at two different points in time might be misleading. Same-store sales control for this by only looking at revenues of stores open within a specific period.

## Problem 2PQ

Equity Multiplier and Return on Equity Thomsen Company has a debt-equity ratio of .90. Return on assets is 10.1 percent, and total equity is \$645,000. What is the equity multiplier? Return on equity? Net income?

## Step-by-step solution

step 1 of 1

The equity multiplier is:

$$EM = 1 + D/E$$

$$EM = 1 + 0.90 = 1.90$$

One formula to calculate return on equity is:

$$\text{ROE} = (\text{ROA})(\text{EM})$$

$$\text{ROE} = 0.1010(1.90) = .1919 \text{ or } 19.19\%$$

ROE can also be calculated as:

$$\text{ROE} = \text{NI} / \text{TE}$$

So, net income is:

$$\text{NI} = \text{ROE}(\text{TE})$$

$$\text{NI} = (.1919)(\$645,000) = \$123,775.50$$

### Problem 3

Calculate the sustainable growth rate of East Coast Yachts. Calculate external funds needed (EFN) and prepare pro forma income statements and balance sheets assuming growth at precisely this rate. Recalculate the ratios in the previous question. What do you observe?

### Step-by-step solution

step 1 of 1

To calculate the internal growth rate, we first need to find the ROE and the retention ratio, so:

$$\text{ROE} = \text{NI} / \text{TE}$$

$$\text{ROE} = \$12,562,200 / \$55,341,000$$

$$\text{ROE} = .2270 \text{ or } 22.70\%$$

$$b = \text{Addition to RE} / \text{NI}$$

$$b = \$5,024,800 / \$12,562,200$$

$$b = 0.40 \text{ or } 40\%$$

So, the sustainable growth rate is:

Sustainable growth rate =  $(ROE \times b) / [1 - (ROE \times b)]$

Sustainable growth rate =  $[0.2270(.40)] / [1 - 0.2270(.40)]$

Sustainable growth rate = .0999 or 9.99%

The sustainable growth rate is the growth rate the company can achieve with no external financing while maintaining a constant debt-equity ratio.

At the sustainable growth rate, the pro forma statements next year will be:

Income statement	
Sales	\$184,018,615
COGS	129,685,224
Other expenses	21,990,725
Depreciation	5,460,000
EBIT	\$26,882,666
Interest	3,009,000
Taxable income	\$23,873,666
Taxes (40%)	9,549,466
Net income	\$14,324,199

Dividends	\$8,594,520
Add to RE	5,729,680

Balance sheet			
Assets		Liabilities&Equity	
Current Assets		Current Liabilities	
Cash	\$3,345,793	Accounts Payable	\$7,106,236
Accounts rec.	6,019,568	Notes Payable	14,384,050
Inventory	6,748,779	Total CL	\$21,490,286
Total CA	\$16,114,140		
		Long-term debt	\$33,735,000
		Shareholder Equity	
		Common stock	\$5,200,000
Fixed assets		Retained earnings	55,870,680
Net PP&E	\$103,347,828	Total Equity	\$61,070,680
Total Assets	\$119,461,968	Total L&E	\$116,295,966

So, the EFN is:

EFN = Total assets - Total liabilities and equity

EFN = \$119,461,968 - 116,295,966

EFN = \$3,166,002

The ratios with these pro forma statements are:

Current ratio = \$16,114,140 / \$21,490,286

Current ratio = 0.75 times

Quick ratio = (\$16,114,140 - 6,748,779) / \$21,490,286

Quick ratio = 0.44 times

Total asset turnover = \$184,018,615 / \$119,461,968

Total asset turnover = 1.54 times

Inventory turnover = \$129,685,224 / \$6,748,779

Inventory turnover = 19.22 times

Receivables turnover = \$184,018,615 / \$6,019,568

Receivables turnover = 30.57 times

Total debt ratio = (\$116,295,966 - 61,070,680) / \$116,295,966

Total debt ratio = 0.49 times

Debt-equity ratio = (\$21,490,286 + 33,735,000) / \$61,070,680

Debt-equity ratio = 0.90 times

Equity multiplier = \$119,460,968 / \$61,070,680

Equity multiplier = 1.96 times

Interest coverage = \$26,882,666 / \$3,009,000

Interest coverage = 8.93 times

Profit margin = \$14,324,199 / \$184,018,615

Profit margin = 7.78%

Return on assets = \$14,324,199 / \$119,461,968

Return on assets = 11.99%

Return on equity =  $\$14,324,199 / \$61,070,680$

Return on equity = 23.45%

The only ratios that changed are the debt ratio, the interest coverage ratio, profit margin, return on assets, and return on equity. The debt ratio changes because long-term debt is assumed to remain fixed in the pro forma statements. The other ratios change slightly because interest and depreciation are also assumed to remain constant as well.

## Problem 3CTQ

Sales Forecast Why do you think most long-term financial planning begins with sales forecasts?

Put differently, why are future sales the key input?

## Step-by-step solution

step 1 of 1

The reason is that, ultimately, sales are the driving force behind a business. A firm's assets, employees, and, in fact, just about every aspect of its operations and financing exist to directly or indirectly support sales. Put differently, a firm's future need for things like capital assets, employees, inventory, and financing are determined by its future sales level.

## Problem 3PQ

Using the Du Pont Identity Y3K, Inc., has sales of \$3,100, total assets of \$1,580, and a debt-equity ratio of 1.20. If its return on equity is 16 percent, what is its net income?

## Step-by-step solution

step 1 of 1

This is a multi-step problem involving several ratios. The ratios given are all part of the Du Pont Identity. The only Du Pont Identity ratio not given is the profit margin. If we know the profit margin, we can find the net income since sales are given. So, we begin with the Du Pont Identity:

$$ROE = 0.16 = (PM) (TAT) (EM) = (PM) (S / TA) (1 + D/E)$$

Solving the Du Pont Identity for profit margin, we get:

$$PM = [(ROE)(TA)] / [(1 + D/E)(S)]$$

$$PM = [(0.16)(\$1,1580)] / [(1 + 1.20)(\$3,100)] = .0371$$

Now that we have the profit margin, we can use this number and the given sales figure to solve for net income:

$$PM = .0371 = NI / S$$

$$NI = .0371(\$3,100) = \$114.91$$

## Problem 4

As a practical matter, East Coast Yachts is unlikely to be willing to raise external equity capital, in part because the owners don't want to dilute their existing ownership and control positions. However, East Coast Yachts is planning for a growth rate of 20 percent next year. What are your conclusions and recommendations about the feasibility of East Coast's expansion plans?

### Step-by-step solution

step 1 of 1

Pro forma financial statements for next year at a 20 percent growth rate are:

Income statement	
Sales	\$200,772,000
COGS	141,492,000
Other expenses	23,992,800
Depreciation	5,460,000
EBIT	\$29,827,200
Interest	3,009,000
Taxable income	\$26,818,200
Taxes (40%)	10,727,280
Net income	\$16,090,920

Dividends	\$9,654,552
Add to RE	6,436,368

Balance sheet

Assets		Liabilities&Equity	
Current Assets		Current Liabilities	
Cash	\$3,650,400	Accounts Payable	\$7,753,200
Accounts rec.	6,567,600	Notes Payable	15,693,600
Inventory	7,363,200	Total CL	\$23,446,800
Total CA	\$17,581,200		
		Long-term debt	\$33,735,000
		Shareholder Equity	
		Common stock	\$5,200,000
Fixed assets		Retained earnings	56,577,368
Net PP&E	\$112,756,800	Total Equity	\$61,777,368
Total Assets	\$130,338,000	Total L&E	\$118,959,168

So, the EFN is:

$EFN = \text{Total assets} - \text{Total liabilities and equity}$

$EFN = \$130,338,000 - 118,959,168$

$EFN = \$11,378,832$

### Problem 4CTQ

Sustainable Growth In the chapter, we used Rosengarten Corporation to demonstrate how to calculate EFN. The ROE for Rosengarten is about 7.3 percent, and the plowback ratio is about 67 percent. If you calculate the sustainable growth rate for Rosengarten, you will find it is only 5.14 percent. In our calculation for EFN, we used a growth rate of 25 percent. Is this possible? (Hint: Yes. How?)

### Step-by-step solution

Two assumptions of the sustainable growth formula are that the company does not want to sell new equity, and that financial policy is fixed. If the company raises outside equity, or increases its debt-equity ratio, it can grow at a higher rate than the sustainable growth rate. Of course, the company could also grow faster than its profit margin increases, if it changes its dividend policy by increasing the retention ratio, or its total asset turnover increases.

### Problem 4PQ

EFN The most recent financial statements for Martin, Inc., are shown here:

Income Statement		Balance Sheet			
Sales	\$25,800	Assets	\$113,000	Debt	\$ 20,500
Costs	16,500			Equity	92,500
Taxable income	\$ 9,300	Total	\$113,000	Total	\$113,000
Taxes (34%)	3,162				
Net income	\$ 6,138				

Assets and costs are proportional to sales. Debt and equity are not. A dividend of \$1,841.40 was paid, and Martin wishes to maintain a constant payout ratio. Next year's sales are projected to be \$30,960. What external financing is needed?

### Step-by-step solution

step 1 of 1

An increase of sales to \$30,960 is an increase of:

$$\text{Sales increase} = (\$30,960 - 25,800) / \$25,800$$

$$\text{Sales increase} = .20 \text{ or } 20\%$$

Assuming costs and assets increase proportionally, the pro forma financial statements will look like this:

Pro forma income statement	Pro forma balance sheet						
Sales		\$30,960.00	Assets	\$ 135,600	Debt	\$	20,500.00
Costs		19,800.00				Equity	97,655.92
EBIT		11,160.00	Total	\$ 135,600	Total	\$118,155.92	
Taxes (34%)		3,794.40					

Net income	\$	7,365.60					
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The payout ratio is constant, so the dividends paid this year is the payout ratio from last year times net income, or:

$$\text{Dividends} = (\$1,841.40 / \$6,138) (\$7,365.60)$$

$$\text{Dividends} = \$2,209.68$$

The addition to retained earnings is:

$$\text{Addition to retained earnings} = \$7,365 - 2,209.68$$

$$\text{Addition to retained earnings} = \$5,155.92$$

And the new equity balance is:

$$\text{Equity} = \$92,500 + 5,155.92$$

$$\text{Equity} = \$97,655.92$$

So the EFN is:

$$\text{EFN} = \text{Total assets} - \text{Total liabilities and equity}$$

$$\text{EFN} = \$135,600 - 118,155.92$$

$$\text{EFN} = \$17,444.08$$

## Problem 5

Most assets can be increased as a percentage of sales. For instance, cash can be increased by any amount. However, fixed assets often must be increased in specific amounts because it is impossible, as a practical matter, to buy part of a new plant or machine. In this case a company has a “staircase” or “lumpy” fixed cost structure. Assume that East Coast Yachts is currently producing at 100 percent of capacity. As a result, to expand production, the company must set up an entirely new line at a cost of \$30 million. Calculate the new EFN with this assumption. What does this imply about capacity utilization for East Coast Yachts next year?

## Step-by-step solution

step 1 of 1

Now we are assuming the company can only build in amounts of \$30 million. We will assume that the company will go ahead with the fixed asset acquisition. In this case, the pro forma financial statement calculation will change slightly. To estimate the new depreciation charge, we will find the current depreciation as a percentage of fixed assets, then, apply this percentage to the new fixed assets. The depreciation as a percentage of assets this year was:

$$\text{Depreciation percentage} = \$5,460,000 / \$93,964,000$$

$$\text{Depreciation percentage} = .0581 \text{ or } 5.81\%$$

The new level of fixed assets with the \$30 million purchase will be:

$$\text{New fixed assets} = \$93,964,000 + 30,000,000 = \$123,964,000$$

So, the pro forma depreciation as a percentage of sales will be:

$$\text{Pro forma depreciation} = .0581(\$123,964,000)$$

$$\text{Pro forma depreciation} = \$7,203,221$$

We will use this amount in the pro form income statement. So, the pro forma income statement will be:

Income statement	
Sales	\$200,772,000
COGS	141,492,000
Other expenses	23,992,800
Depreciation	7,203,221
EBIT	\$28,083,979
Interest	3,009,000
Taxable income	\$25,074,979
Taxes (40%)	10,029,992
Net income	\$15,044,988
Dividends	\$9,026,993
Add to RE	6,017,995

The pro forma balance sheet will remain the same except for the fixed asset and equity accounts. The fixed asset account will increase by \$30 million, rather than the growth rate of sales.

Balance sheet

Assets		Liabilities&Equity	
Current Assets		Current Liabilities	
Cash	\$3,650,400	Accounts Payable	\$7,753,200
Accounts rec.	6,567,600	Notes Payable	15,693,600
Inventory	7,363,200	Total CL	\$23,446,800
Total CA	\$17,581,200		
		Long-term debt	\$33,735,000
		Shareholder Equity	
		Common stock	\$5,200,000
Fixed assets		Retained earnings	56,158,995
Net PP&E	\$123,964,000	Total Equity	\$61,358,995
Total Assets	\$141,545,200	Total L&E	\$118,540,795

So, the EFN is:

EFN = Total assets - Total liabilities and equity

EFN = \$141,545,200 - 118,540,795

EFN = \$23,004,405

Since the fixed assets have increased at a faster percentage than sales, the capacity utilization for next year will decrease.

### Problem 5CTQ

EFN and Growth Rate Broslofski Co. maintains a positive retention ratio and keeps its debt-equity ratio constant every year. When sales grow by 20 percent, the firm has a negative projected EFN. What does this tell you about the firm's sustainable growth rate? Do you know, with certainty, if the internal growth rate is greater than or less than 20 percent? Why? What happens to the projected EFN if the retention ratio is increased? What if the retention ratio is decreased? What if the retention ratio is zero?

### Step-by-step solution

step 1 of 1

The sustainable growth rate is greater than 20 percent, because at a 20 percent growth rate the negative EFN indicates that there is excess financing still available. If the firm is 100 percent equity financed, then the sustainable and internal growth rates are equal and the internal growth rate would be greater than 20 percent. However, when the firm has some debt, the internal growth rate is always less than the sustainable growth rate, so it is ambiguous whether the internal growth rate would be greater than or less than 20 percent. If the retention ratio is increased, the firm will have more internal funding sources available, and it will have to take on more debt to keep the debt/equity ratio constant, so the EFN will decline. Conversely, if the retention ratio is decreased, the EFN will rise. If the retention rate is zero, both the internal and sustainable growth rates are zero, and the EFN will rise to the change in total assets.

## Problem 5PQ

Sales and Growth The most recent financial statements for Fontenot Co. are shown here:

Income Statement		Balance Sheet			
Sales	\$67,000	Current assets	\$ 31,000	Long-term debt	\$ 68,000
Costs	43,800	Fixed assets	118,000	Equity	81,000
Taxable income	\$23,200	Total	\$149,000	Total	\$149,000
Taxes (34%)	7,888				
Net income	\$15,312				

Assets and costs are proportional to sales. The company maintains a constant 30 percent dividend payout ratio and a constant debt-equity ratio. What is the maximum increase in sales that can be sustained assuming no new equity is issued?

## Step-by-step solution

step 1 of 1

The maximum percentage sales increase without issuing new equity is the sustainable growth rate. To calculate the sustainable growth rate, we first need to calculate the ROE, which is:

$$\text{ROE} = \text{NI} / \text{TE}$$

$$\text{ROE} = \$15,312 / \$81,000$$

$$\text{ROE} = .1890$$

The plowback ratio,  $b$ , is one minus the payout ratio, so:

$$b = 1 - .30$$

$$b = .70$$

Now we can use the sustainable growth rate equation to get:

$$\text{Sustainable growth rate} = (\text{ROE} \times b) / [1 - (\text{ROE} \times b)]$$

$$\text{Sustainable growth rate} = [.1890(.70)] / [1 - .1890(.70)]$$

$$\text{Sustainable growth rate} = .1525 \text{ or } 15.25\%$$

So, the maximum dollar increase in sales is:

$$\text{Maximum increase in sales} = \$67,000(.1525)$$

$$\text{Maximum increase in sales} = \$10,217.93$$

## Problem 6CTQ

**Common-Size Financials** One tool of financial analysis is common-size financial statements. Why do you think common-size income statements and balance sheets are used? Note that the accounting statement of cash flows is not converted into a common-size statement. Why do you think this is?

## Step-by-step solution

step 1 of 1

Common-size financial statements provide the financial manager with a ratio analysis of the company. The common-size income statement can show, for example, that cost of goods sold as a percentage of sales is increasing. The common-size balance sheet can show a firm's increasing reliance on debt as a form of financing. Common-size statements of cash flows are not calculated for a simple reason: There is no possible denominator.

## Problem 6PQ

**Sustainable Growth** If the Layla Corp. has a 15 percent ROE and a 10 percent payout ratio, what is its sustainable growth rate?

## Step-by-step solution

step 1 of 1

We need to calculate the retention ratio to calculate the sustainable growth rate. The retention ratio is:

$$b = 1 - .10$$

$$b = .90$$

Now we can use the sustainable growth rate equation to get:

$$\text{Sustainable growth rate} = (\text{ROE} \times b) / [1 - (\text{ROE} \times b)]$$

$$\text{Sustainable growth rate} = [.15(.90)] / [1 - .15(.90)]$$

$$\text{Sustainable growth rate} = .1561 \text{ or } 15.61\%$$

## Problem 7CTQ

Asset Utilization and EFN One of the implicit assumptions we made in calculating the external funds needed was that the company was operating at full capacity. If the company is operating at less than full capacity, how will this affect the external funds needed?

## Step-by-step solution

step 1 of 1

It would reduce the external funds needed. If the company is not operating at full capacity, it would be able to increase sales without a commensurate increase in fixed assets.

## Problem 7PQ

Sustainable Growth Assuming the following ratios are constant, what is the sustainable growth rate?

Total asset turnover = 1.90

Profit margin = 8.1%

Equity multiplier = 1.25

Payout ratio = 30%

### Step-by-step solution

step 1 of 1

We must first calculate the ROE using the Du Pont ratio to calculate the sustainable growth rate. The ROE is:

$$\text{ROE} = (\text{PM}) (\text{TAT}) (\text{EM})$$

$$\text{ROE} = (.081) (1.90) (1.25)$$

$$\text{ROE} = .1924 \text{ or } 19.24\%$$

The plowback ratio is one minus the dividend payout ratio, so:

$$b = 1 - .30$$

$$b = .70$$

Now, we can use the sustainable growth rate equation to get:

$$\text{Sustainable growth rate} = (\text{ROE} \times b) / [1 - (\text{ROE} \times b)]$$

$$\text{Sustainable growth rate} = [.1924(.70)] / [1 - .1924(.70)]$$

$$\text{Sustainable growth rate} = .1556 \text{ or } 15.56\%$$

### Problem 8CTQ

Comparing ROE and ROA Both ROA and ROE measure profitability. Which one is more useful for comparing two companies? Why?

## Step-by-step solution

step 1 of 1

ROE is a better measure of the company's performance. ROE shows the percentage return for the year earned on shareholder investment. Since the goal of a company is to maximize shareholder wealth, this ratio shows the company's performance in achieving this goal over the period.

## Problem 8PQ

Calculating EFN The most recent financial statements for Bradley, Inc., are shown here (assuming no income taxes):

Income Statement		Balance Sheet			
Sales	\$5,700	Assets	\$14,100	Debt	\$ 6,300
Costs	3,820			Equity	7,800
Net income	\$1,880	Total	\$14,100	Total	\$14,100

Assets and costs are proportional to sales. Debt and equity are not. No dividends are paid. Next year's sales are projected to be \$6,669. What is the external financing needed?

## Step-by-step solution

step 1 of 1

An increase of sales to \$6,669 is an increase of:

$$\text{Sales increase} = (\$6,669 - 5,700) / \$5,700$$

$$\text{Sales increase} = .17 \text{ or } 17\%$$

Assuming costs and assets increase proportionally, the pro forma financial statements will look like this:

Pro forma income statement			Pro forma balance sheet					
Sales	\$	6,669	Assets	\$	16,497	Debt	\$	6,300
Costs		4,469				Equity		10,000
Net income	\$	2,200	Total	\$	16,497	Total	\$	16,300

If no dividends are paid, the equity account will increase by the net income, so:

$$\text{Equity} = \$7,800 + 2,200$$

$$\text{Equity} = \$10,000$$

So the EFN is:

$$\text{EFN} = \text{Total assets} - \text{Total liabilities and equity}$$

$$\text{EFN} = \$16,497 - 16,300 = \$197$$

## Problem 9CTQ

Ratio Analysis Consider the ratio EBITD/Assets. What does this ratio tell us? Why might it be more useful than ROA in comparing two companies?

### Step-by-step solution

step 1 of 1

The EBITD/Assets ratio shows the company's operating performance before interest, taxes, and depreciation. This ratio would show how a company has controlled costs. While taxes are a cost, and depreciation and amortization can be considered costs, they are not as easily controlled by company management. Conversely, depreciation and amortization can be altered by accounting choices. This ratio only uses costs directly related to operations in the numerator. As such, it gives a better metric to measure management performance over a period than does ROA.

## Problem 9PQ

External Funds Needed Cheryl Colby, CFO of Charming Florist Ltd., has created the firm's pro forma balance sheet for the next fiscal year. Sales are projected to grow by 10 percent to \$390 million. Current assets, fixed assets, and short-term debt are 20 percent, 120 percent, and 15 percent of sales, respectively. Charming Florist pays out 30 percent of its net income in dividends. The company currently has \$130 million of long-term debt and \$48 million in common stock par value. The profit margin is 12 percent.

a. Construct the current balance sheet for the firm using the projected sales figure.

---

b. Based on Ms. Colby's sales growth forecast, how much does Charming Florist need in external funds for the upcoming fiscal year?

---

c. Construct the firm's pro forma balance sheet for the next fiscal year and confirm the external funds needed that you calculated in part (b).

### Step-by-step solution

step 1 of 3

a. First, we need to calculate the current sales and change in sales. The current sales are next year's sales divided by one plus the growth rate, so:

$$\text{Current sales} = \text{Next year's sales} / (1 + g)$$

$$\text{Current sales} = \$390,000,000 / (1 + .10)$$

$$\text{Current sales} = \$354,545,455$$

And the change in sales is:

$$\text{Change in sales} = \$390,000,000 - 354,545,455$$

$$\text{Change in sales} = \$35,454,545$$

We can now complete the current balance sheet. The current assets, fixed assets, and short-term debt are calculated as a percentage of current sales. The long-term debt and par value of stock are given. The plug variable is the additions to retained earnings. So:

Assets		Liabilities and equity	
Current assets	\$70,909,091	Short-term debt	\$53,181,818
		Long-term debt	\$130,000,000
Fixed assets	425,454,545	Common stock	\$48,000,000

			Accumulated retained earnings	265,181,818
			Total equity	\$313,181,818
Total assets	\$496,363,636		Total liabilities and equity	\$496,363,636

step 2 of 3

b. We can use the equation from the text to answer this question. The assets/sales and debt/sales are the percentages given in the problem, so:

$$EFN = \left( \frac{\text{Assets}}{\text{Sales}} \right) \times \Delta \text{Sales} - \left( \frac{\text{Debt}}{\text{Sales}} \right) \times \Delta \text{Sales} - (\text{PM} \times \text{Projected sales}) \times (1 - d)$$

$$EFN = (.20 + 1.20) \times \$35,454,545 - (.15 \times \$35,454,545) - [(.12 \times \$390,000,000) \times (1 - .30)]$$

$$EFN = \$11,558,182$$

step 3 of 3

c. The current assets, fixed assets, and short-term debt will all increase at the same percentage as sales. The long-term debt and common stock will remain constant. The accumulated retained earnings will increase by the addition to retained earnings for the year. We can calculate the addition to retained earnings for the year as:

$$\text{Net income} = \text{Profit margin} \times \text{Sales}$$

$$\text{Net income} = .12(\$390,000,000)$$

$$\text{Net income} = \$46,800,000$$

The addition to retained earnings for the year will be the net income times one minus the dividend payout ratio, which is:

$$\text{Addition to retained earnings} = \text{Net income}(1 - d)$$

$$\text{Addition to retained earnings} = \$46,800,000(1 - .30)$$

$$\text{Addition to retained earnings} = \$32,760,000$$

So, the new accumulated retained earnings will be:

$$\text{Accumulated retained earnings} = \$265,181,818 + 32,760,000$$

$$\text{Accumulated retained earnings} = \$297,941,818$$

The pro forma balance sheet will be:

Assets		Liabilities and equity	
Current assets	\$78,000,000	Short-term debt	\$58,500,000
		Long-term debt	\$130,000,000
Fixed assets	\$468,000,000	Common stock	\$48,000,000
		Accumulated retained earnings	297,941,818
		Total equity	\$345,941,818
Total assets	\$546,000,000	Total liabilities and equity	\$534,441,818

The EFN is:

$EFN = \text{Total assets} - \text{Total liabilities and equity}$

$EFN = \$546,000,000 - 534,441,818$

$EFN = \$11,558,182$

### Problem 10CTQ

Return on Investment A ratio that is becoming more widely used is return on investment. Return on investment is calculated as net income divided by long-term liabilities plus equity. What do you think return on investment is intended to measure? What is the relationship between return on investment and return on assets?

Use the following information to answer the next five questions: A small business called The Grandmother Calendar Company began selling personalized photo calendar kits. The kits were a hit, and sales soon sharply exceeded forecasts. The rush of orders created a huge backlog, so the company leased more space and expanded capacity, but it still could not keep up with demand. Equipment failed from overuse and quality suffered. Working capital was drained to expand production, and, at the same time, payments from customers were often delayed until the product was shipped. Unable

to deliver on orders, the company became so strapped for cash that employee paychecks began to bounce. Finally, out of cash, the company ceased operations entirely three years later.

### Step-by-step solution

step 1 of 1

Long-term liabilities and equity are investments made by investors in the company, either in the form of a loan or ownership. Return on investment is intended to measure the return the company earned from these investments. Return on investment will be higher than the return on assets for a company with current liabilities. To see this, realize that total assets must equal total debt and equity, and total debt and equity is equal to current liabilities plus long-term liabilities plus equity. So, return on investment could be calculated as net income divided by total assets minus current liabilities.

### Problem 10PQ

Sustainable Growth Rate The Steiben Company has an ROE of 10.5 percent and a payout ratio of 40 percent.

a. What is the company's sustainable growth rate?

---

b. Can the company's actual growth rate be different from its sustainable growth rate? Why or why not?

---

c. How can the company increase its sustainable growth rate?

### Step-by-step solution

step 1 of 1

a. The sustainable growth is:

$$\text{Sustainable growth rate} = \frac{\text{ROE} \times b}{1 - \text{ROE} \times b}$$

where:

$$b = \text{Retention ratio} = 1 - \text{Payout ratio} = .60$$

So:

$$\text{Sustainable growth rate} = \frac{.1050 \times .60}{1 - .1050 \times .60}$$

Sustainable growth rate = .0672 or 6.72%

b. It is possible for the sustainable growth rate and the actual growth rate to differ. If any of the actual parameters in the sustainable growth rate equation differs from those used to compute the sustainable growth rate, the actual growth rate will differ from the sustainable growth rate. Since the sustainable growth rate includes ROE in the calculation, this also implies that changes in the profit margin, total asset turnover, or equity multiplier will affect the sustainable growth rate.

c. The company can increase its growth rate by . doing any of the following:

- Increase the debt-to-equity ratio by selling more debt or repurchasing stock
- Increase the profit margin, most likely by better controlling costs.
- Decrease its total assets/sales ratio; in other words, utilize its assets more efficiently.
- Reduce the dividend payout ratio.

## Problem 11CTQ

Product Sales Do you think the company would have suffered the same fate if its product had been less popular? Why or why not?

## Step-by-step solution

step 1 of 1

Presumably not, but, of course, if the product had been much less popular, then a similar fate would have awaited due to lack of sales.

## Problem 11PQ

Return on Equity Firm A and Firm B have debt-total asset ratios of 40 percent and 30 percent and returns on total assets of 12 percent and 15 percent, respectively. Which firm has a greater return on equity?

### Step-by-step solution

step 1 of 1

The solution requires substituting two ratios into a third ratio. Rearranging D/TA:

Firm A	Firm B
$D / TA = .40$	$D / TA = .30$
$(TA - E) / TA = .40$	$(TA - E) / TA = .30$
$(TA / TA) - (E / TA) = .40$	$(TA / TA) - (E / TA) = .30$
$1 - (E / TA) = .40$	$1 - (E / TA) = .30$
$E / TA = .60$	$E / TA = .70$
$E = .60(TA)$	$E = .70(TA)$

Rearranging ROA, we find:

$$NI / TA = .15 \quad NI / TA = .12$$

$$NI = .15(TA) \quad NI = .12(TA)$$

Since  $ROE = NI / E$ , we can substitute the above equations into the ROE formula, which yields:

$$ROE = .15(TA) / .70(TA) = .30 / .70 \quad ROE = .12(TA) / .60(TA) = .12 / .60 = 20\% = 21.43\%$$

### Problem 12CTQ

Cash Flow The Grandmother Calendar Company clearly had a cash flow problem. In the context of the cash flow analysis we developed in Chapter 2, what was the impact of customers not paying until orders were shipped?

### Step-by-step solution

step 1 of 1

Since customers did not pay until shipment, receivables rose. The firm's NWC, but not its cash, increased. At the same time, costs were rising faster than cash revenues, so operating cash flow declined. The firm's capital spending was also rising. Thus, all three components of cash flow from assets were negatively impacted.

## Problem 12PQ

Ratios and Foreign Companies Prince Albert Canning PLC had a net loss of £15,834 on sales of £167,983.

What was the company's profit margin? Does the fact that these figures are quoted in a foreign currency make any difference? Why? In dollars, sales were \$251,257. What was the net loss in dollars?

## Step-by-step solution

step 1 of 1

$$PM = NI / S = -£15,834 / £167,983 = -.0943 \text{ or } 9.43\%$$

As long as both net income and sales are measured in the same currency, there is no problem; in fact, except for some market value ratios like EPS and BVPS, none of the financial ratios discussed in the text are measured in terms of currency. This is one reason why financial ratio analysis is widely used in international finance to compare the business operations of firms and/or divisions across national economic borders. The net income in dollars is:

$$NI = PM \times \text{Sales}$$

$$NI = -0.0943(\$251,257) = -\$23,683.37$$

## Problem 13CTQ

Corporate Borrowing If the firm was so successful at selling, why wouldn't a bank or some other lender step in and provide it with the cash it needed to continue?

## Step-by-step solution

step 1 of 1

Financing possibly could have been arranged if the company had taken quick enough action. Sometimes it becomes apparent that help is needed only when it is too late, again emphasizing the need for planning.

### Problem 13PQ

**External Funds Needed** The Optical Scam Company has forecast a 20 percent sales growth rate for next year. The current financial statements are shown here:

Income Statement			
Sales			\$30,400,000
Costs			26,720,000
Taxable income			\$ 3,680,000
Taxes			1,288,000
Net income			\$ 2,392,000
Dividends	\$ 956,800		
Addition to retained earnings	1,435,200		

  

Balance Sheet			
Assets		Liabilities and Equity	
Current assets \$	7,200,000	Short-term debt	\$ 6,400,000
		Long-term debt	4,800,000
Fixed assets	17,600,000		
		Common stock	\$ 3,200,000
		Accumulated retained earnings	10,400,000
		Total equity	\$13,600,000
Total assets	\$24,800,000	Total liabilities and equity	\$24,800,000

a. Using the equation from the chapter, calculate the external funds needed for next year.

---

b. Construct the firm's pro forma balance sheet for next year and confirm the external funds needed that you calculated in part (a).

---

c. Calculate the sustainable growth rate for the company.

---

d. Can Optical Scam eliminate the need for external funds by changing its dividend policy? What other options are available to the company to meet its growth objectives?

### Step-by-step solution

step 1 of 4

a. The equation for external funds needed is:

$$EFN = \left( \frac{\text{Assets}}{\text{Sales}} \right) \times \Delta \text{Sales} - \left( \frac{\text{Debt}}{\text{Sales}} \right) \times \Delta \text{Sales} - (\text{PM} \times \text{Projected sales}) \times (1 - d)$$

where:

$$\text{Assets/Sales} = \$24,800,000 / \$30,400,000 = 0.82$$

$$\Delta \text{Sales} = \text{Current sales} \times \text{Sales growth rate} = \$30,400,000 (.20) = \$6,080,000$$

$$\text{Debt/Sales} = \$6,400,000 / \$30,400,000 = .2105$$

$$p = \text{Net income/Sales} = \$2,392,000 / \$30,400,000 = .0787$$

$$\text{Projected sales} = \text{Current sales} \times (1 + \text{Sales growth rate}) = \$30,400,000 (1 + .20) = \$36,480,000$$

$$d = \text{Dividends/Net income} = \$956,800 / \$2,392,000 = .40$$

so:

$$EFN = (.82 \times \$6,080,000) - (.2105 \times \$6,080,000) - (.0787 \times \$36,480,000) \times (1 - .40)$$

$$EFN = \$1,957,760$$

step 2 of 4

b. The current assets, fixed assets, and short-term debt will all increase at the same percentage as sales. The long-term debt and common stock will remain constant. The accumulated retained earnings will increase by the addition to retained earnings for the year. We can calculate the addition to retained earnings for the year as:

Net income = Profit margin × Sales

Net income = .0787(\$36,480,000)

Net income = \$2,870,400

The addition to retained earnings for the year will be the net income times one minus the dividend payout ratio, which is:

Addition to retained earnings = Net income(1 - d)

Addition to retained earnings = \$2,870,400(1 - .40)

Addition to retained earnings = \$1,722,240

So, the new accumulated retained earnings will be:

Accumulated retained earnings = \$10,400,000 + 1,722,240

Accumulated retained earnings = \$12,122,240

The pro forma balance sheet will be:

Assets		Liabilities and equity	
Current assets	\$8,640,000	Short-term debt	\$7,680,000
		Long-term debt	\$4,800,000
Fixed assets	21,120,000	Common stock	\$3,200,000
		Accumulated retained earnings	12,122,240
		Total equity	\$15,322,240
Total assets	\$29,760,000	Total liabilities and equity	\$27,802,240

The EFN is:

EFN = Total assets - Total liabilities and equity

EFN = \$29,760,000 - 27,802,240

EFN = \$1,957,760

step 3 of 4

cThe sustainable growth is: .

$$\text{Sustainable growth rate} = \frac{\text{ROE} \times b}{1 - \text{ROE} \times b}$$

where:

$$\text{ROE} = \text{Net income/Total equity} = \$2,392,000/\$13,600,000 = .1759$$

$$b = \text{Retention ratio} = \text{Retained earnings/Net income} = \$1,435,200/\$2,392,000 = .60$$

So:

$$\text{Sustainable growth rate} = \frac{.1759 \times .60}{1 - .1759 \times .60}$$

$$\text{Sustainable growth rate} = .1180 \text{ or } 11.80\%$$

step 4 of 4

The company cannot just cut its dividends to . achieve the forecast growth rate. As shown below, even with a zero dividend policy, the EFN will still be \$809,600.

Assets		Liabilities and equity	
Current assets	\$8,640,000	Short-term debt	\$7,680,000
		Long-term debt	\$4,800,000
Fixed assets	21,120,000	Common stock	\$3,200,000
		Accumulated retained earnings	13,270,400
		Total equity	\$16,470,400
Total assets	\$29,760,000	Total liabilities and equity	\$28,950,400

The EFN is:

$$\text{EFN} = \text{Total assets} - \text{Total liabilities and equity}$$

$$\text{EFN} = \$29,760,000 - 28,950,400$$

$$\text{EFN} = \$809,600$$

The company does have several alternatives. It can increase its asset utilization and/or its profit margin. The company could also increase the debt in its capital structure. This will decrease the equity account, thereby increasing ROE.

Problem 14CTQ

Cash Flow Which was the biggest culprit here: Too many orders, too little cash, or too little production capacity?

### Step-by-step solution

step 1 of 1

All three were important, but the lack of cash or, more generally, financial resources, ultimately spelled doom. An inadequate cash resource is usually cited as the most common cause of small business failure.

### Problem 14PQ

Days' Sales in Receivables A company has net income of \$205,000, a profit margin of 9.3 percent, and an accounts receivable balance of \$162,500. Assuming 80 percent of sales are on credit, what is the company's days' sales in receivables?

### Step-by-step solution

step 1 of 1

This is a multi-step problem involving several ratios. It is often easier to look backward to determine where to start. We need receivables turnover to find days' sales in receivables. To calculate receivables turnover, we need credit sales, and to find credit sales, we need total sales. Since we are given the profit margin and net income, we can use these to calculate total sales as:

$$PM = 0.093 = NI / \text{Sales} = \$205,000 / \text{Sales}; \text{Sales} = \$2,204,301$$

Credit sales are 80 percent of total sales, so:

$$\text{Credit sales} = \$2,204,301(0.80) = \$1,763,441$$

Now we can find receivables turnover by:

$$\text{Receivables turnover} = \text{Credit sales} / \text{Accounts receivable} = \$1,763,441 / \$162,500 = 10.85 \text{ times}$$

$$\text{Days' sales in receivables} = 365 \text{ days} / \text{Receivables turnover} = 365 / 10.85 = 33.63 \text{ days}$$

### Problem 15CTQ

Cash Flow What are some actions a small company like The Grandmother Calendar Company can take (besides expansion of capacity) if it finds itself in a situation in which growth in sales outstrips production?

### Step-by-step solution

step 1 of 1

Demanding cash upfront, increasing prices, subcontracting production, and improving financial resources via new owners or new sources of credit are some of the options. When orders exceed capacity, price increases may be especially beneficial.

### Problem 15PQ

Ratios and Fixed Assets The Le Bleu Company has a ratio of long-term debt to total assets of .40 and a current ratio of 1.30. Current liabilities are \$900, sales are \$5,320, profit margin is 9.4 percent, and ROE is 18.2 percent. What is the amount of the firm's net fixed assets?

### Step-by-step solution

step 1 of 1

The solution to this problem requires a number of steps. First, remember that  $CA + NFA = TA$ . So, if we find the CA and the TA, we can solve for NFA. Using the numbers given for the current ratio and the current liabilities, we solve for CA:

$$CR = CA / CL$$

$$CA = CR(CL) = 1.30(\$900) = \$1,170$$

To find the total assets, we must first find the total debt and equity from the information given. So, we find the net income using the profit margin:

$$PM = NI / Sales$$

$$NI = Profit\ margin \times Sales = .094(\$5,320) = \$500.08$$

We now use the net income figure as an input into ROE to find the total equity:

$$ROE = NI / TE$$

$$TE = NI / ROE = \$500.08 / .182 = \$2,747.69$$

Next, we need to find the long-term debt. The long-term debt ratio is:

$$\text{Long-term debt ratio} = 0.40 = LTD / (LTD + TE)$$

Inverting both sides gives:

$$1 / 0.40 = (LTD + TE) / LTD = 1 + (TE / LTD)$$

Substituting the total equity into the equation and solving for long-term debt gives the following:

$$1 + \$2,747.69 / LTD = 2.5$$

$$LTD = \$2,747.69 / 1.5 = \$1,831.79$$

Now, we can find the total debt of the company:

$$TD = CL + LTD = \$900 + 1,831.79 = \$2,731.79$$

And, with the total debt, we can find the TD &E, which is equal to TA:

$$TA = TD + TE = \$2,731.79 + 2,747.69 = \$5,479.49$$

And finally, we are ready to solve the balance sheet identity as:

$$NFA = TA - CA = \$5,479.49 - 1,170 = \$4,309.49$$

## Problem 16PQ

Calculating the Cash Coverage Ratio Titan Inc.' s net income for the most recent year was \$9,450.

The tax rate was 34 percent. The firm paid \$2,360 in total interest expense and deducted \$3,480 in depreciation expense. What was Titan' s cash coverage ratio for the year?

## Step-by-step solution

step 1 of 1

This problem requires you to work backward through the income statement. Net income =  $(1 - t_c) \text{EBT}$ . First, recognize that  $\text{EBT} = \text{EBT}$ . Plugging in the numbers given and solving for EBT, we get:

$$\text{EBT} = \$9,450 / 0.66 = \$14,318.18$$

Now, we can add interest to EBT to get EBIT as follows:

$$\text{EBIT} = \text{EBT} + \text{Interest paid} = \$14,318.18 + 2,360 = \$16,678.18$$

To get EBITD (earnings before interest, taxes, and depreciation), the numerator in the cash coverage ratio, add depreciation to EBIT:

$$\text{EBITD} = \text{EBIT} + \text{Depreciation} = \$16,678.18 + 3,480 = \$20,158.18$$

Now, simply plug the numbers into the cash coverage ratio and calculate:

$$\text{Cash coverage ratio} = \text{EBITD} / \text{Interest} = \$20,158.18 / \$2,360 = 8.54 \text{ times}$$

## Problem 17PQ

Cost of Goods Sold Guthrie Corp. has current liabilities of \$270,000, a quick ratio of 1.1, inventory turnover of 4.2, and a current ratio of 2.3. What is the cost of goods sold for the company?

### Step-by-step solution

step 1 of 1

The only ratio given which includes cost of goods sold is the inventory turnover ratio, so it is the last ratio used. Since current liabilities are given, we start with the current ratio:

$$\text{Current ratio} = 2.3 = \text{CA} / \text{CL} = \text{CA} / \$270,000$$

$$\text{CA} = \$621,000$$

Using the quick ratio, we solve for inventory:

$$\text{Quick ratio} = 1.1 = (\text{CA} - \text{Inventory}) / \text{CL} = (\$621,000 - \text{Inventory}) / \$270,000$$

$$\text{Inventory} = \text{CA} - (\text{Quick ratio} \times \text{CL})$$

$$\text{Inventory} = \$621,000 - (1.1 \times \$270,000)$$

$$\text{Inventory} = \$324,000$$

Inventory turnover = 4.2 = COGS / Inventory = COGS / \$324,000

COGS = \$1,360,800

### Problem 18PQ

**Common-Size and Common-Base Year Financial Statements** In addition to common-size financial statements, common-base year financial statements are often used. Common-base year financial statements are constructed by dividing the current year account value by the base year account value. Thus, the result shows the growth rate in the account. Using the following financial statements, construct the common-size balance sheet and common-base year balance sheet for the company. Use 2009 as the base year.

JARROW CORPORATION					
2009 and 2010 Balance Sheets					
Assets			Liabilities and Owners' Equity		
	2009	2010		2009	2010
Current assets	\$ 8,436	\$ 10,157	Current liabilities		
Cash			Accounts payable	\$ 43,050	\$ 46,821
			Notes payable	18,384	17,382
Accounts receivable	21,530	23,406	Total	\$ 61,434	\$ 64,203
Inventory	38,760	42,650	Long-term debt	\$ 25,000	\$ 32,000
Total	\$ 68,726	\$ 76,213	Owners' equity		
Fixed assets			Common stock and paid-in	\$ 40,000	\$ 40,000
Net plant and equipment	\$226,706	\$248,306			

			surplus		
			Accumulated retained earnings	168,998	188,316
			Total	\$208,998	\$228,316
Total assets	\$295,432	\$324,519	Total liabilities and owners' equity	\$295,432	\$324,519

Use the following information for Problems 19, 20, and 22:

The discussion of EFN in the chapter implicitly assumed that the company was operating at full capacity. Often, this is not the case. For example, assume that Rosengarten was operating at 90 percent capacity. Full-capacity sales would be  $\$1,000 / .90 = \$1,111$ . The balance sheet shows \$1,800 in fixed assets. The capital intensity ratio for the company is

$$\text{Capital intensity ratio} = \text{Fixed assets} / \text{Full-capacity sales} = \$1,800 / \$1,111 = .62$$

This means that Rosengarten needs \$1.62 in fixed assets for every dollar in sales when it reaches full capacity. At the projected sales level of \$1,250, it needs  $\$1,250 \times 1.62 = \$2,025$  in fixed assets, which is \$225 lower than our projection of \$2,250 in fixed assets. So, EFN is only  $\$565 - 225 = \$340$ .

### Step-by-step solution

step 1 of 1

	Common	Common
	2009 size	2010 size Common base year
Assets		

Current assets					
Cash	\$8,436	2.86%	\$10,157	3.13%	1.2040
Accounts receivable	21,530	7.29%	23,406	7.21%	1.0871
Inventory	38,760	13.12%	42,650	13.14%	1.1004
Total	\$68,726	23.26%	\$76,213	23.48%	1.1089
Fixed assets					
Net plant and equipment	226,706	76.74%	248,306	76.52%	1.0953
Total assets	\$295,432	100%	\$324,519	100%	1.0985
Liabilities and Owners' Equity					
Current liabilities					
Accounts payable	\$43,050	14.57%	\$46,821	14.43%	1.0876
Notes payable	18,384	6.22%	17,382	5.36%	0.9455
Total	\$61,434	20.79%	\$64,203	19.78%	1.0451
Long-term debt	25,000	8.46%	32,000	9.86%	1.2800
Owners' equity					
Common stock and paid-in surplus	\$40,000	13.54%	\$40,000	12.33%	1.0000
Accumulated retained earnings	168,998	57.20%	188,316	58.03%	1.1143
Total	\$208,998	70.74%	\$228,316	70.36%	1.0924
Total liabilities and owners' equity	\$295,432	100%	\$324,519	100%	1.0985

The common-size balance sheet answers are found by dividing each category by total assets. For example, the cash percentage for 2009 is:

$$\$8,436 / \$295,432 = .0286 \text{ or } 2.86\%$$

This means that cash is 2.86% of total assets.

The common-base year answers for Question 18 are found by dividing each category value for 2010 by the same category value for 2009. For example, the cash common-base year number is found by:

$$\$10,157 / \$8,436 = 1.2040$$

This means the cash balance in 2010 is 1.2040 times as large as the cash balance in 2009.

## Problem 19PQ

Full-Capacity Sales Thorpe Mfg., Inc., is currently operating at only 85 percent of fixed asset capacity. Current sales are \$630,000. How much can sales increase before any new fixed assets are needed?

## Step-by-step solution

step 1 of 1

To determine full capacity sales, we divide the current sales by the capacity the company is currently

using, so:

$$\text{Full capacity sales} = \$630,000 / .85$$

$$\text{Full capacity sales} = \$741,176$$

So, the dollar growth rate in sales is:

$$\text{Sales growth} = \$741,176 - 630,000$$

$$\text{Sales growth} = \$111,176$$

## Problem 20PQ

Fixed Assets and Capacity Usage For the company in the previous problem, suppose fixed assets are \$580,000 and sales are projected to grow to \$790,000. How much in new fixed assets are required to support this growth in sales?

## Step-by-step solution

step 1 of 1

To find the new level of fixed assets, we need to find the current percentage of fixed assets to full capacity sales. Doing so, we find:

$$\text{Fixed assets} / \text{Full capacity sales} = \$580,000 / \$741,176$$

$$\text{Fixed assets} / \text{Full capacity sales} = .7825$$

Next, we calculate the total dollar amount of fixed assets needed at the new sales figure.

$$\text{Total fixed assets} = .7825(\$790,000)$$

$$\text{Total fixed assets} = \$618,206.35$$

The new fixed assets necessary is the total fixed assets at the new sales figure minus the current level of fixed assets.

New fixed assets = \$618,206.35 - 580,000

New fixed assets = \$38,206.35

## Problem 21PQ

Calculating EFN The most recent financial statements for Moose Tours, Inc., appear below. Sales for 2010 are projected to grow by 20 percent. Interest expense will remain constant; the tax rate and the dividend payout rate will also remain constant. Costs, other expenses, current assets, fixed assets, and accounts payable increase spontaneously with sales. If the firm is operating at full capacity and no new debt or equity is issued, what external financing is needed to support the 20 percent growth rate in sales?

## Step-by-step solution

step 1 of 1

Assuming costs vary with sales and a 20 percent increase in sales, the pro forma income statement will look like this:

MOOSE TOURS INC.	
Pro Forma Income Statement	
Sales	1,114,800
Costs	867,600
Other expenses	22,800
EBIT	\$ 224,400
Interest	14,000
Taxable income	\$ 210,400
Taxes (35%)	73,640
Net income	\$ 136,760

The payout ratio is constant, so the dividends paid this year is the payout ratio from last year times net income, or:

Dividends =  $(\$33,735/\$112,450) (\$136,760)$

Dividends = \$41,028

And the addition to retained earnings will be:

Addition to retained earnings = \$136,760 - 41,028

Addition to retained earnings = \$95,732

The new retained earnings on the pro forma balance sheet will be:

New retained earnings = \$182,900 + 95,732

New retained earnings = \$278,632

The pro forma balance sheet will look like this:

MOOSE TOURS INC.

Pro Forma Balance Sheet

Liabilities and Owners' Equity Assets

Current assets			Current liabilities						
	Cash		\$	30,360		Accounts payable	\$	81,600	
	Accounts receivable		48,840		Notes payable		17,000		
	Inventory		104,280			Total	\$	98,600	
		Total	\$	183,480	Long-term debt		158,000		
Fixed assets									
	Net plant and equipment		495,600		Owners' equity				
					Common stock and				
					paid-in surplus	\$	140,000		
					Retained earnings		278,632		
						Total	\$	418,632	

Total liabilities and owners'

Total assets 679,080 \$ equity 675,232 \$

So the EFN is:

EFN = Total assets - Total liabilities and equity

EFN = \$679,080 - 675,232

EFN = \$3,848

### Problem 22PQ

Capacity Usage and Growth In the previous problem, suppose the firm was operating at only 80 percent capacity in 2009. What is EFN now?

MOOSE TOURS, INC.			
2009 Income Statement			
Sales			\$929,000
Costs			723,000
Other expenses			19,000
Earnings before interest and taxes			\$187,000
Interest expense			14,000
Taxable income			\$173,000
Taxes			60,550
Net income			\$112,450
Dividends		\$33,735	
Addition to retained earnings		78,715	

  

MOOSE TOURS, INC.			
Balance Sheet			
as of December 31, 2009			
Assets		Liabilities and Owners' Equity	
Current assets		Current liabilities	
Cash	\$ 25,300	Accounts payable	\$ 68,000
Accounts receivable	40,700	Notes payable	17,000

Inventory	86,900	Total	\$ 85,000
Total	\$152,900	Long-term debt	\$158,000
		Owners' equity	
Fixed assets		Common stock and paid-in surplus	\$140,000
Net plant and equipment	\$413,000	Retained earnings	182,900
		Total	\$322,900
Total assets	\$565,900	Total liabilities and owners' equity	\$565,900

## Step-by-step solution

step 1 of 3

Yield to Maturity (YTM)

Yield to Maturity is the Internal Rate of Return expected on a bond by investor who buys and holds the securities or bonds till its maturity. This methodology is based on some assumption that all the coupons are reinvested at the same rate. Bond's Yield to Maturity with annual coupon payment can be calculated by following:

$$\text{Price} = \text{Par Value} \times \frac{1}{(1+\text{YTM})^n} + \text{coupon} \times \frac{1 - [1/(1 + \text{YTM})^n]}{\text{YTM}}$$

step 2 of 3

Coupon price = \$8.25

Price = \$87.155

Par value = \$1,000

$n = 10$  years

Now calculating YTM for IOU Company,

$$\text{Price} = \text{Par Value} \times \frac{1}{(1+\text{YTM})^n} + \text{coupon} \times \frac{1 - (1/(1 + \text{YTM})^n)}{\text{YTM}}$$

$$87.155 = 1,000 \times \frac{1}{(1+\text{YTM})^{10}} + 8.25 \times \frac{1 - (1/(1 + \text{YTM})^{10})}{\text{YTM}}$$

Solving this, using hit and trial method, YTM is 31.9%

step 3 of 3

Current yield is an annual interest income divided by the current price of the given security. It is basically the expected return not the actual return.

To calculate current yield,

Annual cash inflows is \$8.25

Market price is \$87.155

$$\begin{aligned}\text{Current yield} &= \frac{\text{Annual cash inflows}}{\text{Market price}} \\ &= \frac{8.25}{87.155} \\ &= 0.0946 \\ &= 9.46\%\end{aligned}$$

Therefore, the current yield is 9.46%

## Problem 23PQ

Calculating EFN In Problem 21, suppose the firm wishes to keep its debt-equity ratio constant.

What is EFN now?

## Step-by-step solution

step 1 of 1

The D/E ratio of the company is:

$$D/E = (\$85,000 + 158,000) / \$322,900$$

$$D/E = .7526$$

So the new total debt amount will be:

$$\text{New total debt} = .7526(\$418,632)$$

$$\text{New total debt} = \$315,044$$

This is the new total debt for the company. Given that our calculation for EFN is the amount that must be raised externally and does not increase spontaneously with sales, we need to subtract the spontaneous increase in accounts payable. The new level of accounts payable will be, which is the current accounts payable times the sales growth, or:

$$\text{Spontaneous increase in accounts payable} = \$68,000(.20)$$

$$\text{Spontaneous increase in accounts payable} = \$13,600$$

This means that \$13,600 of the new total debt is not raised externally. So, the debt raised externally, which will be the EFN is:

$$\text{EFN} = \text{New total debt} - (\text{Beginning LTD} + \text{Beginning CL} + \text{Spontaneous increase in AP})$$

$$\text{EFN} = \$315,044 - (\$158,000 + 85,000 + 13,600) = \$58,444$$

The pro forma balance sheet with the new long-term debt will be:

MOOSE TOURS INC.

Pro Forma Balance Sheet

Assets	Liabilities and Owners' Equity								
Current assets			Current liabilities						
	Cash		\$ 30,360		Accounts payable	\$ 81,600			
	Accounts receivable		48,840		Notes payable	17,000			
	Inventory		104,280		Total	\$ 98,600			
		Total	\$ 183,480	Long-term debt		216,444			
Fixed assets									
	Net plant and equipment		495,600	Owners' equity					
				Common stock and paid-in surplus	\$ 140,000				
				Retained earnings	278,632				
					Total	\$ 418,632			
				Total liabilities and owners'					

Total assets	\$	679,080	equity	\$	733,676			
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The funds raised by the debt issue can be put into an excess cash account to make the balance sheet balance. The excess debt will be:

$$\text{Excess debt} = \$733,676 - 679,080 = \$54,596$$

To make the balance sheet balance, the company will have to increase its assets. We will put this amount in an account called excess cash, which will give us the following balance sheet:

MOOSE TOURS INC.

Pro Forma Balance Sheet

Assets	Liabilities and Owners' Equity							
Current assets			Current liabilities					
	Cash		\$ 30,360			Accounts payable	\$ 81,600	
	Excess cash		54,596					
	Accounts receivable		48,480		Notes payable		17,000	
	Inventory		104,280			Total	\$ 98,600	
		Total	\$ 238,076		Long-term debt		216,444	
Fixed assets								
	Net plant and equipment		495,600		Owners' equity			
					Common stock and			
						paid-in surplus	\$ 140,000	
						Retained earnings	278,632	
						Total	\$ 418,632	
					Total liabilities and owners'			
Total assets	\$	733,676	equity	\$	733,676			

The excess cash has an opportunity cost that we discussed earlier. Increasing fixed assets would also not be a good idea since the company already has enough fixed assets.

A likely scenario would be the repurchase of debt and equity in its current capital structure weights. The company's debt-assets and equity assets are:

$$\text{Debt-assets} = .7526 / (1 + .7526) = .43$$

$$\text{Equity-assets} = 1 / (1 + .7526) = .57$$

So, the amount of debt and equity needed will be:

$$\text{Total debt needed} = .43(\$679,080) = \$291,600$$

$$\text{Equity needed} = .57(\$679,080) = \$387,480$$

So, the repurchases of debt and equity will be:

$$\text{Debt repurchase} = (\$98,600 + 216,444) - 291,600 = \$23,444$$

$$\text{Equity repurchase} = \$418,632 - 387,480 = \$31,152$$

Assuming all of the debt repurchase is from long-term debt, and the equity repurchase is entirely from the retained earnings, the final pro forma balance sheet will be:

MOOSE TOURS INC.

Pro Forma Balance Sheet

Assets	Liabilities and Owners' Equity								
Current assets			Current liabilities						
	Cash		\$ 30,360			Accounts payable	\$ 81,600		
	Accounts receivable		48,840		Notes payable		17,000		
	Inventory		104,280			Total	\$ 98,600		
		Total	\$ 183,480	Long-term debt			193,000		
Fixed assets									
	Net plant and equipment		495,600	Owners' equity					
				Common stock and paid-in surplus			\$ 140,000		
						Retained earnings		247,480	
							Total	\$ 387,480	
				Total					

					liabilities and owners'				
Total assets	\$	679,080	equity		\$	679,080			

### Problem 24PQ

EFN and Internal Growth Redo Problem 21 using sales growth rates of 15 and 25 percent in addition to 20 percent. Illustrate graphically the relationship between EFN and the growth rate, and use this graph to determine the relationship between them.

### Step-by-step solution

step 1 of 1

The pro forma income statements for all three growth rates will be:

MOOSE TOURS INC.

#### Pro Forma Income Statement

	15 % Sales	20% Sales	25% Sales
	Growth	Growth	Growth
Sales	\$1,068,350	\$1,114,800	\$1,161,250
Costs	831,450	867,600	903,750
Other expenses	21,850	22,800	23,750
EBIT	\$215,050	\$224,400	\$233,750
Interest	14,000	14,000	14,000
Taxable income	\$201,050	\$210,400	\$219,750
Taxes (35%)	70,368	73,640	76,913
Net income	\$130,683	\$136,760	\$142,838
Dividends	\$39,205	\$41,028	\$42,851
Add to RE	91,478	95,732	99,986

We will calculate the EFN for the 15 percent growth rate first. Assuming the payout ratio is constant, the dividends paid will be:

$$\text{Dividends} = (\$33,735/\$112,450) (\$130,683)$$

Dividends = \$39,205

And the addition to retained earnings will be:

Addition to retained earnings = \$130,683 - 39,205

Addition to retained earnings = \$91,478

The new retained earnings on the pro forma balance sheet will be:

New retained earnings = \$182,900 + 91,478

New retained earnings = \$274,378

The pro forma balance sheet will look like this:

15% Sales Growth :

MOOSE TOURS INC.

Pro Forma Balance Sheet

Assets      Liabilities and  
                 Owners' Equity

Current  
assets

Cash

Current  
liabilities

\$                      29,095

Accounts payable      \$            78,200

Accounts  
receivable

46,805

Notes payable                      17,000

Inventory

99,935

Total                      \$            95,200

Total      \$                      175,835

Long-term debt      \$                      158,000

Fixed  
assets

Net plant and

Owners'  
equity

equipment

474,950

Common stock and  
paid-in surplus      \$            140,000  
Retained earnings                      274,378

Total      \$                      414,378

Total liabilities  
and owners'

Total assets \$ 650,785 equity \$ 667,578

So the EFN is:

EFN = Total assets - Total liabilities and equity

EFN = \$650,785 - 667,578

EFN = -\$16,793

At a 20 percent growth rate, and assuming the payout ratio is constant, the dividends paid will be:

Dividends =  $(\$33,735 / \$112,450) (\$136,760)$

Dividends = \$41,028

And the addition to retained earnings will be:

Addition to retained earnings = \$136,760 - 41,028

Addition to retained earnings = \$95,732

The new retained earnings on the pro forma balance sheet will be:

New retained earnings = \$182,900 + 95,732

New retained earnings = \$278,632

The pro forma balance sheet will look like this:

20% Sales Growth :

MOOSE TOURS INC.

Pro Forma Balance Sheet

Assets Liabilities and  
Owners' Equity

Current  
assets

Cash

Current  
liabilities

\$ 30,360

Accounts payable \$ 81,600

	Accounts receivable	48,840		Notes payable	17,000
	Inventory	104,280		Total	\$ 98,600
Fixed assets	Total	\$ 183,480	Long-term debt	\$	158,000
	Net plant and equipment	495,600	Owners' equity		
			Common stock and paid-in surplus	\$	140,000
			Retained earnings		278,632
			Total	\$	418,632
Total assets	\$	679,080	Total liabilities and owners' equity	\$	675,232

So the EFN is:

$EFN = \text{Total assets} - \text{Total liabilities and equity}$

$EFN = \$679,080 - 675,232$

$EFN = \$3,848$

At a 25 percent growth rate, and assuming the payout ratio is constant, the dividends paid will be:

$\text{Dividends} = (\$33,735 / \$112,450) (\$142,838)$

$\text{Dividends} = \$42,851$

And the addition to retained earnings will be:

$\text{Addition to retained earnings} = \$142,838 - 42,851$

$\text{Addition to retained earnings} = \$99,986$

The new retained earnings on the pro forma balance sheet will be:

$\text{New retained earnings} = \$182,900 + 99,986$

$\text{New retained earnings} = \$282,886$

The pro forma balance sheet will look like this:

25% Sales Growth :

MOOSE TOURS INC.

Pro Forma Balance Sheet

Assets	Liabilities and Owners' Equity
Current assets	Current liabilities
Cash	\$ 31,625
Accounts receivable	50,875
Inventory	108,625
Total	\$ 191,125
Fixed assets	Owners' equity
Net plant and equipment	516,250
Total assets	\$ 707,375
	Long-term debt
	Accounts payable
	Notes payable
	Total
	\$ 158,000
	\$ 102,000
	17,000
	Common stock and paid-in surplus
	Retained earnings
	Total
	\$ 422,886
	Total liabilities and owners' equity
	\$ 682,886

So the EFN is:

EFN = Total assets - Total liabilities and equity

EFN = \$707,375 - 682,886

EFN = \$24,489

Problem 25PQ

EFN and Sustainable Growth Redo Problem 23 using sales growth rates of 30 and 35 percent in addition to 20 percent. Illustrate graphically the relationship between EFN and the growth rate, and use this graph to determine the relationship between them.

### Step-by-step solution

step 1 of 1

The pro forma income statements for all three growth rates will be:

MOOSE TOURS INC.

#### Pro Forma Income Statement

	20% Sales Growth	30% Sales Growth	35% Sales Growth
Sales	\$1,114,800	\$1,207,700	\$1,254,150
Costs	867,600	939,900	976,050
Other expenses	22,800	24,700	25,650
EBIT	\$224,400	\$243,100	\$252,450
Interest	14,000	14,000	14,000
Taxable income	\$210,400	\$229,100	\$238,450
Taxes (35%)	73,640	80,185	83,458
Net income	\$136,760	\$148,915	\$154,993
Dividends	\$41,028	\$44,675	\$46,498
Add to RE	95,732	104,241	108,495

At a 30 percent growth rate, and assuming the payout ratio is constant, the dividends paid will be:

$$\text{Dividends} = (\$33,735/\$112,450) (\$148,915)$$

$$\text{Dividends} = \$44,675$$

And the addition to retained earnings will be:

$$\text{Addition to retained earnings} = \$148,915 - 44,675$$

Addition to retained earnings = \$104,241

The new addition to retained earnings on the pro forma balance sheet will be:

New addition to retained earnings = \$182,900 + 104,241

New addition to retained earnings = \$287,141

The new total debt will be:

New total debt = .7556(\$427,141)

New total debt = \$321,447

So, the new long-term debt will be the new total debt minus the new short-term debt, or:

New long-term debt = \$321,447 - 105,400

New long-term debt = \$216,047

The pro forma balance sheet will look like this:

Sales growth rate = 30% and debt/equity ratio = .7526:

MOOSE TOURS INC.

Pro Forma Balance Sheet

Assets	Liabilities and Owners' Equity								
Current assets			Current liabilities						
	Cash		\$ 32,890		Accounts payable	\$ 88,400			
	Accounts receivable		52,910		Notes payable	17,000			
	Inventory		112,970		Total	\$ 105,400			
		Total	\$ 198,770	Long-term debt		216,047			
Fixed assets									
	Net plant and equipment		536,900	Owners' equity					
				Common stock and paid-in		\$ 140,000			

						surplus			
						Retained earnings		287,141	
							Total	\$	427,141
					Total liabilities and owners'				
Total assets	\$	735,670	equity		\$	748,587			

So the excess debt raised is:

$$\text{Excess debt} = \$748,587 - 735,670$$

$$\text{Excess debt} = \$12,917$$

At a 35 percent growth rate, and assuming the payout ratio is constant, the dividends paid will be:

$$\text{Dividends} = (\$33,735 / \$112,450) (\$154,993)$$

$$\text{Dividends} = \$46,498$$

And the addition to retained earnings will be:

$$\text{Addition to retained earnings} = \$154,993 - 46,498$$

$$\text{Addition to retained earnings} = \$108,495$$

The new retained earnings on the pro forma balance sheet will be:

$$\text{New retained earnings} = \$182,900 + 108,495$$

$$\text{New retained earnings} = \$291,395$$

The new total debt will be:

$$\text{New total debt} = .75255(\$431,395)$$

$$\text{New total debt} = \$324,648$$

So, the new long-term debt will be the new total debt minus the new short-term debt, or:

$$\text{New long-term debt} = \$324,648 - 108,800$$

$$\text{New long-term debt} = \$215,848$$

Sales growth rate = 35% and debt/equity ratio = .75255:

MOOSE TOURS INC.

Pro Forma Balance Sheet

Assets	Liabilities and Owners' Equity								
Current assets			Current liabilities						
	Cash		\$ 34,155		Accounts payable	\$ 91,800			
	Accounts receivable		54,945		Notes payable	17,000			
	Inventory		117,315		Total	\$ 108,800			
		Total	\$ 206,415	Long-term debt	\$ 215,848				
Fixed assets									
	Net plant and equipment		557,550	Owners' equity					
				Common stock and paid-in surplus	\$ 140,000				
				Retained earnings	291,395				
					Total	\$ 431,395			
				Total liabilities and owners'					
Total assets	\$ 763,965	equity	\$ 756,043						

So the excess debt raised is:

Excess debt = \$756,043 - 763,965

Excess debt = -\$7,922

At a 35 percent growth rate, the firm will need funds in the amount of \$7,922 in addition to the external debt already raised. So, the EFN will be:

EFN = \$57,848 + 7,922

EFN = \$65,770

## Problem 26PQ

Constraints on Growth Bulla Recording, Inc., wishes to maintain a growth rate of 12 percent per year and a debt-equity ratio of .30. Profit margin is 5.9 percent, and the ratio of total assets to sales is constant at .85. Is this growth rate possible? To answer, determine what the dividend payout ratio must be. How do you interpret the result?

### Step-by-step solution

step 1 of 1

We must need the ROE to calculate the sustainable growth rate. The ROE is:

$$\text{ROE} = (\text{PM}) (\text{TAT}) (\text{EM})$$

$$\text{ROE} = (.059) (1 / 0.85) (1 + 0.3)$$

$$\text{ROE} = .0902 \text{ or } 9.02\%$$

Now, we can use the sustainable growth rate equation to find the retention ratio as:

$$\text{Sustainable growth rate} = (\text{ROE} \times b) / [1 - (\text{ROE} \times b)]$$

$$\text{Sustainable growth rate} = .12 = [.0902 b] / [1 - .0902b]$$

$$b = 1.19$$

This implies the payout ratio is:

$$\text{Payout ratio} = 1 - b$$

$$\text{Payout ratio} = 1 - 1.19$$

$$\text{Payout ratio} = -0.19$$

This is a negative dividend payout ratio of negative 19 percent, which is impossible. The growth rate is not consistent with the other constraints. The lowest possible payout rate is 0, which corresponds to retention ratio of 1, or total earnings retention.

The maximum sustainable growth rate for this company is:

$$\text{Maximum sustainable growth rate} = (\text{ROE} \times b) / [1 - (\text{ROE} \times b)]$$

$$\text{Maximum sustainable growth rate} = [.0902(1)] / [1 - .0902(1)]$$

$$\text{Maximum sustainable growth rate} = .0992 \text{ or } 9.92\%$$

## Problem 27PQ

EFN Define the following:

= Previous year's sales  $S$

= Total assets  $A$

= Total debt  $D$

= Total equity  $E$

$g$  = Projected growth in sales

= Profit margin  $PM$

$b$  = Retention (plowback) ratio

Show that EFN can be written as:

$$\text{EFN} = -PM(S)b + [A - PM(S)b] \times g$$

Hint: Asset needs will equal  $A \times g$ . The addition to retained earnings will equal  $PM(S)b \times (1 + g)$ .

Step-by-step solution

step 1 of 1

We know that EFN is:

$$\text{EFN} = \text{Increase in assets} - \text{Addition to retained earnings}$$

The increase in assets is the beginning assets times the growth rate, so:

$$\text{Increase in assets} = A \times g$$

The addition to retained earnings next year is the current net income times the retention ratio, times one plus the growth rate, so:

$$\text{Addition to retained earnings} = (\text{NI} \times b)(1 + g)$$

And rearranging the profit margin to solve for net income, we get:

$$\text{NI} = \text{PM}(S)$$

Substituting the last three equations into the EFN equation we started with and rearranging, we get:

$$\text{EFN} = A(g) - \text{PM}(S)b(1 + g)$$

$$\text{EFN} = A(g) - \text{PM}(S)b - [\text{PM}(S)b]g$$

$$\text{EFN} = -\text{PM}(S)b + [A - \text{PM}(S)b]g$$

## Problem 28PQ

Sustainable Growth Rate Based on the results in Problem 27, show that the internal and sustainable growth rates can be calculated as shown in Equations 3.23 and 3.24. Hint: For the internal growth rate, set EFN equal to zero and solve for  $g$ .

### Step-by-step solution

step 1 of 1

We start with the EFN equation we derived in Problem 27 and set it equal to zero:

$$\text{EFN} = 0 = -\text{PM}(S)b + [A - \text{PM}(S)b]g$$

Substituting the rearranged profit margin equation into the internal growth rate equation, we have:

$$\text{Internal growth rate} = \frac{[PM(S) b]}{[A - PM(S)b]}$$

Since:

$$ROA = NI / A$$

$$ROA = PM(S) / A$$

We can substitute this into the internal growth rate equation and divide both the numerator and denominator by A. This gives:

$$\text{Internal growth rate} = \frac{[PM(S) b / A]}{[A - PM(S)b / A]}$$

$$\text{Internal growth rate} = \frac{b(ROA)}{[1 - b(ROA)]}$$

To derive the sustainable growth rate, we must realize that to maintain a constant D/E ratio with no external equity financing, EFN must equal the addition to retained earnings times the D/E ratio:

$$EFN = (D/E)[PM(S) b(1 + g)]$$

$$EFN = A(g) - PM(S)b(1 + g)$$

Solving for g and then dividing numerator and denominator by A:

$$\text{Sustainable growth rate} = \frac{PM(S) b(1 + D/E)}{[A - PM(S)b(1 + D/E)]}$$

$$\text{Sustainable growth rate} = \frac{[ROA(1 + D/E) b]}{[1 - ROA(1 + D/E) b]}$$

$$\text{Sustainable growth rate} = \frac{b(ROE)}{[1 - b(ROE)]}$$

## Problem 29PQ

**Sustainable Growth Rate** In the chapter, we discussed one calculation of the sustainable growth rate as:

$$\text{Sustainable growth rate} = \frac{ROE \times b}{1 - ROE \times b}$$

In practice, probably the most commonly used calculation of the sustainable growth rate is  $ROE \times b$ . This equation is identical to the sustainable growth rate equation presented in the chapter

if the ROE is calculated using the beginning of period equity. Derive this equation from the equation presented in the chapter.

### Step-by-step solution

step 1 of 1

In the following derivations, the subscript "E" refers to end of period numbers, and the subscript "B" refers to beginning of period numbers. TE is total equity and TA is total assets.

For the sustainable growth rate :

$$\text{Sustainable growth rate} = (\text{ROE}_E \times b) / (1 - \text{ROEE} \times b)$$

$$\text{Sustainable growth rate} = (\text{NI}/\text{TE}_E \times b) / (1 - \text{NI}/\text{TEE} \times b)$$

We multiply this equation by:

$$(\text{TE}_E / \text{TEE})$$

$$\text{Sustainable growth rate} = (\text{NI} / \text{TE}_E \times b) / (1 - \text{NI} / \text{TEE} \times b) \times (\text{TEE} / \text{TEE})$$

$$\text{Sustainable growth rate} = (\text{NI} \times b) / (\text{TEE} - \text{NI} \times b)$$

Recognize that the denominator is equal to beginning of period equity, that is:

$$(\text{TE}_E - \text{NI} \times b) = \text{TEB}$$

Substituting this into the previous equation, we get:

$$\text{Sustainable rate} = (\text{NI} \times b) / \text{TEB}$$

Which is equivalent to:

$$\text{Sustainable rate} = (\text{NI} / \text{TE}_B) \times b$$

$$\text{Since } \text{ROE}_B = \text{NI} / \text{TEB}$$

The sustainable growth rate equation is:

$$\text{Sustainable growth rate} = \text{ROE}_B \times b$$

For the internal growth rate:

$$\text{Internal growth rate} = (\text{ROA E} \times b) / (1 - \text{ROAE} \times b)$$

$$\text{Internal growth rate} = (\text{NI} / \text{TAE} \times b) / (1 - \text{NI} / \text{TAE} \times b)$$

We multiply this equation by:

$$(\text{TAE} / \text{TAE})$$

$$\text{Internal growth rate} = (\text{NI} / \text{TAE} \times b) / [(1 - \text{NI} / \text{TAE} \times b) \times (\text{TAE} / \text{TAE})]$$

$$\text{Internal growth rate} = (\text{NI} \times b) / (\text{TAE} - \text{NI} \times b)$$

Recognize that the denominator is equal to beginning of period assets, that is:

$$(\text{TAE} - \text{NI} \times b) = \text{TAB}$$

Substituting this into the previous equation, we get:

$$\text{Internal growth rate} = (\text{NI} \times b) / \text{TAB}$$

Which is equivalent to:

$$\text{Internal growth rate} = (\text{NI} / \text{TAB}) \times b$$

$$\text{Since ROA B} = \text{NI} / \text{TAB}$$

The internal growth rate equation is:

$$\text{Internal growth rate} = \text{ROA B} \times b$$

## Problem 30PQ

**Sustainable Growth Rate** Use the sustainable growth rate equations from the previous problem to answer the following questions. No Return, Inc., had total assets of \$310,000 and equity of \$183,000 at the beginning of the year. At the end of the year, the company had total assets of \$355,000. During the year the company sold no new equity. Net income for the year was \$95,000 and dividends were \$68,000. What is the sustainable growth rate for the company? What is the sustainable growth rate if you calculate ROE based on the beginning of period equity?

## Step-by-step solution

step 1 of 1

Since the company issued no new equity, shareholders' equity increased by retained earnings. Retained earnings for the year were:

Retained earnings = NI - Dividends

Retained earnings = \$95,000 - 68,000

Retained earnings = \$27,000

So, the equity at the end of the year was:

Ending equity = \$183,000 + 27,000

Ending equity = \$210,000

The ROE based on the end of period equity is:

ROE = \$95,000 / \$210,000

ROE = 45.24%

The plowback ratio is:

Plowback ratio = Addition to retained earnings/NI

Plowback ratio = \$27,000 / \$95,000

Plowback ratio = .2842 or 28.42%

Using the equation presented in the text for the sustainable growth rate, we get:

Sustainable growth rate =  $(ROE \times b) / [1 - (ROE \times b)]$

Sustainable growth rate =  $[\.4524(.2842)] / [1 - .4524(.2842)]$

Sustainable growth rate = .1475 or 14.75%

The ROE based on the beginning of period equity is

ROE = \$95,000 / \$183,000

ROE = .5191 or 51.91%

Using the shortened equation for the sustainable growth rate and the beginning of period ROE, we get:

$$\text{Sustainable growth rate} = \text{ROE} \times b$$

$$\text{Sustainable growth rate} = .5191 \times .2842$$

$$\text{Sustainable growth rate} = .1475 \text{ or } 14.75\%$$

Using the shortened equation for the sustainable growth rate and the end of period ROE, we get:

$$\text{Sustainable growth rate} = \text{ROE} \times b$$

$$\text{Sustainable growth rate} = .4524 \times .2842$$

$$\text{Sustainable growth rate} = .1286 \text{ or } 12.86\%$$

Using the end of period ROE in the shortened sustainable growth rate results in a growth rate that is too low. This will always occur whenever the equity increases. If equity increases, the ROE based on end of period equity is lower than the ROE based on the beginning of period equity. The ROE (and sustainable growth rate) in the abbreviated equation is based on equity that did not exist when the net income was earned.