CHAPTER 12

Financial Planning and Forecasting Financial Statements

A recent survey of CFOs disclosed a paradox regarding financial planning. On the one hand, almost all CFOs stated that financial planning is both important and highly useful for allocating resources. On the other hand, 45% also said that budgeting is "contentious, political, and time-consuming," and 53% went on to say that the budgeting process can encourage undesirable behavior among managers as they negotiate budgets to meet their own rather than the company's objectives. Further, they also said that instead of basing growth and incentive compensation targets on an analysis of what markets and competitors are likely to do in the future, firms often set their targets at last year's levels plus a percentage increase, which is dangerous in a dynamic economy.

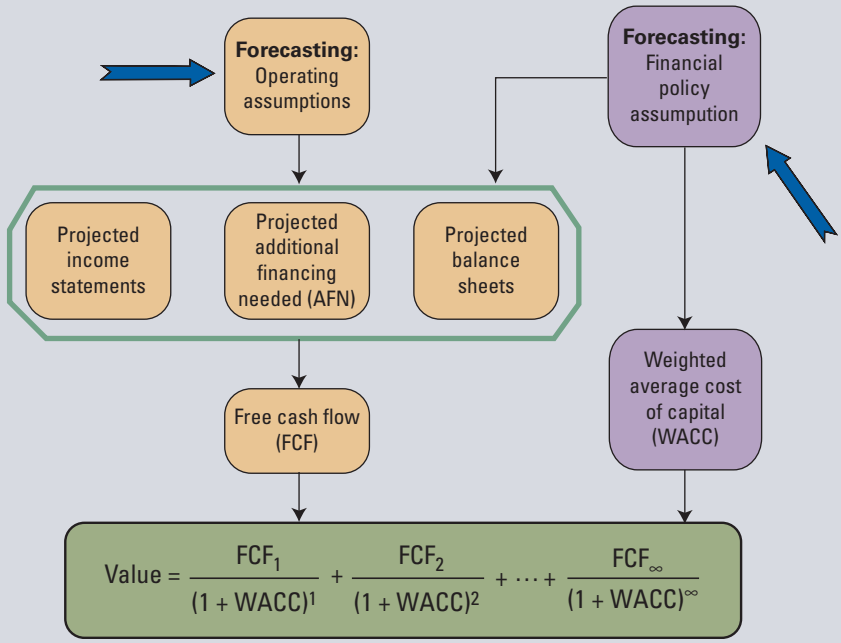
To help resolve these issues, companies are developing a variety of new strategies. For example, demand-pull budgeting links the budget to a sales forecast, and the sales forecast is updated as needed to reflect changing economic conditions. This approach is often augmented with a rolling forecast, in which companies make 1- and 5-year forecasts but then modify the 1-year forecast each month as new operating results become available. Also, some companies have switched to activity-based budgeting, which allocates costs and revenues by products and services rather than by traditional departments.

A recent survey shows that high-performance companies also focus on the links between forecasting, planning, and business strategy rather than on just cost management and cost accounting. According to John McMahan of the Hackett Group, such changes are leading to greater forecasting accuracy, higher employee morale, and better corporate performance. These issues are often thought of as "management" rather than "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. The procedures discussed in this chapter can help firms improve their operations and results.

Sources: J. McCafferty, "Planning for the Best," CFO, *February 2007, p. 24; and Don Durfee, "Alternative Budgeting,"* CFO, *June 2006, p. 28.*

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 explains how to project financial statements and use them to calculate expected future free cash flows under different operating plans. The next chapter takes the analysis further, showing how to identify optimal plans and then design incentive compensation systems that will lead to optimal results.



resource

The textbook's Web site contains an Excel *file that will guide you through the chapter's calculations. The file for this chapter is* **Ch12 Tool Kit.xls**, *and we encourage you to open the file and follow along as you read the chapter.*

Our primary objective in this book is to explain how financial managers can make their companies more valuable. However, value creation is impossible unless the company has well-designed strategic and tactical operating plans. 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."

12.1 Overview of Financial Planning

Most companies have strategic plans, operating plans, and financial plans.

Strategic Plans

Strategic plans usually have statements for mission, corporate scope, corporate objectives, and strategies.

Mission Statement. Strategic plans usually begin with a *mission statement*, which is a statement of the firm's overall purpose. Many companies are very clear about their corporate mission, and for most this is typical: "Our mission is to maximize shareowner value over time." Before the economic crisis of 2008 and 2009, many companies forgot about the "over time" part, focusing instead on "maximizing the stock price on the date the CEO's options vest." Stockholders and directors have, fortunately, brought "over time" back into focus.

The goal of creating wealth for the company's owners is not as common abroad as it is in the United States. For example, Veba AG, one of Germany's largest companies, created a stir when it made the following statement in its annual report: "Our commitment is to create value for you, our shareholders." This was quite different from the usual German model, for German companies generally have representatives from labor on their boards of directors and explicitly state their commitments to labor and a variety of other 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 Veba.

Corporate Scope. A firm's corporate scope defines its line or lines of business and its geographic area of operations. For example, Coca-Cola limits its products to soft drinks, but it operates on a global scale. PepsiCo followed Coke's lead by spinning off its food service businesses, as several studies have found that the market tends to value focused firms more highly than diversified ones.[1] During the bull market that led up to the 2008–2009 crash, many companies expanded willy-nilly into things that management knew little about, seeking sales growth as much or more than profits. For example, electric utilities bought insurance companies, and conservative banks bought gun-slinging mortgage companies. Those misguided ventures led to many disasters, so today companies are paying more attention to having a reasonable corporate scope.

Statement of Corporate Objectives. This statement sets forth specific goals or targets to help operating managers focus on the firm's primary objectives. Most organizations have both quantitative and qualitative objectives. A typical quantitative objective might be attaining a 50% market share, a 20% ROE, and a 10% earnings growth rate. Qualitatively, their stated objective might be: "To provide better information systems to lower the cost and improve the efficiency of the U.S. medical system."

Corporate Strategies. 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 to a limited number of cities, while another's strategy may be to offer "a stateroom in the sky." Any such strategy should, of course, be compatible with the firm's purpose, scope, and objectives.

Overall, the strategic plan provides a "vision" of what the firm's top management expects, and without such a vision, the firm is not likely to be successful.

Operating Plans

Operating plans provide detailed implementation guidance to help the firm realize its strategic vision. These plans can be developed for any time horizon, but most companies use a 5-year horizon, with the plan being quite detailed for the first year but less and less specific for each succeeding year. The plan explains who is responsible for each particular function, when specific tasks are to be accomplished, targets for sales and profits, and the like. Large, multidivisional companies such as General Electric break their operating plans down by divisions, so each division has its own goals,

[1]See, for example, Philip G. Berger and Eli Ofek, "Diversification's Effect on Firm Value," *Journal of Financial Economics*, January 1995, pp. 39–66; and Larry Lang and René Stulz, "Tobin's Q, Corporate Diversification, and Firm Performance," *Journal of Political Economy*, Vol. 102, 1994, pp. 1248–1280.

mission, and plan for meeting its objectives. These plans are then consolidated to form the overall corporate plan.

The Financial Plan

The financial planning process generally involves five steps.

1. The firm forecasts financial statements under alternative versions of the operating plan in order to analyze the effects of different operating procedures on projected profits and financial ratios.
2. Next, it determines the amount of capital that will be needed to support the plan; that is, it finds out how much the new assets needed to achieve the target sales will cost, since without adequate capital, the plan obviously cannot be realized.
3. Then the firm forecasts the funds that will be generated internally. If internal funds are insufficient to cover the required new investment, then it must identify sources from which the required external capital can be raised, taking account of any constraints due to bond covenants that limit its debt ratio and other financial ratios. Market conditions must also be recognized. For example, in 2009 banks reduced many firms' lines of credit and also increased the fees and interest rates on such lines. This surprised firms that were not keeping up with conditions in financial markets.
4. The firm establishes a performance-based management compensation system that rewards employees for creating shareholder wealth. The emphasis here should be on the long run, not on profits over the next few quarters or even years. A failure in this area was perhaps the most important factor leading to the worldwide financial and economic crisis that hit in 2008 and 2009.
5. Finally, management must monitor operations after implementing the plan to spot any deviations and then take corrective actions. Computer software is helping greatly here, and it's changing the way companies do business. In particular, corporate information systems are reducing the need for "middle managers" and flattening firms' management structures.

In the remainder of this chapter, we explain how to create a financial plan, including its three key components: (1) the sales forecast, (2) forecasted financial statements, and (3) methods for raising any needed external financing. Then, in Chapter 13, we discuss in more detail the relationships among incentives, compensation, and performance.

Self-Test

Briefly explain the following terms: (1) mission statement, (2) corporate scope, (3) corporate objectives, and (4) corporate strategies.

Briefly describe the key elements of an operating plan.

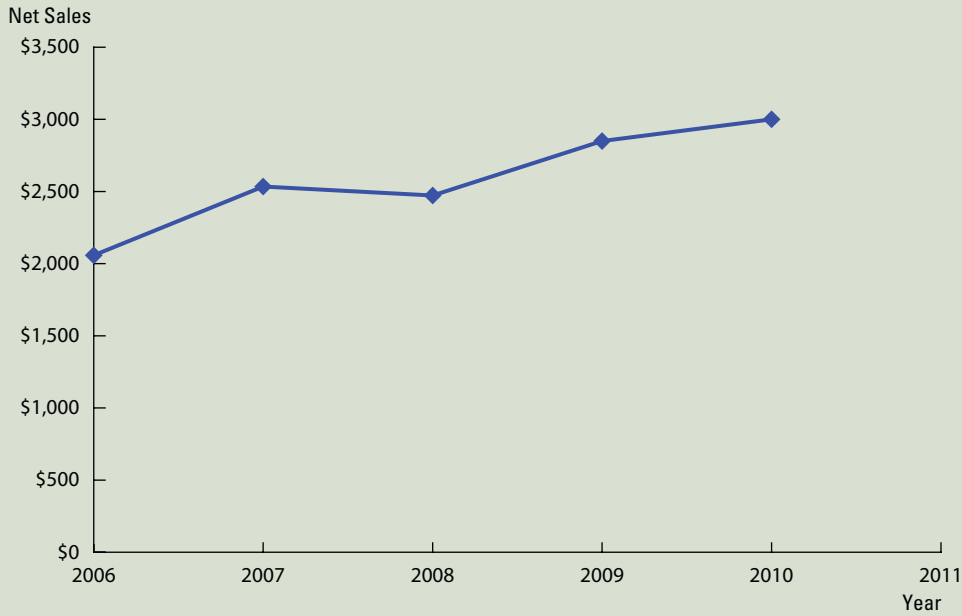
Identify the five steps involved in the financial planning process as discussed in this section.

12.2 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 12-1. The first part of the graph shows 5 years of historical sales for MicroDrive, the fictional firm we discussed in Chapters 2 and 3. The graph could have contained 10 years of sales data, but MicroDrive typically focuses on sales for the latest 5 years because its studies have shown that its future growth is more closely related to recent events than to the distant past.

Entire courses are devoted to forecasting sales, so we only touch on the basic elements here. However, forecasting the future sales growth rate always begins with a

FIGURE 12-1 MicroDrive Inc.: Historical Sales (Millions of Dollars)



Year	Sales	Annual Growth Rate
2006	$2,058	
2007	2,534	23.1%
2008	2,472	–2.4
2009	2,850	15.3
2010	3,000	5.3
		Average = 10.3%

look at past growth. MicroDrive's recent annual growth rates have averaged 10.3%, and the compound growth rate from 2006 to 2010 is the value for g in this equation:[2]

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

The value of g can be found by solving the equation with a financial calculator. Enter N = 4, PV = –2058, PMT = 0, and FV = 3000; then press I/YR to get g = 9.9%.[3]

No sensible manager would ever just forecast a continuation of past sales growth without taking account of current conditions in both the national and global economies, the firm's and its competitors' new products, planned advertising programs, and so on. But in the end, a sales forecast will emerge. In MicroDrive's case, the conclusion is that sales are most likely to grow at a 10% rate. Note, though, that actual sales could turn out to be materially higher or lower, depending on a number of factors that cannot be forecasted at this time.

[2]Unless we indicate otherwise, we report values from MicroDrive's financial statements in millions of dollars, as shown in Figure 12-1.

[3]See this chapter's *Excel* ***Tool Kit*** for an explanation of projecting sales using a trend line or the average exponential growth rate.

If the sales forecast is off and the company does not have sufficient flexibility built into its plans, the consequences could 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 that might be hard to regain. On the other hand, if its projections are overly optimistic then it could wind up with too much plant, equipment, and inventory, which would hurt its profits, free cash flow, and intrinsic stock value. Moreover, if the firm had financed an expansion with debt, high interest charges and mandatory debt repayments would compound its problem. Thus, an accurate sales forecast is critical to the firm's well-being. After much discussion and analysis, MicroDrive's managers decided that a 10% increase in sales was the most appropriate forecast.

The firm's next questions include these: How much new capital will be needed to fund the increased sales? Can this capital be raised internally, or will new external funds be needed? And in view of current economic conditions, will it be feasible to raise the needed capital? We answer these questions in the following sections using two approaches: (1) the additional funds needed (AFN) method, and (2) the forecasted financial statements method.

Self-Test

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

12.3 Additional Funds Needed (AFN) Method

MicroDrive is typical of most companies in that it expects growth in sales, which means its assets also must grow. Asset growth requires additional funds, so the firm may have to raise additional external capital if it has insufficient internal funds. If we assume that none of the firm's ratios will change (an assumption that we later modify), we can use a simple approach, the **Additional Funds Needed (AFN)** method, to forecast financial requirements. The logic of the AFN approach is discussed in the next few sections.

Required Increase in Assets

In a steady-state situation in which no excess capacity exists, the firm must have additional plant and equipment, more delivery trucks, higher inventories, and so forth if sales are to increase. In addition, more sales will lead to more accounts receivable, and those receivables must be financed from the time of the sale until they are collected. Therefore, both fixed and current assets must increase if sales are to increase. Of course, if assets are to increase, liabilities and equity must also increase by a like amount to make the balance sheet balance.

Spontaneous Liabilities

The first sources of expansion funding are the "spontaneous" increases that will occur in MicroDrive's accounts payable and accrued wages and taxes. The company's suppliers give it 10 days to pay for inventory purchases, and since purchases will increase with sales, accounts payable will automatically rise. For example, if sales rise by 10% then inventory purchases will also rise by 10%, and this will cause accounts payable to rise spontaneously by the same 10%. Similarly, because the company pays workers every two weeks, more workers and a larger payroll will mean more accrued wages payable. Finally, higher expected income will mean more accrued income taxes, and its higher wage bill will mean more accrued withholding taxes. No interest normally is paid on these spontaneous funds, but their amount is limited by credit terms,

contracts with workers, and tax laws. Therefore, *spontaneous funds will thus be used to the extent possible, but there is little flexibility in their usage.*

Addition to Retained Earnings

The second source of funds for expansion comes from net income. Part of MicroDrive's profit will be paid out in dividends, but the remainder will be reinvested in operating assets, as shown in the Assets section of the balance sheet; a corresponding amount will be reported as an addition to retained earnings in the Liabilities and equity section of the balance sheet. There is some flexibility in the amount of funds that will be generated from new reinvested earnings because dividends can be increased or decreased, but if the firm plans to hold its dividend steady or to increase it at a target rate, as most do, then flexibility is limited.

Calculating Additional Funds Needed (AFN)

If we start with the required new assets and then subtract both spontaneous funds and additions to retained earnings, we are left with the Additional Funds Needed, or AFN. The AFN must come from *external sources*; hence it is sometimes called EFN. The typical sources of external funds are bank loans, new long-term bonds, new preferred stock, and newly issued common stock. The mix of the external funds used should be consistent with the firm's financial policies, especially its target debt ratio.

Using MicroDrive's Data to Implement the AFN Method

Figure 12-2 reports MicroDrive's 2009 and 2010 financial statements.

FIGURE 12-2 MicroDrive's Most Recent Financial Statements (Millions of Dollars, Except for Per Share Data)

	A	B	C	D	E	F	G	H
103	INCOME STATEMENTS		2009	2010	BALANCE SHEETS		2009	2010
104					*Assets*			
105	Sales		$2,850.0	$3,000.0	Cash		$15.0	$10.0
106	Costs except depreciation		2,497.0	2,616.2	ST Investments		65.0	0.0
107	Depreciation		90.0	100.0	Accounts receivable		315.0	375.0
108	Total operating costs		$2,587.0	$2,716.2	Inventories		415.0	615.0
109	EBIT		263.0	283.8	Total current assets		$810.0	$1,000.0
110	Less interest (INT)		60.0	88.0	Net plant and equip.		870.0	1,000.0
111	Earnings before taxes (EBT)		$203.0	$195.8	Total assets		$1,680.0	$2,000.0
112	Taxes (40%)		81.2	78.3				
113	Income before pref. dividends		$121.8	$117.5	*Liabilities and equity*			
114	Preferred dividends		4.0	4.0	Accounts payable		$30.0	$60.0
115	Net income for common (NI)		$117.8	$113.5	Accruals		130.0	140.0
116					Notes payable		60.0	110.0
117	Dividends to common (DIVs)		$53.0	$57.5	Total current liab.		$220.0	$310.0
118	Add. to retained earnings:				Long-term bonds		580.0	754.0
119	(NI – DIVs)		$64.8	$56.0	Total liabilities		$800.0	$1,064.0
120	Shares of common stock		50	50	Preferred stock		40.0	40.0
121	Earnings per share (EPS)		$2.36	$2.27	Common stock		130.0	130.0
122	Dividends per share (DPS)		$1.06	$1.15	Retained earnings		710.0	766.0
123	Price per share (P)		$26.00	$23.00	Total common equity		$840.0	$896.0
124					Total liab. & equity		$1,680.0	$2,000.0
125								

FIGURE 12-3 Additional Funds Needed (AFN) (Millions of Dollars)

	A	B	C	D	E	F	G	H	I
131	Part I. Inputs and Definitions								
132	S_0:		Last year's sales, i.e., 2010 sales:						$3,000
133	g:		Forecasted growth rate in sales:						10.000000%
134	S_1:		Coming year's sales, i.e., 2011 sales = $S_0 \times (1 + g)$:						$3,000
135	gS_0:		Change in sales = $S_1 - S_2 = \Delta S$:						$300
136	A_0^*:		Assets that must increase to support the increase in sales:						$2,000
137	A_0^* / S_0:		Required assets per dollar of sales:						66.67%
138	L_0^*:		Last year's spontaneous assets, i.e., payables + accruals:						$200
139	L_0^* / S_0:		Spontaneous liabilities per dollar of sales:						6.67%
140	Profit margin (M):		2010 profit margin = net income/sales:						3.78%
141	Payout ratio (POR):		Last year's dividends / net income = % of income paid out:						50.67%
142									
143	Part II. Additional Funds Needed (AFN) to Support Growth								
144									
145	AFN =	Required Increase in Assets	–	Spontaneous Increase	–			Addition to Retained	
146	=	$(A_0^*/S_0)\Delta S$	–	$(L_0^*/S_0)\Delta S$	–			$S_1 \times M \times (1 - POR)$	
147			–		–				
148	=	$(A_0^*/S_0)(gS_0)$	–	$(L_0^*/S_0)(gS_0)$	–			$(1+g)S_0 \times M \times (1 - POR)$	
149			–		–				
150	=	(0.667)($300)	–	(0.667)($300)	–			$3,300(0.0378)(1 – 0.507)	
151	=	$200	–	$20.00	–			$61.58	
152	AFN =	$118.42 million							

Notes:

1. Under the assumed conditions, the firm must raise $118.42 million externally to support its planned growth. However, the model assumes (1) that no excess capacity existed in 2010, so all assets were needed to produce the indicated sales; and (2) that the key ratios will remain constant at their 2010 levels. We explain later how to relax these assumptions, but it is better to use forecasted financial statements to deal with these issues, as we do on ***Tab 2*** of the *Excel* ***Tool Kit*** model.
2. Under the conditions set forth in Figure 12-3, a growth rate of 3.21% could be achieved without any AFN. This 3.21% is called the "sustainable growth rate," and we explain how it is calculated in a later section and also in the chapter's *Excel* ***Tool Kit*** model.

Equation 12-1 summarizes the logic underlying the AFN method. Figure 12-3 defines the notation in Equation 12-1 and applies it to identify MicroDrive's AFN.

$$\begin{array}{cccccc} \text{Required increase in assets} & - & \text{Increase in spontaneous liabilities} & - & \text{Increase in retained earnings} & = & \text{Additional funds needed} \\ (A_0^*/S_0)\Delta S & - & (L_0^*/S_0)\Delta S & - & S_1 \times M \times (1 - POR) & = & AFN \end{array} \quad (12\text{-}1)$$

We see from Part II of Figure 12-3 that, for sales to increase by $300 million, MicroDrive must increase assets by $200 million. Therefore, liabilities and capital must also increase by $200 million. Of this total, $20 million will come from spontaneous liabilities, and another $61.58 million will come from new retained earnings. The remaining $118.42 million must be raised from external sources—probably some combination of short-term bank loans, long-term bonds, preferred stock, and common stock.

Key Factors in the AFN Equation

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

1. **Sales growth (g).** Rapidly growing companies require large increases in assets and a corresponding large amount of external financing, other things held constant. When capital is in short supply, as was the case during the financial crisis of 2009, companies may be forced to limit their growth.
2. **Capital intensity (A_0^*/S_0).** The amount of assets required per dollar of sales, A_0^*/S_0, is the **capital intensity ratio**, which has a major effect on capital requirements. Companies with relatively high assets-to-sales ratios require a relatively large amount of new assets for any given increase in sales; hence they have a greater need for external financing. If a firm can find a way to lower this ratio—for instance, by adopting a just-in-time inventory system, by going to two shifts in its manufacturing plants, or by outsourcing rather than manufacturing parts—then it can achieve a given level of growth with fewer assets and thus less new external capital.
3. **Spontaneous liabilities-to-sales ratio (L_0^*/S_0).** If a company can increase its spontaneously generated liabilities, this will reduce its need for external financing. One way of raising this ratio is by paying suppliers in, say, 20 days rather than 10 days. Such a change may be possible but, as we shall see in Chapter 16, it would probably have serious adverse consequences.
4. **Profit margin (M = Net Income/Sales).** The higher the profit margin, the more net income is available to support increases in assets—and hence the less the need for external financing. A firms' profit margin is normally as high as management can get it, but sometimes a change in operations can boost the sales price or reduce costs, thus raising the margin further. If so, this will permit a faster growth rate with less external capital.
5. **Payout Ratio (POR = DPS/EPS).** The less of its income a company distributes as dividends, the larger its addition to retained earnings—and hence the less its need for external capital. Companies typically like to keep their dividends stable or to increase them at a steady rate—stockholders like stable, dependable dividends, so such a dividend policy will generally lower the cost of equity and thus maximize the stock price. So even though reducing the dividend is one way a company can reduce its need for external capital, companies generally resort to this method only if they are under financial duress.

The Self-Supporting Growth Rate

One interesting question is: "What is the maximum growth rate the firm could achieve if it had no access to external capital?" This rate is called the "self-supporting growth rate," and it can be found as the value of g that, when used in the AFN equation, results in an AFN of zero. We first replace ΔS in the AFN equation with gS_0 and S_1 with $(1+g)S_0$ so that the only unknown is g; then we then solve for g to obtain the following equation for the self-supporting growth rate:

$$\text{Self-supporting } g = \frac{M(1 - POR)(S_0)}{A_0^* - L_0^* - M(1 - POR)(S_0)} \quad (12\text{-}2)$$

The definitions of the terms used in this equation are shown in Figure 12-3.

If the firm has any positive earnings and pays out less than 100% in dividends, then it will have some additions to retained earnings, and those additions could be combined with spontaneous funds to enable the company to grow at some rate without having to raise external capital. As explained in the chapter's *Excel* ***Tool Kit,*** this value can be found either algebraically or with *Excel*'s Goal Seek function. For MicroDrive, the self-supporting growth rate is 3.21%; this means it could grow at that rate even if capital markets dried up completely, with everything else held constant.

See **Ch12 Tool Kit.xls** *on the textbook's Web site for details.*

A Potential Problem with the AFN Equation: Excess Capacity

As noted previously, when we use the AFN equation we are implicitly assuming that the key ratios remain constant at their base-year levels. However, this assumption may not always be true. For example, in 2010 many firms were operating at significantly less than their full capacity because of the recession. Let's suppose MicroDrive had been operating its fixed assets at only 50% of capacity. It could then double its sales, which is a 100% increase, without adding any fixed assets at all. Similarly, if it had 25% more inventories at the start of the year than it required, it could increase sales by 25% without increasing its inventories. We could adjust the AFN equation to account for excess capacity, and we explain how to do so in the ***Tool Kit.*** However, a far better procedure is simply to recognize that while the AFN is useful for quickly obtaining a "back of the envelope" estimate of external financing requirements, the forecasted financial statements method, which is explained in the next section, is vastly superior for realistic financial planning.

Self-Test

If all ratios are expected to remain constant, an equation can be used to forecast AFN. Write out the equation and briefly explain it.

Describe how do the following factors affect external capital requirements: (1) payout ratio, (2) capital intensity, (3) profit margin.

In what sense do accounts payable and accruals provide "spontaneous funds" to a growing firm?

Is it possible for the calculated AFN to be negative? If so, what would this imply?

Refer to data in the MicroDrive example presented, but now assume that MicroDrive's growth rate in sales is forecasted to be 15% rather than 10%. If all ratios remain constant, what would the AFN be? **($205.62 million)**

12.4 Forecasted Financial Statements Method

As its name implies, the objective of the **forecasted financial statements (FFS) method** is to project a complete set of financial statements. Because financial statements contain numerous accounts, forecasting is almost always done using computer software such as *Excel.* As you have probably experienced in your own spreadsheets, there are many different ways to solve a particular problem, and this is also true when forecasting financial statements. In fact, entire books have been written on the topic.[4] In the following analysis, we explain one particular approach that we have found to be effective, particularly for a company considering changes to its capital structures

[4]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).

or dividend policy.[5] In addition, it is easy to modify this forecasting approach to incorporate changes in assumptions.

Forecasting financial statements is conceptually similar to the AFN equation, but it is easy to get lost in the details. *Excel*'s calculations don't necessarily follow this sequence, but keep these conceptual steps in mind as we describe MicroDrive's forecasted financial statements.

1. Forecast the operating items on the income statement and balance sheet; these include sales, costs, operating assets, and spontaneous operating liabilities. Notice that these are the items required to calculate free cash flow.
2. Forecast items that depend on the firm's choice of financial policies, such as the dividend payout policy and the planned financing from debt and equity.
3. Forecast interest expense and preferred dividends, given the levels of debt and preferred stock that were forecast according to the financing plan.
4. Use the forecasted interest expense and preferred dividends to complete the income statement.
5. Determine the total common dividend payments.
6. Issue or repurchase additional common stock to make the balance sheets balance.

Forecasting is an iterative process. It begins with a set of initial operating assumptions and financial policies. The resulting forecasted statements are used to estimate free cash flow, EPS, and financial ratios. Managers then go through a set of "what if" questions and examine their operating assumptions and financial policies, as we describe next.

Background on the Company and the Forecast

MicroDrive's board recently installed a new management team: a new CEO, CFO, marketing manager, sales manager, inventory manager, and credit manager—only the production manager was retained. The new team was charged with improving the company's performance. As we noted in Chapter 3, many of MicroDrive's ratios are below industry averages.

The management team met in late 2010, when the industry was in a recession, for a 3-day retreat. The new CFO developed an *Excel* model to forecast financial statements under several different sets of assumptions, or scenarios. The first scenario assumes that operations maintain the status quo, the second that operations improve, and the third that conditions deteriorate. During the 3-day meeting, the CFO developed a fourth scenario based on discussions among the managers regarding changes that could be made to improve the firm's performance. (We report the details of these discussions in a later section.) They concluded that many changes could be implemented almost immediately and that the effects of those changes would be reflected in the 2011 results.

[5]One point about *Excel* models is worth noting. It is generally fairly easy to set up a model to study a given issue, but the complexity of the model rises exponentially as you attempt to deal with more and more different issues within the model. Therefore, in our experience it's generally better to develop limited-scope, single-issue models and then modify them to create new models—rather than trying to develop one model that can "do everything." Also, and crucially, it's much easier to debug single-purpose models than all-inclusive ones. Furthermore, if others are planning to use and perhaps modify the model, it's far easier for them to work with a simple model. There have been numerous occasions when we were given a complex model, had a hard time understanding it, and then abandoned it to make our own model that could do what we needed. These statements about "keeping it simple" are, of course, more appropriate for time-constrained students than for business people.

See **Ch12 Tool Kit.xls** *on the textbook's Web site for details.*

Input Data for the Forecast: Alternative Scenarios

The forecast begins with Figure 12-4, which shows the data used in the three preliminary forecasts as well as the final forecast. Industry averages and MicroDrive's actual operating and financial data for the most recent year are given in Columns C and D. Ignore Column E for the moment and look at Columns F, G, H, and I, which show the inputs used in four alternative scenarios.

Inputs for the Status Quo Scenario. The Status Quo scenario in Column F assumes that the firm in 2011 has essentially the same operating and financial ratios as it had in 2010, except that its rate of sales growth increases from 5.26% to 10%. Operating costs, operating assets, and operating spontaneous liabilities are assumed to be the same percentage of sales in 2011 as in 2010. Depreciation is assumed to be a fixed percentage of the net plant and equipment.

The components of MicroDrive's investor-supplied capital are notes payable, long-term bonds, preferred stock, and common equity. For this initial forecast, the target proportions of these components as percentages of total investor-supplied capital are held constant. The interest rates on its debt and the dividend rate on its preferred stock are assumed to remain at 2010 levels. The payout ratio for total common dividends is also assumed to stay at the 2010 level in the Status Quo scenario.

If additional financing is needed, it is assumed that new shares of common stock can be issued at $23 per share, the 2010 year-end price. If a surplus of funds arises, then MicroDrive will pay down some of its debt and repurchase shares of preferred and common stock.

Inputs for the Best-Case Scenario. The data in Column G are for the Best case. Here the CEO assumes that MicroDrive is able to achieve industry average operating

FIGURE 12-4 Input Data for the Forecast (Millions, Except for Percentages and Per Share Data)

	A	B	C	D	E	F	G	H	I
85			2010		2011				
86	Inputs		Actual Values		Forecasted Input Values for Scenarios				
87									
88			Industry	MicroDrive	Active Scenario: Final	Status Quo	Best	Worst	Final
89	Operating Ratios:								
90	Growth rate in sales		10.00%	5.26%	10.00%	10.00%	10.00%	–10.00%	10.00%
91	Op costs except depr'n / Sales		83.00%	87.21%	86.00%	87.21%	83.00%	92.21%	86.00%
92	Depr'n / Net plant & equip.		10.20%	10.00%	10.20%	10.00%	10.00%	10.00%	10.20%
93	Cash / Sales		0.25%	0.33%	0.25%	0.33%	0.33%	0.33%	0.25%
94	Accounts Rec. / Sales		9.80%	12.50%	11.00%	12.50%	9.80%	15.00%	11.00%
95	Inventory / Sales		11.11%	20.50%	16.00%	20.50%	11.11%	25.50%	16.00%
96	Net plant & equip. / Sales		33.33%	33.33%	33.33%	33.33%	33.33%	40.00%	33.33%
97	Accounts Pay. / Sales		2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%
98	Accruals / Sales		4.00%	4.67%	4.00%	4.67%	2.00%	4.67%	4.00%
99	Tax rate:		40.00%	40.00%	40.00%	40.00%	40.00%	40.00%	40.00%
100	Financing Data:								
101	Notes payable/Investor-sup cap		5.00%	6.11%	5.00%	6.11%	6.11%	6.11%	5.00%
102	LT bonds/Investor-sup capital		32.00%	41.89%	37.00%	41.89%	41.89%	41.89%	37.00%
103	Pref.stock/Investor-sup cap.		3.00%	2.22%	3.00%	2.22%	2.22%	2.22%	3.00%
104	Comm equity/Investor-sup cap		60.00%	49.78%	55.00%	49.78%	49.78%	49.78%	55.00%
105	Interest rate on notes payable		8.00%	9.00%	8.50%	9.00%	8.50%	11.00%	8.50%
106	Interest rate on L-T bonds		10.00%	11.00%	10.50%	11.00%	10.50%	11.50%	10.50%
107	Dividend rate on pfd stock		9.00%	10.00%	9.50%	10.00%	9.50%	10.00%	9.50%
108	Target dividend payout ratio		40.00%	50.67%	40.00%	50.67%	50.67%	50.67%	40.00%

results immediately. However, the CEO also assumes that the company continues to use its current capital structure, which calls for more debt than the industry average. The improved operating performance would lower the costs of debt and preferred stock. However, the higher than average debt level would offset this factor to some extent, so the end result would be somewhat higher than industry average cost rates for notes payable, long-term debt, and preferred stock.

Inputs for the Worst-Case Scenario. The data in Column H, the Worst case, assume a continued long, bad recession, in which case the growth rate would be negative and the operating and financial ratios would be poor. It is likely that the stock price would decline during the year, but the CFO assumes that new shares could still have been issued at the beginning of the year for $23 per share, before investors and managers learned how bad things were going to get.

Inputs for the Final Scenario. The fourth set of input data, given in Column I and called "Final," was developed during the 3-day management conference held in late 2010. All of the operating executives were there, and all aspects of the business (including the ratios shown in Figure 12-4) were discussed. Some of the executives were relatively optimistic while others were relatively pessimistic, but all tried their best to be realistic. We will discuss these Final inputs in the next section.

Inputs for the Active Scenario. Now look at Column E in Figure 12-4, the one labeled "Active Scenario: Final." With *Excel*'s Scenario Manager, you choose a scenario and *Excel* replaces the input date in Column E with the data for the chosen scenario (we had chosen the Final scenario when we created Figure 12-4, so that is the scenario showing in Column E). These inputs are then linked to the section of the spreadsheet where the financial statements are forecast. (The forecasted statements are shown in Figure 12-5.)

After forecasting the financial statements, the model calculates performance measures, including the forecasted free cash flow (FCF), return on invested capital (ROIC), EPS, ROE, number of shares at the end of the year, and DPS. These six key results are shown in Figure 12-6; we will discuss them later.

Discussion of the Forecasted Operating Input Data

The CFO had taken a two-part computer course in college. The first module was taught by a computer science expert who focused on the mechanics of programming and computer usage in general. The second module was taught by an economist who discussed how to apply computers to specific tasks, including various types of forecasting. The economist's favorite term was GIGO, which stands for "garbage in, garbage out," and she repeated it constantly. No matter how well a model is set up, if the inputs used aren't accurate then the output won't be accurate, either. The CFO began the discussion by reminding the management team of this critical fact.

The sales growth rate is the first input item shown in Figure 12-4 and is followed by the most important driver of profitability, the ratio of operating costs (excluding depreciation) to sales. MicroDrive's 2010 operating cost ratio was 87.21%, well above the 83% industry average. This ratio is affected by operating costs, sales prices, and unit sales, and it was discussed at length during the planning conference. The CFO showed the forecasted results for the status quo, best-case, and worst-case scenarios, after which the CEO led a discussion of what the firm could actually achieve in 2011. After much discussion, the management team concluded that, because of licensing fees and other costs, it was not feasible for the firm to achieve the industry average operating cost ratio of 83% in the foreseeable future. However, the team believed

that a figure of 86%, down from 2010's 87.21%, was "attainable." They agreed that over time it might be possible to reduce this ratio a bit further, but that 86% was the most realistic choice to use in the forecast.

Intrinsic value is affected by many factors, including the level of inventory. If MicroDrive carries too much inventory then storage costs, deterioration, and obsolescence will drive up operating costs. The CFO had studied the inventory/sales ratio earlier and had pointed out that MicroDrive had almost twice as much inventory for its sales as an average firm in the industry. The CEO stated that the production, sales, and purchasing managers were jointly responsible for inventory in MicroDrive's supply chain. The managers said that they had already been working on a plan to fix this problem. Because MicroDrive's production facilities are farther from their suppliers and customers than are those of most other firms in the industry, MicroDrive must hold a higher than average level of inventory to avoid running out of stock if sales surge. In the end, it was agreed that the inventory/sales ratio could be lowered from 20.5% to 16%, a significant improvement but still above the 11.11% industry average.

The CFO also pointed out that accounts receivable were much higher than the industry average level. This meant that too much capital was tied up in receivables. If a firm continues to sell to a customer who does not pay on time, the account balance will rise significantly, and if the customer then defaults, the selling firm will suffer a larger bad debt loss than if it had stopped selling to the customer sooner. In addition, collection costs rise with the amount of old receivables, which is another reason to keep a tight rein on credit operations. During the discussion, the sales manager noted that tightening its credit policy would lose the firm some sales. However, the lost sales would not be excessive, because most of the late-paying customers were financially sound but were just taking advantage of the "float" MicroDrive was giving them. After the discussion, the credit manager, sales manager, and treasurer jointly agreed that it would be feasible to reduce the receivables/sales ratio to 11% in 2011. That was still above the 9.8% industry average but below MicroDrive's 2010 level of 12.5%. Therefore, 11% was built into the final forecast.

The CFO also brought up the net plant/sales ratio but noted that this ratio was in line with the industry average—the production manager, who was not replaced during the management change, had been forecasting sales accurately and holding equipment purchases to the level actually required. This was facilitated by the outsourcing of production to make up for shortfalls if more orders came during a given period than had been expected. This smart use of outsourcing enabled the firm to operate without carrying excess capacity in "normal" times in order to meet demand when orders surged. Thus, the 2010 ratio of 33.3% for net plant and equipment to sales was used in the forecast.

Financial Policy Issues

The discussion next turned to two key financial policies: capital structure and dividends. The CFO noted that MicroDrive's debt ratio was significantly above the industry average. This high leverage boosted ROE and EPS during good times, but it also raised the interest rates for debt as well as the required return on common stock. Further, an excessive amount of debt increased the risk of bankruptcy and reduced the firm's ability to maintain stable operations in times of stress. The treasurer noted that the company's banks were concerned about its high debt usage and that banks nationwide were reducing the credit lines of companies deemed to have too much debt. MicroDrive's credit lines had not been reduced to date, but if the firm were

to have even one bad quarter then a reduction might well occur, and that would be devastating. Credit is the lifeblood of a business, and if its credit were curtailed then MicroDrive might not be able to purchase supplies, pay workers, and so on, which would be fatal. After this discussion, the decision was made to increase the common equity ratio from its current 49.8% level of investor-supplied capital to 55.0%.[6]

The discussion then turned to dividend policy. In recent years, MicroDrive has been increasing the dividend by about 8% per year, and the board of directors has stated that it would like to continue this policy. However, the CFO recently disclosed to the board that many companies that formerly increased their dividends at a steady rate had re-examined that policy and had lowered the targeted rate of increase. An 8% annual increase during the long boom from the 1980s until 2008 had been feasible, but in the current and likely future economic climate a different policy might be necessary. The CFO also pointed out that the average mature firm in the industry was distributing about 40% of its earnings as dividends, compared with MicroDrive's 50.7%. At the conclusion of this discussion, it was decided to use the 40% industry average payout for the forecast, determine the resulting dividend per share, review the resulting performance measures, and then discuss the recommended dividend policy recommendation with the board. The CEO agreed with this plan but clearly hoped that the forecast would support a dividend growth rate of 8% or more.

The next item discussed was the timing of new financing. The treasurer argued that it would be best to issue any required new stock early in the year to ensure that these funds would be available—stock prices are volatile, and the market for new stock could slam shut later in the year. Also, if the firm raised equity early, that would make it easier to issue new debt later. The CFO and CEO agreed, so the decision was made to sell any required new stock early and to borrow throughout the year as needed.

A question was asked about the price at which new stock would be sold. The CFO noted that the most recent price was $23 per share, and that was the most likely price at which new shares could be sold early in the year. Interest rates on the existing debt floated, moving up and down with rates in the general economy and the company's financial condition.[7] The CFO thought interest rates probably would fluctuate to some extent, but there was no more reason to believe that rates would go up than go down. However, by mid-year the company's own financial condition would be known sufficiently well to influence its cost of debt. Therefore, as indicated in Figure 12-4, the rates vary depending on the scenarios—low rates under good conditions and high rates under bad conditions. The preferred dividend also floated, so its rate also varied with the scenarios.

See **Ch12 Tool Kit.xls** *on the textbook's Web site for details.*

Based on an earlier back-of-the-envelope calculation using the AFN model, the CFO had concluded that if operations improved significantly, the firm might not need any new external funds and might even have a surplus. For example, if the profit margin could be increased, this would lower external capital requirements. Even more importantly, if the ratios of inventories and accounts receivable to sales could be lowered, as the management team had discussed earlier, then this would greatly reduce the need for new capital, especially during 2011. Those considerations prompted the CEO to raise the following question: "If excess funds become available, what should we do with them?" The CFO had actually considered several

[6]Capital structure decisions are discussed in detail in Chapter 15.

[7]All of the debt—both short-term bank loans and long-term bonds—had floating rates. The spread between the bank loan rate and the London Interbank Offered Rate (LIBOR) was based on the firm's coverage ratio (EBIT to interest charges). The long-term bond rate was determined similarly. The bank loan rate was reset quarterly, and the long-term rate was reset every 6 months.

possibilities: (1) increase the dividend, (2) repurchase stock and repay debt in amounts that would keep the capital structure constant, (3) invest excess funds in marketable securities, or (4) embark on a merger program to acquire other firms. They decided that the best alternative for modeling purposes was to simply use surplus funds to repay debt and buy back stock. If the surplus was projected to extend on into the long run, then a strategic decision would have to be made regarding what to do with it, but that would require input from the board.

Debt could be repaid at book value and preferred stock repurchased at close to book value. If the repurchase occurred early in the year, then it could probably be bought at close to the current price. This brought up the question of when any surplus funds would actually be available—would they be available early or late, or would they come in regularly throughout the year? It might make sense to *raise* new funds early, but excess funds could not be *used* until they were actually in hand, and that would probably occur throughout the year. The decision was made to repurchase stock early in the year and repay debt later in the year. The CFO also planned to revisit this issue when developing the projected 2011 cash budget. (Cash budgets are discussed in Chapter 16; they are typically done on a monthly basis.)

See **Ch12 Tool Kit.xls** *on the textbook's Web site for details.*

The Forecasted Financial Statements

Using input from the Final scenario as shown in column E of Figure 12-4, MicroDrive's forecasted financial statements (balance sheet and income statement) are reported in Figure 12-5.[8] The following points explain how to forecast the statements shown in Figure 12-5.

1. Forecast next year's sales based on the assumed growth rate: $S_{2011} = S_{2010} \times (1 + g)$.
2. Forecast each of the operating assets (cash, accounts receivable, inventories, and net plant and equipment) and the spontaneous current liabilities (accounts payable and accruals) as a percentage of forecasted sales. This completes the assets section of the balance sheet and partially completes the liabilities section.
3. Use the forecasted operating data from Step 2 to calculate the required investor-supplied capital, which is found as Total assets – (Accounts payable + Accruals).
4. Multiply the investor-supplied capital found in Step 3 by the inputs for the target capital structure percentages shown in Figure 12-4 to forecast the amounts of notes payable, long-term bonds, preferred stock, and total common equity. This completes the balance sheet except for dividing the forecasted total common equity into its two components, common stock and retained earnings.
5. Calculate operating costs as a percentage of forecasted sales and calculate depreciation as a percentage of forecasted net plant and equipment. Subtract these costs from sales to find EBIT.
6. It is assumed that new debt will be borrowed throughout the year, so interest expenses will be based on the average amount of debt outstanding during the year. This amount is equal to the average of the beginning-of-year debt and the end-of-year debt forecast in Step 4. Multiply this average by the interest rate to determine the forecasted interest expense. Observe that the income statement shows separate lines for the interest expense due to notes payable and long-term bonds—we find that we make fewer errors if we have more lines in a spreadsheet but less complicated formulas in each cell.

[8]Columns E and I are identical in Figure 12-4. *Excel*'s Scenario Manager replaces the values in Column E with the values shown in Column I when the Final scenario is selected. Similarly, the Scenario Manager replaces data in Column E with the values shown in Columns F, G, or H when those scenarios are selected.

FIGURE 12-5 Forecasted Financial Statements (Millions of Dollars, Except for Per Share Data)

	A	B	C	D	E	F	G
129	Scenario Shown:	Final					Final
130			Most Recent				Forecast
131	Part 1. Balance Sheet		2010	Factors	Basis for 2011 Forecast		2011
132	*Assets*						
133	Cash		$10.0	0.25%	Factor × 2011 Sales		$8.25
134	Accounts receivable		375.0	11.00%	Factor × 2011 Sales		363.00
135	Inventories		615.0	16.00%	Factor × 2011 Sales		528.00
136	Total current assets		$1,000.0				$899.25
137	Net plant and equipment		1,000.0	33.33%	Factor × 2011 Sales		1,100.00
138	Total assets (TA)		$2,000.0				$1,999.25
139	*Liabilities and equity*						
140	Accounts payable		$60.0	2.00%	Factor × 2011 Sales		$66.00
141	Accruals		140.0	4.00%	Factor × 2011 Sales		132.00
142	Notes payable[a]		110.0	5.00%	% of investor-sup. cap.		90.06
143	Total current liabilities		$310.0				$288.06
144	Long-term bonds[a]		754.0	37.00%	% of investor-sup. cap.		666.46
145	Total liabilities		$1,064.0				$954.52
146	Preferred stock[a]		40.0	3.00%	% of investor-sup. cap.		$54.04
147	Common stock		130.0		Tot. Com–Eq – Ret. Earn		131.37
148	Retained earnings		766.0		Old RE + Add. to RE		859.32
149	Total common equity[a]		$896.0	55.00%	% of investor -sup. cap.		$990.69
150	Total liabilities and equity		$2,000.0				$1,999.25
151	[a]Investor-supplied capital		$1,800.0		TA – accts. pay. – accrual		$1,801.25
152	Scenario Shown:	Final					Final
153			Most Recent				Forecast
154	Part 2. Income Statement		2010	Factors	Basis for 2011 Forecast		2011
155	Sales		$3,000.0	110%	Factor × 2010 Sales		$3,300.0
156	Costs except depreciation		2,616.2	86.00%	Factor × 2011 Sales		2,838.0
157	Depreciation		100.0	10.20%	Factor × 2011 Net plant		112.2
158	Total operating costs		$2,716.2				$2,950.2
159	EBIT		$283.8				$349.8
160	Less: Interest on notes		9.9	8.50%	Interest rate × Avg notes		8.5
161	Interest on bonds		78.1	10.50%	Interest rate × Avg bonds		74.6
162	Earnings before taxes (EBT)		$195.8				$266.7
163	Taxes (40%)		78.3	40.00%	Tax rate × 2011 EBT		106.7
164	NI before preferred dividends		$117.5				$160.0
165	Preferred dividends		4.0	9.50%	Pfd div rate × Avg preferred		4.5
166	NI available to common		$113.5				$155.6
167	Dividends paid out		$57.5	40.00%	Net income × Payout rate		$62.2
168	Addition to retained earnings		$56.0		Net income – Dividends		$93.3
169	Change in shares outstanding				(Change in com.stk.)/P_{2010}		0.06
170	Ending shares outstanding		50.00		$Shares_{2010}$ + Δ shares		50.06
171	Earnings per share, EPS		$2.27		Net income/Total shares		$3.11
172	Dividends per share, DPS		$1.15		Total dividends/Total shares		$1.24

Note: Calculations in the model have been shown to one decimal, so rounding differences may occur.

7. Subtract interest expense from EBIT to find taxable income (EBT). Calculate taxes and subtract them from EBT to get net income before preferred dividends.
8. Forecast preferred dividends in a similar manner as the forecasted interest expense in Step 6: (1) find the average amount of preferred stock outstanding during the year and then (2) multiply it by the preferred stock's dividend rate.

9. Subtract the forecasted preferred dividends from the net income before preferred dividends to find the net income available to common stockholders.
10. Multiply the net income by the target payout ratio to forecast the total amount of common dividends paid. If net income is negative, set common dividends to zero.
11. Subtract common dividends from net income to find the addition to retained earnings.
12. The forecasted total retained earnings shown on the balance sheet is equal to the prior year's retained earnings plus the addition to retained earnings calculated in Step 11.
13. The forecasted total common stock must be equal to the difference between forecasted total common equity from Step 4 and the forecasted retained earnings balance from Step 12: Common stock = Total common equity – Retained earnings.
14. The required additional dollars of common stock issued or repurchased are equal to the change in common stock: Additional dollars of stock issued or repurchased = Common stock in 2011 – Common stock in 2010. If the amount is negative, it means that stock will be repurchased rather than issued.
15. The number of new shares either issued or repurchased is equal to the additional dollars of common stock found in Step 14 divided by the price per share. Because the stock is assumed to be sold at the beginning of 2011, the assumed stock price is $23, the price at the end of 2010. We calculate this as: Change in shares = (Additional dollars of common stock) ÷ (Stock price at the beginning of the year).
16. The number of shares outstanding at the end of the year is equal to the number of outstanding shares at the beginning of the year plus the change in the number of shares calculated in Step 15.

Analyzing the Forecasted Results

After the Final set of inputs had been chosen, the CFO created a summary sheet showing key results for the different scenarios, as shown in Figure 12-6. After projecting the key results on a big screen, the team discussed each of the scenarios. Everyone dismissed the worst-case results, because if things started getting that bad there would be an emergency meeting in which actions would be taken to modify the plan. Similarly, the status quo and best-case results were given short shrift, and then the team focused on the Final scenario results.

The jump in EPS looked good, and even with the assumed 40% payout ratio, DPS rose by about 8%, which pleased the CEO.

The ROE improved nicely, rising from 12.7% to 15.7%, which exceeded the industry average. However, the CFO pointed out that the firm's debt ratio, even after the capital structure change, still exceeded the industry average, and that its greater leverage was largely responsible for the above-average ROE.

Free cash flow was projected to make a tremendous improvement, from –$175 million in 2010 to +$209 million in 2011. The CFO noted, though, that a similar improvement would not occur in the future, because most of the gain in free cash flow was attributable to the one-time reduction in inventories and accounts receivable. AFN, the last item in Figure 12-6, turned out to be negative, indicating that a surplus of funds would exist in 2011 and for the same reason that free cash flow rose—the reduction in inventories and accounts receivable. The lower payout and higher profit margin also helped reduce the AFN, but the one-time reduction in inventories and receivables was the key driver here.

FIGURE 12-6 Summary of Key Results for Forecasted Scenarios (Millions, Except for Percentages and Per Share Data)

	2010 Actual		2011 Forecasts			
	Industry	MicroDrive				
Key Results			Final	Status Quo	Best	Worst
Net operating profit after taxes	NA	$170	$210	$187	$271	$61
Net operating working capital	NA	$800	$701	$880	$569	$922
Total operating capital	NA	$1,800	$1,801	$1,980	$1,669	$2,002
FCF = NOPAT – Δ op capital	NA	–$175	$209	$7	$402	–$141
Return on invested capital	11.0%	9.5%	11.7%	9.5%	16.2%	3.1%
EPS	NA	$2.27	$3.11	$2.43	$5.07	–$0.10
DPS	NA	$1.15	$1.24	$1.23	$2.57	$0.00
Return on equity (ROE)	15.0%	12.7%	15.7%	12.6%	26.0%	–0.5%
Return on assets (ROA)	9.0%	5.7%	7.8%	5.7%	12.0%	–0.2%
Inventory turnover	9.0	4.9	6.3	4.9	9.0	3.9
Days sales outstanding	36.0	45.6	40.2	45.6	35.8	54.8
Total liabilities / TA	46.0%	53.2%	47.7%	53.2%	51.8%	52.3%
Times interest earned	6.0	3.2	4.2	3.2	5.3	1.0
Shares outstanding	NA	50.00	50.06	51.22	42.54	54.62
Payout ratio	40.0%	50.7%	4.0%	50.7%	50.7%	0.0%
AFN[a]	NA	$224	–$92	$119	–$237	$208

[a] Unlike the AFN equation, the approach used to forecast the statements in these scenarios determines the total amount of financing (the sum of notes payable, bonds, preferred stock, and common equity) rather than the additional financing needed in comparison to the financing used in the most recent year. Therefore, the additional financing needed is calculated directly from the changes in notes payable, bonds, preferred stock, and common stock.

The forecasted statement of cash flows in Figure 12-7 tells a similar story: (1) cash flow from operations is positive and large (with large cash flows resulting from improved asset utilization; (2) cash flow from investments is negative because of the expansion in fixed assets needed to support growth; and (3) the cash flow from financing activities shows that MicroDrive would be able to pay large dividends and reduce its debt.

At the conclusion of the CFO's summary, the CEO said that the firm would be in great shape and that nice bonuses and stock options would result if the targets were met and maintained over the long run.

Alternative Financial Policies and Multi-Year Forecasts

When the CEO and CFO presented the plan to the board of directors, the board was pleased overall but had a few questions. Several board members, including the chairman and founder of the company, were concerned that the plan included issuing new shares of common stock. They were also uneasy about the assumed price at which shares of stock could be repurchased later in the year if there were surplus funds. In addition, the board thought that determining dividends as a fixed percentage payout of net income might introduce quite a bit of volatility in DPS. Because of these concerns, the board asked the CFO to provide forecasted statements using the following different assumptions regarding the financial policies.

For the purposes of this additional forecast, the board specified the following financial policies: (1) let the regular DPS grow at a specified rate; (2) do not change the level of existing notes payable; and (3) do not issue or repurchase bonds, preferred stock, or common stock. If additional financing is needed, the board suggested forecasting the AFN as a draw against an existing line of credit on a temporary basis

FIGURE 12-7 Forecasted Statement of Cash Flows (Millions of Dollars, Except for Per Share Data)

	A	E	F
268	Scenario Shown: Final	Actual	Forecast
269		2010	2011
270	Operating Activities		
271	Net Income before preferred dividends	$117.5	$160.0
272	Noncash adjustments		
273	Depreciation and amortization	100.0	112.2
274	Due to changes in working capital		
275	Increase(–)/Decrease (+) in accounts receivable	–60.0	12.0
276	Increase(–)/Decrease (+) in inventories	–200.0	87.0
277	Increase(–)/Decrease (+) in payables	30.0	6.0
278	Increase(–)/Decrease (+) in accruals	10.0	–8.0
279	Net cash provided by operating activities	–$2.5	$369.2
280			
281	Long-term investing activities		
282	Cash used to acquire fixed assets	–$230.0	–$212.2
283	Sale of short-term investments	65.0	0.0
284	Net cash provided by financing activities	–$165.0	–$212.2
285			
286	Financing Activities		
287	Increase(+)/Decrease(–) in notes payable	$50.0	–$19.9
288	Increase(+)/Decrease(–) in bonds	174.0	–87.0
289	Preferred stock issue (+) / repurchase(–)	0.0	14.0
290	Payment of common and preferred dividends	–61.5	–66.7
291	Common stock issue (+) / repurchase (–)	0.0	1.4
292	Net cash provided by financing activities	$162.5	–$158.8
293			
294	Net cash flow	–$5.0	–$1.7
295	Cash at beginning of the year	15.0	10.0
296	Cash at end of the year	$10.0	$8.3

(even though the interest rate would be high) until the board could meet and decide on a final financing plan. If instead a surplus of funds is available at the end of the year, the board suggested that the surplus be paid to shareholders in the form of a special dividend.[9]

The board asked to see two scenarios. The first is similar to the Status Quo scenario previously discussed, except that the board's three financial policies just described are employed (the board suggested a zero growth rate for regular DPS). Because there is no change in operating performance, this is called the Maintain scenario. The second scenario is similar to the Final scenario discussed earlier, except that the board's financial policy is applied (the board suggested an 8% growth in regular DPS for this scenario). Because there are significant improvements in operating performance, this is called the Improve scenario. The board asked to see the Maintain scenario first, which is shown in Figure 12-8 (see ***Tab 3*** in ***Ch12 Tool Kit.xls*** for details).

The operating items are forecasted in the same way as shown before. All liabilities and equity accounts (except the line of credit) are planned in the sense that they are specified by the financial policies. For the policies used here, there are no changes in notes payable, bonds, or common stock; in addition, regular dividends are specified, so the addition to retained earnings is specified. Column F in Figure 12-8 shows

[9]In actuality, the board would decide at that time whether to repurchase shares of stock instead, if that seemed preferable given the prevailing stock price.

FIGURE 12-8 One-Year Forecasted Financial Statements under an Alternative Financial Policy: Scenario = Maintain (Millions, Except for Per Share Data)

	A	B	C	D	E	F	G	H
94	Scenario Shown:	Maintain				Planned		With
95		Actual	Factor	Basis for		(w/o AFN)	AFN	AFN
96	Balance Sheet	2010	or Rate	2011 forecast		2011	Adjust.	2011
97	*Assets*							
98	Cash	$10.0	0.33%	× 2011 Sales		$11.0		$11.0
99	Acc. rec.	375.0	12.50%	× 2011 Sales		412.5		412.5
100	Inventories	615.0	20.50%	× 2011 Sales		676.5		676.5
101	Total CA	$1,000.0				$1,100.0		$1,100.0
102	Net plant & equip.	1,000.0	33.33%	× 2011 Sales		1,100.0		1,100.0
103	Total assets (TA)	$2,000.0				$2,200.0		$2,200.0
104	*Liab. & equity*							
105	Accounts payable	$60.0	2.00%	× 2011 Sales		$66.0		$66.0
106	Accruals	140.0	4.67%	× 2011 Sales		154.1		154.1
107	Notes pay. (NP)	110.0		Carry over		110.0		110.0
108	Line of credit (LOC)[a]			Blank			$109.8	109.8
109	Total CL	$310.0				$330.1		$440.0
110	LT bonds	754.0		Carry over		754.0		754.0
111	Tot. liab.	$1,064.0				$1,084.1		$1,194.0
112	Pref. stock	40.0		Carry over		40.0		40.0
113	Com. stock	130.0		Carry over		130.0		130.0
114	Ret. earnings	766.0		2010 RE+ ΔRE		836.0		836.0
115	Total CE	$896.0				$966.0		$966.0
116	Total L&E	$2,000.0				$2,090.1		$2,200.0
117								
118	AFN[b]	= TA − Planned total liabilities & equity					$109.8	
119	Line of credit[c]	= AFN if AFN > 0 (additional financing needed)					$109.8	
120	Special dividend[d]	= −AFN if AFN ≤ 0 (surplus funds available)					$0.0	
121								
122	Scenario Shown:	Maintain				Planned		With
123		Actual	Factor	Basis for		(w/o AFN)	AFN	AFN
124	Income Statement	2010	or Rate	2011 forecast		2011	Adjust.	2011
125	Sales	$3,000.0	1.10	× 2010 Sales		$3,300.0		$3,300.0
126	Costs (excl. depr.)	2,616.2	87.21%	× 2011 Sales		2,877.9		2,877.9
127	Depreciation	100.0	10.00%	× 2011 Net plant		110.0		110.0
128	Total op. costs	$2,716.2				$2,987.9		$2,987.9
129	EBIT	$283.8				$312.1		$312.1
130	Int. on planned NP	9.9	9.00%	× Avg notes		9.9		9.9
131	Int. on planned bonds	78.1	11.00%	× Avg bonds		82.9		82.9
132	Int. on LOC[e]		9.00%	Blank			$0.0	0.0
133	EBT	$195.8				$219.2		$219.2
134	Taxes (T = 40%)	78.3	40.00%	× 2011 EBT		87.7		87.7
135	NI before pref. div.	$117.5				$131.5		$131.5
136	Pref. div.	4.0	10.00%	× Avg preferred		4.0		4.0
137	NI to common	$113.5				$127.5		$127.5
138								
139	# of shares (n)	50.0		Carry over		50.0		50.0
140	Regular DPS	$1.15	1.00	× 2010 DPS		$1.15		$1.15
141	Regular dividends	$57.5		n × 2011 DPS		$57.5		$57.5
142	Special dividend[f]	0.0				0.0	$0.0	0.0
143	Add. To RE (ΔRE)	$56.0		NI – Dividends		$70.0		$70.0

Notes:

[a]If additional financing is needed, notes payable will be added on a temporary basis.

[b]The AFN in forecasted financial statements is equal to the required assets minus the planned liabilities and equity (i.e., the liabilities and equity assuming AFN is zero).

[c]If AFN > 0, then additional financing will be raised by borrowing via notes payable.

[d]If AFN ≤ 0, then surplus funds will be used to pay a special dividend.

[e]This forecast assumes that any temporary notes payable will be raised at the end of the year; thus, there will be no additional interest expense.

[f]Any surplus funds will be paid out as a special dividend.

these planned forecasts, but notice that the balance sheets don't balance: The total assets line equals $2,200, but total liabilities and equity sum only to $2,090.1. Thus, there is a $2,200 – $2,090.1 = $109.9 million shortfall. In other words, the AFN is $109.9, as shown in Row 118. Because additional financing is needed, there will be an adjustment to the statements by borrowing $109.9 through the line of credit, as shown in Column G. Because we assume that the borrowing occurs at the end of the year, there will be no additional interest in this forecast. Column H shows the forecasted statements after including the AFN.

Figure 12-9 reports the forecasted statements for the Improve scenario. The balance sheets in Column F again do not balance, but this is because there is more financing (total liabilities and equity = $2,088.8) than assets (total assets = $1,999.2). Thus, Row 118 shows a negative AFN, –$89.6 million. This will be paid out as a special dividend, as shown in Column G. Column H reports the forecasted statements after including the AFN.

The board expressed two additional concerns. First, they thought it unrealistic to assume that the line of credit was only used on the last day of the year and thus caused no additional interest expense. The board felt it would be more appropriate to assume that the line of credit was accessed at regular intervals throughout the year, which would lead to additional interest expense. The CFO explained that when the AFN leads to additional interest expense it reduces net income, which reduces the addition to retained earnings and then increases the AFN, with the cycle being repeated in a circular manner. This is called **financing feedback,** and there are a variety of ways to incorporate feedback effects into the forecast. The CFO agreed that adding debt throughout the year was a more realistic assumption but said that the end-of-year assumption usually produced results fairly close to those that incorporated feedback effects. However, the CFO agreed to incorporate financing feedback in the next set of forecasts, but rather than use valuable board time explaining feedback adjustments in detail, the CFO suggested that interested board members take a look at ***Tab 4*** in ***Ch12 Tool Kit.xls.***

The board also wanted to see multi-year projections. After updating the forecasting model to incorporate feedback effects and multi-year forecasts, the CFO returned to the board meeting and presented the results shown in Figure 12-10. (See ***Tab 5*** in ***Ch12 Tool Kit.xls*** for calculations.)

The dramatic increase in FCF during 2011 would be a result of the improved operations, including less inventory and fewer receivables. After this one-time improvement, FCF drops in 2012 but then increases each year. The improved operations are reflected in the increased return on invested capital, which in turn leads to strong growth in EPS and thus enables growth in DPS. With the projected increase in the times interest earned ratio and the decrease in the ratio of total liabilities to total assets, the board discussed whether MicroDrive could support more debt. They decided to discuss a possible recapitalization at their next meeting, in which MicroDrive might issue bonds and use the proceeds to pay off the line of credit and possibly repurchase shares of stock, topics we discuss in Chapter 14 and Chapter 15.

Self-Test

Is the AFN as calculated using the forecasted financial statements method, with all the ratios held constant, the same (except for rounding errors) as the AFN found using the AFN equation? Explain.

Why does the text argue that the forecasted financial statements method is preferable to the AFN equation method?

What does the acronym GIGO stand for? Is this important for forecasting?

FIGURE 12-9 One-Year Forecasted Financial Statements under an Alternative Financial Policy: Scenario = Improve (Millions, Except for Per Share Data)

	A	B	C	D	E	F	G	H
94	Scenario Shown:	Improve				Planned		With
95		Actual	Factor	Basis for		(w/o AFN)	AFN	AFN
96	Balance Sheet	2010	or Rate	2011 forecast		2011	Adjust.	2011
97	*Assets*							
98	Cash	$10.0	0.25%	× 2011 Sales		$8.3		$8.3
99	Acc. rec.	375.0	11.00%	× 2011 Sales		363.0		363.0
100	Inventories	615.0	16.00%	× 2011 Sales		568.0		568.0
101	Total CA	$1,000.0				$899.3		$899.3
102	Net plant & equip.	1,000.0	33.33%	× 2011 Sales		1,100.0		1,100.0
103	Total assets (TA)	$2,000.0				$1,992.2		$1,999.2
104	*Liab. & equity*							
105	Accounts payable	$60.0	2.00%	× 2011 Sales		$66.0		$66.0
106	Accruals	140.0	4.67%	× 2011 Sales		132.0		132.0
107	Notes pay. (NP)	110.0		Carry over		110.0		110.0
108	Line of credit (LOC)[a]			Blank			$0.0	0.0
109	Total CL	$310.0				$308.0		$308.0
110	LT bonds	754.0		Carry over		754.0		754.0
111	Tot. liab.	$1,064.0				$1,062.0		$1,062.0
112	Pref. stock	40.0		Carry over		40.0		40.0
113	Com. stock	130.0		Carry over		130.0		130.0
114	Ret. earnings	766.0		2010 RE+ ΔRE		856.8		767.2
115	Total CE	$896.0				$986.8		$897.2
116	Total L&E	$2,000.0				$2,088.8		$1,999.2
117								
118	AFN[b]	= TA − Planned total liabilities & equity					−$89.6	
119	Line of credit[c]	= AFN if AFN > 0 (additional financing needed)					$0.0	
120	Special dividend[d]	= −AFN if AFN ≤ 0 (surplus funds available)					$89.6	
121								
122	Scenario Shown:	Improve				Planned		With
123		Actual	Factor	Basis for		(w/o AFN)	AFN	AFN
124	Income Statement	2010	or Rate	2011 forecast		2011	Adjust.	2011
125	Sales	$3,000.0	1.10	× 2010 Sales		$3,300.0		$3,300.0
126	Costs (excl. depr.)	2,616.2	86.00%	× 2011 Sales		2,838.0		2,838.0
127	Depreciation	100.0	10.20%	× 2011 Net plant		112.2		112.2
128	Total op. costs	$2,716.2				$2,950.2		$2,950.2
129	EBIT	$283.8				$349.8		$349.8
130	Int. on planned NP	9.9	8.50%	× Avg notes		9.4		9.4
131	Int. on planned bonds	78.1	10.50%	× Avg bonds		79.2		79.2
132	Int. on LOC[e]		8.50%	Blank			$0.0	0.0
133	EBT	$195.8				$261.3		$261.3
134	Taxes (T = 40%)	78.3	40.00%	× 2011 EBT		104.5		104.5
135	NI before pref. div.	$117.5				$156.8		$156.8
136	Pref. div.	4.0	9.50%	× Avg preferred		3.8		3.8
137	NI to common	$113.5				$153.0		$153.0
138								
139	# of shares (n)	50.0		Carry over		50.0		50.0
140	Regular DPS	$1.15	1.08	× 2010 DPS		$1.24		$1.24
141	Regular dividends	$57.5		n × 2011 DPS		$62.1		$62.1
142	Special dividend[f]	0.0				0.0	$89.6	89.6
143	Add. To RE (ΔRE)	$56.0		NI – Dividends		$90.9		$1.3

Notes:

[a]If additional financing is needed, notes payable will be added on a temporary basis.

[b]The AFN in forecasted financial statements is equal to the required assets minus the planned liabilities and equity (i.e., the liabilities and equity assuming AFN is zero).

[c]If AFN > 0, then additional financing will be raised by borrowing via notes payable.

[d]If AFN ≤ 0, then surplus funds will be used to pay a special dividend.

[e]This forecast assumes that any temporary notes payable will be raised at the end of the year; thus, there will be no additional interest expense.

[f]Any surplus funds will be paid out as a special dividend.

FIGURE 12-10 Summary of Forecasted Key Results for the "Improve" Scenario (Millions, Except for Percentages and Per Share Data)

	Actual 2010		Forecast 2011	Forecast 2012	Forecast 2013	Forecast 2014	Forecast 2015
	Industry	MicroDrive	Improve	Improve	Improve	Improve	Improve
Key Results							
Net operating profit after taxes	NA	$170	$210	$231	$254	$279	$307
Net operating working capital	NA	$800	$701	$771	$849	$933	$1,027
Total operating capital	NA	$1,800	$1,801	$1,981	$2,180	$2,397	$2,637
FCF = NOPAT – Δ op capital	NA	–$175	$209	$51	$56	$61	$68
Return on invested capital	11.0%	9.5%	11.7%	11.7%	11.7%	11.7%	11.7%
EPS	NA	$2.27	$3.06	$3.43	$3.79	$4.18	$4.62
DPS	NA	$1.15	$1.24	$1.34	$1.45	$1.56	$1.69
Return on equity (ROE)	15.0%	12.7%	17.0%	17.1%	16.9%	16.7%	16.6%
Return on assets (ROA)	9.0%	5.7%	7.7%	7.8%	7.8%	7.9%	7.9%
Inventory turnover	9.0	4.9	6.3	6.3	6.3	6.3	6.3
Days sales outstanding	36.0	45.6	40.2	40.2	40.2	40.2	40.2
Total liabilities / TA	46.0%	53.2%	53.1%	52.6%	52.1%	51.5%	50.9%
Times interest earned	6.0	3.2	4.0	4.3	4.8	5.3	5.8
Shares outstanding	NA	50.00	50.00	50.00	50.00	50.00	50.00
Payout ratio	40.0%	50.7%	40.6%	39.1%	38.3%	37.4%	36.5%
AFN	NA	$224	–$90	$76	$157	$244	$337

12.5 Forecasting When the Ratios Change

The AFN equation assumes that the ratios of assets and liabilities to sales (A_0^*/S_0 and L_0^*/S_0) remain constant over time. This assumption can be relaxed when we use the forecasted financial statement method, but in our forecast we made a one-time change in these ratios and then held them constant thereafter. This implies 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 12-11, a relationship whose graph (1) is 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%, then inventory will also increase by 100%, from $100 million to $200 million.

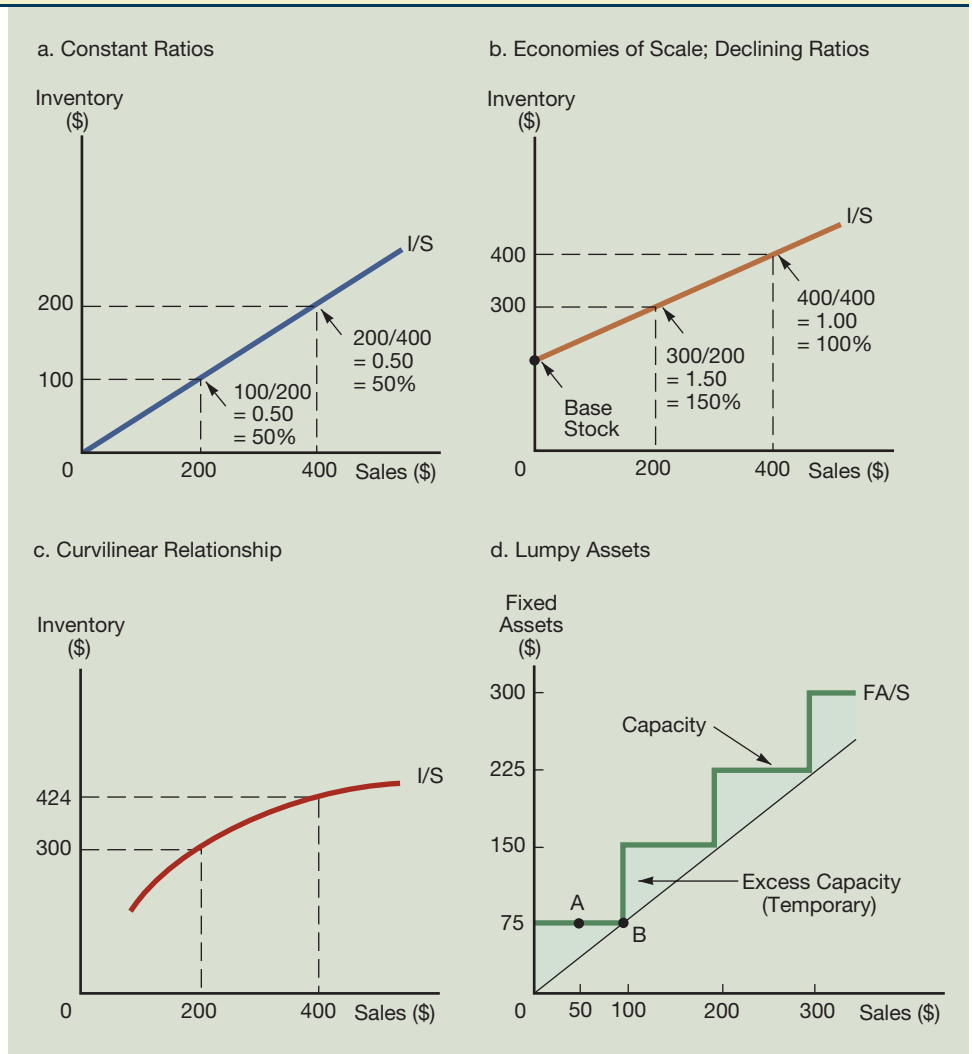
The assumption of constant ratios and identical growth rates is appropriate at times, but there are times when it is incorrect. Three such conditions are described in the following sections.

Economies of Scale

There are economies of scale in the use of many kinds of assets, and when economies 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 (I/S) declines. This situation is depicted in Panel b of Figure 12-11. Here we see that the inventory/sales ratio is 1.5 (or 150%) when sales are $200 million but 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 Economic Ordering Quantity, or EOQ, model), its inventories will rise with the *square root* of sales. This situation is shown in Panel c of Figure 12-11, which shows a

FIGURE 12-11 Four Possible Ratio Relationships (Millions of Dollars)



curved line whose slope decreases at higher sales levels. In this situation, very large increases in sales would require very little additional inventory.[10]

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 12-11. 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

[10]See ***Web Extension 12A*** for more on forecasting when things like inventories are not constant in relation to sales.

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 ratio of fixed assets to sales (FA/S) 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 and 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 large financial requirement.[11]

Excess Capacity Adjustments

If a firm has excess capacity, then sales can grow before the firm must add capacity. The level of full capacity sales is

$$\text{Full capacity sales} = \frac{\text{Actual sales}}{\text{Percentage of capacity at which fixed assets were operated}} \tag{12-3}$$

For example, consider MicroDrive and use the data from its financial statements in Figure 12-2, but now assume that excess capacity exists in fixed assets. Specifically, assume that fixed assets in 2010 were being utilized to only 96% of capacity. If fixed assets had been used to full capacity, then 2010 sales could have been as high as $3,125 million versus the $3,000 million in actual sales:

$$\text{Full capacity sales} = \frac{\text{Actual sales}}{\text{Percentage of capacity at which fixed assets were operated}}$$

$$= \frac{\$3{,}000 \text{ million}}{0.96} = \$3{,}125 \text{ million}$$

The target fixed assets/sales ratio can be defined in terms of the full capacity sales:

$$\text{Target fixed assets/Sales} = \frac{\text{Actual fixed assets}}{\text{Full capacity sales}} \tag{12-4}$$

[11] Several other points should be noted about Panel d of Figure 12-11. First, if the firm is operating at a sales level of $100 million or less, then any expansion that calls for a sales increase of more than $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.

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

$$\text{Target fixed assets/Sales} = \frac{\text{Actual fixed assets}}{\text{Full capacity sales}} = \frac{\$1{,}000}{\$3{,}125} = 0.32 = 32\%$$

The required level of fixed assets depends upon this target fixed assets/sales ratio:

$$\text{Required level of fixed assets} = \left(\frac{\text{Target fixed assets}}{\text{Sales}}\right)\left(\begin{array}{c}\text{Projected}\\ \text{sales}\end{array}\right) \quad (12\text{-}5)$$

Therefore, if MicroDrive's sales increase to $3,300 million, its fixed assets would have to increase to $1,056 million:

$$\text{Required level of fixed assets} = \left(\frac{\text{Target fixed assets}}{\text{Sales}}\right)\left(\begin{array}{c}\text{Projected}\\ \text{sales}\end{array}\right) = 0.32(\$3{,}300) = \$1{,}056 \text{ million}$$

We previously forecasted that MicroDrive would need to increase fixed assets at the same rate as sales, or by 10%. That meant an increase of $100 million, from $1,000 million to $1,100 million. Under the new assumptions, the actual required increase in fixed assets is only from $1,000 million to $1,056 million, or $56 million. Thus, the capacity-adjusted forecast is $100 – $56 = $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 – $44 = $74 million.

Note also that when excess capacity exists, sales can grow to the capacity sales as calculated above with no increase in fixed assets, but sales beyond that level would require additions of fixed assets as 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 How do economies of scale and lumpy assets affect financial forecasting?

Summary

- **Financial forecasting** generally begins with a forecast of the firm's sales in terms of both units and dollars.
- Either the **forecasted financial statements (FFS) method** or the **additional funds needed (AFN) equation** can be used to forecast financial requirements. If conditions are likely to change, the financial statements method is more reliable, and it also provides ratios and other data that can be used to evaluate alternative business plans. The AFN equation is typically used to arrive at an approximation for AFN.
- A firm can determine its **AFN** by estimating the amount of new assets necessary to support the forecasted level of sales and then subtracting from this 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** and the higher its **payout ratio,** the greater will be its need for additional financing.
- The greatest benefit of the forecasted financial statements method is its use in **planning to optimize operations and thereby increase the firm's intrinsic value** and thus its stock price.
- Adjustments must be made if **economies of scale** exist in the use of assets, if **excess capacity** exists, or if growth must occur in large increments **(lumpy assets).**
- **Linear regression** and **excess capacity adjustments** can be used to forecast asset requirements in situations in which assets are not expected to grow at the same rate as sales. See ***Web Extension 12A*** for more discussion of these issues.

Questions

(12–1) Define each of the following terms:

a. Mission statement; corporate scope; statement of corporate objectives; corporate strategies
b. Operating plan; financial plan; sales forecast
c. Spontaneous liabilities; profit margin; payout ratio
d. Additional funds needed (AFN); AFN equation; capital intensity ratio; self-supporting growth rate
e. Forecasted financial statement approach
f. Excess capacity; lumpy assets; economies of scale
g. Full capacity sales; target fixed assets/sales ratio; required level of fixed assets
h. Financing feedback effects

(12–2) Some liability and net worth items increase spontaneously with increases in sales. Put a check (✓) by those items listed below that typically increase spontaneously:

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

(12–3) The following equation is sometimes used to forecast financial requirements:

$$AFN = (A_0^*/S_0)(\Delta S) - (L_0^*/S_0)(\Delta S) - MS_1(1 - POR)$$

What key assumption do we make when using this equation? Under what conditions might this assumption not hold true?

(12–4) Name five key factors that affect a firm's external financing requirements.

(12–5) What is meant by the term "self-supporting growth rate?" How is this rate related to the AFN equation, and how can that equation be used to calculate the self-supporting growth rate?

(12–6) Suppose a firm makes the policy changes listed below. If a change means that external, nonspontaneous financial requirements (AFN) will increase, indicate this by a (+); indicate a decrease by a (–); and indicate no effect or an indeterminate 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 offer credit to its customers, whereas previously all sales had been on a cash basis. _____
d. The firm's profit margin is eroded by increased competition, although sales hold steady. _____
e. The firm sells its manufacturing plants for cash to a contractor and simultaneously signs an outsourcing contract to purchase from that contractor goods that the firm formerly produced. _____
f. The firm negotiates a new contract with its union that lowers its labor costs without affecting its output. _____

(12–7) Assume that you recently received your MBA and now work as assistant to the CFO of a relatively large corporation. Your boss has asked you to prepare a financial forecast for the coming year, using an *Excel* model, and then to present your forecast to the firm's executive committee. Describe how you would deal with the following issues.

a. Would you want to set up the model with a number of scenarios whose results could be presented to the executives?
b. What are "financing feedbacks," and what are the pros and cons of incorporating such feedbacks into your model?
c. What are the pros and cons of assuming that all necessary outside funds are obtained from a single source (such as a bank loan) versus assuming that a mix of funds is raised so as to keep the capital structure at its target level?
d. What are the pros and cons of providing the capability to examine the results of changing dividend policy and capital structure policy as well as various operating policies such as credit policy, outsourcing policy, and so forth?
e. What does the acronym GIGO stand for, and how important is this for someone who is developing a financial model? For someone using a forecasting model? How might post-audits and incentive compensation plans help reduce GIGO?

Self-Test Problems

Solutions Appear in Appendix A

(ST–1) Self-Supporting Growth Rate

The Barnsdale Corporation has the following ratios: $A_0^*/S_0 = 1.6$; $L_0^*/S_0 = 0.4$; 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 equation to determine the firm's self-supporting growth rate—in other words, the maximum growth rate Barnsdale can achieve without having to employ nonspontaneous external funds.

(ST–2) AFN Equation

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

(ST–3) Excess Capacity

Van Auken Lumber's 2010 financial statements are shown below.

Van Auken Lumber: Balance Sheet as of December 31, 2010
(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, 2010
(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 2010 with regard to all items *except* fixed assets, which in 2010 were being utilized to only 75% of capacity. By what percentage could 2011 sales increase over 2010 sales without the need for an increase in fixed assets?

b. Now suppose that 2011 sales increase by 25% over 2010 sales. Use the forecasted financial statement method to forecast a 12/31/11 balance sheet and 2011 income statement, assuming that (1) the historical ratios of operating costs/sales, cash/sales, receivables/sales, inventories/sales, accounts payable/sales, and accruals/sales remain constant; (2) Van Auken cannot sell any of its fixed assets; (3) any required financing is done at the *end* of 2011 as notes payable; (4) the firm earns no interest on its cash; and (5) the interest rate on all of its debt is 12%. Van Auken pays out 60% of its net income as dividends and has a tax rate of 40%. How much additional external capital will be required? (*Hints:* Base the forecasted interest expense on the amount of debt at the beginning of the year, because any new debt is added at the end of the year; also, use the forecasted income statement to determine the addition to retained earnings for use in the balance sheet.)

Problems

Answers Appear in Appendix B

EASY PROBLEMS 1–3

(12–1) AFN Equation

Baxter Video Products's sales are expected to increase by 20% from $5 million in 2010 to $6 million in 2011. Its assets totaled $3 million at the end of 2010. Baxter is already at full capacity, so its assets must grow at the same rate as projected sales. At the end of 2010, 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 equation to forecast Baxter's additional funds needed for the coming year.

(12–2) AFN Equation

Refer to Problem 12-1. What would be the additional funds needed if the company's year-end 2010 assets had been $4 million? Assume that all other numbers, including sales, are the same as in Problem 12-1 and that the company is operating at full capacity. Why is this AFN different from the one you found in Problem 12-1? Is the company's "capital intensity" ratio the same or different?

(12–3) AFN Equation

Refer to Problem 12-1. Return to the assumption that the company had $3 million in assets at the end of 2010, 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 12-1?

INTERMEDIATE PROBLEMS 4–6

(12–4) Sales Increase

Bannister Legal Services generated $2,000,000 in sales during 2010, and its year-end total assets were $1,500,000. Also, at year-end 2010, 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 2011, the company estimates that its assets must increase at the same rate as sales, its spontaneous liabilities will increase at the same rate as sales, its profit margin will be 5%, and its payout ratio will be 60%. How large a sales increase can the company achieve without having to raise funds externally; that is, what is its self-supporting growth rate?

(12–5) Long-Term Financing Needed

At year-end 2010, Bertin Inc.'s total assets were $1.2 million and its accounts payable were $375,000. Sales, which in 2010 were $2.5 million, are expected to increase by 25% in 2011. 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 2010, and retained earnings were $295,000. Bertin has arranged to sell $75,000 of new common stock in 2011 to meet some of its financing needs. The remainder of its financing needs will be met by issuing new long-term debt at the end of 2011. (Because the debt is added at the end of the year, there will be no additional interest expense due to the new debt.) Its profit margin on sales is 6%, and 40% of earnings will be paid out as dividends.

a. What were Bertin's total long-term debt and total liabilities in 2010?

b. How much new long-term debt financing will be needed in 2011? (*Hint:* AFN – New stock = New long-term debt.)

(12–6) Additional Funds Needed

The Booth Company's sales are forecasted to double from $1,000 in 2010 to $2,000 in 2011. Here is the December 31, 2010, 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 2010, but its current assets were at their proper levels in relation to sales. All assets except fixed assets must increase at the same rate as sales, and fixed assets would also have to 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 to be 60%. What is Booth's additional funds needed (AFN) for the coming year?

CHALLENGING PROBLEMS 7–9

(12–7) Forecasted Statements and Ratios

Upton Computers makes bulk purchases of small computers, stocks them in conveniently located warehouses, ships them to its chain of retail stores, and has a staff to advise customers and help them set up their new computers. Upton's balance sheet as of December 31, 2010, 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 2010 were $350 million and net income for the year was $10.5 million, so the firm's profit margin was 3.0%. Upton paid dividends of $4.2 million to common stockholders, so its payout ratio was 40%. Its tax rate is 40%, and it operated at full capacity. Assume that all assets/sales ratios, spontaneous liabilities/sales ratios, the profit margin, and the payout ratio remain constant in 2011.

a. If sales are projected to increase by $70 million, or 20%, during 2011, use the AFN equation to determine Upton's projected external capital requirements.

b. Using the AFN equation, determine Upton's self-supporting growth rate. That is, what is the maximum growth rate the firm can achieve without having to employ nonspontaneous external funds?

c. Use the forecasted financial statement method to forecast Upton's balance sheet for December 31, 2011. Assume that all additional external capital is raised as a bank loan at the end of the year and is reflected in notes payable (because the debt is added at the end of the year, there will be no additional interest expense due to the new debt). Assume Upton's profit margin and dividend payout ratio will be the same in 2011 as they were in 2010. What is the amount of notes

payable reported on the 2011 forecasted balance sheets? (*Hint:* You don't need to forecast the income statements because you are given the projected sales, profit margin, and dividend payout ratio; these figures allow you to calculate the 2011 addition to retained earnings for the balance sheet.)

(12–8) Additional Funds Needed

Stevens Textiles's 2010 financial statements are shown below:

Balance Sheet as of December 31, 2010 (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

Income Statement for December 31, 2010 (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

a. Suppose 2011 sales are projected to increase by 15% over 2010 sales. Use the forecasted financial statement method to forecast a balance sheet and income statement for December 31, 2011. The interest rate on all debt is 10%, and cash earns no interest income. Assume that all additional debt is added at the end of the year, which means that you should base the forecasted interest expense on the balance of debt at the beginning of the year. Use the forecasted income statement to determine the addition to retained earnings. Assume that the company was operating at full capacity in 2010, 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. Determine the additional funds needed.

b. What is the resulting total forecasted amount of notes payable?

c. In your answers to Parts a and b, you should not have charged any interest on the additional debt added during 2011 because it was assumed that the new debt was added at the end of the year. But now suppose that the new debt is added throughout the year. Don't do any calculations, but how would this change the answers to parts a and b?

(12–9) Additional Funds Needed

Garlington Technologies Inc.'s 2010 financial statements are shown below:

Balance Sheet as of December 31, 2010

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

Income Statement for December 31, 2010

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 2011 sales increase by 10% over 2010 sales and that 2011 dividends will increase to $112,000. Forecast the financial statements using the forecasted financial statement method. Assume the firm operated at full capacity in 2010. Use an interest rate of 13%, and assume that any new debt will be added at the end of the year (so forecast the interest expense based on the debt balance at the beginning of the year). Cash does not earn any interest income. Assume that the AFN will be in the form of notes payable.

Spreadsheet Problems

(12-10) Build a Model: Forecasting Financial Statements

Start with the partial model in the file ***Ch12 P10 Build a Model.xls*** on the textbook's Web site, which contains the 2010 financial statements of Zieber Corporation. Forecast Zeiber's 2011 income statement and balance sheets. Use the following assumptions: (1) Sales grow by 6%. (2) The ratios of expenses to sales, depreciation to fixed assets, cash to sales, accounts receivable to sales, and inventories to sales will be the same in 2011 as in 2010. (3) Zeiber will not issue any new stock or new long-term bonds. (4) The interest rate is 9% for short-term debt and 11% for long-term debt. (5) No interest is earned on cash. (6) Dividends grow at an 8% rate. (6) Calculate the additional funds needed (AFN). If new financing is required, assume it will be raised as notes payable. Assume that any new notes payable will be borrowed on the last day of the year, so there will be no additional interest expense for the new notes payable. If surplus funds are available, pay a special dividend.

a. What are the forecasted levels of notes payable and special dividends?

b. Now assume that the growth in sales is only 3%. What are the forecasted levels of notes payable and special dividends?

(12-11)
Build a Model: Forecasting Financial Statements

Start with the partial model in the file ***Ch12 P11 Build a Model.xls*** on the textbook's Web site, which shows Matthews Industries's most recent balance sheet, income statement, and other data. Matthews Industries's financial planners must forecast the company's financial results for the coming year. The forecast will be based on the forecasted financial statement method, and any additional funds needed will be obtained by using notes payable. Complete the partial model and answer the following questions.

a. Assume that the firm's 2010 profit margin, payout ratio, capital intensity ratio, and spontaneous liabilities-to-sales ratio remain constant. If sales grow by 10% in 2011, what is the required external capital the firm will need in 2011 as calculated by the AFN equation?
b. If 2010 ratios remain constant, what is Matthews's self-supporting growth rate? Describe how the self-supporting growth rate will change in response to each of the following: (1) the profit margin declines, (2) the payout ratio increases, (3) the capital intensity ratio declines.
c. Matthews's management has reviewed its financial statements and arrived at two possible scenarios for 2011. The first scenario assumes a steady state while the second scenario, the target scenario, shows some improvement in ratios toward industry average values. Forecasted values for the scenarios are shown in the partially completed file ***Ch12 P11 Build a Model.xls.*** If Matthews assumes that external financing is achieved through notes payable and that financing feedbacks are not considered because the new notes payable are added at the end of the year, then what are the firm's forecasted AFN, EPS, DPS, and year-end stock price under each scenario?
d. Matthews's management realizes that interest for additional notes payable should be included in the analysis. Assume that notes will be issued midway through the year, so that interest on these notes is incurred for only half the year. If Matthews assumes now that external financing is achieved through notes payable and if financing feedbacks are considered, then what are the firm's forecasted AFN, EPS, DPS, and year-end stock price under each scenario?

THOMSON ONE | Business School Edition Problem

Use the Thomson ONE—Business School Edition online database to work this chapter's questions.

Forecasting the Future Performance of Abercrombie & Fitch

Clothing retailer Abercrombie & Fitch enjoyed phenomenal success in the late 1990s. Between 1996 and 2000, its sales grew almost fourfold, from $335 million to more than $1.2 billion, and its stock price soared by more than 500%. More recently, however, its growth rate has begun to slow down, and Abercrombie has had a hard time meeting its quarterly earnings targets. As a result, the stock price in late 2002 was about half of what it was 3 years earlier. Abercrombie's struggles resulted from increased competition, a sluggish economy, and the challenges of staying ahead of the fashion curve.

Since 2002, the company's stock has rebounded strongly but questions remain about the firm's long-term growth prospects. Given the questions about Abercrombie's future

growth rate, analysts have focused on the company's earnings reports. Thomson ONE provides a convenient and detailed summary of the company's recent earnings history along with a summary of analysts' earnings forecasts.

To access this information, we begin by entering the company's ticker symbol, ANF, on Thomson ONE's main screen and then selecting GO. This takes us to an overview of the company's recent performance. After checking out the overview, you should click on the tab labeled Estimates, near the top of your screen. Here you will find a wide range of information about the company's past and projected earnings.

Thomson ONE—BSE Discussion Questions

1. What are the mean and median forecasts for Abercrombie's earnings per share over the next fiscal year?
2. Based on analysts' forecasts, what is the firm's expected long-term growth rate in earnings?
3. Have analysts made any significant changes to their forecasted earnings for Abercrombie & Fitch in the past few months?
4. Historically, have Abercrombie's reported earnings generally met, exceeded, or fallen short of analysts' forecasted earnings?
5. How has Abercrombie's stock performed this year relative to the S&P 500?

Mini Case

Hatfield Medical Supplies's stock price had been lagging its industry averages, so its board of directors brought in a new CEO, Adam Lee. Lee asked for the company's long-run strategic plan; when he learned that no formal plan existed, he decided to develop one himself. Lee had brought in Rick Novak, a finance MBA who had been working for a consulting company, to replace the old CFO, and he asked Rick to develop the financial planning section of the strategic plan. In his previous job, Novak's primary task had been to help clients develop financial forecasts, and that was one reason Lee hired him.

Novak began as he always did, by comparing Hatfield's financial ratios to the industry averages. If any ratio was substandard, he discussed it with the responsible manager to see what could be done to improve the situation. Figure MC-1 provides Hatfield's latest financial statements plus some ratios and other data that Novak plans to use in his analysis. Notice that the figure is extracted from an *Excel* spreadsheet. Novak learned back in his university days that, because of interactions among variables, any realistic financial forecast must be based on a computer model. (The model is available to your instructor on the textbook's Web site.) Of course, he is also aware of the well-known computer axiom—garbage in, garbage out (GIGO). Novak therefore plans to discuss the model's inputs carefully with Hatfield's operating managers, individually and also collectively in the company's financial planning conference.

a. Do you think Adam Lee should develop a strategic plan for the company? Why? What are the central elements of such a plan? What is the role of finance in a strategic plan?
b. Given the data in Figure MC-1, how well run would you say Hatfield appears to be in comparison with other firms in its industry? What are its primary strengths and weaknesses? Be specific in your answer, and point to various ratios that support your position. Also, use the Du Pont equation (see Chapter 3) as one part of your analysis.
c. Use the AFN equation to estimate Hatfield's required new external capital for 2011 if the 15% expected growth takes place. Assume that the firm's 2010 ratios will remain the same in 2011.
d. Define the term *capital intensity*. Explain how a decline in capital intensity would affect the AFN, other things held constant. Would economies of scale combined with rapid growth affect capital intensity, other things held constant? Also, explain how changes in each of the following would affect AFN, holding other things constant: the growth rate, the amount of accounts payable, the profit margin, and the payout ratio.

FIGURE MC-1 Financial Statements and Other Data (Millions, Except for Per Share Data)

	A	B	C	D	E	F	G
4							
5	Balance Sheet, Hatfield, 12/31/10				Income Statement, Hatfield, 2010		
6	Cash and securities		$20		Sales		$2,000
7	Accounts receivable		290		Total operating costs		1,900
8	Inventories		390		EBIT		$100
9	Total current assets		$700		Interest		60
10	Net fixed assests		500		EBT		$40
11	Total assets		$1,200		Taxes (40%)		16
12					Net income		$24
13	Accounts pay. + accruals		$100		Dividends		$9
14	Notes payable		80		Add'n to retain. earnings		$15
15	Total current liabilities		$180		Shares outstanding		10
16	Long-term debt		520		EPS		$2.40
17	Total liabilities		$700		DPS		$0.90
18	Common stock		300		Year-end stock price		$24.00
19	Retained earnings		200				
20	Total common equity		$500				
21	Total liab. & equity		$1,200				

	A	B	C	D	E	F	G
23	Selected Ratios and Other Data, 2010			Hatfield	Industry		
24	Sales, 2010 (S_0)			$2.000	$2.000		
25	Expected growth in sales:			15.0%	15.0%		
26	Profit margin (M):			1.2%	2.74%		
27	Assests/Sales (A_0*S_0):			60.0%	50.0%		
28	Payout ratio (POR):			67.5%	35.0%		
29	Equity multiplier (Assets/Equity):			2.40	2.13		
30	Total liability/Total assests			58.3%	53.0%		
31	Times interest earned (EBIT/Interest):			1.67	5.20		
32	Increase in sales ($\Delta S = gS_0$):			$300	$300		
33	(Payables + Accruals)/Sales (L_0*S_0)			5.0%	4.0%		
34	Operating costs/Sales:			95.0%	93.0%		
35	Cash/Sales:			1.0%	1.0%		
36	Receivables/Sales:			14.5%	11.0%		
37	Inventories/Sales:			19.5%	15.0%		
38	Fixed assets/Sales:			25.0%	23.0%		
39	Tax rate:			40.0%	40.0%		
40	Interest rate on all debt:			10.00%	9.5%		
41	Price/Earning (P/E):			10.0	12.0		
42	ROE (Net income/Common equity):			4.80%	11.64%		

Sales set equal to Hatfield to make the data comparable.

Note: Hatfield was operating at full capacity in 2010.

e. Define the term *self-supporting growth rate*. Based on the Figure MC-1 data, what is Hatfield's self-supporting growth rate? Would the self-supporting growth rate be affected by a change in the capital intensity ratio or the other factors mentioned in question d? Other things held constant, would the calculated capital intensity ratio change over time if the company were growing and were also subject to economies of scale and/or lumpy assets?

f. Forecast the financial statements for 2011 using the following assumptions. (1) Operating ratios remain unchanged. (2) No additional notes payable, LT bonds, or common

stock will be issued. (3) The interest rate on all debt is 10%. (4) If additional financing is needed, then it will be raised through a line of credit. The line of credit would be tapped on the last day of the year, so it would create no additional interest expenses for that year. (5) Interest expenses for notes payable and LT bonds are based on the average balances during the year. (6) If surplus funds are available, the surplus will be paid out as a special dividend payment. (7) Regular dividends will grow by 15%. (8) Sales will grow by 15%. We call this the Steady scenario because operations remain unchanged.

1. How much new capital will the firm need (i.e., what is the forecasted AFN); how does it compare with the amount you calculated using the AFN equation; and why does any difference exist?
2. Calculate the firm's free cash flow, return on invested capital, EPS, DPS, ROE, and any other ratios you think would be useful in considering the situation.
3. Assuming all of the inputs turn out to be exactly correct, would these answers also be exactly correct? If not, why not?

g. Repeat the analysis performed for Question f but now assume that Hatfield is able to achieve industry averages for the following input variables: operating costs/sales, receivables/sales, inventories/sales, and fixed assets/sales. Answer parts (1) and (2) of f under the new assumptions.

h. Could a strategic plan that included an incentive compensation program affect the firm's ability to move toward industry average operating performance?

i. What is financing feedback?

Selected Additional Cases

The following cases from Textchoice, *Cengage 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."