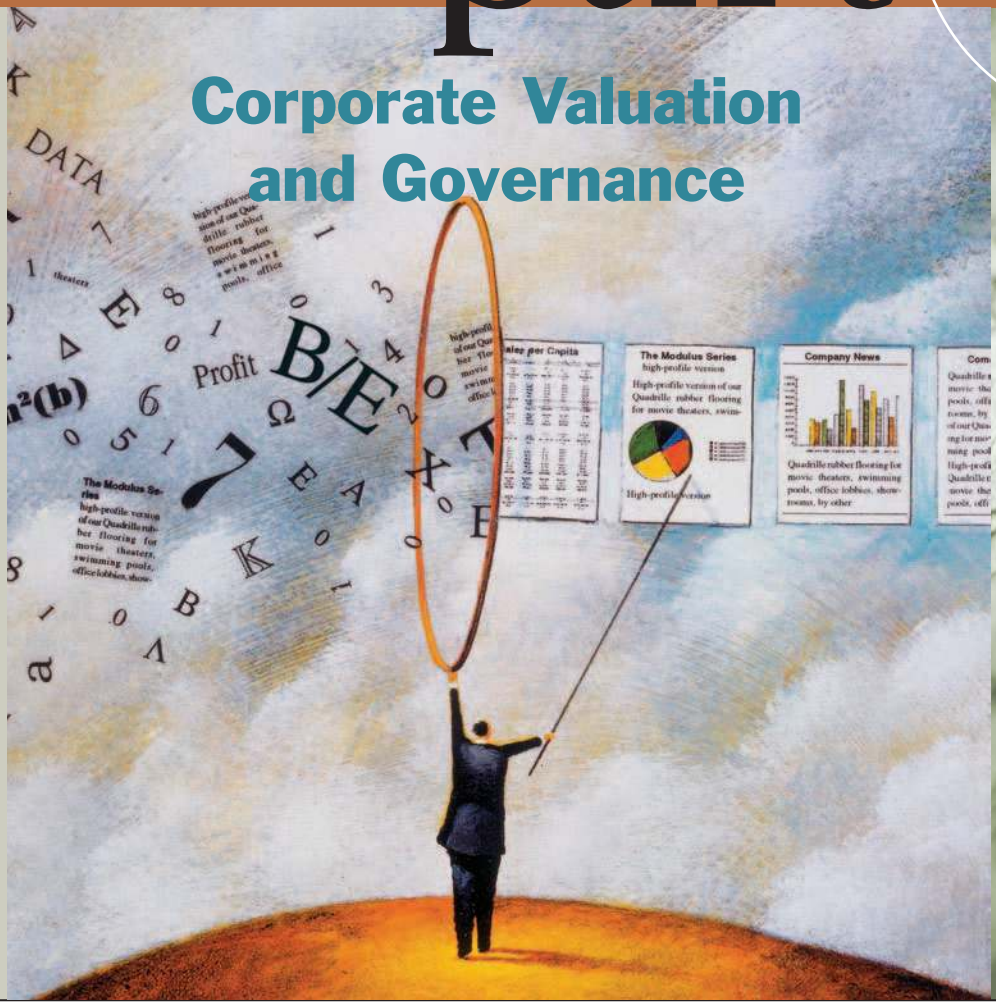
part 4

Corporate Valuation and Governance



chapter 14

Financial Planning and Forecasting Financial Statements

A recent survey of CFOs on financial planning found a paradox. On one hand, most respondents believe that financial planning is important, with the majority stating that budgeting is highly useful for allocating resources. On the other hand, many managers have doubts about the process, largely because they believe that the input data are rarely accurate enough to yield realistic results. In fact, 45% of the CFOs reported that budgeting is "contentious, political, and time-consuming." Even worse, 53% said that the budgeting process can encourage undesirable behavior among managers as they negotiate budgets to meet their own rather than the company's objectives.

What can CFOs do to improve the situation? Consider the budgeting process. It typically starts in July and ends in December, just prior to the forecasted year. The process begins with data acquisition, including historical information on sales, costs, inventories, batch sizes, defect rates, number of repeat customers, product mix by customer type, hours of employee training, and the like. Unfortunately, most larger companies have stand-alone software packages and spreadsheets that vary from division to division, making data acquisition time-consuming and error filled. Instead of basing growth and performance targets on analysis of the markets and competitors, targets are often set as last-year's-results-plus-a-percentage-increase.

To help solve this problem, companies are developing a variety of new strategies. "Demand-pull budgeting" links the budget to sales forecasts, and the sales forecasts are frequently updated to reflect changing economic conditions. A similar, but more regimented, procedure that is now used by 48% of the responding companies is the "rolling forecast." These companies make forecasts for 1-year ahead and 5-years ahead, but then modify them each quarter (or month) as new results become available. Also, some companies are now using "activity-based budgeting," which allocates costs and revenues by products and services rather than by traditional departments.

Another change is that the budgeting process at many companies is now focused on specific key items, which avoids wasting time and effort on things that have little effect on the firm's value. Yet another modification is to use performance targets based

Source: Don Durfee, "Alternative Budgeting," *CFO*, June 2006, p. 28.

on competitors' performances rather than the firm's own previous year, and then linking managerial compensation to these targets.

According to John McMahan of the Hackett Group, such changes are leading to greater forecast accuracy, higher employee satisfaction, and better corporate performance. Note too that these issues are often thought of more as "management" than as "finance," but this is a false distinction. Much of finance is numbers-oriented, but as any CFO will tell you, his or her primary job is to help the firm as a whole achieve good results. Think about all this as you go through the chapter.

Managers use **pro forma**, or **projected, financial statements** in four ways: (1) By looking at projected statements, they can assess whether the firm's anticipated performance is in line with the firm's own general targets and with investors' expectations. (2) Pro forma statements can be used to estimate the effect of proposed operating changes, enabling managers to conduct "what if" analyses. (3) Managers use pro forma statements to anticipate the firm's future financing needs. (4) Managers forecast free cash flows under different operating plans, forecast their capital requirements, and then choose the plan that maximizes shareholder value. Security analysts make the same types of projections, forecasting future earnings, cash flows, and stock prices.

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The texbook's Web site contains an *Excel* file that will guide you through the chapter's calculations. The file for this chapter is ***FM12 Ch 14 Tool Kit.xls***, and we encourage you to open the file and follow along as you read the chapter.

14.1 Overview of Financial Planning

Our primary objective in this book is to explain what managers can do to make their companies more valuable. However, value creation is impossible unless the company has a well-articulated plan. As Yogi Berra once said, "You've got to be careful if you don't know where you're going, because you might not get there."

Strategic Plans

Strategic plans usually begin with a statement of the overall *corporate purpose*. Many companies are very clear about their corporate purpose: "Our mission is to maximize shareowner value over time."

This corporate purpose is increasingly common for U.S. companies, but that has not always been the case. For example, in 1990 Varian Associates, Inc. was regarded as one of the most technologically advanced electronics companies. However, Varian's management had been more concerned with developing new technology than with marketing it, and its stock price was lower than it had been 10 years earlier. Some of the larger stockholders were intensely unhappy with the state of affairs, and management was faced with the threat of a proxy fight or forced merger. In 1991, management announced a change in policy and stated that it would, in the future, emphasize both technological excellence *and* profitability, rather than focusing primarily on technology. Earnings improved dramatically, and the stock price rose after the change in corporate purpose.

Corporate Valuation and Financial Planning

The value of a firm is determined by the size, timing, and risk of its expected future free cash flows (FCF). This chapter shows you how to project the financial statements that are used to calculate expected future free cash flows. The next chapter shows you how to take those projected financial statements and estimate the value of the firm under different financial plans.

$$\text{Value} = \frac{FCF_1}{(1 + WACC)^1} + \frac{FCF_2}{(1 + WACC)^2} + \frac{FCF_3}{(1 + WACC)^3} + \cdots + \frac{FCF_\infty}{(1 + WACC)^\infty}$$

A corporate focus on creating wealth for the company's owners is not yet as common abroad as it is in the United States. For example, Veba AG, one of Germany's largest companies, created a stir in 1996 when it stated in its annual report that "Our commitment is to create value for you, our shareholders." This was quite different from the usual German model, in which companies have representatives from labor on their boards of directors and explicitly state their commitments to a variety of stakeholders. As one might expect, Veba's stock has consistently outperformed the average German stock. As the trend in international investing continues, more and more non–U.S. companies are adopting a corporate purpose similar to that of Varian and Veba.

Corporate scope defines a firm's lines of business and geographic area of operations. For example, Coca-Cola limits its products to soft drinks, but on a global scale. PepsiCo recently followed Coke's lead—it restricted its scope by spinning off its food service businesses. In fact, several studies have found that the market tends to value focused firms more highly than diversified firms.[1]

The corporate purpose states the general philosophy of the business, but it does not provide managers with operational objectives. The *statement of corporate objectives* sets forth specific goals to guide management. Most organizations have both qualitative and quantitative objectives. A typical quantitative objective might be attaining a 50% market share, a 20% ROE, a 10% earnings growth rate, or a $100 million Economic Value Added (EVA).

Once a firm has defined its purpose, scope, and objectives, it must develop a strategy for achieving its goals. *Corporate strategies* are broad approaches rather than detailed plans. For example, one airline may have a strategy of offering no-frills service among a limited number of cities, while another's strategy may be to offer "staterooms in the sky." Any such strategy should be compatible with the firm's purpose, scope, and objectives.

Operating Plans

Operating plans provide detailed implementation guidance to help meet the corporate objectives. These plans can be developed for any time horizon, but most companies use a 5-year horizon. A 5-year plan is detailed for the first year, with

[1]See, for example, Philip G. Berger and Eli Ofek, "Diversification's Effect on Firm Value," *Journal of Financial Economics*, 1995, pp. 39–66; and Larry Lang and René Stulz, "Tobin's Q, Corporate Diversification, and Firm Performance," *Journal of Political Economy*, 1994, pp. 1248–1280.

each succeeding year's plan becoming less specific. The plan explains who is responsible for each particular function, when specific tasks are to be accomplished, sales and profit targets, and the like.

Large, multidivisional companies such as General Electric break down their operating plans by divisions. Thus, each division has its own goals, mission, and plan for meeting its objectives, and these plans are then consolidated to form the corporate plan.

The Financial Plan

The financial planning process has five steps:

1. Project financial statements to analyze the effects of the operating plan on projected profits and financial ratios.
2. Determine the funds needed to support the 5-year plan.
3. Forecast the funds to be generated internally and identify those to be obtained from external sources, subject to any constraints due to borrowing covenants, such as restrictions on the debt ratio, the current ratio, and the coverage ratios.
4. Establish a performance-based management compensation system that rewards employees for creating shareholder wealth.
5. Monitor operations after implementing the plan, identify the cause of any deviations, and take corrective actions.

In the remainder of this chapter, we explain how to create a financial plan, including its three key components: (1) the sales forecast, (2) pro forma financial statements, and (3) the external financing plan. We discuss compensation in Chapter 15.

SELF-TEST

What are four ways that managers use pro forma statements?
Briefly explain the following terms: (1) corporate purpose, (2) corporate scope, (3) corporate objectives, and (4) corporate strategies.
Briefly describe the contents of an operating plan.
What are the steps of the financial planning process?

14.2 Sales Forecast

The **sales forecast** generally starts with a review of sales during the past 5 to 10 years, expressed in a graph such as that in Figure 14-1. The first part of the graph shows 5 years of historical sales for MicroDrive. The graph could have contained 10 years of sales data, but MicroDrive typically focuses on sales figures for the latest 5 years because the firm's studies have shown that its future growth is more closely related to recent events than to the distant past.

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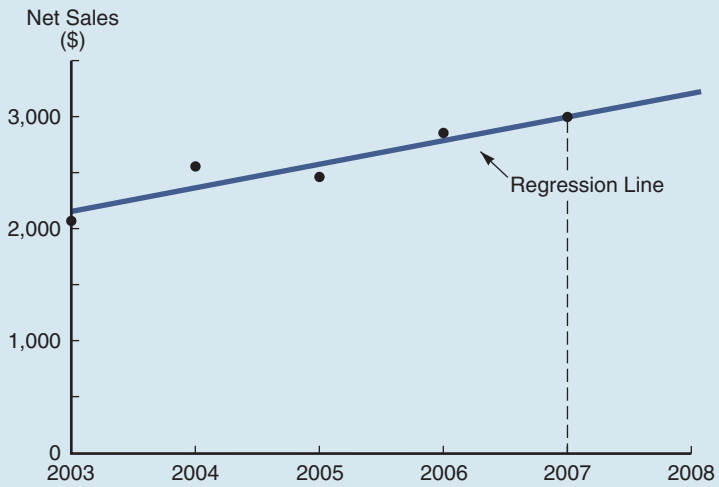
See ***FM12 Ch 14 Tool Kit.xls*** at the textbook's Web site for details.

Entire courses are devoted to forecasting sales, so we can only touch on the basic elements here. However, forecasting the future sales growth rate always begins with a look at past growth. For example, the average of MicroDrive's recent annual growth rates is 10.3%. However, the compound growth rate from 2003 to 2007 is the solution value for g in the equation

$$\$2{,}058(1 + g)^4 = \$3{,}000,$$

Figure 14-1

MicroDrive Inc.: Historical Sales (Millions of Dollars)



Year	Sales	Annual Growth Rate
2003	$2,058	
2004	2,534	23.1%
2005	2,472	−2.4
2006	2,850	15.3
2007	3,000	5.3
		Average = 10.3%

and it can be found by solving the equation or with a financial calculator, entering N = 4, PV = −2058, PMT = 0, FV = 3000, and then pressing I/YR to get g = 9.9%.[2]

The preceding approaches are simple, but both can be poor representations of past growth. First, the arithmetic average procedure generally produces numbers that are too high. To illustrate why, suppose sales grew by 100% one year and then fell by −50% the next year. There would actually be zero growth over the 2 years, but the calculated average growth rate would be 25%. Similarly, the point-to-point procedure is not reliable because if either the beginning or ending year is an "outlier" in the sense of being above or below the trend line shown in Figure 14-1, then the calculated growth rate will not be representative of past growth. The solution to these problems is to use a regression approach, where a curve is fitted to the historic sales data and then the slope of that curve is used to measure historic growth. If we expect a constant growth rate (as opposed to a constant dollar amount, which would mean a declining growth rate), then the regression should be based on the natural log of sales, not sales itself. With a spreadsheet, this is not a difficult calculation, and by far the easiest way to calculate the growth rate is with *Excel*'s LOGEST function. Simply type the years and sales into a spreadsheet, click f_x on the menu bar, select Statistical functions, and then choose the LOGEST function. Highlight the sales range for the Y variable and the years range for X in the function dialog box, and then click OK. The result will be 1 + g, so you finish by subtracting 1 to get the growth rate. For MicroDrive, the growth rate is 9.1%.

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These approaches are demonstrated in the ***FM12 Ch 14 Tool Kit.xls*** at the textbook's Web site. Also, ***Web Extension 10B*** illustrates these approaches when estimating dividend growth rates.

[2]Unless we state differently, we will report values from MicroDrive's financial statements in units of a million dollars, as shown in Figure 14-1.

Although it is useful to calculate the past growth rate in sales, much more is involved in estimating future sales. Future sales will depend on the economy (both domestic and global), the industry's prospects, the company's current product line, proposed products that are in the pipeline, and marketing campaigns. When MicroDrive incorporated these issues into its analysis, it estimated 10% expected growth for the upcoming year.

If the sales forecast is off, the consequences can be serious. First, if the market expands by *more* than MicroDrive has anticipated, the company will not be able to meet demand. Its customers will end up buying competitors' products, and MicroDrive will lose market share. On the other hand, if its projections are overly optimistic, MicroDrive could end up with too much plant, equipment, and inventory, which hurts free cash flow and stock prices. If MicroDrive had financed an unnecessary expansion with debt, high interest charges would compound its problems. Thus, an accurate sales forecast is critical to the firm's well-being.

After much discussion and analysis, MicroDrive's managers decided to forecast a 10% increase in sales. How will MicroDrive's managers incorporate this increased level of sales into the financial plan? In particular, will MicroDrive have to raise any additional external funds in order to implement the plan? We will answer this question using two approaches: (1) the additional funds needed (AFN) formula, and (2) the forecasted financial statement method.

SELF-TEST

List some factors that should be considered when developing a sales forecast.
Explain why an accurate sales forecast is critical to profitability.

14.3 The AFN Formula

If we assume that none of a firm's ratios will change (a heroic assumption!), we can use a simple approach to forecast financial requirements. Here is the logic. If sales increase, firms usually have to purchase assets (such as inventories, machines, etc.) in order to support the increased level of sales. Where will the firm get the money to purchase the projected increase in assets? There are three sources. First, some liabilities (such as accounts payable) usually increase when sales increase. Balance sheets require that total assets equal total liabilities and equity, which also means that the increase in assets must equal the increase in total liabilities and equity. Therefore, this spontaneous increase in liabilities is a source of funds for the projected increase in assets. Second, the firm should make a profit on the new sales. Part of this profit will be used to pay dividends, but the remaining profit can be used to help purchase the new assets. Recall that the net income not paid out as dividends is an addition to retained earnings. Therefore, this increase in equity is a source of financing for the projected increase in assets. Finally, any remaining increase in assets must be financed by additional external funds, such as additional bank loans, long-term debt, or stock issuances. The following formula applies this logic and defines the **additional funds needed (AFN):**

$$\begin{array}{lcccccc} \text{Additional funds needed} & = & \text{Required asset increase} & - & \text{Spontaneous liability increase} & - & \text{Increase in retained earnings} \\ \text{AFN} & = & (A^*/S_0)\Delta S & - & (L^*/S_0)\Delta S & - & MS_1(RR). \end{array} \quad (14\text{-}1)$$

The symbols in Equation 14-1 are defined below:

AFN	=	Additional funds needed.
A*	=	Assets that are tied directly to sales, hence must increase if sales are to increase. Note that A designates total assets and A* designates those assets that must increase if sales are to increase. When the firm is operating at full capacity, as is the case here, A* = A. Often, though, A* and A are not equal, and either the equation must be modified or we must use the projected financial statement method.
S_0	=	Sales during the last year.
A^*/S_0	=	Percentage of required assets to sales, which also shows the required dollar increase in assets per $1 increase in sales.
L*	=	Liabilities that increase spontaneously. L* is normally much less than total liabilities (L). Spontaneous liabilities include accounts payable and accruals, but not bank loans and bonds.
L^*/S_0	=	Liabilities that increase spontaneously as a percentage of sales, or spontaneously generated financing per $1 increase in sales.
S_1	=	Total sales projected for next year.
ΔS	=	Change in sales
M	=	Profit margin, or profit per $1 of sales.
RR	=	Retention ratio, which is the percentage of net income that is retained. The payout ratio is the percentage of net income paid out to shareholders. Because the retention ratio and the payout ratio must total to 1, RR is also equal to 1 − payout ratio.

Recall from the previous section that MicroDrive's managers forecast a 10% increase in sales, from $3,000 million to $3,300 million. Based on this projection, S_1 = $3,300 million and ΔS = $300 million. In the previous year, MicroDrive had $2,000 million in assets, which means that A^*/S_0 = $2,000/$3,000 = 0.6667.[3] If this ratio remains constant, as assumed in the AFN formula, assets must increase by about 67 cents for every $1 increase in sales.

In the previous year MicroDrive had $60 million in accounts payable and $140 million, for a total spontaneous liabilities, L*, of $60 + $140 = $200 million. Therefore, L^*/S_0 = $200/$3,000 = 0.0667, which means that MicroDrive generates about 7 cents of spontaneous financing for every $1 increase in sales.

MicroDrive had $113.5 million in net income, for a profit margin of M = $113.5/$3,000 = 0.0378, which means that MicroDrive earns almost 3.8 cents on each dollar of sales. MicroDrive paid out $57.5 million in common dividends and retained $56 million, so RR = $56/$113.5 = 0.493.

Inserting MicroDrive's values into Equation 14-1, we find the additional funds needed to be $118 million:

$$\begin{aligned}
\text{Additional funds needed} &= \text{Projected increase in assets} - \text{Spontaneous increase in liabilities} - \text{Increase in retained earnings} \\
&= 0.667(\Delta S) - 0.067(\Delta S) - 0.0378(S_1)(0.493) \\
&= 0.667(\$300 \text{ million}) - 0.067(\$300 \text{ million}) \\
&\quad - 0.0378(\$3{,}300 \text{ million})(0.493) \\
&= \$200 \text{ million} - \$20 \text{ million} - \$61.58 \text{ million} \\
&= \$118.42 \text{ million}.[4]
\end{aligned}$$

[3]For MicroDrive's financial statements, look back to Chapter 3 or look ahead to Tables 14-2 or 14-3.
[4]All calculations are done in the *Excel* file, ***FM12 Ch 14 Tool Kit.xls***, available at the textbook's Web site. Because *Excel* doesn't round values in intermediate steps, there may be slight differences between the values from *Excel* and calculations based on the rounded intermediate values in the textbook.

To increase sales by $300 million, the formula suggests that MicroDrive must increase assets by $200 million. The $200 million of new assets must be financed in some manner. Of the total, $20 million will come from a spontaneous increase in liabilities, while another $61.58 million will be obtained from retained earnings. The remaining $118.42 million must be raised from external sources.

The AFN equation shows that external financing requirements depend on five key factors:

1. **Sales growth (ΔS).** Rapidly growing companies require large increases in assets and more external financing, other things held constant.
2. **Capital intensity (A^*/S_0).** The amount of assets required per dollar of sales, A^*/S_0 in Equation 14-1, is called the **capital intensity ratio.** This ratio has a major effect on capital requirements. Companies with higher assets-to-sales ratios require more assets for a given increase in sales, hence a greater need for external financing.
3. **Spontaneous liabilities-to-sales ratio (L^*/S_0).** Companies that spontaneously generate a large amount of liabilities from accounts payable and accruals will have a relatively lower need for external financing.
4. **Profit margin (M).** The higher the profit margin, the larger the net income available to support increases in assets, hence the lower the need for external financing.
5. **Retention ratio (RR).** Companies that retain more of their earnings as opposed to paying them out as dividends will generate more retained earnings and thus have less need for external financing.

The logic behind the AFN formula and the insights above are important, but the AFN formula provides an accurate forecast only for companies whose ratios are all expected to remain constant. The AFN formula is useful for quickly obtaining a "back of the envelope" estimate of external financing requirements, but the percent of sales method, explained in the next section, is used by most companies for their more detailed financial planning.

SELF-TEST

If all ratios are expected to remain constant, a formula can be used to forecast AFN. Give the formula and briefly explain it.

How do the following factors affect external capital requirements: (1) retention ratio, (2) capital intensity, and (3) profit margin?

Suppose MicroDrive's growth rate in sales is forecast as 15%. If all ratios stay the same, what is the AFN? ($205.62 million)

14.4 The Forecasted Financial Statement (FFS) Method

Unlike the AFN formula, the **forecasted financial statement approach (FFS)** actually forecasts the complete set of financial statements. However, the logic of this approach is similar to that of the AFN formula. Before going into the details, let's take a look at the big picture. Just as with the AFN formula, we begin with the sales forecast. Similarly, we also forecast the assets that are required to support the sales. The AFN formula assumes all assets grow by the same proportion, but the forecasted financial statement approach allows different asset classes to grow at different rates. This additional level of detail makes this approach more realistic.

In addition, the result is a forecast of the entire asset side of the balance sheet, while the AFN formula only shows the net increase in assets.

Similar to the AFN formula, we forecast the spontaneous liabilities in the FFS approach. The AFN formula assumes each spontaneous liability grows at the same rate, but the FFS approach allows each spontaneous liability to grow at a different rate, providing a more realistic forecast. The AFN formula provides a forecast of the addition to retained earnings, based on the profit margin and the dividend retention ratio. In the FFS approach, we also forecast the addition to retained earnings, but we do this by first forecasting the entire income statement and dividend payment. We define the *specified sources of financing* as the total of spontaneous liabilities, existing financing (i.e., the current levels of debt and common equity), and the addition to retained earnings.

At this point in the process, we have a forecast of the projected income statements, a forecast of the asset side of the balance sheets, and a forecast of the liabilities and equity side of the balance sheets. If we are extraordinarily lucky, the balance sheets balance, which means that sources of financing (i.e., the liabilities and equity side of the balance sheets) are exactly equal to the required assets (i.e., the asset side of the balance sheets). If so, we have exactly enough financing to acquire the assets needed to support the forecasted level of sales. But in all our years of forecasting, we have never had this happen, and you probably won't be any luckier.

To make the balance sheets balance (ensuring enough financing to purchase the required assets), the FFS approach uses the **plug technique.** To use this technique, we define the AFN as the required assets minus the specified sources of financing, based on the projected balance sheets. If the AFN is positive, then we need to raise additional funds, so we "plug" this amount into the balance sheet as additional financing in the form of new notes payable, long-term debt, or equity.[5] For example, suppose the required assets equal $2,500 million and the specified sources of financing total $2,400 million. The required additional financing is $2,500 − $2,400 = $100 million. The firm might choose to raise this $100 million as new notes payable, thus increasing the old notes payable by $100 million.

If the AFN is negative, then the forecast has more financing (i.e., liabilities and equity) than needed to support the required assets. The firm could reduce its financing by paying off some debt, by repurchasing stock, or by paying higher dividends (which reduces the addition to retained earnings). However, many firms use short-term investments as a temporary repository for any extra cash, or as a "slush fund" for use in times when operating cash flows are lower than expected. Therefore, in our initial forecast, often we assume that any extra funds will be used to purchase additional short-term investments. We "plug" the amount of extra financing (the absolute value of the AFN) into short-term investments on the asset side of the balance sheet. For example, suppose the required assets equal only $2,200 million and the specified sources of financing total $2,400 million. The required additional financing is $2,200 − $2,400 = −$200 million. Thus, the firm would have an extra $200 million that it could use to purchase short-term investments. Notice that total assets would now equal $2,200 + $200 = $2,400 million, which is exactly equal to the total sources of financing.

Keep the big picture in mind as we forecast MicroDrive's financial statements.[6]

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[5]We could even raise this additional financing by reducing dividend payments, which increases the addition to retained earnings. If the company has short-term investments, it might satisfy the AFN by selling some. But notice that if the company sells (or chooses not to purchase) operating assets, then the company will not be able to support the forecast sales. We'll discuss these issues later in the section.

[6]For a much more detailed treatment of financial forecasting, see P. Daves, M. Ehrhardt, and R. Shrieves, *Corporate Valuation: A Guide for Managers and Investors* (Mason, OH: Thomson/South-Western, 2004).

Step 1. Analyze the Historical Ratios

The first step is to analyze the historical ratios that will be used in the projections (see Table 14-1). This differs somewhat from the ratio analysis of Chapter 4, since the objective here is to forecast the future, or pro forma, financial statements. The next sections explain exactly why we need these particular ratios, but for now we will just describe the ratios and how to use them. Our illustration has only 2 years of data for MicroDrive, but a thorough analysis should have at least 5 years of historical data. In addition to MicroDrive's actual year-by-year ratios, the table also shows the historical average, which in this case is the average of the two prior years. The last column of the table shows the ratio for the industry composite, which is the sum of the financial statements for all firms in the industry.

See ***FM12 Ch 14 Tool Kit.xls*** at the textbook's Web site for details.

Forecasting is as much art as science, but here are a few basic guidelines. First, are there trends in the ratios? In our experience, simple trends can help predict the future, because most companies, especially large ones, cannot turn on a dime. Second, how does a ratio compare with its historical average? Is any aberration caused by temporary factors, which means the ratio might revert back toward its average? Third, how does a ratio compare to the industry average? For example, in competitive industries, it is very difficult for a company to maintain a cost/sales ratio too much better than its peers. Fourth, what is happening in the economy and the firm's industry? For example, if a firm depends on oil as an input, then wars in the Middle East might drive up its costs. Fifth, what are the company's operating plans? For example, if the company is planning a major expansion, then its projected costs might be temporarily high as it has larger than normal advertising campaigns. Only after thinking about these questions and issues should a forecaster move on to the next step.

Step 2. Forecast the Income Statement

In this section we explain how to forecast the income statement and in the following section we forecast the balance sheet. Although we cover these topics in two separate sections, the forecasted financial statements are actually integrated with one another and with the previous year's statements. For example, the following

Table 14-1 Historical Ratios for MicroDrive Inc.

	Actual 2006	Actual 2007	Historical Average	Industry Average
Costs to sales	87.6%	87.2%	87.4%	87.1%
Depreciation to net plant and equipment	10.3	10.0	10.2	10.2
Cash to sales	0.5	0.3	0.4	1.0
Accounts receivable to sales	11.1	12.5	11.8	10.0
Inventory to sales	14.6	20.5	17.5	11.1
Net plant and equipment to sales	30.5	33.3	31.9	33.3
Accounts payable to sales	1.1	2.0	1.5	1.0
Accruals to sales	4.6	4.7	4.6	2.0

See ***FM12 Ch 14 Tool Kit.xls*** at the textbook's Web site for details.

sections show that the income statement item "depreciation" depends on net plant and equipment, which is a balance sheet item. The balance sheet item "retained earnings" depends on the previous year's retained earnings, the forecasted net income, and the firm's dividend policy. Keep this interrelatedness in mind as you go through the forecast.

Forecast Sales Table 14-2 shows the forecasted income statement. Management forecasts that sales will grow by 10%. Thus, forecasted sales, shown in Row 1, Column 3, is the product of the prior year's sales of $3,000 million and (1 + g): $3,000(1.1) = $3,300 million.

Forecast Earnings before Interest and Taxes (EBIT) Table 14-1 shows that MicroDrive's ratio of costs to sales for the most recent year was 87.2% ($2,616/$3,000 = 0.872). Thus, to get a dollar of sales, MicroDrive had to incur 87.2 cents of costs. Initially, we assume that the cost structure will remain unchanged. Later on, we explore the impact of changes in the cost structure, but for now we assume that forecasted costs will equal 87.2% of forecasted sales. See Row 2 of Table 14-2.[7]

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See ***FM12 Ch 14 Tool Kit.xls*** at the textbook's Web site for details.

Because depreciation depends on the asset base, as described in Chapter 12, it is more reasonable to forecast depreciation as a percent of net plant and equipment rather than of sales. The most recent ratio of depreciation to net plant and equipment, shown in Table 14-1, was 10% ($100/$1,000 = 0.10), and MicroDrive's managers believe this is a good estimate of future depreciation rates. As we show

Table 14-2

MicroDrive Inc.: Actual and Projected Income Statements
(Millions of Dollars Except Per Share Data)

	Actual 2007 (1)	Forecast Basis (2)	Forecast for 2008 (3)
1. Sales	$3,000.0	110% × 2007 Sales =	$3,300.0
2. Costs except depreciation	2,616.2	87.2% × 2008 Sales =	2,877.6
3. Depreciation expense	100.0	10% × 2008 Net plant =	110.0
4. Total operating costs	$2,716.2		$2,987.6
5. EBIT	$ 283.8		$ 312.4
6. Less interest	88.0	(See text for explanation)	92.8
7. Earnings before taxes (EBT)	$ 195.8		$ 219.6
8. Taxes (40%)	78.3		87.8
9. NI before preferred dividends	$ 117.5		$ 131.8
10. Preferred dividends	4.0	Dividend rate × 2008 Pref. stk. =	4.0
11. NI available to common	$ 113.5		$ 127.8
12. Shares of common equity	50.0		50.0
13. Dividends per share	$ 1.15	108% × 2007 DPS =	$ 1.25
14. Dividends to common	$ 57.5	2008 DPS × Number of shares =	$ 62.5
15. Additions to retained earnings	$ 56.0		$ 65.3

[7]Notice that we don't forecast the growth rate in costs. Instead, we forecast the growth rate in sales and specify costs as a percent of sales.

later in Table 14-3, the forecasted net plant and equipment is $1,100 million. Therefore, forecasted depreciation is 0.10($1,100) = $110 million. Notice how a balance sheet item, net plant and equipment, affects the charge for depreciation, which is an income statement item.

Total operating costs, shown on Row 4, are the sum of costs of goods sold plus depreciation. EBIT is then found by subtraction.

Forecast Interest Expense How should we forecast the interest charges? The actual net interest expense is the sum of a firm's daily interest charges less its daily interest income, if any, from short-term investments. Most companies have a variety of different debt obligations with different fixed interest rates and/or floating interest rates. For example, bonds issued in different years generally have different fixed rates, while most bank loans have rates that vary with interest rates in the economy. Given this situation, it is impossible to forecast the exact interest expense for the upcoming year, so we make two simplifying assumptions.

Assumption 1: Specifying the Balance of Debt for Computing Interest Expense. As noted above, interest on bank loans is calculated daily, based on the amount of debt at the beginning of the day, while bond interest depends on the amount of bonds outstanding. If debt remained constant all during the year, the correct balance to use when forecasting the annual interest expense would be the amount of debt at the beginning of the year, which is the same as the debt shown on the balance sheets at the end of the previous year. But how should you forecast the annual interest expense if debt is expected to change during the year, which is typical for most companies? One option would be to base the interest expense on the debt balance shown at the end of the forecasted year, but this has two disadvantages. First, it would charge a full year's interest on the additional debt, which would imply that the debt was put in place on January 1. Because this is usually not true, that forecast would overstate the most likely interest expense. Second, this assumption causes circularity in the spreadsheet. We discuss this in detail in ***Web Extension 14A***, but the short explanation is that additional debt causes additional interest expense, which reduces the addition to retained earnings, which in turn requires a higher level of debt, which causes still more interest expense, and the cycle keeps repeating. This is called **financing feedback.** Spreadsheets can deal with this problem (see ***Web Extension 14A***, available at the textbook's Web site), but add complexity to the model that might not be worth the benefits.

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See ***FM12 Ch 14 Tool Kit.xls*** at the textbook's Web site for details.

A similar approach would be to base the interest expense on the average of the debt at the beginning and end of the year. This approach would produce the correct interest expense only if debt were added evenly throughout the year, which is a big assumption. In addition, it also results in a circular model with all its complexity.

A third approach, which we illustrate below, works well for most situations. We base the interest expense on the amount of debt at the beginning of the year as shown on the previous year's balance sheet. However, since this will underestimate the true interest expense if debt increases throughout the year, as it usually does for most companies, we use an interest rate that is about 0.5% higher than the rate we actually expect. This approach provides reasonably accurate forecasts without greatly increasing the model's complexity. Keep in mind, though, that this simple approach might not work well in all situations, so see ***Web Extension 14A*** if you want to implement the more complex modeling technique.

Assumption 2: Specifying Interest Rates. As noted earlier, different loans have different interest rates. Rather than trying to specify the rate on each separate debt issue, we usually specify only two rates, one for short-term notes payable and one

for long-term bonds. The interest rate on short-term debt usually floats, and because the best estimate of future rates is generally the current rate, it is most reasonable to apply the current market rate to short-term loans. For MicroDrive, the appropriate short-term rate is about 8.5%, which we rounded up to 9% because we will apply it to the debt balance at the beginning of the year.

Most companies' long-term debt consists of several different bond issues with different interest rates. During the course of the year, some of this debt may be paid off, and some new long-term debt may be added. Rather than try to estimate the interest expense for each particular issue, we apply a single interest rate to the total amount of long-term debt. This rate is an average of the rates on the currently outstanding long-term bonds and the rate that is expected on any new long-term debt. The average rate on MicroDrive's existing long-term bonds is about 10%, and it would have to pay about 10.5% on new long-term bonds. The average rate on old and new bonds is somewhere between 10% and 10.5%, which we round up to 11% because we are going to apply it to the debt at the beginning of the year, as explained above.

Calculating Interest Expense. The forecasted interest expense is the net interest paid on short-term financing plus the interest on long-term bonds. We estimate the net interest on short-term financing by first finding the interest expense on notes payable and then subtracting any interest income from short-term investments. We base interest charges on the amount of short-term debt at the beginning of the year (which is the debt at the end of the previous year), and we note that MicroDrive had no short-term investments. Therefore, MicroDrive's net short-term interest is 0.09($110) − 0.09($0) = $9.9 million. The interest on long-term bonds is 0.11($754.0) = $82.94, rounded to $82.9 million. Therefore, the total interest expense is $9.9 + $82.9 = $92.8 million.

Complete the Income Statement Earnings before taxes (EBT) is calculated by subtracting interest from EBIT, and then we deduct taxes calculated at a 40% rate. The resulting net income before preferred dividends for 2008, which is $131.8 million, is shown in Row 9 of Table 14-2. MicroDrive's preferred stock pays a dividend of 10%. Based on the amount of preferred stock at the beginning of the year, the preferred dividends are 0.10($40) = $4 million. Thus, MicroDrive's forecasted net income available to common stock is $127.8 million, shown in Row 11.

Row 12 shows the number of shares of common stock, and Row 13 shows the most recent dividend per share, $1.15. MicroDrive does not plan to issue any new shares, but it does plan to increase the dividend by 8%, resulting in a forecasted dividend of 1.08($1.15) = $1.242, rounded up to $1.25 per share. With 50 million shares, the total forecasted dividend is 50($1.25) = $62.5 million. The forecasted addition to retained earnings is equal to the net income available to common stockholders minus the total dividends: $127.8 − $62.5 = $65.3 million, as shown in Row 15.

Step 3. Forecast the Balance Sheet

Let's start with the assets required to support sales.

Forecast Operating Assets As noted earlier, MicroDrive's assets must increase if sales are to increase. MicroDrive writes and deposits checks every day. Because its managers don't know exactly when all of the checks will clear, they can't predict exactly what the balance in their checking accounts will be on any given day.

Therefore, they must maintain a balance of cash and cash equivalents (such as very short-term marketable securities) to avoid overdrawing their accounts. We discuss the issue of cash management in Chapter 22 and in ***Web Chapter 28,*** but for now we simply assume that the cash required to support a company's operations is proportional to its sales. MicroDrive's most recent ratio of cash to sales was approximately 0.33% ($10/$3,000 = 0.003333), and management believes this ratio should remain constant. Therefore, the forecasted cash balance, shown in Row 1 of Table 14-3, is 0.003333($3,300) = $11 million.[8]

Unless a company changes its credit policy or has a change in its customer base, accounts receivable should be proportional to sales. The ratio of accounts receivable to sales was $375/$3,000 = 0.125 = 12.5%. For now we assume that the credit policy and customers' paying patterns will remain constant, so the forecast for accounts receivable is 0.125($3,300) = $412.5 million, as shown in Row 3.

As sales increase, firms generally must carry more inventories. Chapter 22 and ***Web Chapter 28*** discuss inventory management in detail, but for now we assume that inventory will also be proportional to sales. The most recent inventory-to-sales ratio was $615/$3,000 = 0.205 = 20.5%. Assuming no change in MicroDrive's inventory policy, the forecasted inventory is 0.205($3,300) = $676.5 million, as shown in Row 4.

It might be reasonable to assume that cash, accounts receivable, and inventories will be proportional to sales, but will the amount of net plant and equipment go up and down as sales go up and down? The correct answer could be either yes or no. When companies acquire plant and equipment, they often install more capacity than they currently need due to economies of scale in building capacity. Moreover, even if a plant is operating at its maximum rated capacity, most companies can produce additional units by reducing downtime for scheduled maintenance, by running machinery at a higher than optimal speed, or by adding a second or third shift. Therefore, at least in the short run, companies may not have a very close relationship between sales and net plant and equipment.

However, some companies do have a fixed relationship between sales and net plant and equipment, even in the short term. For example, new stores in many retail chains achieve the same sales during their first year as the chain's existing stores. The only way such retailers can grow (beyond inflation) is by adding new stores. Such companies therefore have a strong proportional relationship between fixed assets and sales.

Finally, in the long term there is a strong relationship between sales and net plant and equipment for virtually all companies: Few companies can continue to increase sales unless they eventually add capacity. Therefore, as a first approximation it is reasonable to assume that the long-term ratio of net plant and equipment to sales will be constant.

For the first years in a forecast, managers generally build in the actual planned expenditures on plant and equipment. If those estimates are not available, it is generally best to assume a constant ratio of net plant and equipment to sales.

For MicroDrive, the ratio of net plant and equipment to sales was $1,000/$3,000 = 0.3333 = 33.33%. MicroDrive's net plant and equipment have grown fairly steadily in the past, and its managers expect steady future growth. Therefore, they forecast that they will need net plant and equipment of 0.3333($3,300) = $1,100 million.

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[8]Notice that we do not specify a growth rate for cash. Instead, we specify a growth rate for sales and let cash equal a percent of sales. So the growth rate in cash depends on the sales growth rate and its percent of sales. If this percent of sales differs from the percentage in the previous year, then its growth rate will differ from the sales growth rate. Thus, items on the balance sheet may have different growth rates than the sales growth rate.

Table 14-3

MicroDrive Inc.: Actual and Projected Balance Sheets
(Millions of Dollars)

	Actual 2007 (1)	Forecast Basis (2)	Forecast for 2008 (3)
Assets			
1. Cash	$ 10.0	0.33% × 2008 Sales =	$ 11.0
2. Short-term investments	0.0	Previous plus "plug" if needed	0.0
3. Accounts receivable	375.0	12.50% × 2008 Sales =	412.5
4. Inventories	615.0	20.50% × 2008 Sales =	676.5
5. Total current assets	$1,000.0		$1,100.0
6. Net plant and equipment	1,000.0	33.33% × 2008 Sales =	1,100.0
7. Total assets	$2,000.0		$2,200.0
Liabilities and Equity			
8. Accounts payable	$ 60.0	2.00% × 2008 Sales =	$ 66.0
9. Accruals	140.0	4.67% × 2008 Sales =	154.0
10. Notes payable	110.0	Previous plus "plug" if needed	224.7
11. Total current liabilities	$ 310.0		$ 444.7
12. Long-term bonds	754.0	Same: no new issue	754.0
13. Total liabilities	$1,064.0		$1,198.7
14. Preferred stock	40.0	Same: no new issue	40.0
15. Common stock	130.0	Same: no new issue	130.0
16. Retained earnings	766.0	2007 RE + 2008 Additions to RE =	831.3
17. Total common equity	$ 896.0		$ 961.3
18. Total liabilities and equity	$2,000.0		$2,200.0
19. Required assets[a]			$2,200.0
20. Specified sources of financing[b]			2,085.3
21. Additional funds needed (AFN)			$ 114.7
22. Required additional notes payable			$ 114.7
23. Additional short-term investments			0.0

[a]Required assets include all of the forecasted operating assets, plus short-term investment from the previous year.

[b]Specified sources of financing include forecasted operating current liabilities, forecasted long-term bonds, forecasted preferred stock, forecasted common equity, and the amount of notes payable from the previous year.

For now, we make the temporary assumption that short-term investments will remain at their current level. We will return to this point after we forecast the rest of the balance sheet.

Forecast Operating Current Liabilities As sales increase, so will purchases of raw materials, and those additional purchases will spontaneously lead to a higher level of accounts payable. MicroDrive's most recent ratio of accounts payable to sales was $60/$3,000 = 0.02 = 2%. Assuming that the payables policy will not

change, the forecasted level of accounts payable is 0.02($3,300) = $66 million, as shown in Row 8.

Higher sales require more labor, and higher sales normally result in higher taxable income and thus taxes. Therefore, accrued wages and taxes both increase as sales increase. MicroDrive's most recent ratio of accruals to sales was $140/$3,000 = 0.0467 = 4.67%. There is no reason to expect a change in this ratio, so the forecasted level of accruals is 0.0467($3,300) = $154 million.

Forecast Items Determined by Financial Policy Decisions Forecasting the remaining liability and equity depends on a firm's financial policies, which vary widely from firm to firm. We explain one fairly typical set of financial policies below, and we go through the calculations in detail in the chapter spreadsheet model, ***FM12 Ch 14 Tool Kit.xls***. However, there are many other possible policies. ***Web Extension 14B*** describes a procedure that can be used to develop a model to fit any set of financial policies. Following is a brief discussion of financial policy decisions.

First, most mature companies rarely issue new common stock, so the forecast for common stock is usually the previous year's common stock; see Chapters 16 and 17 for more discussion. Second, most firms increase their dividends at a fairly steady rate, which allows us to forecast dividend payments; see Chapter 18 for a discussion of dividend policy. Subtracting forecasted dividends from forecasted net income gives the additions to retained earnings, which affects total common equity. Third, most firms do not use preferred stock, and those that already have preferred stock issue new preferred stock infrequently. Fourth, issuing more long-term bonds is a major event for most firms, and it often requires approval from the board of directors. Chapters 16 and 17 discuss long-term debt financing in detail. Fifth, many firms use short-term bank loans as a financial "shock absorber." When extra funding is needed, they draw down their lines of credit, thus increasing notes payable, until their short-term debt has risen to an unacceptably high level, at which point they arrange long-term financing. When they secure the long-term financing, they pay off some of their short-term debt to bring it down to an acceptable level.

With these typical financial policies in mind, let's turn back to MicroDrive. Initially we assume that MicroDrive will simply maintain its current level of notes payable; we will explain how to forecast the final level of notes payable shortly. In its initial financial plan, MicroDrive will keep long-term debt at the 2007 level, as shown in Row 12 of Table 14-3. The company's policy is not to issue any additional shares of preferred or common stock barring extraordinary circumstances. Therefore, its forecasts for preferred and common stock, shown in Rows 14 and 15, are the 2006 levels. MicroDrive plans to increase its dividend per share by about 8% per year. As shown in Row 15, this policy, when combined with the forecasted level of net income, results in a $65.3 million addition to retained earnings. On the balance sheet, the forecasted level of retained earnings is equal to the 2007 retained earnings plus the forecasted addition to retained earnings, or $766.0 + $65.3 = $831.3 million. Again, note that we make the temporary assumption that notes payable remain at their 2007 level.

Step 4. Raise the Additional Funds Needed

Based on the forecasted balance sheet, MicroDrive will need $2,200 million of operating assets to support its forecasted $3,300 million of sales. We define required assets as the sum of its forecasted operating assets plus the previous

amount of short-term investments. Since MicroDrive had no short-term investments in 2007, its required assets are simply $2,200 million, as shown in Row 19 of Table 14-3.

We define the specified sources of financing as the sum of forecasted levels of operating current liabilities, long-term debt, preferred stock, and common equity, plus notes payable carried over from the previous year:

Accounts payable	$ 66.0
Accruals	154.0
Notes payable (carryover)	110.0
Long-term bonds	754.0
Preferred stock	40.0
Common stock	130.0
Retained earnings	831.3
Total	$2,085.3

Based on its required assets and specified sources of financing, MicroDrive's AFN is $2,200 − $2,085.3 = $114.7 million, as shown in Rows 19, 20, and 21 of Table 14-3. Because the AFN is positive, MicroDrive needs $114.7 million of additional financing, and its initial financial policy is to obtain these funds as notes payable. Therefore, we add $114.7 million into notes payable (Row 10 of Table 14-3), bringing the forecasted total to $110 + $114.7 = $224.7 million.

The plug approach that we used specifies the additional amount of *either* notes payable *or* short-term investments, but not both. If the AFN is positive, we assume that the firm will add to notes payable but leave short-term investments at their current level. If the AFN is negative, it will add to short-term investments but not to notes payable. Because we added notes payable, we don't add any short-term investment, and so this completes the initial forecast. Now it is time to analyze the plan and consider potential changes.

Analysis of the Forecast

The 2008 forecast as developed above is only the first part of MicroDrive's total forecasting process. We must next examine the projected statements and determine whether the forecast meets the financial targets as set forth in the 5-year financial plan. If the statements do not meet the targets, then elements of the forecast must be changed.

Table 14-4 shows MicroDrive's most recent actual ratios, its projected ratios, and the latest industry average ratios. (The table also shows a "Revised Forecast" in the third column, which we will discuss later. Disregard the revised data for now.) The firm's financial condition at the close of 2007 was weak, with many ratios being well below the industry averages. For example, MicroDrive's current ratio, based on Column 1 of Table 14-4, was only 3.2 versus 4.2 for an average competitor.

The "Inputs" section shown on the top three rows of the table provides data on three of the model's key drivers: (1) costs (excluding depreciation) as a percentage of sales, (2) accounts receivable as a percentage of sales, and (3) inventory as a percentage of sales. The preliminary forecast in Column 2 assumes these variables remain constant. While MicroDrive's cost-to-sales ratio is only slightly worse than the industry average, its ratios of accounts receivable to sales and inventory to sales are significantly higher than those of its competitors. Its investment in inventories

Table 14-4

Model Inputs, AFN, and Key Ratios (Millions of Dollars)

	Actual 2007 (1)	Preliminary Forecast for 2008 (2)	Revised Forecast for 2008 (3)	Industry Average 2007 (4)
Model Inputs				
Costs (excluding depreciation) as percentage of sales	87.2%	87.2%	86.0%	87.1%
Accounts receivable as percentage of sales	12.5	12.5	11.8	10.0
Inventory as percentage of sales	20.5	20.5	16.7	11.1
Model Outputs				
NOPAT (net operating profit after taxes)[a]	$170.3	$187.4	$211.2	
Net operating working capital[b]	$800.0	$880.0	$731.5	
Total operating capital[c]	$1,800.0	$1,980.0	$1,831.5	
Free cash flows (FCF)[d]	($174.7)	$7.4	$179.7	
AFN		$114.7	($57.5)	
Ratios				
Current ratio	3.2×	2.5×	3.1×	4.2×
Inventory turnover	4.9	1.9	6.0	9.0
Days sales outstanding	45.6	45.6	43.1	36.0
Total assets turnover	1.5	1.5	1.6	1.8
Debt ratio	53.2%	54.5%	51.4%	40.0%
Profit margin	3.8	3.9	4.6	5.0
Return on assets	5.7	5.8	7.2	9.0
Return on equity	12.7	13.3	15.4	15.0
Return on invested capital (NOPAT/Total operating capital)	9.5	9.5	11.5	11.4

[a]NOPAT = EBIT × (1 − T) from Table 14-2.

[b]Net operating working capital = Cash + Accounts receivable + Inventories − Accounts payable − Accruals from Table 14-3.

[c]Total operating capital = Net operating working capital + Net plant and equipment from Table 14-3.

[d]Free cash flow = NOPAT − Investment in total operating capital.

and receivables is too high, causing its returns on assets, equity, and invested capital as shown in the lower part of the table to be too low. Therefore, MicroDrive should make operational changes designed to reduce its current assets.

The "Ratios" section of Table 14-4 provides more details regarding the firm's weaknesses. MicroDrive's asset management ratios are much worse than the industry averages. For example, its total assets turnover ratio is 1.5 versus an industry average of 1.8. Its poor asset management ratios drag down the return on invested capital (9.5% for MicroDrive versus 11.4% for the industry average).

Furthermore, MicroDrive must carry more than the average amount of debt to support its excessive assets, and the extra interest expense reduces its profit margin to 3.9% versus 5.0% for the industry. Much of the debt is short term, and this results in a current ratio of 2.5 versus the 4.2 industry average. These problems will persist unless management takes action to improve things.

After reviewing its preliminary forecast, management decided to take three steps to improve its financial condition: (1) It decided to lay off some workers and close certain operations. It forecasted that these steps would lower operating costs (excluding depreciation) from the current 87.2% to 86% of sales as shown in Column 3 of Table 14-4. (2) By screening credit customers more closely and being more aggressive in collecting past-due accounts, the company believes it can reduce the ratio of accounts receivable to sales from 12.5% to 11.8%. (3) Finally, management thinks it can reduce the inventory-to-sales ratio from 20.5% to 16.7% through the use of tighter inventory controls.[9]

These projected operational changes were then used to create a revised set of forecasted statements for 2008. We do not show the new financial statements, but the revised ratios are shown in the third column of Table 14-4. You can see the details in the chapter spreadsheet model, ***FM12 CH 14 Tool Kit.xls.*** Here are the highlights of the revised forecast:

1. The reduction in operating costs improved the 2008 NOPAT, or net operating profit after taxes, by $23.8 million. Even more impressive, the improvements in the receivables policy and in inventory management reduced receivables and inventories by $148.5 million. The net result of the increase in NOPAT and the reduction of operating current assets was a very large increase in free cash flow for 2008, from a previously estimated $7.4 million to $179.7 million.
2. The profit margin improved to 4.6%. However, the firm's profit margin still lagged the industry average because its high debt ratio results in higher than average interest payments.
3. The increase in the profit margin resulted in an increase in projected retained earnings. More importantly, by tightening inventory controls and reducing the days sales outstanding, MicroDrive projected a reduction in inventories and receivables. Taken together, these actions resulted in a *negative* AFN of $57.5 million, which means that MicroDrive would actually generate $57.5 million more from internal operations and its financing plan than it needs for new assets. Under its current financial policy, MicroDrive would have $110 million in notes payable (the amount it carried over from the previous year) and $57.5 million in short-term investments. (Note: MicroDrive's managers considered using the $57.5 million to pay down some of the debt but decided instead to keep it as a liquid asset, which gives them the flexibility to quickly fund any new projects created by their R&D department.) The net effect is a significant reduction in MicroDrive's debt ratio, although it is still above the industry average.
4. These actions also raised the rate of return on assets from 5.8% to 7.2%, and they boosted the return on equity from 13.3% to 15.4%, which is even higher than the industry average.

Although MicroDrive's managers believed that the revised forecast was achievable, they were not sure of this. Accordingly, they wanted to know how variations in sales would affect the forecast. Therefore, they ran a spreadsheet model using several different sales growth rates and analyzed the results to see how the ratios would change under different growth scenarios. To illustrate, if the

[9]We will discuss receivables and inventory management in detail in Chapter 22.

sales growth rate increased from 10% to 20%, the AFN would change dramatically, from a $57.5 million *surplus* to an $89.8 million *shortfall* because more assets would be required to finance the additional sales.

The spreadsheet model was also used to evaluate dividend policy. If MicroDrive decided to reduce its dividend growth rate, then additional funds would be generated, and those funds could be invested in plant, equipment, and inventories; used to reduce debt; or used to repurchase stock.

We see, then, that forecasting is an iterative process. For planning purposes, the financial staff develops a preliminary forecast based on a continuation of past policies and trends. This provides a starting point, or "baseline" forecast. Next, the projections are modified to see what effects alternative operating plans would have on the firm's earnings and financial condition. This results in a revised forecast. Then alternative operating plans are examined under different sales growth scenarios, and the model is used to evaluate both dividend policy and capital structure decisions.

Finally, the projected statements can be used to estimate the effect of different plans on MicroDrive's stock price. This is called value-based management and is covered in Chapter 15.

SELF-TEST

List some factors that should be considered when developing a sales forecast.
What is the AFN, and how is the forecasted financial statements method used to estimate it?
Why do accounts payable and accruals provide "spontaneous funds" to a growing firm?

14.5 Forecasting Financial Requirements When the Balance Sheet Ratios Are Subject to Change

Both the AFN formula and the projected financial statement method as we initially used it assume that the ratios of assets and liabilities to sales (A^*/S_0 and L^*/S_0) remain constant over time. This, in turn, requires the assumption that each "spontaneous" asset and liability item increases at the same rate as sales. In graph form, this implies the type of relationship shown in Panel a of Figure 14-2, a relationship that is (1) linear and (2) passes through the origin. Under those conditions, if the company's sales increase from $200 million to $400 million, or by 100%, inventory will also increase by 100%, from $100 million to $200 million.

The assumption of constant ratios and identical growth rates is appropriate at times, but there are times when it is incorrect. Three such conditions are described in the following sections.

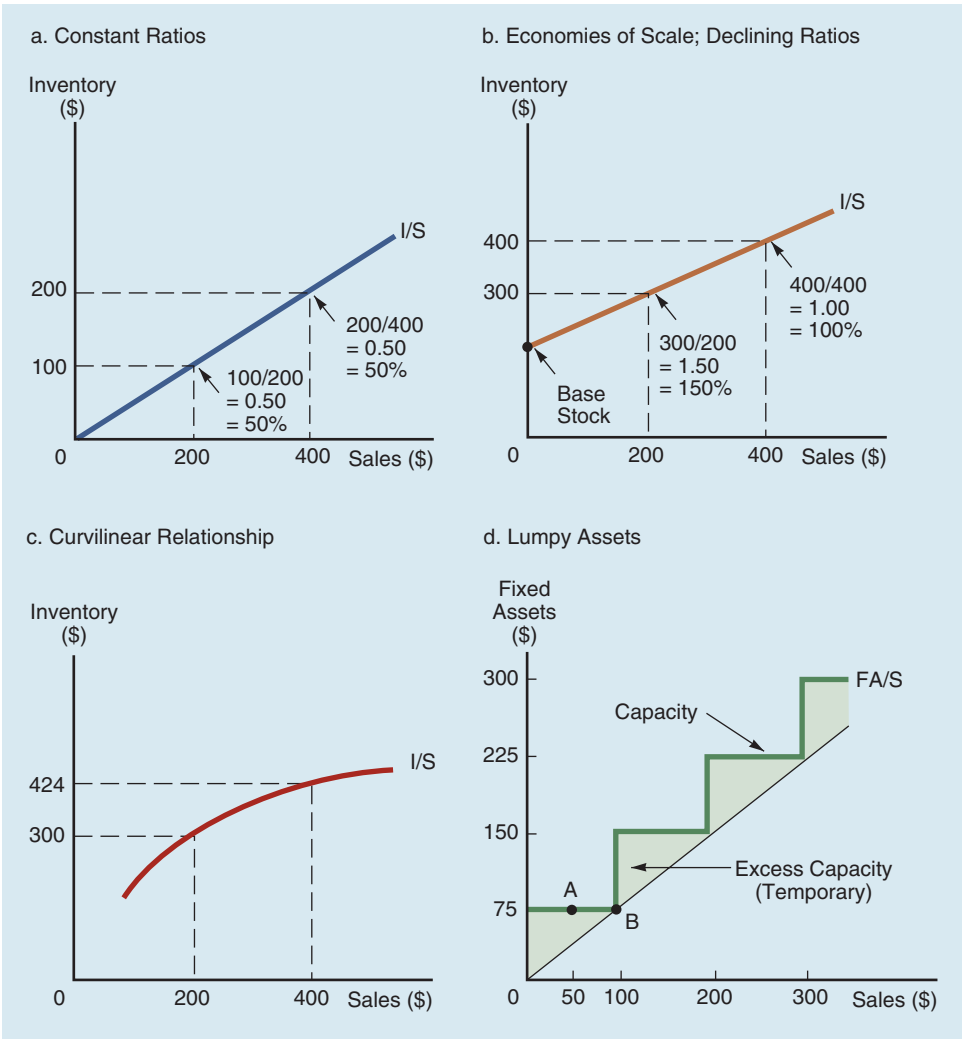
Economies of Scale

There are economies of scale in the use of many kinds of assets, and when economies 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 (I/S) declines. This situation is depicted in Panel b of Figure 14-2. Here we see that the inventory/sales ratio is 1.5, or 150%, when sales are $200 million, but the ratio declines to 1.0 when sales climb to $400 million.

The relationship in Panel b is linear, but nonlinear relationships often exist. Indeed, if the firm uses one popular model for establishing inventory levels (the EOQ model), its inventories will rise with the square root of sales. This situation

Figure 14-2

Four Possible Ratio Relationships (Millions of Dollars)



is shown in Panel c of Figure 14-2, which shows a curved line whose slope decreases at higher sales levels. In this situation, very large increases in sales would require very little additional inventory.

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See ***Web Extension 14B*** for more on forecasting when variables are not proportional to sales.

Lumpy Assets

In many industries, technological considerations dictate that if a firm is to be competitive, it must add fixed assets in large, discrete units; such assets are often referred to as **lumpy assets.** In the paper industry, for example, there are strong economies of scale in basic paper mill equipment, so when a paper company expands capacity, it must do so in large, lumpy increments. This type of situation is depicted in Panel d of Figure 14-2. Here we assume that the minimum economically efficient plant has a cost of $75 million and that such a plant can produce enough output to reach a sales level of $100 million. If the firm is to be competitive, it simply must have at least $75 million of fixed assets.

Lumpy assets have a major effect on the fixed assets/sales (FA/S) ratio at different sales levels and, consequently, on financial requirements. At Point A in Panel d, which represents a sales level of $50 million, the fixed assets are $75 million, so the ratio FA/S = $75/$50 = 1.5. Sales can expand by $50 million, out to $100 million, with no additions to fixed assets. At that point, represented by Point B, the ratio FA/S = $75/$100 = 0.75. However, since the firm is operating at capacity (sales of $100 million), even a small increase in sales would require a doubling of plant capacity, so a small projected sales increase would bring with it a very large financial requirement.[10]

Excess Capacity Adjustments

Consider again the MicroDrive example set forth in Tables 14-2 and 14-3, but now assume that excess capacity exists in fixed assets. Specifically, assume that fixed assets in 2007 were being utilized to only 96% of capacity. If fixed assets had been used to full capacity, 2007 sales could have been as high as $3,125 million versus the $3,000 million in actual sales:

$$\text{Full capacity sales} = \frac{\text{Actual sales}}{\text{Percentage of capacity at which fixed assets were operated}} = \frac{\$3{,}000 \text{ million}}{0.96} = \$3{,}125 \text{ million.} \quad \textbf{(14-2)}$$

This suggests that MicroDrive's target fixed assets/sales ratio should be 32% rather than 33.3%:

$$\text{Target fixed assets/Sales} = \frac{\text{Actual fixed assets}}{\text{Full capacity sales}} = \frac{\$1{,}000}{\$3{,}125} = 0.32 = 32\%. \quad \textbf{(14-3)}$$

Therefore, if sales are to increase to $3,300 million, then fixed assets would have to increase to $1,056 million:

$$\begin{aligned}\text{Required level of fixed assets} &= (\text{Target fixed assets/Sales})(\text{Projected sales}) \\ &= 0.32(\$3{,}300) = \$1{,}056 \text{ million.}\end{aligned} \quad \textbf{(14-4)}$$

We previously forecasted that MicroDrive would need to increase fixed assets at the same rate as sales, or by 10%. That meant an increase from $1,000 million to $1,100 million, or by $100 million. Now we see that the actual required increase is only from $1,000 million to $1,056 million, or by $56 million. Thus, the capacity-adjusted forecast is $100 million − $56 million = $44 million less than the earlier forecast. With a smaller fixed asset requirement, the projected AFN would decline from an estimated $118 million to $118 million − $44 million = $74 million.

[10]Several other points should be noted about Panel d of Figure 14-2. First, if the firm is operating at a sales level of $100 million or less, any expansion that calls for a sales increase above $100 million would require a *doubling* of the firm's fixed assets. A much smaller percentage increase would be involved if the firm were large enough to be operating a number of plants. Second, firms generally go to multiple shifts and take other actions to minimize the need for new fixed asset capacity as they approach Point B. However, these efforts can only go so far, and eventually a fixed asset expansion will be required. Third, firms often make arrangements to share excess capacity with other firms in their industry. For example, the situation in the electric utility industry is very much like that depicted in Panel d. However, electric companies often build jointly owned plants, or else they "take turns" building plants, and then they buy power from or sell power to other utilities to avoid building new plants that would be underutilized.

Note also that when excess capacity exists, sales can grow to the capacity sales as determined above with no increase in fixed assets, but sales beyond that level will require fixed asset additions as calculated in our example. The same situation could occur with respect to inventories, and the required additions would be determined in exactly the same manner as for fixed assets. Theoretically, the same situation could occur with other types of assets, but as a practical matter excess capacity normally exists only with respect to fixed assets and inventories.

SELF-TEST Explain how economies of scale and lumpy asset acquisition affect financial forecasting.

Summary

The key concepts covered are listed below:

- **Financial forecasting** generally begins with a forecast of the firm's sales, in terms of both units and dollars.
- Either the **forecasted,** or **pro forma, financial statement method** or the **AFN formula method** can be used to forecast financial requirements. The financial statement method is more reliable, and it also provides ratios that can be used to evaluate alternative business plans.
- A firm can determine its **additional funds needed (AFN)** by estimating the amount of new assets necessary to support the forecasted level of sales and then subtracting from that amount the spontaneous funds that will be generated from operations. The firm can then plan how to raise the AFN most efficiently.
- The **higher a firm's sales growth rate,** the **greater** will be its need for additional financing. Similarly, the **smaller its retention ratio,** the **greater** its need for additional funds.
- Adjustments must be made if **economies of scale** exist in the use of assets, if **excess capacity** exists, or if assets must be added in **lumpy increments.**
- **Linear regression** and **excess capacity adjustments** can be used to forecast asset requirements in situations where assets are not expected to grow at the same rate as sales.

Questions

(14-1) Define each of the following terms:
a. Operating plan; financial plan; sales forecast
b. Pro forma financial statement; forecasted financial statement method
c. Spontaneously generated funds
d. Additional funds needed (AFN); AFN formula; capital intensity ratio
e. Lumpy assets

(14-2) Certain liability and net worth items generally increase spontaneously with increases in sales. Put a check (✓) by those items that typically increase spontaneously:

Accounts payable	_____	Mortgage bonds	_____
Notes payable to banks	_____	Common stock	_____
Accrued wages	_____	Retained earnings	_____
Accrued taxes	_____		

(14-3) The following equation can, under certain assumptions, be used to forecast financial requirements:

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

Under what conditions does the equation give satisfactory predictions, and when should it *not* be used?

(14-4) Suppose a firm makes the following policy changes. If the change means that external, nonspontaneous financial requirements (AFN) will increase, indicate this by a (+); indicate a decrease by a (−); and indicate indeterminate or no effect by a (0). Think in terms of the immediate, short-run effect on funds requirements.

a. The dividend payout ratio is increased. _____
b. The firm decides to pay all suppliers on delivery, rather than after a 30-day delay, to take advantage of discounts for rapid payment. _____
c. The firm begins to sell on credit (previously all sales had been on a cash basis). _____
d. The firm's profit margin is eroded by increased competition; sales are steady. _____

Self-Test Problems Solutions Appear in Appendix A

(ST-1) Growth Rate

The Barnsdale Corporation has the following ratios: $A^*/S_0 = 1.6$; $L^*/S_0 = 0.4$; profit margin = 0.10; and dividend payout ratio = 0.45, or 45%. Sales last year were $100 million. Assuming that these ratios will remain constant, use the AFN formula to determine the maximum growth rate Barnsdale can achieve without having to employ nonspontaneous external funds.

(ST-2) Additional Funds Needed

Suppose Barnsdale's financial consultants (see Problem ST-1) report (1) that the inventory turnover ratio is sales/inventory = 3 times versus an industry average of 4 times and (2) that Barnsdale could reduce inventories and thus raise its turnover to 4 without affecting sales, the profit margin, or the other asset turnover ratios. Under these conditions, use the AFN formula to determine the amount of additional funds Barnsdale would require during each of the next 2 years if sales grew at a rate of 20% per year.

(ST-3) Excess Capacity

Van Auken Lumber's 2007 financial statements are shown below.

Van Auken Lumber: Balance Sheet as of December 31, 2007 (Thousands of Dollars)

Cash	$ 1,800	Accounts payable	$ 7,200
Receivables	10,800	Notes payable	3,472
Inventories	12,600	Accruals	2,520
Total current assets	$25,200	Total current liabilities	$13,192
Net fixed assets	21,600	Mortgage bonds	5,000
		Common stock	2,000
		Retained earnings	26,608
Total assets	$46,800	Total liabilities and equity	$46,800

Van Auken Lumber: Income Statement for December 31, 2007 (Thousands of Dollars)

Sales	$36,000
Operating costs	30,783
Earnings before interest and taxes	$ 5,217
Interest	717
Earnings before taxes	$ 4,500
Taxes (40%)	1,800
Net income	$ 2,700
Dividends (60%)	$ 1,620
Addition to retained earnings	$ 1,080

a. Assume that the company was operating at full capacity in 2007 with regard to all items *except* fixed assets; fixed assets in 2007 were being utilized to only 75% of capacity. By what percentage could 2008 sales increase over 2007 sales without the need for an increase in fixed assets?

b. Now suppose 2008 sales increase by 25% over 2007 sales. How much additional external capital will be required? Assume that Van Auken cannot sell any fixed assets. (Hint: Use the forecasted financial statements method to develop a pro forma balance sheet and income statement as in Tables 14-2 and 14-3.) Assume that any required financing is borrowed as notes payable. Use a 12% interest rate for all debt at the beginning of the year to forecast interest expense (cash does not earn interest), and use a pro forma income statement to determine the addition to retained earnings. (Another hint: Notes payable = $6,021.)

Problems

Answers Appear in Appendix B

Easy Problems 1–3

(14-1) AFN Formula

Baxter Video Products' sales are expected to increase from $5 million in 2007 to $6 million in 2008 or by 20%. Its assets totaled $3 million at the end of 2007. Baxter is at full capacity, so its assets must grow at the same rate as projected sales. At the end of 2007, current liabilities were $1 million, consisting of $250,000 of accounts payable, $500,000 of notes payable, and $250,000 of accruals. The after-tax profit margin is forecasted to be 5%, and the forecasted payout ratio is 70%. Use the AFN formula to forecast Baxter's additional funds needed for the coming year.

(14-2) AFN Formula

Refer to Problem 14-1. What would be the additional funds needed if the company's year-end 2007 assets had been $4 million? Assume that all other numbers are the same. Why is this AFN different from the one you found in Problem 14-1? Is the company's "capital intensity" the same or different?

(14-3) AFN Formula

Refer to Problem 14-1. Return to the assumption that the company had $3 million in assets at the end of 2007, but now assume that the company pays no dividends. Under these assumptions, what would be the additional funds needed for the coming year? Why is this AFN different from the one you found in Problem 14-1?

Intermediate Problems 4–6

(14-4) Sales Increase

Bannister Legal Services generated $2.0 million in sales during 2007, and its year-end total assets were $1.5 million. Also, at year-end 2007, current liabilities were $500,000, consisting of $200,000 of notes payable, $200,000 of accounts payable, and $100,000 of accruals. Looking ahead to 2008, the company estimates that its

assets must increase by 75 cents for every $1 increase in sales. Bannister's profit margin is 5%, and its payout ratio is 60%. How large a sales increase can the company achieve without having to raise funds externally?

(14-5) Long-Term Financing Needed

At year-end 2007, total assets for Bertin Inc. were $1.2 million and accounts payable were $375,000. Sales, which in 2007 were $2.5 million, are expected to increase by 25% in 2008. Total assets and accounts payable are proportional to sales, and that relationship will be maintained. Bertin typically uses no current liabilities other than accounts payable. Common stock amounted to $425,000 in 2007, and retained earnings were $295,000. Bertin plans to sell new common stock in the amount of $75,000. The firm's profit margin on sales is 6%; 40% of earnings will be paid out as dividends.

a. What was Bertin's total debt in 2007?
b. How much new, long-term debt financing will be needed in 2008? (Hint: AFN − New stock = New long-term debt.) Do not consider any financing feedback effects.

(14-6) Additional Funds Needed

The Booth Company's sales are forecasted to increase from $1,000 in 2007 to $2,000 in 2008. Here is the December 31, 2007, balance sheet:

Cash	$ 100	Accounts payable	$ 50
Accounts receivable	200	Notes payable	150
Inventories	200	Accruals	50
Net fixed assets	500	Long-term debt	400
		Common stock	100
		Retained earnings	250
Total assets	$1,000	Total liabilities and equity	$1,000

Booth's fixed assets were used to only 50% of capacity during 2007, but its current assets were at their proper levels. All assets except fixed assets increase at the same rate as sales, and fixed assets would also increase at the same rate if the current excess capacity did not exist. Booth's after-tax profit margin is forecasted to be 5%, and its payout ratio will be 60%. What is Booth's additional funds needed (AFN) for the coming year?

Challenging Problems 7–9

(14-7) Pro Forma Statements and Ratios

Upton Computers makes bulk purchases of small computers, stocks them in conveniently located warehouses, and ships them to its chain of retail stores. Upton's balance sheet as of December 31, 2007, is shown here (millions of dollars).

Cash	$ 3.5	Accounts payable	$ 9.0
Receivables	26.0	Notes payable	18.0
Inventories	58.0	Accruals	8.5
Total current assets	$ 87.5	Total current liabilities	$ 35.5
Net fixed assets	35.0	Mortgage loan	6.0
		Common stock	15.0
		Retained earnings	66.0
Total assets	$122.5	Total liabilities and equity	$122.5

Sales for 2007 were $350 million, while net income for the year was $10.5 million. Upton paid dividends of $4.2 million to common stockholders. The firm is operating at full capacity. Assume that all ratios remain constant.

a. If sales are projected to increase by $70 million, or 20%, during 2008, use the AFN equation to determine Upton's projected external capital requirements.

b. Construct Upton's pro forma balance sheet for December 31, 2008. Assume that all external capital requirements are met by bank loans and are reflected in notes payable. Assume Upton's profit margin and dividend payout ratio remain constant.

(14-8) Additional Funds Needed

Stevens Textile's 2007 financial statements are shown below.

Stevens Textile: Balance Sheet as of December 31, 2007 (Thousands of Dollars)

Cash	$ 1,080	Accounts payable	$ 4,320
Receivables	6,480	Accruals	2,880
Inventories	9,000	Notes payable	2,100
Total current assets	$16,560	Total current liabilities	$ 9,300
Net fixed assets	12,600	Mortgage bonds	3,500
		Common stock	3,500
		Retained earnings	12,860
Total assets	$29,160	Total liabilities and equity	$29,160

Stevens Textile: Income Statement for December 31, 2007 (Thousands of Dollars)

Sales	$36,000
Operating costs	32,440
Earnings before interest and taxes	$ 3,560
Interest	460
Earnings before taxes	$ 3,100
Taxes (40%)	1,240
Net income	$ 1,860
Dividends (45%)	$ 837
Addition to retained earnings	$ 1,023

Suppose 2008 sales are projected to increase by 15% over 2007 sales. Determine the additional funds needed. Assume that the company was operating at full capacity in 2007, that it cannot sell off any of its fixed assets, and that any required financing will be borrowed as notes payable. Also, assume that assets, spontaneous liabilities, and operating costs are expected to increase by the same percentage as sales. Use the forecasted financial statements method to develop a pro forma balance sheet and income statement for December 31, 2008. Use an interest rate of 10% on the balance of debt at the beginning of the year to compute interest (cash pays no interest). Use the pro forma income statement to determine the addition to retained earnings.

(14-9) Additional Funds Needed

Garlington Technologies Inc.'s 2007 financial statements are shown below.

Garlington Technologies Inc.: Balance Sheet as of December 31, 2007

Cash	$ 180,000	Accounts payable	$ 360,000
Receivables	360,000	Notes payable	156,000
Inventories	720,000	Accruals	180,000
Total current assets	$1,260,000	Total current liabilities	$ 696,000
Fixed assets	1,440,000	Common stock	1,800,000
		Retained earnings	204,000
Total assets	$2,700,000	Total liabilities and equity	$2,700,000

Garlington Technologies Inc.: Income Statement for December 31, 2007

Sales	$3,600,000
Operating costs	3,279,720
EBIT	$ 320,280
Interest	18,280
EBT	$ 302,000
Taxes (40%)	120,800
Net income	$ 181,200
Dividends	$ 108,000

Suppose that in 2008 sales increase by 10% over 2007 sales and that 2008 dividends will increase to $112,000. Construct the pro forma financial statements using the percent of sales method. Assume the firm operated at full capacity in 2007. Use an interest rate of 13% on the debt balance at the beginning of the year. Assume that the AFN will be in the form of notes payable.

Spreadsheet Problem

(14-10)
Build a Model: Forecasting Financial Statements

FM
e-resource

Start with the partial model in the file ***FM12 Ch 14 P10 Build a Model.xls*** from the textbook's Web site. Cumberland Industries' financial planners must forecast the company's financial results for the coming year. The forecast will be based on the forecasted financial statements method, and any additional funds needed will be obtained by using a mix of notes payable, long-term debt, and common stock. No preferred stock will be issued. Data for the problem, including Cumberland Industries' balance sheet and income statement, can be found in the spreadsheet problem for Chapter 3. Use these data to answer the following questions.

a. Cumberland Industries has had the following sales since 2002. Assuming the historical trend continues, what will sales be in 2008?

Year	Sales
2002	$129,215,000
2003	180,901,000
2004	235,252,000
2005	294,065,000
2006	396,692,000
2007	455,150,000

Base your forecast on a spreadsheet regression analysis of the 2002–2007 sales. By what percentage are sales predicted to increase in 2008 over 2007? Is the sales growth rate increasing or decreasing?

b. Cumberland's management believes that the firm will actually experience a 20% increase in sales during 2008. Construct the 2008 pro forma financial statements. Cumberland will not issue any new stock or long-term bonds. Assume Cumberland will carry forward its current amounts of short-term investments and notes payable, prior to calculating additional funds needed

(AFN). Assume that any AFN will be raised as notes payable (if AFN is negative, Cumberland will purchase additional short-term investments). Use an interest rate of 9% for short-term debt (and for the interest income on short-term investments) and a rate of 11% for long-term debt. No interest is earned on cash. Use the beginning-of-year debt balances to calculate net interest expense. Assume dividends grow at an 8% rate.

c. Now create a graph that shows the sensitivity of AFN to the sales growth rate. To make this graph, compare the AFN at sales growth rates of 5%, 10%, 15%, 20%, 25%, and 30%.

d. Calculate net operating working capital (NOWC), total operating capital, NOPAT, and operating cash flow (OCF) for 2007 and 2008. Also, calculate the free cash flow (FCF) for 2008.

e. Suppose Cumberland can reduce its inventory-to-sales ratio to 5% and its cost-to-sales ratio to 83%. What happens to AFN and FCF?

Cyberproblems

FM e-resource

Please go to the textbook's Web site to access any Cyberproblems.

Mini Case

Betty Simmons, the new financial manager of Southeast Chemicals (SEC), a Georgia producer of specialized chemicals for use in fruit orchards, must prepare a financial forecast for 2008. SEC's 2007 sales were $2 billion, and the marketing department is forecasting a 25% increase for 2008. Simmons thinks the company was operating at full capacity in 2007, but she is not sure about this. The 2007 financial statements, plus some other data, are shown below.

A. 2007 Balance Sheet (Millions of Dollars)

		Percent of Sales			Percent 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. 2007 Income Statement (Millions of Dollars)

		Percent 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

		SEC Industry
Profit margin	2.70%	4.005
Return on equity	7.71	15.60
Days sales outstanding (365 days)	43.80 days	32.00 days
Inventory turnover	8.33×	11.00×
Fixed assets turnover	4.00	5.00
Debt/assets	30.00%	36.00%
Times interest earned	10.00×	9.40×
Current ratio	2.50	3.00
Return on invested capital (NOPAT/Operating capital)	6.67%	14.00%

Assume that you were recently hired as Simmons's 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.

a. Describe three ways that pro forma statements are used in financial planning.
b. Explain the steps in financial forecasting.
c. Assume (1) that SEC was operating at full capacity in 2007 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 2007 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.
d. How would changes in the following items affect the AFN? (1) Sales increase; (2) the dividend payout ratio increases; (3) the profit margin increases; (4) the capital intensity ratio increases; (5) SEC begins paying its suppliers sooner. (Consider each item separately and hold all other things constant.)
e. Briefly explain how to forecast financial statements using the forecasted financial statements approach. Be sure to explain how to forecast interest expenses.

f. Now estimate the 2008 financial requirements using the forecasted 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 2008 as in 2007; (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%; and (5) that interest expenses should be based on the balance of debt at the beginning of the year.

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

h. Calculate SEC's forecasted ratios, and compare them with the company's 2007 ratios and with the industry averages. Calculate SEC's forecasted free cash flow and return on invested capital (ROIC).

i. Based on comparisons between SEC's days sales outstanding (DSO) and inventory turnover ratios with the industry average figures, does it appear that SEC is operating efficiently with respect to its inventory and accounts receivable? Suppose SEC were 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?

j. Suppose you now learn that SEC's 2007 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.
   (1) What level of sales could have existed in 2007 with the available fixed assets?
   (2) How would the existence of excess capacity in fixed assets affect the additional funds needed during 2008?

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.

Selected Additional Cases

The following cases from Textchoice, *Thomson Learning's online library, cover many of the concepts discussed in this chapter and are available at* ***http://www.textchoice2.com.***

Klein-Brigham Series:
Case 37, "Space-Age Materials, Inc."; Case 38, "Automated Banking Management, Inc."; Case 52, "Expert Systems"; and Case 69, "Medical Management Systems, Inc."