Chapter 4
Long-Term Financial Planning and Corporate Growth

Chapter Organization

- 4.1 What is Financial Planning?
- 4.2 Financial Planning Models: A First Look
- 4.3 The Percentage of Sales Approach
- 4.4 External Financing and Growth
- 4.5 Some Caveats Regarding Financial Planning Models
- 4.6 Summary and Conclusions

T4.2 Financial Planning Model Ingredients

- Sales Forecast
  - Drives the model
- Pro Forma Statements
  - The output summarizing different projections
- Asset Requirements
  - Investment needed to support sales growth
- Financial Requirements
  - Debt and dividend policies
- The "Plug"
  - Designated source(s) of external financing
- Economic Assumptions
  - State of the economy, interest rates, inflation

T4.3 Example: A Simple Financial Planning Model

Recent Financial Statements

Income statement

Sales	$100
Costs	90
Net Income	$ 10

Balance sheet

Assets	$50	Debt	$20
		Equity	30
Total	$50	Total	$50

- Assume that:
  - 1. sales are projected to rise by 25%
  - 2. the debt/equity ratio stays at 2/3
  - 3. costs and assets grow at the same rate as sales

T4.3 Example: A Simple Financial Planning Model (concluded)

Pro Forma Financial Statements

Income statement		Balance sheet			
Sales	$_____	Assets	$_____	Debt	_____
Costs	_____		_____	Equity	_____
Net	$ _____	Total	$_____	Total	$_____

T4.3 Example: A Simple Financial Planning Model (concluded)

Pro Forma Financial Statements

Income statement		Balance sheet			
Sales	$ 125	Assets	$ 62.5	Debt	$ 25
Costs	112.5			Equity	37.5
Net	$ 12.5	Total	$ 62.5	Total	$ 62.5

What's the plug?

Notice that projected net income is $12.50, but equity only increases by $7.50. The difference, $5.00 paid out in cash dividends, is the plug.

T4.4 The Percentage of Sales Approach

Income Statement

(projected growth = 30%)

	Original	Pro forma	
Sales	$2000	$_____	(+30%)
Costs	1700	2210	(= 85% of sales)
EBT	300	_____	
Taxes (34%)	102	132.6	
Net income	198	257.4	
Dividends	66	85.8	(= 1/3 of net)
Add. to ret. Earnings	_____	_____	(= 2/3 of net)

T4.4 The Percentage of Sales Approach

Income Statement

(projected growth = 30%)

	Original	Pro forma	
Sales	$2000	$2600	(+30%)
Costs	1700	2210	(= 85% of sales)
EBT	300	390	
Taxes (34%)	102	132.6	
Net income	198	257.4	
Dividends	66	85.8	(= 1/3 of net)
Add. to ret. Earnings	132	171.6	(= 2/3 of net)

T4.4 The Percentage of Sales Approach (concluded)

Preliminary Balance Sheet

	Orig.	% of sales
Cash	$100	___%
A/R	120	6%
Inv 140	7%	Total
Total	$360	__%
NFA	640	32%
Total	$1000	50%

	Orig.	% of sales
A/P	$60	___%
N/P	140	n/a
200 n/a		
LTD	$200	n/a
C/S	10	n/a
R/E	590	n/a
	$600	n/a
Total	$1000	n/a

T4.4 The Percentage of Sales Approach (concluded)

Preliminary Balance Sheet

	Orig.	% of sales
Cash	$100	5%
A/R	120	6%
Inv 140	7%	Total
Total	$360	18%
NFA	640	32%
Total	$1000	50%

	Orig.	% of sales
A/P	$60	3%
N/P	140	n/a
200 n/a		
LTD	$200	n/a
C/S	10	n/a
R/E	590	n/a
	$600	n/a
Total	$1000	n/a

Note that the ratio of total assets to sales is $1000/$2000 = 0.50. This is the capital intensity ratio. It equals 1/(total asset turnover).

T4.5 Pro Forma Statements

The Percentage of Sales Approach, Continued

	Proj.	(+/-)
Cash	$____	$____
A/R	____	____
Inv 182	42	Total
Total	$____	$108
NFA	832	192
Total	$____	$____

	Proj.	(+/-)
A/P	$____	$____
N/P	____	____
$____	$____	____
LTD	200	____
C/S	10	
R/E	761.6	____
	$771.6	$____
Total	$1189.6	$____

Financing needs are $300, but internally generated sources are only $189.60. The difference is *external financing needed:*

EFN = $300 - 189.60 = $_____

T4.5 Pro Forma Statements

The Percentage of Sales Approach, Continued

	Proj.	(+/-)
Cash	$130	$ 30
A/R	156	36
Inv 182	42	Total
Total	$468	$108
NFA	832	192
Total	$1300	$300

	Proj.	(+/-)
A/P	$ 78	$ 18
N/P	140	0
$ 218	$ 18	
LTD	200	0
C/S	10	0
R/E	761.6	171.6
	$771.6	$171.6
Total	$1189.6	$189.6

Financing needs are $300, but internally generated sources are only $189.60. The difference is *external financing needed:*

EFN = $300 - 189.60 = $110.40

T4.5 Pro Forma Statements (concluded)

- One *possible* financing strategy:
  - 1. Borrow short-term first
  - 2. If needed, borrow long-term next
  - 3. Sell equity as a last resort

- Constraints:
  - 1. Current ratio must not fall below 2.0.
  - 2. Total debt ratio must not rise above 0.40.

T4.6 The Percentage of Sales Approach: General Formulas

- Given a sales forecast and an estimated profit margin, what addition to retained earnings can be expected?

  Let:

  S = previous period's sales

  g = projected increase in sales

  PM = profit margin

  b = earnings retention ("plowback") ratio

- The expected addition to retained earnings is:

$$S(1 + g) \times PM \times b$$

  This represents the level of *internal financing* the firm is expected to generate over the coming period.

T4.6 The Percentage of Sales Approach: General Formulas (concluded)

- What level of asset investment is needed to support a given level of sales growth? For simplicity, assume we are at full capacity. Then the indicated increase in assets required equals

$$A \times g$$

where A = ending total assets from the previous period.

- If the required increase in assets exceeds the internal funding available (i.e., the increase in retained earnings), then the difference is the

External Financing Needed (EFN).

T4.7 The Percentage of Sales Approach: A Financing Plan

- Given the following information, determine maximum allowable borrowing for the firm:
  - 1. $468/CL = 2.0 implies maximum CL = $____

    Maximum short-term borrowing = $234 - $____ = $____
  - 2. .40 × $1300 = $____ = maximum debt

    $520 - ____ = $____ = maximum long-term debt

    Maximum long-term borrowing = $286 - ____ = $____
  - 3. Total new borrowings = $16 + 86 = $____

    Shortage = $____ - 102 = $____

- A *possible* plan:

New short-term debt	=	$8.0
New long-term debt	=	43.0
New equity	=	59.4
		$110.4

T4.7 The Percentage of Sales Approach: A Financing Plan

- Given the following information, determine maximum allowable borrowing for the firm:
  - 1. $468/CL = 2.0 implies maximum CL = $234

    Maximum short-term borrowing = $234 - $218 = $16
  - 2. .40 × $1300 = $520 = maximum debt

    $520 - 234 = $286 = maximum long-term debt

    Maximum long-term borrowing = $286 - 200 = $286
  - 3. Total new borrowings = $16 + 86 = $102

    Shortage = $110.4 - 102 = $8.4

- A possible plan:

New short-term debt	=	$8.0
New long-term debt	=	43.0
New equity	=	59.4
		$110.4

T4.7 The Percentage of Sales Approach: A Financing Plan (concluded)

Completed *Pro Forma* Balance Sheet

	Proj.	(+/-)		Proj.	(+/-)
Cash	$130	$ 30	A/P	$ 78	$ 18
A/R	156	36	N/P	148	8
Inv	182	42	Total	$226	$ 26
Total	$468	$108	LTD	243	43
NFA	832	192	C/S	69.4	59.4
			R/E	761.6	171.6
				$831	$231
Total	$1300	$300	Total	$1300	$300

T4.8 The Percentage of Sales Approach: What About Capacity?

So far, 100% capacity has been assumed. Suppose that, instead, current capacity use is 80%.

- 1. At 80% capacity:
  - $2000 = .80 × full capacity sales
  - $2000/.80 = $_____ = full capacity sales
- 2. At full capacity, fixed assets to sales will be:
  - $640/$_____ = 25.60%
- 3. So, NFA will need to be just:
  - 25.60% × $2600 = $_____ , not $832
  - $832 - $665.60 = $_____ *less* than originally projected
- 4. In this case, original EFN is substantially overstated:
  - New EFN = $110.40 - $166.40 = -$_____ .

So, the impact of different capacity assumptions is _____?

T4.8 The Percentage of Sales Approach: What About Capacity?

So far, 100% capacity has been assumed. Suppose that, instead, current capacity use is 80%.

1. At 80% capacity:
   - $2000 = .80 × full capacity sales
   - $2000/.80 = $2500 = full capacity sales
2. At full capacity, fixed assets to sales will be:
   - $640/$2500 = 25.60%
3. So, NFA will need to be just:
   - 25.60% × $2600 = $665.60, not $832
   - $832 - $665.60 = $166.40 *less* than originally projected
4. In this case, original EFN is substantially overstated:
   - New EFN = $110.40 - $166.40 = –$56 (i.e., a surplus!)

So, the impact of different capacity assumptions is _____?

T4.9 Growth and External Financing

- Key issue:
  - What is the relationship between *sales growth* and *financing needs*?

Recent Financial Statements

Income statement		Balance sheet			
Sales	$100	Assets	$50	Debt	$20
Costs	90			Equity	30
Net	$ 10	Total	$50	Total	$50

T4.9 Growth and External Financing (concluded)

- Assume that:
  - 1. costs and assets grow at the same rate as sales
  - 2. 60% of net income is paid out in dividends
  - 3. no external financing is available (debt or equity)
- Q. What is the *maximum* growth rate achievable?
- A. The maximum growth rate is given by

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

  - ROA = \$10/___ = ___%
  - b = 1 - .___ = .___
  - IGR = (20% × .40)/[1 - (20% × .40)]
    = .08/.92 = 8.7% (= 8.695656…%)

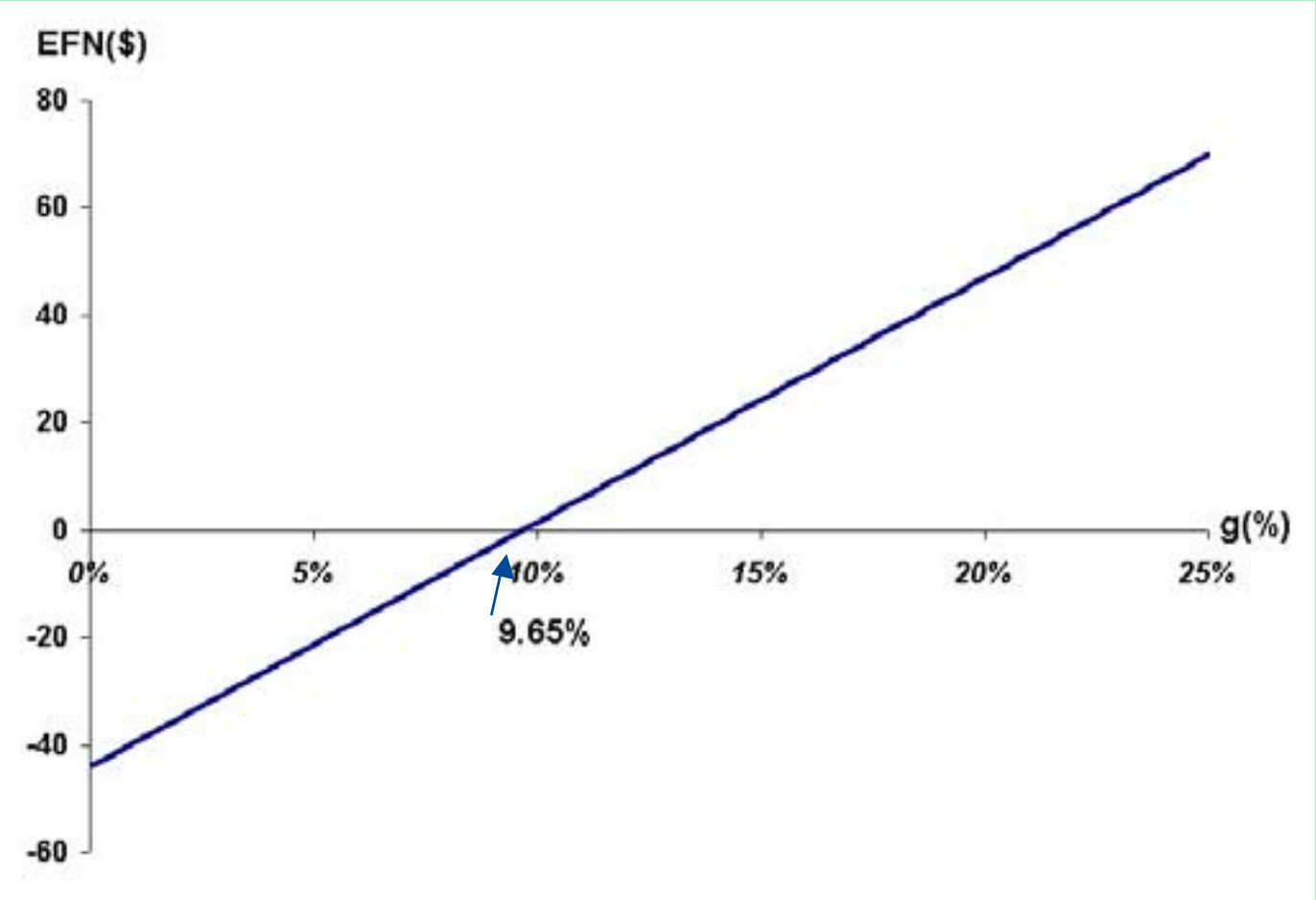
T4.9 Growth and External Financing (concluded)

- Assume that:
  - 1. costs and assets grow at the same rate as sales
  - 2. 60% of net income is paid out in dividends
  - 3. no external financing is available (debt or equity)
- Q. What is the *maximum* growth rate achievable?
- A. The maximum growth rate is given by

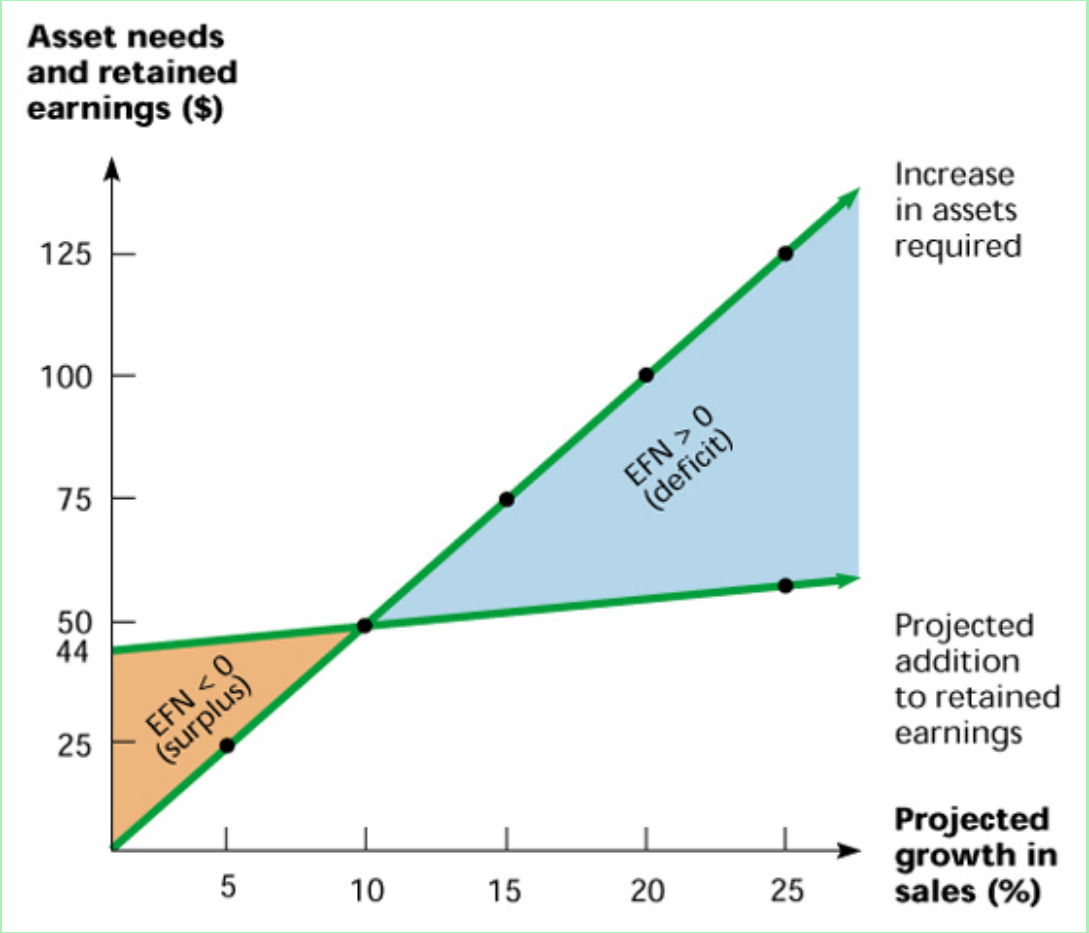
$$\text{Internal growth rate (IGR)} = \frac{ROA \times b}{1 - (ROA \times b)}$$

  - ROA = \$10/50 = 20%
  - b = 1 - .60 = .40
  - IGR = (20% × .40)/[1 - (20% × .40)]
    = .08/.92 = 8.7% (= 8.695656…%)

T4.10 Growth and Financing Needed for the Hoffman Company (Figure 4.1)



T4.10 Growth and Financing Needed for the Hoffman Company (Figure 4.1)



T4.11 The Internal Growth Rate

- Assume sales *do* grow at 8.7 percent. How are the financial statements affected?

Pro Forma Financial Statements

Income statement		Balance sheet			
Sales	$108.70	Assets	$54.35	Debt	$20.00
Costs	97.83			Equity	_____
Net	$10.87	Total	$54.35	Total	$_____
Dividends	$6.52				
Add to R/E	_____				

T4.11 The Internal Growth Rate

- Assume sales *do* grow at 8.7 percent. How are the financial statements affected?

Pro Forma Financial Statements

Income statement		Balance sheet			
Sales	$108.70	Assets	$54.35	Debt	$20.00
Costs	97.83			Equity	34.35
Net	$10.87	Total	$54.35	Total	$54.35
Dividends	$6.52				
Add to R/E	4.35				

T4.11 Internal Growth Rate (concluded)

- Now assume:
  - 1. no external *equity* financing is available
  - 2. the current debt/equity ratio is optimal
- Q. What is the *maximum* growth rate achievable now?
- A. The maximum growth rate is given by

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

- ROE = $___ /___ = 1/3(= 33.333…%)
- b = 1.00 - .60 = .40
- SGR = (1/3 × .40)/[1 - (1/3 × .40)]
  = 15.385% (=15.38462…%)

T4.11 Internal Growth Rate (concluded)

- Now assume:
  - 1. no external *equity* financing is available
  - 2. the current debt/equity ratio is optimal
- Q. What is the *maximum* growth rate achievable now?
- A. The maximum growth rate is given by

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

- ROE = \$10 / 30 = 1/3(= 33.333…%)
- b = 1.00 - .60 = .40
- SGR = (1/3 × .40)/[1 - (1/3 × .40)]
  = 15.385% (=15.38462…%)

T4.12 The Sustainable Growth Rate

- Assume sales *do* grow at 15.385 percent:

Pro Forma Financial Statements

Income statement		Balance sheet			
Sales	$115.38	Assets	$57.69	Debt	$_____
Costs	103.85		_____	Equity	_____
Net	$11.53	Total	$57.69	Total	$_____
Dividends	$6.92			EFN	$_____
Add to R/E	_____				

If we borrow the $3.08, the debt/equity ratio will be:

$ _____/ _____=_____

T4.12 The Sustainable Growth Rate

- Assume sales *do* grow at 15.385 percent:

Pro Forma Financial Statements

Income statement		Balance sheet			
Sales	$115.38	Assets	$57.69	Debt	$ 20
Costs	103.85			Equity	34.61
Net	$11.53	Total	$57.69	Total	$54.61
Dividends	$6.92			EFN	$3.08
Add to R/E	4.61				

If we borrow the $3.08, the debt/equity ratio will be:

$ 23.08 / 34.61 = 2/3

Is this what you expected?

T4.12 The Sustainable Growth Rate (concluded)

- The rate of *sustainable growth* depends on four factors:
  - 1. *Profitability* (profit margin)
  - 2. *Dividend Policy* (dividend payout)
  - 3. *Financial policy* (debt-equity ratio)
  - 4. _____

T4.12 The Sustainable Growth Rate (concluded)

- The rate of *sustainable growth* depends on four factors:
  - 1. *Profitability* (profit margin)
  - 2. *Dividend Policy* (dividend payout)
  - 3. *Financial policy* (debt-equity ratio)
  - 4. *Asset utilization* (total asset turnover)
- Do you see any relationship between the SGR and the Du Pont identity?

T4.13 Summary of Internal and Sustainable Growth Rates

I. Internal Growth Rate

$$IGR = (ROA \times b)/[1 - (ROA \times b)]$$

where: ROA = return on assets = Net income/assets

b = earnings retention or "plowback" ratio

The IGR is the maximum growth rate that can be achieved with no external financing of any kind.

II. Sustainable Growth Rate

$$SGR = (ROE \times b)/[1 - (ROE \times b)]$$

where: ROE = return on equity = Net income/equity

b = earnings retention or "plowback" ratio

The SGR is the maximum growth rate that can be achieved with no external equity financing while maintaining a constant debt/equity ratio.

T4.14 Questions the Financial Planner Should Consider

- Mark Twain once said “forecasting is very difficult, particularly if it concerns the future”. The process of financial planning involves the use of mathematical models which provide the *illusion* of great accuracy. In assessing a financial forecast, the planner should ask the following questions:
  - Are the results generated by the model *reasonable*?
  - Have I considered *all* possible outcomes?
  - How *reasonable* were the economic assumptions which were used to generate the forecast?
  - Which assumptions have the greatest impact on the outcome?
  - Which variables are of the greatest importance in determining the outcome?
  - Have I forgotten anything important?
- The final question may be the most crucial. It is worthwhile to remember that, if you think your forecasting model is too good to be true, you’re undoubtedly right.

T4.15 Chapter 4 Quick Quiz

1. How does one compute the external financing needed (EFN)? Why is this information important to a financial planner?

2. What is the internal growth rate (IGR)?

3. What is the sustainable growth rate (SGR)?

4. What kinds of questions might one ask in evaluating a financial plan?

T4.15 Chapter 4 Quick Quiz

1. How does one compute the external financing needed (EFN)? Why is this information important to a financial planner?

   EFN = increase in assets required - increase in internal financing.

2. What is the internal growth rate (IGR)?

   IGR = maximum growth rate achievable without external financing.

3. What is the sustainable growth rate (SGR)?

   SGR = maximum growth rate achievable without external financing and while maintaining a constant debt-equity ratio.

4. What kinds of questions might one ask in evaluating a financial plan?

   Are the results reasonable? Which assumptions are crucial? What have I forgotten?

T4.16 Solution to Problem 4.8

- What is Ping, Li, Yi, & Co.'s maximum sales increase if no new equity is issued?

  Assume: Assets and costs are proportional to sales, 50% dividend payout ratio, and constant debt-equity ratio.

Sales	$23,000
- Costs	15,200
Taxable Income	$ 7,800
- Taxes	2,652
Net Income	$5,148

Net W. Cap.	$10,500	L. T. Debt	$30,000
Fixed Assets	50,000	Equity	30,500
	$60,500		$60,500

T4.16 Solution to Problem 4.8 (concluded)

SGR = (ROE × b) / [1 - (ROE × b)]

ROE = Net income / Equity
= $5,148 / $30,500 = .168787

b = Retention ratio
= 1 - Dividends/Net income
= 1 - .50 = .50

SGR = (.168787 × .50) / [1 - (.168788 × .50)]
= .0922

Maximum Increase = Sales × SGR
= $23,000 × .0922 = $2,120.60

T4.17 Solution to Problem 4.14

- Given the following information, compute the sustainable growth rate (SGR) and the ROE for Newlook Fitness Centre.
  - a. Profit Margin = .085
  - b. Capital Intensity = .60
  - c. Debt-Equity = .50
  - d. Net Income = $10,000
  - e. Dividends = $ 4,000

ROE = (Profit Margin)(Asset Turnover)(Equity Multiplier)

Profit Margin = Net Income / Sales = $10,000/Sales = .085

Sales = $10,000/.085 = $117,647

Asset Turnover = Sales / Assets = 1/Capital Intensity = 1 /.60 = 1.667

Equity Multiplier = Assets / Equity = $70,588/47,059 = 1.5

Assets = Sales/Asset Turnover = $117,647/1.667 = $70,588

Equity = 2/3 (Assets) = 2/3 ($70,588) = $47,059

T4.17 Solution to Problem 4.14 (concluded)

ROE = (.085)(1.667)(1.5) = .2125 = 21.25%

SGR = (ROE × b) / [1 - (ROE × b)]

b = 1 - (Dividends / Net Income)

= 1 - $4,000 / $10,000

= 1 - .40 = .60

SGR = (.2125 × .60) / [1 - (.2125 × .60)]

= .1461 = 14.61%