CHAPTER 4
LONG-TERM FINANCIAL PLANNING AND GROWTH

Answers to Concepts Review and Critical Thinking Questions

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.

2. It's probably more important for a capital intensive company because such companies must make large cash outlays long in advance of actual needs. For example, a new manufacturing facility might have to be started years before the planned output is needed.

3. The internal growth rate is greater than 15%, because at a 15% growth rate the negative EFN indicates that there is excess internal financing. If the internal growth rate is greater than 15%, then the sustainable growth rate is certainly greater than 15%, because there is additional debt financing used in that case (assuming the firm is not 100% equity-financed). As the retention ratio is increased, the firm has more internal sources of funding, so the EFN will decline. Conversely, as the retention ratio is decreased, the EFN will rise. If the firm pays out all its earnings in the form of dividends, then the firm has no internal sources of funding (ignoring the effects of accounts payable); the internal growth rate is zero in this case and the EFN will rise to the change in total assets.

4. The sustainable growth rate is greater than 20%, because at a 20% growth rate the negative EFN indicates that there is excess financing still available. If the firm is 100% equity financed, then the sustainable and internal growth rates are equal and the internal growth rate would be greater than 20%. 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%. 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.

5. 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.

6. 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.

7. Apparently not! In hindsight, the firm may have underestimated costs and also underestimated the extra demand from the lower price.

8. 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.

9. 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.

10. Demanding cash up front, 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.

Solutions to Questions and Problems

Basic

1.

Pro forma income statement			Pro forma balance sheet		
Sales	$16,500	Assets	$ 4,730	Debt	$ 3,080
Costs	12,100			Equity	1,650
Net income	$ 4,400	Total	$ 4,730	Total	$ 4,730

Net income is $4,400 but equity only increased by $150; therefore, a dividend of $4,250 must have been paid. Dividends paid is the plug variable.

2.

Pro forma income statement			Pro forma balance sheet		
Sales	$16,500	Assets	$ 4,730	Debt	$ 2,800
Costs	12,100			Equity	3,700
Net income	$ 4,400	Total	$ 4,730	Total	$ 6,500

Dividends	$ 2,200	EFN = $4,730 – 6,500 = –$1,770
Add. to RE	2,200	

3.

Pro forma income statement			Pro forma balance sheet		
Sales	$ 5,320	Assets	$ 18,620	Debt	$ 9,200
Costs	2,394			Equity	7,026
Net income	$ 2,926	Total	$ 18,620	Total	$ 16,226

EFN = $18,620 – 16,226 = $2,394

4.

Pro forma income statement		Pro forma balance sheet			
Sales	$24,000.00	Assets	$ 116,250	Debt	$ 20,400.00
Costs	19,437.50			Equity	73,804.37
EBIT	4,562.50	Total	$ 116,250	Total	$ 94,204.37
Taxes(34%)	1,551.25				
Net income	$ 3,011.25				

Dividends	$ 1,806.88	Dividends = ($1,445.50 / $2,409)($3.011.25) = $1,806.75
Add. to RE	1,204.37	EFN = $116,250 – 94,204.37 = $22,045.63

5.

Pro forma income statement		Pro forma balance sheet			
Sales	$3,596.00	CA	$4,640.00	CL	$ 870.00
Costs	3,016.00	FA	3,480.00	LTD	1,250.00
Taxable income	580.00			Equity	5,191.40
Taxes (34%)	197.20	Total	$8,120.00	Total	$7,311.40
Net income	$ 382.80				

Dividends	$ 191.40	Dividends = 0.50($382.80) = $191.40
Add. to RE	191.40	EFN = $8,120.00 – 7,311.40 = $808.60

6. ROA = NI / TA = $1,646 / $34,000 = .0484
b = 1 – 0.2 = 0.8
internal g = [0.0484(.80)] / [1 – 0.0484(.80)] = .0403 = 4.03%

7. ROE = NI / TE = $1,646 / $12,000 = .1372
b = 1 – 0.2 = 0.8
sustainable g = [0.1372(.80)] / [1 – 0.1372(.80)] = .1233 = 12.33%

8. ROE = NI / TE = $10,296 / $61,000 = .1688
b = 1 – 0.3 = 0.7
sustainable g = [0.1688(.70)] / [1 – 0.1688(.70)] = .1340 = 13.40%
maximum increase in sales = $46,000(.1340) = $6,163.11

9.

HEIR JORDAN CORPORATION
Pro Forma Income Statement

Sales	$28,800.00
Costs	16,200.00
Taxable income	$12,600.00
Taxes (34%)	4,284.00
Net income	$ 8,316.00
Dividends	$ 2,911.20
Add. to RE	5,404.80

10.

HEIR JORDAN CORPORATION
Balance Sheet

Assets	($)	(%)	Liabilities and Owners' Equity	($)	(%)
Current assets			Current liabilities		
Cash	$ 3,525	14.69	Accounts payable	$ 3,000	12.50
Accounts receivable	7,500	31.25	Notes payable	7,500	n/a
Inventory	6,000	25.00	Total	$10,500	n/a
Total	$17,025	70.94	Long-term debt	19,500	n/a
Fixed assets			Owners' equity		
Net plant and equipment	30,000	125.00	Common stock and paid-in surplus	$15,000	n/a
			Retained earnings	2,025	n/a
			Total	$17,025	n/a
			Total liabilities and owners'		
Total assets	$47,025	195.94	equity	$47,025	n/a

11.

HEIR JORDAN CORPORATION
Pro Forma Balance Sheet

Assets		Liabilities and Owners' Equity	
Current assets		Current liabilities	
Cash	$ 4,053.75	Accounts payable	$ 3,450.00
Accounts receivable	8,625.00	Notes payable	7,500.00
Inventory	6,900.00	Total	$ 10,950.00
Total	$ 19,578.75	Long-term debt	19,500.00
Fixed assets			
Net plant and equipment	34,500.00	Owners' equity	
		Common stock and paid-in surplus	$ 15,000.00
		Retained earnings	7,204.60
		Total	$ 22,204.60
		Total liabilities and owners'	
Total assets	$ 54,078.75	equity	$ 52,654.60

EFN = $54,078.75 – 52,654.60 = $1,424.15

12. b = 1 – .25 = .75; internal g = [.12(.75)] / [1 – .12(.75)] = 9.89%

13. b = 1 – .30 = .70; sustainable g = [.18(.70)] / [1 – .18(.70)] = 14.42%

14. ROE = (PM)(TAT)(EM) = (.092)(1/.60)(1 + .50) = 23.00%
b = 1 – ($14,000 / $23,000) = .3913; sustainable g = [.2300(.3913)] / [1 – .2300(.3913)] = 9.89%

15. ROE = (PM)(TAT)(EM) = (.075)(1.60)(1.95) = 23.40%
b = 1 – .40 = .60; sustainable g = [.2340(.60)] / [1 – .2340(.60)] = 16.33%

Intermediate

16. Full capacity sales = $425,000 / 0.75 = $566,666.67
Max sales growth = ($566,666.67 / $425,000) – 1 = 33.33%

17. Fixed assets / full capacity sales = $310,000 / $566,666.67 = 0.5471
Total fixed assets = 0.5471($620,000) = $339,176.47
New fixed assets = $339,176.47 – $310,000 = $29,176.47

18. b = 1 – .60 = .40; sustainable g = .08 = [ROE(.40)] / [1 – ROE(.40)]; ROE = 18.52%
ROE = .1852 = PM(1 / 1.60)(1 + .45); PM = (.1852)(1.60) / 1.45 = 20.43%

19. b = 1 – .50 = .50; sustainable g = .115 = [ROE(.50)] / [1 – ROE(.50)]; ROE = 20.62%
ROE = .2062 = (.09)(1 / 0.8)EM; EM = (.2062)(0.8) / .09 = 1.83; D/E = 0.83

20. b = 1 – .40 = .60; internal g = .09 = [ROA(.60)] / [1 – ROA(.60)]; ROA = .1376
ROA = .1376 = (PM)(TAT); TAT = .1376 / .12 = 1.15

21. TDR = 0.60 = TD / TA; 1 / 0.60 = TA / TD = 1 + TE / TD; D/E = 1 / [(1 / 0.60) – 1] = 1.5
ROE = (PM)(TAT)(EM) = (.09)(1.60)(1 + 1.5) = .3600
ROA = ROE / EM = .3600 / 2.5 = 14.40%;
b = 1 – .55 = .45; sustainable g = [.3600(.45)] / [1 – .3600(.45)] = 19.33%

22. b = 1 – ($4,800 / $15,000) = .68; ROE = NI / TE = $15,000 / $32,000 = 46.88%
sustainable g = [.68(.4688)] / [1 – .68(.4688)] = 46.79%
new TA = 1.4679($97,000) = $142,385.32; D/E = $65,000 / $32,000 = 2.03
new TD = [D / (D+E)](TA) = [$65,000 / ($65,000 + 32,000)]($142,385.32) = $95,412.84
additional borrowing = $95,412.84 – 65,000 = $30,412.84
ROA = NI / TA = $15,000 / $97,000 = .1546
internal g = [.1546(.68)] / [1 – .1546(.68)] = 11.75%

23.

MOOSE TOURS INC.
2003 Pro Forma Income Statement

Sales	$ 1,176,000
Costs	924,000
Other expenses	16,800
EBIT	$ 235,200
Interest	23,800
Taxable income	$ 211,400
Taxes(35%)	73,990
Net income	$ 137,410
Dividends	$ 54,964
Add to RE	82,446

MOOSE TOURS INC.
Pro Forma Balance Sheet as of December 31, 2003

Assets		Liabilities and Owners' Equity	
Current assets		Current liabilities	
Cash	$ 33,600	Accounts payable	$ 84,000
Accounts receivable	58,800	Notes payable	7,000
Inventory	100,800	Total	$ 91,000
Total	$ 193,200	Long-term debt	168,000
Fixed assets		Owners' equity	
Net plant and equipment	462,000	Common stock and paid-in surplus	$ 21,000
		Retained earnings	362,446
		Total	$ 383,446
Total assets	$ 655,200	Total liabilities and owners' equity	$ 642,446

EFN = $655,200 – 642,446 = $12,754

24. Full capacity sales = $980,000 / .80 = $1,225,000
Fixed assets required at full capacity = $385,000 / $1,225,000 = 0.31429
Total fixed assets = .31429($1,176,000) = $369,600
EFN = ($193,200 + 369,600) – $642,446 = –$79,646
Note that this solution assumes that fixed assets are decreased (sold) so the company has a 100 percent fixed asset utilization. If we assume fixed assets are not sold, the answer becomes:
EFN = ($193,200 + 385,600) – $642,446 = –$63,646

25. D/E = ($168,000 + 77,000) / $301,000 = 0.81395;
new total debt = 0.81395($383,446) = $312,107.21
EFN = $655,200 – ($312,107.21 + 383,446) = –$40,353.21
An interpretation of the answer is not that the company has a negative EFN. Looking back at problem 23, we see that for the same sales growth, the EFN is $12,754. The negative number in this case means the company has too much capital. There are two possible solutions. First, the company can put the excess funds in cash, which has the effect of changing the current asset growth rate. Second, the company can use the excess funds to repurchase debt and equity. To maintain the current capital structure, the repurchase must be in the same proportion as the current capital structure.

Challenge

26.

MOOSE TOURS INC.
Pro Forma Income Statement

	20 % Sales Growth	*25% Sales Growth*	*30% Sales Growth*
Sales	$1,176,000	$1,225,000	$1,274,000
Costs	924,000	962,500	1,001,000
Other expenses	16,800	17,500	18,200
EBIT	$ 235,200	$ 245,000	$ 254,800
Interest	23,800	23,800	23,800
Taxable income	$ 211,400	$ 221,200	$ 231,000
Taxes (35%)	73,990	77,420	80,850
Net income	$ 137,410	$ 143,780	$ 150,150
Dividends	$54,964	$57,512	$60,060
Add to RE	82,446	86,268	90,090

20% Sales Growth:

MOOSE TOURS INC.
Pro Forma Balance Sheet as of December 31, 2003

Assets		Liabilities and Owners' Equity	
Current assets		Current liabilities	
Cash	$ 33,600	Accounts payable	$ 84,000
Accounts receivable	58,800	Notes payable	7,000
Inventory	100,800	Total	$ 91,000
Total	$ 193,200	Long-term debt	168,000
Fixed assets			
Net plant and equipment	462,000	Owners' equity	
		Common stock and paid-in surplus	$ 21,000
		Retained earnings	362,446
		Total	$ 383,446
Total assets	$ 655,200	Total liabilities and owners' equity	$ 642,446

EFN = $655,200 – 642,446 = $12,754

25% Sales Growth:

MOOSE TOURS INC.
Pro Forma Balance Sheet as of December 31, 2003

Assets		Liabilities and Owners' Equity	
Current assets		Current liabilities	
Cash	$ 35,000	Accounts payable	$ 87,500
Accounts receivable	61,250	Notes payable	7,000
Inventory	105,000	Total	$ 94,500
Total	$ 201,250	Long-term debt	168,000
Fixed assets			
Net plant and equipment	481,250	Owners' equity	
		Common stock and paid-in surplus	$ 21,000
		Retained earnings	366,628
		Total	$ 387,628
		Total liabilities and owners'	
Total assets	$ 682,500	equity	$ 649,768

EFN = $682,500 – 649,768 = $32,732

30% Sales Growth:

MOOSE TOURS INC.
Pro Forma Balance Sheet as of December 31, 2003

Assets		Liabilities and Owners' Equity	
Current assets		Current liabilities	
Cash	$ 36,400	Accounts payable	$ 91,000
Accounts receivable	63,700	Notes payable	7,000
Inventory	109,200	Total	$ 98,000
Total	$ 209,300	Long-term debt	168,000
Fixed assets			
Net plant and equipment	500,500	Owners' equity	
		Common stock and paid-in surplus	$ 21,000
		Retained earnings	370,090
		Total	$ 391,090
		Total liabilities and owners'	
Total assets	$ 709,800	equity	$ 657,090

EFN = $709,800 – 657,090 = $52,710

27.

MOOSE TOURS INC.
Pro Forma Income Statement

	20 % Sales Growth	*30% Sales Growth*	*35% Sales Growth*
Sales	$1,176,000	$1,274,000	$1,323,000
Costs	924,000	1,001,000	1,039,500
Other expenses	16,800	18,200	18,900
EBIT	$ 235,200	$ 254,800	$ 264,600
Interest	23,800	23,800	23,800
Taxable income	$ 211,400	$ 231,000	$ 240,800
Taxes (35%)	73,990	80,850	84,280
Net income	$ 137,410	$ 150,150	$ 156,520
Dividends	$54,964	$60,060	$62,608
Add to RE	82,446	90,090	93,912

Sales growth rate = 20% and debt/equity ratio = 0.81395:

MOOSE TOURS INC.
Pro Forma Balance Sheet as of December 31, 2003

Assets		Liabilities and Owners' Equity	
Current assets		Current liabilities	
Cash	$ 33,600.00	Accounts payable	$ 84,000.00
Accounts receivable	58,800.00	Notes payable	7,000.00
Inventory	100,800.00	Total	$ 91,000.00
Total	$ 193,200.00	Long-term debt	221,107.21
Fixed assets			
Net plant and equipment	462,000.00	Owners' equity	
		Common stock and paid-in surplus	$ 21,000.00
		Retained earnings	362,446.00
		Total	$ 383,446.00
		Total liabilities and owners'	
Total assets	$ 655,200.00	equity	$ 695,553.21

EFN = $655,200.00 – 695,553.21 = –$40,353.21

Sales growth rate = 30% and debt/equity ratio = 0.81395:

MOOSE TOURS INC.
Pro Forma Balance Sheet as of December 31, 2003

Assets		Liabilities and Owners' Equity	
Current assets		Current liabilities	
Cash	$ 36,400.00	Accounts payable	$ 91,000.00
Accounts receivable	63,700.00	Notes payable	7,000.00
Inventory	109,200.00	Total	$ 98,000.00
Total	$ 209,300.00	Long-term debt	220,329.07
Fixed assets			
Net plant and equipment	500,500.00	Owners' equity	
		Common stock and paid-in surplus	$ 21,000.00
		Retained earnings	370,090.00
		Total	$ 391,090.00
		Total liabilities and owners'	
Total assets	$ 709,800.00	equity	$ 709,419.07

EFN = $709,800.00 – 709,419.07 = $380.93

Sales growth rate = 35% and debt/equity ratio = 0.81395:

MOOSE TOURS INC.
Pro Forma Balance Sheet as of December 31, 2003

Assets		Liabilities and Owners' Equity	
Current assets		Current liabilities	
Cash	$ 37,800.00	Accounts payable	$ 94,500.00
Accounts receivable	66,150.00	Notes payable	7,000.00
Inventory	113,400.00	Total	$ 101,500.00
Total	$ 217,350.00	Long-term debt	219,940.00
Fixed assets			
Net plant and equipment	519,750.00	Owners' equity	
		Common stock and paid-in surplus	$ 21,000.00
		Retained earnings	373,912.00
		Total	$ 394,912.00
		Total liabilities and owners'	
Total assets	$ 737,100.00	equity	$ 716,352.00

EFN = $737,100.00 – 716,352.00 = $20,748.00

28. ROE = (PM)(TAT)(EM) = (.045)(1 / 1.75)(1 + 0.4) = 3.60%
sustainable g = .12 = [.0360(b)] / [1 – .0360(b)]; b = 2.98; payout ratio = 1 – b = – 1.98
This is a negative dividend payout ratio of 198%, which is impossible; the growth rate is not consistent with the other constraints. The lowest possible payout rate is 0, which corresponds to b = 1, or total earnings retention.
max sustainable g = .0360 / (1 – .0360) = 3.73%

29. EFN = increase in assets – addition to retained earnings
Increase in assets = $A \times g$
Addition to retained earnings = $(NI \times b)(1 + g)$
NI = PM(S)

Thus, EFN = A(g) – PM(S)b(1 + g)
= A(g) – PM(S)b – [PM(S)b]g
= – PM(S)b + [A – PM(S)b]g

30. Internal growth rate*:*

EFN = 0 = – PM(S)b + [A – PM(S)b]g
g = [PM(S)b] / [A – PM(S)b]
Since ROA = NI / A = PM(S) / A, dividing numerator and denominator by A gives
g = {[PM(S)b] / A} / {[A – PM(S)b] / A}
= b(ROA) / [1 – b(ROA)]

Sustainable growth rate:

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)] = A(g) – PM(S)b(1 + g)

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

g = PM(S)b(1 + D/E) / [A – PM(S)b(1 + D/E)]
= [ROA(1 + D/E)b] / [1 – ROA(1 + D/E)b]
= b(ROE) / [1 – b(ROE)]