GETTING THE CASH TO FLOW

In a 2016 article on how small businesses can avoid cash flow issues, the author provided the following suggestions:

- Get money to come in before money has to be spent via presales to book revenue and cash.
- Hold early sales events.
- Sell gift cards (which will generate contractually obligated revenue).
- Demand payment on delivery (if customers will not prepay) so you do not need to wait 30 to 90 days for payment.
- Accept credit card, mobile payment, or debit card payments, which will result in faster payment.
- To provide more time to repay bills, try to negotiate favorable repayment terms when possible.
- Ask if installment payment options are available.
- Pay by credit card, but make sure you have the ability to pay credit card balances in full to avoid interest charges.
- Have vendors fill the order in your place, but you do the marketing and get the difference between the manufactured price (plus shipping) and the sales price (Abrams, 2016).

invest in those projects that provide the greatest return for their investment. Given the long-term effects associated with any investment, we can see why capital budgeting is a primary focus for sports organizations.

A sport business can raise and spend capital funds in countless ways. An integral part of financial management is determining the best capital sources. Efficient capital spending leads to growth and success for a sport business. To grow, a business must invest some of its available capital in fixed assets such as land, equipment, or machinery. For example, a fitness center cannot improve its recreational offerings without investing in new equipment and facilities. Although a for-profit business should invest in those projects that will result in the largest return on investment, this concern may not always be true for government or nonprofit organizations.

CAPITAL SPENDING

Before critically analyzing capital budgeting any further, we must focus on the meaning of capital spending. **Capital spending** is the net spending on fixed assets. Net spending is the total money that a business uses to acquire real assets, less the sale of previously owned real assets (Brigham & Ehrhardt, 2011). During the first decade of the 2000s, many businesses invested heavily in fixed assets. This trend carried over into the sport industry as well. A boom occurred in construction of new sport stadiums and arenas such as AT&T Stadium in Dallas and Citi Field in New York. The construction boom was fostered by several circumstances. On the financial side, team owners believed that capital expenditures for facility amenities such as luxury suites, club seats, concessions, and parking would result in new income streams. Additionally, new facilities were needed to replace older structures that required major repairs, such as Veterans Stadium in Philadelphia and Busch Stadium in St. Louis. The building boom slowed down, however, with the recession of 2007 to 2008 because many teams either had trouble securing financing for these projects or decided to wait until the end of the recession. More recently, with the United States and many other countries growing out of the recession, new stadiums, such as Mercedes-Benz Stadium in Atlanta were built.

Capital budgeting and purchasing capital items are long-term endeavors. When we refer to items as long term, the period involved is usually greater than one year. For equipment and facilities, this refers to their productive life. With respect to capital, a business is usually unable to allocate the amount of money necessary for

purchasing high-priced fixed assets in a single year. Therefore, the business must develop capital budgets that detail how the funds will be raised and allocated over an extended period. For this reason, current, or short-term, items are separated from capital items in financial statements.

The funding mix required for capital expenditures is referred to as the **capital structure**. In general, the traditional corporate capital structure includes debt (bonds and long-term loans), preferred stock, and common stock (Ross, Westerfield, & Jordan, 2008). All these capital sources have an accompanying cost. If a sport business wishes to borrow funds from a bank to construct a new facility, it must pay interest on the borrowed amount. The interest that is paid in addition to the principal being borrowed is referred to as the cost of the debt. The next section deals with each form of capital and covers methods to measure the accompanying costs.

For nonprofit organizations such as university athletics departments, additional sources of funding include donations and gifts. Supporters of nonprofit organizations often make financial donations toward new capital projects. For example, a university alumnus may donate a significant amount of money toward constructing or renovating a sports facility, such as when T. Boone Pickens donated over $175 million to the Oklahoma State University Department of Athletics. Many nonprofit organizations rely on these donations for a portion, or all, of the funds necessary to complete capital projects. These donations are important to nonprofit organizations because unlike corporations, they cannot raise capital through equity ownership.

COST OF CAPITAL

Sport businesses can use four traditional forms of capital, known as capital components, to fund growth: debt, common stock, preferred stock, and retained earnings. These components all have one common trait: The persons or institutions that provide the capital expect, or demand, a return on investment (Brigham & Ehrhardt, 2011). A bank or financial institution that loans money to a sport business expects to be repaid the loan principal plus interest. A common stockholder or investor expects the firm to invest in capital-spending projects that will increase the value of the company and ultimately result in increased stock value. This expected return on the investment means that the business incurs a cost to acquire the capital funds. In the case of a bank loan, the cost of capital is the amount of interest owed to the creditor. This section develops methods to measure the cost of capital for debt and equity. Sport businesses need to understand and appreciate the fact that any capital acquisition technique has a cost, and that cost will dictate how much capital can be raised.

We must make a quick point about retained earnings before moving forward. Retained earnings are funds that are kept by a business to be used for **reinvestment** in the company. This reinvestment often takes the form of capital spending. Management believes that the stockholders will benefit more from this reinvestment than from having the money returned through dividend payments. Because the retained earnings can be used by the sport business to purchase additional stock, the cost of retained earnings is considered to be the cost of common stock. Therefore, we will discuss the cost of retained earnings along with the cost of common stock.

Note that companies develop strategies for structuring their capital. For example, Speedway Motorsports may have 50% of its capital in the form of debt, 30% in preferred stock, and 20% in common stock. These proportions, referred to as a target capital structure, may vary greatly across businesses and industries (Ross et al., 2008). Within some professional sports leagues, capital structure is controlled by the league to some extent. For example, the NFL has restrictions on the level of debt that each team can maintain. The NFL set the debt limit as a financial safeguard to ensure that none of its teams has excess debt that will lead to financial difficulties.

Most larger sport businesses finance their capital budgets through a combination of debt and equity. Each form of capital has an associated cost. Some businesses decide to structure their capital budgets such that they rely on one form of capital, but this approach is uncommon for large corporations. For government-owned and -operated institutions such as a university athletic department, the sources of capital are primarily debt and money raised through gifts and donations. State-funded universities such as Florida State University and The University

of Iowa have no individual private ownership rights. Their income comes from sources such as donations, ticket sales, sponsorships, student fees, and broadcast fees. These funds are used to cover the current expenses involved in operating a collegiate athletic program. The university usually raises money for capital projects from donations or the issuance of debt. The state government is ultimately responsible for paying the bondholders if the university defaults.

Privately held sport businesses such as fitness centers, pro sports teams, and apparel companies can also raise capital by selling equity ownership rights or borrowing funds. For example, Under Armour may raise money by issuing common stock to the public, but it may also borrow from banks or issue bonds.

Several factors can influence capital-structuring decisions. For example, a weak stock market such as that seen in 2007 and 2008 may make the issuance of stock less attractive than it might be otherwise. As stock prices fall, a business needs to issue more shares to raise the necessary capital funds. In addition, a cost is associated with issuing new stock. Most businesses work with a financial institution to help with a public offering, and they pay for those services. The expenses related to issuing new stock are known as **flotation costs** (Ross et al., 2008). Immoo, Lochhead, Ritter, and Zhao (1996) found that a company that wants to raise $2 million to $10 million in capital through a common stock offering will have flotation costs of approximately 13.28% of the total amount of capital being raised. Thus, if a business wants to have $2 million in capital, it will need to raise approximately $2.26 million.

Immoo et al. (1996) also found that the average flotation cost is significantly less when capital is raised through debt. In this case, in the $2 million to $10 million debt range, the average flotation cost is 4.39%, one-third the level of flotation costs for common stock. Whether debt or equity is used, many of the flotation costs, such as attorneys' fees, are fixed and are not greatly affected by the amount of capital being raised. Therefore, most businesses do not like to raise capital in small quantities. Other businesses also elect to raise capital through a single debt or equity source each year in an effort to minimize flotation costs (Ross et al., 2008).

A professional sports team example will illustrate average cost of capital for debt. Assume that the Atlanta Braves decide to go public by issuing stock. The team raises $300 million in its initial public offering. If the average flotation cost for such an offering is 8%, then $24 million will be paid to float the shares, and $4.5 million to $6 million of that amount might represent attorneys' fees. The attorneys' fees need to be paid even if only $100 million had been raised through the offering.

Selecting one capital source each year has short-term effects on a target capital structure, so maintaining the target structure is difficult. A business' target capital structure may also be affected by outside economic forces such as the stock market or interest rates. Interest rates have an effect on the cost of issuing debt. Therefore, a business may want to select debt as its capital source (to maintain its capital target), but issuing new stock may be more cost effective, especially when stock prices are relatively high.

Thus far, we have discussed the general principles of capital, the forms of capital, and the importance of capital cost. The next step is to develop a method for accurately measuring new capital costs. The most commonly used method to measure the cost of capital is the **weighted average cost of capital (WACC)**. The WACC focuses on determining the average cost of each capital component and weights each based on its contribution to the total capital amount. In general, a sport business will maximize its value when it minimizes its WACC (Ross et al., 2008).

To calculate the WACC, we must separate capital into each of the three potential capital sources available for a business: debt, preferred stock, and common stock. As stated earlier, the cost of retaining earnings and the cost of issuing common stock are calculated similarly. In doing the calculation of the WACC as outlined in this chapter, retained earnings are implicitly included in the value of common stock. Whether new shares of stock are issued or whether retained earnings are used to finance a capital project, the cost of funds is identical (ignoring underwriting and flotation costs). Because most sports organizations do not issue preferred stock and very few issue stocks and bonds, we decided to mention this process, but it is so detailed that we defer anyone interested in the topic to take a finance course.

Cost of Debt

Debt is important because many smaller businesses raise most of their capital through this capital component, usually in the form of bank loans (Brigham & Ehrhardt, 2011).

Concepts Into Practice

Suppose that you own a relatively small business, such as a local health and fitness center. You may borrow money from a bank or similar financial institution to fund new capital spending. The principal amount that you borrow must be repaid over time with interest. The interest is the cost of borrowing the funds. If you borrow $200,000 at an interest rate of 8%, the cost of debt, excluding taxes, is also 8%. But the cost of debt is misleading unless the potential tax implications are extracted. Because the debt repayment of 8% is probably tax deductible, you will not pay 8% per year. The true cost will be $16,000 (8% multiplied by $200,000) minus what tax savings can be generated by reducing your income by $16,000. Assuming a 30% combined federal and state tax rate for the business, the potential cost could drop from $16,000 to $11,200 ($16,000 minus 30% of 16,000).

Many large corporations also issue debt through bonds and debentures. A bond is a long-term promissory note issued by a business. For most bonds, the business agrees to pay back the amount borrowed at a specified future date (usually in 10 to 30 years for long-term bonds) in addition to a coupon payment, which is a percentage of the bond's value. The coupon payment for most corporate coupon bonds is made semiannually. For example, a sport business can sell 25-year bonds with a value of $1,000 and a semiannual coupon payment of 6%. Anyone who purchases a bond will receive semiannual payments of $60 for 25 years. Also, at the end of the 25 years, the creditor will receive $1,000. In this example, the annual cost of debt for the life of the bond would average around 12%.

A debenture is a long-term bond. But unlike regular bonds that are secured by corporate assets, a debenture is unsecured. The only protection that a debenture holder has to guarantee repayment is the good name of the company that issues the debenture. If the corporation faces financial hardship, the debenture holders are similar to all other unsecured lenders in that they are often the last group to be repaid, if they are paid at all.

From these examples, measuring the rate of return required by debt holders appears to be relatively straightforward. How much will debt holders demand in future payments to make the necessary funds available today? For a small business like an independently operated sporting goods store, ascertaining this number may be as simple as determining the annual interest rate on a bank loan. But the process can be a bit more complex for a large corporation such as Under Armour. Given that the WACC is used in the planning process for the issuance of future debt, a financial manager is making a prediction or estimation of the future cost of debt. Determining the coupon payment that must be offered to attract future bond purchasers is not always easy. A business that issues a new bond at a time when interest rates are on the rise will have a hard time selling the bonds without increasing the interest rate paid to purchasers. Therefore, determining the appropriate rate of return is not an exact science. Nevertheless, by using the correct information, the analyst can make a credible estimate.

What Is the Correct Information?

A financial manager can analyze historical data on debt instruments to make a prediction about the future. Suppose UA wants to issue new 25-year bonds to raise capital. Through experience, the financial manager knows that similar bonds have been issued for each of the past five years. She also knows that the financial position of the business has not changed over that period and that the previous bonds were issued with a 10% coupon rate. Additionally, the financial manager would look at the **current yield** on a bond with the same maturity and credit rating, as determined by Moody's or Standard & Poor's, as well as the current debt costs for similar businesses. For example, suppose UA is investigating issuing debt to build a new warehouse. The financial manager would gather information on the cost of debt incurred by other businesses that have recently financed facility construction.

Calculating the Cost of Debt

One other important debt feature is crucial to the cost-of-debt calculation. To encourage capital investment in the United States, the federal government and most state governments provide a tax deduction on the interest payments made to debt holders. For most corporations, the federal tax rate for interest deductions is 35%. Most states also give tax allowances for interest deductions, usually at about a 5% rate (Brigham & Ehrhardt, 2011). In total, the average tax rate for interest deductions is approximately 40%. This tax savings reduces the overall cost of debt for a sport business.

Assume that we want to calculate the cost of debt for UA. The cost of debt can be written as a mathematical formula:

$$D = R - (R \times T)$$

D = cost of debt

R = interest rate paid to debt holder

T = marginal tax rate on interest payments

The rate of return required by debt holders is the interest rate, or R, that is paid on the debt. The tax savings is the rate of return required by debt holders multiplied by the **marginal tax** rate on interest payments, which we will abbreviate as T. We can rewrite the cost of debt this way:

$$D = R \times (1 - T)$$

Concepts Into Practice

In our example, we assume that UA borrows $1,000,000 at an interest rate of 6% and has a marginal tax rate of 40%. Their cost of debt is calculated as follows:

$$D = 6\% \times (1 - 0.4)$$
$$D = 3.6\%$$

Therefore, UA's cost of debt is 3.6% annually. Multiplying 3.6% by $1,000,000 shows that the cost of debt in dollars is $36,000. The tax deduction associated with making interest payments will save UA 2.4%, or $24,000 each year, of the original $1,000,000 that was borrowed.

Cost of Equity

Capital can also be acquired by selling ownership in the business, also known as the issuance of equity. Equity is separated into two different classifications: preferred stock and common stock. As mentioned previously, we will not go into preferred stock, but rather we will focus just on common stock.

Cost of Common Stock

With respect to common stock, a sport business can raise capital through two methods. First, it can issue new common stock. To attract new common stock shareholders, the sport business must sell the stock shares at an attractive price. Prospective stockholders will buy the stock if they believe that the value of the stock will increase in the future. The annual percentage return (holding period return) associated with annual dividend payments and increases in the stock price must exceed the returns on investments of equivalent risk. If it does not, people will invest their money elsewhere.

A sport business can also raise capital through retaining earnings that would otherwise be used to pay dividends to common stockholders. By not paying dividends, the firm is retaining funds for use in capital spending. The capital-spending goal is to increase the value of the business. If the value of the business grows because of the capital spending, the common stock price should also increase. Most common stockholders will gladly forgo current dividend payments if the retained earnings will lead to an increase in the firm's stock price that is greater than the expected dividend payment.

Dividend policy is an important part of corporate finance. Financial managers continually struggle with the trade-off between dividend payments and retained earnings. They are looking for the appropriate levels of each that will both keep the stockholders happy and allow the firm to grow. Making every investor happy is impossible, and there are never any guarantees. For example, Speedway Motorsports could pour $100 million into retained earnings and build a new racetrack. Investors might be ecstatic with the prospects of future increased value as new track revenues develop. But a year after the track opens a competitor may build a better facility and send

Speedway's stock into a dramatic tailspin. Thus, retained earnings represent a potential risk, but all business decisions contain an element of risk.

Ultimately, the important aspect of common stock is that common stock shareholders require a return on their investment. This expected return on investment is vital for calculating the cost of common stock. In the simplest terms, the cost of common stock is the rate of return demanded by stockholders.

We must include several factors in calculating the cost of common stock. As with preferred stock, flotation costs are incurred when new common stock is issued. Likewise, issuing new common stock increases the overall supply of common shares available in the market. The increased supply of stock will cause the price of all shares to drop. The price decline often forces the firm to sell the new stock at a lower price and reduce the amount of capital that is raised. All these additional costs discourage some businesses from issuing new common stock. Most established larger businesses do not regularly offer new common stock on the open market. Instead, they elect to raise capital through retained earnings that would otherwise be paid as dividends or by issuing bonds or commercial paper.

Shareholders incur an opportunity cost, also known as implicit cost, if a business retains earnings to raise capital. The shareholders are forgoing dividends when earnings are retained. Shareholders could have reinvested those dividend payments in stocks, bonds, and other opportunities that may have resulted in a positive return. Therefore, the retained earnings should result in an increase in the value of a business that is greater than the amount that a shareholder can expect to earn if the money is paid out as dividends. The difficult task for a financial manager is to calculate this amount. As with issuing new stock, the amount that shareholders could make by investing their dividend payments in the best alternative can serve to help measure the cost of common stock. Thus, the cost of common stock involves many factors, such as dividend payments, flotation costs, the rate of return of other investment opportunities, and the risk involved in investing in common stock. There are three primary techniques for valuing common stocks that are beyond the scope of this text—the **capital asset pricing model**, **bond yield** plus risk premium model, and the dividend growth model. These models examine risks of various investments and the costs of issuing common stock compared to other investment options.

Once the cost of issuing bonds, preferred stocks, and common stocks is calculated, the numbers can be used to help calculate the WACC. The analysis is beyond the scope of this text, but it is an important concept to know because the WACC uses the targeted levels, or proportions, of the three components along with the cost measures developed for each. Most firms have a targeted capital structure. The target is the proportion of debt to preferred stock to common stock that the business believes will be best for its future success. The proportions of target capital are represented by weights that are given to each capital type. When added up, the weights must equal 1. For example, if the debt portion has a weight of 0.1, then 10% of the business' targeted capital structure is funded through a debt instrument. The WACC is for the cost of new capital only in an attempt to develop cost measures as part of the capital-budgeting process. This estimate should not be used to make statements about the cost of previously issued capital. Previous capital was raised under different economic and financial circumstances, and such circumstances can greatly influence the cost of capital. Note that the weights used are based on a targeted capital structure. If the firm raises capital in proportions that vary from the targets, the WACC will vary as well. Again, the WACC is a method used to estimate the cost of capital. Any changes in the variables used in the model will change the WACC.

Our discussion of WACC and the cost of capital has focused primarily on publicly held businesses. Numerous businesses in the sport industry are small businesses, privately held companies, or both. Neither of these types of businesses has stocks that are openly bought and sold. This circumstance presents some unusual problems when determining the cost of capital. The price of preferred and common stock is not easily obtainable because the stocks are not traded on the open market. Overall, the same principles for the cost of capital determination apply for small businesses and privately held companies. Obtaining accurate and usable financial data, however, is difficult. Moreover, many small firms do not pay any dividends.

Earnings are often retained and used to grow the company, adding to the difficulty of calculating accurate costs of preferred and common stock.

In addition, most small businesses do not have publicly traded bonds. The bond yield plus risk premium method for determining the cost of common stock relies on knowing a business' bond yield. Applying this method to small businesses is usually not appropriate.

Another consideration when examining any capital-related decision is the concept of time. Capital spending and obtaining the returns from capital projects occurs over many years. Therefore, the timing of the costs and revenues is critical.

Concepts Into Practice

Let's assume that a university athletic department, such as the one at The Ohio State University, is approached by a wealthy philanthropist who would like to make a large donation. The philanthropist offers two options for how the money will be paid:

1. The athletic department can receive a $500,000 check today to help build a new practice field.
2. The athletic department can receive a $550,000 check in one year for the field.

The decision is based on which option is more valuable. If the value of $550,000 in one year is expected to be greater than the value of the $500,000 check received today the athletic department should select option 2. But how do we determine which option is more valuable? Obviously, $500,000 today is worth more than $500,000 a year from now, but is $500,000 today worth more than $550,000 a year from now? The athletic department can invest the $500,000 today in an interest-bearing account and have more than $500,000 in one year. But can it make an additional $50,000 from the investment? Suppose that it investigates the payoff from the best risk-free investment opportunity—probably a U.S. government security—and learns that the annual interest rate is 7%. Therefore, $500,000 invested in a U.S. government security will give the athletic department $35,000 in interest in one year. Under these circumstances, the university should obviously select option 2 and take the $550,000 in one year.

Net Present Value

Another method for making this decision is to calculate the present value of option 2. Using this process, the athletic department will determine the dollar value of receiving $550,000 in one year. To make the decision, the university will need to know the expected rate of return. The rate of return is the reward demanded by investors for waiting one year to receive a payment. Assume that the athletic department would expect no more than a 7% return from its best alternative risk-free investment. Therefore, we will use 7% as the rate of return. The rate of return is then used to develop a discount factor. The tables in appendix B can help calculate the discount value of the $550,000 next year in today's dollars. This analysis would also show that option 2 is the better option as the higher a positive net present value (which will be explained shortly), the more attractive the investment.

Although the calculations in this example help establish which choice will be the most beneficial, they do not take into account other variables. For example, if the athletic department does not build a field with the $500,000 this year, inflation and increased building costs might force the university to pay $575,000 next year. Furthermore, the future contains numerous variables that might make budgeting decisions more difficult. The athletic department might approve an additional $500,000 for a new field, but those funds might not be available if the athletic department waits a year to receive the $550,000 from the philanthropist.

While the time value of money is an important concept, it is even more important when examining future financial decisions, especially expensive decisions. Using current values and present value analysis can help clarify the financial ramifications for various decisions. For all capital investments, a sports manager should calculate the present value of the expected future income related to the project. An investment is considered wise if the present value of this future income is greater than the necessary investment. The financial term associated with this process is **net present value (NPV)**. The NPV is the difference between the present value of the future income and the required investment. It can be represented as follows:

$$NPV = PV - RI$$

NPV = net present value

PV = present value of future income

RI = required investment

The following concepts into practice sidebar highlights how to apply NPV.

Concepts Into Practice

The same university athletic department from the previous example must decide whether it wants to spend $1 million to construct 10 new luxury suites in its basketball arena. Each suite should last for 10 years. At the end of 10 years, we will assume that the suites will need to be replaced and will have no salvage value. For simplicity, we will also assume that each luxury suite can be rented for $30,000 per year and that no other income will be made from the suites. The construction project will take one year. Therefore, the first income from the suites will be earned one year from today. If we think of one year from now as the end of year 1, income will flow into the athletic department at the ends of years 1 through 10. Even though this example is not completely accurate, it offers a good depiction of the concept of NPV.

The athletic department must calculate the NPV of this investment opportunity before making the decision. So starting next year, assuming all 10 suites are rented for all 10 years, it will have $300,000 in income for each of the next 10 years. Overall, the project will generate $3 million in income, but the present value of the income stream must be calculated. Unlike the situation in the previous example, in which one payoff was to be received one year into the future, here there is a stream of future payoffs. Thus, the present value of the payoff in each future year must be calculated. The following mathematical formula is used to calculate cash flows in future years (Brigham & Ehrhardt, 2011):

$$PV = \left(\frac{1}{1+r} \times FP_1\right) + \left(\frac{1}{(1+r)^2} \times FP_2\right) + \left(\frac{1}{(1+r)^3} \times FP_3\right) + \ldots\ldots\ldots + \left(\frac{1}{(1+r)^{10}} \times FP_{10}\right)$$

FP_1 = future payoff one year from now

FP_2 = future payoff two years from now

r = rate of return

And so on for FP_3 through FP_{10}

These calculations will continue up to the end of year 10. We will assume that the rate of return for the athletic department is 8%. We can rewrite the equation as the following:

$$PV = \left(\frac{1}{1.08} \times \$300{,}000\right) + \left(\frac{1}{1.08^2} \times \$300{,}000\right) + \left(\frac{1}{1.08^3} \times \$300{,}000\right) + \ldots\ldots\ldots + \left(\frac{1}{1.08^{10}} \times \$300{,}000\right)$$

$$= \$2{,}013{,}000$$

The present value of $2,013,000 can then be used to calculate the NPV of the capital expenditure. Note that these calculations can be done manually, but if the rate of return and stream of income are constant throughout a project, an annuity table, such as table B.3 in appendix B, can be used. The table will save a great deal of time and frustration by allowing the user to arrive at the correct amount without the need for mathematical calculations because the math has already been done. As stated previously, the initial investment is $1 million, and the present value of the stream of income is $2,013,000. So, we can calculate the NPV as follows:

$$NPV = \$2{,}013{,}000 - \$1{,}000{,}000 = \$1{,}013{,}000$$

The NPV of the construction of 10 luxury boxes is positive and slightly over $1 million. The project definitely is worth more than it costs the athletic department.

Net present value is an important capital-budgeting component. Ordinarily, a project that has a negative NPV should not be undertaken because the cost of the project is higher than the projected income—financially, it is a losing proposition. But not all projects that have a positive NPV must be undertaken. It should be noted that some negative NPV projects are undertaken anyway because they are important projects for political or other reasons. Thus, NPV analysis is a great mechanical tool. However, some decisions are based on intangible issues and benefits.

It is important to note other methods besides NPV can be used for making capital-budgeting decisions. All these methods have strengths and weaknesses. The NPV method was presented first because it is the most often used and is regarded as the best. Although it is important to recognize and discuss these other methods, the NPV method is strongly recommended.

Payback Rule

A second method of analyzing the value of a capital project is through using the payback rule. The payback rule analyzes how long it will take a business to recoup its money after investing in a capital project. The money is paid back through the stream of future income related to the project. The payback rule may be best explained through the concepts into practice sidebar.

As you can see in the example, the capital-budgeting decision method that is used can have a major effect on the decision. The difference occurs because the payback rule weighs all cash flows equally, ignoring the importance of time. This rule centers on which investment option will repay the initial outlay in the shortest time. The NPV method discounts future cash flows based on the opportunity cost of capital. It also looks at the entire cash flow over the life of the project, in this case four years. The university's payback rule of three years means that only the cash flows in the first three years are important; even if project A had a projected cash flow of $1 billion in the fourth year, it would not be selected. Ignoring the cash flows after the arbitrarily selected payback date is an obvious weakness of the payback rule.

To account for the failure of the payback rule to recognize the time value of money, the **discounted payback rule** has been developed.

Discounted Payback Rule

The discounted payback rule discounts the future cash flows based on the opportunity cost of capital, as highlighted in the concepts into practice sidebar.

Concepts Into Practice

Assume that a university athletic department has $1 million that it wants to invest in a capital project. The initial investment will result in a future cash flow into the university. The university has two possible capital projects that cost $1 million each. It must decide which one to select. These are the two choices:

Project A is a new outdoor aquatics facility. The facility is expected to produce $250,000 in revenue in the first year and $300,000 per year for two subsequent years. In the fourth and final year (as the building in this example would be abandoned or torn down after four years), the cash flow will be $400,000. For simplicity, we will assume that there are no other costs or revenues. The total revenue for the next four years will be $1.25 million.

Project B is a new recreational gymnasium to be used for adult and youth sports leagues. This facility should produce $100,000 in the first year and $450,000 per year for the two subsequent years. Because of an expected decrease in future demand, the cash flow for the fourth year will be only $100,000. The total revenue for the next four years will be $1.1 million.

The question is, *which capital project should the athletic department select?* The university is going to use the payback rule to make this decision. The university has decided that all of the initial $1 million investment must be paid back within three years. If this cannot occur, capital funds will not be allocated for the project. Table 12.3 depicts the cash flows over time, the expected payback periods, and the NPV for each project.

Examining table 12.3, we see that it will take four years for project A to repay the investment, whereas the investment for project B will be repaid within three years. Given the university's payback rule of three years, project B is the one to select. The projected cash flow from this project can repay the $1 million initial investment in three years.

The decision would change dramatically if we used the NPV method. To determine NPV, we assume that the opportunity cost of capital is 8%. We find that the NPV of project A is $20,842, and the NPV for project B is –$90,880. Using the NPV method, project B would be rejected and the athletic department would select project A.

Table 12.3 Timeline of Cash Flows for Projects A and B

Project	P_0	P_1	P_2	P_3	P_4	Payback period	Net present value at 8%
A	–$1 million	$250,000	$300,000	$300,000	$400,000	4 years	$20,842
B	–$1 million	$100,000	$450,000	$450,000	$100,000	3 years	–$90,880

Concepts Into Practice

To return to our previous example, table 12.4 shows the cash flows when the athletic department applies the discounted payback rule, incorporating an 8% rate of return.

Using the discounted payback rule, the payback period remains at four years for project A. Project B is not expected to produce enough cash flow in four years to cover the initial investment. Therefore, using the discounted payback rule and a predetermined three-year maximum payback period, both projects are rejected. Remember that using the NPV method would lead to the selection of project A, and the original payback rule would result in the selection of project B. This illustrates that which capital-budgeting decision method is used has a major effect on the disbursement of long-term capital.

Table 12.4 Timeline of Discounted Cash Flows for Projects A and B

Project	P_0	P_1	P_2	P_3	P_4	Payback period	Net present value at 8%
A	–$1 million	$231,481	$257,210	$238,150	$294,009	4 years	$20,842
B	–$1 million	$92,593	$385,802	$357,225	$73,502	>4 years	–$90,880

Internal Rate of Return Method

The last method for making capital-budgeting decisions is to use the **internal rate of return (IRR)**. As with NPV and the discounted payback rule, IRR relies on the opportunity cost of capital and the time value of money. As stated earlier, the opportunity cost of capital is the return obtained by investing the capital in the next best alternative. For example, if you can place $100,000 in an interest-bearing investment that will result in you having $110,000 at the end of one year, the rate of return is 10%. Therefore, you would invest only in projects that can return more than $110,000. The IRR method emphasizes finding the rate of return for which NPV equals zero. Table 12.5 displays a situation in which a $1,000 capital investment results in a $750 cash flow in one year and a $500 cash flow in two years.

Table 12.5 Timeline of Cash Flows

Time 0 (P_0)	In one year (P_1)	In two years (P_2)
–$1,000	$750	$500

The goal of the IRR method is to find the rate of return for which NPV equals zero. The mathematical model for our example in table 12.5 is as follows:

$$\text{NPV} = P_0 + \frac{P_1}{1+r} + \frac{P_2}{1+r^2} = 0$$

NPV = net present value

P_0 = cash flow at time zero

P_1 = cash flow in first year

r = rate of return

P_2 = cash flow in second year

To complete the formula, we need to solve for r, the rate of return. This can be difficult without the proper computer software. If you attempt to solve the formula manually, it will be a matter of trial and error. The trial-and-error process for manual calculation requires you to estimate for r and keep lowering or raising r until the equation equals zero. With a computer you can perform the analysis almost instantaneously. If we input the information from table 12.5, the equation can be rewritten as follows:

$$\text{NPV} = -\$1{,}000 + \frac{\$750}{1+r} + \frac{\$500}{1+r^2} = 0$$

We must now solve for r. Using trial and error, let's start with a 10% rate of return. If we solve the equation when $r = 0.10$, we find that the NPV equals $95.10. We now know that the IRR for which NPV will equal zero is greater than 0.10. We continue this trial-and-error process until we find the rate of return at which NPV

equals zero. In our example, NPV will equal zero when r equals 0.175. A wise sports manager will undertake this capital project if she believes that its opportunity cost of capital is less than 17.5%. In other words, she will go ahead with the project if no other investment choices have an expected rate of return greater than 17.5%.

It should be noted that all the examples in this section have used terms such as *expected* rate of return. That is because each decision has an element of risk. When you are calculating the return on investment for capital expenditures, risk is important. Different capital projects have different levels of risk. To accept a higher level of risk for a project, the investor must expect the returns to be higher. In every case, a wise sports manager faced with the choice of selecting one of two capital investment opportunities with equal returns will select the one with the lower risk.

PROJECTING CASH FLOW

The discussion to this point has centered on capital budgeting from the cost side. The calculation of capital costs is an integral part of capital budgeting, but it is only half the story. The other half deals with income and with developing methods to estimate future income that results from capital investment. The combination of expenses and income is known as cash flow. The accurate projection of cash flows, both expenses and income, is a key to making wise capital-budgeting decisions. Although no projection of future income will be totally accurate, a sports manager needs to make the best and most accurate attempt.

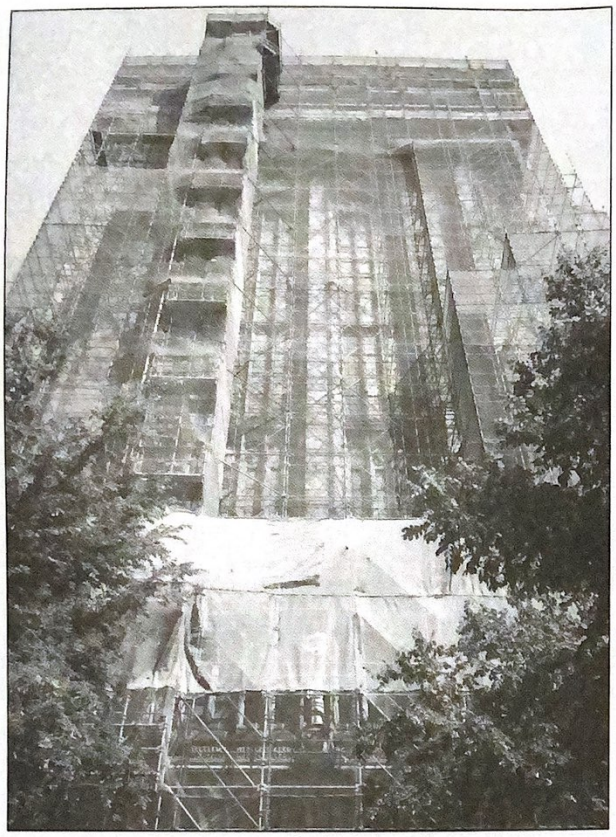
The future cash flows that result from capital investment depend on many business factors. For example, if an athletic department plans to spend $100 million on a new 30,000-seat football stadium, the future cash flow resulting from this spending may be difficult to estimate accurately. The following is a list of factors that may affect future cash flow for such a project:

- Is there demand for 30,000 tickets to the football games? Before construction, an in-depth market analysis should be undertaken to determine spectator demand.
- How important is ticket price to the spectators? Would an increase in the ticket price affect spectator demand?
- The athletic department cannot assume that it will always put a winning team on the field. How will winning and losing affect spectator attendance?
- If the project succeeds and the 30,000 seats are filled on a regular basis, can the stadium be expanded in the future?
- If the capital is raised, in part, through booster donations, how will fund-raising efforts for other parts of the athletic program and university be affected? Will other projects or budgets be affected by the stadium project?
- How much additional cash will flow into the athletic department? If the new stadium is built, will it have an effect on future cash flow compared with the current cash flow from football games?
- Besides football games, what other uses would the facility have, and what would the cash flow be from those uses?
- If luxury seating or boxes are included, is there a demand from corporate clients for those seats? What is the fair price for the luxury seating or boxes?
- How much will it cost to maintain and repair the stadium after it is built?
- What will the cost be for the capital required to construct the facility?

All the factors listed are important when projecting the cash flow from a new university sports facility. It is necessary to ask questions related to market demand, sales projections, operating costs, and capital costs when attempting to project future cash flow. Remember that projecting cash flow is not an exact science. A financial manager makes the best possible estimation based on available data and research.

We will define the cash flow of a project as the net cash inflows and investment expenditures associated with the project (Brigham & Ehrhardt, 2011). Again, projecting cash flow is the most difficult facet of capital budgeting.

For a sports organization, many people and departments should be involved in any major capital projects. For example, when a university athletic department constructs a new stadium, several departments will be involved in the process. The ticketing and marketing departments need to make projections about ticket



When Yale University was renovating the Payne Whitney Gym, the process took so long that the university ended up having to buy all the scaffolding around the building for several hundred thousand dollars—an unexpected expense.

sales and pricing. The university's construction planners and outside construction firms need to estimate construction costs. The university's physical plant department should be consulted to estimate maintenance costs. An event planner or promoter can help determine what revenues will be generated from other events being held in the stadium. The university's advancement or fund-raising office can estimate the effect of stadium fund-raising on other university fund-raising endeavors. The focus should be on obtaining relevant and accurate information. Any projections made based on poor information will be a disaster.

An organization's financial staff must play a prominent role in projecting the cash flow. The financial managers have the job of taking all the information obtained from other departments and developing accurate projections. Several common pitfalls must be avoided. For a number of reasons, such as career advancement, emotional ties, or possible benefits to their departments, some people in other departments will be strong supporters of specific capital projects. This bias may affect the accuracy of the information that they provide to the financial staff. The financial staff needs to ensure that projections are as accurate as possible. Unfortunately, doing this is not always easy.

All businesses have a limited capital budget and many alternatives for capital spending. Each project must be evaluated on its own financial worth and needs to be compared with other options. Those investment opportunities that fit within the capital budget and have the highest NPV are the most attractive. The process of quantifying the NPV of investment choices is not easy because many confounding factors come into play. One capital-spending project may affect another, and some may need to happen simultaneously to be successful. Management has the job of deciphering all this information.

Measuring Relevant Cash Flow

The first step in projecting cash flow is to measure the relevant cash flow for a capital project. All existing firms have a cash flow. The key to obtaining an accurate measurement of the cash flow of a single project is to include only new cash flow. The new, or incremental, cash flow is the additional future cash flow, either internal or external to the business, which results only from the decision to undertake a project. Any cash flow that occurs regardless of the presence of a new project should not be included in the calculation of relevant cash flow. You need to remember this important concept throughout this discussion. With respect to measuring incremental cash flows, financial managers make several common errors.

The first common error relates to measuring **sunk costs**. Sunk costs are costs that have already occurred and do not change regardless of the decision to undertake a project. Let's go back to the example of a university. The university may pay $20,000 for a feasibility study on the construction of a new student recreation building. If, because of this report, the university decides not to construct the building, it would still have to pay for the feasibility study. The cost is incurred regardless of the outcome. According

to our definition of incremental cash flow, the $20,000 is not important in making the capital-spending decision.

The second common error concerns **opportunity cost**, another important aspect of projecting relevant cash flow. Opportunity cost refers to the most valuable alternative that is forgone if a particular capital project is undertaken. Returning to the university example, the recreation building must be built on a piece of land. The university has a parcel of land that can be used, but the land could also be used for new playing fields or a swimming pool. Initially, you might think that the cost of land is zero because the university already owns it. This assessment is not accurate. An opportunity cost is associated with using that piece of land; the university is forgoing its next best alternative use of the land. The next best alternative may be to build a swimming pool. The university must estimate the value of the land and include it in its projection of project costs. This point is especially important if the university will need to buy a new piece of land in the future to build a pool.

Failure to analyze the effect of any funding decision is a third common error. Most new capital-spending projects have an effect on the overall organization. If the athletic department elects to build the new student recreation building, other parts of the university may feel some side effects. Perhaps student fees will increase for activities that do not take place in the new recreation center. Visitors to the new facility will learn more about other activities at the university and might pay to attend them. This result is an example of a positive side effect, also known as a spillover effect. But negative spillover effects can also occur. Students may decide to decrease their activities at other university venues or events to go to the new facility. This drop in attendance—and most likely a loss in income at other locations—is directly related to the new project. These types of spillover effects must be factored into projecting cash flows.

The failure to appreciate the effect of a decision on net working capital is another common error. New projects normally result in an increase in net working capital. Most projects need some cash on hand to pay for short-term expenses that arise. For our example, the university may need to buy a scoreboard for the new facility using net working capital. Additional net working capital must be allotted for any new project. We could expect the increased investment in net working capital to be recouped by the university at the end of the project's life span. If the new facility has a life span of 30 years, at the end of that 30 years, the scoreboard will no longer be needed. The scoreboard can possibly be sold for scrap value, and some of the initial investment in net working capital can be recouped. The increase in net working capital could be viewed as a loan that will be repaid at the end of the project's life span.

The last common error is including interest payments in the cash flow projections. We are interested only in the cash flows, both income and expense, that result directly from the project's assets. Interest payments and dividends are payments to creditors and shareholders. They are not expenses that result from the assets themselves. But perhaps more important, as already discussed, interest and dividend payments were included in calculating capital costs. If we also include them as cash outflows, we would be double counting these payments, so they do not need to be included as expenses (Brigham & Ehrhardt, 2011).

As you can see, some aspects of projecting cash flow are complex. The easiest way to explain the projection of cash flow for a capital project is probably through an example.

Example of Projecting Cash Flow: New Fitness Facility

Pro forma financial statements must be developed to project cash flow for a small business owner who wants to construct a new health and fitness center. Pro formas are the easiest and most convenient method for projecting cash flow. To develop these statements, we need estimates of items such as fixed costs, variable costs, unit sales, and sales price per unit. Information must also be obtained on the change in net working capital and the total required investment. For our example, several numbers will be simplified. We will limit the life span of the facility to four years. A four-year life span is somewhat unrealistic (the facility would probably last much longer than that), but it will make our example of projecting cash flow much easier to understand. The important thing is to understand the concepts of projecting cash flow.

Several assumptions will be made for the new facility. The new facility will be built on land valued at $250,000. The fitness center owner currently owns the property and has already had an offer from another business to buy the land for this amount. The construction cost of the building will be $400,000. The equipment that will be required, such as fitness machines, weights, and computers, will cost $100,000. The equipment can be fully depreciated over four years. For simplicity we will assume that the new facility can be constructed in one year and will open for business the following year. Therefore, all the land, building, and equipment costs will occur in the same fiscal year (2018), and income from the facility will occur from 2019 to 2022. This assumption is also somewhat unrealistic, but it will make the example easier to understand. Table 12.6 provides an overview of the investment costs for the project.

At the end of the building's four-year life span, the land should still have a value of $250,000, and the building is projected to be worth $200,000. Therefore, straight-line depreciation will be used to depreciate the $200,000 loss in value over the four years. The value of the equipment will be equal to the cost of removing it from the site; therefore, we will state that the overall value of the equipment in four years will be zero.

The owner believes that 1,000 memberships can be sold at an average price of $500 per year. She estimates that they will incur about $100 per person in variable costs (e.g., staff salaries, benefits, and supplies such as towels). For a membership level of 1,000, fixed costs such as rent, electricity, and water will be approximately $70,000 per year. Again, for simplicity, we will assume that there is no inflation and that the level of sales will remain at 1,000 memberships for each of the four years of operation.

To open the new facility, the owner must initially increase her net working capital. The net working capital for the entire organization will be increased from its prior level of $65,000 to $75,000. The additional $10,000 in the first year must be included as a cash flow. The $10,000 will be retained at the end of the project, and that sum must also be included in the projections of total cash flow. The new facility will be subject to federal, state, and local taxes. The total cumulative tax rate will be 35%. Last, the WACC for the owner is 9.5% (if she raises $1 million, then $950,000 of that is associated with using debt or equity), and we will assume an interest rate (r) of 5%.

Table 12.6 Investment Outlays for 2018 (Year 1)

Fixed assets	Cost ($)
Land	250,000
Building	400,000
Equipment	100,000
Total initial investment	750,000

From all this information, we can construct our pro forma statement of cash flows as shown in table 12.7. As you can see, a pro forma cash flow statement is complex. But it captures the expected inflows and outflows of cash for the new facility during its four-year operational life span. Several important aspects must be discussed here. First, notice that depreciation is added back into the calculation of cash flow. Depreciation is an item that is included as part of the balance sheet of a business to calculate its accounting value. But depreciation is not a flow of cash into or out of a firm. Therefore, although it is initially deducted in the cash flow statement, depreciation is ultimately added back into the cash flow.

This important point is worth reemphasizing—the cash flow statement measures the inflows and outflows of cash for a firm, and depreciation is not a cash flow (therefore the $75,000 is added back into the cash flow statement in our example). The important result from the cash flow statement is that it provides a projection for the amount of cash that will accrue from operating the new facility. The cash flows range from $230,750 in 2019 to $250,750 in 2022. The difference in cash flows occurs because the owner must increase her net working capital in 2019 to start the operation. She will get this $10,000 back in 2022 when the facility closes.

The next step for the fitness center owner is to make the decision about undertaking this project. At this point, she has a projection on the cost of construction for the facility and the projected cash flows during the life of the operation. The importance of the time value of money must be mentioned. The owner is using capital today to construct a facility that will increase future cash flow. The future cash flow must be discounted to account for the time value of money as highlighted in the concepts into practice sidebar.

Table 12.7 Pro Forma Statement of Cash Flow

	2019 (year 2)	2020 (year 3)	2021 (year 4)	2022 (year 5)
Unit sales	1,000	1,000	1,000	1,000
Sales price	$500	$500	$500	$500
Net sales	$500,000	$500,000	$500,000	$500,000
Variable costs	$100,000	$100,000	$100,000	$100,000
Fixed costs	$70,000	$70,000	$70,000	$70,000
Depreciation (building)	$50,000	$50,000	$50,000	$50,000
Depreciation (equipment)	$25,000	$25,000	$25,000	$25,000
Earnings before taxes	$255,000	$255,000	$255,000	$255,000
Taxes (35%)	$89,250	$89,250	$89,250	$89,250
Projected net operating income	$165,750	$165,750	$165,750	$165,750
Add back noncash expenses*	$75,000	$75,000	$75,000	$75,000
Cash flow from operations	$240,750	$240,750	$240,750	$240,750
Investment in net working capital	($10,000)			$10,000
Total projected cash flow	$230,750	$240,750	$240,750	$250,750

*Depreciation is used for tax purposes. However, it is not a cash flow, and therefore the $75,000 is added back into the cash flow statement.

Concepts Into Practice

In this example, we will assume that there is no inflation. The timeline in table 12.8 captures the cash flow analysis. Additionally, the value of the land must be included in the cost of the project.

Using the assumptions that have been made and the projected cash flows that are presented in tables 12.7, 12.8, and 12.9, we can calculate the net present value, internal rate of return, and discounted payback period. You should be able to make these calculations on your own.

Table 12.8 Timeline of Net Cash Flows (2018-2022)

Year	Net cash flow ($)
2018	–750,000
2019	230,000
2020	240,740
2021	240,740
2022	250,740

Table 12.9 Discounted Payback Period (5% Interest Rate)

	2018	2019	2020	2021	2022	Discounted payback period
Cash flow	–$750,000	$230,750	$240,750	$240,750	$250,750	
Discounted cash flow	–$750,000	$219,762	$218,367	$207,969	$206,293	
Aggregate discounted cash flow		–$530,938	–$312,571	–$104,602	$101,691	Approximately 4.5 more years

(continued)

(continued)

Net Present Value

$$NPV = P_0 + [P_1 / (1 + r)] + [P_2 / (1 + r)^2] + [P_3 / (1 + r)^3] + [P_4 / (1 + r)^4]$$

Assume $r = 5\%$.

$$NPV = -\$750{,}000 + [\$230{,}750 / (1 + 0.05)] + [\$240{,}750 / (1 + 0.05)^2] + [\$240{,}750 / (1 + 0.05)^3] + [\$250{,}750 / (1 + 0.05)^4]$$

$$NPV = -\$750{,}000 + [\$230{,}750 / 1.05] + [\$240{,}750 / 1.1025] + [\$240{,}750 / 1.1576] + [\$250{,}750 / 1.2155]$$

$$NPV = -\$750{,}000 + \$219{,}762 + \$218{,}367 + \$207{,}969 + \$206{,}293$$
$$= \$102{,}391$$

Internal Rate of Return

$$NPV = P_0 + [P_1 / (1 + r)] + [P_2 / (1 + r)^2] + [P_3 / (1 + r)^3] + [P_4 / (1 + r)^4] = 0$$

$$NPV = -\$750{,}000 + [\$230{,}750 / (1 + r)] + [\$240{,}750 / (1 + r)^2] + [\$240{,}750 / (1 + r)^3] + [\$250{,}750 / (1 + r)^4] = 0$$

Through trial and error, we find that for NPV to equal 0 in the previous equation, r must equal 0.1066, or 10.66%.

Table 12.9 presents the calculations for determining the discounted payback period. For each period, the discounted cash flow values, which were calculated when determining the NPV, are deducted from the initial investment. The discounted payback period is the estimated length of time required to repay the investment after discounting the value of the cash flows because of the passage of time. In this case, approximately 3.5 years is needed to generate the cash flows necessary to repay the initial $750,000 investment.

As the calculations show, the NPV of this project is $102,391. Because the NPV is positive, it appears that this capital project could be undertaken. Additionally, the IRR is higher than the weighted average cost of capital (WACC), 10.7% versus 9.5%. Therefore, a sports manager who uses IRR as a basis for capital-budgeting decisions would also accept this project. Finally, through use of the discounted payback method, the manager would learn that it would take approximately 3.5 years to pay back the initial capital outlay of $750,000. Thus, someone basing her decision on the discounted payback method may elect to pass on this project and search for other business opportunities. As stated earlier, the owner wants to recoup her investment within four years. As this example clearly shows, the various capital-budgeting decision techniques can support different conclusions.

A financial manager can use all these measures—IRR, NPV, and the discounted payback method—in making the capital-budgeting decision for this project.

You should note that a project should not be undertaken solely because it has a positive NPV or an IRR that is higher than the WACC. Capital budgeting is one part of a sports organization's overall financial management strategy. The capital project must fit into the organization's long-term objectives. A sporting goods company may have an opportunity to invest in a capital project involving athlete representation that will result in a positive NPV, but if this project does not fit into the overall organizational objective, it should not be undertaken.

The previous example explores trying to make a decision where the goal is to make the most amount of money or to undertake a difficult long-term decision. Decisions are also made for everyday types of activities every business might undertake. For noncapital issues, a company might utilize break-even analysis.

BREAK-EVEN ANALYSIS

In chapter 8 we explored break-even analysis in terms of the budgetary process. When developing a budget, an executive wants to make sure the projected revenue will at least cover the expected expenses. The same approach is used for everyday and large capital expenditures. Every day, executives need to make decisions critical for running their business. For example, how would a fitness facility price its yoga classes? The executives could look at what other facilities in the area charge. They could look at national standards. They can also just come up with a number they feel is reasonable. There are many techniques, but most organizations will try to price the class

at more than the cost. Businesses are around to make money, not lose money. Even a government agency will need to generate positive cash flow or risk being cut due to tight budgets. If the class needs to generate more money than it costs, the facility is going to utilize break-even analysis. Break-even analysis is a financial tool used to determine the level of unit sales required for the business to cover its expenses. In other words, break-even analysis provides the base sales level needed to ensure profitability. The **break-even point** occurs when EBIT equals zero (i.e., when pretax operating profits, independent of financing considerations, are zero).

Before discussing the formula, it is important to remind the reader about the difference between fixed and variable costs. Fixed costs refer to costs that occur regardless of any units being made or sold. Office rent, managerial salaries, and research and development costs are all examples of fixed costs that need to be considered regardless of any other sales or production. Variable costs, on the other hand, are associated with the volume produced. Raw material, electricity for specific equipment, and personnel costs for the builders all might be examples of variable costs. In the yoga example, the costs to open and staff the gym are examples of fixed costs. Paying the independent contractor yoga instructor is a variable cost, as he is paid $100 for every class he teaches. If he teaches three classes one day, then the variable cost is $300 that day. If the fixed cost for the facility is $500 a day (just for a simple analysis), then the total costs are $800 per day. If 100 people attend the classes on an average day, then the facility would need to charge $8 each to break even. Thus, to make a profit and protect the facility from any low attendance days, it will probably charge at least $10 per class, per participant. The break-even point can be expressed in the following way:

$$\text{EBIT} = \text{revenues} - \text{variable costs} - \text{fixed costs of production} = 0$$

The preceding equation can also be expressed as follows: $\text{EBIT} = PQ - VQ - F = 0$ where:

EBIT = earnings before interest and taxes

P = selling price per unit sold

Q = sales

V = variable cost per unit sold

F = fixed costs of production

The break-even point of unit sales (QBE) follows:

$$QBE = F / (P - V)$$

QBE = break-even point of unit sales

F = fixed costs of production

P = selling price per unit sold

V= variable cost per unit sold

The break-even formula states the break-even point of unit sales will be higher if fixed costs are higher. The difference between unit price and unit variable cost (P – V) can be viewed as the gross profit per unit sold. The higher the level of gross profit per unit sold, the lower the number of units needed to be sold to break even. The break-even formula can be demonstrated using assumptions about Under Armour. For example, assume the company's per shirt price (P) is $15 and the per shirt variable cost (V) is $8.25, which is the sum of the direct manufacturing costs ($7 per shirt) and the selling and administrative costs ($1.25 per shirt). The fixed cost of production is $15 million, which is the sum of the $10 million depreciation expense and the $5 million interest expense. Plugging these values into the break-even formula, we get the following:

$$QBE = \$15{,}000{,}000 / (\$15 - \$8.25) = 2{,}222{,}222 \text{ shirts}$$

Thus, to break even, UA would need to sell over 2.2 million shirts to cover its costs. Also note UA's per shirt gross profit margin on each sale is equal to $15 minus $8.25, or $6.75 per shirt sold. If fixed costs remain at $15 million per year, the per shirt gross profit margin would have to fall to $3.75 for UA to be breaking even at four million shirts. This calculation indicates that UA is in good shape because any reduction in per shirt profits could come about only through severe price reductions, significantly reduced sales, or substantial increases in variable costs.

This analysis can be used for all facets of a professional sports team. A professional sports team, will take into consideration all expense and revenue items, so the analysis is more complex. That analysis is made more difficult by variable components that will need to be explored, such as a revenue-sharing agreement with players, which can change on a regular basis based on ticket sales and sponsorship contracts.

While a majority of this chapter has focused on identifying hard numbers upon which to