

Long-Term Financial Planning and Corporate Growth



Thirteenth Street Winery is a small producer of Old World-style wines in Jordan, Ontario. Three partners who still work at other “real jobs” founded the company as a labour of love in 1998. The winery sells its limited production from company-owned vineyards out of its winery shop, open Saturdays and Sundays only.

In contrast, Vincor International Inc. was the eighth-largest wine producer globally and TSX listed when it was bought by Constellation Brands for \$1.5 billion in 2006. Started in 1989 by Donald Trigg with the purchase of a discontinued brand from Labatt’s, the company grew by acquisitions in Canada with the financial backing of Gerry Schwartz and the Ontario Teachers’

Pension Plan. As the company expanded into the U.S., Australia, and New Zealand, it won numerous awards for its quality products, while Donald Trigg became Ernst & Young’s 2003 Entrepreneur of the Year.

To achieve their diverse goals, both Vincor and Thirteenth Street needed proper financial planning. In the case of Vincor, rapid growth by acquisitions required financing from profits, new debt, and later new equity accessed by going public. For small companies like Thirteenth Street, keeping on mission requires planning to ensure that growth does not outrun the firm’s financial resources.¹



www.corel.com
www.gmcanada.com

A LACK OF EFFECTIVE long-range planning is a commonly cited reason for financial distress and failure. This is especially true for small businesses—a sector vital to the creation of future jobs in Canada. As we 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 General Motors Corporation’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.

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

¹ Our examples of Vincor International Inc. and Thirteenth Street Winery draw on S. Ryval, “Glass half full,” *The Globe and Mail*, September 28, 2001, as well as information from www.vincorinternational.com and www.13thstreetwines.com.

We begin by describing what is usually meant by financial planning. For the most part, we talk about long-term planning. Short-term financial planning is discussed in Chapter 18. 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 arises from the investment opportunities that 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 determines the amount of borrowing the firm uses 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 shall see, the decisions that a firm makes in these four areas directly affect its future profitability, its need for external financing, and its opportunities for growth.

A key lesson 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 that the firm plans on purchasing must be considered along with the firm's ability to raise the necessary capital to fund those investments.

Financial planning forces the corporation to think about goals. A goal frequently espoused by corporations is growth, and almost all firms use an explicit, company-wide growth rate as a major component of their long-run financial planning. In November 2000, Molson Inc. announced it was buying a new brand of beer in Brazil for around \$300 million Canadian. This was part of Molson's strategy to develop an earnings stream in emerging markets where a younger average age may produce faster sales growth. This strategy shows that growth is an important goal for most large companies.

There are direct connections between the growth that a company can achieve and its financial policy. In the following sections, we show that financial planning models can help you better understand how growth is achieved. We also show how such models can be used to establish limits on possible growth. This analysis can help companies avoid the sometimes fatal mistake of growing too fast.



www.molson.com

4.1

WHAT IS FINANCIAL PLANNING?

Financial planning formulates the way 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. A firm that wants to build a factory in 2005, for example, might have to begin lining up contractors and financing in 2003, or even earlier.

Growth as a Financial Management Goal

Because we discuss the subject of growth in various places in this chapter, we start out with an important warning: Growth, by itself, is *not* an appropriate goal for the financial manager. In fact, as we have seen, rapid growth isn't always even good for a firm. Cott Corp., a Toronto-based bottler of private-label soft drinks, is another example of what happens when a firm grows too fast. The company aggressively marketed its soft drinks in the early 1990s, and sales exploded. However, despite its growth in sales, the company lost \$29.4 million for the fiscal year ended January 27, 1996.



www.cott.com

Cott's pains included the following: (1) aluminum prices rose; (2) the firm faced price competition; (3) costs surged as Cott built corporate infrastructure in anticipation of becoming a much bigger company; and (4) the firm botched expansion into the United Kingdom. Cott quickly grabbed a 25 percent market share by undercutting the big brands, but then had to hire an outside bottler at a cost much higher than the cost of bottling in its own plants to meet the demand. Half the cases sold in the United Kingdom in 1995 were sold below cost, bringing a loss to the company as a whole. Cott is now focusing on slower growth while keeping a line on operating costs.

As we discuss 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, growth usually results. 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 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 the 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 is called the **planning horizon**, and it is the first dimension of the planning process that must be established.²

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

Once the planning horizon and level of aggregation are established, a financial plan would need 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.
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

planning horizon

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

aggregation

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



www.daimlerchrysler.ca

² The techniques we present can also be used for short-term financial planning.

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 could 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 later, 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 would take if things go seriously wrong or, more generally, if assumptions made today about the future are seriously in error. 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 current 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 big companies, too.

ENSURING FEASIBILITY AND INTERNAL CONSISTENCY Beyond a specific goal of creating value, a firm normally has many specific goals. Such goals might be couched in market share, return on equity, financial leverage, and so on. At times, the linkages 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 checking that the goals and plans made with regard to specific areas of a firm's operations are feasible and internally consistent. Conflicting goals often exist. To generate a coherent plan, goals and objectives have to be modified therefore, and priorities 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 percent to 20 percent. Are these two goals compatible? Can they be accomplished simultaneously? Maybe yes, maybe no. As we discuss later, financial planning is a way of finding out just what is possible, and, by implication, what is not possible.

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

COMMUNICATION WITH INVESTORS AND LENDERS Our discussion to this point has tried to convince you that financial planning is essential to good management. Because



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good management controls the riskiness of a firm, equity investors and lenders are very interested in studying a firm's financial plan. As discussed in Chapter 15, securities regulators require that firms issuing new shares or debt file a detailed financial plan as part of the *prospectus* describing the new issue. Chartered banks and other financial institutions that make loans to businesses almost always require prospective borrowers to provide a financial plan. In small businesses with limited resources for planning, pressure from lenders is often the main motivator for engaging in financial planning.

CONCEPT QUESTIONS

1. What are the two dimensions of the financial planning process?
2. Why should firms draw up financial plans?

4.2

FINANCIAL PLANNING MODELS: A FIRST LOOK

Just as companies differ in size and products, the financial planning process differs from firm to firm. In this section, we discuss some common elements in financial plans and develop a basic model to illustrate these elements.

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 variables. Models can vary quite a bit in their complexity, but almost all would have the following elements:

SALES FORECAST Almost all financial plans require an externally supplied sales forecast. In the models that follow, for example, the sales forecast is the driver, meaning that the user of the planning model supplies this value and all other values are calculated based on it. This arrangement would be common for many types of business; planning focuses on projected future sales and the assets and financing needed to support those sales.

Frequently, the sales forecast is given as a 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 and on industry conditions.

For example, the September 11, 2001 terrorist attacks caused many firms to scale down their sales forecasts. Some industries were hit particularly hard, such as airlines and hotels. To help firms come up with such projections, some economic consulting firms specialize in macroeconomic and industry projections. Economic and industry forecasts are also available free from the economic research departments of chartered banks.

As we discussed earlier, we are frequently interested in evaluating alternative scenarios, so it isn't necessarily crucial that the sales forecast be accurate. 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.

PRO FORMA STATEMENTS A financial plan has a forecasted balance sheet, an income statement, and a 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." This means that the financial statements are the forms we use to summarize the different events projected for the future. At a minimum, a financial planning model generates these statements based on projections of key items such as sales.

In the planning models we describe later, the pro formas are the output from the financial planning model. The user supplies a sales figure, and the model generates the resulting income statement and balance sheet.

ASSET REQUIREMENTS The plan describes projected capital spending. At a minimum, the projected balance sheets contain changes in total fixed assets and net working capital. These



Spreadsheets to use for *pro forma* statements can be obtained at www.jaxworks.com

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 includes a section on the financial arrangements that are necessary. This part of the plan should discuss dividend policy and debt policy. Sometimes firms expect to raise cash by selling new shares of stock or by borrowing. Then, the plan has to spell out what kinds of securities have to be sold and what methods of issuance are most appropriate. These are subjects we consider in Part 6 when we discuss long-term financing, capital structure, and dividend policy.

CASH SURPLUS OR SHORTFALL After the firm has a sales forecast and an estimate of the required spending on assets, some amount of new financing is often necessary because projected total assets exceed projected total liabilities and equity. In other words, the balance sheet no longer balances.

Because new financing may be necessary to cover all the projected capital spending, a financial “plug” variable must be designated. The cash surplus or shortfall (also called the “plug”) is the designated source or sources of external financing needed to deal with any shortfall (or surplus) in financing and thereby to 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 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 has to explicitly describe the economic environment in which the firm expects to reside over the life of the plan. Among the more important economic assumptions that have to be made are the level of interest rates and the firm's tax rate, as well as sales forecasts, as discussed earlier.

A Simple Financial Planning Model

We begin our discussion of long-term planning models with a relatively simple example.³ 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	<u>\$ 200</u>	Total	<u>\$500</u>	Total	<u>\$500</u>

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

Suppose that sales increase by 20 percent, rising from \$1,000 to \$1,200. Then planners would 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	<u>\$ 240</u>

³ Computer spreadsheets are the standard way to execute this and the other examples we present. Appendix 10B gives an overview of spreadsheets and how they are used in planning with capital budgeting as the application.

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

Assets	\$600 (+100)	Debt	\$300 (+50)
		Equity	<u>300 (+50)</u>
Total	<u>\$600 (+100)</u>	Total	<u>\$600 (+100)</u>

Notice that 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. Here, the addition to retained earnings is the full \$240. Computerfield's equity thus grows to \$250 (the starting amount) + 240 (net income) = \$490, and debt must be retired to keep total assets equal to \$600.

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

Assets	\$600 (+100)	Debt	\$110 (-140)
		Equity	<u>490 (+240)</u>
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. Since assets are growing, total liabilities and equity, the right-hand side of the balance sheet, 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. Also, in our example the firm needed no outside funds. As this isn't usually the case, we explore a more detailed situation in the next section.

CONCEPT QUESTIONS

1. What are the basic concepts of a financial plan?
2. Why is it necessary to designate a plug in a financial planning model?

4.3

THE PERCENTAGE OF SALES APPROACH

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 are able to calculate how much financing the firm needs to support the predicted sales level.

An Illustration of the Percentage of Sales Approach

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.

percentage of sales approach

Financial planning method in which accounts are projected depending on a firm's predicted sales level.

THE INCOME STATEMENT We start with the most recent income statement for the Rosengarten Corporation, as shown in Table 4.1. Notice that we have still simplified things by including costs, depreciation, and interest in a single cost figure. We separate these out in Appendix 4A at the end of this chapter.

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 continue to run at $\$800/\$1,000 = 80\%$ of sales. 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 assume that Rosengarten has a policy of paying out a constant fraction of net income in the form of a cash dividend. From the most recent year, the **dividend payout ratio** was:

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

dividend payout ratio
Amount of cash paid out to shareholders divided by net income.

TABLE 4.1

ROSENGARTEN CORPORATION
Income Statement

Sales		\$1,000
Costs		<u>800</u>
Taxable income		\$ 200
Taxes		<u>68</u>
Net income		<u>\$ 132</u>
Addition to retained earnings	\$88	
Dividends	\$44	

TABLE 4.2

ROSENGARTEN CORPORATION
Pro Forma Income Statement

Sales (projected)		\$1,250
Costs (80% of sales)		<u>1,000</u>
Taxable income		\$ 250
Taxes		<u>85</u>
Net income		<u>\$ 165</u>

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

$$\text{Retained earnings/Net income} = \$88/\$132 = 66\frac{2}{3}\%.$$

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 and retention ratios are constant, the projected dividends and addition to retained earnings would be:

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

retention ratio or plowback ratio
Retained earnings divided by net income.

THE BALANCE SHEET To generate a pro forma balance sheet, we start with the most recent statement in Table 4.3. On our balance sheet, we assume that some of the items vary directly with sales, while 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 that this percentage applies to the coming year, so for each \$1 increase in sales, inventory rises by \$.60. More generally, the ratio of total assets to sales for the year just ended is $\$3,000/\$1,000 = 3$, or 300%.

TABLE 4.3

ROSENGARTEN CORPORATION
Balance Sheet

	(\$)	(%)		(\$)	(%)
	<i>Assets</i>			<i>Liabilities and Owners' Equity</i>	
Current assets			Current liabilities		
Cash	\$ 160	16%	Accounts payable	\$ 300	30%
Accounts receivable	440	44	Notes payable	<u>100</u>	<u>n/a</u>
Inventory	<u>600</u>	<u>60</u>	Total	<u>\$ 400</u>	<u>n/a</u>
Total	<u>\$1,200</u>	<u>120%</u>			
Fixed assets			Long-term debt	\$ 800	n/a
Net plant and equipment	<u>\$1,800</u>	<u>180%</u>	Owners' equity		
			Common stock	\$ 800	n/a
			Retained earnings	<u>1,000</u>	<u>n/a</u>
			Total	<u>\$1,800</u>	<u>n/a</u>
Total assets	<u>\$3,000</u>	<u>300%</u>	Total liabilities and owners' equity	<u>\$3,000</u>	<u>n/a</u>

capital intensity ratio

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

This ratio of total assets to sales is sometimes called the **capital intensity ratio**. It tells us the 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. A decrease in a firm's need for new assets as sales grow increases the sustainable growth rate.

For Rosengarten, assuming 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, Rosengarten has 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 should change spontaneously with sales. Notes payable, on the other hand, represent short-term debt such as bank borrowing. These would not vary unless we take specific actions to change the amount, so we mark them 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. The last item on the right-hand side, retained earnings, varies with sales, but it won't be a simple percentage of sales. Instead, we 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 calculated earlier wherever possible to calculate the projected amounts. For example, fixed assets are 180 percent of sales; so, with a new sales level of \$1,250, the fixed asset amount is $1.80 \times \$1,250 = \$2,250$, an increase of $\$2,250 - 1,800 = \450 in plant and equipment. Importantly, 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 the pro forma balance sheet in Table 4.4. Notice that the change in retained earnings is equal to the \$110 addition to retained earnings that 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 only increase by \$185, leaving a shortfall of $\$750 - 185 = \565 . We label this amount **external financing needed (EFN)**.

external financing needed (EFN)

The amount of financing required to balance both sides of the balance sheet.

A PARTICULAR SCENARIO Our financial planning model now reminds us of one of those good news/bad news jokes. The good news is that we're projecting a 25 percent increase in sales. The bad news is that this isn't going to happen unless we 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, a 25 percent increase in sales is probably not feasible.

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

Suppose that Rosengarten decides to borrow the needed funds. The firm might choose to borrow some short-term and some long-term. For example, current assets increased by \$300 while current liabilities rose by only \$75. Rosengarten could borrow $\$300 - 75 = \225 in short-term notes payable in

TABLE 4.4

ROSENGARTEN CORPORATION
Partial Pro Forma Balance Sheet

	Present Year	Change from Previous Year		Present Year	Change from Previous Year
	<i>Assets</i>			<i>Liabilities and Owners' Equity</i>	
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	\$1,500	\$300	Long-term debt	\$ 800	\$ 0
Fixed assets			Owners' equity		
Net plant and equipment	\$2,250	\$450	Common stock	\$ 800	\$ 0
Total assets	\$3,750	\$750	Retained earnings	1,110	110
			Total	\$1,910	\$110
			Total liabilities and owners' equity	\$3,185	\$185
			External financing needed	\$ 565	

the form of a loan from a chartered bank. This would leave total net working capital unchanged. With \$565 needed, the remaining $\$565 - 225 = \340 would have to come from long-term debt. Two examples of long-term debt discussed in Chapter 15 are a bond issue and a term loan from a chartered bank or insurance company. Table 4.5 shows the completed pro forma balance sheet for Rosengarten.

Even though we used a combination of short- and long-term debt as the plug here, we emphasize that this is just one possible strategy; it is not necessarily the best one by any means. There are many other scenarios that 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 changes in financial position along the lines discussed in Chapter 3. We leave this as an exercise and instead investigate an important alternative scenario.

AN ALTERNATIVE SCENARIO The assumption that assets are a fixed percentage of sales is convenient, but it may not be suitable in many cases. For example, we effectively assumed that Rosengarten 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 2004, both Ford and GM announced plans to increase production in Venezuela. The increased production was to accommodate increased sales in that country. In

TABLE 4.5

ROSENGARTEN CORPORATION
Pro Forma Balance Sheet

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

EXAMPLE 4.1: EFN and Capacity Usage

Suppose Rosengarten were operating at 90 percent capacity. What would be sales 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, 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 we need $\$1.62$ in fixed assets for every $\$1$ in sales once we reach full capacity. At the projected sales

level of $\$1,250$, we need $\$1,250 \times 1.62 = \$2,025$ 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.

Ford's case, the company planned no additional capital expenditures; in other words, the company did not plan to increase production facilities. GM's announcement of increased production came with an announcement that the company would invest in production facilities. Apparently, Ford had the capacity to expand production without significantly adding to fixed costs, while GM did not.

If we assume that Rosengarten is only operating at 70 percent of capacity, the need for external funds would be quite different. By 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 were 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 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, we only need $\$565 - 450 = \115 in external funds. The excess capacity thus makes a considerable difference in our projections.

These alternative scenarios illustrate that it is inappropriate to manipulate financial statement information blindly in the planning process. The output of any model is only as good as the input assumptions or, as is said in the computer field, GIGO: garbage in, garbage out. Results depend critically on the assumptions made about the relationships between sales and asset needs. We return to this point later.

CONCEPT QUESTIONS

1. What is the basic idea behind the percentage of sales approach?
2. Unless it is modified, what does the percentage of sales approach assume about fixed asset capacity usage?

4.4**EXTERNAL FINANCING AND GROWTH**

External financing needed and growth are obviously related. All other things being 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 a given, and then we determined the amount of external financing needed to support the growth. In this section, we turn things around a bit. We take the firm's financial policy as a given and then examine the relationship between that financial policy and the firm's ability to finance new investments and thereby grow.

TABLE 4.6

HOFFMAN COMPANY Income Statement and Balance Sheet					
Income Statement					
Sales					\$500
Costs					<u>400</u>
Taxable income					\$100
Taxes					<u>34</u>
Net income					<u>\$ 66</u>
Addition to retained earnings				\$44	
Dividends				\$22	
Balance Sheet					
	\$	% of Sales		\$	% of Sales
<i>Assets</i>			<i>Liabilities</i>		
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>

This approach can be very useful because, as you have already seen, growth in sales requires financing, so it follows that growth that is too fast can cause a company to grow broke.⁴ Companies that neglect to plan for financing growth can fail even when production and marketing are on track. From a positive perspective, planning growth that is financially sustainable can help an excellent company achieve its potential. This is why managers, along with their bankers and other suppliers of funds, need to look at sustainable growth.

External Financing Needed and Growth

To begin, we must establish the relationship between EFN and growth. To do this, we introduce Table 4.6, a simplified income statement and balance sheet for the Hoffman Company. Notice that 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 varies 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 they have been netted out in current assets.⁵ Also, we continue to combine depreciation, interest, and costs on the income statement.

The following symbols are useful:

$$S = \text{Previous year's sales} = \$500$$

$$A = \text{Total assets} = \$500$$

$$D = \text{Total debt} = \$250$$

$$E = \text{Total equity} = \$250$$

In addition, based on our earlier discussions of financial ratios, we can calculate the following:

$$p = \text{Profit margin} = \$66/\$500 = 13.2\%$$

$$R = \text{Retention ratio} = \$44/\$66 = 2/3$$

$$ROA = \text{Return on assets} = \$66/\$500 = 13.2\%$$

$$ROE = \text{Return on equity} = \$66/\$250 = 26.4\%$$

$$D/E = \text{Debt/equity ratio} = \$250/\$250 = 1.0$$

Suppose the Hoffman Company is forecasting next year's sales level at \$600, a \$100 increase. The capital intensity ratio is $\$500/\$500 = 1$, so assets need to rise by $1 \times \$100 = \100 (assuming

⁴ This phrase and the following discussion draws heavily on R. C. Higgins, "How Much Growth Can a Firm Afford?" *Financial Management* 6, Fall 1977, pp. 7–16.

⁵ This assumption makes our use of EFN here consistent with how we defined it earlier in the chapter.

full capacity usage). Notice that the percentage increase in sales is $\$100/\$500 = 20\%$. The percentage increase in assets is also 20 percent: $100/\$500 = 20\%$. As this illustrates, assuming a constant capital intensity ratio, the increase in total assets is simply $A \times g$, where g is growth rate in sales:

$$\begin{aligned}\text{Increase in total assets} &= A \times g \\ &= \$500 \times 20\% \\ &= \$100\end{aligned}$$

In other words, the growth rate in sales can also be interpreted as the rate of increase in the firm's total assets.

Some of the financing necessary to cover the increase in total assets comes from internally generated funds and shows up in the form of the addition to retained earnings. This amount is equal to net income multiplied by the plowback or retention ratio, R . Projected net income is equal to the profit margin, p , multiplied by projected sales, $S \times (1 + g)$. The projected addition to retained earnings for Hoffman can thus be written as:

$$\begin{aligned}\text{Addition to retained earnings} &= p(S)R \times (1 + g) \\ &= .132(\$500)(2/3) \times 1.20 \\ &= \$44 \times 1.20 \\ &= \$52.80\end{aligned}$$

Notice that this is equal to last year's addition to retained earnings, \$44, multiplied by $(1 + g)$.

Putting this information together, we need $A \times g = \$100$ in new financing. We generate $p(S)R \times (1 + g) = \$52.80$ internally, so the difference is what we need to raise. In other words, we find that EFN can be written as:

$$\begin{aligned}\text{EFN} &= \text{Increase in total assets} - \text{Addition to retained earnings} && [4.2] \\ &= A(g) - p(S)R \times (1 + g)\end{aligned}$$

For Hoffman, this works out to be

$$\begin{aligned}\text{EFN} &= \$500(.20) - .132(\$500)(2/3) \times 1.20 \\ &= \$100 - \$52.80 \\ &= \$47.20\end{aligned}$$

We can check that this is correct by filling in a pro forma income statement and balance sheet, as in Table 4.7. As we calculated, Hoffman needs to raise \$47.20.

Looking at our equation for EFN, we see that EFN depends directly on g . Rearranging things to highlight this relationship, we get:

TABLE 4.7

HOFFMAN COMPANY
Pro Forma Income Statement and Balance Sheet

Income Statement					
Sales					\$600.0
Costs (80% of sales)					<u>480.0</u>
Taxable income					\$120.0
Taxes					<u>40.8</u>
Net income					<u>\$ 79.2</u>
Addition to retained earnings			\$52.8		
Dividends			\$26.4		
Balance Sheet					
	\$	% of Sales		\$	% of Sales
<i>Assets</i>			<i>Liabilities</i>		
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>	n/a
Total assets	<u>\$600.0</u>	<u>100%</u>	Total liabilities	<u>\$552.8</u>	n/a
			External funds needed	<u>\$ 47.2</u>	

$$\text{EFN} = -p(S)R + [A - p(S)R] \times g \quad [4.3]$$

Plugging in the numbers for Hoffman, the relationship between EFN and g is:

$$\begin{aligned} \text{EFN} &= -.132(\$500)(2/3) + [\$500 - .132(\$500)(2/3)] \times g \\ &= -44 + 456 \times g \end{aligned}$$

Notice that this is the equation of a straight line with a vertical intercept of $-\$44$ and a slope of $\$456$.

The relationship between growth and EFN is illustrated in Figure 4.1. The y -axis intercept of our line, $-\$44$, is equal to last year's addition to retained earnings. This makes sense because, if the growth in sales is zero, then retained earnings are $\$44$, the same as last year. Furthermore, with no growth, no net investment in assets is needed, so we run a surplus equal to the addition to retained earnings, which is why we have a negative sign.

The slope of the line in Figure 4.1 tells us that for every .01 (1 percent) in sales growth, we need an additional $\$456 \times .01 = \4.56 in external financing to support that growth.

Internal Growth Rate

internal growth rate

The growth rate a firm can maintain with only internal financing.

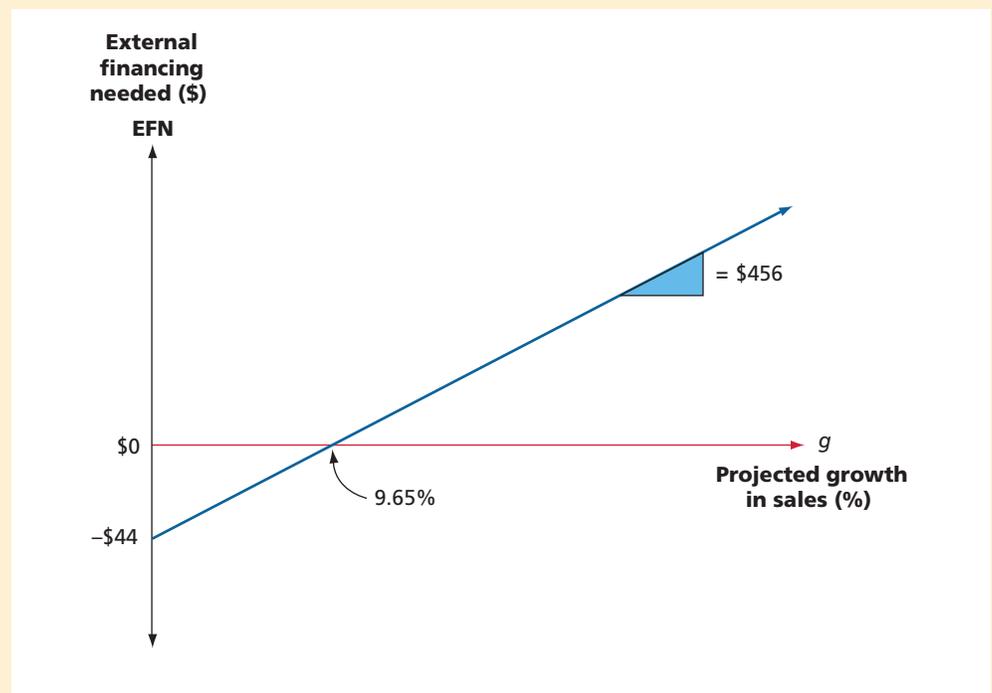
Looking at Figure 4.1, there is one growth rate of obvious interest. What growth rate can we achieve with no external financing? We call this the **internal growth rate** because it is the rate the firm can maintain with only internal financing. This growth rate corresponds to the point where our line crosses the horizontal axis, that is, the point where EFN is zero. At this point, the required increase in assets is exactly equal to the addition to retained earnings, and EFN is therefore zero. Figure 4.1 shows that this rate is just under 10 percent.

We can easily calculate this rate by setting EFN equal to zero:

$$\begin{aligned} \text{EFN} &= -p(S)R + [A - p(S)R] \times g & [4.4] \\ g &= pS(R)/[A - pS(R)] \\ &= .132(\$500)(2/3)/[\$500 - .132(\$500)(2/3)] \\ &= 44/[500 - 44] \\ &= 44/456 = 9.65\% \end{aligned}$$

FIGURE 4.1

External financing needed and growth in sales for the Hoffman Company



Hoffman can therefore grow at a 9.65 percent rate before any external financing is required. With a little algebra, we can restate the expression for the internal growth rate (Equation 4.4) as:⁶

$$\text{Internal growth rate} = \frac{ROA \times R}{1 - ROA \times R} \quad [4.5]$$

For Hoffman, we can check this by recomputing the 9.65% internal growth rate

$$= \frac{.132 \times 2/3}{1 - .132 \times 2/3}$$

Financial Policy and Growth

Suppose Hoffman, for whatever reason, does not wish to sell any new equity. As we discuss in Chapter 15, one possible reason is simply that new equity sales can be very expensive. Alternatively, the current owners may not wish to bring in new owners or contribute additional equity themselves. For a small business or a start-up, the reason may be even more compelling: All sources of new equity have likely already been tapped and the only way to increase equity is through additions to retained earnings.

In addition, we assume that Hoffman wishes to maintain its current debt/equity ratio. To be more specific, Hoffman (and its lenders) regard its current debt policy as optimal. We discuss why a particular mixture of debt and equity might be better than any other in Chapters 14 and 15. For now, we say that Hoffman has a fixed **debt capacity** relative to total equity. If the debt/equity ratio declines, Hoffman has excess debt capacity and can comfortably borrow additional funds.

Assuming that Hoffman does borrow to its debt capacity, what growth rate can be achieved? The answer is the **sustainable growth rate**, the maximum growth rate a firm can achieve with no external *equity* financing while it maintains a constant debt/equity ratio. To find the sustainable growth rate, we go back to Equation 4.2 and add another term for new borrowings (up to debt capacity). One way to see where the amount of new borrowings comes from is to relate it to the addition to retained earnings. Because this addition increases equity, it reduces the debt/equity ratio. Since sustainable growth is based on a constant debt/equity ratio, we use new borrowings to top up debt. Because we are now allowing new borrowings, EFN refers to outside equity only. Because no new outside equity is available, EFN = 0.

$$\begin{aligned} \text{EFN} &= \text{Increase in total assets} - \text{Addition to retained earnings} && [4.6] \\ &\quad - \text{New borrowing} \\ &= A(g) - p(S)R \times (1 + g) - pS(R) \times (1 + g)[D/E] \\ \text{EFN} &= 0 \end{aligned}$$

With some algebra we can solve for the sustainable growth rate.⁷

$$g^* = ROE \times R / [1 - ROE \times R] \quad [4.7]$$

This growth rate is called the firm's sustainable growth rate (SGR).

For example, for the Hoffman Company, we already know that the ROE is 26.4 percent and the retention ratio, R , is $2/3$. The sustainable growth rate is thus:

$$\begin{aligned} g^* &= (ROE \times R) / (1 - ROE \times R) \\ &= .176 / .824 \\ &= 21.3\% \end{aligned}$$

This tells us that Hoffman can increase its sales and assets at a rate of 21.3 percent per year without selling any additional equity and without changing its debt ratio or payout ratio. If a growth rate in excess of this is desired or predicted, something has to give.

To better see that the SGR is 21.3 percent (and to check our answer), we can fill out the pro forma financial statements assuming that Hoffman's sales increase at exactly the SGR. We do this to verify that if Hoffman's sales do grow at 21.3 percent, all needed financing can be obtained without the need to sell new equity, and, at the same time, the debt/equity ratio can be maintained at its current level of 1.

6 To derive Equation 4.5 from (4.4) divide through by A and recognize that $ROA = p(S)/A$.

7 The derivation of the sustainable rate is shown in Appendix 4B.

debt capacity

The ability to borrow to increase firm value.

sustainable growth rate

The growth rate a firm can maintain given its debt capacity, ROE, and retention ratio.

To get started, sales increase from \$500 to $500 \times (1 + .213) = \606 . Assuming, as before, that costs are proportional to sales, the income statement would be:

HOFFMAN COMPANY Pro Forma Income Statement	
Sales	\$606
Costs (80% of sales)	<u>485</u>
Taxable income	\$121
Taxes	<u>41</u>
Net income	<u>\$ 80</u>

Given that the retention ratio, R , stays at $2/3$, the addition to retained earnings is $\$80 \times (2/3) = \53 , and the dividend paid is $\$80 - 53 = \27 .

We fill out the pro forma balance sheet (Table 4.8) just as we did earlier. Note that the owners' equity rises from \$250 to \$303 because the addition to retained earnings is \$53. As illustrated, EFN is \$53. If Hoffman borrows this amount, its total debt rises to $\$250 + 53 = \303 . The debt/equity ratio therefore is $\$303/\$303 = 1$ as desired, thereby verifying our earlier calculations. At any other growth rate, something would have to change.

Pro Forma Income Statement	
Sales	\$1,000
Costs (80% of sales)	<u>800</u>
Taxable income	\$ 200
Taxes	<u>68</u>
Net income	<u>\$ 132</u>
Dividends (1/3)	\$44
Addition to retained earnings	88

Pro Forma Balance Sheet			
Current assets	\$ 400	Total debt	\$250
Fixed assets	<u>600</u>	Owners' equity	<u>338</u>
Total assets	<u>\$1,000</u>	Total liabilities	<u>\$588</u>
		External funds needed	<u>\$412</u>

To maintain the debt/equity ratio at 1, Hoffman can increase debt to \$338, an increase of \$88. This leaves $\$412 - \$88 = \$324$ to be raised by external equity. If this is not available, Hoffman could try to raise the full \$412 in additional debt. This would rocket the debt/equity ratio to $(\$250 + \$412)/\$338 = 1.96$, basically doubling the target amount.

TABLE 4.8

HOFFMAN COMPANY Pro Forma Balance Sheet					
	\$	% of Sales		\$	% of Sales
Current assets	\$242	40	Total debt	\$250	n/a
Net fixed assets	<u>364</u>	<u>60</u>	Owners' equity	<u>303</u>	<u>n/a</u>
Total assets	<u>\$606</u>	<u>100</u>	Total liabilities	<u>\$553</u>	<u>n/a</u>
			External funds needed	<u>\$ 53</u>	

EXAMPLE 4.2: Growing Bankrupt

Suppose the management of Hoffman Company is not satisfied with a growth rate of 21 percent. Instead, the company wants to expand rapidly and double its sales to \$1,000 next year. What will happen? To answer this question we go back to the starting point of our previous example.

We know that the sustainable growth rate for Hoffman is 21.3 percent, so doubling sales (100 percent growth) is not possible unless the company obtains outside equity financing or allows its debt/equity ratio to balloon beyond 1. We can prove this with simple pro forma statements.

Given that the firm's bankers and other external lenders likely had considerable say over the target D/E in the first place, it is highly unlikely that Hoffman could obtain this much additional debt. The most likely outcome is that if Hoffman insists on doubling sales, the firm would grow bankrupt.

Determinants of Growth

In the last chapter, we saw that the return on equity could be decomposed into its various components using the Du Pont identity. Because ROE appears prominently in the determination of the SGR, the important factors in determining ROE are also important determinants of growth. To see this, recall that from the Du Pont identity, ROE can be written as:

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

Using our current symbols for these ratios,⁸

$$\text{ROE} = p(S/A)(1 + D/E)$$

If we substitute this into our expression for g^* (SGR), we see that the sustainable growth rate can be written in greater detail as:

$$g^* = \frac{p(S/A)(1 + D/E) \times R}{1 - p(S/A)(1 + D/E) \times R} \quad [4.8]$$

Writing the SGR out in this way makes it look a little complicated, but it does highlight the various important factors determining the ability of a firm to grow.

Examining our expression for the SGR, we see that growth depends on the following four factors:

1. Profit margin. An increase in profit margin, p , increases 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 increases the retention ratio, R . This increases internally generated equity and thus increases sustainable growth.
3. Financial policy. An increase in the debt/equity ratio, D/E , increases the firm's financial leverage. Since 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, S/A , 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 the 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 p , its asset use efficiency as measured by S/A , its dividend policy as measured by R , and its financial policy as measured by D/E .

Given values for all four of these, only one growth rate 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, there is only one possible maximum growth rate.

As we described early in this chapter, one of the primary benefits to financial planning is to ensure internal consistency among the firm's various goals. The sustainable growth rate captures this element nicely. For this reason, sustainable growth is included in the software used by commercial lenders at several Canadian chartered banks in analyzing their accounts.

Also, we now see how to use a financial planning model 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

⁸ Remember that the equity multiplier is the same as 1 plus the debt/equity ratio. Appendix 4B shows the derivation in detail.

increase profit margins, increase total asset turnover, increase financial leverage, increase earnings retention, or sell new shares.

At the other extreme, suppose the firm is losing money (has a negative profit margin) or is paying out more than 100 percent of earnings in dividends so that R is negative. In each of these cases, the negative SGR signals the rate at which sales and assets must shrink. Firms can achieve negative growth by selling assets and closing divisions. The cash generated by selling assets is often used to pay down excessive debt taken on earlier to fund rapid expansion. Nortel Networks and CanWest Global Communications Corp. are examples of Canadian companies that underwent this painful negative growth in 2002. Nortel was losing money on its operations, and was selling assets to keep the remaining core businesses operating. CanWest Global, on the other hand, experienced negative growth because it paid out more in dividends than it earned. CanWest elected to sell some assets to pay down a portion of its debt.

A Note on Sustainable Growth Rate Calculations

Very commonly, the sustainable growth rate is calculated using just the numerator in our expression, $ROE \times R$. This causes some confusion, which we can clear up here. The issue has to do with how ROE is computed. Recall that ROE is calculated as net income divided by total equity. If total equity is taken from an ending balance sheet (as we have done consistently, and is commonly done in practice), then our formula is the right one. However, if total equity is from the beginning of the period, then the simpler formula is the correct one.

In Their Own Words . . .

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 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. Updates on his research are at www.depts.washington.edu/~finance/higgins.html.



EXAMPLE 4.3: Sustainable Growth

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

The sustainable growth rate is:

$$g^* = .03(1)(1 + .5)(1 - .40)/[1 - .03(1)(1 + .5)(1 - .40)] \\ = 2.77\%$$

To achieve a 10 percent growth rate, the profit margin has to rise. To see this, assume that g^* is equal to 10 percent and then solve for p :

$$.10 = p(1.5)(.6)/[1 - p(1.5)(.6)] \\ p = .1/.99 = 10.1\%$$

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.

In principle, you'll get exactly the same sustainable growth rate regardless of which way you calculate it (as long you match up the ROE calculation with the right formula). In reality, you may see some differences because of accounting-related complications. By the way, if you use the average of beginning and ending equity (as some advocate), yet another formula is needed. Note: all of our comments here apply to the internal growth rate as well.

One more point that is important to note is that for the sustainable growth calculations to work, all items involved in the formulas must increase at the same rate. If any items do not change at the same rate, the formulas will not work properly.

CONCEPT QUESTIONS

1. What are the determinants of growth?
2. How is a firm's sustainable growth related to its accounting return on equity (ROE)?
3. What does it mean if a firm's sustainable growth rate is negative?

4.5**SOME CAVEATS ON FINANCIAL PLANNING MODELS**

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 would 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 is a negotiated result between all the different parties to the process. In practice, long-term financial planning in some corporations relies too much on a top-down approach. Senior management has a growth target in mind and it is up to the planning staff to rework and ultimately deliver a plan to meet that target. Such plans are often made feasible (on paper or a computer screen) by unrealistically optimistic assumptions on sales growth and target debt/equity ratios. The plans collapse when lower sales make it impossible to service debt. This is what happened to Campeau's takeover of Federated Department Stores, as we discuss in Chapter 23.

As a negotiated result, the final plan implicitly contains different goals in different areas and also satisfies 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

1. What are some important elements often missing in financial planning models?
2. Why do we say that planning is an iterative process?

4.6**SUMMARY AND CONCLUSIONS**

Financial planning forces the firm to think about the future. We have examined a number of features of the planning process. We describe what financial planning can accomplish and the components of a financial model. We go on to develop the relationship between growth and financing needs. Two growth rates, internal and sustainable, are summarized in Table 4.9. The table recaps the key difference between the two growth rates. The internal growth rate is the maximum growth rate that can be achieved with no external financing of any kind. The sustainable growth rate is the maximum growth rate that can be achieved with no external equity financing while maintaining a constant debt/equity ratio. For Hoffman, the internal growth rate is 9.65 percent and the sustainable growth rate is 21.3 percent. The sustainable growth rate is higher because the calculation allows for debt financing up to a limit set by the target debt/equity ratio. We discuss how a financial planning model is useful in exploring that relationship.

Corporate financial planning should not become a purely mechanical activity. When it does, it probably focuses 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 backwards.

TABLE 4.9
Summary of internal and sustainable growth rates from Hoffman Company example

I. INTERNAL GROWTH RATE

$$\text{Internal growth rate} = \frac{\text{ROA} \times R}{1 - \text{ROA} \times R} = \frac{.132 \times 2/3}{1 - 0.132 \times 2/3} = 9.65\%$$

where

ROA = Return on assets = Net income/Total assets = 13.2%

R = Plowback (retention) ratio = $2/3$

= Addition to retained earnings/Net income

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

II. SUSTAINABLE GROWTH RATE

$$\text{Sustainable growth rate} = \frac{\text{ROE} \times R}{1 - \text{ROE} \times R} = \frac{0.264 \times (2/3)}{1 - 0.264 \times (2/3)} = 21.3\%$$

where

ROE = Return on equity = Net income/Total equity = 26.4%

R = Plowback (retention) ratio = $2/3$

= Addition to retained earnings/Net income

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

Key Terms

aggregation (page 88)

capital intensity ratio (page 94)

debt capacity (page 100)

dividend payout ratio (page 93)

external financing needed (EFN) (page 94)

internal growth rate (page 99)

percentage of sales approach (page 92)

planning horizon (page 88)

retention ratio or plowback ratio (page 93)

sustainable growth rate (page 100)

Chapter Review Problems and Self-Test

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	
Sales	\$4,250.0	<i>Assets</i>	<i>Liabilities and Owner's Equity</i>
Costs	<u>3,876.0</u>	Current assets	\$ 900
Taxable income	\$ 374.0	Net fixed assets	<u>2,200</u>
Taxes (34%)	<u>127.2</u>	Total	<u>\$3,100</u>
Net income	<u>\$ 246.8</u>		Long-term debt
			\$1,800
			Owners' equity
			<u>800</u>
			Total liabilities and owners' equity
			<u>\$3,100</u>
Dividends	\$ 82.4		
Addition to retained earnings	164.4		

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 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	<u>4,263.6</u>	91.2% of sales
Taxable income	\$ 411.4	
Taxes (34%)	<u>\$ 139.9</u>	
Net income	<u>\$ 271.5</u>	
Dividends	\$ 90.6	33.37% of net income
Addition to retained earnings	180.9	

Balance Sheet					
<i>Assets</i>		<i>Liabilities and Owners' Equity</i>			
Current assets	\$ 990.0	21.18%	Current liabilities	\$ 550	11.76%
Net fixed assets	<u>2,420.0</u>	51.76%	Long-term debt	\$1,800.0	n/a
Total assets	<u>\$3,410.0</u>	<u>72.94%</u>	Owners' equity	<u>980.9</u>	n/a
			Total liabilities and owners' equity	<u>3,330.9</u>	n/a
			EFN	<u>\$ 79.1</u>	<u>n/a</u>

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

$$\begin{aligned} \$4,250 &= .60 \times \text{Full-capacity sales} \\ \$7,083 &= \text{Full-capacity sales} \end{aligned}$$

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 $\$79.1 - 220 = -\140.9 , 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 $\$79.1 - 121.3 = \42.2 , a surplus. No additional financing is needed.

- 4.3 Skandia retains $R = 1 - .3337 = 66.63\%$ of net income. Return on assets is $\$246.8/3,100 = 7.96\%$. The internal growth rate is:

$$\frac{ROA \times R}{1 - ROA \times R} = \frac{.0796 \times .6663}{1 - .0796 \times .6663} = 5.60\%$$

Return on equity for Skandia is $\$246.8/800 = 30.85\%$, so we can calculate the sustainable growth rate as:

$$\frac{ROE \times R}{1 - ROE \times R} = \frac{.3085 \times .6663}{1 - .3085 \times .6663} \\ R = 25.87\%$$

Concepts Review and Critical Thinking Questions

- Why do you think most long-term financial planning begins with sales forecasts? Put differently, why are future sales the key input?
- 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?
- Testaburger, Ltd., 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?
- 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 paycheques began to bounce. Finally, out of cash, the company ceased operations entirely in January 1995.
- Do you think the company would have suffered the same fate if its product had been less popular? Why or why not?
- 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?
- 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?
- 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?
- Which is the biggest culprit here: too many orders, too little cash, or too little production capacity?
- 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 1. **Pro Forma Statements** Consider the following simplified financial statements for the Fisk Corporation (assuming no income taxes):

Income Statement		Balance Sheet			
Sales	\$16,000	Assets	\$8,900	Debt	\$5,100
Costs	12,500			Equity	3,800
Net income	<u>\$ 3,500</u>	Total	<u>\$8,900</u>	Total	<u>\$8,900</u>

Fisk 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?

Basic
(continued)

2. **Pro Forma Statements and EFN** In the previous question, assume Fisk 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	\$4,400	Assets	\$13,400	Debt	\$9,100
Costs	<u>2,685</u>			Equity	<u>4,300</u>
Net income	<u>\$1,715</u>	Total	<u>\$13,400</u>	Total	<u>\$13,400</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 \$5,192. What is the external financing needed?

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

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	<u>\$3,650</u>	Total	<u>\$93,000</u>	Total	<u>\$93,000</u>
Taxes (34%)	1,241				
Net income	<u>\$ 2,409</u>				

Assets and costs are proportional to sales. Debt and equity are not. A dividend of \$963.60 was paid, and McGillicuddy wishes to maintain a constant payout ratio. Next year's sales are projected to be \$23,040. What is the external financing needed?

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

Income Statement		Balance Sheet			
Sales	\$3,600	Current Assets	\$4,500	Current Liabilities	\$ 920
Costs	<u>2,900</u>	Fixed Assets	3,900	Long-term debt	1,840
Taxable income	<u>\$ 700</u>			Equity	<u>\$5,640</u>
Taxes (34%)	<u>238</u>	Total	<u>\$8,400</u>	Total	<u>\$8,400</u>
Net income	<u>\$ 462</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 15%. What is the external financing needed?

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

Income Statement		Balance Sheet			
Sales	\$10,400	Current Assets	\$11,000	Debt	\$22,000
Costs	<u>6,820</u>	Fixed Assets	<u>27,000</u>	Equity	<u>16,000</u>
Taxable income	<u>\$ 3,580</u>	Total	<u>\$38,000</u>	Total	<u>\$38,000</u>
Taxes (34%)	<u>1,217</u>				
Net income	<u>\$ 2,363</u>				

Assets and costs are proportional to sales. Debt and equity are not. Panama 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 Fontenot Co. are shown here:

Income Statement		Balance Sheet			
Sales	\$54,000	Current Assets	\$ 26,000	Long-term Debt	\$ 58,000
Costs	<u>34,800</u>	Fixed Assets	<u>105,000</u>	Equity	<u>73,000</u>
Taxable income	<u>\$19,200</u>	Total	<u>\$131,000</u>	Total	<u>\$131,000</u>
Taxes (34%)	<u>6,528</u>				
Net income	<u>\$12,672</u>				

Basic
(continued)

Assets and costs are proportional to sales. The company 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?

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

ARMOUR CORPORATION Income Statement	
Sales	\$29,000
Costs	<u>11,200</u>
Taxable income	\$17,800
Taxes (34%)	<u>6,052</u>
Net income	<u>\$11,748</u>
Dividends	\$4,935
Addition to retained earnings	6,813

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 Armour 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.

ARMOUR CORPORATION Balance Sheet					
Assets			Liabilities and Owners' Equity		
	\$	Percentage of Sales		\$	Percentage of Sales
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, no new external debt or equity financing, and a constant payout ratio.
12. **Internal Growth** If Highfield Hobby Shop has a 10 percent ROA and a 20 percent payout ratio, what is its internal growth rate?
13. **Sustainable Growth** If the Layla Corp. has a 19 percent ROE and a 25 percent payout ratio, what is its sustainable growth rate?
14. **Sustainable Growth** Based on the following information, calculate the sustainable growth rate for Kaleb's Kickboxing:
- | | |
|-------------------------|------------|
| Profit margin | = 8.9% |
| Capital intensity ratio | = .55 |
| Debt-equity ratio | = .60 |
| Net income | = \$29,000 |
| Dividends | = \$15,000 |
- What is the ROE here?
15. **Sustainable Growth** Assuming the following ratios are constant, what is the sustainable growth rate?
- | | |
|----------------------|--------|
| Total asset turnover | = 1.40 |
| Profit margin | = 7.6% |
| Equity multiplier | = 1.50 |
| Payout ratio | = 40% |

Intermediate
(Questions
16–29)

16. **Full-Capacity Sales** Thorpe Mfg., Inc., is currently operating at only 85 percent of fixed asset capacity. Current sales are \$510,000. 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 \$415,000 and sales are projected to grow to \$680,000. How much in new fixed assets are required to support this growth in sales?
18. **Full-Capacity Sales** If a company is operating at 70 percent of fixed asset capacity and current sales are \$250,000, how fast can that company grow before any new fixed assets are needed?
19. **Full-Capacity Sales** Red Brick Manufacturing sold \$300,000 of red bricks in the last year. They were operating at 91 percent of fixed asset capacity. How fast can Red Brick grow before they need to purchase new fixed assets?
20. **Growth and Profit Margin** Top Hat Co. wishes to maintain a growth rate of 8 percent a year, a debt-equity ratio of .40, and a dividend payout ratio of 50 percent. The ratio of total assets to sales is constant at 1.30. What profit margin must the firm achieve?
21. **Growth and Debt-Equity Ratio** A firm wishes to maintain a growth rate of 11 percent and a dividend payout ratio of 60 percent. The ratio of total assets to sales is constant at .9, and profit margin is 9.5 percent. If the firm also wishes to maintain a constant debt-equity ratio, what must it be?
22. **Growth and Assets** A firm wishes to maintain an internal growth rate of 9 percent and a dividend payout ratio of 30 percent. The current profit margin is 8 percent and the firm uses no external financing sources. What must total asset turnover be?



23. **Sustainable Growth** Based on the following information, calculate the sustainable growth rate for Hendrix Guitars, Inc.:
- | | |
|----------------------|--------|
| Profit margin | = 6.4% |
| Total asset turnover | = 1.80 |
| Total debt ratio | = .60 |
| Payout ratio | = 60% |
- What is the ROA here?

24. **Sustainable Growth and Outside Financing** You've collected the following information about Bad Company, Inc.:

Sales	= \$140,000
Net income	= \$21,000
Dividends	= \$12,000
Total debt	= \$85,000
Total equity	= \$49,000

What is the sustainable growth rate for Bad Company, 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?



25. **Sustainable Growth Rate** No Return, Inc., had equity of \$165,000 at the beginning of the year. At the end of the year, the company had total assets of \$250,000. During the year the company sold no new equity. Net income for the year was \$80,000 and dividends were \$49,000. What is the sustainable growth rate for the company? What is the sustainable growth rate if you use the formula $ROE \times R$ and beginning of period equity? What is the sustainable growth rate if you use end of period equity in this formula? Is this number too high or too low? Why?
26. **Internal Growth Rates** Calculate the internal growth rate for the company in the previous problem. Now calculate the internal growth rate using $ROA \times R$ for both beginning of period and end of period total assets. What do you observe?
27. **Calculating EFN** The most recent financial statements for Moose Tours, Inc., follow. Sales for 2007 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?

MOOSE TOURS, INC.
2006 Income Statement

Sales		\$905,000
Costs		710,000
Other expenses		12,000
Earnings before interest and taxes		\$183,000
Interest paid		19,700
Taxable income		\$163,300
Taxes (35%)		57,155
Net income		\$106,145
Dividends	\$42,458	
Addition to retained earnings	63,687	

Intermediate
(continued)MOOSE TOURS, INC.
Balance Sheet as of December 31, 2006

Assets		Liabilities and Owners' Equity	
Current assets		Current liabilities	
Cash	\$ 25,000	Accounts payable	\$ 65,000
Accounts receivable	43,000	Notes payable	9,000
Inventory	76,000	Total	\$ 74,000
Total	\$144,000	Long-term debt	\$156,000
Fixed assets		Owners' equity	
Net plant and equipment	\$364,000	Common stock and paid-in surplus	\$ 21,000
		Retained earnings	257,000
		Total	\$278,000
Total assets	\$508,000	Total liabilities and owners' equity	\$508,000



28. **Capacity Usage and Growth** In the previous problem, suppose the firm was operating at only 80 percent capacity in 2004. What is EFN now?

29. **Calculating EFN** In Problem 25, suppose the firm wishes to keep its debt-equity ratio constant. What is EFN now?



30. **EFN and Internal Growth** Redo Problem 25 using sales growth rates of 15 and 25 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?

Challenge
(Questions
30–32)

31. **EFN and Sustainable Growth** Redo Problem 27 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?

32. **Constraints on Growth** Bulla Recording, Inc., wishes to maintain a growth rate of 14 percent per year and a debt-equity ratio of .30. Profit margin is 6.2 percent, and the ratio of total assets to sales is constant at 1.55. Is this growth rate possible? To answer, determine what the dividend payout ratio must be. How do you interpret the result?

MINI CASE

You are an analyst for a major investment bank, and your manager has asked you to develop pro forma financial information for Skyline Incorporated. You have contacted management at Skyline, who have provided you with the following financial statements for 2006:

Income Statement for the Year Ended December 31, 2006 (in 000s)	
Sales	\$ 10,430
Cost of goods sold	4,339
Operating expenses	2,100
Depreciation	765
EBIT	\$ 3,226
Interest	315
Taxable income	\$ 2,911
Taxes (at 35%)	1,019
Net income	\$ 1,892

Balance Sheet as at December 31, 2006 (in 000s)

Assets	
Cash	\$ 795
Accounts receivable	1,550
Inventory	963
Total current assets	\$ 3,308
Fixed assets	14,743
Total assets	\$ 18,051
Liabilities and Owners' Equity	
Accounts payable	\$ 1,032
Short-term debt	550
Total current liabilities	\$ 1,582
Long-term debt	2,527
Total liabilities	\$ 4,109
Common shares	9,725
Retained earnings	4,217
Total liabilities and owners' equity	\$ 18,051

MINI CASE (continued)

You also asked a number of specific questions about the company's expected performance in the next year, and were provided with the following:

- Projected sales for 2007 (in 000s)

January	\$ 150	July	\$1,425
February	150	August	1,275
March	150	September	1,200
April	1,275	October	450
May	2,469	November	150
June	1,950	December	150
 - While demand for the company's products is highly seasonal, the firm's labour availability and plant capacity mean it must undertake even production throughout the year.
 - Skyline is expecting its cost of goods sold to increase with the rate of inflation, or about 0.5% each quarter through 2007.
 - Accounts payable are paid two months after the material is used in production. Labour costs must be paid immediately.
 - Labour is approximately 65% of the cost of goods sold.
 - Depreciation for 2007 is expected to be \$625,000.
 - A minimum cash balance of \$1,100 is required to operate the company.
 - Taxes are paid each December.
 - A total of \$850,000 of the long-term debt will be due this June (with no more issued).
 - The firm has access to a line of credit for any cash shortfalls.
- a) Prepare quarterly pro forma financial statements for 2007 (discuss any necessary assumptions).
 - b) Your manager is concerned that with present poor economic conditions, Skyline's second quarter sales could be as much as 25 percent lower. However, an economic recovery is predicted by some and would result in sales that are 10 percent higher through the last three quarters. Adjust the pro forma statements to reflect these possibilities.
 - c) If there are 1,500,000 common shares in Skyline, how much is each share worth right now (at the start of 2007)? How much will they be worth at the end of 2007 if the projections in part (a) are correct?
 - d) Skyline's bank is considering placing a new limit of \$2,500,000 on the company's line of credit. If all the company's short-term debt is on this line of credit, is there a possible cash flow concern for the company under each of the scenarios?

S&P Problems

1. **Calculating EFN** Find the income statements and balance sheets for Magna International (MGA). Assuming sales grow by 10 percent, what is the EFN for Magna 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. Magna 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 Potash Corporation of Saskatchewan Inc. (POT) and CanWest Global Communications (CWG). For each company, calculate 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?

**STANDARD
& POOR'S**

Internet Application Questions



1. Go to www.globeinvestor.com and enter the ticker symbol "TRP-T" for TransCanada Pipelines. When you get the quote, follow the "Reports" link. What is projected earnings growth for next year? For the next five years? How do these earnings growth projections compare to the industry and to the TSX-S&P index?
2. You can find the homepage for Barrick at www.barrick.com. Go to the Annual Report. Using the growth in sales for the most recent year as the projected sales growth rate for next year, construct a pro forma income statement and balance sheet.
3. Locate the most recent annual financial statements for Canadian Tire at www.canadiantire.ca by clicking on "Investor Relations" and then on "Annual/Quarterly Reports." Using the information from the financial statements, what is the internal growth rate for Canadian Tire? What is the sustainable growth rate?

Suggested Readings

A useful textbook on financial planning is:

Higgins, R. C. *Analysis for Financial Management*. 8th ed. McGraw-Hill Irwin, 2007.

Sustainable growth is discussed in:

Higgins, R. C. "Sustainable Growth under Inflation." *Financial Management* 10, Autumn 1981.

For a critical discussion of sustainable growth, see:

Rappaport, A. *Creating Shareholder Value: The New Standard for Business Performance*. New York: Free Press, 1986.

APPENDIX 4A

A FINANCIAL PLANNING MODEL FOR THE HOFFMAN COMPANY

In this Appendix, we discuss how to get started with building a financial planning model in somewhat greater detail.⁹ Our goal is to build a simple model for the Hoffman Company, incorporating some features commonly found in planning models. This model includes our earlier percentage of sales approach as a special case, but it is more flexible and a little more realistic. It is by no means complete, but it should give you a good idea of how to proceed.

Table 4A.1 shows the financial statements for the Hoffman Company in slightly more detail than we had before. Primarily, we have separated out depreciation and interest. We have also included some abbreviations that we use to refer to the various items on these statements.

As we have discussed, it is necessary to designate a plug. We use new borrowing as the plug in our model, and we assume Hoffman does not issue new equity. This means our model allows the debt/equity ratio to change if needed. Our model takes a sales forecast as its input and supplies the pro forma financial statements as its output.

To create our model, we take the financial statements and replace the numbers with formulas describing their relationships. In addition to the preceding symbols, we use E_0 to stand for the beginning equity.

In Table 4A.2, the symbols a_1 through a_7 are called the *model parameters*. These describe the relationships among the variables. For example, a_7 is the relationship between sales and total assets, and it can be interpreted as the capital intensity ratio:

$$TA = a_7 \times S$$

$$a_7 = TA/S = \text{Capital intensity ratio}$$

TABLE 4A.1

HOFFMAN COMPANY					
Income Statement and Balance Sheet					
Income Statement					
Sales	(S)				\$500
Costs	(C)				235
Depreciation	(DEP)				120
Interest	(INT)				45
Taxable income	(TI)				100
Taxes	(T)				34
Net income	(NI)				\$ 66
Addition to retained earnings	(ARE)		\$22		
Dividends	(DIV)		\$44		
Balance Sheet					
	Assets			Liabilities	
Current assets	(CA)	\$ 400	Total debt	(D)	\$ 450
Net fixed assets	(FA)	600	Owners' equity	(E)	550
Total assets	(TA)	<u>\$1,000</u>	Total liabilities	(L)	<u>\$1,000</u>

⁹ This Appendix draws, in part, from R. A. Brealey and S. C. Myers, *Principles of Corporate Finance*, 3d ed. (New York: McGraw-Hill Book Company, 1984), chap. 28.

TABLE 4A.2

HOFFMAN COMPANY
Long-Term Financial Planning Model

Income Statement			
Sales			$S = \text{Input by user}$
Costs			$C = a_1 \times S$
Depreciation			$DEP = a_2 \times FA$
Interest			$INT = a_3 \times D$
Taxable income			$TI = S - C - DEP - INT$
Taxes			$T = a_4 \times TI$
Net income			$NI = TI - T$
Addition to retained earnings			$ARE = NI - DIV$
Dividends			$DIV = a_5 \times NI$
Balance Sheet			
<i>Assets</i>		<i>Liabilities</i>	
Current assets	$CA = TA - FA$	Total debt	$D = TA - E$
Net fixed assets	$FA = a_6 \times TA$	Owners' equity	$E = E_0 + ARE$
Total assets	<u>$TA = a_7 \times S$</u>	Total liabilities	<u>$L = TA$</u>

Similarly, a_3 is the relationship between total debt and interest paid, so a_3 can be interpreted as an overall interest rate. The tax rate is given by a_4 , and a_5 is the dividend payout ratio.

This model uses new borrowing as the plug by first setting total liabilities and owners' equity equal to total assets. Next, the ending amount for owners' equity is calculated as the beginning amount, E_0 , plus the addition to retained earnings, ARE . The difference between these amounts, $TA - E$, is the new total debt needed to balance the balance sheet.

The primary difference between this model and our earlier EFN approach is that we have separated out depreciation and interest. Notice that a_2 expresses depreciation as a fraction of beginning fixed assets. This, along with the assumption that the interest paid depends on total debt, is a more realistic approach than we used earlier. However, since interest and depreciation now do not necessarily vary directly with sales, we no longer have a constant profit margin.

Model parameters a_1 to a_7 can be based on a simple percentage of sales approach, or they can be determined by any other means that the model builder wishes. For example, they might be based on average values for the last several years, industry standards, subjective estimates, or even company targets. Alternatively, sophisticated statistical techniques can be used to estimate them.

We finish this discussion by estimating the model parameters for Hoffman using simple percentages and then generating pro forma statements for a \$600 predicted sales level. We estimate the parameters as:

$$\begin{aligned}
 a_1 &= \$235/500 = .47 = \text{Cost percentage} \\
 a_2 &= \$120/600 = .20 = \text{Depreciation rate} \\
 a_3 &= \$45/450 = .10 = \text{Interest rate} \\
 a_4 &= \$34/100 = .34 = \text{Tax rate} \\
 a_5 &= \$44/66 = 2/3 = \text{Payout ratio} \\
 a_6 &= \$600/1,000 = .60 = \text{Fixed assets/Total assets} \\
 a_7 &= \$1,000/500 = 2 = \text{Capital intensity ratio}
 \end{aligned}$$

With these parameters and a sales forecast of \$600, our pro forma financial statements are shown in Table 4A.3.¹⁰

What our model is now telling us is that a sales increase of \$100 requires \$200 in net new assets (since the capital intensity ratio is 2). To finance this, we use \$24 in internally generated funds. The balance of \$200 – \$24 = \$176 has to be borrowed. This amount is the increase in total debt on the balance sheet: \$626 – \$450 = \$176. If we pursue this plan, our profit margin would decline somewhat and the debt/equity ratio would rise.

Appendix Questions and Problems

Consider the following simplified financial statements from the Hoffman Company.

HOFFMAN COMPANY			
Income Statement and Balance Sheet			
Income Statement			
Sales			\$5,623
Costs			<u>4,500</u>
Taxable income			\$ 1,123
Taxes			<u>381</u>
Net income			<u>\$ 742</u>
Addition to retained earnings		\$247	
Dividends		\$495	
Balance Sheet			
<i>Assets</i>		<i>Liabilities</i>	
Current assets	\$3,000	Total debt	\$3,375
Net fixed assets	<u>4,500</u>	Owners' equity	<u>4,125</u>
Total assets	<u>\$7,500</u>	Total liabilities	<u>\$7,500</u>

- A.1** Prepare a financial planning model along the lines of our model for the Hoffman Company. Estimate the values for the model parameters using percentages calculated from these statements. Prepare the pro forma statements by recalculating the model by hand three or four times.
- A.2** Modify the model in the previous question so that borrowing doesn't change and new equity sales are the plug.
- A.3** This is a challenge question. How would you modify the model for Hoffman Company if you wanted to maintain a constant debt/equity ratio?
- A.4** This is a challenge question. In our financial planning model for Hoffman, show that it is possible to solve algebraically for the amount of new borrowing. Can you interpret the resulting expression?

TABLE 4A.3

HOFFMAN COMPANY			
Pro Forma Financial Statements			
Income Statement			
Sales	(S)		\$600 = Input
Cost of sales	(C)		282 = .47 × \$600
Depreciation	(DEP)		144 = .20 × \$720
Interest	(INT)		<u>63 = .10 × \$626</u>
Taxable income	(TI)		\$111 = \$600 – 282 – 144 – 63
Taxes	(T)		<u>38 = .34 × \$111</u>
Net income	(NI)		<u>\$ 73 = \$111 – 38</u>

¹⁰ If you put this model in a standard computer spreadsheet (as we did to generate the numbers), the software may “complain” that a “circular” reference exists, because the amount of new borrowing depends on the addition to retained earnings, the addition to retained earnings depends on the interest paid, the interest paid depends on the borrowing, and so on. This isn't really a problem; we can have the spreadsheet recalculated a few times until the numbers stop changing.

There really is no circular problem with this method because there is only one unknown, the ending total debt, which we can solve for explicitly. This will usually be the case as long as there is a single plug variable. The algebra can get to be somewhat tedious, however. See the problems at the end of this Appendix for more information.

APPENDIX 4B

DERIVATION OF THE SUSTAINABLE GROWTH FORMULA

$$\begin{aligned} \text{EFN} &= \text{Increase in total assets} - \text{Addition to retained earnings} && [4B.1] \\ &= \text{New borrowing} \\ &= A(g) - p(S)R \times (1 + g) - pS(R) \times (1 + g)[D/E] \end{aligned}$$

Since

$$\begin{aligned} \text{EFN} &= 0 \\ 0 &= A(g) - pS(R)(1 + g)[1 + D/E] \\ &= -pS(R)[1 + D/E] + [A - pS(R) \times (1 + D/E)]g \end{aligned}$$

Dividing through by A gives:

$$\begin{aligned} &= -p(S/A)(R)[1 + D/E] + [1 - p(S/A)(R) \times (1 + D/E)]g \\ g^* &= \frac{p(S/A)(R)[1 + D/E]}{1 - p(S/A)(R)[1 + D/E]} \end{aligned}$$

In the last chapter, we saw that the return on equity could be decomposed into its various components using the Du Pont identity. Recall that from the Du Pont identity, ROE can be written as:

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

Using our current symbols for these ratios, ROE is:

$$\text{ROE} = p(S/A)(1 + D/E) \quad [4B.2]$$

$$g^* = \frac{\text{ROE} \times R}{1 - \text{ROE} \times R}$$



Ratios and Financial Planning at S&S Air, Inc.

Chris Guthrie was recently hired by S&S Air, Inc., to assist the company with its financial planning, and to evaluate the company's performance. Chris graduated from university five years ago with a finance degree. He has been employed in the finance department of a Fortune 500 company since then.

S&S Air was founded 10 years ago by friends Mark Sexton and Todd Story. The company has manufactured and sold light airplanes over this period, and the company's products have received high reviews for safety and reliability. The company has a niche market in that it sells primarily to individuals who own and fly their own airplanes. The company has two models, the Birdie, which sells for \$53,000, and the Eagle, which sells for \$78,000.

While the company manufactures aircraft, its operations are different from those of commercial aircraft companies. S&S Air builds aircraft to order. By using prefabricated parts, the company is able to complete the manufacture of an airplane in only five weeks. The company also receives a deposit on each order, as well as another partial payment before the order is complete. In contrast, a commercial air-

plane may take one and a half to two years to manufacture an airplane once the order is placed.

Mark and Todd have provided the following financial statements. Chris has gathered the industry ratios for the light airplane manufacturing industry.

S&S Air, Inc. 2006 Income Statement

Sales	\$12,870,000
Cost of goods sold	9,070,000
Other expenses	1,538,000
Depreciation	420,000
EBIT	\$ 1,842,000
Interest	231,500
Taxable income	\$ 1,610,500
Taxes (40%)	644,200
Net income	\$ 966,300
Dividends	\$289,890
Add. to retained earnings	676,410



MINI CASE (continued)

S&S Air, Inc. 2006 Balance Sheet

Assets		Liabilities & Equity	
Current assets		Current liabilities	
Cash	\$ 234,000	Accounts payable	\$ 497,000
Accounts receivable	421,000	Notes payable	1,006,000
Inventory	472,000	Total current liabilities	<u>1,503,000</u>
Total current assets	<u>\$1,127,000</u>	Long-term debt	<u>\$2,595,000</u>
Fixed assets		Shareholder equity	
Net plant and equipment	<u>\$7,228,000</u>	Common stock	\$ 100,000
		Retained earnings	<u>4,157,000</u>
		Total equity	<u>\$4,257,000</u>
Total assets	<u>\$8,355,000</u>	Total liabilities & equity	<u>\$8,355,000</u>

Light Airplane Industry Ratios

	Lower Quartile	Median	Upper Quartile
Current ratio	0.50	1.43	1.89
Quick ratio	0.21	0.38	0.62
Cash ratio	0.08	0.21	0.39
Total asset turnover	0.68	0.85	1.38
Inventory turnover	4.89	6.15	10.89
Receivables turnover	6.27	9.82	14.11
Total debt ratio	0.44	0.52	0.61
Debt-equity ratio	0.79	1.08	1.56
Equity multiplier	1.79	2.08	2.56
Times interest earned	5.18	8.06	9.83
Cash coverage ratio	5.84	8.43	10.27
Profit margin	4.05%	6.98%	9.87%
Return on assets	6.05%	10.53%	13.21%
Return on equity	9.93%	16.54%	26.15%

Questions

- Calculate the following ratios for S&S Air: current ratio, quick ratio, cash ratio, total asset turnover, inventory turnover, receivables turnover, total debt ratio, debt-equity ratio, equity multiplier, times interest earned, cash coverage, profit margin, return on assets, and return on equity.
- Mark and Todd agree that a ratio analysis can provide a measure of the company's performance. They have chosen Bombardier Aerospace as an aspirant company. Would you choose Bombardier Aerospace as an aspirant company? Why or why not?
- Compare the performance of S&S Air to the industry average. For each ratio, comment on why it might be viewed as positive or negative relative to the industry. Suppose you create an inventory ratio calculated by inventory divided by current liabilities. How do you think S&S Air's ratio would compare to the industry average?
- Calculate the internal growth rate and sustainable growth rate for S&S Air. What do these numbers mean?
- S&S Air is planning for a growth rate of 20 percent next year. Calculate EFN assuming the company is operating at full capacity.
- Most assets can be increased as a percentage of sales. For instance, cash can be increased by any amount. Fixed assets often must be increased in specific amounts since it is usually impossible or impractical to buy part of a new plant or machine. So, assume S&S Air cannot increase fixed assets as a percentage of sales. Instead, whenever the company needs to purchase new manufacturing equipment, it must purchase in the amount of \$3,000,000. Calculate the new EFN with this assumption. What does this imply about capacity utilization for the company next year?

