



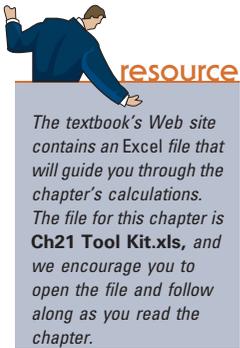
CHAPTER 21

Mergers, LBOs, Divestitures, and Holding Companies

On January 28, 2005, Procter & Gamble (P&G) bid almost \$55 billion to acquire Gillette in a friendly merger. When the deal was completed on October 1, 2005, it created the world's largest consumer goods company, making the merger the biggest of the year.

Combining Gillette and P&G has already produced several winners. When the deal was announced, Gillette's shareholders saw the value of their stock rise by more than 17%. One particular winner was Gillette's largest shareholder, Warren Buffett, who owned roughly 96 million shares. Other winners included Gillette's senior executives, who saw the value of their stock and stock options increase, and the investment banks that helped put the deal together. Estimates suggest that Goldman Sachs, Merrill Lynch, and UBS each received \$30 million from the transaction.

Although many applauded the deal, others believe that P&G will have to work hard to justify the price it paid for Gillette. Moreover, as we point out in this chapter, the track record for acquiring firms in large deals has not always been good. As we write this in July 2009, P&G's stock is up only 3% since the completion of the merger. However, the S&P 500 is down by 20%. We can't say what P&G's performance would have been without the merger, but it has certainly outperformed the overall stock market. Keep the P&G–Gillette merger in mind as you read this chapter.



Most corporate growth occurs by *internal expansion*, which takes place when a firm's existing divisions grow through normal capital budgeting activities. However, the most dramatic examples of growth result from mergers, the first topic covered in this chapter. *Leveraged buyouts*, or *LBOs*, occur when a firm's stock is acquired by a small group of investors rather than by another operating company. Conditions change over time, causing firms to sell off, or divest, major divisions to other firms that can better utilize the divested assets. Divestitures are also discussed in the chapter. Finally, we discuss the *holding company* form of organization, wherein one corporation owns the stock of one or more other companies.

21.1 RATIONALE FOR MERGERS

Many reasons have been proposed by financial managers and theorists to account for the high level of U.S. merger activity. The primary motives behind corporate **mergers** are presented in this section.¹

Synergy

The primary motivation for most mergers is to increase the value of the combined enterprise. If Companies A and B merge to form Company C and if C's value exceeds that of A and B taken together, then **synergy** is said to exist, and such a merger should be beneficial to both A's and B's stockholders.² Synergistic effects can arise from five sources: (1) *operating economies*, which result from economies of scale in management, marketing, production, or distribution; (2) *financial economies*, including lower transaction costs and better coverage by security analysts; (3) *tax effects*, in which case the combined enterprise pays less in taxes than the separate firms would pay; (4) *differential efficiency*, which implies that the management of one firm is more efficient and that the weaker firm's assets will be more productive after the merger; and (5) *increased market power* due to reduced competition. Operating and financial economies are socially desirable, as are mergers that increase managerial efficiency, but mergers that reduce competition are socially undesirable and illegal.³

Expected synergies are not always realized. For example, when AOL acquired Time Warner, it believed that Time Warner's extensive content library could be sold to AOL's Internet subscribers and that AOL subscribers could be shifted over to Time Warner's cable system. When the merger was announced, the new management estimated that such synergies would increase operating income by \$1 billion per year. However, things didn't work out as expected, and in 2002 Time Warner had to write off about \$100 billion in lost value associated with the merger.

Merrill Lynch (ML) was facing bankruptcy in late 2008, so federal officials encouraged Bank of America (BoA) to save ML from bankruptcy by acquiring it,

¹As we use the term, *merger* means any combination that forms one economic unit from two or more previous ones. For legal purposes, there are distinctions among the various ways these combinations can occur, but our focus is on the fundamental economic and financial aspects of mergers.

²If synergy exists, then the whole is greater than the sum of the parts. Synergy is also called the "2 plus 2 equals 5 effect." The distribution of the synergistic gain between A's and B's stockholders is determined by negotiation. This point is discussed later in the chapter.

³In the 1880s and 1890s, many mergers occurred in the United States, and some of them were obviously directed toward gaining market power rather than increasing efficiency. As a result, Congress passed a series of acts designed to ensure that mergers are not used to reduce competition. The principal acts include the Sherman Act (1890), the Clayton Act (1914), and the Celler Act (1950). These acts make it illegal for firms to combine if the combination tends to lessen competition. The acts are enforced by the antitrust division of the Justice Department and by the Federal Trade Commission.

creating one of the world's largest (if not the largest) financial conglomerate. But BoA tried to back out of the deal as it learned more about ML's situation. Under pressure from the government, BoA went through with the merger and almost immediately reported over \$21 billion in associated losses.

As these examples illustrate, often it is blemishes and not synergies that materialize after a merger.

Tax Considerations

Tax considerations have stimulated a number of mergers. For example, a profitable firm in the highest tax bracket could acquire a firm with large accumulated tax losses. These losses could then be turned into immediate tax savings rather than carried forward and used in the future.⁴

Also, mergers can serve as a way of minimizing taxes when disposing of excess cash. For example, if a firm has a shortage of internal investment opportunities compared with its free cash flow, it could (1) pay an extra dividend, (2) invest in marketable securities, (3) repurchase its own stock, or (4) purchase another firm. If it pays an extra dividend, its stockholders would have to pay immediate taxes on the distribution. Marketable securities often provide a good temporary parking place for money, but they generally earn a rate of return less than that required by stockholders. A stock repurchase might result in a capital gain for the selling stockholders. However, using surplus cash to acquire another firm would avoid all these problems, and this has motivated a number of mergers. Still, as we discuss later, the tax savings are often less than the premium paid in the acquisition. Thus, mergers motivated only by tax considerations often reduce the acquiring shareholders' wealth.

Purchase of Assets Below Their Replacement Cost

Sometimes a firm will be touted as an acquisition candidate because the cost of replacing its assets is considerably higher than its market value. This is especially true in the natural resources industry; for example, an oil company's reserves might be worth more on paper than the company's stock. (Of course, converting paper value to monetary value isn't always as easy as it sounds.)

Diversification

Managers often cite diversification as a reason for mergers. They contend that diversification helps stabilize a firm's earnings and thus benefits its owners. Stabilization of earnings is certainly beneficial to employees, suppliers, and customers, but its value to stockholders is less certain. Why should Firm A acquire Firm B to stabilize earnings when stockholders can simply buy the stocks of both firms? Indeed, research suggests that in most cases diversification does not increase the firm's value. In fact, many studies find that diversified firms are worth significantly *less* than the sum of their individual parts.⁵

Of course, if you were the owner-manager of a closely held firm, it might be nearly impossible to sell part of your stock to diversify. Also, selling your stock would probably lead to a large capital gains tax. So, a diversification merger might be the best way to achieve personal diversification for a privately held firm.

⁴Mergers undertaken only to use accumulated tax losses would probably be challenged by the IRS. In recent years, Congress has made it increasingly difficult for firms to pass along tax savings after mergers.

⁵See, for example, Philip Berger and Eli Ofek, "Diversification's Effect on Firm Value," *Journal of Financial Economics*, 1995, pp. 37–65; and Larry Lang and René Stulz, "Tobin's Q, Corporate Diversification, and Firm Performance," *Journal of Political Economy*, December 1994, pp. 1248–1280.

Managers' Personal Incentives

Financial economists like to think that business decisions are based only on economic considerations, especially maximization of firms' values. However, many business decisions are based more on managers' personal motivations than on economic analyses. Business leaders like power, and more power is attached to running a larger corporation than a smaller one. Most likely, no executive would admit that his or her ego was the primary reason behind a merger, but egos do play a prominent role in many mergers.⁶

It has also been observed that executive salaries are highly correlated with company size—the bigger the company, the higher the salaries of its top officers. This, too, could obviously cause unnecessary acquisitions.

Personal considerations deter as well as motivate mergers. After most takeovers, some managers of the acquired companies lose their jobs, or at least their autonomy. Therefore, managers who own less than 51% of their firms' stock look to devices that will lessen the chances of a takeover, and a merger can serve as such a device. In 2005, for example, MCI's board of directors, over the objection of large shareholders, turned down repeated acquisition offers from Qwest, at the time the nation's fourth-largest local phone company, in favor of substantially smaller offers from Verizon, the nation's largest phone company. MCI's management viewed Verizon as a stronger, more stable partner than Qwest even though Qwest's bid was at times 20% higher than Verizon's. In response to management's refusal to accept the higher bid, the holders of some 28% of MCI's stock withheld their votes to re-elect the board of directors as a protest. Nonetheless, management proceeded with the Verizon merger negotiations, and the two companies merged in June of 2006. In such cases, management always argues that synergy, not a desire to protect their own jobs, is the motivation for the choice. However, it is difficult to rationalize rejecting a 20% larger bid for undocumented synergies, and some observers suspect that this merger—like many others—was ultimately designed to benefit managers rather than shareholders.

Breakup Value

Some takeover specialists estimate a company's **breakup value**, which is the value of the individual parts of the firm if they were sold off separately. If this value is higher than the firm's current market value, then a takeover specialist could acquire the firm at or even above its current market value, sell it off in pieces, and earn a profit.

Self-Test

Define *synergy*. Is synergy a valid rationale for mergers? Describe several situations that might produce synergistic gains.

Suppose your firm could purchase another firm for only half of its replacement value. Would that be a sufficient justification for the acquisition?

Discuss the pros and cons of diversification as a rationale for mergers. What is breakup value?

21.2 TYPES OF MERGERS

Economists classify mergers into four types: (1) horizontal, (2) vertical, (3) congeneric, and (4) conglomerate. A **horizontal merger** occurs when one firm combines with another in its same line of business—the 2005 Sprint–Nextel merger is an example. An example of a **vertical merger** would be a steel producer's acquisition of one of its own suppliers, such as an iron or coal mining firm, or an oil producer's acquisition of a petrochemical firm that uses oil as a raw material. *Congeneric* means “allied in nature or

⁶See Randall Morck, Andrei Shleifer, and Robert W. Vishny, “Do Managerial Objectives Drive Bad Acquisitions?” *Journal of Finance*, March 1990, pp. 31–48.

action”; hence a **congeneric merger** involves related enterprises but not producers of the same product (horizontal) or firms in a producer–supplier relationship (vertical). The AOL and Time Warner merger is an example. A **conglomerate merger** occurs when unrelated enterprises combine.

Operating economies (and also anticompetitive effects) are at least partially dependent on the type of merger involved. Vertical and horizontal mergers generally provide the greatest synergistic operating benefits, but they are also the ones most likely to be attacked by the Department of Justice as being anticompetitive.⁷ In any event, it is useful to think of these economic classifications when analyzing prospective mergers.

Self-Test

What are the four economic types of mergers?

21.3 LEVEL OF MERGER ACTIVITY

Five principal “merger waves” have occurred in the United States. The first was in the late 1800s, when consolidations occurred in the oil, steel, tobacco, and other basic industries. The second was in the 1920s, when the stock market boom helped financial promoters consolidate firms in a number of industries, including utilities, communications, and autos. The third was in the 1960s, when conglomerate mergers were the rage. The fourth occurred in the 1980s, when LBO firms and others began using junk bonds to finance all manner of acquisitions. The fifth, which involves strategic alliances designed to enable firms to compete better in the global economy, is in progress today.

As can be seen from Table 21-1, some huge mergers have occurred in recent years. Most recent mergers have been strategic in nature—companies are merging to gain economies of scale or scope and thus be better able to compete in the world economy. Indeed, many recent mergers have involved companies in the financial, defense, media, computer, telecommunications, and health care industries, all of which are experiencing structural changes and intense competition.

TABLE 21-1

The Ten Largest Completed Mergers Worldwide through December 31, 2008

BUYER	TARGET	COMPLETION DATE	VALUE (BILLIONS OF U.S. DOLLARS)
Vodafone AirTouch	Mannesmann	April 12, 2000	\$161
Pfizer	Warner-Lambert	June 19, 2000	116
America Online	Time Warner	January 11, 2001	106
RFS Holdings	ABN-AMRO Holding	October 5, 2007	99
Exxon	Mobil	November 30, 1999	81
Glaxo Wellcome	SmithKline Beecham	December 27, 2000	74
Royal Dutch Petroleum	Shell Transport and Trading	July 20, 2005	74
ATT	BellSouth	December 29, 2006	73
SBC Communications	Ameritech	October 8, 1999	72
VodafoneGroup	AirTouch	June 30, 1999	69

Sources: “A Look at the Top 10 Global Mergers,” *Associated Press Newswires*, January 11, 2001; *The Wall Street Journal*, “Year-End Review of Markets and Finance World-Wide Deals,” various issues.

⁷For interesting insights into antitrust regulations and mergers, see B. Espen Eckbo, “Mergers and the Value of Antitrust Deterrence,” *Journal of Finance*, July 1992, pp. 1005–1029.

In the 1980s, cash was the preferred method of payment, because large cash payments could convince even the most reluctant shareholder to approve the deal. However, the cash was generally obtained by borrowing, leaving the consolidated company with a heavy debt burden, which often led to difficulties. In recent years, stock has replaced borrowed cash as the merger currency for two reasons: (1) Many of the 1980s mergers were financed with junk bonds that later went into default. These defaults, along with the demise of Drexel Burnham, the leading junk bond dealer, have made it difficult to arrange debt-financed mergers. (2) Most recent mergers have been for strategic reasons, such as Eli Lilly's \$6.5 billion acquisition of ImClone Systems in 2008. Most of these mergers have been friendly, and stock swaps are easier to arrange in friendly mergers than in hostile ones.

There has also been an increase in cross-border mergers. For example, in 2009 Wal-Mart acquired *Distribucion y Servicio*, a large chain of supermarkets in Chile.

Self-Test

What five major “merger waves” have occurred in the United States?

What are some reasons for the current wave?

21.4 HOSTILE VERSUS FRIENDLY TAKEOVERS

In the vast majority of merger situations, one firm (generally the larger of the two) simply decides to buy another company, negotiates a price with the management of the target firm, and then acquires the target company. Occasionally, the acquired firm will initiate the action, but it is much more common for a firm to seek companies to acquire than to seek to be acquired. Following convention, we call a company that seeks to acquire another firm the **acquiring company** and the one that it seeks to acquire the **target company**.

Once an acquiring company has identified a possible target, it must (1) establish a suitable price, or range of prices, and (2) decide on the terms of payment—will it offer cash, its own common stock, bonds, or some combination? Next, the acquiring firm's managers must decide how to approach the target company's managers. If the acquiring firm has reason to believe that the target's management will approve the merger, then one CEO will contact the other, propose a merger, and then try to work out suitable terms. If an agreement is reached, then the two management groups will issue statements to their stockholders indicating that they approve the merger, and the target firm's management will recommend to its stockholders that they agree to the merger. Generally, the stockholders are asked to *tender* (or send in) their shares to a designated financial institution, along with a signed power of attorney that transfers ownership of the shares to the acquiring firm. The target firm's stockholders then receive the specified payment, either common stock of the acquiring company (in which case the target company's stockholders become stockholders of the acquiring company), cash, bonds, or some mix of cash and securities. This is a **friendly merger**. The P&G–Gillette merger is an example.

Often, however, the target company's management resists the merger. Perhaps they feel that the price offered is too low, or perhaps they simply want to keep their jobs. Regardless of the reasons, in this case the acquiring firm's offer is said to be **hostile** rather than friendly, and the acquiring firm must make a direct appeal to the target firm's stockholders. In a hostile merger, the acquiring company will again make a **tender offer**, and again it will ask the stockholders of the target firm to tender their shares in exchange for the offered price. This time, though, the target firm's managers will urge stockholders not to tender their shares, generally stating that the price offered (cash, bonds, or stocks in the acquiring firm) is too low.

Although most mergers are friendly, there are cases in which high-profile firms have attempted hostile takeovers. For example, Wachovia defeated a hostile bid by SunTrust and was acquired, instead, by First Union. Looking overseas, Olivetti successfully conducted a hostile takeover of Telecom Italia, and, in another hostile telecommunications merger, Britain's Vodafone AirTouch acquired its German rival, Mannesmann AG.

Perhaps not surprisingly, hostile bids often fail. However, an all-cash offer that is high enough will generally overcome any resistance by the target firm's management. A hostile merger often begins with a "preemptive" or "blowout" bid. The idea is to offer such a high premium over the pre-announcement price that (a) no other bidders will be willing to jump into the fray and (b) the target company's board cannot simply reject the bid. If a hostile bid is eventually accepted by the target's board then the deal ends up as "friendly," despite any acrimony during the hostile phase.

Self-Test

What is the difference between a hostile and a friendly merger?

21.5 MERGER REGULATION

Prior to the mid-1960s, friendly acquisitions generally took place as simple exchange-of-stock mergers, and a proxy fight was the primary weapon used in hostile control battles. In the mid-1960s, however, corporate raiders began to operate differently. First, it took a long time to mount a proxy fight—raiders had to first request a list of the target company's stockholders, be refused, and then get a court order forcing management to turn over the list. During that time, the target's management could think through and then implement a strategy to fend off the raider. As a result, management won most proxy fights.

Then raiders thought, "If we could bring the decision to a head quickly, before management can take countermeasures, that would greatly increase our probability of success." That led the raiders to turn from proxy fights to tender offers, which had a much shorter response time. For example, the stockholders of a company whose stock was selling for \$20 might be offered \$27 per share and be given 2 weeks to accept. The raider, meanwhile, would have accumulated a substantial block of the shares in open market purchases, and additional shares might have been purchased by institutional friends of the raider who promised to tender their shares in exchange for the tip that a raid was to occur.

Faced with a well-planned raid, managements were generally overwhelmed. The stock might actually be worth more than the offered price, but management simply did not have time to get this message across to stockholders or to find a competing bidder. This situation seemed unfair, so Congress passed the Williams Act in 1968. This law had two main objectives: (1) to regulate the way acquiring firms can structure takeover offers and (2) to force acquiring firms to disclose more information about their offers. In essence, Congress wanted to put target managements in a better position to defend against hostile offers. Additionally, Congress believed that shareholders needed easier access to information about tender offers—including information on any securities that might be offered in lieu of cash—in order to make rational tender-versus-don't-tender decisions.

The Williams Act placed the following four restrictions on acquiring firms: (1) Acquirers must disclose their current holdings and future intentions within 10 days of amassing at least 5% of a company's stock. (2) Acquirers must disclose the source of the funds to be used in the acquisition. (3) The target firm's shareholders must be allowed at least 20 days to tender their shares; that is, the offer must be "open" for at least 20

days. (4) If the acquiring firm increases the offer price during the 20-day open period, then all shareholders who tendered prior to the new offer must receive the higher price. In total, these restrictions were intended to reduce the acquiring firm's ability to surprise management and to stampede target shareholders into accepting an inadequate offer. Prior to the Williams Act, offers were generally made on a first-come, first-served basis, and they were often accompanied by an implicit threat to lower the bid price after 50% of the shares were in hand. The legislation also gave the target more time to mount a defense, and it gave rival bidders and white knights a chance to enter the fray and thus help a target's stockholders obtain a better price.

Many states have also passed laws designed to protect firms in their states from hostile takeovers. In 1987 the U.S. Supreme Court upheld an Indiana law that radically changed the rules of the takeover game. Specifically, the Indiana law first defined "control shares" as enough shares to give an investor 20% of the vote. It went on to state that when an investor buys control shares, those shares can be voted only after approval by a majority of "disinterested shareholders," defined as those who are neither officers nor inside directors of the company nor associates of the raider. The law also gives the buyer of control shares the right to insist that a shareholders' meeting be called within 50 days to decide whether the shares may be voted. The Indiana law dealt a major blow to raiders, mainly because it slows down the action and thus gives the target firm time to mount a defense. Delaware (the state in which most large companies are incorporated) later passed a similar bill, as did New York and a number of other important states.

The new state laws also have some features that protect target stockholders from their own managers. Included are limits on the use of golden parachutes, onerous debt financing plans, and some types of takeover defenses. Because these laws do not regulate tender offers per se but rather govern the practices of firms in the state, they have withstood all legal challenges to date. But when companies such as IBM offer 100% premiums for companies such as Lotus, it is hard for any defense to hold them off.

Self-Test

Is there a need to regulate mergers? Explain.

Do the states play a role in merger regulation, or is it all done at the national level? Explain.

21.6 OVERVIEW OF MERGER ANALYSIS

An acquiring firm must answer two questions. First, how much would the target be worth after being incorporated into the acquirer? Notice that this may be quite different from the target's current value, which does not reflect any post-merger synergies or tax benefits. Second, how much should the acquirer offer for the target? A low price is obviously better for the acquirer, but the target won't take the offer if it is too low. However, a higher offer price could scare off potential rival bidders. Later sections discuss setting the offer's price and structure (cash versus stock), but for now we focus on estimating the post-merger value of the target.

There are two basic approaches used in merger valuation: discounted cash flow (DCF) techniques and market multiple analysis.⁸ Survey evidence shows that 49.3% of firms use only discounted cash flow techniques, 33.3% use both DCF and market multiples, and 12.0% use only market multiples. The market multiple approach assumes that a target is directly comparable to the average firm in its industry.

⁸See Chapter 7 for an explanation of market multiple analysis.

Therefore, this procedure provides at best a ballpark estimate. Because it is less accurate and less frequently used than DCF approaches, we will focus on DCF methods.⁹

There are three widely used DCF methods: (1) the corporate valuation method, (2) the adjusted present value method, and (3) the equity residual method, which is also called the “free cash flow to equity” method. Chapter 13 explained the corporate valuation model, Section 21.7 explains the adjusted present value model, and Section 21.8 explains the equity residual model. Section 21.8 also provides a numerical illustration for a company with a constant capital structure and shows that all three models, when properly applied, produce identical valuations if the capital structure is held constant. However, in many situations, there will be a nonconstant capital structure in years immediately following the merger. For example, this often occurs if an acquisition is financed with a temporarily high level of debt that will be reduced to a sustainable level as the merger is digested. In such situations, it is extremely difficult to apply the corporate valuation model or the equity residual model correctly because the cost of equity and the cost of capital are changing as the capital structure changes. Fortunately, the adjusted present value model is ideally suited for such situations, as we show in the next section.

Self-Test

What are the two questions that an acquirer must answer?

What are four methods for estimating a target’s value?

21.7 THE ADJUSTED PRESENT VALUE (APV) APPROACH

Recall from Chapter 15 that interest payments are tax deductible. This means that the government receives less tax revenue from a levered firm than from an otherwise identical but unlevered firm, which leaves more money available for the levered firm’s investors. More money for investors increases a firm’s value, all else equal. In other words, the value of a levered firm is equal to the value of an unlevered firm plus an *adjustment* for tax savings. The **adjusted present value (APV) approach** explicitly employs this concept by expressing the value of operations as the sum of two components: (1) the unlevered value of the firm’s operations (i.e., as though the firm had no debt), plus (2) the present value of the interest tax savings, also known as the **interest tax shield**:

$$V_{\text{Operations}} = V_{\text{Unlevered}} + V_{\text{Tax shield}}$$

(21-1)

The value of an unlevered firm’s operations is the present value of the firm’s free cash flows discounted at the unlevered cost of equity, and the value of the tax shield is the present value of all of the interest tax savings (TS), discounted at the unlevered cost of equity, r_{sU} :¹⁰

⁹For recent survey evidence on merger valuation methods, see Tarun K. Mukherjee, Halil Kiymaz, and H. Kent Baker, “Merger Motives and Target Valuation: A Survey of Evidence from CFOs,” *Journal of Applied Finance*, Fall/Winter 2004, pp. 7–23. For evidence on the effectiveness of market multiples and DCF approaches, see S. N. Kaplan and R. S. Ruback, “The Market Pricing of Cash Flow Forecasts: Discounted Cash Flow vs. the Method of ‘Comparables,’” *Journal of Applied Corporate Finance*, Winter 1996, pp. 45–60. Also see Samuel C. Weaver, Robert S. Harris, Daniel W. Bielinski, and Kenneth F. MacKenzie, “Merger and Acquisition Valuation,” *Financial Management*, Summer 1991, pp. 85–96; and Nancy Mohan, M. Fall Ainina, Daniel Kaufman, and Bernard J. Winger, “Acquisition/Divestiture Valuation Practices in Major U.S. Firms,” *Financial Practice and Education*, Spring 1991, pp. 73–81.

¹⁰Although some analysts discount the tax shield at the cost of debt or some other rate, we believe that the unlevered cost of equity is the appropriate discount rate for the interest tax savings. See Chapter 26 for a detailed explanation.

$$V_{\text{Unlevered}} = \sum_{t=1}^{\infty} \frac{\text{FCF}_t}{(1 + r_{sU})^t} \quad (21-2)$$

and

$$V_{\text{Tax shield}} = \sum_{t=1}^{\infty} \frac{\text{TS}_t}{(1 + r_{sU})^t} \quad (21-3)$$

Before we can apply Equations 21-2 and 21-3, the FCF and TS must eventually stabilize at a constant growth rate. When they do so, we can use an approach similar to the ones we used for the nonconstant dividend model in Chapter 7 and the corporate valuation model in Chapter 13. In those approaches, we explicitly projected the years with nonconstant growth rates, found the horizon value at the end of the nonconstant growth period, and then calculated the present value of the horizon value and the cash flows during the forecast period.

Here is a detailed description of how to apply that approach in the APV model.

1. Calculate the target's unlevered cost of equity, r_{sU} , based upon its current capital structure at the time of the acquisition. In other words, you “unlever” the target's cost of equity. Chapter 26 shows that a firm's levered cost of equity, r_{sL} , is a function of its unlevered cost of equity, its cost of debt (r_d), and the amount of debt (D) and equity (S) in its capital structure:

$$r_{sL} = r_{sU} + (r_{sU} - r_d)(D/S) \quad (21-4)$$

Because the weights of debt and equity in a capital structure, w_d and w_s , are defined as $D/(D + S)$ and $S/(D + S)$, respectively, the ratio of D/S can be expressed as w_d/w_s . We make this substitution in Equation 21-4 and then solve for the unlevered cost of equity:

$$r_{sU} = w_s r_{sL} + w_d r_d \quad (21-5)$$

Keep in mind that r_{sL} , r_d , w_d , and w_s are based upon the target's capital structure immediately before the acquisition.

2. Project the free cash flows, FCF_t , and the annual interest tax savings, TS_t . The tax savings are equal to the projected interest payments multiplied by the tax rate:¹¹

$$\text{Tax savings} = (\text{Interest expense})(\text{Tax rate}) \quad (21-6)$$

¹¹The tax shield is based only on interest expense, not the net value of interest expense and interest income. This is because the impact of interest income is taken into account when the value of short-term investments is added later to the value of operations; hence, including the impact of interest income in the tax shield would amount to “double counting.” In other words, there are no “side effects” due to owning a short-term investment: The value of the investment to the company is just the reported value. This is in contrast to debt, which does have a “side effect” in the sense that the cost to the company is less than the reported value because of the tax shield provided by the debt.



You must project enough years so that the FCF and the tax savings are expected to grow at a constant rate (g) after the horizon, which is at Year N . This means that the capital structure must become constant at Year $N - 1$ to ensure that the projected interest payment at Year N will grow at a constant rate after Year N . See **Web Extension 21A** for a detailed explanation of how to project financial statements that reflect a constant capital structure. For the remainder of this chapter, we will assume that your trusty assistant has made such projections.

Observe that the APV approach does not require a constant capital structure in each and every year of the analysis; it requires only that the capital structure eventually become stable in the post-horizon period.

3. Calculate the horizon value of an unlevered firm at Year N ($HV_{U,N}$), which is the value of all free cash flows beyond the horizon discounted back to the horizon at the unlevered cost of equity. Also calculate the horizon value of the tax shield at Year N ($HV_{TS,N}$), which is the value of all tax shields beyond the horizon discounted back to the horizon at the unlevered cost of equity. Because FCF and TS are growing at a constant rate of g in the post-horizon period, we can use the constant growth formula:

$$\text{Horizon value of unlevered firm} = HV_{U,N} = \frac{FCF_{N+1}}{r_{sU} - g} = \frac{FCF_N(1 + g)}{r_{sU} - g} \quad (21-7)$$

and

$$\text{Horizon value of tax shield} = HV_{TS,N} = \frac{TS_{N+1}}{r_{sU} - g} = \frac{TS_N(1 + g)}{r_{sU} - g} \quad (21-8)$$

The unlevered horizon value is the horizon value of the company if it had no debt. The tax shield horizon value is the contribution the tax savings after Year N make to the horizon value of the levered firm. Therefore, the horizon value of the levered firm is the sum of the unlevered horizon value and the tax shield horizon value.

4. Calculate the present value of the free cash flows and their horizon value. This is the value of operations for the unlevered firm—that is, the value it would have if it had no debt. Also calculate the present value of the yearly tax savings during the forecast period and the horizon value of tax savings. This is the value that the interest tax shield contributes to the firm. The sum of the value of unlevered operation and the value of the tax shield is equal to the value of operations for the levered firm:

$$V_{\text{Unlevered}} = \sum_{t=1}^N \frac{FCF_t}{(1 + r_{sU})^t} + \frac{HV_{U,N}}{(1 + r_{sU})^N} \quad (21-9)$$

$$V_{\text{Tax shield}} = \sum_{t=1}^N \frac{TS_t}{(1 + r_{sU})^t} + \frac{HV_{TS,N}}{(1 + r_{sU})^N} \quad (21-10)$$

$$V_{\text{Operations}} = V_{\text{Unlevered}} + V_{\text{Tax shield}} \quad (21-11)$$

5. To find the total value of the firm, add the value of operations to the value of any nonoperating assets, such as marketable securities. To find the value of equity, subtract the value of the debt before the merger from the total value of the firm.

$$\begin{array}{r}
 \text{Unlevered value of operations} \\
 + \text{Value of tax shield} \\
 \hline
 \text{Value of operations} \\
 + \text{Value of nonoperating assets} \\
 \hline
 \text{Total value of firm} \\
 - \text{Value of debt} \\
 \hline
 \underline{\underline{\text{Value of equity}}}
 \end{array}$$

To find the stock price per share, divide the value of equity by the number of shares.

The APV technique is especially useful for valuing acquisition targets. Many acquisitions are difficult to value using the corporate valuation model because (1) acquiring firms frequently assume the debt of the target firm, so old debt at different coupon rates is often part of the deal; and (2) the acquisition is usually financed partially by new debt that will be paid down rapidly, so the proportion of debt in the capital structure changes during the years immediately following the acquisition. Thus, the debt cost and capital structure associated with a merger are generally more complex than for a typical firm. The easiest way to handle these complexities is to specify each year's expected interest expense and use the APV method to find the value of the unlevered firm and the interest tax shields separately, and then sum those values.

Self-Test

Why is the adjusted present value approach appropriate for situations with a changing capital structure?

Describe the steps required to apply the APV approach.

21.8 THE FREE CASH FLOW TO EQUITY (FCFE) APPROACH

Free cash flow is the cash flow available for distribution to *all* investors. In contrast, **free cash flow to equity (FCFE)** is the cash flow available for distribution to *common shareholders*. Because FCFE is available for distribution only to shareholders, it should be discounted at the cost of equity. Therefore, the **free cash flow to equity approach**, also called the **equity residual model**, discounts the projected FCFEs at the cost of equity to determine the value of the equity from operations.

Because FCFE is the cash flow available for distribution to shareholders, it may be used to pay common dividends, repurchase stock, purchase financial assets, or some combination of these uses. In other words, the uses of FCFE include all those of FCF except for distributions to debtholders. Therefore, one way to calculate FCFE is to start with FCF and reduce it by the net after-tax distributions to debtholders:

$$\begin{aligned}
 \text{FCFE} &= \text{Free cash flow} - \text{After-tax interest expense} - \text{Principal payments} + \text{Newly issued debt} \\
 &= \text{Free cash flow} - \text{Interest expense} + \text{Interest tax shield} + \text{Net change in debt}
 \end{aligned}$$

(21-12)

Alternatively, the FCFE can be calculated as

$$\text{FCFE} = \text{Net income} - \frac{\text{Net investment in operating capital}}{\text{operating capital}} + \frac{\text{Net change in debt}}{\text{in debt}} \quad (21-12a)$$

Both calculations provide the same value for FCFE, but Equation 21-12 is used more often because analysts don't always estimate the net income for a target after it has been acquired.

Given projections of FCFE, the value of a firm's equity due to operations, V_{FCFE} , is

$$V_{\text{FCFE}} = \sum_{t=1}^{\infty} \frac{\text{FCFE}_t}{(1 + r_{\text{SL}})^t} \quad (21-13)$$

If we assume constant growth beyond the horizon, then the horizon value of the value of equity due to operations, $\text{HV}_{\text{FCFE},N}$, is

$$\text{HV}_{\text{FCFE},N} = \frac{\text{FCFE}_{N+1}}{r_{\text{SL}} - g} = \frac{\text{FCFE}_N(1 + g)}{r_{\text{SL}} - g} \quad (21-14)$$

The value of equity due to operations is the present value of the horizon value and the FCFE during the forecast period:

$$V_{\text{FCFE}} = \sum_{t=1}^N \frac{\text{FCFE}_t}{(1 + r_{\text{SL}})^t} + \frac{\text{HV}_{\text{FCFE},N}}{(1 + r_{\text{SL}})^N} \quad (21-15)$$

The total value of a company's equity, S , is the value of the equity from operations plus the value of any nonoperating assets:

$$S = V_{\text{FCFE}} + \text{Nonoperating assets} \quad (21-16)$$

To get a per share price, simply divide the total value of equity by the shares outstanding.¹² Like the corporate valuation model, the FCFE model can be applied only when the capital structure is constant.

Table 21-2 summarizes the three cash flow valuation methods and their assumptions.

Self-Test

What cash flows are discounted in the FCFE model, and what is the discount rate?

How do the FCFE, corporate valuation, and APV models differ? How are they similar?

¹²The FCFE model is similar to the dividend growth model in that cash flows are discounted at the cost of equity. The cash flows in the FCFE model are those that are generated from operations, while the cash flows in the dividend growth model (i.e., the dividends) also contain cash flows due to interest earned on nonoperating assets.

TABLE 21-2 Summary of Cash Flow Approaches

	APPROACH		
	CORPORATE VALUATION MODEL	FREE CASH FLOW TO EQUITY MODEL	APV MODEL
Cash flow definition	FCF = NOPAT – Net investment in operating capital	FCFE = FCF – Interest expense + Interest tax shield + Net change in debt	(1) FCF and (2) Interest tax savings
Discount rate	WACC	r_{sL} = Cost of equity	r_{sU} = Unlevered cost of equity
Result of present value calculation	Value of operations	Value of equity due to operations	(1) Value of unlevered operations and (2) Value of the tax shield; together, these are the value of operations
How to get equity value	Value of operations + Value of nonoperating assets – Value of debt	Value of equity due to operations + Value of nonoperating assets	Value of operations + Value of nonoperating assets – Value of debt
Assumption about capital structure during forecast period	Capital structure is constant	Capital structure is constant	None
Requirement for analyst to project interest expense	No interest expense projections needed	Projected interest expense must be based on the assumed capital structure	Interest expense projections are unconstrained
Assumption at horizon	FCF grows at constant rate g	FCFE grows at constant rate g	FCF and interest tax savings grow at constant rate g

21.9 ILLUSTRATION OF THE THREE VALUATION APPROACHES FOR A CONSTANT CAPITAL STRUCTURE

To illustrate the three valuation approaches, consider Caldwell Inc., a large technology company, as it evaluates the potential acquisition of Tutwiler Controls. Tutwiler currently has a \$62.5 million market value of equity and \$27 million in debt, for a total market value of \$89.5 million. Thus, Tutwiler's capital structure consists of $\$27/(\$62.5 + \$27) = 30.17\%$ debt. Caldwell intends to finance the acquisition with this same proportion of debt and plans to maintain this constant capital structure throughout the projection period and thereafter. Tutwiler is a publicly traded company, and its market-determined pre-merger beta was 1.2. Given a risk-free rate of 7% and a 5% market risk premium, the Capital Asset Pricing Model produces a pre-merger required rate of return on equity, r_{sL} , of

$$r_{sL} = 7\% + 1.2(5\%) = 13\%$$

Tutwiler's cost of debt is 9%. Its WACC is

$$\begin{aligned} \text{WACC} &= w_d(1 - T)r_d + w_s r_{sL} \\ &= 0.3017(0.60)(9\%) + 0.6983(13\%) \\ &= 10.707\% \end{aligned}$$

How much would Tutwiler be worth to Caldwell after the merger? The following sections illustrate the application of the corporate valuation model, the APV model, and the FCFE model. All three models produce an identical value of equity, but keep in mind this is only because the capital structure is constant. If the capital structure

were to change during the projection period before becoming stable, then only the APV model could be used. Section 21.11 illustrates the APV in the case of a nonconstant capital structure.

Projecting Post-Merger Cash Flows

The first order of business is to estimate the post-merger cash flows that Tutwiler will produce. This is by far the most important task in any merger analysis. In a **pure financial merger**, defined as one in which no operating synergies are expected, the incremental post-merger cash flows are simply the target firm's expected cash flows. In an **operating merger**, in which the two firms' operations are to be integrated, forecasting future cash flows is obviously more difficult, because potential synergies must be estimated. People from marketing, production, human resources, and accounting play leading roles here, with financial managers focusing on financing the acquisition and doing an analysis designed to determine whether the projected cash flows are worth the cost. In this chapter, we take the projections as given and concentrate on how they are analyzed. See *Web Extension 21A*, available on the text-book's Web site, for a discussion that focuses on projecting financial statements in a merger analysis.



Table 21-3 shows Tutwiler's post-merger projections for Tutwiler, taking into account all expected synergies and maintaining a constant capital structure. Both Caldwell and Tutwiler are in the 40% marginal federal-plus-state tax bracket. The cost of debt after the acquisition will remain at 9%. The projections assume that growth in the post-horizon period will be 6%.

Panel A of Table 21-3 shows selected items from the projected financial statements. Panel B shows the calculations for free cash flow, which is used in the corporate valuation model. Row 9 shows net operating profit after taxes (NOPAT), which is equal to $EBIT(1 - T)$. Row 10 shows the net investment in operating capital, which is the annual change in the total net operating capital in Row 8. Free cash flow, shown in Row 11, is equal to NOPAT less the net investment in operating capital. Panel C shows the cash flows that will be used in the APV model. In particular, Row 13 shows the annual tax shield, which is equal to the interest expense multiplied by the tax rate. Panel D provides the calculations for FCFE, based upon Equation 21-12.

Of course, the post-merger cash flows are extremely difficult to estimate, and in merger valuations—just as in capital budgeting analysis—sensitivity, scenario, and simulation analyses should be conducted.¹³ Indeed, in a friendly merger the acquiring firm would send a team consisting of literally dozens of financial analysts, accountants, engineers, and so forth to the target firm's headquarters. They would go over its books, estimate required maintenance expenditures, set values on assets such as real estate and petroleum reserves, and the like. Such an investigation, which is one example of **due diligence**, is an essential part of any merger analysis.

Following are valuations of Tutwiler using all three methods, beginning with the corporate valuation model.

Valuation Using the Corporate Valuation Model

Because Caldwell does not plan on changing Tutwiler's capital structure, the post-merger WACC will be equal to the pre-merger WACC of 10.707% that we

¹³We purposely kept the cash flows simple in order to focus on key analytical issues. In actual merger valuations, the cash flows would be much more complex, normally including such items as tax loss carry-forwards, tax effects of plant and equipment valuation adjustments, and cash flows from the sale of some of the subsidiary's assets.

TABLE 21-3 Post-Merger Projections for the Tutwiler Subsidiary (Millions of Dollars)

	1/1/11	12/31/11	12/31/12	12/31/13	12/31/14	12/31/15
PANEL A: SELECTED ITEMS FROM PROJECTED FINANCIAL STATEMENTS^a						
1. Net sales		\$105.0	\$126.0	\$151.0	\$174.0	\$191.0
2. Cost of goods sold		80.0	94.0	113.0	129.3	142.0
3. Selling and administrative expenses		10.0	12.0	13.0	15.0	16.0
4. Depreciation		8.0	8.0	9.0	9.0	10.0
5. EBIT		\$ 7.0	\$ 12.0	\$ 16.0	\$ 20.7	\$ 23.0
6. Interest expense ^b		3.0	3.2	3.5	3.7	3.9
7. Debt ^c	33.2	35.8	38.7	41.1	43.6	46.2
8. Total net operating capital	116.0	117.0	121.0	125.0	131.0	138.0
PANEL B: CORPORATE VALUATION MODEL CASH FLOWS						
9. NOPAT = EBIT(1 - T)		\$ 4.2	\$ 7.2	\$ 9.6	\$ 12.4	\$ 13.8
10. Less net investment in operating capital		1.0	4.0	4.0	6.0	7.0
11. Free cash flow		\$ 3.2	\$ 3.2	\$ 5.6	\$ 6.4	\$ 6.8
PANEL C: APV MODEL CASH FLOWS						
12. Free cash flow		\$ 3.2	\$ 3.2	\$ 5.6	\$ 6.4	\$ 6.8
13. Interest tax saving = Interest(T)		\$ 1.2	\$ 1.3	\$ 1.4	\$ 1.5	\$ 1.6
PANEL D: FCFE MODEL CASH FLOWS						
14. Free cash flow		\$ 3.2	\$ 3.2	\$ 5.6	\$ 6.4	\$ 6.8
15. Less A-T interest = Interest(1 - T)		1.8	1.9	2.1	2.2	2.4
16. Plus change in debt ^d		6.2	2.6	2.9	2.5	2.6
17. FCFE		\$ 6.2	\$ 4.0	\$ 4.1	\$ 6.0	\$ 7.1

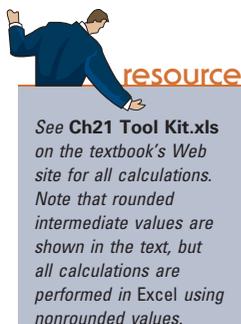
Notes:

^aRounded figures are presented here, but the full nonrounded values are used in all calculations. The tax rate is 40%.

^bInterest payments are based on Tutwiler's existing debt, new debt to be issued to finance the acquisition, and additional debt required to finance annual growth.

^cDebt is existing debt plus additional debt required to maintain a constant capital structure. Caldwell will increase Tutwiler's debt by \$6.2 million, from \$27 million to \$33.2 million, at the time of the acquisition in order to keep the capital structure constant. This increase occurs because the post-merger synergies make Tutwiler more valuable to Caldwell than it was on a stand-alone basis. Therefore, it can support more dollars of debt and still maintain the constant debt ratio.

^dThe increase in debt at the time of acquisition is a source of free cash flow to equity.



calculated previously. Tutwiler's free cash flows are shown in Row 11 of Table 21-3. The horizon value of Tutwiler's operations as of 2015 can be calculated with the constant growth formula that we used in Chapter 13:

$$\begin{aligned}
 HV_{\text{Operations,2015}} &= \frac{FCF_{2016}}{WACC - g} = \frac{FCF_{2015}(1 + g)}{WACC - g} \\
 &= \frac{\$6.800(1.06)}{0.10707 - 0.06} = \$153.1 \text{ million}
 \end{aligned}$$

The value of operations as of January 1, 2011, is the present value of the cash flows in the forecast period and the horizon value:

$$\begin{aligned}
 V_{\text{Operations}} &= \frac{\$3.2}{(1 + 0.10707)^1} + \frac{\$3.2}{(1 + 0.10707)^2} + \frac{\$5.6}{(1 + 0.10707)^3} \\
 &\quad + \frac{\$6.4}{(1 + 0.10707)^4} + \frac{\$6.8 + \$153.1}{(1 + 0.10707)^5} \\
 &= \$110.1
 \end{aligned}$$

There are no nonoperating assets, so the value of equity to Caldwell if Tutwiler is acquired is equal to the value of operations less the value of Tutwiler's debt:¹⁴

$$\$110.1 - \$27 = \$83.1 \text{ million}$$

Valuation Using the APV Approach

The APV approach requires an estimate of Tutwiler's unlevered cost of equity. Putting Tutwiler's capital structure, cost of equity, and cost of debt, Equation 21-5 can be used to estimate the unlevered cost of equity:

$$r_{sU} = w_s r_{sL} + w_d r_d$$

(21-5a)

$$\begin{aligned}
 &= 0.6983(13\%) + 0.3017(9\%) \\
 &= 11.793\%
 \end{aligned}$$

In other words, if Tutwiler had no debt, its cost of equity would be 11.793%.

The horizon value of Tutwiler's unlevered cash flows ($HV_{U,2015}$) and tax shield ($HV_{TS,2015}$) can be calculated using the constant growth formula with the unlevered cost of equity as the discount rate, as shown in Equations 21-7 and 21-8:¹⁵

$$HV_{U,2015} = \frac{FCF_{2016}}{r_{sU} - g} = \frac{FCF_{2015}(1 + g)}{r_{sU} - g} = \frac{\$6.800(1.06)}{0.11793 - 0.06} = \$124.4 \text{ million}$$

$$HV_{TS,2015} = \frac{TS_{2016}}{r_{sU} - g} = \frac{TS_{2015}(1 + g)}{r_{sU} - g} = \frac{\$1.57(1.06)}{0.11793 - 0.06} = \$28.7 \text{ million}$$

The sum of the two horizon values is $\$124.4 + \$28.7 = \$153.1$ million. This is the horizon value of operations, which is the same as the horizon value calculation we reached with the corporate valuation model.

Row 11 in Table 21-3 shows the projected free cash flows. The unlevered value of operations is calculated as the present value of the free cash flows during the forecast period and the horizon value of the free cash flows:

$$\begin{aligned}
 V_{\text{Unlevered}} &= \frac{\$3.2}{(1 + 0.11793)^1} + \frac{\$3.2}{(1 + 0.11793)^2} + \frac{\$5.6}{(1 + 0.11793)^3} \\
 &\quad + \frac{\$6.4}{(1 + 0.11793)^4} + \frac{\$6.8 + \$124.4}{(1 + 0.11793)^5} \\
 &= \$88.7 \text{ million}
 \end{aligned}$$

¹⁴Notice that we subtract the \$27 million value of Tutwiler's debt, not the \$33.2 million of debt supported *after* the merger, because \$27 million is the amount that must be paid off or assumed by Caldwell.

¹⁵Note that we report two decimal places for the 2015 tax shield even though Table 21-3 reports only one decimal place. All calculations are performed in *Excel*, which uses the full nonrounded values.

This shows that Tutwiler's operations would be worth \$88.7 million if it had no debt.

Row 13 shows the yearly interest tax savings. The value of the tax shield is calculated as the present value of the yearly tax savings and the horizon value of the tax shield:

$$\begin{aligned} V_{\text{Tax shield}} &= \frac{\$1.2}{(1 + 0.11793)^1} + \frac{\$1.3}{(1 + 0.11793)^2} + \frac{\$1.4}{(1 + 0.11793)^3} \\ &\quad + \frac{\$1.5}{(1 + 0.11793)^4} + \frac{\$1.57 + \$28.7}{(1 + 0.11793)^5} \\ &= \$21.4 \text{ million} \end{aligned}$$

Thus, Tutwiler's operations would be worth only \$88.7 million if it had no debt, but its capital structure contributes \$21.4 million in value due to the tax deductibility of its interest payments. Since Tutwiler has no nonoperating assets, the total value of the firm is the sum of the unlevered value of operations, \$88.7 million, and the value of the tax shield, \$21.4 million, for a total of \$110.1 million. The value of the equity is this total value less Tutwiler's outstanding debt of \$27 million: \$110.1 - \$27 = \$83.1 million. Note that this is the same value we obtained using the corporate valuation model.

Valuation Using the FCFE Model

The horizon value of Tutwiler's free cash flows to equity can be calculated using the constant growth formula of Equation 21-14:¹⁶

$$HV_{\text{FCFE},2015} = \frac{\text{FCF}_{2015}(1 + g)}{r_{\text{SL}} - g} = \frac{\$7.06(1.06)}{0.13 - 0.06} = \$106.9 \text{ million}$$

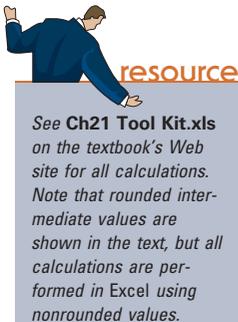
Notice that this horizon value is different from the APV and corporate valuation horizon values. That is because the FCFE horizon value is only for equity, whereas the other two horizon values are for the total value of operations. If the 2015 debt of \$46.2 million shown in Row 7 of Table 21-3 is added to the $HV_{\text{FCFE},2015}$, the result is the same \$153.1 million horizon value of operations obtained with the corporate valuation model and APV model.

Row 17 in Table 21-3 shows the yearly projections of FCFE. When discounted at the 13% cost of equity, the present value of these yearly FCFEs and the horizon value is the value of equity due to operations, which is \$83.1 million:¹⁷

$$\begin{aligned} V_{\text{FCFE}} &= \$6.2 + \frac{\$4.0}{(1 + 0.13)^1} + \frac{\$4.1}{(1 + 0.13)^2} + \frac{\$6.0}{(1 + 0.13)^3} \\ &\quad + \frac{\$6.7}{(1 + 0.13)^4} + \frac{\$7.1 + \$106.9}{(1 + 0.13)^5} \\ &= \$83.1 \text{ million} \end{aligned}$$

¹⁶Note that we report two decimal places for the 2015 FCFE even though Table 21-3 reports only one decimal place. All calculations are performed in *Excel*, which uses the full nonrounded values.

¹⁷Row 16 in Table 21-3 shows that debt is forecast to increase from its pre-merger \$27 million to \$33.2 million at the acquisition date. This is because Tutwiler is more valuable after the merger, so it can support more dollars of debt while still maintaining 30% debt in its capital structure. The increase in debt of \$33.2 - \$27 = \$6.2 million is a FCFE that is immediately available to Caldwell and so is not discounted.



If Tutwiler had any nonoperating assets, we would add them to V_{FCFE} to determine the total value of equity. Since Tutwiler has no nonoperating assets, its total equity value is equal to the V_{FCFE} of \$83.1 million. Notice that this is the same value given by the corporate valuation model and the APV approach.

All three models agree that the estimated equity value is \$83.1 million, which is more than the \$62.5 million current market value of Tutwiler's equity. This means that Tutwiler is more valuable as a part of Caldwell than as a stand-alone corporation being run by its current managers.

Self-Test

Why is the adjusted present value approach appropriate for situations with a changing capital structure?

Describe the steps required to apply the APV approach.

How do the FCFE, APV, and corporate valuation approaches differ from one another?

21.10 SETTING THE BID PRICE

Under the acquisition plan, Caldwell would assume Tutwiler's debt and would also take on additional short-term debt as necessary to complete the purchase. The valuation models show that \$83.1 million is the most it should pay for Tutwiler's stock. If it paid more, then Caldwell's own value would be diluted. On the other hand, if it could get Tutwiler for less than \$83.1 million, Caldwell's stockholders would gain value. Therefore, Caldwell should bid something less than \$83.1 million when it makes an offer for Tutwiler.

Now consider the target company. As stated earlier, Tutwiler's value of equity as an independent operating company is \$62.5 million. If Tutwiler were acquired at a price greater than \$62.5 million then its stockholders would gain value, whereas they would lose value at any lower price.

The difference between \$62.5 million and \$83.1 million, or \$20.6 million, represents **synergistic benefits** expected from the merger. If there were no synergistic benefits, the maximum bid would be the current value of the target company. The greater the synergistic gains, the greater the gap between the target's current price and the maximum the acquiring company could pay.

The issue of how to divide the synergistic benefits is critically important. Obviously, both parties would want to get the best deal possible. In our example, if it knew the maximum price Caldwell could pay, Tutwiler's management would argue for a price close to \$83.1 million. Caldwell, on the other hand, would try to get Tutwiler at a price as close to \$62.5 million as possible.

Where, within the range of \$62.5 to \$83.1 million, will the actual price be set? The answer depends on a number of factors, including whether Caldwell offers to pay with cash or securities, the negotiating skills of the two management teams, and, most importantly, the bargaining positions of the two parties as determined by fundamental economic conditions. Let's first consider bargaining power and then examine the mechanics of a cash offer versus a stock offer.

Relative Bargaining Power

To illustrate the relative bargaining power of the target and the acquirer, assume there are many companies similar to Tutwiler that Caldwell could acquire but suppose that no company other than Caldwell could gain synergies by acquiring Tutwiler. In this case, Caldwell would probably make a relatively low, take-it-or-leave-it offer, and Tutwiler would probably take it because some gain is better than none. On the other hand, if Tutwiler has some unique technology or other asset that many



companies want, then once Caldwell announces its offer, others would probably make competing bids and the final price would probably be close to (or even above) \$83.1 million. A price above \$83.1 million presumably would be paid by some other company with a better synergistic fit or with a management that is more optimistic about Tutwiler's cash flow potential.

Caldwell would, of course, want to keep its maximum bid secret, and it would plan its bidding strategy carefully. If it thought other bidders would emerge or that Tutwiler's management might resist in order to preserve their jobs, it might make a high preemptive bid in hopes of scaring off competing bids or management resistance. On the other hand, it might make a lowball bid in hopes of "stealing" the company.¹⁸

Cash Offers versus Stock Offers

Most target stockholders prefer to sell their shares for cash rather than to exchange them for stock in the post-merger company. Following is a brief description of each payment method.

Cash Offers. Tutwiler's pre-merger equity is worth \$62.5 million. With 10 million shares outstanding, Tutwiler's stock price is $\$62.5/10 = \6.25 . If the synergies are realized, then Tutwiler's equity will be worth \$83.1 million to Caldwell, so $\$83.1/10 = \8.31 is the maximum price per share that Caldwell should be willing to pay to Tutwiler's stockholders. For example, Caldwell might offer \$7.25 cash for each share of Tutwiler stock.

Stock Offers. In a stock offer, Tutwiler's stockholders exchange their Tutwiler shares for new shares in the post-merger company, which will be named CaldwellTutwiler. Targets typically prefer cash offers to stock offers, so perhaps Caldwell must offer a package worth \$7.50 per share. With 10 million outstanding Tutwiler shares, the Tutwiler shareholders must end up owning $\$7.50 \times 10 \text{ million} = \75 million worth of stock in the post-merger company.

Suppose Caldwell has 20 million shares of stock outstanding (n_{Old}) prior to the merger and the stock price per share is \$15. Then the total pre-merger value of Caldwell's equity is $\$15 \times 20 \text{ million} = \300 million . As calculated previously, the post-merger value of Tutwiler to Caldwell is \$83.1 million. Therefore, the total post-merger value of CaldwellTutwiler will be $\$300 + \$83.1 = \$383.1 \text{ million}$.

After the merger, Tutwiler's former stockholders should own $\$75/\$383.1 = 0.196 = 19.58\%$ of the post-merger CaldwellTutwiler. With 20 million Caldwell shares outstanding, Caldwell must issue enough new shares, n_{New} , to the Tutwiler stockholders (in exchange for the Tutwiler shares) so that Tutwiler's former stockholders will own 19.6% of the shares of CaldwellTutwiler:

$$\begin{aligned} \text{Percent required by} &= \frac{n_{\text{New}}}{n_{\text{New}} + n_{\text{Old}}} \\ \text{target stockholders} & \\ 19.58\% &= \frac{n_{\text{New}}}{n_{\text{New}} + 20} \\ n_{\text{New}} &= \frac{20 \times 0.1958}{1 - 0.1958} = 4.87 \text{ million} \end{aligned}$$

¹⁸For an interesting discussion of the aftereffects of losing a bidding contest, see Mark L. Mitchell and Kenneth Lehn, "Do Bad Bidders Become Good Targets?" *Journal of Applied Corporate Finance*, Summer 1990, pp. 60–69.

Tutwiler's former stockholders will exchange 10 million shares of stock in Tutwiler for 4.87 million shares of stock in the combined CaldwellTutwiler. Thus, the exchange ratio is $4.87/10 = 0.487$.

After the merger, there will be 4.87 million new shares for a total of 24.87 million shares. With a combined intrinsic equity value of \$383.1 million, the resulting price per share will be $\$383.1/24.87 = \15.40 . The total value owned by Tutwiler's shareholders is this price multiplied by their shares: $\$15.40 \times 4.87 \text{ million} = \75 million . Also notice that the price will increase from \$15.00 per share before the merger to \$15.40 after the merger, so the merger will benefit Caldwell's shareholders if the synergies are realized.

Self-Test

Explain the issues involved in setting the bid price.

21.11 ANALYSIS WHEN THERE IS A PERMANENT CHANGE IN CAPITAL STRUCTURE

Tutwiler currently has equity worth \$62.5 million and debt of \$27 million, giving it a capital structure financed with about 30% debt: $\$27.0/(\$62.5 + \$27.0) = 0.302 = 30.2\%$. Suppose Caldwell has decided to increase Tutwiler's debt from 30% to 50% over the next 5 years and to maintain the capital structure at that level from 2015 on. How would this affect Tutwiler's valuation? The free cash flows will not change, but the interest tax shield, the WACC, and the bid price will all change.¹⁹ At a 30% debt level, the interest rate on Tutwiler's debt was 9%. However, at a 50% debt level, Tutwiler is more risky, and its interest rate would rise to 9.5% to reflect this additional risk. Because the capital structure is changing, we will use only the APV for this analysis.

The Effect on the Tax Shield

It is reasonable to assume that Caldwell will use more debt during the first 5 years of the acquisition if its long-run target capital structure is 50% debt. With more debt and a higher interest rate, the interest payments will be higher than those shown in Table 21-3, thus increasing the tax savings shown in Line 15. The interest payments and tax savings with more debt and a higher interest rate are projected as follows:

	2011	2012	2013	2014	2015
Interest	\$5.00	\$6.00	\$7.00	\$7.50	\$8.30
Interest tax savings	2.00	2.40	2.80	3.00	3.32

In these projections, Tutwiler will reach its target capital structure of 50% debt and 50% equity by the start of 2015.²⁰

The Effect on the Bid Price

The new capital structure would affect the maximum bid price by changing the value of Tutwiler to Caldwell. Based on the new tax shields, the unlevered and tax shield horizon values in 2015 are calculated as

¹⁹We are assuming for simplicity that Tutwiler has no more expected bankruptcy costs at 50% debt than at 30% debt. If Tutwiler's risk of bankruptcy and hence its expected bankruptcy costs are larger at this higher level of debt, then its projected free cash flows should be reduced by these expected costs. In practice it is extremely difficult to estimate expected bankruptcy costs. However, these costs can be significant and should be considered when a high degree of leverage is being used.

²⁰The last year's projected interest expense must be consistent with the assumed capital structure in order to use the relation $TS_{N+1} = TS_N(1 + g)$ in calculating the tax shield horizon value.



$$HV_{U,2015} = \frac{FCF_{2016}}{r_{sU} - g} = \frac{FCF_{2015}(1+g)}{r_{sU} - g} = \frac{\$6.800(1.06)}{0.11793 - 0.06} = \$124.4$$

$$HV_{TS,2015} = \frac{TS_{2016}}{r_{sU} - g} = \frac{TS_{2015}(1+g)}{r_{sU} - g} = \frac{\$3.32(1.06)}{0.11793 - 0.06} = \$60.7$$

Based on the new interest payments and horizon values, the cash flows to be discounted at the unlevered cost of equity are as follows:

	2011	2012	2013	2014	2015
Free cash flow	\$3.2	\$3.2	\$5.6	\$6.4	\$ 6.8
Unlevered horizon value					<u>124.4</u>
FCF plus horizon value	\$3.2	\$3.2	\$5.6	\$6.4	<u>\$131.2</u>
Interest tax saving	2.0	2.4	2.8	3.0	3.3
Tax shield horizon value					<u>\$ 60.7</u>
TS _t plus horizon value	\$2.0	\$2.4	\$2.8	\$3.0	<u>\$ 64.0</u>

The present value of the free cash flows and their horizon value is \$88.7 million, just as it was under the 30% debt policy; the unlevered value of operations is not impacted by the change in capital structure:

$$V_{\text{Unlevered}} = \frac{\$3.2}{(1 + 0.11793)^1} + \frac{\$3.2}{(1 + 0.11793)^2} + \frac{\$5.6}{(1 + 0.11793)^3}$$

$$+ \frac{\$6.4}{(1 + 0.11793)^4} + \frac{\$6.8 + \$124.4}{(1 + 0.11793)^5}$$

$$= \$88.7 \text{ million}$$

The present value of the tax shields and their horizon value is \$44.3 million, which is \$22.9 million more than the value of the tax shield under the 30% debt policy:

$$V_{\text{Tax shield}} = \frac{\$2.0}{(1 + 0.11793)^1} + \frac{\$2.4}{(1 + 0.11793)^2} + \frac{\$2.8}{(1 + 0.11793)^3}$$

$$+ \frac{\$3.0}{(1 + 0.11793)^4} + \frac{\$3.3 + \$60.7}{(1 + 0.11793)^5}$$

$$= \$44.3 \text{ million}$$

Thus, Tutwiler is worth almost \$23 million more to Caldwell if it is financed with 50% rather than 30% debt because of the added value of the tax shields.

The value of operations under the new 50% debt policy is the sum of the unlevered value of operations and the value of the tax shields, or \$133.0 million. There are no nonoperating assets to add, and subtracting the debt of \$27 million leaves the value of Tutwiler's equity at \$106.0 million. Because Tutwiler has 10 million shares outstanding, the maximum amount Caldwell should be willing to pay per share, given a post-merger target capital structure of 50% debt, is \$10.60. This is more than the \$8.31 maximum price if the capital structure had 30% debt. The difference, \$2.29 per share, reflects the added value of the interest tax shields under the higher-debt plan.

21.12 TAXES AND THE STRUCTURE OF THE TAKEOVER BID

In a merger, the acquiring firm can either buy the target's assets or buy shares of stock directly from the target's shareholders. If the offer is for the target's assets then the target's board of directors will make a recommendation to the shareholders, who will vote either to accept or reject the offer. If they accept the offer, the payment goes directly to the target corporation, which pays off any debt not assumed by the acquiring firm, pays any corporate taxes that are due, and then distributes the remainder of the payment to the shareholders, often in the form of a liquidating dividend. In this situation, the target firm is usually dissolved and no longer continues to exist as a separate legal entity, although its assets and work force may continue to function as a division or as a wholly owned subsidiary of the acquiring firm. The acquisition of assets is a common form of takeover for small and medium-sized firms, especially those that are not publicly traded. A major advantage of this method compared with the acquisition of the target's stock is that the acquiring firm simply acquires assets and is not saddled with any hidden liabilities. In contrast, if the acquiring firm buys the target's stock, then it is responsible for any legal contingencies against the target, even for those that might have occurred prior to the takeover.

An offer for a target's stock rather than its assets can be made either directly to the shareholders, as is typical in a hostile takeover, or indirectly through the board of directors, which in a friendly deal makes a recommendation to the shareholders to accept the offer. In a successful offer, the acquiring firm will end up owning a controlling interest or perhaps even all of the target's stock. Sometimes the target retains its identity as a separate legal entity and is operated as a subsidiary of the acquiring firm, and sometimes its corporate status is dissolved and it is operated as one of the acquiring firm's divisions.

The payment offered by the acquiring firm can be in the form of cash, stock of the acquiring firm, debt of the acquiring firm, or some combination. The structure of the bid affects (1) the capital structure of the post-merger firm, (2) the tax treatment of both the acquiring firm and the target's stockholders, (3) the ability of the target firm's stockholders to benefit from future merger-related gains, and (4) the types of federal and state regulations to which the acquiring firm will be subjected.

The tax consequences of the merger depend on whether it is classified as a *taxable offer* or a *nontaxable offer*.²¹ In general, a nontaxable offer is one in which the form of payment is predominately stock, although the application of this simple principle is much more complicated in practice. The Internal Revenue Code views a mostly stock merger as an exchange rather than a sale, making it a nontaxable event. However, if the offer includes a significant amount of cash or bonds, then the IRS views it as a sale, and it is a taxable transaction just like any other sale.

In a nontaxable deal, target shareholders who receive shares of the acquiring company's stock do not have to pay any taxes at the time of the merger. When they eventually sell their stock in the acquiring company, they must pay a tax on the gain. The amount of the gain is the sales price of their stock in the acquiring company minus the price at which they purchased their original stock in the target company.²² In a

²¹For more details, see J. Fred Weston, Mark L. Mitchell, and Harold Mulherin, *Takeovers, Restructuring, and Corporate Governance*, 4th ed. (Upper Saddle River, NJ: Prentice-Hall, 2004), especially Chapter 4. Also see Kenneth E. Anderson, Thomas R. Pope, and John L. Kramer, eds., *Prentice Hall's Federal Taxation: Corporations, Partnerships, Estates, and Trusts*, 2006 ed. (Upper Saddle River, NJ: Prentice-Hall, 2006), especially Chapter 7.

²²This is a capital gain if it has been at least 1 year since they purchased their original stock in the target.

Tempest in a Teapot?

In 2001, amid a flurry of warnings and lobbying, the Financial Accounting Standards Board (FASB) in its Statement 141 eliminated the use of pooling for merger accounting, requiring that purchase accounting be used instead. Because the change would otherwise have required that all purchased goodwill be amortized and reported earnings be reduced, the FASB also issued Statement 142, which eliminated the regular amortization of purchased goodwill, replacing it with an “impairment test.” The impairment test requires that companies evaluate annually their purchased goodwill and write it down if its value has declined. This impairment test resulted in Time Warner’s unprecedented 2002 write-down of \$54 billion of goodwill associated with the AOL merger.

So what exactly is the effect of the change? First and foremost, the change does *nothing* to the firm’s actual cash flows. Purchased goodwill may still be amortized for federal income tax purposes, so the change does not affect the actual taxes a company pays, nor does it affect the company’s operating cash flows. However,

it does affect the earnings that companies report to their shareholders. Firms that used to have large goodwill charges from past acquisitions have seen their reported earnings increase because they no longer have to amortize the remaining goodwill. Firms whose acquisitions have fared badly, such as Time Warner, must make large write-downs. Executives facing an earnings boost hope—and executives facing a write-down fear—that investors will not see through these accounting changes. However, evidence suggests that investors realize that a company’s assets have deteriorated long before the write-down actually occurs, and they build this information into the price of the stock. For example, Time Warner’s announcement of its \$54 billion charge in January 2002 resulted in only a blip in its stock price at that time, even though the write-down totaled more than a third of its market value. The market had recognized the decline in value months earlier, and by the time of the announcement Time Warner had already lost more than \$100 billion in market value.

taxable offer, the gain between the offer price and the original purchase price of the target stock is taxed in the year of the merger.²³

All other things equal, stockholders prefer nontaxable offers, since they may then postpone taxes on their gains. Furthermore, if the target firm’s stockholders receive stock, they will benefit from any synergistic gains produced by the merger. Most target shareholders are thus willing to give up their stock for a lower price in a nontaxable offer than in a taxable one. As a result, one might expect nontaxable bids to dominate. However, this is not the case: roughly half of all mergers have been taxable. The reason for this is explained in the following paragraphs.

The form of the payment also has tax consequences for the acquiring and target firms. To illustrate, consider the following situation. The target firm has assets with a book value of \$100 million, but these assets have an appraised value of \$150 million. The offer by the acquiring firm is worth \$225 million. If it is a nontaxable offer, then after the merger the acquiring firm simply adds the \$100 million book value of the target’s assets to its own assets and continues to depreciate them according to their previous depreciation schedules. To keep the example simple, we assume the target has no debt.

The situation is more complicated for a taxable offer, and the treatment is different depending on whether the offer is for the target’s assets or for its stock. If the acquiring firm offers \$225 million for the target’s assets, then the target firm must pay a tax on the gain of $\$225 - \$100 = \$125$ million. Assuming a corporate tax rate

²³Even in nontaxable deals, taxes must be paid in the year of the merger by any stockholders who receive cash.

of 40%, this tax is $0.40(\$125) = \50 million. This leaves the target with $\$225 - \$50 = \$175$ million to distribute to its shareholders upon liquidation. Adding insult to injury, the target's shareholders must also pay individual taxes on any of their own gains.²⁴ This is truly a taxable transaction, with taxes assessed at both the corporate and individual levels!

In contrast to the tax disadvantages for the target and its shareholders, the acquiring firm receives two major tax advantages. First, it records the acquired assets at their appraised value and depreciates them accordingly. Thus, it will depreciate \$150 million of assets in this taxable transaction versus only \$100 million in a nontaxable transaction. Second, it will create \$75 million in a new asset account called **goodwill**, which is the difference between the purchase price of \$225 million and the appraised value of \$150 million. Tax laws that took effect in 1993 permit companies to amortize this goodwill over 15 years using the straight-line method and also to deduct the amortization from taxable income. The net effect is that the full purchase price of \$225 million can be written off in a taxable merger versus only the original book value of \$100 million in a nontaxable transaction.

Now suppose the acquiring firm offers \$225 million for the target's stock, rather than just its assets as in the preceding example, in a taxable offer. After completing the merger, the acquiring firm must choose between two tax treatments. Under the first alternative, it will record the assets at their book value of \$100 million and continue depreciating them using their current schedules. This treatment does not create any goodwill. Under the second alternative, it will record the assets at their appraised value of \$150 million and create \$75 million of goodwill. As described earlier for the asset purchase, this allows the acquiring firm to effectively depreciate the entire purchase price of \$225 million for tax purposes. However, there will also be an immediate tax liability on the \$125 million gain, just as when the firm purchased assets.²⁵ Therefore, many companies choose not to mark up the assets. Figure 21-1 illustrates the tax implications for the various types of transactions.

If you think this is complicated, you are right! At this point, you should know enough to talk with specialized accountants and lawyers or be ready to delve into tax accounting texts, but merger taxation is too complex a subject to be covered thoroughly in a general finance textbook.

Securities laws also have an effect on the offer's construction. The SEC has oversight over the issuance of new securities, including stock or debt issued in connection with a merger. Therefore, whenever a corporation bids for control of another firm through the exchange of equity or debt, the entire process must take place under the scrutiny of the Securities and Exchange Commission. The time required for such reviews allows target managements to implement defensive tactics and other firms to make competing offers; as a result, nearly all hostile tender offers are for cash rather than securities.

Self-Test

What are some alternative ways of structuring takeover bids?

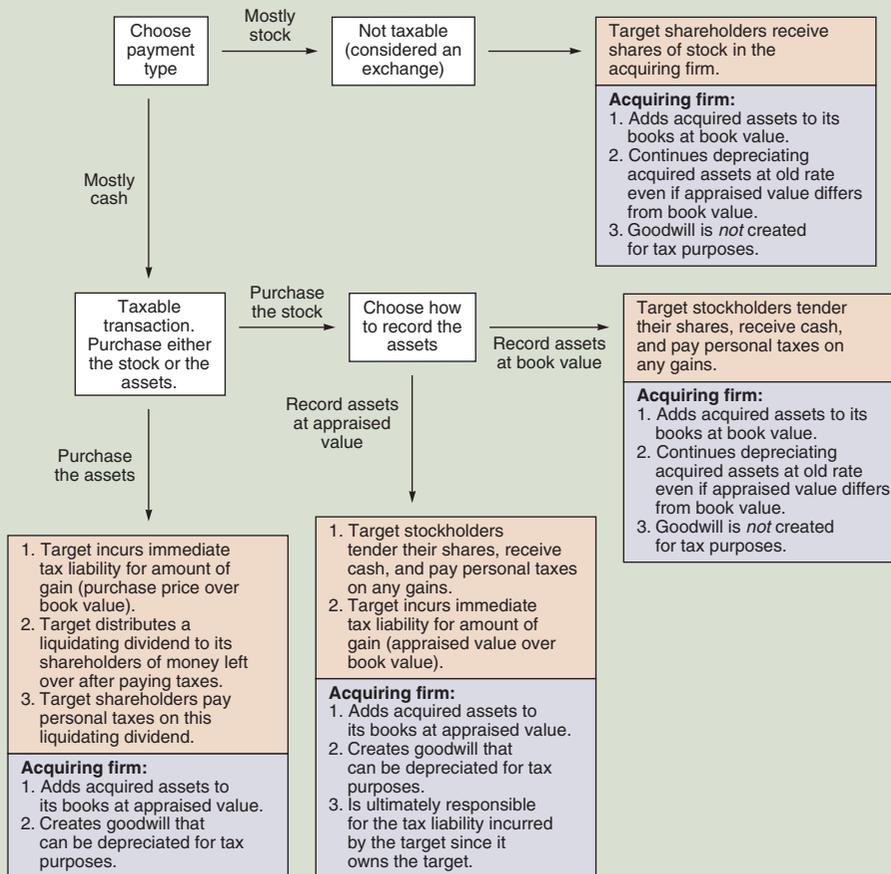
How do taxes influence the payment structure?

How do securities laws affect the payment structure?

²⁴Our example assumes that the target is a publicly owned firm, which means that it must be a "C corporation" for tax purposes. However, if it is privately held then it might be an "S corporation," in which case only the stockholders would be taxed. This helps smaller firms to use mergers as an exit strategy.

²⁵Technically speaking, it is the target firm that is responsible for this tax on the write-up. Keep in mind, however, that the acquiring firm previously purchased the stock in the target and so, in reality, must bear the brunt of the tax.

FIGURE 21-1 Merger Tax Effects



Note: These are actual cash tax effects. However, the tax effects reported to shareholders will be different because shareholder statements must conform to GAAP conventions, not to federal Tax Code conventions. For example, purchased goodwill can no longer be deducted for shareholder reporting under GAAP, even though it is still deductible for federal tax purposes. See the box entitled “Tempest in a Teapot?”; it deals with changes in the accounting treatment of mergers and goodwill.

21.13 FINANCIAL REPORTING FOR MERGERS

Although a detailed discussion of financial reporting is best left to accounting courses, the accounting implications of mergers cannot be ignored. Currently, mergers are handled using **purchase accounting**.²⁶ Keep in mind, however, that all larger companies are required to keep two sets of books. The first is for the IRS, and it reflects the tax treatment of mergers as described in the previous section. The second is for financial reporting, and it reflects the treatment described here. As you will see, the rules for financial reporting differ from those for the IRS.

²⁶In 2001, the Financial Accounting Standards Board (FASB) issued Statement 141, which eliminated the use of *pooling* accounting.

Purchase Accounting

Table 21-4 illustrates purchase accounting. Here, Firm A is assumed to have “bought” Firm B using the stock of the acquiring company. If the price paid is exactly equal to the acquired firm’s *net asset value*, which is defined as its total assets minus its liabilities, then the consolidated balance sheet will be as if the two statements were merged. Normally, though, there is an important difference. If the price paid *exceeds* the net asset value, then asset values will be increased to reflect the price actually paid, whereas if the price paid is *less* than the net asset value, then assets must be written down when preparing the consolidated balance sheet.

Note that Firm B’s net asset value is \$30, which is also its reported common equity value. This \$30 book value could be equal to the market value (which is determined by investors based on the firm’s earning power), but book value could also be more or less than the market value. Three situations are considered in Table 21-4. First, in Column 3 we assume that Firm A gives stock worth \$20 for Firm B. Thus, B’s assets as reported on its balance sheet were overvalued, and A pays less than B’s net asset value. The overvaluation could be in either fixed or current assets; an appraisal would be made, but we assume it is fixed assets that are overvalued. Accordingly, we reduce B’s fixed assets and also its common equity by \$10 before constructing the consolidated balance sheet shown in Column 3. Next, in Column 4, we assume that A pays exactly the net asset value for B. In this case, the financial statements are simply combined.

Finally, in Column 5 we assume that A pays more than the net asset value for B: \$50 is paid for \$30 of net assets. This excess is assumed to be partly attributable to undervalued assets (land, buildings, machinery, and inventories) and so, to reflect this undervaluation, current and fixed assets are each increased by \$5. In addition, we

TABLE 21-4 Accounting for Mergers: Firm A Acquires Firm B with Stock

	POST-MERGER: FIRM A				
	FIRM A (1)	FIRM B (2)	\$20 PAID ^a (3)	\$30 PAID ^a (4)	\$50 PAID ^a (5)
Current assets	\$ 50	\$25	\$ 75	\$ 75	\$ 80 ^c
Fixed assets	50	25	65 ^b	75	80 ^c
Goodwill ^d	0	0	0	0	10 ^d
Total assets	<u>\$100</u>	<u>\$50</u>	<u>\$140</u>	<u>\$150</u>	<u>\$170</u>
Liabilities	\$ 40	\$20	\$ 60	\$ 60	\$ 60
Equity	60	30	80 ^e	90	110 ^f
Total claims	<u>\$100</u>	<u>\$50</u>	<u>\$140</u>	<u>\$150</u>	<u>\$170</u>

Notes:

^aThe price paid is the *net asset value*—that is, total assets minus liabilities.

^bHere we assume that Firm B’s fixed assets are written down from \$25 to \$15 before constructing the consolidated balance sheet.

^cHere we assume that Firm B’s current and fixed assets are both increased to \$30.

^d*Goodwill* refers to the excess paid for a firm above the appraised value of the physical assets purchased. Goodwill represents payment both for intangibles such as patents and for “organization value,” such as that associated with having an effective sales force. Beginning in 2001, purchased goodwill such as this could not be amortized for financial statement reporting purposes.

^eFirm B’s common equity is reduced by \$10 prior to consolidation to reflect the fixed asset write-off.

^fFirm B’s equity is increased to \$50 to reflect the above-book purchase price.

assume that \$10 of the \$20 excess of market value over book value is due to a superior sales organization or to some other intangible factor, and we post this excess as goodwill. Firm B's common equity is increased by \$20, the sum of the increases in current and fixed assets plus goodwill, and this markup is also reflected in Firm A's post-merger equity account.²⁷

Income Statement Effects

A merger can have a significant effect on reported profits. If asset values are increased, as they often are under a purchase, then this must be reflected in higher depreciation charges (and also in a higher cost of goods sold if inventories are written up). This, in turn, will further reduce reported profits. Prior to 2001, goodwill was also amortized over its expected life. Now, however, goodwill is subject to an "annual impairment test." If the fair market value of the goodwill has declined over the year, then the amount of the decline must be charged to earnings. If not, then there is no charge, but gains in goodwill cannot be added to earnings.

Table 21-5 illustrates the income statement effects of the write-up of current and fixed assets. We assume A purchased B for \$50, creating \$10 of goodwill and \$10 of higher physical asset value. As Column 3 indicates, the asset markups cause reported profits to be lower than the sum of the individual companies' reported profits.

The asset markup is also reflected in earnings per share. In our hypothetical merger, we assume that nine shares exist in the consolidated firm. (Six of these shares went to A's stockholders, and three went to B's.) The merged company's EPS is \$2.33, whereas each of the individual companies' EPS was \$2.40.



TABLE 21-5 Income Statement Effects

	PRE-MERGER		POST-MERGER: FIRM A
	FIRM A (1)	FIRM B (2)	MERGED (3)
Sales	\$100.0	\$50.0	\$150.0
Operating costs	<u>72.0</u>	<u>36.0</u>	<u>109.0^a</u>
Operating income	\$ 28.0	\$14.0	\$ 41.0 ^a
Interest (10%)	<u>4.0</u>	<u>2.0</u>	<u>6.0</u>
Taxable income	\$ 24.0	\$12.0	\$ 35.0
Taxes (40%)	<u>9.6</u>	<u>4.8</u>	<u>14.0</u>
Net income	<u>\$ 14.4</u>	<u>\$ 7.2</u>	<u>\$ 21.0</u>
EPS ^b	\$ 2.40	\$ 2.40	\$ 2.33

Notes:

^aOperating costs are \$1 higher than they otherwise would be; this reflects the higher reported costs (depreciation and cost of goods sold) caused by the physical asset markup at the time of purchase.

^bBefore the merger, Firm A had six shares and Firm B had three shares. Firm A gives one of its shares for each of Firm B's, so A has nine shares outstanding after the merger.

²⁷This example assumes that additional debt was not issued to help finance the acquisition. If the acquisition were totally debt financed, then the post-merger balance sheet would show an increase in debt rather than an increase in the equity account. If it were financed by a mix of debt and equity, both accounts would increase. If the acquisition were paid for with cash on hand, then current assets would decrease by the amount paid and the equity account would not increase.

Self-Test

What is purchase accounting for mergers?
 What is goodwill? What impact does goodwill have on the firm's balance sheet? On its income statement?

21.14 ANALYSIS FOR A "TRUE CONSOLIDATION"

Most of our analysis in the preceding sections assumed that one firm plans to acquire another. However, in many situations it is hard to identify an "acquirer" and a "target"—the merger appears to be a true "merger of equals," as was the case with the Exxon–Mobil and First Union–Wachovia mergers. In such cases, how is the analysis handled?

The first step is to estimate the value of the combined enterprise, incorporating any synergies, tax effects, or capital structure changes. The second step is to decide how to allocate the new company's stock between the two sets of old stockholders. Because of synergy, one would normally expect the consolidated value to exceed the sum of the pre-announcement values of the two companies. For example, Company A might have had a pre-merger equity value of \$10 billion, found as (Number of shares)(Price per share), and Company B might have had a pre-merger value of \$15 billion. If the post-merger value of new Company AB is estimated to be \$30 billion, then that value must be allocated. Company A's stockholders must receive enough shares to give them a projected value of at least \$10 billion, and Company B's stockholders must to receive at least \$15 billion. But how will the remaining \$5 billion of synergistically induced value be divided?

This is a key issue, requiring intense negotiation between the two management groups. There is no rule or formula that can be applied, but one basis for the allocation is the relative pre-announcement values of the two companies. For example, in our hypothetical merger of A and B to form AB, the companies might agree to give $\$10/\$25 = 40\%$ of the new stock to A's stockholders and 60% to B's stockholders. Unless a case could be made for giving a higher percentage of the shares to one of the companies because it was responsible for more of the synergistic value, then the pre-merger value proportions would seem to be a "fair" solution. In any event, the pre-merger proportions will probably be given the greatest weight in reaching the final decision.

It should also be noted that control of the consolidated company is always an issue. Generally, the companies hold a press conference and announce that the CEO of one firm will be chairman of the new company, that the other CEO will be president, that the new board will consist of directors from both old boards, and that power will be shared. With huge mergers such as those we have been seeing lately, there is plenty of power to be shared.

Self-Test

How does merger analysis differ in the case of a large company acquiring a smaller one versus a "true merger of equals"?
 Do you think the same guidelines for allocating synergistic gains would be used in both types of mergers?

21.15 THE ROLE OF INVESTMENT BANKERS

Investment bankers are involved with mergers in a number of ways: (1) they help arrange mergers, (2) they help target companies develop and implement defensive tactics, (3) they help value target companies, (4) they help finance mergers, and (5) they invest in the stocks of potential merger candidates.

Arranging Mergers

The major investment banking firms have merger and acquisition groups that operate within their corporate finance departments. (Corporate finance departments offer advice, as opposed to underwriting or brokerage services, to business firms.) Members of these groups identify firms with excess cash that might want to buy other firms, companies that might be willing to be bought, and firms that might, for a number of reasons, be attractive to others. Sometimes dissident stockholders of firms with poor track records work with investment bankers to oust management by helping to arrange a merger.

Developing Defensive Tactics

Target firms that do not want to be acquired generally enlist the help of an investment banking firm along with a law firm that specializes in mergers. Defenses include such tactics as (1) changing the bylaws so that only one-third of the directors are elected each year and/or so that a 75% approval (a *super majority*) rather than a simple majority is required to approve a merger, (2) trying to convince the target firm's stockholders that the price being offered is too low, (3) raising antitrust issues in the hope that the Justice Department will intervene, (4) repurchasing stock in the open market in an effort to push the price above that being offered by the potential acquirer, (5) finding a **white knight** who is acceptable to the target firm's management to compete with the potential acquirer, and (6) finding a **white squire** who is friendly to current management and can buy enough of the target firm's shares to block the merger.

Establishing a Fair Value

If a friendly merger is being worked out between two firms' managements, then it is important to document that the agreed-upon price is a fair one; otherwise, the stockholders of either company may sue to block the merger. Therefore, in most large mergers, each side will hire an investment banking firm to evaluate the target company and to help establish the fair price. Even if the merger is not friendly, investment bankers may still be asked to help establish a price. If a surprise tender offer is to be made, then the acquiring firm will want to know the lowest price at which it might be able to acquire the stock while the target firm may seek help in "proving" that the price being offered is too low.

Financing Mergers

To be successful in the mergers and acquisitions (M&A) business, an investment banker must be able to offer a financing package to clients—whether they are acquirers who need capital to take over companies or target companies trying to finance stock repurchase plans or other defenses against takeovers. In fact, the fees that investment banks generate through issuing merger-related debt often dwarf their other merger-related fees.

Arbitrage Operations

Arbitrage generally means simultaneously buying and selling the same commodity or security in two different markets at different prices and pocketing a risk-free return. However, the major brokerage houses, as well as some wealthy private investors, are engaged in a different type of arbitrage called *risk arbitrage*. The *arbitrageurs*, or "arbs," speculate in the stocks of companies that are likely takeover targets. Vast

amounts of capital are required to speculate in a large number of securities and thus reduce risk, and also to make money on narrow spreads. Yet the large investment bankers have the wherewithal to play this game. To be successful, arbs must be able to sniff out likely targets, assess the probability of offers reaching fruition, and move in and out of the market quickly and with low transaction costs.

Self-Test

What are some defensive tactics that firms can use to resist hostile takeovers?
What is the difference between pure arbitrage and risk arbitrage?

21.16 WHO WINS: THE EMPIRICAL EVIDENCE

The magnitude of the merger market raises two questions: (1) Do corporate acquisitions create value? (2) If so, how is the value shared between the parties?

Most researchers agree that takeovers increase the wealth of the shareholders of target firms, for otherwise they would not agree to the offer. However, there is a debate as to whether mergers benefit the acquiring firm's shareholders. In particular, managements of acquiring firms may be motivated by factors other than maximizing shareholder wealth. For example, they may want to merge merely to increase the size of the corporations they manage, because increased size usually brings larger salaries plus job security, perquisites, power, and prestige.

The question of who gains from corporate acquisitions can be tested by examining the stock price changes that occur around the time of a merger or takeover announcement. Changes in the stock prices of the acquiring and target firms represent market participants' beliefs about the value created by the merger and about how that value will be divided between the target and acquiring firms' shareholders. Therefore, examining a large sample of stock price movements can shed light on the issue of who gains from mergers.

One cannot simply examine stock prices around merger announcement dates, because other factors influence stock prices. For example, if a merger was announced on a day when the entire market advanced, then a rise in the target firm's price would not necessarily signify that the merger was expected to create value. Hence, studies examine *abnormal returns* associated with merger announcements, where abnormal returns are defined as that part of a stock price change caused by factors other than changes in the general stock market.

These "event studies" have examined both acquiring and target firms' stock price responses to mergers and tender offers.²⁸ Jointly, they have covered nearly every acquisition involving publicly traded firms from the early 1960s to the present, and they are remarkably consistent in their results: On average, the stock prices of target firms increase by about 30% in hostile tender offers, whereas in friendly mergers the average increase is about 20%. However, for both hostile and friendly deals, the stock prices of acquiring firms, on average, remain constant. Thus, the event study evidence strongly indicates (1) that acquisitions do create value but (2) that shareholders of target firms reap virtually all the benefits.

The event study evidence suggests that mergers benefit targets but not acquirers—and hence that an acquiring firm's stockholders should be skeptical of its managers' plans for acquisitions. This evidence cannot be dismissed out of hand, but neither is

²⁸For more on the effects of mergers on value, see Bernard S. Black and Joseph A. Grundfest, "Shareholder Gains from Takeovers and Restructurings between 1981 and 1986: \$162 Billion Is a Lot of Money," *Journal of Applied Corporate Finance*, Spring 1988, pp. 5–15; and James W. Wansley, William R. Lane, and Ho C. Yang, "Abnormal Returns to Acquired Firms by Type of Acquisition and Method of Payment," *Financial Management*, Autumn 1983, pp. 16–22.

Merger Mistakes

Academics have long known that acquiring firms' shareholders rarely reap the benefits of mergers. However, this important information never seemed to make it up to the offices of corporate America's decision makers; the 1990s saw bad deal after bad deal and with no apparent learning on the part of acquisitive executives. *BusinessWeek* published an analysis of 302 large mergers from 1995 to 2001, and it found that 61% of them led to losses by the acquiring firms' shareholders. Indeed, those losing shareholders' returns during the first post-merger year averaged 25 percentage points less than the returns on other companies in their industry. The average returns for all the merging companies, both winners and losers, were 4.3% below industry averages and 9.2% below the S&P 500.

The article cited four common mistakes:

1. The acquiring firms often overpaid. Generally, the acquirers gave away all of the synergies from the mergers to the acquired firms' shareholders, and then some.
2. Management overestimated the synergies (cost savings and revenue gains) that would result from the merger.
3. Management took too long to integrate operations between the merged companies. This irritated customers and employees alike, and it postponed any gains from the integration.
4. Some companies cut costs too deeply at the expense of maintaining sales and production infrastructures.

The worst performance came from companies that paid for their acquisitions with stock. The best performance, albeit a paltry 0.3% better than industry averages, came from companies that used cash for their acquisitions. On the bright side, the shareholders of the companies that were acquired fared quite well, earning on average 19.3% more than their industry peers, and all of those gains came in the two weeks surrounding the merger announcement.

Source: David Henry, "Mergers: Why Most Big Deals Don't Pay Off," *BusinessWeek*, October 14, 2002, pp. 60–70.

it entirely convincing. There are undoubtedly many good mergers, just as there are many poorly conceived ones. Like most of finance, merger decisions should be studied carefully, and it is best not to judge the outcome of a specific merger until the actual results start to come in.

Self-Test

Explain how researchers can study the effects of mergers on shareholder wealth. Do mergers create value? If so, who profits from this value? Do the research results discussed in this section seem logical? Explain.

21.17 CORPORATE ALLIANCES

Mergers are one way for two companies to join forces, but many companies are striking cooperative deals, called **corporate**, or **strategic alliances**, which stop far short of merging. Whereas mergers combine all of the assets of the firms involved, as well as their ownership and managerial expertise, alliances allow firms to create combinations that focus on specific business lines that offer the most potential synergies. These alliances take many forms, from simple marketing agreements to joint ownership of worldwide operations.

One form of corporate alliance is the **joint venture**, in which parts of companies are joined to achieve specific, limited objectives. A joint venture is controlled by a management team consisting of representatives of the two (or more) parent companies. A study of 345 corporate alliances found that the stock prices of both partners in an alliance tended to increase when the alliance was announced, with an average

abnormal return of about 0.64% on the day of the announcement.²⁹ About 43% of the alliances were marketing agreements, 14% were R&D agreements, 11% were for licensing technology, 7% for technology transfers, and 25% were for some combination of these four reasons. Although most alliances were for marketing agreements, the market reacted most favorably when the alliance was for technology sharing between two firms in the same industry. The study also found that the typical alliance lasted at least 5 years and that the allied firms had better operating performance than their industry peers during this period.

Self-Test

What is the difference between a merger and a corporate alliance?
What is a joint venture? Give some reasons why joint ventures may be advantageous to the parties involved.

21.18 LEVERAGED BUYOUTS

In a **leveraged buyout (LBO)**, a small group of investors, often led by a private equity fund, acquires a firm in a transaction financed largely by debt. The debt is serviced with funds generated by the acquired company's operations and often by the sale of some of its assets. Generally, the acquiring group keeps the current management team and provides them with incentive compensation plans. The objective is to run the acquired company for a number of years, boost its value, and then take it public again as a stronger company. In other instances, the acquiring firm plans to sell off divisions to other firms that can gain synergies. In either case, the acquiring group expects to make a substantial profit from the LBO, but the inherent risks are great owing to the heavy use of financial leverage.³⁰

Self-Test

What is an LBO?

21.19 DIVESTITURES

There are four types of **divestitures**. **Sale to another firm** generally involves the sale of an entire division or unit, usually for cash but sometimes for stock in the acquiring firm. In a **spin-off**, the firm's existing stockholders are given new stock representing separate ownership rights in the division that was divested. The division establishes its own board of directors and officers, and it becomes a separate company. The stockholders end up owning shares of two firms instead of one, but no cash has been transferred. In a **carve-out**, a minority interest in a corporate subsidiary is sold to new shareholders, so the parent gains new equity financing yet retains control. In a **liquidation**, the assets of a division are sold off piecemeal to many purchasers rather than as a single operating entity to one purchaser. To illustrate the different types of divestitures, we now present some examples.

²⁹See Su Han Chan, John W. Kensinger, Arthur J. Keown, and John D. Martin, "When Do Strategic Alliances Create Shareholder Value?" *Journal of Applied Corporate Finance*, Winter 1999, pp. 82–87.

³⁰For more on LBOs, see Martin S. Fridson, "What Went Wrong with the Highly Leveraged Deals? (Or, All Variety of Agency Costs)," *Journal of Applied Corporate Finance*, Fall 1991, pp. 47–57. Also see Jay R. Allen, "LBOs—The Evolution of Financial Strategies and Structures," *Journal of Applied Corporate Finance*, Winter 1996, pp. 18–29; George P. Baker, "Beatrice: A Study in the Creation and Destruction of Value," *Journal of Finance*, July 1992, pp. 1081–1119; and George P. Baker and Karen H. Wruck, "Lessons from a Middle Market LBO: The Case of O. M. Scott," *Journal of Applied Corporate Finance*, Spring 1991, pp. 46–58.

In 2009, Time Warner announced that it planned to spin off AOL, the dissolution of a merger that had never worked. In 2008, Cadbury Schweppes decided to focus on its chocolate and candy businesses, so it spun off soft-drink brands into a separately traded company, the Dr Pepper Snapple Group. The Altria Group completed its spin-off of Kraft Foods in 2007 and then spun off its international cigarette operations into Phillip Morris International, which allowed the group to focus on domestic cigarette operations, smokeless tobacco, and premium wines.

As these examples illustrate, the reasons for divestitures vary widely. Sometimes the market feels more comfortable when firms “stick to their knitting,” as the Cadbury Schweppes divestiture illustrates. Sometimes companies need cash either to finance expansion in their primary business lines or to reduce a large debt burden, and divestitures can be used to raise this cash; for example, AMD spun off its manufacturing operations in 2009. The divestitures also show that running a business is a dynamic process—conditions change, corporate strategies change in response, and consequently firms alter their asset portfolios by acquisitions and/or divestitures. Some divestitures are designed to unload losing assets that would otherwise drag the company down, such as Time Warner’s planned spin-off of AOL.

In general, the empirical evidence shows that the market reacts favorably to divestitures, with the divesting company typically having a small increase in stock price on the day of the announcement. The announcement-day returns are largest for companies that “undo” previous conglomerate mergers by divesting businesses in unrelated areas.³¹ Studies also show that divestitures generally lead to superior operating performance for both the parent and the divested company.³²

Self-Test

What are some types of divestitures?

What are some motives for divestitures?

21.20 HOLDING COMPANIES

Holding companies date from 1889, when New Jersey became the first state to pass a law permitting corporations to be formed for the sole purpose of owning the stocks of other companies. Many of the advantages and disadvantages of holding companies are identical to those of any large-scale organization. Whether a company is organized on a divisional basis or with subsidiaries kept as separate companies does not affect the basic reasons for conducting a large-scale, multiproduct, multiplant operation.

Advantages and Disadvantages of Holding Companies

There are two principal advantages of a holding company.

1. *Control with fractional ownership.* Through a holding company operation, a firm may buy 5%, 10%, or 50% of the stock of another corporation. Such fractional ownership may be sufficient to give the holding company effective working control over the operations of the company in which it has acquired stock ownership. Working control is often considered to entail more than 25% of the common

³¹For details, see Jeffrey W. Allen, Scott L. Lummer, John J. McConnell, and Debra K. Reed, “Can Takeover Losses Explain Spin-off Gains?” *Journal of Financial and Quantitative Analysis*, December 1995, pp. 465–485.

³²See Shane A. Johnson, Daniel P. Klein, and Verne L. Thibodeaux, “The Effects of Spin-offs on Corporate Investment and Performance,” *Journal of Financial Research*, Summer 1996, pp. 293–307. Also see Steven Kaplan and Michael S. Weisbach, “The Success of Acquisitions: Evidence from Divestitures,” *Journal of Finance*, March 1992, pp. 107–138.

stock, but it can be as low as 10% if the stock is widely distributed. One financier says that the attitude of management is more important than the number of shares owned: “If management thinks you can control the company, then you do.” In addition, control on a very slim margin can be held through relationships with large stockholders outside the holding company group.

2. *Isolation of risks.* Because the various **operating companies** in a holding company system are separate legal entities, the obligations of any one unit are separate from those of the other units. Therefore, catastrophic losses incurred by one unit of the holding company system may not be translatable into claims on the assets of the other units. However, we should note that while this is a customary generalization, it is not always valid. First, the **parent company** may feel obligated to make good on the subsidiary’s debts, even though it is not legally bound to do so, in order to keep its good name and to retain customers. Second, a parent company may feel obligated to supply capital to an affiliate in order to protect its initial investment. And third, when lending to one of the units of a holding company system, an astute loan officer may require a guarantee by the parent holding company. To some degree, then, the assets in the various elements of a holding company are not really separate.

The main disadvantage of a holding company involves *partial multiple taxation*. Provided the holding company owns at least 80% of a subsidiary’s voting stock, the IRS permits the filing of consolidated returns, in which case dividends received by the parent are not taxed. However, if less than 80% of the stock is owned, then tax returns cannot be consolidated. Firms that own more than 20% but less than 80% of another corporation can deduct 80% of the dividends received, whereas firms that own less than 20% may deduct only 70% of the dividends received. This partial double taxation somewhat offsets the benefits of holding company control with limited ownership, but whether the tax penalty is sufficient to offset other possible advantages varies from case to case.

Holding Companies as a Leveraging Device

The holding company vehicle has been used to obtain huge degrees of financial leverage. In the 1920s, several tiers of holding companies were established in the electric utility, railroad, and other industries. In those days, an operating company at the bottom of the pyramid might have \$100 million of assets, financed by \$50 million of debt and \$50 million of equity. Then, a first-tier holding company might own the stock of the operating firm as its only asset and be financed with \$25 million of debt and \$25 million of equity. A second-tier holding company, which owned the stock of the first-tier company, might be financed with \$12.5 million of debt and \$12.5 million of equity. Such systems were extended to five or six levels. With six holding companies, \$100 million of operating assets could be controlled at the top by only \$0.78 million of equity, and the operating assets would have to provide enough cash income to support \$99.22 million of debt. *Such a holding company system is highly leveraged—its consolidated debt ratio is 99.22%, even though each of the individual components shows only a 50% debt/assets ratio.* Because of this consolidated leverage, even a small decline in profits at the operating company level could bring the whole system down like a house of cards. This situation existed in the electric utility industry in the 1920s, and the Depression of the 1930s wreaked such havoc with the holding companies that federal legislation was enacted that constrained holding companies in that industry.

Self-Test

What is a holding company?

What are some of the advantages of holding companies? Identify a disadvantage.

Summary

- A **merger** occurs when two firms combine to form a single company. The primary motives for mergers are (1) synergy, (2) tax considerations, (3) purchase of assets below their replacement costs, (4) diversification, (5) gaining control over a larger enterprise, and (6) breakup value.
- Mergers can provide economic benefits through **economies of scale** and through putting assets in the hands of **more efficient managers**. However, mergers also have the potential for reducing competition, and for this reason they are carefully regulated by government agencies.
- In most mergers, one company (the **acquiring company**) initiates action to take over another (the **target company**).
- A **horizontal merger** occurs when two firms in the same line of business combine.
- A **vertical merger** combines a firm with one of its customers or suppliers.
- A **congeneric merger** involves firms in related industries but where no customer–supplier relationship exists.
- A **conglomerate merger** occurs when firms in totally different industries combine.
- In a **friendly merger**, the managements of both firms approve the merger, whereas in a **hostile merger**, the target firm’s management opposes it.
- An **operating merger** is one in which the operations of the two firms are combined. A **financial merger** is one in which the firms continue to operate separately; hence no operating economies are expected.
- In a typical **merger analysis**, the key issues to be resolved are (1) the price to be paid for the target firm and (2) the employment/control situation. If the merger is a consolidation of two relatively equal firms, at issue is the percentage of ownership that each merger partner’s shareholders will receive.
- Four methods are commonly used to determine the **value of the target firm**: (1) **market multiple analysis**, (2) the **corporate valuation model**, (3) the **free cash flow to equity (FCFE) model**, and (4) the **adjusted present value (APV) model**. The three cash flow models give the same value if implemented correctly, but the APV model is the easiest to implement correctly and should be used when the capital structure is changing.
- For accounting purposes, mergers are handled as a **purchase**.
- A **joint venture** is a **corporate alliance** in which two or more companies combine some of their resources to achieve a specific, limited objective.
- A **leveraged buyout (LBO)** is a transaction in which a firm’s publicly owned stock is acquired in a mostly debt-financed tender offer, resulting in a privately owned, highly leveraged firm. Often, the firm’s own management initiates the LBO.
- A **divestiture** is the sale of some of a company’s operating assets. A divestiture may involve (1) selling an operating unit to another firm, (2) **spinning off** a unit as a separate company, (3) **carving out** a unit by selling a minority interest, or (4) the outright **liquidation** of a unit’s assets.
- The **reasons for divestiture** include (1) to settle antitrust suits, (2) to improve the transparency of the resulting companies so that investors can more easily evaluate them, (3) to enable management to concentrate on a particular type of activity, and (4) to raise the capital needed to strengthen the corporation’s core business.

- A **holding company** is a corporation that owns sufficient stock in another firm to control it. The holding company is also known as the **parent company**, and the companies that it controls are called **subsidiaries**, or **operating companies**.
- Holding company operations are advantageous because (1) control can often be obtained for a smaller cash outlay, (2) risks may be segregated, and (3) regulated companies can operate separate subsidiaries for their regulated and unregulated businesses.
- A major disadvantages to holding company operations is the possibility of multiple taxation.

Questions

- (21-1) Define each of the following terms:
- Synergy; merger
 - Horizontal merger; vertical merger; congeneric merger; conglomerate merger
 - Friendly merger; hostile merger; defensive merger; tender offer; target company; breakup value; acquiring company
 - Operating merger; financial merger
 - Adjusted present value (APV) model
 - Free cash flow to equity
 - Purchase accounting
 - White knight; proxy fight
 - Joint venture; corporate alliance
 - Divestiture; spin-off; leveraged buyout (LBO)
 - Holding company; operating company; parent company
 - Arbitrage; risk arbitrage
- (21-2) Four economic classifications of mergers are (1) horizontal, (2) vertical, (3) conglomerate, and (4) congeneric. Explain the significance of these terms in merger analysis with regard to (a) the likelihood of governmental intervention and (b) possibilities for operating synergy.
- (21-3) Firm A wants to acquire Firm B. Firm B's management agrees that the merger is a good idea. Might a tender offer be used?
- (21-4) Distinguish between operating mergers and financial mergers.
- (21-5) Distinguish between the APV, FCFE, and corporate valuation models.

Self-Test Problem

Solution Appears in Appendix A

- (ST-1) Valuation Red Valley Breweries is considering an acquisition of Flagg Markets. Flagg currently has a cost of equity of 10%; 25% of its financing is in the form of 6% debt, and the rest is in common equity. Its federal-plus-state tax rate is 40%. After the acquisition, Red Valley expects Flagg to have the following FCFs and interest payments for the next 3 years (in millions):

	Year 1	Year 2	Year 3
FCF	\$10.00	\$20.00	\$25.00
Interest expense	28.00	24.00	20.28

After this, the free cash flows are expected to grow at a constant rate of 5%, and the capital structure will stabilize at 35% debt with an interest rate of 7%.

- What is Flagg's unlevered cost of equity? What are its levered cost of equity and cost of capital for the post-horizon period?
- Using the adjusted present value approach, what is Flagg's value of operations to Red Valley?

Problems

Answers Appear in Appendix B

The following information is required to work Problems 21-1 through 21-4.

Hastings Corporation is interested in acquiring Vandell Corporation. Vandell has 1 million shares outstanding and a target capital structure consisting of 30% debt. Vandell's debt interest rate is 8%. Assume that the risk-free rate of interest is 5% and the market risk premium is 6%. Both Vandell and Hastings face a 40% tax rate.

EASY PROBLEM 1

(21-1)

Valuation

Vandell's free cash flow (FCF_0) is \$2 million per year and is expected to grow at a constant rate of 5% a year; its beta is 1.4. What is the value of Vandell's operations? If Vandell has \$10.82 million in debt, what is the current value of Vandell's stock? (*Hint:* Use the corporate valuation model from Chapter 13.)

INTERMEDIATE PROBLEMS 2-3

(21-2)

Merger Valuation

Hastings estimates that if it acquires Vandell, interest payments will be \$1,500,000 per year for 3 years, after which the current target capital structure of 30% debt will be maintained. Interest in the fourth year will be \$1.472 million, after which interest and the tax shield will grow at 5%. Synergies will cause the free cash flows to be \$2.5 million, \$2.9 million, \$3.4 million, and \$3.57 million in Years 1 through 4, respectively, after which the free cash flows will grow at a 5% rate. What is the unlevered value of Vandell, and what is the value of its tax shields? What is the per share value of Vandell to Hastings Corporation? Assume that Vandell now has \$10.82 million in debt.

(21-3)

Merger Bid

On the basis of your answers to Problems 21-1 and 21-2, indicate the range of possible prices that Hastings could bid for each share of Vandell common stock in an acquisition.

CHALLENGING PROBLEMS 4-6

(21-4)

Merger Valuation with
Change in Capital
Structure

Assuming the same information as for Problem 21-2, suppose Hastings will increase Vandell's level of debt at the end of Year 3 to \$30.6 million so that the target capital structure is now 45% debt. Assume that with this higher level of debt the interest rate would be 8.5%, and assume that interest payments in Year 4 are based on the new debt level from the end of Year 3 and a new interest rate. Again, free cash flows and tax shields are projected to grow at 5% after Year 4. What are the values of the unlevered firm and the tax shield, and what is the maximum price that Hastings would bid for Vandell now?

(21-5)

Merger Analysis

Marston Marble Corporation is considering a merger with the Conroy Concrete Company. Conroy is a publicly traded company, and its beta is 1.30. Conroy has been barely profitable, so it has paid an average of only 20% in taxes during the last

several years. In addition, it uses little debt; its target ratio is just 25%, with the cost of debt 9%.

If the acquisition were made, Marston would operate Conroy as a separate, wholly owned subsidiary. Marston would pay taxes on a consolidated basis, and the tax rate would therefore increase to 35%. Marston also would increase the debt capitalization in the Conroy subsidiary to $w_d = 40\%$, for a total of \$22.27 million in debt by the end of Year 4, and pay 9.5% on the debt. Marston's acquisition department estimates that Conroy, if acquired, would generate the following free cash flows and interest expenses (in millions of dollars) in Years 1–5:

Year	Free Cash Flows	Interest Expense
1	\$1.30	\$1.2
2	1.50	1.7
3	1.75	2.8
4	2.00	2.1
5	2.12	?

In Year 5, Conroy's interest expense would be based on its beginning-of-year (that is, the end-of-Year-4) debt, and in subsequent years both interest expense and free cash flows are projected to grow at a rate of 6%.

These cash flows include all acquisition effects. Marston's cost of equity is 10.5%, its beta is 1.0, and its cost of debt is 9.5%. The risk-free rate is 6%, and the market risk premium is 4.5%.

- What is the value of Conroy's unlevered operations, and what is the value of Conroy's tax shields under the proposed merger and financing arrangements?
- What is the dollar value of Conroy's operations? If Conroy has \$10 million in debt outstanding, how much would Marston be willing to pay for Conroy?

(21–6)

Merger Valuation with
Change in Capital
Structure

VolWorld Communications Inc., a large telecommunications company, is evaluating the possible acquisition of Bulldog Cable Company (BCC), a regional cable company. VolWorld's analysts project the following post-merger data for BCC (in thousands of dollars, with a year end of December 31):

	2010	2011	2012	2013	2014	2015
Net sales		\$450	\$518	\$ 555	\$ 600	\$ 643
Selling and administrative expense		45	53	60	68	73
Interest		40	45	47	52	54
Total net operating capital	\$800	850	930	1,005	1,075	1,150
Tax rate after merger: 35%						
Cost of goods sold as a percent of sales: 65%						
BCC's pre-merger beta: 1.40						
Risk-free rate: 6%						
Market risk premium: 4%						
Terminal growth rate of free cash flows: 7%						

If the acquisition is made, it will occur on January 1, 2011. All cash flows shown in the income statements are assumed to occur at the end of the year. BCC currently has a capital structure of 40% debt, which costs 10%, but over the next 4 years VolWorld would increase that to 50%, and the target capital structure would be reached

by the start of 2015. BCC, if independent, would pay taxes at 20%, but its income would be taxed at 35% if it were consolidated. BCC's current market-determined beta is 1.4. The cost of goods sold is expected to be 65% of sales.

- What is the unlevered cost of equity for BCC?
- What are the free cash flows and interest tax shields for the first 5 years?
- What is BCC's horizon value of interest tax shields and unlevered horizon value?
- What is the value of BCC's equity to VolWorld's shareholders if BCC has \$300,000 in debt outstanding now?

SPREADSHEET PROBLEM

(21-7)

Build a Model: Merger
Analysis



resource

Start with the partial model in the file *Ch21 P07 Build a Model.xls* on the textbook's Web site. Wansley Portal Inc., a large Internet service provider, is evaluating the possible acquisition of Alabama Connections Company (ACC), a regional Internet service provider. Wansley's analysts project the following post-merger data for ACC (in thousands of dollars):

	2011	2012	2013	2014	2015
Net sales	\$500	\$600	\$700	\$760	\$806
Selling and administrative expense	60	70	80	90	96
Interest	30	40	45	60	74

If the acquisition is made, it will occur on January 1, 2011. All cash flows shown in the income statements are assumed to occur at the end of the year. ACC currently has a capital structure of 30% debt, which costs 9%, but Wansley would increase that over time to 40%, costing 10%, if the acquisition were made. ACC, if independent, would pay taxes at 30%, but its income would be taxed at 35% if it were consolidated. ACC's current market-determined beta is 1.4. The cost of goods sold, which includes depreciation, is expected to be 65% of sales, but it could vary somewhat. Required gross investment in operating capital is approximately equal to the depreciation charged, so there will be no investment in net operating capital. The risk-free rate is 7%, and the market risk premium is 6.5%. Wansley currently has \$400,000 in debt outstanding.

- What is the unlevered cost of equity?
- What are the horizon value of the tax shields and the horizon value of the unlevered operations? What are the value of ACC's operations and the value of ACC's equity to Wansley's shareholders?

Mini Case

Hager's Home Repair Company, a regional hardware chain that specializes in "do it yourself" materials and equipment rentals, is cash rich because of several consecutive good years. One of the alternative uses for the excess funds is an acquisition. Doug Zona, Hager's treasurer and your boss, has been asked to place a value on a potential target, Lyons Lighting (LL), a chain that operates in several adjacent states, and he has enlisted your help.

The table below indicates Zona's estimates of LL's earnings potential if it came under Hager's management (in millions of dollars). The interest expense listed here includes the interest

(1) on LL's existing debt, which is \$55 million at a rate of 9%, and (2) on new debt expected to be issued over time to help finance expansion within the new "L division," the code name given to the target firm. If acquired, LL will face a 40% tax rate.

Security analysts estimate LL's beta to be 1.3. The acquisition would not change Lyons's capital structure, which is 20% debt. Zona realizes that Lyons Lighting's business plan also requires certain levels of operating capital and that the annual investment could be significant. The required levels of total net operating capital are listed in the table.

Zona estimates the risk-free rate to be 7% and the market risk premium to be 4%. He also estimates that free cash flows after 2015 will grow at a constant rate of 6%. Following are projections for sales and other items.

	2010	2011	2012	2013	2014	2015
Net sales		\$ 60.00	\$ 90.00	\$112.50	\$127.50	\$139.70
Cost of goods sold (60%)		36.00	54.00	67.50	76.50	83.80
Selling/administrative expense		4.50	6.00	7.50	9.00	11.00
Interest expense		5.00	6.50	6.50	7.00	8.16
Total net operating capital	\$150.00	150.00	157.50	163.50	168.00	173.00

Hager's management is new to the merger game, so Zona has been asked to answer some basic questions about mergers as well as to perform the merger analysis. To structure the task, Zona has developed the following questions, which you must answer and then defend to Hager's board.

- Several reasons have been proposed to justify mergers. Among the more prominent are (1) tax considerations, (2) risk reduction, (3) control, (4) purchase of assets at below replacement cost, (5) synergy, and (6) globalization. In general, which of the reasons are economically justifiable? Which are not? Which fit the situation at hand? Explain.
- Briefly describe the differences between a hostile merger and a friendly merger.
- What are the steps in valuing a merger?
- Use the data developed in the table to construct the L division's free cash flows for 2011 through 2015. Why are we identifying interest expense separately when it is not normally included in calculating free cash flows or in a capital budgeting cash flow analysis? Why is investment in net operating capital included when calculating the free cash flow?
- Conceptually, what is the appropriate discount rate to apply to the cash flows developed in part c? What is your actual estimate of this discount rate?
- What is the estimated horizon, or continuing, value of the acquisition; that is, what is the estimated value of the L division's cash flows beyond 2015? What is LL's value to Hager's shareholders? Suppose another firm were evaluating LL as an acquisition candidate. Would it obtain the same value? Explain.
- Assume that LL has 20 million shares outstanding. These shares are traded relatively infrequently, but the last trade (made several weeks ago) was at a price of \$11 per share. Should Hager's make an offer for Lyons Lighting? If so, how much should it offer per share?
- How would the analysis be different if Hager's intended to recapitalize LL with 40% debt costing 10% at the end of 4 years? This amounts to \$221.6 million in debt as of the end of 2014.
- There has been considerable research undertaken to determine whether mergers really create value and, if so, how this value is shared between the parties involved. What are the results of this research?
- What method is used to account for mergers?
- What merger-related activities are undertaken by investment bankers?
 - What is a leveraged buyout (LBO)? What are some of the advantages and disadvantages of going private?
- What are the major types of divestitures? What motivates firms to divest assets?
- What are holding companies? What are their advantages and disadvantages?

SELECTED ADDITIONAL CASES

The following cases from Textchoice, Cengage Learning's online library, cover many of the concepts discussed in this chapter and are available at <http://www.textchoice2.com>.

Klein-Brigham Series:

Case 40, "Nina's Fashions, Inc.;" Case 53, "Nero's Pasta, Inc.;" and Case 70, "Computer Concepts/CompuTech."