LONG-TERM FINANCIAL PLANNING AND GROWTH

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On February 11, 2000, JetBlue Airways took to the sky. The company, which started as a low-cost commuter airline, offered such amenities as leather seats and free satellite TV to all passengers. To the surprise of many people, the company took off. During a period of turmoil and huge losses for most companies in the industry, JetBlue posted profits for 19 consecutive quarters and became the airline darling of Wall Street investors. Unfortunately, it is said that what goes up must come down, and so it went for JetBlue. The company altered its strategy when it changed its fleet to have more than one type of aircraft. It continued to expand aggressively while fuel prices were soaring. Due in part to the company's rapid expansion, its on-time flights were the second worst in the industry.

Another problem caused by the rapid expansion was JetBlue's debt, which ballooned as the company financed its rapid growth. The increased debt strained the company's cash flow. During the fourth quarter of 2005 and the first quarter of 2006, JetBlue posted a loss when other airlines were beginning to increase net income.

As JetBlue's experience shows, proper management of growth is vital. This chapter emphasizes the importance of planning for the future and discusses some tools firms use to think about, and manage, growth.

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

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 a firm makes. In the chapters ahead, we will examine in much more detail how these decisions are made.

We first describe what is usually meant by *financial planning*. For the most part, we talk about long-term planning. Short-term financial planning is discussed in a later chapter. We examine what the firm can accomplish by developing a long-term financial plan. To do this, we develop a

simple but 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, managers must establish certain basic elements of the firm's financial policy:

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

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

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

Financial planning forces the corporation to think about goals. A goal frequently espoused by corporations is growth, and almost all firms use an explicit, companywide growth rate as a major component of their long-term financial planning. For example, in May 2006, Toyota Motor announced that it planned to sell about 10.3 million vehicles in 2010, an increase of a million cars from its 2005 sales. The company expected a 35 percent sales increase in North America, while sales were expected to grow at 7 percent in Japan.

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

4.1 What Is Financial Planning?

Financial planning formulates the way in which financial goals are to be achieved. A financial plan is thus a statement of what is to be done in the future. Most decisions have long lead times, which means they take a long time to implement. In an uncertain world, this requires that decisions be made far in advance of their implementation. If a firm wants to build a factory in 2010, for example, it might have to begin lining up contractors and financing in 2008 or even earlier.

GROWTH AS A FINANCIAL MANAGEMENT GOAL

Because the subject of growth will be discussed in various places in this chapter, we need to start out with an important warning: Growth, by itself, is not an appropriate goal for the financial manager. Clothing retailer J. Peterman Co., whose quirky catalogs were made famous on the TV show *Seinfeld*, learned this lesson the hard way. Despite its strong brand

name and years of explosive revenue growth, the company was ultimately forced to file for bankruptcy—the victim of an overly ambitious, growth-oriented expansion plan.

Amazon.com, the big online retailer, is another example. At one time, Amazon's motto seemed to be "growth at any cost." Unfortunately, what really grew rapidly for the company were losses. Amazon refocused its business, explicitly sacrificing growth in the hope of achieving profitability. The plan seems to be working as Amazon.com turned a profit for the first time in the third quarter of 2003.

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

You can find growth rates under the research links at www.investor.reuters.com *and* finance.yahoo.com.

DIMENSIONS OF FINANCIAL PLANNING

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

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

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

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

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

1. *A worst case*: This plan would require making relatively pessimistic assumptions about the company's products and the state of the economy. This kind of disaster planning would emphasize a division's ability to withstand significant economic adversity, and it would require details concerning cost cutting and even divestiture and liquidation. For example, sales of SUVs were sluggish in 2006 because of high gas prices. That left auto manufacturers like Ford and GM with large inventories and resulted in large price cuts and discounts.
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).

WHAT CAN PLANNING ACCOMPLISH?

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

Examining Interactions As we discuss in greater detail in the following pages, the financial plan must make explicit the linkages between investment proposals for the different operating activities of the firm and its available financing choices. 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 allows 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 optimal financing arrangements are addressed. Options such as marketing new products or closing plants might be evaluated.

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

For example, in December 2005, Microsoft lowered the sales numbers on its new Xbox 360 from 3 million units to 2.5–2.75 million units during the first 90 days it was on the market. The fall in sales did not occur because of a lack of demand. Instead, Microsoft experienced a shortage of parts. Thus, a lack of planning for sales growth can be a problem for even the biggest companies.

Ensuring Feasibility and Internal Consistency Beyond a general goal of creating value, a firm will normally have many specific goals. Such goals might be couched in terms of market share, return on equity, financial leverage, and so on. At times, the 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 goals and objectives. In other words, financial planning is a way of verifying that the goals and plans made for specific areas of a firm's operations are feasible and internally consistent. Conflicting goals will often exist. To generate a coherent plan, goals and objectives will therefore have to be modified, and priorities will have to be established.

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

Conclusion Probably the most important result of the planning process is that it forces managers to think about goals and establish priorities. In fact, conventional business wisdom holds that financial plans don't work, but financial planning does. The future is inherently unknown. What we can do is establish the direction in which we want to travel and

make 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.

Concept Questions

4.1a What are the two dimensions of the financial planning process?

4.1b Why should firms draw up financial plans?

Financial Planning Models: A First Look

4.2

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

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 many other variables. Models can vary quite a bit in complexity, but almost all have the elements we discuss next.

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

Frequently, the sales forecast will be given as the growth rate in sales rather than as an explicit sales figure. These two approaches are essentially the same because we can calculate projected sales once we know the growth rate. Perfect sales forecasts are not possible, of course, because sales depend on the uncertain future state of the economy. To help a firm come up with its projections, some businesses specialize in macroeconomic and industry projections.

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

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

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

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

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

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

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

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

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

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

A SIMPLE FINANCIAL PLANNING MODEL

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

COMPUTERFIELD CORPORATION
Financial Statements

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

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

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

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

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

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

Planware provides insight into cash flow forecasting in its "White Papers" section (www.planware.org).

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. In this case, the addition to retained earnings is the full $240. Computerfield's equity will thus grow to $250 (the starting amount) plus $240 (net income), or $490, and debt must be retired to keep total assets equal to $600.

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

Pro Forma Balance Sheet			
Assets	$600 (+100)	Debt	$110 (−140)
		Equity	490 (+240)
Total	$600 (+100)	Total	$600 (+100)

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

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

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

Concept Questions

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

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

4.3 The Percentage of Sales Approach

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: 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 vary directly with sales and those that do not. Given a sales forecast, we will then be able to calculate how much financing the firm will need to support the predicted sales level.

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

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

THE INCOME STATEMENT

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

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

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

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

TABLE 4.1

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

TABLE 4.2

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

ratio was this:

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

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

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

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

$$\text{Projected dividends paid to shareholders} = \$165 \times 1/3 = \$\ 55$$
$$\text{Projected addition to retained earnings} = \$165 \times 2/3 = \ 110$$
$$\$165$$

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

THE BALANCE SHEET

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

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

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

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

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

TABLE 4.3

ROSENGARTEN CORPORATION
Balance Sheet

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

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

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

Similarly, we use "n/a" for long-term debt because it won't automatically change with sales. The same is true for common stock and paid-in surplus. The last item on the right side, retained earnings, will vary with sales, but it won't be a simple percentage of sales. Instead, we will explicitly calculate the change in retained earnings based on our projected net income and dividends.

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

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

TABLE 4.4

ROSENGARTEN CORPORATION
Partial Pro Forma Balance Sheet

Assets			Liabilities and Owners' Equity		
	Present Year	Change from Previous Year		Present Year	Change from Previous Year
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					
Net plant and equipment	$2,250	$450	Owners' equity		
			Common stock and paid-in surplus	$ 800	$ 0
			Retained earnings	1,110	110
			Total	$1,910	$110
Total assets	$3,750	$750	Total liabilities and owners' equity	$3,185	$185
			External financing needed	$ 565	$565

A PARTICULAR SCENARIO

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

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

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

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

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

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

TABLE 4.5

ROSENGARTEN CORPORATION
Pro Forma Balance Sheet

Assets			Liabilities and Owners' Equity		
	Present Year	Change from Previous Year		Present Year	Change from Previous Year
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					
Net plant and equipment	$2,250	$450	Owners' equity		
			Common stock and paid-in surplus	$ 800	$ 0
			Retained earnings	1,110	110
			Total	$1,910	$110
Total assets	$3,750	$750	Total liabilities and owners' equity	$3,750	$750

AN ALTERNATIVE SCENARIO

The assumption that assets are a fixed percentage of sales is convenient, but it may not be suitable in many cases. In particular, note that we effectively assumed that 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. According to the Federal Reserve, the overall capacity utilization for U.S. industrial companies in April 2006 was 81.4 percent, up from a low of 73.9 percent in 2001.

For example, in early 2006, Kia Motors announced that it would build its first manufacturing plant in North America in Georgia. This followed recent announcements by Ford and General Motors that those companies would be closing plants in Georgia. Evidently, both Ford and General Motors had excess capacity, whereas Kia did not.

In another example, in early 2004, Simmons announced it was closing its mattress factory in Ohio. The company stated it would increase mattress production at other plants to compensate for the closing. Apparently, Simmons had significant excess capacity in its production facilities.

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

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

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

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

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

EXAMPLE 4.1 EFN and Capacity Usage

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

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

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

So, Rosengarten needs $1.62 in fixed assets for every $1 in sales once it reaches full capacity. At the projected sales level of $1,250, then, it needs $1,250 × 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, which is less than our original value of 3 because of the excess capacity.

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

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

Concept Questions

4.3a What is the basic idea behind the percentage of sales approach?

4.3b Unless it is modified, what does the percentage of sales approach assume about fixed asset capacity usage?

External Financing and Growth 4.4

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

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

EFN AND GROWTH

The first thing we need to do is establish the relationship between EFN and growth. To do this, we introduce the simplified income statement and balance sheet for the Hoffman Company in Table 4.6. Notice 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 that any such accounts have been netted out in current assets. Also, we continue to combine depreciation, interest, and costs on the income statement.

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

TABLE 4.6

HOFFMAN COMPANY
Income Statement and Balance Sheet

Income Statement

Sales		$500
Costs		400
Taxable income		$100
Taxes (34%)		34
Net income		$ 66
Dividends	$22	
Addition to retained earnings	44	

Balance Sheet

Assets			Liabilities and Owners' Equity		
	$	Percentage of Sales		$	Percentage of Sales
Current assets	$200	40%	Total debt	$250	n/a
Net fixed assets	300	60	Owners' equity	250	n/a
Total assets	$500	100%	Total liabilities and owners' equity	$500	n/a

TABLE 4.7

HOFFMAN COMPANY
Pro Forma Income Statement and Balance Sheet

Income Statement

Sales (projected)		$600.0
Costs (80% of sales)		480.0
Taxable income		$120.0
Taxes (34%)		40.8
Net income		$ 79.2
Dividends	$26.4	
Addition to retained earnings	52.8	

Balance Sheet

Assets			Liabilities and Owners' Equity		
	$	Percentage of Sales		$	Percentage of Sales
Current assets	$240.0	40%	Total debt	$250.0	n/a
Net fixed assets	360.0	60	Owners' equity	302.8	n/a
Total assets	$600.0	100%	Total liabilities and owners' equity	$552.8	n/a
			External financing needed	$ 47.2	n/a

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

WORK THE WEB

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

Revenue Est	Current Qtr Sep-06	Next Qtr Dec-06	Current Year Dec-06	Next Year Dec-07
Avg. Estimate	5.76B	5.75B	22.77B	24.27B
No. of Analysts	10	9	12	11
Low Estimate	5.65B	5.63B	22.49B	23.61B
High Estimate	5.87B	5.93B	23.09B	25.44B
Year Ago Sales	5.38B	N/A	N/A	22.77B
Sales Growth (year/est)	7.0%	N/A	N/A	6.6%

As shown, analysts expect, on average, revenue (sales) of $22.77 billion in 2006, growing to $24.27 billion in 2007, an increase of 6.6 percent. We also have the following table comparing MMM to some benchmarks:

Growth Est	MMM	Industry	Sector	S&P 500
Current Qtr.	1.8%	18.3%	16.2%	N/A
Next Qtr.	8.7%	36.7%	15.5%	N/A
This Year	5.2%	14.4%	17.1%	N/A
Next Year	11.2%	14.1%	13.6%	N/A
Past 5 Years (per annum)	1.2%	N/A	N/A	N/A
Next 5 Years (per annum)	11.0%	11.07%	12.57%	N/A
Price/Earnings (avg. for comparison categories)	16.7	17.34	17.13	N/A
PEG Ratio (avg. for comparison categories)	1.52	1.57	1.36	N/A

As you can see, the estimated earnings growth rate for MMM is lower than the industry and S&P 500 over the next five years. What does this mean for MMM stock? We'll get to that in a later chapter.

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

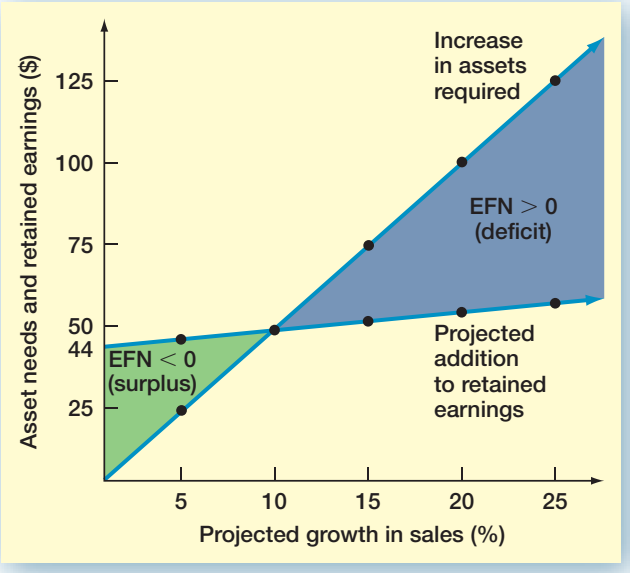
TABLE 4.8

Growth and Projected EFN for the Hoffman Company

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

FIGURE 4.1

Growth and Related Financing Needed for the Hoffman Company



the original assets of $500 multiplied by the growth rate. Similarly, the addition to retained earnings is equal to the original $44 plus $44 times the growth rate.

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

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

As this discussion shows, whether a firm runs a cash surplus or deficit depends on growth. Microsoft is a good example. Its revenue growth in the 1990s was amazing, averaging well over 30 percent per year for the decade. Growth slowed down noticeably over the 2000–2006 period; but nonetheless, Microsoft's combination of growth and substantial profit margins led to enormous cash surpluses. In part because Microsoft paid few or no dividends, the cash really piled up; in 2006, Microsoft's cash horde exceeded $38 billion.

FINANCIAL POLICY AND GROWTH

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

The Internal Growth Rate The first growth rate of interest is the maximum growth rate that can be achieved with no external financing of any kind. We will call this the **internal growth rate** because this is the rate the firm can maintain with internal financing only. In Figure 4.1, this internal growth rate is represented by the point where the two lines cross. At this point, the required increase in assets is exactly equal to the addition to retained earnings, and EFN is therefore zero. We have seen that this happens when the growth rate is slightly less than 10 percent. With a little algebra (see Problem 32 at the end of the chapter), we can define this growth rate more precisely:

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

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

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

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

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

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

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

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

There are various reasons why a firm might wish to avoid equity sales. For example, as we discuss in Chapter 16, new equity sales can be expensive. Alternatively, the current owners may not wish to bring in new owners or contribute additional equity. Why a firm might view a particular debt–equity ratio as optimal is discussed in Chapters 15 and 17; for now, we will take it as given.

Based on Table 4.8, the sustainable growth rate for Hoffman is approximately 20 percent because the debt–equity ratio is near 1.0 at that growth rate. The precise value can be calculated (see Problem 32 at the end of the chapter):

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

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

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

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

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

EXAMPLE 4.2 Sustainable Growth

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

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

HOFFMAN COMPANY
Pro Forma Income Statement

Sales (projected)		$606.8
Costs (80% of sales)		485.4
Taxable income		$121.4
Taxes (34%)		41.3
Net income		$ 80.1
Dividends	$26.7	
Addition to retained earnings	53.4	

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

HOFFMAN COMPANY
Pro Forma Balance Sheet

Assets			Liabilities and Owners' Equity		
	$	Percentage of Sales		$	Percentage of Sales
Current assets	$242.7	40%	Total debt	$250.0	n/a
Net fixed assets	364.1	60	Owners' equity	303.4	n/a
Total assets	$606.8	100%	Total liabilities and owners' equity	$553.4	n/a
			External financing needed	$ 53.4	n/a

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

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

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

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

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

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

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

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

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

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

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

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

TABLE 4.9
Summary of Internal and Sustainable Growth Rates

I. Internal Growth Rate

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

where

ROA = Return on assets = Net income/Total assets

b = Plowback (retention) ratio

= Addition to retained earnings/Net income

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

II. Sustainable Growth Rate

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

where

ROE = Return on equity = Net income/Total equity

b = Plowback (retention) ratio

= Addition to retained earnings/Net income

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

A NOTE ABOUT SUSTAINABLE GROWTH RATE CALCULATIONS

Very commonly, the sustainable growth rate is calculated using just the numerator in our expression, ROE $\times$ b. 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 principle, you'll get exactly the same sustainable growth rate regardless of which way you calculate it (as long as 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. Also, all of our comments here apply to the internal growth rate as well.

A simple example is useful to illustrate these points. Suppose a firm has a net income of \$20 and a retention ratio of .60. Beginning assets are \$100. The debt–equity ratio is .25, so beginning equity is \$80.

If we use beginning numbers, we get the following:

ROE = \$20/80 = .25 = 25%

Sustainable growth = .60 $\times$ .25 = .15 = 15%

For the same firm, ending equity is \$80 + .60 $\times$ \$20 = \$92. So, we can calculate this:

ROE = \$20/92 = .2174 = 21.74%

Sustainable growth = .60 $\times$ .2174/(1 − .60 $\times$ .2174) = .15 = 15%

These growth rates are exactly the same (after accounting for a small rounding error in the second calculation). See if you don't agree that the internal growth rate is 12%.

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 credit worthiness. They are aided in this exercise by several sophisticated computer software packages that provide detailed analyses of the company's past financial performance, including its annual sustainable growth rate.

Bankers use this information in several ways. Quick comparison of a company's actual growth rate to its sustainable rate tells the banker what issues will be at the top of management's financial agenda. If actual growth consistently exceeds sustainable growth, management's problem will be where to get the cash to finance growth. The banker thus can anticipate interest in loan products. Conversely, if sustainable growth consistently exceeds actual, the banker had best be prepared to talk about investment products, because management's problem will be what to do with all the cash that keeps piling up in the till.

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

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

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

Profit Margins and Sustainable Growth — EXAMPLE 4.3

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

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

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

$.10 = PM(1.5)(.6)/[1 - PM(1.5)(.6)]$

$PM = .1/.99 = 10.1\%$

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

Concept Questions

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

4.4b What are the determinants of growth?

4.5 Some Caveats Regarding 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 meaningful clues about what strategies will lead to increases in value. Instead, they divert the user's attention to questions concerning the association of, say, the debt–equity ratio and firm growth.

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

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

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

Concept Questions

4.5a What are some important elements that are often missing in financial planning models?

4.5b Why do we say planning is an iterative process?

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

Summary and Conclusions 4.6

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

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

CHAPTER REVIEW AND SELF-TEST PROBLEMS

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

SKANDIA MINING COMPANY
Financial Statements

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

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?

[2]We're not *exactly* sure what this means either, but we like the sound of it.

ANSWERS TO CHAPTER REVIEW AND SELF-TEST PROBLEMS

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

SKANDIA MINING COMPANY
Pro Forma Financial Statements

Income Statement

Sales	$4,675.0	Forecast
Costs	4,262.7	91.18% of sales
Taxable income	$ 412.3	
Taxes (34%)	140.2	
Net income	$ 272.1	
Dividends	$ 90.8	33.37% of net income
Addition to retained earnings	181.3	

Balance Sheet

Assets			Liabilities and Owner's Equity		
Current assets	$ 990.0	21.18%	Current liabilities	$ 550	11.76%
Net fixed assets	2,420.0	51.76%	Long-term debt	1,800.0	n/a
			Owners' equity	981.3	n/a
Total assets	$3,410.0	72.94%	Total liabilities and owners' equity	$3,331.3	n/a
			EFN	$ 78.7	n/a

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

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

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

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

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

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

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

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

CONCEPTS REVIEW AND CRITICAL THINKING QUESTIONS

1. **Sales Forecast** Why do you think most long-term financial planning begins with sales forecasts? Put differently, why are future sales the key input?
2. **Sustainable Growth** In the chapter, we used Rosengarten Corporation to demonstrate how to calculate EFN. The ROE for Rosengarten is about 7.3 percent, and the plowback ratio is about 67 percent. If you calculate the sustainable growth rate for Rosengarten, you will find it is only 5.14 percent. In our calculation for EFN, we used a growth rate of 25 percent. Is this possible? (*Hint:* Yes. How?)
3. **External Financing Needed** Testaburger, Inc., uses no external financing and maintains a positive retention ratio. When sales grow by 15 percent, the firm has a negative projected EFN. What does this tell you about the firm's internal growth rate? How about the sustainable growth rate? At this same level of sales growth, what will happen to the projected EFN if the retention ratio is increased? What if the retention ratio is decreased? What happens to the projected EFN if the firm pays out all of its earnings in the form of dividends?
4. **EFN and Growth Rates** Broslofski Co. maintains a positive retention ratio and keeps its debt–equity ratio constant every year. When sales grow by 20 percent, the firm has a negative projected EFN. What does this tell you about the firm's sustainable growth rate? Do you know, with certainty, if the internal growth rate is greater than or less than 20 percent? Why? What happens to the projected EFN if the retention ratio is increased? What if the retention ratio is decreased? What if the retention ratio is zero?

   Use the following information to answer the next six questions: A small business called The Grandmother Calendar Company began selling personalized photo calendar kits. The kits were a hit, and sales soon sharply exceeded forecasts. The rush of orders created a huge backlog, so the company leased more space and expanded capacity; but it still could not keep up with demand. Equipment failed from overuse and quality suffered. Working capital was drained to expand production, and, at the same time, payments from customers were often delayed until the product was shipped. Unable to deliver on orders, the company became so strapped for cash that employee paychecks began to bounce. Finally, out of cash, the company ceased operations entirely three years later.
5. **Product Sales** Do you think the company would have suffered the same fate if its product had been less popular? Why or why not?
6. **Cash Flow** The Grandmother Calendar Company clearly had a cash flow problem. In the context of the cash flow analysis we developed in Chapter 2, what was the impact of customers not paying until orders were shipped?
7. **Product Pricing** The firm actually priced its product to be about 20 percent less than that of competitors, even though the Grandmother calendar was more detailed. In retrospect, was this a wise choice?
8. **Corporate Borrowing** If the firm was so successful at selling, why wouldn't a bank or some other lender step in and provide it with the cash it needed to continue?
9. **Cash Flow** Which was the biggest culprit here: too many orders, too little cash, or too little production capacity?
10. **Cash Flow** What are some of the actions that a small company like The Grandmother Calendar Company can take if it finds itself in a situation in which growth in sales outstrips production capacity and available financial resources? What other options (besides expansion of capacity) are available to a company when orders exceed capacity?

QUESTIONS AND PROBLEMS

BASIC (Questions 1–15)

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

Income Statement		Balance Sheet			
Sales	$19,000	Assets	$9,900	Debt	$5,100
Costs	13,500			Equity	4,800
Net income	$ 5,500	Total	$9,900	Total	$9,900

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

2. Pro Forma Statements and EFN In the previous question, assume Parcells 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 Watchtower, Inc., are shown here (assuming no income taxes):

Income Statement		Balance Sheet			
Sales	$5,100	Assets	$14,500	Debt	$10,200
Costs	3,480			Equity	4,300
Net income	$1,620	Total	$14,500	Total	$14,500

Assets and costs are proportional to sales. Debt and equity are not. No dividends are paid. Next year's sales are projected to be $5,967. What is the external financing needed?

4. EFN The most recent financial statements for Last in Line, Inc., are shown here:

Income Statement		Balance Sheet			
Sales	$23,000	Assets	$115,000	Debt	$ 38,600
Costs	16,500			Equity	76,400
Taxable income	$ 6,500	Total	$115,000	Total	$115,000
Taxes (40%)	2,600				
Net income	$ 3,900				

Assets and costs are proportional to sales. Debt and equity are not. A dividend of $1,560 was paid, and the company wishes to maintain a constant payout ratio. Next year's sales are projected to be $27,600. What is the external financing needed?

5. EFN The most recent financial statements for 7 Seas, Inc., are shown here:

Income Statement		Balance Sheet			
Sales	$3,400	Current assets	$ 4,400	Current liabilities	$ 880
Costs	2,800	Fixed assets	5,700	Long-term debt	3,580
Taxable income	$ 600			Equity	5,640
Taxes (34%)	204	Total	$10,100	Total	$10,100
Net income	$ 396				

Assets, costs, and current liabilities are proportional to sales. Long-term debt and equity are not. The company maintains a constant 50 percent dividend payout ratio. As with every other firm in its industry, next year's sales are projected to increase by exactly 15 percent. What is the external financing needed?

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

Income Statement		Balance Sheet			
Sales	$15,180	Current assets	$11,500	Debt	$24,900
Costs	10,505	Fixed assets	30,800	Equity	17,400
Taxable income	$ 4,675	Total	$42,300	Total	$42,300
Taxes (40%)	1,870				
Net income	$ 2,805				

Assets and costs are proportional to sales. Debt and equity are not. The company 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 Heng Co. are shown here:

Income Statement		Balance Sheet			
Sales	$46,000	Current assets	$ 24,000	Long-term debt	$ 51,000
Costs	29,500	Fixed assets	92,000	Equity	65,000
Taxable income	$16,500	Total	$116,000	Total	$116,000
Taxes (34%)	5,610				
Net income	$10,890				

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 Heir Jordan Corporation:

HEIR JORDAN CORPORATION Income Statement		
Sales		$32,000
Costs		12,900
Taxable income		$19,100
Taxes (34%)		6,494
Net income		$12,606
Dividends	$4,800	
Addition to retained earnings	7,806	

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

10. **Applying Percentage of Sales** The balance sheet for the Heir Jordan Corporation follows. Based on this information and the income statement in the previous

problem, supply the missing information using the percentage of sales approach. Assume that accounts payable vary with sales, whereas notes payable do not. Put "n/a" where needed.

HEIR JORDAN CORPORATION
Balance Sheet

Assets	$	Percentage of Sales	Liabilities and Owners' Equity	$	Percentage of Sales
Current assets			Current liabilities		
Cash	$ 3,650	_____	Accounts payable	$ 2,900	_____
Accounts receivable	7,200	_____	Notes payable	7,600	_____
Inventory	6,300	_____	Total	$10,500	_____
Total	$17,150	_____	Long-term debt	$21,000	_____
Fixed assets			Owners' equity		
Net plant and equipment	$31,500	_____	Common stock and paid-in surplus	$15,000	_____
			Retained earnings	2,150	_____
			Total	$17,150	_____
Total assets	$48,650	_____	Total liabilities and owners' equity	$48,650	_____

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 the Soccer Shoppe has a 9 percent ROA and a 15 percent payout ratio, what is its internal growth rate?
13. **Sustainable Growth** If the Parodies Corp. has a 16 percent ROE and a 20 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 = .75
    Debt–equity ratio = .60
    Net income = $34,000
    Dividends = $16,000

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

    Total asset turnover = 1.90
    Profit margin = 7.6%
    Equity multiplier = 1.40
    Payout ratio = 40%

INTERMEDIATE
(Questions 16–27)

16. **Full-Capacity Sales** Seaweed Mfg., Inc., is currently operating at only 90 percent of fixed asset capacity. Current sales are $610,000. 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 $470,000 and sales are projected to grow to $710,000. How much in new fixed assets are required to support this growth in sales?

18. **Growth and Profit Margin** Fixed Appliance Co. wishes to maintain a growth rate of 12 percent a year, a debt–equity ratio of .60, and a dividend payout ratio of 30 percent. The ratio of total assets to sales is constant at .95. What profit margin must the firm achieve?

19. **Growth and Debt–Equity Ratio** A firm wishes to maintain a growth rate of 14 percent and a dividend payout ratio of 40 percent. The ratio of total assets to sales is constant at .8, and profit margin is 8.5 percent. If the firm also wishes to maintain a constant debt–equity ratio, what must it be?

20. **Growth and Assets** A firm wishes to maintain an internal growth rate of 8 percent and a dividend payout ratio of 20 percent. The current profit margin is 7 percent, and the firm uses no external financing sources. What must total asset turnover be?

21. **Sustainable Growth** Based on the following information, calculate the sustainable growth rate for Hendrix Guitars, Inc.:

Profit margin	= 6.4%
Total asset turnover	= 1.70
Total debt ratio	= .40
Payout ratio	= 40%

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

Sales	= $170,000
Net income	= $16,000
Dividends	= $11,500
Total debt	= $120,000
Total equity	= $44,000

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?

23. **Sustainable Growth Rate** Country Comfort, Inc., had equity of $145,000 at the beginning of the year. At the end of the year, the company had total assets of $270,000. During the year the company sold no new equity. Net income for the year was $60,000 and dividends were $26,000. What is the sustainable growth rate for the company? What is the sustainable growth rate if you use the formula ROE $\times$ *b* 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?

24. **Internal Growth Rates** Calculate the internal growth rate for the company in the previous problem. Now calculate the internal growth rate using ROA $\times$ *b* for both beginning of period and end of period total assets. What do you observe?

25. **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 external financing is needed to support the 20 percent growth rate in sales?

MOOSE TOURS, INC.
2006 Income Statement

Sales		$845,000
Costs		657,000
Other expenses		17,500
Earnings before interest and taxes		$170,500
Interest paid		12,500
Taxable income		$158,000
Taxes (35%)		55,300
Net income		$102,700
Dividends	$30,810	
Addition to retained earnings	71,890	

MOOSE TOURS, INC.
Balance Sheet as of December 31, 2006

Assets		Liabilities and Owners' Equity	
Current assets		Current liabilities	
Cash	$ 23,000	Accounts payable	$ 62,000
Accounts receivable	37,000	Notes payable	15,000
Inventory	79,000	Total	$ 77,000
Total	$139,000	Long-term debt	$144,000
Fixed assets		Owners' equity	
Net plant and equipment	$375,000	Common stock and paid-in surplus	$100,000
		Retained earnings	193,000
		Total	$293,000
Total assets	$514,000	Total liabilities and owners' equity	$514,000

26. Capacity Usage and Growth In the previous problem, suppose the firm was operating at only 80 percent capacity in 2006. What is EFN now?

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

CHALLENGE
(Questions 28–33)

28. 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?

29. 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?

30. Constraints on Growth Let Me Be, Inc., wishes to maintain a growth rate of 14 percent per year and a debt–equity ratio of .25. Profit margin is 5.9 percent, and the ratio of total assets to sales is constant at 1.25. Is this growth rate possible? To answer, determine what the dividend payout ratio must be. How do you interpret the result?

31. EFN Define the following:

S = Previous year's sales
A = Total assets
D = Total debt
E = Total equity
g = Projected growth in sales
PM = Profit margin
b = Retention (plowback) ratio

Show that EFN can be written as follows:

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

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

32. Growth Rates Based on the result in Problem 31, show that the internal and sustainable growth rates are as given in the chapter. *Hint:* For the internal growth rate, set EFN equal to zero and solve for g.

33. Sustainable Growth Rate In the chapter, we discussed the two versions of the sustainable growth rate formula. Derive the formula ROE $\times$ b from the formula given in the chapter, where ROE is based on beginning of period equity. Also, derive the formula ROA $\times$ b from the internal growth rate formula.

WEB EXERCISES

4.1 Growth Rates Go to finance.yahoo.com and enter the ticker symbol "IP" for International Paper. When you get the quote, follow the "Analyst Estimates" link. What is the projected sales growth for International Paper for next year? What is the projected earnings growth rate for next year? For the next five years? How do these earnings growth projections compare to the industry, sector, and S&P 500 index?

4.2 Applying Percentage of Sales Locate the most recent annual financial statements for Du Pont at www.dupont.com under the "Investor Center" link. Locate the annual report. Using the growth in sales for the most recent year as the projected sales growth for next year, construct a pro forma income statement and balance sheet.

4.3 Growth Rates You can find the home page for Caterpillar, Inc., at www.caterpillar.com. Go to the Web page, select "About Cat," and find the most recent annual report. Using the information from the financial statements, what is the internal growth rate for Caterpillar? What is the sustainable growth rate?

MINICASE

Planning for Growth at S&S Air

After Chris completed the ratio analysis for S&S Air (see Chapter 3), Mark and Todd approached him about planning for next year's sales. The company had historically used little planning for investment needs. As a result, the company experienced some challenging times because of cash flow problems. The lack of planning resulted in missed sales, as well as periods when Mark and Todd were unable to draw salaries. To this end, they would like Chris to prepare a financial plan for the next year so the company can begin to address any outside investment requirements. The income statement and balance sheet are shown here:

S&S Air, Inc. 2006 Income Statement		
Sales		$21,785,300
Cost of goods sold		15,874,700
Other expenses		2,762,500
Depreciation		976,200
EBIT		$ 2,171,900
Interest		341,600
Taxable income		$ 1,830,300
Taxes (40%)		732,120
Net income		$ 1,098,180
Dividends	$439,272	
Add to retained earnings	658,908	

S&S Air, Inc. 2006 Balance Sheet			
Assets		**Liabilities and Equity**	
Current assets		Current liabilities	
Cash	$ 315,000	Accounts payable	$ 635,000
Accounts receivable	506,000	Notes payable	1,450,000
Inventory	740,800	Total current liabilities	$ 2,085,000
Total current assets	$ 1,561,800		
		Long-term debt	$ 3,800,000
Fixed assets			
Net plant and equipment	$ 11,516,000	Shareholder equity	
		Common stock	$ 250,000
		Retained earnings	6,942,800
		Total equity	$ 7,192,800
Total assets	$ 13,077,800	Total liabilities and equity	$13,077,800

QUESTIONS

1. Calculate the internal growth rate and sustainable growth rate for S&S Air. What do these numbers mean?
2. S&S Air is planning for a growth rate of 12 percent next year. Calculate the EFN for the company assuming the company is operating at full capacity. Can the company's sales increase at this growth rate?
3. Most assets can be increased as a percentage of sales. For instance, cash can be increased by any amount. However, fixed assets must be increased in specific amounts because it is impossible, as a practical matter, to buy part of a new plant or machine. In this case, a company has a "staircase" or "lumpy" fixed cost structure. Assume S&S Air is currently producing at 100 percent capacity. As a result, to increase production, the company must set up an entirely new line at a cost of $4,000,000. Calculate the new EFN with this assumption. What does this imply about capacity utilization for the company next year?