



## Long-Term Financial Planning and Growth

**Boston Chicken Inc.**, operator and franchiser of Boston Market restaurants, was one of the great success stories of the early 1990s. The firm added restaurants at a staggering rate resulting in an increase in sales from \$42.5 million in 1993 (the year it first became a publicly traded corporation) to \$462.4 million in 1997, for an average growth rate of 82 percent per year. Unfortunately, the firm's recipe for growth turned out to be a disaster by 1998 because the firm grew too fast to maintain the quality its customers had come to expect. In addition, Boston Chicken made loans to its franchisees to build stores, but the stores increasingly ran into financial difficulty because of increased competition. As a result, the overall level of debt in the system became too much to bear, and the firm lost its game of chicken with its creditors. Effectively out of cash, the firm filed for bankruptcy in October 1998 and closed 178 of its 1,143 outlets. The company did not emerge from bankruptcy until 2000, when it was acquired by McDonald's.

The case of Boston Chicken is not a unique one. Often firms that grow at a phenomenal pace run into cash flow problems and, subsequently, financial difficulties. In other words, it is literally possible to “grow broke.” This chapter emphasizes the importance of planning for the future and discusses tools firms use to think about, and manage, growth.

**A** lack of effective long-range planning is a commonly cited reason for financial distress and failure. As we will develop in this chapter, long-range planning is a means of systematically thinking about the future and anticipating possible problems before they arrive. There are no magic mirrors, of course, so the best we can hope for is a logical and organized procedure for exploring the unknown. As one member of GM's board was heard to say, “Planning is a process that at best helps the firm avoid stumbling into the future backwards.”

Financial planning establishes guidelines for change and growth in a firm. It normally focuses on the big picture. This means it is concerned with the major elements of a firm's financial and investment policies without examining the individual components of those policies in detail.

**Slide 4.1 Key Concepts and Skills**

**Slide 4.2 Chapter Outline**

For a chapter-related case study, see the *Financial Forecasting Case in Cases in Finance* by Jim DeMello.

Our primary goals in this chapter are to discuss financial planning and to illustrate the interrelatedness of the various investment and financing decisions a firm makes. In the chapters ahead, we will examine in much more detail how these decisions are made.

We first describe what is usually meant by financial planning. For the most part, we talk about long-term planning. Short-term financial planning is discussed in a later chapter. We examine what the firm can accomplish by developing a long-term financial plan. To do this, we develop a simple, but very useful, long-range planning technique: the percentage of sales approach. We describe how to apply this approach in some simple cases, and we discuss some extensions.

To develop an explicit financial plan, management must establish certain elements of the firm's financial policy. These basic policy elements of financial planning are:

1. The firm's needed investment in new assets. This will arise from the investment opportunities the firm chooses to undertake, and it is the result of the firm's capital budgeting decisions.
2. The degree of financial leverage the firm chooses to employ. This will determine the amount of borrowing the firm will use to finance its investments in real assets. This is the firm's capital structure policy.
3. The amount of cash the firm thinks is necessary and appropriate to pay shareholders. This is the firm's dividend policy.
4. The amount of liquidity and working capital the firm needs on an ongoing basis. This is the firm's net working capital decision.

As we will see, the decisions a firm makes in these four areas will directly affect its future profitability, need for external financing, and opportunities for growth.

A key lesson to be learned from this chapter is that the firm's investment and financing policies interact and thus cannot truly be considered in isolation from one another. The types and amounts of assets the firm plans on purchasing must be considered along with the firm's ability to raise the capital necessary to fund those investments. Many business students are aware of the classic three *Ps* (or even four *Ps*) of marketing. Not to be outdone, financial planners have no fewer than six *Ps*: *Proper Prior Planning Prevents Poor Performance*.

Financial planning forces the corporation to think about goals. A goal frequently espoused by corporations is growth, and almost all firms use an explicit, companywide growth rate as a major component of their long-run financial planning. For example, in 2001, food products giant (and ketchup maker) H. J. Heinz was focusing on improving growth, projecting that sales would grow at between 3 percent and 5 percent. It also projected that EPS would grow at a rate exceeding 10 percent.

There are direct connections between the growth a company can achieve and its financial policy. In the following sections, we show how financial planning models can be used to better understand how growth is achieved. We also show how such models can be used to establish the limits on possible growth.

**Lecture Tip:** You may wish to emphasize the link between this chapter and Chapter 1—the decisions listed in this section reflect the extension of the firm's *investment* (capital budgeting, working capital) and *financing* (capital structure, dividend policy) decisions to future periods.

**Slide 4.3** Elements of Financial Planning

## 4.1

## WHAT IS FINANCIAL PLANNING?

**Critical Thinking Questions 2, 5**

Financial planning formulates the way in which financial goals are to be achieved. A financial plan is thus a statement of what is to be done in the future. Most decisions have long lead times, which means they take a long time to implement. In an uncertain world, this requires that decisions be made far in advance of their implementation. If a firm

wants to build a factory in 2006, for example, it might have to begin lining up contractors and financing in 2004, or even earlier.

## Growth as a Financial Management Goal

Because the subject of growth will be discussed in various places in this chapter, we need to start out with an important warning: Growth, by itself, is not an appropriate goal for the financial manager. Clothing retailer J. Peterman Co., whose quirky catalogs were made famous on the TV show “Seinfeld,” learned this lesson the hard way. Despite its strong brand name and years of explosive revenue growth, the company filed for bankruptcy in 1999, the victim of an overly ambitious, growth-oriented, expansion plan.

Amazon.com, the big online retailer, is another example. At one time, Amazon’s motto seemed to be “growth at any cost.” Unfortunately, what really grew rapidly for the company were losses. By 2001, Amazon had refocused its business, explicitly sacrificing growth in the hope of achieving profitability.

As we discussed in Chapter 1, the appropriate goal is increasing the market value of the owners’ equity. Of course, if a firm is successful in doing this, then growth will usually result. Growth may thus be a desirable consequence of good decision making, but it is not an end unto itself. We discuss growth simply because growth rates are so commonly used in the planning process. As we will see, growth is a convenient means of summarizing various aspects of a firm’s financial and investment policies. Also, if we think of growth as growth in the market value of the equity in the firm, then goals of growth and increasing the market value of the equity in the firm are not all that different.

## Dimensions of Financial Planning

It is often useful for planning purposes to think of the future as having a short run and a long run. The short run, in practice, is usually the coming 12 months. We focus our attention on financial planning over the long run, which is usually taken to be the coming two to five years. This time period is called the **planning horizon**, and it is the first dimension of the planning process that must be established.

In drawing up a financial plan, all of the individual projects and investments the firm will undertake are combined to determine the total needed investment. In effect, the smaller investment proposals of each operational unit are added up, and the sum is treated as one big project. This process is called **aggregation**. The level of aggregation is the second dimension of the planning process that needs to be determined.

Once the planning horizon and level of aggregation are established, a financial plan requires inputs in the form of alternative sets of assumptions about important variables. For example, suppose a company has two separate divisions: one for consumer products and one for gas turbine engines. The financial planning process might require each division to prepare three alternative business plans for the next three years:

1. A worst case. This plan would require making relatively pessimistic assumptions about the company’s products and the state of the economy. This kind of disaster planning would emphasize a division’s ability to withstand significant economic adversity, and it would require details concerning cost cutting, and even divestiture and liquidation. For example, the bottom was dropping out of the PC market in 2001. That left big manufacturers like Compaq, Dell, and Gateway locked in a price war, fighting for market share at a time when sales were stagnant.
2. A normal case. This plan would require making the most likely assumptions about the company and the economy.

**Lecture Tip:** How rapid is “rapid”? The market valuations of Internet firms raise interesting questions. One analyst noted that Yahoo! would have to grow at “over 1000% per year” to justify its market value in 1998.

You can find growth rates under the research links at [www.multinvestor.com](http://www.multinvestor.com) and [finance.yahoo.com](http://finance.yahoo.com).

### Concept Q Answer 4.1a

#### Slide 4.4 Financial Planning Process

##### planning horizon

The long-range time period on which the financial planning process focuses, usually the next two to five years.

##### aggregation

The process by which smaller investment proposals of each of a firm’s operational units are added up and treated as one big project.

**Lecture Tip:** Scenario analysis is introduced here with financial planning. It is also an important component of the capital budgeting process.

**Lecture Tip:** IM 4.1 provides some additional tips on describing “best case” and “worst case” scenarios to students.

**Real-World Tip:** Chrysler’s accumulation of cash was questioned by some analysts and investors. IM 4.1 provides additional background on the pros and cons of Chrysler’s management strategy, and its consequences.

**Concept Q Answer 4.1b**

**Slide 4.5** Role of Financial Planning

**Lecture Tip:** Some emphasize this as the most important aspect of financial planning. Committing a plan to paper (and the scrutiny of others) forces managers to think seriously about the future and anticipate the effects of future events.

3. A best case. Each division would be required to work out a case based on optimistic assumptions. It could involve new products and expansion and would then detail the financing needed to fund the expansion.

In this example, business activities are aggregated along divisional lines and the planning horizon is three years. This type of planning, which considers all possible events, is particularly important for cyclical businesses (businesses with sales that are strongly affected by the overall state of the economy or business cycles). For example, in 1995, Chrysler put together a forecast for the upcoming four years. According to the likeliest scenario, Chrysler would end 1999 with cash of \$10.7 billion, showing a steady increase from \$6.9 billion at the end of 1995. In the worst-case scenario that was reported, however, Chrysler would end 1999 with \$3.3 billion in cash, having reached a low of \$0 in 1997. So, how did the 1999 cash picture for Chrysler actually turn out? We’ll never know. Just to show you how hard it is to predict the future, Chrysler merged with Daimler-Benz, maker of Mercedes automobiles, in 1998 to form DaimlerChrysler AG.

## What Can Planning Accomplish?

Because the company is likely to spend a lot of time examining the different scenarios that will become the basis for the company’s financial plan, it seems reasonable to ask what the planning process will accomplish.

**Examining Interactions** As we discuss in greater detail in the following pages, the financial plan must make explicit the linkages between investment proposals for the different operating activities of the firm and the financing choices available to the firm. In other words, if the firm is planning on expanding and undertaking new investments and projects, where will the financing be obtained to pay for this activity?

**Exploring Options** The financial plan provides the opportunity for the firm to develop, analyze, and compare many different scenarios in a consistent way. Various investment and financing options can be explored, and their impact on the firm’s shareholders can be evaluated. Questions concerning the firm’s future lines of business and questions of what financing arrangements are optimal are addressed. Options such as marketing new products or closing plants might be evaluated.

**Avoiding Surprises** Financial planning should identify what may happen to the firm if different events take place. In particular, it should address what actions the firm will take if things go seriously wrong, or, more generally, if assumptions made today about the future are seriously in error. As Mark Twain once observed, “Prediction is very difficult, particularly when it concerns the future.” Thus, one of the purposes of financial planning is to avoid surprises and develop contingency plans.

For example, IBM announced in September 1995 that it was delaying shipment of new mainframe computers by up to four weeks because of a shortage of a key component—the power supply. The delay in shipments was expected to reduce revenue by \$250 million and cut earnings by as much as 20 cents a share, or about 8 percent in the quarter. Apparently, IBM found itself unable to meet orders when demand accelerated. Thus, a lack of planning for sales growth can be a problem for even the biggest companies.

**Ensuring Feasibility and Internal Consistency** Beyond a general goal of creating value, a firm will normally have many specific goals. Such goals might be couched in terms of market share, return on equity, financial leverage, and so on. At times, the link-

ages between different goals and different aspects of a firm's business are difficult to see. Not only does a financial plan make explicit these linkages, but it also imposes a unified structure for reconciling differing goals and objectives. In other words, financial planning is a way of verifying that the goals and plans made with regard to specific areas of a firm's operations are feasible and internally consistent. Conflicting goals will often exist. To generate a coherent plan, goals and objectives will therefore have to be modified, and priorities will have to be established.

For example, one goal a firm might have is 12 percent growth in unit sales per year. Another goal might be to reduce the firm's total debt ratio from 40 to 20 percent. Are these two goals compatible? Can they be accomplished simultaneously? Maybe yes, maybe no. As we will discuss, financial planning is a way of finding out just what is possible, and, by implication, what is not possible.

**Conclusion** Probably the most important result of the planning process is that it forces management to think about goals and to establish priorities. In fact, conventional business wisdom holds that financial plans don't work, but financial planning does. The future is inherently unknown. What we can do is establish the direction in which we want to travel and take some educated guesses at what we will find along the way. If we do a good job, then we won't be caught off guard when the future rolls around.

**Concept Q Answer 4.1b**

#### CONCEPT QUESTIONS

- 4.1a** What are the two dimensions of the financial planning process?  
**4.1b** Why should firms draw up financial plans?

## FINANCIAL PLANNING MODELS: A FIRST LOOK

### 4.2

Just as companies differ in size and products, the financial planning process will differ from firm to firm. In this section, we discuss some common elements in financial plans and develop a basic model to illustrate these elements. What follows is just a quick overview; later sections will take up the various topics in more detail.

**Critical Thinking Questions 1, 7, 9, 10**

**Problems 1, 2**

### A Financial Planning Model: The Ingredients

Most financial planning models require the user to specify some assumptions about the future. Based on those assumptions, the model generates predicted values for a large number of other variables. Models can vary quite a bit in terms of their complexity, but almost all will have the elements that we discuss next.

**Slide 4.6 Financial Planning Model Ingredients**

**Sales Forecast** Almost all financial plans require an externally supplied sales forecast. In our models that follow, for example, the sales forecast will be the "driver," meaning that the user of the planning model will supply this value, and most other values will be calculated based on it. This arrangement is common for many types of business; planning will focus on projected future sales and the assets and financing needed to support those sales.

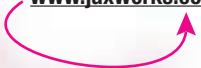
**Concept Q Answer 4.2a**

Frequently, the sales forecast will be given as the growth rate in sales rather than as an explicit sales figure. These two approaches are essentially the same because we can

calculate projected sales once we know the growth rate. Perfect sales forecasts are not possible, of course, because sales depend on the uncertain future state of the economy. To help a firm come up with its projections, some businesses specialize in macroeconomic and industry projections.

As we discussed previously, we frequently will be interested in evaluating alternative scenarios, so it isn't necessarily crucial that the sales forecast be accurate. In such cases, our goal is to examine the interplay between investment and financing needs at different possible sales levels, not to pinpoint what we expect to happen.

Spreadsheets to use for *pro forma* statements can be obtained at [www.jaxworks.com](http://www.jaxworks.com).



**Real World Tip:** The term *pro forma* can be a difficult one. The financial media and company executives often use the term *pro forma* to mean the operating portion of an income statement, ignoring any financing costs or extraordinary items. They may be referring to historical results or future predictions.

#### Concept Q Answer 4.2b

**Pro Forma Statements** A financial plan will have a forecasted balance sheet, income statement, and statement of cash flows. These are called *pro forma statements*, or *pro formas* for short. The phrase *pro forma* literally means “as a matter of form.” In our case, this means the financial statements are the form we use to summarize the different events projected for the future. At a minimum, a financial planning model will generate these statements based on projections of key items such as sales.

In the planning models we will describe, the *pro formas* are the output from the financial planning model. The user will supply a sales figure, and the model will generate the resulting income statement and balance sheet.

**Asset Requirements** The plan will describe projected capital spending. At a minimum, the projected balance sheet will contain changes in total fixed assets and net working capital. These changes are effectively the firm's total capital budget. Proposed capital spending in different areas must thus be reconciled with the overall increases contained in the long-range plan.

**Financial Requirements** The plan will include a section on the necessary financing arrangements. This part of the plan should discuss dividend policy and debt policy. Sometimes firms will expect to raise cash by selling new shares of stock or by borrowing. In this case, the plan will have to consider what kinds of securities have to be sold and what methods of issuance are most appropriate. These are subjects we consider in Part 6 of our book, where we discuss long-term financing, capital structure, and dividend policy.

**The Plug** After the firm has a sales forecast and an estimate of the required spending on assets, some amount of new financing will often be necessary because projected total assets will exceed projected total liabilities and equity. In other words, the balance sheet will no longer balance.

Because new financing may be necessary to cover all of the projected capital spending, a financial “plug” variable must be selected. The plug is the designated source or sources of external financing needed to deal with any shortfall (or surplus) in financing and thereby bring the balance sheet into balance.

For example, a firm with a great number of investment opportunities and limited cash flow may have to raise new equity. Other firms with few growth opportunities and ample cash flow will have a surplus and thus might pay an extra dividend. In the first case, external equity is the plug variable. In the second, the dividend is used.

**Economic Assumptions** The plan will have to state explicitly the economic environment in which the firm expects to reside over the life of the plan. Among the more important economic assumptions that will have to be made are the level of interest rates and the firm's tax rate.

## A Simple Financial Planning Model

We can begin our discussion of long-term planning models with a relatively simple example. The Computerfield Corporation's financial statements from the most recent year are as follows:

COMPUTERFIELD CORPORATION Financial Statements					
Income Statement			Balance Sheet		
Sales	\$1,000	Assets	\$500	Debt	\$250
Costs	800			Equity	250
Net income	\$ 200	Total	\$500	Total	\$500

Unless otherwise stated, the financial planners at Computerfield assume that all variables are tied directly to sales and current relationships are optimal. This means that all items will grow at exactly the same rate as sales. This is obviously oversimplified; we use this assumption only to make a point.

Suppose sales increase by 20 percent, rising from \$1,000 to \$1,200. Planners would then also forecast a 20 percent increase in costs, from \$800 to  $\$800 \times 1.2 = \$960$ . The pro forma income statement would thus be:

Pro Forma Income Statement	
Sales	\$1,200
Costs	960
Net income	\$ 240

The assumption that all variables will grow by 20 percent will enable us to easily construct the pro forma balance sheet as well:

Pro Forma Balance Sheet			
Assets	\$600 (+100)	Debt	\$300 (+ 50)
		Equity	300 (+ 50)
Total	\$600 (+100)	Total	\$600 (+100)

Notice we have simply increased every item by 20 percent. The numbers in parentheses are the dollar changes for the different items.

Now we have to reconcile these two pro formas. How, for example, can net income be equal to \$240 and equity increase by only \$50? The answer is that Computerfield must have paid out the difference of  $\$240 - 50 = \$190$ , possibly as a cash dividend. In this case, dividends are the plug variable.

Suppose Computerfield does not pay out the \$190. In this case, the addition to retained earnings is the full \$240. Computerfield's equity will thus grow to \$250 (the starting amount) plus \$240 (net income), or \$490, and debt must be retired to keep total assets equal to \$600.

With \$600 in total assets and \$490 in equity, debt will have to be  $\$600 - 490 = \$110$ . Since we started with \$250 in debt, Computerfield will have to retire  $\$250 - 110 = \$140$  in debt. The resulting pro forma balance sheet would look like this:

**Slide 4.7 Example:**  
Historical Financial Statements

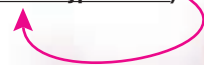
**Slide 4.8 Example:** Pro Forma Income Statement

**Slide 4.9 Example:** Pro Forma Balance Sheet

**Lecture Tip:** The true value of any planning model is to highlight the relationships that exist between financial variables—see IM 4.2 for further discussion.

**Real-World Tip:** The dazzling array of PC-based business planning software attests to the widespread use of sophisticated planning that goes on each year. The IM describes the basics of Enterprise Resource Planning (ERP) software.

Treasury Point has a cash flow forecasting tutorial in its "Knowledge" section ([www.treasurypoint.com](http://www.treasurypoint.com)).



Pro Forma Balance Sheet			
Assets	\$600 (+100)	Debt	\$110 (-140)
		Equity	490 (+240)
Total	<u>\$600 (+100)</u>	Total	<u>\$600 (+100)</u>

In this case, debt is the plug variable used to balance out projected total assets and liabilities.

This example shows the interaction between sales growth and financial policy. As sales increase, so do total assets. This occurs because the firm must invest in net working capital and fixed assets to support higher sales levels. Because assets are growing, total liabilities and equity, the right-hand side of the balance sheet, will grow as well.

The thing to notice from our simple example is that the way the liabilities and owners' equity change depends on the firm's financing policy and its dividend policy. The growth in assets requires that the firm decide on how to finance that growth. This is strictly a managerial decision. Note that, in our example, the firm needed no outside funds. This won't usually be the case, so we explore a more detailed situation in the next section.

### CONCEPT QUESTIONS

**4.2a** What are the basic components of a financial plan?

**4.2b** Why is it necessary to designate a plug in a financial planning model?

## 4.3

## THE PERCENTAGE OF SALES APPROACH

**Self-Test Problems 4.1, 4.2**

**Critical Thinking Question 6**

**Problems 3–5, 9–11, 16, 17, 25**

**Concept Q Answer 4.3a**

### percentage of sales approach

A financial planning method in which accounts are varied depending on a firm's predicted sales level.

**Slide 4.10 Percent of Sales Approach**

**Slide 4.11 Example: Income Statement**

In the previous section, we described a simple planning model in which every item increased at the same rate as sales. This may be a reasonable assumption for some elements. For others, such as long-term borrowing, it probably is not, because the amount of long-term borrowing is something set by management, and it does not necessarily relate directly to the level of sales.

In this section, we describe an extended version of our simple model. The basic idea is to separate the income statement and balance sheet accounts into two groups, those that do vary directly with sales and those that do not. Given a sales forecast, we will then be able to calculate how much financing the firm will need to support the predicted sales level.

The financial planning model we describe next is based on the **percentage of sales approach**. Our goal here is to develop a quick and practical way of generating pro forma statements. We defer discussion of some “bells and whistles” to a later section.

### The Income Statement

We start out with the most recent income statement for the Rosengarten Corporation, as shown in Table 4.1. Notice we have still simplified things by including costs, depreciation, and interest in a single cost figure.

Rosengarten has projected a 25 percent increase in sales for the coming year, so we are anticipating sales of  $\$1,000 \times 1.25 = \$1,250$ . To generate a pro forma income statement, we assume that total costs will continue to run at  $\$800/1,000 = 80\%$  of sales.



ROSENGARTEN CORPORATION Income Statement	
Sales	\$1,000
Costs	<u>800</u>
Taxable income	\$ 200
Taxes (34%)	<u>68</u>
Net income	<u><u>\$ 132</u></u>
Dividends	\$44
Addition to retained earnings	88

TABLE 4.1

ROSENGARTEN CORPORATION Pro Forma Income Statement	
Sales (projected)	\$1,250
Costs (80% of sales)	<u>1,000</u>
Taxable income	\$ 250
Taxes (34%)	<u>85</u>
Net income	<u><u>\$ 165</u></u>

TABLE 4.2

With this assumption, Rosengarten's pro forma income statement is as shown in Table 4.2. The effect here of assuming that costs are a constant percentage of sales is to assume that the profit margin is constant. To check this, notice that the profit margin was  $\$132/1,000 = 13.2\%$ . In our pro forma, the profit margin is  $\$165/1,250 = 13.2\%$ ; so it is unchanged.

Next, we need to project the dividend payment. This amount is up to Rosengarten's management. We will assume Rosengarten has a policy of paying out a constant fraction of net income in the form of a cash dividend. For the most recent year, the **dividend payout ratio** was:

$$\begin{aligned} \text{Dividend payout ratio} &= \text{Cash dividends}/\text{Net income} \\ &= \$44/132 = 33 \frac{1}{3}\% \end{aligned} \quad [4.1]$$

We can also calculate the ratio of the addition to retained earnings to net income as:

$$\text{Addition to retained earnings}/\text{Net income} = \$88/132 = 66 \frac{2}{3}\%$$

This ratio is called the **retention ratio** or **plowback ratio**, and it is equal to 1 minus the dividend payout ratio because everything not paid out is retained. Assuming that the payout ratio is constant, the projected dividends and addition to retained earnings will be:

$$\begin{aligned} \text{Projected dividends paid to shareholders} &= \$165 \times 1/3 = \$ 55 \\ \text{Projected addition to retained earnings} &= \$165 \times 2/3 = \underline{110} \\ & \qquad \qquad \qquad \underline{\underline{\$165}} \end{aligned}$$

#### dividend payout ratio

The amount of cash paid out to shareholders divided by net income.

#### retention ratio

The addition to retained earnings divided by net income. Also called the plowback ratio.

TABLE 4.3

ROSENGARTEN CORPORATION Balance Sheet					
	\$	Percentage of Sales		\$	Percentage of Sales
Assets			Liabilities and Owners' Equity		
Current assets			Current liabilities		
Cash	\$ 160	16%	Accounts payable	\$ 300	30%
Accounts receivable	440	44	Notes payable	100	n/a
Inventory	600	60	Total	\$ 400	n/a
Total	\$1,200	120	Long-term debt	\$ 800	n/a
Fixed assets			Owners' equity		
Net plant and equipment	\$1,800	180	Common stock and paid-in surplus	\$ 800	n/a
			Retained earnings	1,000	n/a
			Total	\$1,800	n/a
Total assets	\$3,000	300%	Total liabilities and owners' equity	\$3,000	n/a

## The Balance Sheet

### Slide 4.12 Example: Balance Sheet

To generate a pro forma balance sheet, we start with the most recent statement, as shown in Table 4.3.

On our balance sheet, we assume that some of the items vary directly with sales and others do not. For those items that do vary with sales, we express each as a percentage of sales for the year just completed. When an item does not vary directly with sales, we write “n/a” for “not applicable.”

For example, on the asset side, inventory is equal to 60 percent of sales (\$600/1,000) for the year just ended. We assume this percentage applies to the coming year, so for each \$1 increase in sales, inventory will rise by \$.60. More generally, the ratio of total assets to sales for the year just ended is  $\$3,000/1,000 = 3$ , or 300%.

This ratio of total assets to sales is sometimes called the **capital intensity ratio**. It tells us the amount of assets needed to generate \$1 in sales; so the higher the ratio is, the more capital intensive is the firm. Notice also that this ratio is just the reciprocal of the total asset turnover ratio we defined in the last chapter.

For Rosengarten, assuming that this ratio is constant, it takes \$3 in total assets to generate \$1 in sales (apparently Rosengarten is in a relatively capital intensive business). Therefore, if sales are to increase by \$100, then Rosengarten will have to increase total assets by three times this amount, or \$300.

On the liability side of the balance sheet, we show accounts payable varying with sales. The reason is that we expect to place more orders with our suppliers as sales volume increases, so payables will change “spontaneously” with sales. Notes payable, on the other hand, represents short-term debt such as bank borrowing. This will not vary unless we take specific actions to change the amount, so we mark this item as “n/a.”

Similarly, we use “n/a” for long-term debt because it won’t automatically change with sales. The same is true for common stock and paid-in surplus. The last item on the

### capital intensity ratio

A firm’s total assets divided by its sales, or the amount of assets needed to generate \$1 in sales.

**Lecture Tip:** This is a good place at which to introduce the concepts of “spontaneous” and “nonspontaneous” financing. See IM 4.3.

TABLE 4.4

ROSENGARTEN CORPORATION Partial Pro Forma Balance Sheet					
	Present Year	Change from Previous Year		Present Year	Change from Previous Year
<b>Assets</b>			<b>Liabilities and Owners' Equity</b>		
Current assets			Current liabilities		
Cash	\$ 200	\$ 40	Accounts payable	\$ 375	\$ 75
Accounts receivable	550	110	Notes payable	100	0
Inventory	750	150	Total	\$ 475	\$ 75
Total	<u>\$1,500</u>	<u>\$300</u>	Long-term debt	<u>\$ 800</u>	<u>\$ 0</u>
Fixed assets			Owners' equity		
Net plant and equipment	<u>\$2,250</u>	<u>\$450</u>	Common stock and paid-in surplus	\$ 800	\$ 0
			Retained earnings	1,110	110
			Total	<u>\$1,910</u>	<u>\$110</u>
Total assets	<u>\$3,750</u>	<u>\$750</u>	Total liabilities and owners' equity	<u>\$3,185</u>	<u>\$185</u>
			External financing needed	<u>\$ 565</u>	<u>\$565</u>

right-hand side, retained earnings, will vary with sales, but it won't be a simple percentage of sales. Instead, we will explicitly calculate the change in retained earnings based on our projected net income and dividends.

We can now construct a partial pro forma balance sheet for Rosengarten. We do this by using the percentages we have just calculated wherever possible to calculate the projected amounts. For example, net fixed assets are 180 percent of sales; so, with a new sales level of \$1,250, the net fixed asset amount will be  $1.80 \times \$1,250 = \$2,250$ , representing an increase of  $\$2,250 - 1,800 = \$450$  in plant and equipment. It is important to note that for those items that don't vary directly with sales, we initially assume no change and simply write in the original amounts. The result is shown in Table 4.4. Notice that the change in retained earnings is equal to the \$110 addition to retained earnings we calculated earlier.

Inspecting our pro forma balance sheet, we notice that assets are projected to increase by \$750. However, without additional financing, liabilities and equity will only increase by \$185, leaving a shortfall of  $\$750 - 185 = \$565$ . We label this amount *external financing needed* (EFN).

## A Particular Scenario

Our financial planning model now reminds us of one of those good news–bad news jokes. The good news is we're projecting a 25 percent increase in sales. The bad news is this isn't going to happen unless Rosengarten can somehow raise \$565 in new financing.

This is a good example of how the planning process can point out problems and potential conflicts. If, for example, Rosengarten has a goal of not borrowing any additional funds and not selling any new equity, then a 25 percent increase in sales is probably not feasible.

**Slide 4.13 Example:**  
External Financing  
Needed

TABLE 4.5

<b>ROSENGARTEN CORPORATION</b>					
<b>Pro Forma Balance Sheet</b>					
	<b>Present Year</b>	<b>Change from Previous Year</b>		<b>Present Year</b>	<b>Change from Previous Year</b>
<b>Assets</b>	<b>Liabilities and Owners' Equity</b>				
<b>Current assets</b>			<b>Current liabilities</b>		
Cash	\$ 200	\$ 40	Accounts payable	\$ 375	\$ 75
Accounts receivable	550	110	Notes payable	<u>325</u>	<u>225</u>
Inventory	<u>750</u>	<u>150</u>	Total	<u>\$ 700</u>	<u>\$300</u>
Total	<u>\$1,500</u>	<u>\$300</u>	Long-term debt	<u>\$1,140</u>	<u>\$340</u>
<b>Fixed assets</b>			<b>Owners' equity</b>		
Net plant and equipment	<u>\$2,250</u>	<u>\$450</u>	Common stock and paid-in surplus	\$ 800	\$ 0
			Retained earnings	<u>1,110</u>	<u>110</u>
			Total	<u>\$1,910</u>	<u>\$110</u>
<b>Total assets</b>	<u>\$3,750</u>	<u>\$750</u>	<b>Total liabilities and owners' equity</b>	<u>\$3,750</u>	<u>\$750</u>

If we take the need for \$565 in new financing as given, we know that Rosengarten has three possible sources: short-term borrowing, long-term borrowing, and new equity. The choice of some combination among these three is up to management; we will illustrate only one of the many possibilities.

Suppose Rosengarten decides to borrow the needed funds. In this case, the firm might choose to borrow some over the short term and some over the long term. For example, current assets increased by \$300 whereas current liabilities rose by only \$75. Rosengarten could borrow  $\$300 - \$75 = \$225$  in short-term notes payable and leave total net working capital unchanged. With \$565 needed, the remaining  $\$565 - \$225 = \$340$  would have to come from long-term debt. Table 4.5 shows the completed pro forma balance sheet for Rosengarten.

We have used a combination of short- and long-term debt as the plug here, but we emphasize that this is just one possible strategy; it is not necessarily the best one by any means. There are many other scenarios we could (and should) investigate. The various ratios we discussed in Chapter 3 come in very handy here. For example, with the scenario we have just examined, we would surely want to examine the current ratio and the total debt ratio to see if we were comfortable with the new projected debt levels.

Now that we have finished our balance sheet, we have all of the projected sources and uses of cash. We could finish off our pro formas by drawing up the projected statement of cash flows along the lines discussed in Chapter 3. We will leave this as an exercise and instead investigate an important alternative scenario.

**Lecture Tip:** This is a good opportunity to note the importance of such factors as issuance costs, changing market rates, and agency issues in making external financing decisions. Doing so provides links between the topics in this chapter and subsequent chapters.

**Slide 4.14 Example:**  
Operating at Less than  
Full Capacity

**Concept Q Answer 4.3b**

## An Alternative Scenario

The assumption that assets are a fixed percentage of sales is convenient, but it may not be suitable in many cases. In particular, note that we effectively assumed that Rosen-

garten was using its fixed assets at 100 percent of capacity, because any increase in sales led to an increase in fixed assets. For most businesses, there would be some slack or excess capacity, and production could be increased by, perhaps, running an extra shift.

For example, in early 1999, Ford and GM both announced plans to boost truck production in response to strong sales without increasing production facilities. GM increased its 1999 production schedule by 250,000 vehicles to 975,000, a 35 percent increase over 1998. Similarly, Honda Motor Co. announced plans to boost its North American production capacity by about 100,000 vehicles over the next three years. Honda planned to achieve its expansion by making production improvements, not by building new plants. Thus, in all three cases, the auto manufacturers apparently had the capacity to expand output without adding significantly to fixed assets.

If we assume that Rosengarten is only operating at 70 percent of capacity, then the need for external funds will be quite different. When we say “70 percent of capacity,” we mean that the current sales level is 70 percent of the full-capacity sales level:

$$\text{Current sales} = \$1,000 = .70 \times \text{Full-capacity sales}$$

$$\text{Full-capacity sales} = \$1,000/.70 = \$1,429$$

This tells us that sales could increase by almost 43 percent—from \$1,000 to \$1,429—before any new fixed assets would be needed.

In our previous scenario, we assumed it would be necessary to add \$450 in net fixed assets. In the current scenario, no spending on net fixed assets is needed, because sales are projected to rise only to \$1,250, which is substantially less than the \$1,429 full-capacity level.

As a result, our original estimate of \$565 in external funds needed is too high. We estimated that \$450 in net new fixed assets would be needed. Instead, no spending on new net fixed assets is necessary. Thus, if we are currently operating at 70 percent capacity, then we need only  $\$565 - 450 = \$115$  in external funds. The excess capacity thus makes a considerable difference in our projections.

### EFN and Capacity Usage

Suppose Rosengarten were operating at 90 percent capacity. What would sales be at full capacity? What is the capital intensity ratio at full capacity? What is EFN in this case?

Full-capacity sales would be  $\$1,000/.90 = \$1,111$ . From Table 4.3, we know that fixed assets are \$1,800. At full capacity, the ratio of fixed assets to sales is thus:

$$\text{Fixed assets/Full-capacity sales} = \$1,800/1,111 = 1.62$$

This tells us that Rosengarten needs \$1.62 in fixed assets for every \$1 in sales once it reaches full capacity. At the projected sales level of \$1,250, then, it needs  $\$1,250 \times 1.62 = \$2,025$  in fixed assets. Compared to the \$2,250 we originally projected, this is \$225 less, so EFN is  $\$565 - 225 = \$340$ .

Current assets would still be \$1,500, so total assets would be  $\$1,500 + 2,025 = \$3,525$ . The capital intensity ratio would thus be  $\$3,525/1,250 = 2.82$ , less than our original value of 3 because of the excess capacity.

### EXAMPLE 4.1

These alternative scenarios illustrate that it is inappropriate to blindly manipulate financial statement information in the planning process. The results depend critically on the assumptions made about the relationships between sales and asset needs. We return to this point a little later.

## Work the Web



WWW

Calculating company growth rates can involve detailed research, and a major part of a stock analyst's job is to provide estimates of them. One place to find earnings and sales growth rates on the Web is Yahoo! Finance at [finance.yahoo.com](http://finance.yahoo.com). Here, we pulled up a quote for Minnesota Mining & Manufacturing (MMM, or 3M as it is known) and followed the "Research" link. Below you will see an abbreviated look at the results.

### Slide 4.15 Work the Web Example

Consensus Estimates				
	This Quarter (Sep 01)	Next Quarter (Sep 01)	This Year (Sep 01)	Next Year (Sep 02)
<b>Earnings Estimates</b>				
Avg Estimate	1.13	1.13	4.43	3.29
# of Analysts	70	7	11	30
Low Estimate	1.10	1.09	4.50	3.00
High Estimate	1.23	1.20	5.00	3.75
Trw Age EPS	1.18	1.23	4.43	4.43
<b>Revenue Estimates</b>				
Avg Estimate	\$4.20	\$4.20	\$17.13	\$18.40
# of Analysts	1	1	4	2
Low Estimate	\$4.20	\$4.20	\$16.98	\$18.40
High Estimate	\$4.20	\$4.20	\$17.28	\$18.58
Trw Age Sales	36A	36A	36A	\$17.13
Sales Growth			36A	8.1%

As shown, analysts expect revenue (sales) of \$17.1 billion in 2001, growing to \$18.4 billion in 2002, an increase of 8.1 percent. We also have the following table comparing MMM to some benchmarks:

Earnings Growth								
Calendar Year Range	Past 3 years	This Quarter (9/01)	Next Quarter (9/01)	This Year (2001)	Next Year (2002)	Next 5 Years	Price/Earn	PEG Ratio
Minnesota Mining Manufacturing	3.9%	-4.2%	-4.0%	-1.9%	14.3%	12.0%	25.1	2.16
Industry	36A	6.3%	11.4%	6.3%	9.5%	14.2%	25.52	1.72
Sector	36A	-4.6%	7.7%	-3.7%	24.2%	14.50%	25.64	1.77
S&P 500	36A	-4.8%	5.3%	-4.3%	19.4%	13.2%	24.02	1.80

As you can see, the estimated earnings growth rate for MMM is slightly lower than the industry, sector, and S&P 500 over the next five years. What does this mean for MMM stock? We'll get to that in a later chapter. Here is an assignment for you: What's a PEG ratio? Locate a financial glossary on the Web (there are lots of them) to find out.

One thing should be clear by now. Projected growth rates play an important role in the planning process. They are also important to outside analysts and potential investors. Our nearby *Work the Web* box shows you how to obtain growth rate estimates for real companies.

### CONCEPT QUESTIONS

- 4.3a** What is the basic idea behind the percentage of sales approach?
- 4.3b** Unless it is modified, what does the percentage of sales approach assume about fixed asset capacity usage?

## EXTERNAL FINANCING AND GROWTH

### 4.4

External financing needed and growth are obviously related. All other things staying the same, the higher the rate of growth in sales or assets, the greater will be the need for external financing. In the previous section, we took a growth rate as given, and then we determined the amount of external financing needed to support that growth. In this section, we turn things around a bit. We will take the firm's financial policy as given and then examine the relationship between that financial policy and the firm's ability to finance new investments and thereby grow.

Once again, we emphasize that we are focusing on growth not because growth is an appropriate goal; instead, for our purposes, growth is simply a convenient means of examining the interactions between investment and financing decisions. In effect, we assume that the use of growth as a basis for planning is just a reflection of the very high level of aggregation used in the planning process.

### EFN and Growth

The first thing we need to do is establish the relationship between EFN and growth. To do this, we introduce the simplified income statement and balance sheet for the Hoffman Company in Table 4.6. Notice we have simplified the balance sheet by combining short-term and long-term debt into a single total debt figure. Effectively, we are assuming that none of the current liabilities vary spontaneously with sales. This assumption isn't as restrictive as it sounds. If any current liabilities (such as accounts payable) vary with sales, we can assume that any such accounts have been netted out in current assets. Also, we continue to combine depreciation, interest, and costs on the income statement.

**Self-Test Problem 4.3**

**Critical Thinking Questions 3, 4, 8**

**Problems 6–8, 12–15, 18–24, 26–30**

**Lecture Tip:** IM 4.4 discusses the relative importance of external financing and growth to firms in the early stages of the life cycle.

**Slide 4.16** Growth and External Financing

**Lecture Tip:** IM 4.4 provides some interesting background information on external financing and high-growth firms.

**TABLE 4.6**

<b>HOFFMAN COMPANY</b>					
<b>Income Statement and Balance Sheet</b>					
<b>Income Statement</b>					
	Sales			\$500	
	Costs			<u>400</u>	
	Taxable income			\$100	
	Taxes (34%)			<u>34</u>	
	Net income			<u>\$ 66</u>	
	Dividends		\$22		
	Addition to retained earnings		44		
<b>Balance Sheet</b>					
	\$	Percentage of Sales		\$	Percentage of Sales
<b>Assets</b>			<b>Liabilities and Owners' Equity</b>		
Current assets	\$200	40%	Total debt	\$250	n/a
Net fixed assets	<u>300</u>	<u>60</u>	Owners' equity	<u>250</u>	<u>n/a</u>
Total assets	<u>\$500</u>	<u>100%</u>	Total liabilities and owners' equity	<u>\$500</u>	<u>n/a</u>

TABLE 4.7

<b>HOFFMAN COMPANY</b>					
<b>Pro Forma Income Statement and Balance Sheet</b>					
<b>Income Statement</b>					
Sales (projected)				\$600.0	
Costs (80% of sales)				480.0	
Taxable income				\$120.0	
Taxes (34%)				40.8	
Net income				<u>\$ 79.2</u>	
Dividends			\$26.4		
Addition to retained earnings			52.8		
<b>Balance Sheet</b>					
	\$	Percentage of Sales		\$	Percentage of Sales
<b>Assets</b>			<b>Liabilities and Owners' Equity</b>		
Current assets	\$240.0	40%	Total debt	\$250.0	n/a
Net fixed assets	<u>360.0</u>	<u>60</u>	Owners' equity	<u>302.8</u>	<u>n/a</u>
Total assets	<u>\$600.0</u>	<u>100%</u>	Total liabilities and owners' equity	<u>\$552.8</u>	<u>n/a</u>
			External financing needed	<u>\$ 47.2</u>	<u>n/a</u>

Suppose the Hoffman Company is forecasting next year's sales level at \$600, a \$100 increase. Notice that the percentage increase in sales is  $\$100/\$500 = 20\%$ . Using the percentage of sales approach and the figures in Table 4.6, we can prepare a pro forma income statement and balance sheet as in Table 4.7. As Table 4.7 illustrates, at a 20 percent growth rate, Hoffman needs \$100 in new assets (assuming full capacity). The projected addition to retained earnings is \$52.8, so the external financing needed, EFN, is  $\$100 - \$52.8 = \$47.2$ .

Notice that the debt-equity ratio for Hoffman was originally (from Table 4.6) equal to  $\$250/\$250 = 1.0$ . We will assume that the Hoffman Company does not wish to sell new equity. In this case, the \$47.2 in EFN will have to be borrowed. What will the new debt-equity ratio be? From Table 4.7, we know that total owners' equity is projected at \$302.8. The new total debt will be the original \$250 plus \$47.2 in new borrowing, or \$297.2 total. The debt-equity ratio thus falls slightly from 1.0 to  $\$297.2/\$302.8 = .98$ .

Table 4.8 shows EFN for several different growth rates. The projected addition to retained earnings and the projected debt-equity ratio for each scenario are also given (you should probably calculate a few of these for practice). In determining the debt-equity ratios, we assumed that any needed funds were borrowed, and we also assumed any surplus funds were used to pay off debt. Thus, for the zero growth case, the debt falls by \$44, from \$250 to \$206. In Table 4.8, notice that the increase in assets required is simply equal to the original assets of \$500 multiplied by the growth rate. Similarly, the addition to retained earnings is equal to the original \$44 plus \$44 times the growth rate.

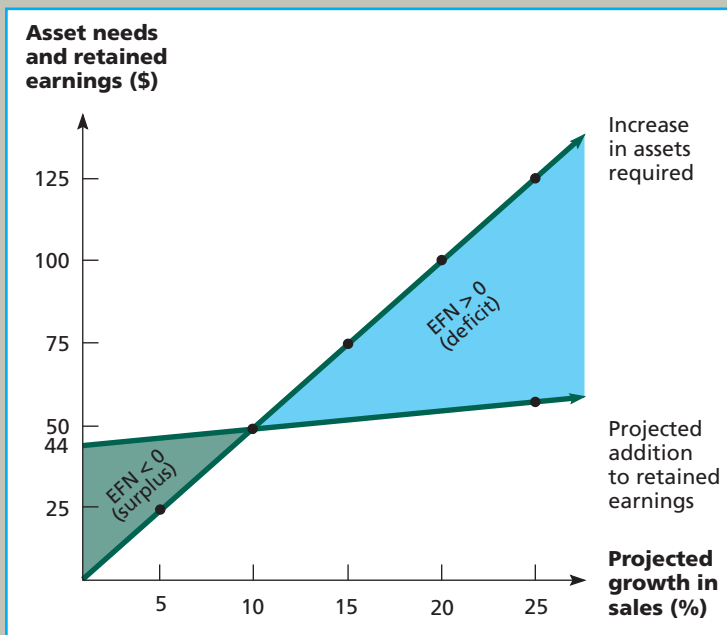
Table 4.8 shows that for relatively low growth rates, Hoffman will run a surplus, and its debt-equity ratio will decline. Once the growth rate increases to about 10 percent, however, the surplus becomes a deficit. Furthermore, as the growth rate exceeds approximately 20 percent, the debt-equity ratio passes its original value of 1.0.



Projected Sales Growth	Increase in Assets Required	Addition to Retained Earnings	External Financing Needed, EFN	Projected Debt-Equity Ratio
0%	\$ 0	\$44.0	-\$44.0	.70
5	25	46.2	- 21.2	.77
10	50	48.4	1.6	.84
15	75	50.6	24.4	.91
20	100	52.8	47.2	.98
25	125	55.0	70.0	1.05

**TABLE 4.8**

Growth and Projected EFN for the Hoffman Company

**FIGURE 4.1**

Growth and Related Financing Needed for the Hoffman Company

Figure 4.1 illustrates the connection between growth in sales and external financing needed in more detail by plotting asset needs and additions to retained earnings from Table 4.8 against the growth rates. As shown, the need for new assets grows at a much faster rate than the addition to retained earnings, so the internal financing provided by the addition to retained earnings rapidly disappears.

As this discussion shows, whether a firm runs a cash surplus or deficit depends on growth. For example, in the early 1990s, electronics manufacturer Hewlett-Packard achieved growth rates in sales well above 20 percent annually. However, from 1996 to 1997, HP's growth slowed to 12 percent. You might think that such a slowdown would mean that HP would experience cash flow problems. However, according to HP, this slower growth actually increased its cash generation, leading to a record cash balance of \$5.3 billion in late 1998, nearly double the year-earlier figure. Although much of the cash came from reductions in inventory, the firm had also decreased its spending for business expansion.

## Financial Policy and Growth

Based on our discussion just preceding, we see that there is a direct link between growth and external financing. In this section, we discuss two growth rates that are particularly useful in long-range planning.

### internal growth rate

The maximum growth rate a firm can achieve without external financing of any kind.

### Slide 4.17 The Internal Growth Rate

**The Internal Growth Rate** The first growth rate of interest is the maximum growth rate that can be achieved with no external financing of any kind. We will call this the **internal growth rate** because this is the rate the firm can maintain with internal financing only. In Figure 4.1, this internal growth rate is represented by the point where the two lines cross. At this point, the required increase in assets is exactly equal to the addition to retained earnings, and EFN is therefore zero. We have seen that this happens when the growth rate is slightly less than 10 percent. With a little algebra (see Problem 30 at the end of the chapter), we can define this growth rate more precisely as:

$$\text{Internal growth rate} = \frac{\text{ROA} \times b}{1 - \text{ROA} \times b} \quad [4.2]$$

where ROA is the return on assets we discussed in Chapter 3, and  $b$  is the plowback, or retention, ratio defined earlier in this chapter.

For the Hoffman Company, net income was \$66 and total assets were \$500. ROA is thus  $\$66/\$500 = 13.2\%$ . Of the \$66 net income, \$44 was retained, so the plowback ratio,  $b$ , is  $\$44/\$66 = 2/3$ . With these numbers, we can calculate the internal growth rate as:

$$\begin{aligned} \text{Internal growth rate} &= \frac{\text{ROA} \times b}{1 - \text{ROA} \times b} \\ &= \frac{.132 \times (2/3)}{1 - .132 \times (2/3)} \\ &= 9.65\% \end{aligned}$$

**Lecture Tip:** In other words, if sales increase by 9.65% (to \$548.25), the increase in assets required is \$48.25 ( $\$500 \times .0965$ ), which equals the addition to retained earnings.

Thus, the Hoffman Company can expand at a maximum rate of 9.65 percent per year without external financing.

### Slide 4.18 The Sustainable Growth Rate

### sustainable growth rate

The maximum growth rate a firm can achieve without external equity financing while maintaining a constant debt-equity ratio.

**The Sustainable Growth Rate** We have seen that if the Hoffman Company wishes to grow more rapidly than at a rate of 9.65 percent per year, then external financing must be arranged. The second growth rate of interest is the maximum growth rate a firm can achieve with no external *equity* financing while it maintains a constant debt-equity ratio. This rate is commonly called the **sustainable growth rate** because it is the maximum rate of growth a firm can maintain without increasing its financial leverage.

There are various reasons why a firm might wish to avoid equity sales. For example, as we discuss in Chapter 15, new equity sales can be very expensive. Alternatively, the current owners may not wish to bring in new owners or contribute additional equity. Why a firm might view a particular debt-equity ratio as optimal is discussed in Chapters 14 and 16; for now, we will take it as given.

Based on Table 4.8, the sustainable growth rate for Hoffman is approximately 20 percent because the debt-equity ratio is near 1.0 at that growth rate. The precise value can be calculated as (see Problem 30 at the end of the chapter):

$$\text{Sustainable growth rate} = \frac{\text{ROE} \times b}{1 - \text{ROE} \times b} \quad [4.3]$$

### Concept Q Answer 4.4b

This is identical to the internal growth rate except that ROE, return on equity, is used instead of ROA.

For the Hoffman Company, net income was \$66 and total equity was \$250; ROE is thus  $\$66/\$250 = 26.4$  percent. The plowback ratio,  $b$ , is still  $2/3$ , so we can calculate the sustainable growth rate as:

$$\begin{aligned} \text{Sustainable growth rate} &= \frac{\text{ROE} \times b}{1 - \text{ROE} \times b} \\ &= \frac{.264 \times (2/3)}{1 - .264 \times (2/3)} \\ &= 21.36\% \end{aligned}$$

Thus, the Hoffman Company can expand at a maximum rate of 21.36 percent per year without external equity financing.

**Lecture Tip:** Some reasons for reluctance to issue equity are detailed in IM 4.4.

**Lecture Tip:** The commonly used sustainable growth rate formula,  $\text{SGR} = \text{ROE} \times b$ , is correct only if ROE is calculated as Net income/Beginning equity; otherwise it's an approximation. The same is true for IGR.

### Sustainable Growth

Suppose Hoffman grows at exactly the sustainable growth rate of 21.36 percent. What will the pro forma statements look like?

At a 21.36 percent growth rate, sales will rise from \$500 to \$606.8. The pro forma income statement will look like this:

### EXAMPLE 4.2

HOFFMAN COMPANY Pro Forma Income Statement	
Sales (projected)	\$606.8
Costs (80% of sales)	485.4
Taxable income	\$121.4
Taxes (34%)	41.3
Net income	\$ 80.1
Dividends	\$26.7
Addition to retained earnings	53.4

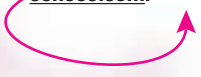
We construct the balance sheet just as we did before. Notice, in this case, that owners' equity will rise from \$250 to \$303.4 because the addition to retained earnings is \$53.4.

HOFFMAN COMPANY Pro Forma Balance Sheet					
	\$	Percentage of Sales		\$	Percentage of Sales
<b>Assets</b>			<b>Liabilities and Owners' Equity</b>		
Current assets	\$242.7	40%	Total debt	\$250.0	n/a
Net fixed assets	364.1	60	Owners' equity	303.4	n/a
Total assets	\$606.8	100%	Total liabilities and owners' equity	\$553.4	n/a
			External financing needed	\$ 53.4	n/a

As illustrated, EFN is \$53.4. If Hoffman borrows this amount, then total debt will rise to \$303.4, and the debt-equity ratio will be exactly 1.0, which verifies our earlier calculation. At any other growth rate, something would have to change.

**Slide 4.19** Determinants of Growth

To see how one company thinks about sustainable growth, see [www.sustainablegrowth.conoco.com](http://www.sustainablegrowth.conoco.com).



**Determinants of Growth** In the last chapter, we saw that the return on equity, ROE, could be decomposed into its various components using the Du Pont identity. Because ROE appears so prominently in the determination of the sustainable growth rate, it is obvious that the factors important in determining ROE are also important determinants of growth.

From Chapter 3, we know that ROE can be written as the product of three factors:

$$\text{ROE} = \text{Profit margin} \times \text{Total asset turnover} \times \text{Equity multiplier}$$

If we examine our expression for the sustainable growth rate, we see that anything that increases ROE will increase the sustainable growth rate by making the top bigger and the bottom smaller. Increasing the plowback ratio will have the same effect.

Putting it all together, what we have is that a firm's ability to sustain growth depends explicitly on the following four factors:

**Concept Q Answer 4.4a**

1. Profit margin. An increase in profit margin will increase the firm's ability to generate funds internally and thereby increase its sustainable growth.
2. Dividend policy. A decrease in the percentage of net income paid out as dividends will increase the retention ratio. This increases internally generated equity and thus increases sustainable growth.
3. Financial policy. An increase in the debt-equity ratio increases the firm's financial leverage. Because this makes additional debt financing available, it increases the sustainable growth rate.
4. Total asset turnover. An increase in the firm's total asset turnover increases the sales generated for each dollar in assets. This decreases the firm's need for new assets as sales grow and thereby increases the sustainable growth rate. Notice that increasing total asset turnover is the same thing as decreasing capital intensity.

The sustainable growth rate is a very useful planning number. What it illustrates is the explicit relationship between the firm's four major areas of concern: its operating efficiency as measured by profit margin, its asset use efficiency as measured by total asset turnover, its dividend policy as measured by the retention ratio, and its financial policy as measured by the debt-equity ratio.

Given values for all four of these, there is only one growth rate that can be achieved. This is an important point, so it bears restating:

**If a firm does not wish to sell new equity and its profit margin, dividend policy, financial policy, and total asset turnover (or capital intensity) are all fixed, then there is only one possible growth rate.**

**Lecture Tip:** IM 4.4 lists other factors that should be taken into account in undertaking sales growth as a firm's goal.

As we described early in this chapter, one of the primary benefits of financial planning is that it ensures internal consistency among the firm's various goals. The concept of the sustainable growth rate captures this element nicely. Also, we now see how a financial planning model can be used to test the feasibility of a planned growth rate. If sales are to grow at a rate higher than the sustainable growth rate, the firm must increase profit margins, increase total asset turnover, increase financial leverage, increase earnings retention, or sell new shares.

The two growth rates, internal and sustainable, are summarized in Table 4.9.



## Robert C. Higgins on Sustainable Growth

**Most financial officers** know intuitively that it takes money to make money. Rapid sales growth requires increased assets in the form of accounts receivable,

inventory, and fixed plant, which, in turn, require money to pay for assets. They also know that if their company does not have the money when needed, it can literally “grow broke.” The sustainable growth equation states these intuitive truths explicitly.

Sustainable growth is often used by bankers and other external analysts to assess a company’s creditworthiness. They are aided in this exercise by several sophisticated computer software packages that provide detailed analyses of the company’s past financial performance, including its annual sustainable growth rate.

Bankers use this information in several ways. Quick comparison of a company’s actual growth rate to its sustainable rate tells the banker what issues will be at the top of management’s financial agenda. If actual growth consistently exceeds sustainable growth,

management’s problem will be where to get the cash to finance growth. The banker thus can anticipate interest in loan products. Conversely, if sustainable growth consistently exceeds actual, the banker had best be prepared to talk about investment products, because management’s problem will be what to do with all the cash that keeps piling up in the till.

Bankers also find the sustainable growth equation useful for explaining to financially inexperienced small business owners and overly optimistic entrepreneurs that, for the long-run viability of their business, it is necessary to keep growth and profitability in proper balance.

Finally, comparison of actual to sustainable growth rates helps a banker understand why a loan applicant needs money and for how long the need might continue. In one instance, a loan applicant requested \$100,000 to pay off several insistent suppliers and promised to repay in a few months when he collected some accounts receivable that were coming due. A sustainable growth analysis revealed that the firm had been growing at four to six times its sustainable growth rate and that this pattern was likely to continue in the foreseeable future. This alerted the banker to the fact that impatient suppliers were only a symptom of the much more fundamental disease of overly rapid growth, and that a \$100,000 loan would likely prove to be only the down payment on a much larger, multiyear commitment.

Robert C. Higgins is Professor of Finance at the University of Washington. He pioneered the use of sustainable growth as a tool for financial analysis.

### I. Internal growth rate

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

where

ROA = Return on assets = Net income/Total assets

$b$  = Plowback (retention) ratio  
= Addition to retained earnings/Net income

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

### II. Sustainable growth rate

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

where

ROE = Return on equity = Net income/Total equity

$b$  = Plowback (retention) ratio  
= Addition to retained earnings/Net income

The sustainable growth rate is the maximum growth rate than can be achieved with no external equity financing while maintaining a constant debt-equity ratio.

**TABLE 4.9**

Summary of Internal and Sustainable Growth Rates

**EXAMPLE 4.3****Profit Margins and Sustainable Growth**

The Sandar Co. has a debt-equity ratio of .5, a profit margin of 3 percent, a dividend payout ratio of 40 percent, and a capital intensity ratio of 1. What is its sustainable growth rate? If Sandar desired a 10 percent sustainable growth rate and planned to achieve this goal by improving profit margins, what would you think?

ROE is  $.03 \times 1 \times 1.5 = 4.5$  percent. The retention ratio is  $1 - .40 = .60$ . Sustainable growth is thus  $.045(.60)/[1 - .045(.60)] = 2.77$  percent.

For the company to achieve a 10 percent growth rate, the profit margin will have to rise. To see this, assume that sustainable growth is equal to 10 percent and then solve for profit margin, PM:

$$.10 = \text{PM}(1.5)(.6)/[1 - \text{PM}(1.5)(.6)]$$

$$\text{PM} = .1/.99 = 10.1\%$$

For the plan to succeed, the necessary increase in profit margin is substantial, from 3 percent to about 10 percent. This may not be feasible.

**CONCEPT QUESTIONS**

**4.4a** What are the determinants of growth?

**4.4b** How is a firm's sustainable growth related to its accounting return on equity (ROE)?

## SOME CAVEATS REGARDING FINANCIAL PLANNING MODELS

### 4.5

**Concept Q Answer 4.5a**

**Lecture Tip:** It should be noted here that financial planning models of the type described in this chapter do not replace the *cash budget* for forecasting cash inflows and outflows.

**Concept Q Answer 4.5b**

**Lecture Tip:** Apropos of this, the founder of a high-tech firm recently told one of the author's classes that "obtaining capital is easy—managing rapid growth is hard."

**Slide 4.20 Important Questions**

Financial planning models do not always ask the right questions. A primary reason is that they tend to rely on accounting relationships and not financial relationships. In particular, the three basic elements of firm value tend to get left out, namely, cash flow size, risk, and timing.

Because of this, financial planning models sometimes do not produce output that gives the user many meaningful clues about what strategies will lead to increases in value. Instead, they divert the user's attention to questions concerning the association of, say, the debt-equity ratio and firm growth.

The financial model we used for the Hoffman Company was simple—in fact, too simple. Our model, like many in use today, is really an accounting statement generator at heart. Such models are useful for pointing out inconsistencies and reminding us of financial needs, but they offer very little guidance concerning what to do about these problems.

In closing our discussion, we should add that financial planning is an iterative process. Plans are created, examined, and modified over and over. The final plan will be a result negotiated between all the different parties to the process. In fact, long-term financial planning in most corporations relies on what might be called the Procrustes approach.<sup>1</sup> Upper-level management has a goal in mind, and it is up to the planning staff to rework and to ultimately deliver a feasible plan that meets that goal.

<sup>1</sup>In Greek mythology, Procrustes is a giant who seizes travelers and ties them to an iron bed. He stretches them or cuts off their legs as needed to make them fit the bed.

The final plan will therefore implicitly contain different goals in different areas and also satisfy many constraints. For this reason, such a plan need not be a dispassionate assessment of what we think the future will bring; it may instead be a means of reconciling the planned activities of different groups and a way of setting common goals for the future.

### CONCEPT QUESTIONS

- 4.5a** What are some important elements that are often missing in financial planning models?
- 4.5b** Why do we say planning is an iterative process?

## SUMMARY AND CONCLUSIONS

### 4.6

Slide 4.21 Quick Quiz

Financial planning forces the firm to think about the future. We have examined a number of features of the planning process. We described what financial planning can accomplish and the components of a financial model. We went on to develop the relationship between growth and financing needs, and we discussed how a financial planning model is useful in exploring that relationship.

Corporate financial planning should not become a purely mechanical activity. If it does, it will probably focus on the wrong things. In particular, plans all too often are formulated in terms of a growth target with no explicit linkage to value creation, and they frequently are overly concerned with accounting statements. Nevertheless, the alternative to financial planning is stumbling into the future. Perhaps the immortal Yogi Berra (the baseball catcher, not the cartoon character) put it best when he said, “Ya gotta watch out if you don’t know where you’re goin’. You just might not get there.”<sup>2</sup>

## Chapter Review and Self-Test Problems

- 4.1 Calculating EFN** Based on the following information for the Skandia Mining Company, what is EFN if sales are predicted to grow by 10 percent? Use the percentage of sales approach and assume the company is operating at full capacity. The payout ratio is constant.

SKANDIA MINING COMPANY Financial Statements						
Income Statement			Balance Sheet			
			Assets		Liabilities and Owners' Equity	
Sales	\$4,250.0		Current assets	\$ 900.0	Current liabilities	\$ 500.0
Costs	<u>3,875.0</u>		Net fixed assets	<u>2,200.0</u>	Long-term debt	1,800.0
Taxable income	\$ 375.0		Total	<u>\$3,100.0</u>	Owners' equity	<u>800.0</u>
Taxes (34%)	<u>127.5</u>				Total liabilities and owners' equity	<u>\$3,100.0</u>
Net income	<u>\$ 247.5</u>					
Dividends	\$ 82.6					
Addition to retained earnings	164.9					

<sup>2</sup>We're not *exactly* sure what this means either, but we like the sound of it.

- 4.2 EFN and Capacity Use** Based on the information in Problem 4.1, what is EFN, assuming 60 percent capacity usage for net fixed assets? Assuming 95 percent capacity?
- 4.3 Sustainable Growth** Based on the information in Problem 4.1, what growth rate can Skandia maintain if no external financing is used? What is the sustainable growth rate?

## Answers to Chapter Review and Self-Test Problems

- 4.1** We can calculate EFN by preparing the pro forma statements using the percentage of sales approach. Note that sales are forecasted to be  $\$4,250 \times 1.10 = \$4,675$ .

SKANDIA MINING COMPANY Pro Forma Financial Statements					
Income Statement					
Sales	\$4,675.0		Forecast		
Costs	4,262.7		91.18% of sales		
Taxable income	\$ 412.3				
Taxes (34%)	140.2				
Net income	\$ 272.1				
Dividends	\$ 90.8		33.37% of net income		
Addition to retained earnings	181.3				
Balance Sheet					
Assets			Liabilities and Owners' Equity		
Current assets	\$ 990.0	21.18%	Current liabilities	\$ 550	11.76%
Net fixed assets	2,420.0	51.76%	Long-term debt	1,800.0	n/a
Total assets	\$3,410.0	72.94%	Owners' equity	981.3	n/a
			Total liabilities and owners' equity	\$3,331.3	n/a
			EFN	\$ 78.7	n/a

- 4.2** Full-capacity sales are equal to current sales divided by the capacity utilization. At 60 percent of capacity:

$$\$4,250 = .60 \times \text{Full-capacity sales}$$

$$\$7,083 = \text{Full-capacity sales}$$

With a sales level of \$4,675, no net new fixed assets will be needed, so our earlier estimate is too high. We estimated an increase in fixed assets of  $\$2,420 - 2,200 = \$220$ . The new EFN will thus be  $\$78.7 - 220 = -\$141.3$ , a surplus. No external financing is needed in this case.

At 95 percent capacity, full-capacity sales are \$4,474. The ratio of fixed assets to full-capacity sales is thus  $\$2,200/\$4,474 = 49.17\%$ . At a sales level of \$4,675, we will thus need  $\$4,675 \times .4917 = \$2,298.7$  in net fixed assets, an increase of  $\$98.7$ . This is  $\$220 - 98.7 = \$121.3$  less than we originally predicted, so the EFN is now  $\$78.7 - 121.3 = -\$42.6$ , a surplus. No additional financing is needed.



- 4.3 Skandia retains  $b = 1 - .3337 = 66.63\%$  of net income. Return on assets is  $\$247.5/3,100 = 7.98\%$ . The internal growth rate is:

$$\frac{\text{ROA} \times b}{1 - \text{ROA} \times b} = \frac{.0798 \times .6663}{1 - .0798 \times .6663} \\ = 5.62\%$$

Return on equity for Skandia is  $\$247.5/800 = 30.94\%$ , so we can calculate the sustainable growth rate as:

$$\frac{\text{ROE} \times b}{1 - \text{ROE} \times b} = \frac{.3094 \times .6663}{1 - .3094 \times .6663} \\ = 25.97\%$$

## Concepts Review and Critical Thinking Questions

- Sales Forecast** Why do you think most long-term financial planning begins with sales forecasts? Put differently, why are future sales the key input?
- Long Range Financial Planning** Would long-range financial planning be more important for a capital intensive company, such as a heavy equipment manufacturer, or an import-export business? Why?
- External Financing Needed** Testaburger, Inc., uses no external financing and maintains a positive retention ratio. When sales grow by 15 percent, the firm has a negative projected EFN. What does this tell you about the firm's internal growth rate? How about the sustainable growth rate? At this same level of sales growth, what will happen to the projected EFN if the retention ratio is increased? What if the retention ratio is decreased? What happens to the projected EFN if the firm pays out all of its earnings in the form of dividends?
- EFN and Growth Rates** Broslofski Co. maintains a positive retention ratio and keeps its debt-equity ratio constant every year. When sales grow by 20 percent, the firm has a negative projected EFN. What does this tell you about the firm's sustainable growth rate? Do you know, with certainty, if the internal growth rate is greater than or less than 20 percent? Why? What happens to the projected EFN if the retention ratio is increased? What if the retention ratio is decreased? What if the retention ratio is zero?

Use the following information to answer the next six questions: A small business called The Grandmother Calendar Company began selling personalized photo calendar kits in 1992. The kits were a hit, and sales soon sharply exceeded forecasts. The rush of orders created a huge backlog, so the company leased more space and expanded capacity, but it still could not keep up with demand. Equipment failed from overuse and quality suffered. Working capital was drained to expand production, and, at the same time, payments from customers were often delayed until the product was shipped. Unable to deliver on orders, the company became so strapped for cash that employee paychecks began to bounce. Finally, out of cash, the company ceased operations entirely in January 1995.

- Product Sales** Do you think the company would have suffered the same fate if its product had been less popular? Why or why not?
- Cash Flow** The Grandmother Calendar Company clearly had a cash flow problem. In the context of the cash flow analysis we developed in Chapter 2, what was the impact of customers' not paying until orders were shipped?

7. **Product Pricing** The firm actually priced its product to be about 20 percent less than that of competitors, even though the Grandmother calendar was more detailed. In retrospect, was this a wise choice?
8. **Corporate Borrowing** If the firm was so successful at selling, why wouldn't a bank or some other lender step in and provide it with the cash it needed to continue?
9. **Cash Flow** Which is the biggest culprit here: too many orders, too little cash, or too little production capacity?
10. **Cash Flow** What are some of the actions that a small company like The Grandmother Calendar Company can take if it finds itself in a situation in which growth in sales outstrips production capacity and available financial resources? What other options (besides expansion of capacity) are available to a company when orders exceed capacity?

## Questions and Problems

### Basic

(Questions 1–15)

Dividends = \$4,250

1. **Pro Forma Statements** Consider the following simplified financial statements for the Lafferty Ranch Corporation (assuming no income taxes):

Income Statement		Balance Sheet			
Sales	\$15,000	Assets	\$4,300	Debt	\$2,800
Costs	<u>11,000</u>			Equity	<u>1,500</u>
Net income	<u>\$ 4,000</u>	Total	<u>\$4,300</u>	Total	<u>\$4,300</u>

Lafferty Ranch has predicted a sales increase of 10 percent. It has predicted that every item on the balance sheet will increase by 10 percent as well. Create the pro forma statements and reconcile them. What is the plug variable here?

2. **Pro Forma Statements and EFN** In the previous question, assume Lafferty Ranch pays out half of net income in the form of a cash dividend. Costs and assets vary with sales, but debt and equity do not. Prepare the pro forma statements and determine the external financing needed.
3. **Calculating EFN** The most recent financial statements for Bradley's Bagels, Inc., are shown here (assuming no income taxes):

Income Statement		Balance Sheet			
Sales	\$3,800	Assets	\$13,300	Debt	\$ 9,200
Costs	<u>1,710</u>			Equity	<u>4,100</u>
Net income	<u>\$2,090</u>	Total	<u>\$13,300</u>	Total	<u>\$13,300</u>

Assets and costs are proportional to sales. Debt and equity are not. No dividends are paid. Next year's sales are projected to be \$5,320. What is the external financing needed?

4. **EFN** The most recent financial statements for Schism, Inc., are shown here:

EFN = -\$1,770

EFN = \$2,394

EFN = \$22,045.63

Income Statement		Balance Sheet			
Sales	\$19,200	Assets	\$93,000	Debt	\$20,400
Costs	<u>15,550</u>			Equity	<u>72,600</u>
Taxable income	\$ 3,650	Total	<u>\$93,000</u>	Total	<u>\$93,000</u>
Taxes (34%)	<u>1,241</u>				
Net income	<u>\$ 2,409</u>				

**Basic***(continued)*

Assets and costs are proportional to sales. Debt and equity are not. A dividend of \$1,445.40 was paid, and Schism wishes to maintain a constant payout ratio. Next year's sales are projected to be \$24,000. What is the external financing needed?

5. **EFN** The most recent financial statements for 2 Doors Down, Inc., are shown here:

EFN = \$808.60

Income Statement		Balance Sheet			
Sales	\$3,100	Current assets	\$4,000	Current liabilities	\$ 750
Costs	<u>2,600</u>	Fixed assets	3,000	Long-term debt	1,250
Taxable income	\$ 500			Equity	<u>5,000</u>
Taxes (34%)	<u>170</u>	Total	<u>\$7,000</u>	Total	<u>\$7,000</u>
Net income	<u>\$ 330</u>				

Assets, costs, and current liabilities are proportional to sales. Long-term debt and equity are not. 2 Doors Down maintains a constant 50 percent dividend payout ratio. Like every other firm in its industry, next year's sales are projected to increase by exactly 16%. What is the external financing needed?

6. **Calculating Internal Growth** The most recent financial statements for Barely Heroes Co. are shown here:

Internal growth rate = 4.03%

Income Statement		Balance Sheet			
Sales	\$6,475	Current assets	\$ 9,000	Debt	\$22,000
Costs	<u>3,981</u>	Fixed assets	<u>25,000</u>	Equity	<u>12,000</u>
Taxable income	\$2,494	Total	<u>\$34,000</u>	Total	<u>\$34,000</u>
Taxes (34%)	<u>848</u>				
Net income	<u>\$1,646</u>				

Assets and costs are proportional to sales. Debt and equity are not. Barely Heroes maintains a constant 20 percent dividend payout ratio. No external equity financing is possible. What is the internal growth rate?

7. **Calculating Sustainable Growth** For the company in the previous problem, what is the sustainable growth rate?
8. **Sales and Growth** The most recent financial statements for Tool Co. are shown here:

Sustainable growth rate = 12.33%

Maximum increase in sales = \$6,163.11

**Basic**

(continued)

Income Statement		Balance Sheet			
Sales	\$46,000	Net working capital	\$ 21,000	Long-term debt	\$ 60,000
Costs	<u>30,400</u>	Fixed assets	<u>100,000</u>	Equity	<u>61,000</u>
Taxable income	\$15,600	Total	<u>\$121,000</u>	Total	<u>\$121,000</u>
Taxes (34%)	<u>5,304</u>				
Net income	<u>\$10,296</u>				

Assets and costs are proportional to sales. Tool Co. maintains a constant 30 percent dividend payout ratio and a constant debt-equity ratio. What is the maximum increase in sales that can be sustained assuming no new equity is issued?

Addition to retained earnings = \$5,404.80

9. **Calculating Retained Earnings from Pro Forma Income** Consider the following income statement for the Heir Jordan Corporation:

HEIR JORDAN CORPORATION Income Statement	
Sales	\$24,000
Costs	<u>13,500</u>
Taxable income	\$10,500
Taxes (34%)	<u>3,570</u>
Net income	<u>\$ 6,930</u>
Dividends	\$2,426
Addition to retained earnings	4,504

A 20 percent growth rate in sales is projected. Prepare a pro forma income statement assuming costs vary with sales and the dividend payout ratio is constant. What is the projected addition to retained earnings?

10. **Applying Percentage of Sales** The balance sheet for the Heir Jordan Corporation follows. Based on this information and the income statement in the previous problem, supply the missing information using the percentage of sales approach. Assume that accounts payable vary with sales, whereas notes payable do not. Put "n/a" where needed.

HEIR JORDAN CORPORATION Balance Sheet					
	\$	Percentage of Sales		\$	Percentage of Sales
<b>Assets</b>			<b>Liabilities and Owners' Equity</b>		
Current assets			Current liabilities		
Cash	\$ 3,525	_____	Accounts payable	\$ 3,000	_____
Accounts receivable	7,500	_____	Notes payable	<u>7,500</u>	_____
Inventory	<u>6,000</u>	_____	Total	<u>\$10,500</u>	_____
Total	<u>\$17,025</u>	_____	Long-term debt	<u>\$19,500</u>	_____
Fixed assets			Owners' equity		
Net plant and equipment	<u>\$30,000</u>	_____	Common stock and paid-in surplus	\$15,000	_____
Total assets	<u>\$47,025</u>	_____	Retained earnings	<u>2,025</u>	_____
			Total	<u>\$17,025</u>	_____
			Total liabilities and owners' equity	<u>\$47,025</u>	_____

11. **EFN and Sales** From the previous two questions, prepare a pro forma balance sheet showing EFN, assuming a 15 percent increase in sales and no new external debt or equity financing.
12. **Internal Growth** If Highfield Hobby Shop has a 12 percent ROA and a 25 percent payout ratio, what is its internal growth rate?
13. **Sustainable Growth** If the Hlinka Corp. has an 18 percent ROE and a 30 percent payout ratio, what is its sustainable growth rate?
14. **Sustainable Growth** Based on the following information, calculate the sustainable growth rate for Kovalev's Kickboxing:

Profit margin	= 9.2%
Capital intensity ratio	= .60
Debt-equity ratio	= .50
Net income	= \$23,000
Dividends	= \$14,000

What is the ROE here?

15. **Sustainable Growth** Assuming the following ratios are constant, what is the sustainable growth rate?

Total asset turnover	= 1.60
Profit margin	= 7.5%
Equity multiplier	= 1.95
Payout ratio	= 40%

16. **Full-Capacity Sales** Straka Mfg., Inc., is currently operating at only 75 percent of fixed asset capacity. Current sales are \$425,000. How fast can sales grow before any new fixed assets are needed?
17. **Fixed Assets and Capacity Usage** For the company in the previous problem, suppose fixed assets are \$310,000 and sales are projected to grow to \$620,000. How much in new fixed assets are required to support this growth in sales?
18. **Growth and Profit Margin** Lang Co. wishes to maintain a growth rate of 8 percent a year, a debt-equity ratio of .45, and a dividend payout ratio of 60 percent. The ratio of total assets to sales is constant at 1.60. What profit margin must the firm achieve?
19. **Growth and Debt-Equity Ratio** A firm wishes to maintain a growth rate of 11.5 percent and a dividend payout ratio of 50 percent. The ratio of total assets to sales is constant at .8, and profit margin is 9 percent. If the firm also wishes to maintain a constant debt-equity ratio, what must it be?
20. **Growth and Assets** A firm wishes to maintain a growth rate of 9 percent and a dividend payout ratio of 40 percent. The current profit margin is 12 percent and the firm uses no external financing sources. What must total asset turnover be?
21. **Sustainable Growth** Based on the following information, calculate the sustainable growth rate for Corbet, Inc.:

Profit margin	= 9.0%
Total asset turnover	= 1.60
Total debt ratio	= .60
Payout ratio	= 55%

What is the ROA here?

### Basic

(continued)

EFN = \$1,424.15

Internal growth rate = 9.89%

Sustainable growth rate = 14.42%

Sustainable growth rate = 9.89%

ROE = 23.00%

Sustainable growth rate = 16.33%

### Intermediate

(Questions 16–25)

Maximum sales growth = 33.33%

New fixed assets = \$29,176.47

Profit margin = 20.43%

D/E ratio = 0.83 times

TAT = 1.15 times

Sustainable growth rate = 19.33%

ROA = 14.40%

**Intermediate***(continued)*

Sustainable growth rate  
= 46.79%

New borrowing =  
\$30,412.84

Internal growth rate =  
11.75%

EFN = \$12,754

22. **Sustainable Growth and Outside Financing** You've collected the following information about Hedberg's Cranberry Farm, Inc.:

Sales	=	\$110,000
Net income	=	\$15,000
Dividends	=	\$4,800
Total debt	=	\$65,000
Total equity	=	\$32,000

What is the sustainable growth rate for Hedberg's Cranberry Farm, Inc.? If it does grow at this rate, how much new borrowing will take place in the coming year, assuming a constant debt-equity ratio? What growth rate could be supported with no outside financing at all?

23. **Calculating EFN** The most recent financial statements for Moose Tours, Inc., follow. Sales for 2003 are projected to grow by 20 percent. Interest expense will remain constant; the tax rate and the dividend payout rate will also remain constant. Costs, other expenses, current assets, and accounts payable increase spontaneously with sales. If the firm is operating at full capacity and no new debt or equity is issued, what is the external financing needed to support the 20 percent growth rate in sales?

<b>MOOSE TOURS, INC.</b>			
<b>2002 Income Statement</b>			
Sales			\$980,000
Costs			770,000
Other expenses			14,000
Earnings before interest and taxes			\$196,000
Interest paid			23,800
Taxable income			\$172,200
Taxes (35%)			60,270
Net income			<u>\$111,930</u>
Dividends		\$44,772	
Addition to retained earnings		67,158	
<b>MOOSE TOURS, INC.</b>			
<b>Balance Sheet as of December 31, 2002</b>			
<b>Assets</b>		<b>Liabilities and Owners' Equity</b>	
Current assets		Current liabilities	
Cash	\$ 28,000	Accounts payable	\$ 70,000
Accounts receivable	49,000	Notes payable	7,000
Inventory	<u>84,000</u>	Total	<u>\$ 77,000</u>
Total	<u>\$161,000</u>	Long-term debt	<u>\$168,000</u>
Fixed assets		Owners' equity	
Net plant and equipment	<u>\$385,000</u>	Common stock and paid-in surplus	\$ 21,000
		Retained earnings	<u>280,000</u>
		Total	<u>\$301,000</u>
Total assets	<u>\$546,000</u>	Total liabilities and owners' equity	<u>\$546,000</u>

- 24. Capacity Usage and Growth** In the previous problem, suppose the firm was operating at only 80 percent capacity in 2002. What is EFN now?
- 25. Calculating EFN** In Problem 23, suppose the firm wishes to keep its debt-equity ratio constant. What is EFN now?
- 26. EFN and Internal Growth** Redo Problem 23 using sales growth rates of 25 and 30 percent in addition to 20 percent. Illustrate graphically the relationship between EFN and the growth rate, and use this graph to determine the relationship between them. At what growth rate is the EFN equal to zero? Why is this internal growth rate different from that found by using the equation in the text?
- 27. EFN and Sustainable Growth** Redo Problem 25 using sales growth rates of 30 and 35 percent in addition to 20 percent. Illustrate graphically the relationship between EFN and the growth rate, and use this graph to determine the relationship between them. At what growth rate is the EFN equal to zero? Why is this sustainable growth rate different from that found by using the equation in the text?
- 28. Constraints on Growth** Lander's Recording, Inc., wishes to maintain a growth rate of 12 percent per year and a debt-equity ratio of .40. Profit margin is 4.5 percent, and the ratio of total assets to sales is constant at 1.75. Is this growth rate possible? To answer, determine what the dividend payout ratio must be. How do you interpret the result?
- 29. EFN** Define the following:
- S = Previous year's sales
  - A = Total assets
  - D = Total debt
  - E = Total equity
  - $g$  = Projected growth in sales
  - PM = Profit margin
  - $b$  = Retention (plowback) ratio

Show that EFN can be written as:

$$\text{EFN} = -\text{PM}(S)b + (A - \text{PM}(S)b) \times g$$

Hint: Asset needs will equal  $A \times g$ . The addition to retained earnings will equal  $\text{PM}(S)b \times (1 + g)$ .

- 30. Growth Rates** Based on the result in Problem 29, show that the internal and sustainable growth rates are as given in the chapter. Hint: For the internal growth rate, set EFN equal to zero and solve for  $g$ .
- 1. Calculating EFN** Find the income statements and balance sheets for Huffy Corporation (HUF), the bicycle manufacturer. Assuming sales grow by 10 percent, what is the EFN for Huffy next year? Assume non-operating income/expense and special items will be zero next year. Assets, costs, and current liabilities are proportional to sales. Long-term debt and equity are not. Huffy will have the same tax rate next year as it does in the current year.
- 2. Internal and Sustainable Growth Rates** Look up the financial statements for Emerson Electric (EMR) and Wal-Mart (WMT). For each company, calculate

### Intermediate

(continued)

$$\text{EFN} = -\$79,790$$

$$\text{EFN} = -\$79,646$$

### Challenge

(Questions 26–30)

$$\text{EFN @ 20.00\%} = \$12,754$$

$$\text{EFN @ 25.00\%} = \$32,732$$

$$\text{EFN @ 30.00\%} = \$52,710$$

$$\text{EFN @ 16.81\%} = \$0$$

$$\text{EFN @ 30.00\%} = \$380.93$$

$$\text{EFN @ 35.00\%} = \$20,748$$

$$\text{EFN @ 20.00\%} =$$

$$-\$40,353$$

$$\text{EFN @ 29.91\%} = \$0$$

Maximum sustainable growth rate = 3.73%

## S&P Problems

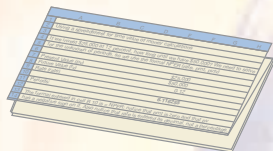
## STANDARD & POOR'S

the internal growth rate and sustainable growth rate over the past two years. Are the growth rates the same for each company for the two years? Why or why not?



**What's On the Web?**

- 4.1 Growth Rates** Go to [quote.yahoo.com](http://quote.yahoo.com) and enter the ticker symbol “IP” for International Paper. When you get the quote, follow the “Research” link. What is the projected sales growth for International Paper for next year? What is the projected earnings growth rate for next year? For the next five years? How do these earnings growth projections compare to the industry, sector, and S&P 500 index?
- 4.2 Applying Percentage of Sales** Locate the most recent annual financial statements for Du Pont at [www.dupont.com](http://www.dupont.com) under the “Investor Center” link. Locate the annual report. Using the growth in sales for the most recent year as the projected sales growth for next year, construct a pro forma income statement and balance sheet.
- 4.3 Growth Rates** You can find the home page for Caterpillar, Inc., at [www.caterpillar.com](http://www.caterpillar.com). Go to the web page, select “Cat Stock,” and find the most recent annual report. Using the information from the financial statements, what is the internal growth rate for Caterpillar? What is the sustainable growth rate?



**Spreadsheet Templates** 4-5, 4-6, 4-21, 4-23, 4-26, 4-27