Chapter 5
Financial Planning and Forecasting Financial Statements

ANSWERS TO END-OF-CHAPTER QUESTIONS

5-1 a. The operating plan provides detailed implementation guidance designed to accomplish corporate objectives. It details who is responsible for what particular function, and when specific tasks are to be accomplished. The financial plan details the financial aspects of the corporation's operating plan. In addition to an analysis of the firm's current financial condition, the financial plan normally includes a sales forecast, the capital budget, the cash budget, pro forma financial statements, and the external financing plan. A sales forecast is merely the forecast of unit and dollar sales for some future period. Of course, a lot of work is required to produce a good sales forecast. Generally, sales forecasts are based on the recent trend in sales plus forecasts of the economic prospects for the nation, industry, region, and so forth. The sales forecast is critical to good financial planning.

b. A pro forma financial statement shows how an actual statement would look if certain assumptions are realized. With the forecasted financial statement method, many (but not all) items on the income statement and balance sheets are assumed to increase proportionally with sales. As sales increase, these items that are tied to sales also increase, and the values of these items for a particular year are estimated as percentages of the forecasted sales for that year.

c. Funds are spontaneously generated if a liability account increases spontaneously (automatically) as sales increase. An increase in a liability account is a source of funds, thus funds have been generated. Two examples of spontaneous liability accounts are accounts payable and accrued wages. Note that notes payable, although a current liability account, is not a spontaneous source of funds since an increase in notes payable requires a specific action between the firm and a creditor.

d. Additional funds needed (AFN) are those funds required from external sources to increase the firm's assets to support a sales increase. A sales increase will normally require an increase in assets. However, some of this increase is usually offset by a spontaneous increase in liabilities as well as by earnings retained in the firm. Those funds that are required but not generated internally must be obtained from external sources. Although most firms' forecasts of capital requirements are made by constructing pro forma income statements and balance sheets, the AFN formula is sometimes used to forecast financial requirements. It is written as follows:

$$\begin{array}{lcl} \text{Additional funds needed} & = & \text{Required asset increase} - \text{Spontaneous liability increase} - \text{Increase in retained earnings} \\ \text{AFN} & = & (A^*/S_0)\Delta S - (L^*/S_0)\Delta S - MS_1(RR) \end{array}$$

Capital intensity is the dollar amount of assets required to produce a dollar of sales. The capital intensity ratio is the reciprocal of the total assets turnover ratio.

e. "Lumpy" assets are those assets that cannot be acquired smoothly, but require large, discrete additions. For example, an electric utility that is operating at full capacity cannot add a small amount of generating capacity, at least not economically. A firm has excess capacity when its sales can grow before it must add fixed assets such as plant and equipment. When economies of scale occur, the ratios are likely to change over time as the size of the firm increases. For example, retailers often need to maintain base stocks of different inventory items, even if current sales are quite low. As sales expand, inventories may then grow less rapidly than sales, so the ratio of inventory to sales declines.

f. Financing feedback effects are incorporated in the forecasted financial statement method when the effects of external capital are included in the analysis. Interest on notes payable and long-term debt will increase (decrease) as notes and debt are issued (retired). Dividends of additional common and preferred shares issued must be included in the analysis. This will lower the addition of retained earnings. Likewise, if common and preferred shares are repurchased then dividends will decline and this will increase the addition of retained earnings. When financial feedback effects are considered, this changes the AFN forecast if these feedback effects are not considered.

5-2 Accounts payable, accrued wages, and accrued taxes increase spontaneously and proportionately with sales. Retained earnings increase, but not proportionately.

5-3 The equation gives good forecasts of financial requirements if the ratios A*/S and L*/S, the profit margin, and payout ratio are stable. This equation assumes that ratios are constant. This would not occur if there were economies of scale, excess capacity, or when lumpy assets are required. Otherwise, the forecasted financial statement method should be used.

5-4 The five key factors that impact a firm's external financing requirements are: Sales growth, capital intensity, spontaneous liabilities-to-sales ratio, profit margin, and retention ratio.

5-5 The self-supporting growth rate is the maximum rate a firm can achieve without having to raise external capital. The self-supporting growth rate is calculated using the AFN equation, setting AFN equal to zero, replacing the term ΔS with the term $g \times S0$, and replacing the term S1 with $S0 \times (1 + g)$. Once the AFN equation is rewritten with these modifications, you can now solve for g. This "g" obtained is the firm's self-supporting growth rate.

5-6 a. +.

b. +. It reduces spontaneous funds; however, it may eventually increase retained earnings.

c. +.

d. +.

SOLUTIONS TO END-OF-CHAPTER PROBLEMS

5-1 $AFN = (A^*/S_0)\Delta S - (L^*/S_0)\Delta S - MS_1(RR)$

$$= \left(\frac{\$1{,}500{,}000}{\$2{,}000{,}000}\right)\$1{,}000{,}000 - \left(\frac{\$300{,}000}{\$2{,}000{,}000}\right)\$1{,}000{,}000 - 0.05(\$3{,}000{,}000)(1 - 0.7)$$

$$= (0.75)(\$1{,}000{,}000) - (0.15)(\$1{,}000{,}000) - (\$150{,}000)(0.3)$$

$$= \$750{,}000 - \$150{,}000 - \$45{,}000$$

$$= \$555{,}000.$$

5-2 $$AFN = \left(\frac{\$4{,}000{,}000}{\$2{,}000{,}000}\right)\$1{,}000{,}000 – (0.15)(\$1{,}000{,}000) – (\$150{,}000)(0.3)$$

$$= (2)(\$1{,}000{,}000) - \$150{,}000 - \$45{,}000$$

$$= \$2{,}000{,}000 - \$195{,}000$$

$$= \$1{,}805{,}000.$$

The capital intensity ratio is measured as A^*/S_0. This firm's capital intensity ratio is higher than that of the firm in Problem 5-1; therefore, this firm is more capital intensive—it would require a large increase in total assets to support the increase in sales.

5-3 $$AFN = (0.75)(\$1{,}000{,}000) - (0.15)(\$1{,}000{,}000) - 0.05(\$3{,}000{,}000)(1 - 0)$$

$$= \$750{,}000 - \$150{,}000 - \$150{,}000$$

$$= \$450{,}000.$$

Under this scenario the company would have a higher level of retained earnings which would reduce the amount of additional funds needed.

5-4 S_{2012} = \$2,000,000; A_{2012} = \$1,500,000; CL_{2012} = \$500,000; NP_{2012} = \$200,000; A/P_{2012} = \$200,000; $Accruals_{2012}$ = \$100,000; PM = 5%; d = 60%; $A^*/S_0 = 0.75$.

$$AFN = (A^*/S_0)\Delta S - (L^*/S_0)\Delta S - MS_1(1 - d)$$
$$= (0.75)\Delta S - \left(\frac{\$300,000}{\$2,000,000}\right)\Delta S - (0.05)(S_1)(1 - 0.6)$$
$$= (0.75)\Delta S - (0.15)\Delta S - (0.02)S_1$$
$$= (0.6)\Delta S - (0.02)S_1$$
$$= 0.6(S_1 - S_0) - (0.02)S_1$$
$$= 0.6(S_1 - \$2,000,000) - (0.02)S_1$$
$$= 0.6S_1 - \$1,200,000 - 0.02S_1$$
$$\$1,200,000 = 0.58S_1$$
$$\$2,068,965.52 = S_1.$$

Sales can increase by \$2,068,965.52 - \$2,000,000 = \$68,965.52 without additional funds being needed.

5-5 a. $\underset{\text{and equity}}{\text{Total liabilities}} = \underset{\text{Payable}}{\text{Accounts}} + \underset{\text{debt}}{\text{Long-term}} + \underset{\text{stock}}{\text{Common}} + \underset{\text{earnings}}{\text{Retained}}$.

\$1,200,000 = \$375,000 + Long-term debt + \$425,000 + \$295,000
Long-term debt = \$105,000.

Total debt = Accounts payable + Long-term debt
= \$375,000 + \$105,000
= \$480,000.

Alternatively,

Total debt = $\underset{\text{and equity}}{\text{Total liabilities}}$ - Common stock - Retained earnings
= \$1,200,000 - \$425,000 - \$295,000
= \$480,000.

b. Assets/Sales (A^*/S) = \$1,200,000/\$2,500,000 = 48%.
L^*/Sales = \$375,000/\$2,500,000 = 15%.
2013 Sales = (1.25)(\$2,500,000) = \$3,125,000.

AFN = $(A^*/S)(\Delta S) - (L^*/S)(\Delta S) - MS_1(1 - d)$ - New common stock
= (0.48)(\$625,000) - (0.15)(\$625,000) - (0.06)(\$3,125,000)(0.6) - \$75,000
= \$300,000 - \$93,750 - \$112,500 - \$75,000 = \$18,750.

Alternatively, using the percentage of sales method:

	2012	Forecast Basis % 2013 Sales	Additions (New Financing, R/E)	Pro Forma
Total assets	\$1,200,000	0.48		\$1,500,000
Current liabilities	375,000	0.15		468,750
Long-term debt	105,000			105,000
Total debt	480,000			573,750
Common stock	425,000		75,000*	500,000
Retained earnings	295,000		112,500**	407,500
Total common equity	720,000			907,500
Total liabilities and equity	\$1,200,000			\$1,481,250
AFN = Long-term debt =				\$ 18,750

*Given in problem that firm will sell new common stock = \$75,000.
**PM = 6%; Payout = 40%; NI_{2013} = \$2,500,000 x 1.25 x 0.06 = \$187,500.
Addition to RE = NI x (1 - Payout) = \$187,500 x 0.6 = \$112,500.

5-6

	2012			2013
Cash	$ 100.00	× 2	=	$ 200.00
Accounts receivable	200.00	× 2	=	400.00
Inventories	200.00	× 2	=	400.00
Net fixed assets	500.00	+ 0.0	=	500.00
Total assets	$1,000.00			$1,500.00
Accounts payable	$ 50.00	× 2	=	$ 100.00
Notes payable	150.00	150.00 + 360.00	=	510.00
Accruals	50.00	× 2	=	100.00
Long-term debt	400.00			400.00
Common stock	100.00			100.00
Retained earnings	250.00	+ 40	=	290.00
Total liabilities and equity	$1,000.00			$1,140.00
			AFN	$ 360.00

Capacity sales = Sales/0.5 = $1,000/0.5 = $2,000.

Target FA/S ratio = $500/$2,000 = 0.25.

Target FA = 0.25($2,000) = $500 = Required FA. Since the firm currently has $500 of fixed assets, no new fixed assets will be required.

Addition to RE = $M(S_1)$(1 - Payout ratio) = 0.05($2,000)(0.4) = $40.

5-7 a.

	2012			2013
Cash	$ 100.00	× 2	=	$ 200.00
Accounts receivable	200.00	329 for 2013	=	329.00
Inventories	200.00	350 for 2013	=	350.00
Net fixed assets	500.00	+ 0.0	=	500.00
Total assets	$1,000.00			$1,379.00
Accounts payable	$ 50.00	× 2	=	$ 100.00
Notes payable	150.00	+ 239.00	=	389.00
Accruals	50.00	× 2	=	100.00
Long-term debt	400.00			400.00
Common stock	100.00			100.00
Retained earnings	250.00	+ 40	=	290.00
Total liabilities and equity	$1,000.00			$1,140.00
		AFN		$ 239.00

Accounts receivable for 2013 = $2,000/365 x 60 = $329.

Inventory = $2,000/5.71 = $350

Capacity sales = Sales/0.5 = $1,000/0.5 = $2,000.

Target FA/S ratio = $500/$2,000 = 0.25.

Target FA = 0.25($2,000) = $500 = Required FA. Since the firm currently has $500 of fixed assets, no new fixed assets will be required.

Addition to RE = $M(S_1)$(1 - Payout ratio) = 0.05($2,000)(0.4) = $40.

b. Change in incremental borrowing is $121 ($360 - $239) and the change in interest expense is $121 x 0.09 = $10.89 annually.

5-8 a. $AFN = (A^*/S)(\Delta S) - (L^*/S)(\Delta S) - MS_1(1 - d)$

$$= \frac{\$122.5}{\$280}(\$70) - \frac{\$17.5}{\$280}(\$70) - \frac{\$10.5}{\$280}(\$350)(0.6)$$

$$= \$18.375 \text{ million.}$$

b. $$g = \frac{M(1-d)(S_0)}{A^* - L^* - M(1-d)(S_0)} = \frac{0.0375(0.6)(\$280)}{\$122.5 - \$17.5 - 0.0375(0.6)(\$280)} = \frac{\$6.3}{\$98.7} = 6.38\%$$

c.

Re-boot Computers
Pro Forma Balance Sheet
December 31, 2013
(Millions of Dollars)

	2012	Forecast Basis % 2013 Sales	Additions	Pro Forma	Financing	Pro Forma after Financing
Cash	$ 3.5	0.0125		$ 4.38		$ 4.38
Receivables	26.0	0.0929		32.50		32.50
Inventories	58.0	0.2071		72.50		72.50
Total current assets	87.5			109.38		109.38
Net fixed assets	35.0	0.125		43.75		43.75
Total assets	$122.5			$153.13		$153.13
Accounts payable	$ 9.0	0.0321		$ 11.25		$ 11.25
Notes payable	18.0			18.00	+18.37	36.37
Accruals	8.5	0.0304		10.63		10.63
Total current liabilities	35.5			39.88		58.25
Mortgage loan	6.0			6.00		6.00
Common stock	15.0			15.00		15.00
Retained earnings	66.0		7.88*	73.88		73.88
Total liab. and equity	$122.5			$134.76		$153.13
AFN =				$ 18.37		

*PM = \$10.5/\$280 = 3.75%.
Payout = \$4.2/\$10.5 = 40%.
NI = \$280 × 1.2 × 0.0375 = \$13.125.
Addition to RE = NI - DIV = \$13.125 - 0.4(\$13.125) = 0.6(\$13.125) = \$7.88.

5-9 a.

Stevens Textiles
Pro Forma Income Statement
December 31, 2013
(Thousands of Dollars)

	2012	Forecast Basis	Pro Forma 2013
Sales	$ 36,000	$1.15 \times Sales_{12}$	$ 41,400
Operating costs	32,440	$0.9011 \times Sales_{13}$	37,306
EBIT	3,560		4,094
Interest	460	$0.10 \times Debt_{12}$	560
EBT	3,100		3,534
Taxes (40%)	1,240		1,414
Net income	$ 1,860		$ 2,120
Dividends (45%)	$ 837		$ 954
Addition to RE	$ 1,023		$ 1,166

Stevens Textiles
Pro Forma Balance Sheet
December 31, 2013
(Thousands of Dollars)

	2012	Forecast Basis % 2013 Sales	Additions	Pro Forma	Financing	Pro Forma after Financing
Cash	$ 1,080	0.030		$ 1,242		$ 1,242
Accts receivable	6,480	0.180		7,452		7,452
Inventories	9,000	0.25		10,350		10,350
Total current assets	16,560			19,044		19,044
Fixed assets	12,600	0.3500		14,490		14,490
Total assets	$ 29,160			$33,534		$33,534
Accounts payable	$ 4,320	0.1200		$ 4,968		$ 4,968
Accruals	2,880	0.0800		3,312		3,312
Notes payable	2,100			2,100	+2,128	4,228
Total current liabilities	9,300			10,380		12,508
Long-term debt	3,500			3,500		3,500
Total debt	12,800			13,880		16,008
Common stock	3,500			3,500		3,500
Retained earnings	12,860		1,166*	14,026		14,026
Total liab. & equity	$ 29,160			$31,406		$33,534
			AFN =	$ 2,128		

*From income statement.

b. If debt is added throughout the year rather than only at the end of the year, interest expense will be higher than in the projections of part a. This would cause net income to be lower, the addition to retained earnings to be lower, and the AFN to be higher. Thus, you would have to add more than $2,128 in new debt. This is called the financing feedback effect.

5-10 a.

Garlington Technologies Inc.
Pro Forma Income Statement
December 31, 2013

	2012	Forecast Basis	Additions	2013
Sales	$3,600,000	1.10 × $Sales_{12}$		$3,960,000
Operating costs	3,279,720	0.911 × $Sales_{13}$		3,607,692
EBIT	320,280			352,308
Interest	18,280	0.13 × $Debt_{12}$		20,280
EBT	302,000			332,028
Taxes (40%)	120,800			132,811
Net income	$ 181,200			$ 199,217
Dividends:	$ 108,000	Set by management		$ 112,000
Addition to RE:	$ 73,200			$ 87,217

Garlington Technologies Inc.
Pro Forma Balance Statement
December 31, 2013

	2012	Forecast Basis % 2013 Sales	Additions	2013	AFN Effects	With AFN 2013
Cash	$ 180,000	0.05		$ 198,000		$ 198,000
Receivables	360,000	0.10		396,000		396,000
Inventories	720,000	0.20		792,000		792,000
Total current assets	1,260,000			1,386,000		1,386,000
Fixed assets	1,440,000	0.40		1,584,000		1,584,000
Total assets	$2,700,000			$2,970,000		$2,970,000
Accounts payable	$ 360,000	0.10		$ 396,000		$ 396,000
Notes payable	156,000			156,000	+128,783	284,783
Accruals	180,000	0.05		198,000		198,000
Total current liabilities	696,000			750,000		878,783
Common stock	1,800,000			1,800,000		1,800,000
Retained earnings	204,000		87,217*	291,217		291,217
Total liab. and equity	$2,700,000			$ 2,841,217		$2,970,000
					AFN =	$ 128,783

*See income statement.

b.

I. Current ratio = \$1,386,000/\$878,783 = 1.58x

Return on equity = \$199,217/(\$2,091,217) = 9.5%

Earnings per share = \$199,217/108,000 = \$1.84

Dividends per share = \$112,000/108,000 = \$1.04

II. $$\text{Current ratio} = \frac{\$1{,}386}{\$396+\$198+\text{Note payable}} = 1.7$$

$$\text{Note payable} + \$396 + \$198 = \frac{\$1{,}386}{1.7}$$

$$\text{Note payable} = \$221.294$$

Increase in Note payable = \$221,294 - \$156,000 = \$65,294

III. Current ratio = \$1,386,000/(\$396,000 + \$198,000 + \$221,294) = 1.70x

New financing required	\$128,783
Increase in note payable	\$65,294
New equity	\$63,489

Return on equity = \$199,217/(\$2,091,217 + \$63,489) = 9.2%

New shares = \$63,489/\$18 = 3,528

Earnings per share = \$199,217/(108,000 + 3,528) = \$1.79

Dividends per share = \$112,000/(108,000 + 3,528) = \$1.00

IV. Return on equity = \$199,217(\$2,091,217 + \$128,783) = 9.0%

New shares = \$128,783/\$18 = 7,155

Earnings per share = \$199,217/(108,000 + 7,155) = \$1.73

Dividends per share = \$112,000/(108,000 + 7,155) = \$0.97

Yes, financing choice matters as dividends will not grow as fast (or decline) if additional stock is sold. ROE will also not grow as fast (or remain the same).

SOLUTION TO SPREADSHEET PROBLEM

5-11 The detailed solution for the spreadsheet problem is in the file ***Ch 05 Build a Model Solution.xlsx*** and is available on the textbook's website.

MINI CASE

Betty Simmons, the new financial manager of Okanagan Chemicals Ltd. (OCL), a B.C. producer of specialized chemicals for use in fruit orchards, must prepare a financial forecast for 2013. OCL's 2012 sales were $2 billion, and the marketing department is forecasting a 25% increase for 2013. Simmons thinks the company was operating at full capacity in 2012, but she is not sure about this. The 2012 financial statements, plus some other data, are shown below.

Assume that you were recently hired as Simmons' assistant, and your first major task is to help her develop the forecast. She asked you to begin by answering the following set of questions.

Financial Statements and Other Data on OCL
(Millions of Dollars)

A. *2012 Balance Sheet*

		% of sales			% of sales
Cash and securities	$ 20	1%	Accounts payable And accruals	$ 100	5%
Accounts receivable	240	12	Notes payable	100	
Inventories	240	12	Total current liabilities	200	
Total current assets	500		Long-term debt	100	
Net fixed assets	500	25	Common stock	500	
			Retained earnings	200	
Total assets	$1,000		Total liabilities and equity	$1,000	

B. *2012 Income Statement*

		% of sales
Sales	$2,000.00	
Cost of goods sold (COGS)	1,200.00	60%
Sales, general, and administrative costs (SGA)	700.00	35
Earnings before interest and taxes	100.00	
Interest	10.00	
Earnings before taxes	90.00	
Taxes (40%)	36.00	
Net income	54.00	
Dividends (40%)	21.60	
Addition to retained earnings	$ 32.40	

C. *Key Ratios*	OCL	Industry
Profit Margin	2.7%	4.0%
Return On Equity	7.71%	15.6%
Days Sales Outstanding (365 Days)	44 Days	32 Days
Inventory Turnover	8.33x	11.0x
Fixed Assets Turnover	4.0x	5.0x
Debt/Assets	30%	36%
Times Interest Earned	10.0x	9.4x
Current Ratio	2.5x	3x
Return On Invested Capital (NOPAT/Operating Capital)	6.67%	14%

a. Describe three ways that pro forma statements are used in financial planning.

Answer: Three important uses: (1) forecast the amount of external financing that will be required, (2) evaluate the impact that changes in the operating plan have on the value of the firm, (3) set appropriate targets for compensation plans

b. Explain the steps in financial forecasting.

Answer: (1) forecast sales, (2) project the assets needed to support sales, (3) project internally generated funds, (4) project outside funds needed, (5) decide how to raise funds, and (6) see effects of plan on ratios and stock price**.**

c. Assume (1) that OCL was operating at full capacity in 2012 with respect to all assets, (2) that all assets must grow proportionally with sales, (3) that accounts payable and accruals will also grow in proportion to sales, and (4) that the 2012 profit margin and dividend payout will be maintained. Under these conditions, what will the company's financial requirements be for the coming year? Use the AFN equation to answer this question.

Answer: OCL will need \$184.5 million. Here is the AFN equation:

$$AFN = (A^*/S_0)\Delta S - (L^*/S_0)\Delta S - M(S_1)(RR)$$
$$= (A^*/S_0)(g)(S_0) - (L^*/S_0)(g)(S_0) - M(S_0)(1 + g)(1 - payout)$$
$$= (\$1{,}000/\$2{,}000)(0.25)(\$2{,}000) - (\$100/\$2{,}000)(0.25)(\$2{,}000) - 0.0270(\$2{,}000)(1.25)(0.6)$$
$$= \$250 - \$25 - \$40.5 = \$184.5 \text{ million.}$$

d. **How would changes in these items affect the AFN? (1) sales increase, (2) the dividend payout ratio increases, (3) the profit margin increases, (4) the capital intensity ratio increases, and (5) OCL begins paying its suppliers sooner. (Consider each item separately and hold all other things constant.)**

Answer:

1. If sales increase, more assets are required, which increases the AFN.

2. If the payout ratio were increased, then less earnings would be retained, and this would increase the need for external financing, or AFN. Note that if the firm is profitable and has any payout ratio less than 100 percent, it will have some retained earnings, so if the growth rate were zero, AFN would be negative, i.e., the firm would have surplus funds. As the growth rate rose above zero, these surplus funds would be used to finance growth. At some point, i.e., at some growth rate, the surplus AFN would be exactly used up. This growth rate where AFN = $0 is called the "sustainable growth rate," and it is the maximum growth rate which can be financed without outside funds, holding the debt ratio and other ratios constant.

3. If the profit margin goes up, then both total earnings and retained earnings will increase, and this will reduce the amount of AFN.

4. The capital intensity ratio is defined as the ratio of required assets to total sales, or a^*/s_0. Put another way, it represents the dollars of assets required per dollar of sales. The higher the capital intensity ratio, the more new money will be required to support an additional dollar of sales. Thus, the higher the capital intensity ratio, the greater the AFN, other things held constant.

5. If OCL begins paying sooner, this reduces spontaneous liabilities, leading to a higher AFN.

e.	**Briefly explain how to forecast financial statements using the forecast financial statements approach. Be sure to explain how to forecast interest expenses.**

Answer: Project sales based on forecasted growth rate in sales. Forecast some items as a percent of the forecasted sales, such as costs, cash, accounts receivable, inventories, net fixed assets, accounts payable, and accruals. Choose other items according to the company's financial policy: debt, dividend policy (which determines retained earnings), common stock. Given the previous assumptions and choices, we can estimate the required assets to support sales and the specified sources of financing. The additional funds needed (AFN) is: required assets minus specified sources of financing. If AFN is positive, then you must secure additional financing. If AFN is negative, then you have more financing than is needed and you can pay off debt, buy back stock, or buy short-term investments.

Interest expense is actually based on the daily balance of debt during the year. There are three ways to approximate interest expense. You can base it on: (1) debt at end of year, (2) debt at beginning of year, or (3) average of beginning and ending debt.

Basing interest expense on debt at end of year will over-estimate interest expense if debt is added throughout the year instead of all on January 1. It also causes circularity called financial feedback: more debt causes more interest, which reduces net income, which reduces retained earnings, which causes more debt, etc.

Basing interest expense on debt at beginning of year will under-estimate interest expense if debt is added throughout the year instead of all on December 31. But it doesn't cause the problem of circularity.

Basing interest expense on average of beginning and ending debt will accurately estimate the interest payments if debt is added smoothly throughout the year. But it has the problem of circularity.

A solution that balances accuracy and complexity is to base interest expense on beginning debt, but use a slightly higher interest rate. This is easy to implement and is reasonably accurate. See ***Ch 05 Mini Case Feedback.xlsx*** for an example basing interest expense on average debt.

f. **Now estimate the 2013 financial requirements using the forecast financial statements approach. Assume (1) that each type of asset, as well as payables, accruals, and fixed and variable costs, will be the same percent of sales in 2013 as in 2012; (2) that the payout ratio is held constant at 40%; (3) that external funds needed are financed 50% by notes payable and 50% by long-term debt (no new common stock will be issued); (4) that all debt carries an interest rate of 10 percent; and (5) that interest expenses should be based on the balance of debt at the beginning of the year.**

Answer: See the completed worksheet. The problem is not difficult to do "by hand," but we used a spreadsheet model for the flexibility such a model provides.

Income Statement (In Millions of Dollars)	Actual 2012	Forecast Basis		Forecast 2013
Sales	$ 2,000.0	Growth	1.25	$ 2,500.0
COGS	1,200.0	% Of Sales	60.00%	1,500.0
SGA expenses	700.0	% Of Sales	35.00%	875.0
EBIT	100.0			125.0
Less interest	10.0	Interest rate x $Debt_{12}$		20.0
EBT	90.0			105.0
Taxes (40%)	36.0			42.0
Net income	$ 54.0			$ 63.0
Dividends	$ 21.6			$ 25.2
Add. to retained earnings	$ 32.4			$ 37.8

Balance Sheet (In Millions of Dollars)	2012	Forecast Basis		2013 Forecast Without AFN	AFN	2013 Forecast With AFN
Assets						
Cash	$ 20.0	% Of Sales	1.00%	$ 25.0		$ 25.0
Accounts receivable	240.0	% Of Sales	12.00%	300.0		300.0
Inventories	240.0	% Of Sales	12.00%	300.0		300.0
Total current assets	500.0			625.0		625.0
Net plant and equipment	500.0	% Of Sales	25.00%	625.0		625.0
Total assets	$ 1,000.0			$ 1,250.0		$ 1,250.0
Liabilities and Equity						
Accounts payable & accruals	$ 100.0	% Of Sales	5.00%	$ 125.0		$ 125.0
Notes payable	100.0	Carry-Over		100.0	$93.6	193.6
Total current liabilities	200.0			225.0		318.6
Long-term bonds	100.0	Carry-Over		100.0	$93.6	193.6
Total liabilities	300.0			325.0		512.2
Common stock	500.0	Carry-Over		500.0		500.0
Retained earnings	200.0	$RE_{12} + \Delta RE_{13}$		237.8		237.8
Total common equity	700.0			737.8		737.8
Total liabilities and equity	$ 1,000.0			$ 1,062.8		$ 1,250.0
Required Assets =				$1,250.0		
Specified Sources Of Financing =				$1,062.8		
Additional Funds Needed (AFN)				$ 187.2		

g. Why does the forecasted financial statement approach produce a somewhat different AFN than the equation approach? Which method provides the more accurate forecast?

Answer: The difference occurs because the AFN equation method assumes that the profit margin remains constant, while the forecasted balance sheet method permits the profit margin to vary. The balance sheet method is somewhat more accurate, but in this case the difference is not very large. The real advantage of the balance sheet method is that it can be used when everything does not increase proportionately with sales. In addition, forecasters generally want to see the resulting ratios, and the balance sheet method is necessary to develop the ratios.

In practice, the only time we have ever seen the AFN equation used is to provide (1) a "quick and dirty" forecast prior to developing the balance sheet forecast and (2) a rough check on the balance sheet forecast.

h. **Calculate OCL's forecasted ratios, and compare them with the company's 2012 ratios and with the industry averages. Calculate OCL's forecasted free cash flow and return on invested capital (ROIC).**

Answer:

Key Ratios	Actual 2012	Forecast 2013	Industry
Profit Margin	2.70%	2.52%	4.00%
ROE	7.71%	8.54%	15.60%
DSO	43.80	43.80	32.00
Inventory Turnover	8.33	8.33	11.00
Fixed Asset Turnover	4.00	4.00	5.00
Debt/Assets	30.00%	40.98%	36.00%
TIE	10.00	6.25	9.40
Current Ratio	2.50	1.96	3.00

$$\text{Free Cash Flow} = \text{Operating Cash Flow} - \text{Gross Investment in Operating Capital}$$

$$= \text{NOPAT} - \text{Net Investment in Operating Capital}$$

$$FCF = \text{NOPAT} - (\text{Operating Capital}_{2013} - \text{Operating Capital}_{2012})$$

$$= \$125(1 - 0.4) + [(\$625 - \$125 + \$625) - (\$500 - \$100 + \$500)$$

$$= \$75 - (\$1{,}125 - \$900) = \$75 - \$225 = -\$150.$$

Note: Operating Capital = Net Operating Working Capital + Net Fixed Assets.

ROIC = NOPAT / Capital = \$75 / \$1,125 = 0.067 = 6.67%.

i. **Based on comparisons between OCL's days sales outstanding (DSO) and inventory turnover ratios with the industry average figures, does it appear that OCL is operating efficiently with respect to its inventory and accounts receivable? Suppose OCL was able to bring these ratios into line with the industry averages and reduce its SGA/sales ratio to 33%. What effect would this have on its AFN and its financial ratios? What effect would this have on free cash flow and ROIC?**

Answer: The DSO and inventory turnover ratio indicate that OCL has excessive inventories and receivables. The effect of improvements here would reduce asset requirements and AFN. See the results below based on the spreadsheet ***Ch 05 Mini Case.xlsx***.

Inputs	Before	After
DSO	43.8 0	32.01
Accounts Receivable/Sales	12.0%	8.77%
Inventory Turnover	8.33	11.00
Inventory/Sales	12.0%	9.09%
SGA/Sales	35.0%	33.0%
Outputs		
AFN	$187.2	$15.7
FCF	-$150.0	$33.5
ROIC	6.7%	10.8%
ROE	8.5%	12.3%

j. **Suppose you now learn that OCL's 2012 receivables and inventories were in line with required levels, given the firm's credit and inventory policies, but that excess capacity existed with regard to fixed assets. Specifically, fixed assets were operated at only 75% of capacity.**

j. 1. What level of sales could have existed in 2012 with the available fixed assets?

Answer: Full Capacity Sales = $\dfrac{\text{Actual sales}}{\text{\% of capacity at which fixed assets were operated}} = \dfrac{\$2{,}000}{0.75} = \$2{,}667.$

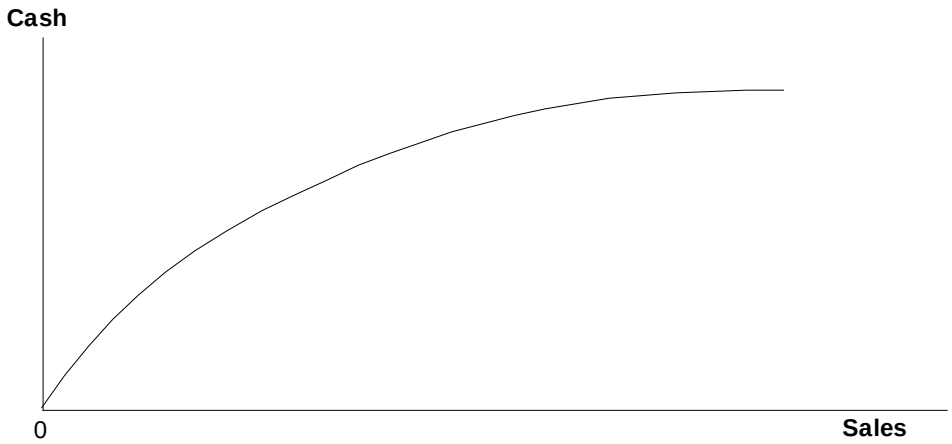
Since the firm started with excess fixed asset capacity, it will not have to add as much fixed assets during 2013 as was originally forecasted.

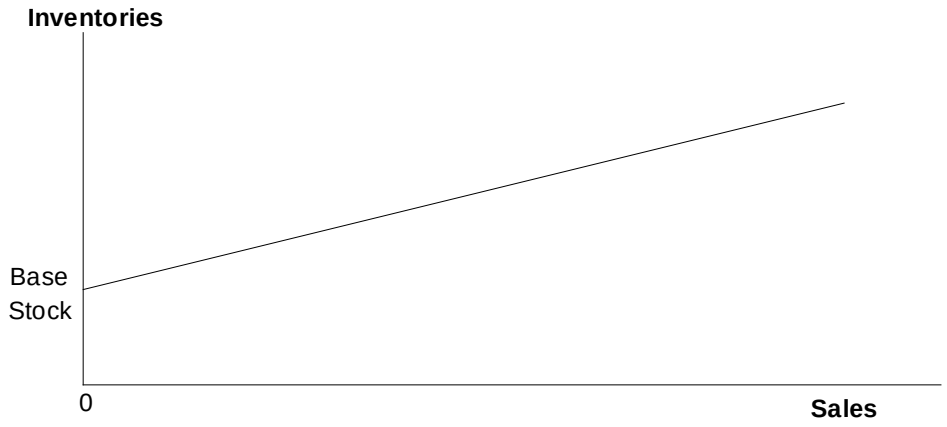
j. 2. How would the existence of excess capacity in fixed assets affect the additional funds needed during 2013?

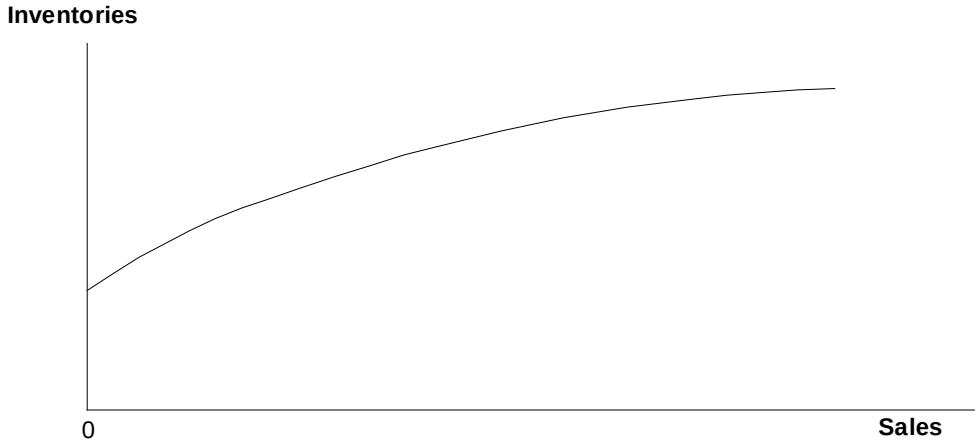
Answer: We had previously found an AFN of $187.2 using the balance sheet method. The fixed assets increase was 0.25($500) = $125. Therefore, the funds needed will decline by $125.

k. The relationship between sales and the various types of assets is important in financial forecasting. The forecasted financial statements approach, under the assumption that each asset item grows at the same rate as sales, leads to an AFN forecast that is reasonably close to the forecast using the AFN equation. Explain how each of the following factors would affect the accuracy of financial forecasts based on the AFN equation: (1) economies of scale in the use of assets, and (2) lumpy assets.

Answer: 1. Economies of scale in the use of assets mean that the asset item in question must increase less than proportionately with sales; hence it will grow less rapidly than sales. Cash and inventory are common examples, with possible relationship to sales as shown below:







2. Lumpy assets would cause the relationship between assets and sales to look as shown below. This situation is common with fixed assets.