

## CHAPTER 25

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**ACQUISITIONS AND TAKEOVERS**

Firms are acquired for a number of reasons. In the 1960s and 1970s, firms such as Gulf and Western and ITT built themselves into conglomerates by acquiring firms in other lines of business. In the 1980s, corporate giants like Time, Beatrice and RJR Nabisco were acquired by other firms, their own management or wealthy raiders, who saw potential value in restructuring or breaking up these firms. In the 1990s, we saw a wave of consolidation in the media business as telecommunications firms acquired entertainment firms and entertainment firms acquired cable businesses. Through time, firms have also acquired or merged with other firms to gain the benefits of synergy, in the form of either higher growth, as in the Disney acquisition of Capital Cities, or lower costs.

Acquisitions seem to offer firms a short cut to their strategic objectives, but the process has its costs. In this chapter, we examine the four basic steps in an acquisition, starting with establishing an acquisition motive, continuing with the identification and valuation of a target firm, and following up with structuring and paying for the deal. The final and often the most difficult step is making the acquisition work after the deal is consummated.

**Background on Acquisitions**

When we talk about acquisitions or takeovers, we are talking about a number of different transactions. These transactions can range from one firm merging with another firm to create a new firm to managers of a firm acquiring the firm from its stockholders and creating a private firm. We begin this section by looking at the different forms taken by acquisitions, continue the section by providing an overview on the acquisition process and conclude by examining the history of the acquisitions in the United States.

**Classifying Acquisitions**

There are several ways in which a firm can be acquired by another firm. In a **merger**, the boards of directors of two firms agree to combine and seek stockholder approval for the combination. In most cases, at least 50% of the shareholders of the target and the bidding firm have to agree to the merger. The target firm ceases to exist and

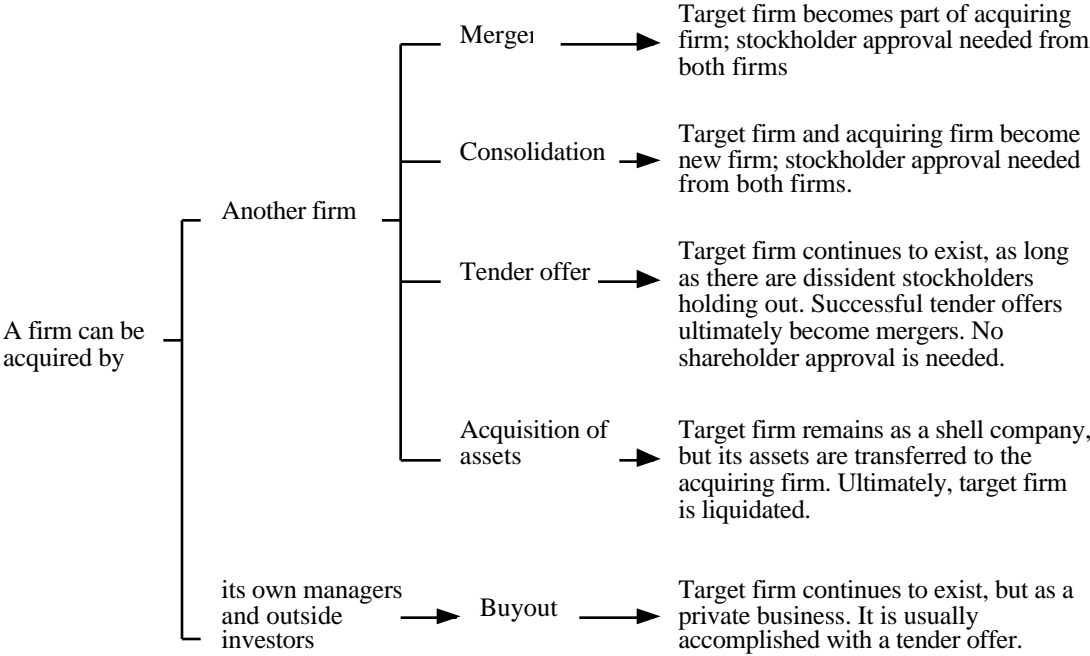
becomes part of the acquiring firm; Digital Computers was absorbed by Compaq after it was acquired in 1997. In a **consolidation**, a new firm is created after the merger and both the acquiring firm and target firm stockholders receive stock in the new firm; Citigroup, for instance, was the firm created after the consolidation of Citicorp and Travelers' Insurance Group.

In a **tender offer**, one firm offers to buy the outstanding stock of the other firm at a specific price and communicates this offer in advertisements and mailings to stockholders. By doing so, it bypasses the incumbent management and board of directors of the target firm. Consequently, tender offers are used to carry out hostile takeovers. The acquired firm will continue to exist as long as there are minority stockholders who refuse the tender. From a practical standpoint, however, most tender offers eventually become mergers, if the acquiring firm is successful in gaining control of the target firm.

In a **purchase of assets**, one firm acquires the assets of another, though a formal vote by the shareholders of the firm being acquired is still needed.

There is a one final category of acquisitions that does not fit into any of the four described above. Here, a firm is acquired by its own management or by a group of investors, usually with a tender offer. After this transaction, the acquired firm can cease to exist as a publicly traded firm and become a private business. These acquisitions are called **management buyouts**, if managers are involved, and **leveraged buyouts**, if the funds for the tender offer come predominantly from debt. This was the case, for instance, with the leveraged buyouts of firms such as RJR Nabisco in the 1980s. Figure 25.1 summarizes the various transactions and the consequences for the target firm.

Figure 25.1: Classification of Acquisitions



**The Process of an Acquisition**

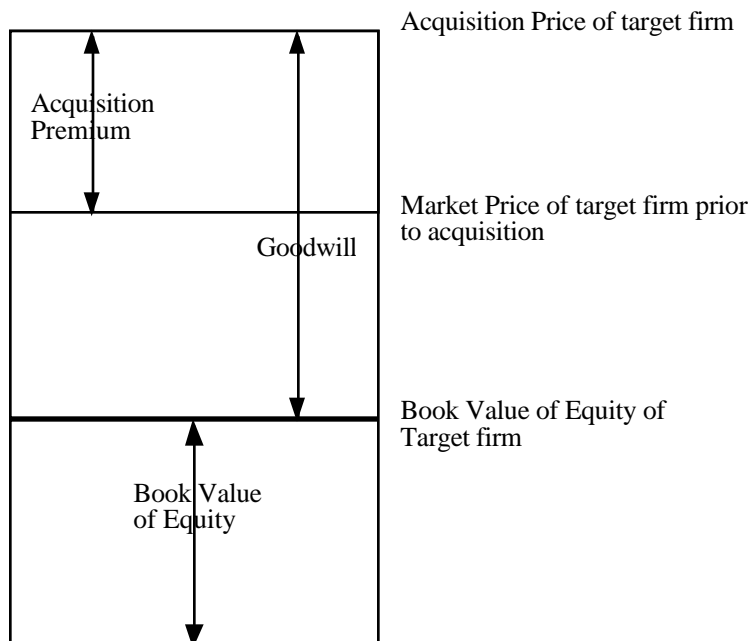
Acquisitions can be friendly or hostile events. In a friendly acquisition, the managers of the target firm welcome the acquisition and, in some cases, seek it out. In a hostile acquisition, the target firm’s management does not want to be acquired. The acquiring firm offers a price higher than the target firm’s market price prior to the acquisition and invites stockholders in the target firm to tender their shares for the price.

In either friendly or hostile acquisitions, the difference between the acquisition price and the market price prior to the acquisition is called the **acquisition premium**. The **acquisition price**, in the context of mergers and consolidations, is the price that will be paid by the acquiring firm for each of the target firm’s shares. This price is usually based upon negotiations between the acquiring firm and the target firm’s managers. In a tender offer, it is the price at which the acquiring firm receives enough shares to gain control of the target firm. This price may be higher than the initial price offered by the acquirer, if there are other firms bidding for the same target firm or if an insufficient number of stockholders tender at that initial price. For instance, in 1991, AT&T initially

offered to buy NCR for \$80 per share, a premium of \$ 25 over the stock price at the time of the offer. AT&T ultimately paid \$110 per share to complete the acquisition.

There is one final comparison that can be made and that is between the price paid on the acquisition and the accounting book value of the equity in the firm being acquired. Depending upon how the acquisition is accounted for, this difference will be recorded as goodwill on the acquiring firm's books or not be recorded at all. Figure 25.2 presents the break down of the acquisition price into these component parts.

*Figure 25.2: Breaking down the Acquisition Price*



### **Empirical Evidence on the Value Effects Of Takeovers**

Many researchers have studied the effects of takeovers on the value of both the target and bidder firms. The evidence indicates that the stockholders of target firms are the clear winners in takeovers — they earn significant excess returns<sup>1</sup> not only around the announcement of the acquisitions, but also in the weeks leading up to it. Jensen and Ruback (1983) reviewed 13 studies that look at returns around takeover announcements

<sup>1</sup> Excess returns represent returns over and above the returns you would have expected an investment to make after adjusting for risk and market performance.

and reported an average excess return of 30% to target stockholders in successful tender offers and 20% to target stockholders in successful mergers. Jarrell, Brickley, and Netter (1988) reviewed the results of 663 tender offers made between 1962 and 1985 and noted that premiums averaged 19% in the 1960s, 35% in the 1970s and 30% between 1980 and 1985. Many of the studies report an increase in the stock price of the target firm prior to the takeover announcement, suggesting either a very perceptive financial market or leaked information about prospective deals.

Some attempts at takeovers fail, either because the bidding firm withdraws the offer or because the target firm fights it off. Bradley, Desai, and Kim(1983) analyzed the effects of takeover failures on target firm stockholders and found that, while the initial reaction to the announcement of the failure is negative, albeit statistically insignificant, a substantial number of target firms are taken over within 60 days of the first takeover failing, earning significant excess returns (50% to 66%).

The effect of takeover announcements on bidder firm stock prices is not clear cut. Jensen and Ruback report excess returns of 4% for bidding firm stockholders around tender offers and no excess returns around mergers. Jarrell, Brickley and Netter, in their examination of tender offers from 1962 to 1985, note a decline in excess returns to bidding firm stockholders from 4.4% in the 1960s to 2% in the 1970s to -1% in the 1980s. Other studies indicate that approximately half of all bidding firms earn negative excess returns around the announcement of takeovers, suggesting that shareholders are skeptical about the perceived value of the takeover in a significant number of cases.

When an attempt at a takeover fails, Bradley, Desai and Kim (1983) report negative excess returns of 5% to bidding firm stockholders around the announcement of the failure. When the existence of a rival bidder is figured in, the studies indicate significant negative excess returns (of approximately 8%) for bidder firm stockholders who lose out to a rival bidder within 180 trading days of the announcement, and no excess returns when no rival bidder exists.

### **Steps in an Acquisition**

There are four basic and not necessarily sequential steps, in acquiring a target firm. The first is the development of a rationale and a strategy for doing acquisitions, and the

understanding of what the strategy requires in terms of resources. The second is the choice of a target for the acquisition and the valuation of the target firm, with premiums for the value of control and any synergy. The third is the determination of how much to pay on the acquisition, how best to raise funds to do it, and whether to use stock or cash. This decision has significant implications for the choice of accounting treatment for the acquisition. The final step in the acquisition, and perhaps the most challenging one, is to make the acquisition work after the deal is complete.

### **Developing an Acquisition Strategy**

Not all firms that make acquisitions have acquisition strategies, and not all firms that have acquisition strategies stick with them. In this section, we consider a number of different motives for acquisitions and suggest that a coherent acquisition strategy has to be based on one or another of these motives.

#### ***Acquire undervalued firms***

Firms that are undervalued by financial markets can be targeted for acquisition by those who recognize this mispricing. The acquirer can then gain the difference between the value and the purchase price as surplus. For this strategy to work, however, three basic components need to come together.

1. *A capacity to find firms that trade at less than their true value:* This capacity would require either access to better information than is available to other investors in the market, or better analytical tools than those used by other market participants.
2. *Access to the funds that will be needed to complete the acquisition:* Knowing a firm is undervalued does not necessarily imply having capital easily available to carry out the acquisition. Access to capital depends upon the size of the acquirer – large firms will have more access to capital markets and internal funds than smaller firms or individuals – and upon the acquirer’s track record – a history of success at identifying and acquiring under valued firms will make subsequent acquisitions easier.
3. *Skill in execution:* If the acquirer, in the process of the acquisition, drives the stock price up to and beyond the estimated value, there will be no value gain from the

acquisition. To illustrate, assume that the estimated value for a firm is \$100 million and that the current market price is \$75 million. In acquiring this firm, the acquirer will have to pay a premium. If that premium exceeds 33% of the market price, the price exceeds the estimated value, and the acquisition will not create any value for the acquirer.

While the strategy of buying under valued firms has a great deal of intuitive appeal, it is daunting, especially when acquiring publicly traded firms in reasonably efficient markets, where the premiums paid on market prices can very quickly eliminate the valuation surplus. The odds are better in less efficient markets or when acquiring private businesses.

### ***Diversify to reduce risk***

We made a strong argument in Chapter 6 that diversification reduces an investor's exposure to firm-specific risk. In fact, the risk and return models that we have used in this book have been built on the presumption that the firm-specific risk will be diversified away and hence will not be rewarded. By buying firms in other businesses and diversifying, acquiring firms' managers believe, they can reduce earnings volatility and risk and increase potential value.

Although diversification has benefits, it is an open question whether it can be accomplished more efficiently by investors diversifying across traded stocks, or by firms diversifying by acquiring other firms. If we compare the transactions costs associated with investor diversification with the costs and the premiums paid by firms doing the same, investors in most publicly traded firms can diversify far more cheaply than firms can.

There are two exceptions to this view. The first is in the case of a private firm, where the owner may have all or most of his or her wealth invested in the firm. Here, the argument for diversification becomes stronger, since the owner alone is exposed to all risk. This risk exposure may explain why many family-owned businesses in Asia, for instance, diversified into multiple businesses and became conglomerates. The second, albeit weaker case, is the closely held firm, whose incumbent managers may have the bulk of their wealth invested in the firm. By diversifying through acquisitions, they reduce their

exposure to total risk, though other investors (who presumably are more diversified) may not share their enthusiasm.

### *Create Operating or Financial Synergy*

The third reason to explain the significant premiums paid in most acquisitions is **synergy**. Synergy is the potential additional value from combining two firms. It is probably the most widely used and misused rationale for mergers and acquisitions.

#### *Sources of Operating Synergy*

Operating synergies are those synergies that allow firms to increase their operating income, increase growth or both. We would categorize operating synergies into four types.

1. *Economies of scale* that may arise from the merger, allowing the combined firm to become more cost-efficient and profitable.
2. *Greater pricing power* from reduced competition and higher market share, which should result in higher margins and operating income.
3. *Combination of different functional strengths*, as would be the case when a firm with strong marketing skills acquires a firm with a good product line.
4. *Higher growth in new or existing markets*, arising from the combination of the two firms. This would be case when a US consumer products firm acquires an emerging market firm, with an established distribution network and brand name recognition, and uses these strengths to increase sales of its products.

Operating synergies can affect margins and growth, and through these the value of the firms involved in the merger or acquisition.

#### *Sources of Financial Synergy*

With financial synergies, the payoff can take the form of either higher cash flows or a lower cost of capital (discount rate). Included are the following.

- A combination of a firm with excess cash, or **cash slack**, (and limited project opportunities) and a firm with high-return projects (and limited cash) can yield a payoff in terms of higher value for the combined firm. The increase in value comes from the projects that were taken with the excess cash that otherwise would not have



been taken. This synergy is likely to show up most often when large firms acquire smaller firms, or when publicly traded firms acquire private businesses.

- *Debt capacity* can increase, because when two firms combine, their earnings and cash flows may become more stable and predictable. This, in turn, allows them to borrow more than they could have as individual entities, which creates a tax benefit for the combined firm. This tax benefit can take the form of either higher cash flows or a lower cost of capital for the combined firm.
- *Tax benefits* can arise either from the acquisition taking advantage of tax laws or from the use of net operating losses to shelter income. Thus, a profitable firm that acquires a money-losing firm may be able to use the net operating losses of the latter to reduce its tax burden. Alternatively, a firm that is able to increase its depreciation charges after an acquisition will save in taxes and increase its value.

Clearly, there is potential for synergy in many mergers. The more important issues are whether that synergy can be valued and, if so, how to value it.

#### *Empirical Evidence on Synergy*

Synergy is a stated motive in many mergers and acquisitions. Bhidé (1993) examined the motives behind 77 acquisitions in 1985 and 1986 and reported that operating synergy was the primary motive in one-third of these takeovers. A number of studies examine whether synergy exists and, if it does, how much it is worth. If synergy is perceived to exist in a takeover, the value of the combined firm should be greater than the sum of the values of the bidding and target firms, operating independently.

$$V(AB) > V(A) + V(B)$$

where

$V(AB)$  = Value of a firm created by combining A and B (Synergy)

$V(A)$  = Value of firm A, operating independently

$V(B)$  = Value of firm B, operating independently

Studies of stock returns around merger announcements generally conclude that the value of the combined firm does increase in most takeovers and that the increase is significant. Bradley, Desai, and Kim (1988) examined a sample of 236 inter-firms tender offers between 1963 and 1984 and reported that the combined value of the target and bidder

firms increased 7.48% (\$117 million in 1984 dollars), on average, on the announcement of the merger. This result has to be interpreted with caution, however, since the increase in the value of the combined firm after a merger is also consistent with a number of other hypotheses explaining acquisitions, including under valuation and a change in corporate control. It is thus a weak test of the synergy hypothesis.

The existence of synergy generally implies that the combined firm will become more profitable or grow at a faster rate after the merger than will the firms operating separately. A stronger test of synergy is to evaluate whether merged firms improve their performance (profitability and growth) *relative to their competitors*, after takeovers. On this test, as we show later in this chapter, many mergers fail.

### ***Take over poorly managed firms and change management***

Some firms are not managed optimally and others often believe they can run them better than the current managers. Acquiring poorly managed firms and removing incumbent management, or at least changing existing management policy or practices, should make these firms more valuable, allowing the acquirer to claim the increase in value. This value increase is often termed the **value of control**.

### *Prerequisites for Success*

While this corporate control story can be used to justify large premiums over the market price, the potential for its success rests on the following.

1. The poor performance of the firm being acquired should be attributable to the incumbent management of the firm, rather than to market or industry factors that are not under management control.
2. The acquisition has to be followed by a change in management practices, and the change has to increase value. As noted in the last chapter, actions that enhance value increase cash flows from existing assets, increase expected growth rates, increase the length of the growth period, or reduce the cost of capital.
3. The market price of the acquisition should reflect the status quo, i.e., the current management of the firm and their poor business practices. If the

market price already has the control premium built into it, there is little potential for the acquirer to earn the premium.

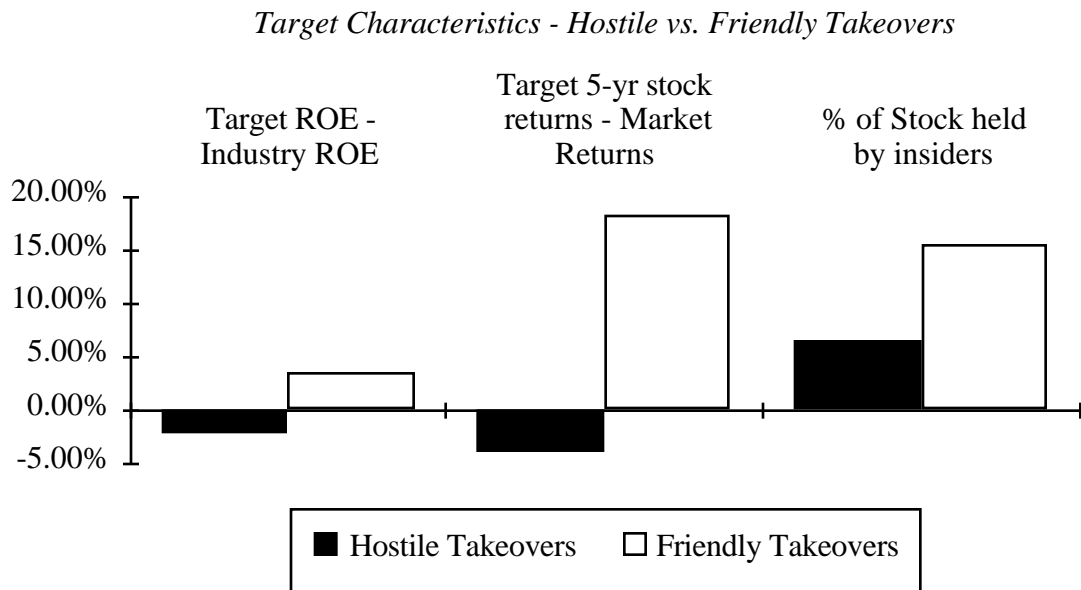
In the last two decades, corporate control has been increasingly cited as a reason for hostile acquisitions.

*Empirical Evidence on the Value of Control*

The strongest support for the existence of a market for corporate control lies in the types of firms that are typically acquired in hostile takeovers. Research indicates that the typical target firm in a hostile takeover has the following characteristics.

- (1) It has under performed other stocks in its industry and the overall market, in terms of returns to its stockholders in the years preceding the takeover.
- (2) It has been less profitable than firms in its industry in the years preceding the takeover.
- (3) It has a much lower stock holding by insiders than do firms in its peer groups.

In a comparison of target firms in hostile and friendly takeovers, Bhide illustrates their differences. His findings are summarized in Figure 25.3.



As you can see, target firms in hostile takeovers have earned a 2.2% lower return on equity, on average, than other firms in their industry; they have earned returns for their

stockholders which are 4% lower than the market; and only 6.5% of their stock were held by insiders.

There is also evidence that firms make significant changes in the way they operate after hostile takeovers. In his study, Bhidé examined the consequences of hostile takeovers and noted the following changes.

1. Many of the hostile takeovers were followed by an increase in debt, which resulted in a downgrading of the debt. The debt was quickly reduced with proceeds from the sale of assets, however.
2. There was no significant change in the amount of capital investment in these firms.
3. Almost 60% of the takeovers were followed by significant divestitures, in which half or more of the firm was divested. The overwhelming majority of the divestitures were units in business areas unrelated to the company's core business (i.e., they constituted reversal of corporate diversification done in earlier time periods).
4. There were significant management changes in 17 of the 19 hostile takeovers, with the replacement of the entire corporate management team in seven of the takeovers.

Thus, contrary to popular view<sup>2</sup>, most hostile takeovers are not followed by the acquirer stripping the assets of the target firm and leading it to ruin. Instead, target firms refocus on their core businesses and often improve their operating performance.

### ***Cater to Managerial Self Interest***

In most acquisitions, it is the managers of the acquiring firm who decide whether to carry out the acquisition and how much to pay for it, rather than the stockholders of the firm. Given these circumstances, the motive for some acquisitions may not be stockholder wealth maximization, but managerial self-interest, manifested in any of the following motives for acquisitions.

- *Empire building*: Some top managers' interests seem to lie in making their firms the largest and most dominant firms in their industry or even in the entire market.

This objective, rather than diversification, may explain the acquisition strategies of

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<sup>2</sup> Even if it is not the popular view, it is the populist view that has found credence in Hollywood, in movies such as *Wall Street*, *Barbarians at the Gate* and *Other People's Money*.

firms like Gulf and Western and ITT<sup>3</sup> in the 1960s and 1970s. Note that both firms had strong-willed CEOs, Charles Bludhorn in the case of Gulf and Western, and Harold Geneen, in the case of the ITT, during their acquisitive periods.

- *Managerial Ego*: It is clear that some acquisitions, especially when there are multiple bidders for the same firm, become tests of machismo<sup>4</sup> for the managers involved. Neither side wants to lose the battle, even though winning might cost their stockholders billions of dollars.
- *Compensation and side-benefits*: In some cases, mergers and acquisitions can result in the rewriting of management compensation contracts. If the potential private gains to the managers from the transaction are large, it might blind them to the costs created for their own stockholders.

In a paper titled “The Hubris Hypothesis”, Roll (1981) suggests that we might be underestimating how much of the acquisition process and the prices paid can be explained by managerial pride and ego.

#### **Should there be an ego discount?**

If managerial self-interest and egos can cause firms to pay too much on acquisitions, should the values of firms run by strong-willed CEOs be discounted? In a sense, this discount is probably already applied if the firm’s current return on capital and reinvestment rate reflect the failed acquisitions of the past, and we assume that the firm will continue to generate the same return on capital in the future.

By the same token, though, this is a good reason to revisit a firm valuation when there is a change at the top. If the new CEO does not seem to have the same desire to empire build or overpay on acquisitions as the old one, the firm’s future return on capital can be expected to be much higher than its past return on capital, and its value will rise.

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<sup>3</sup> In a delicious irony, ITT itself became the target of a hostile acquisition bid by Hilton Hotels and responded by shedding what it termed its non-core businesses, i.e., all the businesses it had acquired during its conglomerate period.

<sup>4</sup> An interesting question that is whether these bidding wars will become less likely as more women rise to become CEOs of firms. They might bring in a different perspective on what winning and losing in a merger means.

### **Choosing a Target firm and valuing control/synergy**

Once a firm has an acquisition motive, there are two key questions that need to be answered. The first relates to how to best identify a potential target firm for an acquisition, given the motives described in the last section. The second is the more concrete question of how to value a target firm, again given the different motives that we have outlined in the last section.

#### ***Choosing a target firm***

Once a firm has identified the reason for its acquisition program, it has to find the appropriate target firm.

- If the motive for acquisitions is under valuation, the target firm must be under valued. How such a firm will be identified depends upon the valuation approach and model used. With relative valuation, an under valued stock is one that trades at a multiple (of earnings, book value or sales) well below that of the rest of the industry, after controlling for significant differences on fundamentals. Thus, a bank with a price to book value ratio of 1.2 would be an undervalued bank, if other banks have similar fundamentals (return on equity, growth, and risk) but trade at much higher price to book value ratios. In discounted cash flow valuation approaches, an under valued stock is one that trades at a price well below the estimated discounted cash flow value.
- If the motive for acquisitions is diversification, the most likely target firms will be in businesses that are unrelated to and uncorrelated with the business of the acquiring firm. Thus, a cyclical firm should try to acquire counter-cyclical or, at least, non-cyclical firms to get the fullest benefit from diversification.
- If the motive for acquisitions is operating synergy, the typical target firm will vary depending upon the source of the synergy. For economies of scale, the target firm should be in the same business as the acquiring firm. Thus, the acquisition of Security Pacific by Bank of America was motivated by potential cost savings from economies of scale. For functional synergy, the target firm should be strongest in those functional areas where the acquiring firm is weak. For financial synergy, the target firm will be chosen to reflect the likely source of the synergy –

a risky firm with limited or no stand-alone capacity for borrowing, if the motive is increased debt capacity, or a firm with significant net operating losses carried forward, if the motive is tax benefits.

- If the motive for the merger is control, the target firm will be a poorly managed firm in an industry where there is potential for excess returns. In addition, its stock holdings will be widely dispersed (making it easier to carry out the hostile acquisition) and the current market price will be based on the presumption that incumbent management will continue to run the firm.
- If the motive is managerial self-interest, the choice of a target firm will reflect managerial interests rather than economic reasons.

In Table 25.1, we summarize the typical target firm, given the motive for the take over.

*Table 25.1: Target Firm Characteristics given Acquisition Motive*

<i>If motive is</i>	<i>then the target firm...</i>
Undervaluation	trades at a price below the estimated value.
Diversification	is in a business different from the acquiring firm's business.
Operating Synergy	has the characteristics that create the operating synergy <i>Cost Savings</i> : in same business to create economies of scale. <i>Higher growth</i> : with potential to open up new markets or expand existing ones.
Financial Synergy	has the characteristics that create financial synergy <i>Tax Savings</i> : provides a tax benefit to acquirer. <i>Debt Capacity</i> : is unable to borrow money or pay high rates. <i>Cash slack</i> : has great projects/no funds.
Control	is a badly managed firm whose stock has under performed the market.
Manager's Interests	has characteristics that best meet CEO's ego and power needs.

There are two final points worth making here before we move on to valuation. The first is that firms often choose a target firm and a motive for the acquisition simultaneously, rather than sequentially. That does not change any of the analysis in these sections. The other point is that firms often have more than one motive in an acquisitions, say, control

and synergy. If this is the case, the search for a target firm should be guided by the dominant motive.

### ***Valuing the Target Firm***

The valuation of an acquisition is not fundamentally different from the valuation of any firm, although the existence of control and synergy premiums introduces some complexity into the valuation process. Given the inter-relationship between synergy and control, the safest way to value a target firm is in steps, starting with a status quo valuation of the firm, and following up with a value for control and a value for synergy.

#### *a. Status Quo Valuation*

We start our valuation of the target firm by estimating the firm value with existing investing, financing and dividend policies. This valuation, which we term the **status quo valuation**, provides a base from which we can estimate control and synergy premiums. All of the basic principles presented in earlier chapters on valuation continue to apply here. In particular, the value of the firm is a function of its cash flows from existing assets, the expected growth in these cash flows during a high growth period, the length of the high growth period and the firm's cost of capital.

#### *Illustration 25.1: A Status Quo Valuation of Digital*

In 1997, Digital Equipment, a leading manufacturer of mainframe computers, was the target of an acquisition bid by Compaq, which was at that time the leading personal computer manufacturer in the world. The acquisition was partly motivated by the belief that Digital was a poorly managed firm and that Compaq would be a much better manager of Digital's assets. In addition, Compaq expected synergies, in the form of both cost savings (from economies of scale) and higher growth (from Compaq selling to Digital's customers).

To analyze the acquisition, we begin with a status quo valuation of Digital. At the time of the acquisition, Digital had the following characteristics.

- Digital had earnings before interest and taxes of \$391.38 million in 1997, which translated into a pre-tax operating margin of 3% on revenues of \$13,046 million and an after-tax return on capital of 8.51%; the firm had a tax rate of 36%.



- Based upon its beta of 1.15, an after-tax cost of borrowing of 5% and a debt ratio of approximately 10%, the cost of capital for Digital in 1997 was 11.59%. (The treasury bond rate at the time of the analysis was 6%.)
  - Cost of Equity =  $6\% + 1.15 (5.5\%) = 12.33\%$
  - Cost of Capital =  $12.33\% (0.9) + 5\% (0.1) = 11.59\%$
- Digital had capital expenditures<sup>5</sup> of \$475 million, depreciation of \$461 million, and working capital is 15% of revenues.
- Operating income, net capital expenditures and revenues were expected to grow 6% a year for the next 5 years.
- After year 5, operating income and revenues were expected to grow 5% a year forever. After year 5, capital expenditures were expected to be 110% of depreciation with depreciation growing at 5%. The debt ratio remained at 10%, but the after-tax cost of debt dropped to 4% and the beta dropped to 1.

The value of Digital, based upon these inputs, was estimated to be \$2,110.41 million.

<i>Year</i>	<i>EBIT (1-t)</i>	<i>Net Cap Ex</i>	<i>Chg in WC</i>	<i>FCFF</i>	<i>Terminal Value</i>	<i>PV</i>
1	\$265.51	\$14.84	\$117.41	\$133.26		\$119.42
2	\$281.44	\$15.73	\$124.46	\$141.25		\$113.43
3	\$298.33	\$16.67	\$131.93	\$149.73		\$107.75
4	\$316.23	\$17.67	\$139.84	\$158.71		\$102.35
5	\$335.20	\$18.74	\$148.23	\$168.24	\$2,717.35	\$1,667.47
Terminal Year	\$351.96	\$64.78	\$130.94	\$156.25		\$2,110.41

Note that the terminal value is computed using the free cash flow to the firm in year 6 and the new cost of capital after year 5.

New cost of equity after year 5 =  $6\% + 1.00 (5.5\%) = 11.5\%$

New cost of capital after year 5 =  $11.50\%(0.9) + 4\% (0.1) = 10.75\%$

$$\text{Terminal value} = \frac{\$156.25}{0.1075 - 0.05} = \$2,717.35$$

### *b. The Value of Corporate Control*

Many hostile takeovers are justified on the basis of the existence of a market for corporate control. Investors and firms are willing to pay large premiums over the market price to control the management of firms, especially those that they perceive to be poorly run. This section explores the determinants of the value of corporate control and attempts to value it in the context of an acquisition.

#### *Determinants of the Value of Corporate Control*

The value of wresting control of a firm from incumbent management is inversely proportional to the perceived quality of that management and its capacity to maximize firm value. In general, the value of control will be much greater for a poorly managed firm that operates at below optimum capacity than for a well managed firm.

The value of controlling a firm comes from changes made to existing management policy that can increase the firm value. Assets can be acquired or liquidated, the financing mix can be changed and the dividend policy reevaluated, and the firm can be restructured to maximize value. If we can identify the changes that we would make to the target firm, we can value control. The value of control can then be written as:

Value of Control = Value of firm, optimally managed - Value of firm with current management

The value of control is negligible for firms that are operating at or close to their optimal value, since a restructuring will yield little additional value. It can be substantial for firms operating at well below optimal, since a restructuring can lead to a significant increase in value.

#### *Illustration 25.2: The Value of Control at Digital*

We said earlier that one of the reasons Digital was targeted by Compaq was that it was viewed as poorly managed. Assuming that Compaq was correct in its perceptions, we valued control at Digital by making the following assumptions.

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<sup>5</sup> The reinvestment rate is therefore artificially low when we look at net capital expenditures. This is

- Digital will raise its debt ratio to 20%. The beta will increase, but the cost of capital will decrease.

New Beta = 1.25 (Unlevered Beta = 1.07; Debt/Equity Ratio = 25%)

Cost of Equity = 6% + 1.25 (5.5%) = 12.88%

New After-tax Cost of Debt = 5.25%; the firm is riskier, and its default risk will increase

Cost of Capital = 12.88% (0.8) + 5.25% (0.2) = 11.35%

- Digital will raise its return on capital to 11.35%, which is its cost of capital. (Pre-tax Operating margin will go up to 4%, which is close to the industry average)
- The reinvestment rate remains unchanged, but the increase in the return on capital will increase the expected growth rate in the next 5 years to 10%.
- After year 5, the beta will drop to 1, and the after-tax cost of debt will decline to 4%, as in the previous example.

The effect of these assumptions on the cash flows and present values is listed in the following table.

<i>Year</i>	<i>EBIT (1-t)</i>	<i>Net Cap Ex</i>	<i>Chg in WC</i>	<i>FCFF</i>	<i>Terminal Value</i>	<i>PV</i>
1	\$367.38	\$15.40	\$195.69	\$156.29		\$140.36
2	\$404.11	\$16.94	\$215.26	\$171.91		\$138.65
3	\$444.52	\$18.63	\$236.78	\$189.11		\$136.97
4	\$488.98	\$20.50	\$260.46	\$208.02		\$135.31
5	\$537.87	\$22.55	\$286.51	\$228.82	\$6,584.62	\$3,980.29
Terminal Year	\$564.77	\$77.96	\$157.58	\$329.23		\$4,531.59

The lower cost of capital and higher growth rate increase the firm value from the status quo valuation of \$2,110.41 million to \$4,531.59 million. We can then estimate the value of control.

Value of firm (optimally managed) = \$4,531.59 million

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because R&D expenses are not capitalized.

Value of firm (status quo) =	\$2,110.41 million
Value of control =	\$2,421.18 million

### *c. Valuing Operating Synergy*

There is a potential for operating synergy, in one form or the other, in many takeovers. Some disagreement exists, however, over whether synergy can be valued and, if so, what that value should be. One school of thought argues that synergy is too nebulous to be valued and that any systematic attempt to do so requires so many assumptions that it is pointless. If this is true, a firm should not be willing to pay large premiums for synergy if it cannot attach a value to it.

While valuing synergy requires us to make assumptions about future cash flows and growth, the lack of precision in the process does not mean we cannot obtain an unbiased estimate of value. Thus we maintain that synergy can be valued by answering two fundamental questions.

(1) *What form is the synergy expected to take?* Will it reduce costs as a percentage of sales and increase profit margins (e.g., when there are economies of scale)? Will it increase future growth (e.g., when there is increased market power) or the length of the growth period? Synergy, to have an effect on value, has to influence one of the four inputs into the valuation process – cash flows from existing assets, higher expected growth rates (market power, higher growth potential), a longer growth period (from increased competitive advantages), or a lower cost of capital (higher debt capacity).

(2) *When will the synergy start affecting cash flows?* — Synergies can show up instantaneously, but they are more likely to show up over time. Since the value of synergy is the present value of the cash flows created by it, the longer it takes for it to show up, the lesser its value.

Once we answer these questions, we can estimate the value of synergy using an extension of discounted cash flow techniques. First, we value the firms involved in the merger independently, by discounting expected cash flows to each firm at the weighted average cost of capital for that firm. Second, we estimate the value of the combined firm, with no synergy, by adding the values obtained for each firm in the first step. Third, we build in the effects of synergy into expected growth rates and cash flows and we value the

combined firm with synergy. The difference between the value of the combined firm with synergy and the value of the combined firm without synergy provides a value for synergy.

Figure 25.4 summarizes the effects of synergy and control in valuing a target firm for an acquisition. Notice the difference between Figure 25.2, which is based upon the market price of the target firm before and after the acquisition, and Figure 25.4, where we are looking at the value of the target firm with and without the premiums for control and synergy. A fair-value acquisition, which would leave the acquiring firm neither better nor worse off, would require that the total price (in Figure 25.2) be equal to the consolidated value (in Figure 25.4) with the synergy and control benefits built in.

Figure 25.4: Valuing an Acquisition

Component	Valuation Guidelines	Should you pay?
Synergy	<p><i>Value the combined firm with synergy built in.</i> This value may include</p> <ul style="list-style-type: none"> <li>a. a higher growth rate in revenues: <i>growth synergy</i></li> <li>b. higher margins, because of <i>economies of scale</i></li> <li>c. lower taxes, because of tax benefits: <i>tax synergy</i></li> <li>d. lower cost of debt: <i>financing synergy</i></li> <li>e. higher debt ratio because of lower risk: <i>debt capacity</i></li> </ul> <p><i>Subtract the value of the target firm (with control premium) + value of the bidding firm (pre-acquisition). This is the value of the synergy.</i></p>	<p><i>Which firm is indispensable for synergy?</i></p> <ul style="list-style-type: none"> <li>- If it is the target, you should be willing to pay up to the value of synergy.</li> <li>- If it is the bidder, you should not.</li> </ul>
Control Premium	<p>Value the company as if optimally managed. This will usually mean altering investment, financing and dividend policy:</p> <p>Investment Policy: Earn higher returns on projects and divest unproductive projects.</p> <p>Financing Policy: Move to a better financing structure; eg. optimal capital structure</p> <p>Dividend Policy: Return cash for which the firm has no need.</p> <p>Practically,</p> <ol style="list-style-type: none"> <li>1. Look at industry averages for optimal (if lazy)</li> <li>2. Do a full-fledged corporate financial analysis</li> </ol>	<p>If motive is control or in a stand-alone valuation, this is the maximum you should pay.</p>
Status Quo Valuation	<p>Value the company as is, with existing inputs for investment, financing and dividend policy.</p>	<p>If motive is undervaluation, the status quo value is the maximum you should pay.</p>

*Illustration 25.4: Valuing Synergy: Compaq and Digital*

Returning to the Compaq/Digital merger, note that synergy was one of the stated reasons for the acquisition. To value this synergy, we needed to first value Compaq as a stand-alone firm. To do this, we made the following assumptions.

- Compaq had earnings before interest and taxes of \$2,987 million on revenues of \$25,484 million. The tax rate for the firm is 36%.
- The firm had capital expenditures of \$ 729 million and depreciation of \$545 million in the most recent year; working capital is 15% of revenues.
- The firm had a debt to capital ratio of 10%, a beta of 1.25, and an after-tax cost of debt of 5%.
- The operating income, revenues and net capital expenditures are all expected to grow 10% a year for the next 5 years.
- After year 5, operating income and revenues are expected to grow 5% a year forever, and capital expenditures are expected to be 110% of depreciation. In addition, the firm will raise its debt ratio to 20%, the after-tax cost of debt will drop to 4% and the beta will drop to 1.00.

Based upon these inputs, the value of the firm can be estimated as follows.

<i>Year</i>	<i>EBIT (1-t)</i>	<i>Net Cap Ex</i>	<i>Chg in WC</i>	<i>FCFF</i>	<i>Terminal Value</i>	<i>PV</i>
1	\$2,102.85	\$202.40	\$382.26	\$1,518.19		\$1,354.47
2	\$2,313.13	\$222.64	\$420.49	\$1,670.01		\$1,329.24
3	\$2,544.45	\$244.90	\$462.53	\$1,837.01		\$1,304.49
4	\$2,798.89	\$269.39	\$508.79	\$2,020.71		\$1,280.19
5	\$3,078.78	\$296.33	\$559.67	\$2,222.78	\$56,654.81	\$33,278.53
Terminal Year	\$3,232.72	\$92.16	\$307.82	\$2,832.74		\$38,546.91

The value of Compaq is \$38.547 billion.

The value of the combined firm (Compaq+Digital), with no synergy, should be the sum of the values of the firms valued independently. To avoid double counting the value of control, we add the value of Digital, optimally managed, that we estimated in Illustration 25.2, to the value of Compaq to arrive at the value of the combined firm:

Value of Digital (optimally managed)=	\$4,531.59 million
Value of Compaq (status quo) =	\$38,546.91 million
Value of combined firm =	\$43,078.50 million

This would be the value of the combined firm in the absence of synergy.

To value the synergy, we made the following assumptions about the way in which synergy would affect cash flows and discount rates at the combined firm.

- The combined firm will have some economies of scale, allowing it to increase its current after-tax operating margin slightly. The annual dollar savings will be approximately \$100 million. This will translate into a slightly higher pre-tax operating margin.

- Current Operating Margin =  $\frac{\text{EBIT}_{\text{Compaq}} + \text{EBIT}_{\text{Digital}}}{\text{Sales}_{\text{Compaq}} + \text{Sales}_{\text{Digital}}} = \frac{2987 + 522}{25484 + 13046} = 9.11\%$

- New Operating Margin =  $\frac{2987 + 522 + 100}{25484 + 13046} = 9.36\%$

- The combined firm will also have a slightly higher growth rate of 10.50% over the next 5 years, because of operating synergies.
- The beta of the combined firm was computed in three steps. We first estimated the unlevered betas for Digital and Compaq.

$$\text{Digital's Unlevered Beta} = \frac{1.25}{1 + (1 - 0.36)(0.25)} = 1.07$$

$$\text{Compaq's Unlevered Beta} = \frac{1.25}{1 + (1 - 0.36)(0.10/0.90)} = 1.17$$



We then weighted these unlevered betas by the values of these firms to estimate an unlevered beta for the combined firm; Digital has a firm value<sup>6</sup> of \$4.5 billion and Compaq's firm value was \$38.6 billion.

$$\text{Unlevered Beta for combined firm} = (1.07) \frac{4.5}{43.1} + (1.17) \frac{38.6}{43.1} = 1.16$$

We then used the debt to equity ratio for the combined firm to estimate a new levered beta and cost of capital for the firm. The debt to equity ratio for the combined firm, estimated by cumulating the outstanding debt and market value of equity at the two firms is 13.64%.

$$3. \text{ New Levered Beta} = 1.16(1 + (1 - 0.36)(0.1364)) = 1.26$$

$$4. \text{ Cost of Capital} = 12.93\% (0.88) + 5\% (0.12) = 11.98\%$$

Based on these assumptions, the cash flows and value of the combined firm, with synergy, can be estimated.

<i>Year</i>	<i>EBIT (1-t)</i>	<i>Net Cap Ex</i>	<i>Chg in WC</i>	<i>FCFF</i>	<i>Terminal Value</i>	<i>PV</i>
1	\$2,552.28	\$218.79	\$606.85	\$1,726.65		\$1,541.95
2	\$2,820.27	\$241.76	\$670.57	\$1,907.95		\$1,521.59
3	\$3,116.40	\$267.15	\$740.98	\$2,108.28		\$1,501.50
4	\$3,443.63	\$295.20	\$818.78	\$2,329.65		\$1,481.68
5	\$3,805.21	\$326.19	\$904.75	\$2,574.26	\$66,907.52	\$39,463.87
Terminal Year	\$3,995.47	\$174.02	\$476.07	\$3,345.38		\$45,510.58

The value of the combined firm, with synergy, is \$45,510.58 million. This can be compared to the value of the combined firm, without synergy, of \$43,078.50 million, and the difference is the value of the synergy in the merger.

$$\text{Value of combined firm (with synergy)} = \$45,510.58 \text{ million}$$


<sup>6</sup> The values that we used were the values immediately before the acquisition announcement. This is to prevent the biases that may be created when target prices increase once an acquisition is announced.

Value of combined firm (with no synergy) = \$43,078.50 million

Value of Synergy = \$ 2,422.08 million

This valuation is based on the presumption that synergy will be created instantaneously. In reality, it can take years before the firms are able to see the benefits of synergy. A simple way to account for the delay is to consider the present value of synergy. Thus, if it will take Compaq and Digital three years to create the synergy, the present value of synergy can be estimated, using the combined firm's cost of capital as the discount rate.

$$\text{Present Value of Synergy} = \frac{\$2,422 \text{ million}}{1.1198^3} = \$1724.86 \text{ million}$$

 *synergy.xls*: This spreadsheet allows you to estimate the approximate value of synergy in a merger or acquisition.

#### *d. Valuing Financial Synergy*

Synergy can also be created from purely financial factors. We will consider three legitimate sources of financial synergy - a greater "tax benefit" from accumulated losses or tax deductions, an increase in debt capacity and therefore firm value and better use for "excess" cash or cash slack. We will begin the discussion, however, with diversification, which though a widely used rationale for mergers, is not a source of increased value by itself.

#### *Diversification*

A takeover motivated only by diversification considerations has no effect on the combined value of the two firms involved in the takeover, when the two firms are both publicly traded and when the investors in the firms can diversify on their own. Consider the following example. Dalton Motors, which is in an automobile parts manufacturing firm in a cyclical business, plans to acquire Lube & Auto, which is an automobile service firm whose business is non-cyclical and high growth, solely for the diversification benefit. The characteristics of the two firms are as follows:

	<i>Lube &amp; Auto</i>	<i>Dalton Motors</i>
Current Free cash flow to the firm	\$100 million	\$200 million
Expected growth rate -next 5 years	20%	10%

Expected growth rate – after year 5	6%	6%
Debt /(Debt + Equity)	30%	30%
After-tax cost of debt	6%	5.40%
Beta for equity - next 5 years	1.20	1.00
Beta for equity - after year 5	1.00	1.00

The treasury bond rate is 7% and the market premium is 5.5%. The calculations for the weighted average cost of capital and the value of the firms are shown in Table 25.2.

*Table 25.2: Value of Lube & Auto, Dalton Motors and Combined Firm*

	<i>Lube &amp; Auto</i>	<i>Dalton Motor</i>	<i>Lube &amp; Auto + Dalton Motor</i>	<i>Combined Firm</i>
<i>Debt (%)</i>	30%	30%		30%
<i>Cost of debt</i>	6.00%	5.40%		5.65%
<i>Equity (%)</i>	70%	70%		70%
<i>Cost of equity</i>	13.60%	12.50%		12.95%
<i>Cost of capital - Yr 1</i>	11.32%	10.37%		10.76%
<i>Cost of capital- Yr 2</i>	11.32%	10.37%		10.76%
<i>Cost of capital- Yr 3</i>	11.32%	10.37%		10.77%
<i>Cost of capital- Yr 4</i>	11.32%	10.37%		10.77%
<i>Cost of capital- Yr 5</i>	11.32%	10.37%		10.77%
<i>Cost of capital after</i>	10.55%	10.37%		10.45%
<i>FCFF in year 1</i>	\$120.00	\$220.00		\$340.00
<i>FCFF in year 2</i>	\$144.00	\$242.00		\$386.00
<i>FCFF in year 3</i>	\$172.80	\$266.20		\$439.00
<i>FCFF in year 4</i>	\$207.36	\$292.82		\$500.18
<i>FCFF in year 5</i>	\$248.83	\$322.10		\$570.93
<i>Terminal Value</i>	\$5,796.97	\$7,813.00		\$13,609.97
<i>Present Value</i>	\$4,020.91	\$5,760.47	\$9,781.38	\$9,781.38

The cost of equity and debt for the combined firm is obtained by taking the weighted average of the individual firm's costs of equity (debt); the weights are based

upon the relative market values of equity (debt) of the two firms. Since these relative market values change over time, the costs of equity and debt for the combined firm also change over time. The value of the combined firm is exactly the same as the sum of the values of the independent firms, indicating that there is no value gain from diversification.

This equality does not imply, however, that the shareholders in the bidding and target firms are indifferent about such takeovers, since the bidding firm pays a significant premium over the market price. To the extent that these firms were correctly valued before the merger (Market Value of Lube & Auto = \$4,020.91, Market Value of Dalton Motors = \$5,760.47), the payment of a premium over the market price will transfer wealth from the bidding firm to the target firm.

The absence of added value from this merger may seem puzzling, given the fact that the two firms are in unrelated businesses and thus should gain some diversification benefit. In fact, if the earnings of the two firms are not highly correlated, the variance in earnings of the combined firm should be significantly lower than the variance in earnings of the individual firms operating independently. This reduction in earnings variance does not affect value, however, because it is firm-specific risk, which is assumed to have no effect on expected returns. (The betas, which are measures of market risk, are always value-weighted averages of the betas of the two merging firms.) But what about the impact of reduced variance on debt capacity? Firms with lower variability in earnings can increase debt capacity and thus value. This can be a real benefit of conglomerate mergers, and we consider it separately later in this section.

### *Cash Slack*

Managers may reject profitable investment opportunities if they have to raise new capital to finance them. Myers and Majluf (1984) suggest that since managers have more information than investors about prospective projects, new stock may have to be issued at less than true value to finance these projects, leading to the rejection of good projects and to capital rationing for some firms. It may therefore make sense for a company with excess cash and no investment opportunities to take over a cash-poor firm with good investment opportunities, or vice versa. The additional value of combining these two

firms is the present value of the projects that would not have been taken if they had stayed apart, but can now be taken because of the availability of cash.

Cash slack can be a potent rationale for publicly traded firms that have more access to capital and want to acquire small, private firms that have capital constraints. It may also explain why acquisition strategies concentrating on buying smaller, private firms have worked fairly well in practice. Blockbuster video (video rental), Browning and Ferris (waste disposal) and Service Merchandise (funeral homes) are good examples.

### *Tax Benefits*

Several possible tax benefits accrue from takeovers. If one of the firms has tax deductions that it cannot use because it is losing money, whereas the other firm has income on which it pays significant taxes, combining the two firms can result in tax benefits that can be shared by the two firms. The value of this synergy is the present value of the tax savings that result from this merger. In addition, the assets of the firm being taken over can be written up to reflect new market values in some forms of mergers, leading to higher tax savings from depreciation in future years.

#### *Illustration 25.5: Tax Benefits of writing up Asset Values after Takeover: Congoleum Inc.*

One of the earliest leveraged buyouts (LBOs) occurred in 1979 and involved Congoleum Inc., a diversified firm in ship building flooring, and automotive accessories. Congoleum's own management bought out the firm. The favorable treatment that would be accorded the firm's assets by tax authorities was a major reason behind the takeover. After the takeover — estimated to cost approximately \$400 million — the firm was allowed to write up its assets to reflect their new market values and to claim depreciation on these new values. The estimated change in depreciation and the present value effect of this depreciation based on a tax rate of 48%, discounted at the firm's cost of capital of 14.5%, are shown in Table 25.3.

*Table 25.3: Depreciation Tax Benefits: Before and After Leveraged Buyout*

<i>Year</i>	<i>Depreciation before</i>	<i>Depreciation after</i>	<i>Change in Depreciation</i>	<i>Tax Savings</i>	<i>Present Value</i>
1980	\$8.00	\$35.51	\$27.51	\$13.20	\$11.53
1981	\$8.80	\$36.26	\$27.46	\$13.18	\$10.05

1982	\$9.68	\$37.07	\$27.39	\$13.15	\$8.76
1983	\$10.65	\$37.95	\$27.30	\$13.10	\$7.62
1984	\$11.71	\$21.23	\$9.52	\$4.57	\$2.32
1985	\$12.65	\$17.50	\$4.85	\$2.33	\$1.03
1986	\$13.66	\$16.00	\$2.34	\$1.12	\$0.43
1987	\$14.75	\$14.75	\$0.00	\$0.00	\$0.00
1988	\$15.94	\$15.94	\$0.00	\$0.00	\$0.00
1989	\$17.21	\$17.21	\$0.00	\$0.00	\$0.00
<i>1980-89</i>	<i>\$123.05</i>	<i>\$249.42</i>	<i>\$126.37</i>	<i>\$60.66</i>	<i>\$41.76</i>

Note that the increase in depreciation occurs in the first seven years, primarily as a consequence of higher asset values and accelerated depreciation. After year seven, however, the old and new depreciation schedules converge. The present value of the additional tax benefits from the higher depreciation amounted to \$41.76 million, about 10% of the overall price paid on the transaction.

In recent years, the tax code covering asset revaluations has been significantly tightened. While acquiring firms can still reassess the value of the acquired firm's assets, they can do so only up to fair value.

#### *Debt Capacity*

If the cash flows of the acquiring and target firms are less than perfectly correlated, the cash flows of the combined firm will be less variable than the cash flows of the individual firms. This decrease in variability can result in an increase in debt capacity and in the value of the firm. The increase in value, however, has to be weighed against the immediate transfer of wealth to existing bondholders in both firms from the stockholders of both the acquiring and target firms. The bondholders in the pre-merger firms find themselves lending to a safer firm after the takeover. The coupon rates they are receiving are based upon the riskier pre-merger firms, however. If the coupon rates are not renegotiated, the bonds will increase in price, increasing the bondholders' wealth at the expense of the stockholders.

There are several models available for analyzing the benefits of higher debt ratios as a consequence of takeovers. Lewellen analyzes the benefits in terms of reduced default

risk, since the combined firm has less variable cash flows than do the individual firms. He provides a rationale for an increase in the value of debt after the merger, but at the expense of equity investors. It is not clear, therefore, that the value of the firm will increase after the merger. Stapleton evaluates the benefits of higher debt capacity after mergers using option pricing. He shows that the effect of a merger on debt capacity is always positive, even when the earnings of the two firms are perfectly correlated. The debt capacity benefits increase as the earnings of the two firms become less correlated and as investors become more risk averse.

Consider again the merger of Lube & Auto and Dalton Motor. The value of the combined firm was the same as the sum of the values of the independent firms. The fact that the two firms were in different business lines reduced the variance in earnings, but value was not affected, because the capital structure of the firm remain unchanged after the merger, and the costs of equity and debt were the weighted averages of the individual firms' costs.

The reduction in variance in earnings can increase debt capacity, which can increase value. If, after the merger of these two firms, the debt capacity for the combined firm were increased to 40% from 30% (leading to an increase in the beta to 1.21 and no change in the cost of debt), the value of the combined firm after the takeover can be estimated as shown in Table 25.4.

*Table 25.4: Value of Debt Capacity – Lube & Auto and Dalton Motors*

	<i>Firm A</i>	<i>Firm B</i>	<i>AB -No new debt</i>	<i>AB - Added Debt</i>
<i>Debt (%)</i>	30%	30%	30%	40%
<i>Cost of debt</i>	6.00%	5.40%	5.65%	5.65%
<i>Equity(%)</i>	70%	70%	70%	60%
<i>Cost of equity</i>	13.60%	12.50%	12.95%	13.65%
<i>Cost of Capital- Yr 1</i>	11.32%	10.37%	10.76%	10.45%
<i>Cost of Capital- Yr 2</i>	11.32%	10.37%	10.76%	10.45%
<i>Cost of Capital- Yr 3</i>	11.32%	10.37%	10.77%	10.45%
<i>Cost of Capital- Yr 4</i>	11.32%	10.37%	10.77%	10.45%
<i>Cost of Capital- Yr 5</i>	11.32%	10.37%	10.77%	10.45%

<i>Cost of Capital after</i>	10.55%	10.37%	10.45%	9.76%
<i>FCFF in year 1</i>	\$120.00	\$220.00	\$340.00	\$340.00
<i>FCFF in year 2</i>	\$144.00	\$242.00	\$386.00	\$386.00
<i>FCFF in year 3</i>	\$172.80	\$266.20	\$439.00	\$439.00
<i>FCFF in year 4</i>	\$207.36	\$292.82	\$500.18	\$500.18
<i>FCFF in year 5</i>	\$248.83	\$322.10	\$570.93	\$570.93
<i>Terminal Value</i>	\$5,796.97	\$7,813.00	\$13,609.97	\$16,101.22
<i>Present Value</i>	\$4,020.91	\$5,760.47	\$9,781.38	\$11,429.35

As a consequence of the added debt, the value of the firm will increase from \$9,781.38 million to \$11,429.35 million.

#### *Increase Growth and Price-Earnings Multiples*

Some acquisitions are motivated by the desire to increase growth and price-cash flow (or price-earnings) multiples. Though the benefits of higher growth are undeniable, the price paid for that growth will determine whether such acquisitions make sense. If the price paid for the growth exceeds the fair market value, the stock price of the acquiring firm will decline even though the expected future growth in its cash flows may increase as a consequence of the takeover.

This can be seen in the previous example. Dalton Motor, with projected growth in cash flows of 10%, acquires Lube & Auto, which is expected to grow 20%. The fair market value for Lube & Auto is \$4,020.91. If Dalton Motor pays more than this amount to acquire Lube & Auto, its stock price will decline, even though the combined firm will grow at a faster rate than Dalton Motor alone. Similarly, Dalton Motor, which sells at a lower multiple of cash flow than Lube & Auto, will increase its value as a multiple of cash flow after the acquisition, but the effect on the stockholders in the firm will still be determined by whether or not the price paid on the acquisition exceeds the fair value.

#### **How often does synergy actually show up?**

McKinsey and Co. examined 58 acquisition programs between 1972 and 1983 for evidence on two questions: (1) Did the return on the amount invested in the acquisitions



exceed the cost of capital? (2) Did the acquisitions help the parent companies outperform the competition? They concluded that 28 of the 58 programs failed both tests, and six failed at least one test. In a follow-up study<sup>7</sup> of 115 mergers in the U.K. and the U.S. in the 1990s, McKinsey concluded that 60% of the transactions earned returns on capital less than the cost of capital and that only 23% earned excess returns. In 1999, KPMG examined 700 of the most expensive deals between 1996 and 1998 and concluded that only 17% created value for the combined firm, 30% were value neutral and 53% destroyed value<sup>8</sup>.

A study<sup>9</sup> looked at the eight largest bank mergers in 1995 and concluded that only two (Chase/Chemical, First Chicago/NBD) subsequently outperformed the bank-stock index. The largest, Wells Fargo's acquisition of First Interstate, was a significant failure. Sirower (1996) takes a detailed look at the promises and failures of synergy and draws the gloomy conclusion that synergy is often promised but seldom delivered.

The most damaging piece of evidence on the outcome of acquisitions is the large number of acquisitions that are reversed within fairly short time periods. Mitchell and Lehn note that 20.2% of the acquisitions made between 1982 and 1986 were divested by 1988. Studies that have tracked acquisitions for longer time periods (ten years or more) have found the divestiture rate of acquisitions rises to almost 50%, suggesting that few firms enjoy the promised benefits from acquisitions. In another study, Kaplan and Weisbach (1992) found that 44% of the mergers they studied were reversed, largely because the acquirer paid too much or because the operations of the two firms did not mesh.

### ***Takeover Valuation: Biases and Common Errors***

The process of takeover valuation has potential pitfalls and biases that arise from the desire of the management of both the bidder and target firms to justify their points of

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<sup>7</sup> This study was referenced in an article titled "Merger Mayhem" that appeared in Barrons on April 20, 1998.

<sup>8</sup> KPMG measured the success at creating value by comparing the post-deal stock price performance of the combined firm to the performance of the relevant industry segment for a year after the deal was completed.

<sup>9</sup> This study was done by Keefe, Bruyette and Woods, an investment bank. It was referenced in an article titled "Merger Mayhem" in Barrons, April 20, 1998.

view to their stockholders. The bidder firm aims to convince its stockholders that it is getting a bargain (i.e., that it is paying less than what the target firm is truly worth). In friendly takeovers, the target firm attempts to show its stockholders that the price it is receiving is a fair price (i.e., it is receiving at least what it is worth). In hostile takeovers, there is a role reversal, with bidding firms trying to convince target firm stockholders that they are not being cheated out of their fair share and target firms arguing otherwise. Along the way, there are a number of common errors and biases in takeover valuation.

#### *Use of Comparable Firms and Multiples*

The prices paid in most takeovers are justified using the following sequence of actions: the acquirer assembles a group of firms comparable to the one being valued, selects a multiple to value the target firm, computes an average multiple for the comparable firms and then makes subjective adjustments to this “average”. Each of these steps provides an opening for bias to enter into the process. Since no two firms are identical, the choice of comparable firms is a subjective one and can be tailored to justify the conclusion we want to reach. Similarly, in selecting a multiple, there are a number of possible choices - price-earnings ratios, price-cash flow ratios, price-book value ratios, and price-sales ratios, among others - and the multiple chosen will be the one that best suits our biases. Finally, once the average multiple has been obtained, subjective adjustments can be made to complete the story. In short, there is plenty of room for a biased firm to justify any price, using reasonable valuation models.

In some acquisition valuation, only firms that have been target firms in acquisitions are used as comparable firms, with the prices paid on the acquisitions being used to estimate multiples. The average multiple paid, which is called a transaction multiple, is then used to justify the price paid in an acquisition. This clearly creates a biased sample and the values estimated using transactions multiples will generally be too high.

#### *Mismatching Cash Flows and Discount Rates*

One of the fundamental principles of valuation is that cash flows should be discounted using a consistent discount rate. Cash flows to equity should be discounted at the cost of equity and cash flows to the firm at the cost of capital, nominal cash flows

should be discounted at the nominal discount rate and real cash flows at the real rate, after-tax cash flows at the after-tax discount rate, and pre-tax cash flows at the pre-tax rate. The failure to match cash flows with discount rates can lead to significant under or over valuation. Some of the more common mismatches include:

(1) *Using the bidding firm's cost of equity or capital to discount the target firm's cash flows:* If the bidding firm raises the funds for the takeover, it is argued, its cost of equity should be used. This argument fails to take into account the fundamental investment principle that it is not who raises the money that determines the cost of equity as much as what the money is raised for. The same firm will face a higher cost of equity for funds raised to finance riskier projects and a lower cost of equity to finance safer projects. Thus, the cost of equity in valuing the target will reflect that firm's riskiness, i.e., it is the target firm's cost of equity. Note, also, that since the cost of equity, as we have defined it, includes only non-diversifiable risk, arguments that the risk will decrease after the merger cannot be used to reduce the cost of equity, if the risk being decreased is firm-specific risk.

(2) *Using the cost of capital to discount the cash flows to equity:* If the bidding firm uses a mix of debt and equity to finance the acquisition of a target firm, the argument goes, the cost of capital should be used in discounting the target firm's cash flows to equity (cash flows left over after interest and principal payments). By this reasoning, the value of a share in IBM to an investor will depend upon how the investor finances his or her acquisition of the share - increasing if the investor borrows to buy the stock (since the cost of debt is less than the cost of equity) and decreasing if the investor buys the stock using his or her own cash. The bottom line is that discounting the cash flows to equity at the cost of capital to obtain the value of equity is always wrong and will result in a significant overvaluation of the equity in the target firm.

### *Subsiding the Target Firm*

The value of the target firm should not include any portion of the value that should be attributed to the acquiring firm. For instance, assume that a firm with excess debt capacity or a high debt rating uses a significant amount of low-cost debt to finance an acquisition. If we estimated a low cost of capital for the target firm, with a high debt ratio

and a low after-tax cost of debt, we would over estimate the value of the firm. If the acquiring firm paid this price on the acquisition, it would represent a transfer of wealth from the acquiring firm's stockholders to the target firm's stockholders. Thus, it is never appropriate to use the acquiring firm's cost of debt or debt capacity to estimate the cost of capital for the target firm.

### **Structuring the Acquisition**

Once the target firm has been identified and valued, the acquisition moves forward into the structuring phase. There are three interrelated steps in this phase. The first is the decision on how much to pay for the target firm, given that we have valued it, with synergy and control built into the valuation. The second is the determination of how to pay for the deal, i.e., whether to use stock, cash or some combination of the two, and whether to borrow any of the funds needed. The final step is the choice of the accounting treatment of the deal because it can affect both taxes paid by stockholders in the target firm and how the purchase is accounted for in the acquiring firm's income statement and balance sheets

### ***Deciding on an Acquisition Price***

In the last section, we explained how to value a target firm, with control and synergy considerations built into the value. This value represents a ceiling on the price that the acquirer can pay on the acquisition rather than a floor. If the acquirer pays the full value, there is no surplus value to claim for the acquirer's stockholders and the target firm's stockholders get the entire value of the synergy and control premiums. This division of value is unfair, if the acquiring firm plays an indispensable role in creating the synergy and control premiums.

Consequently, the acquiring firm should try to keep as much of the premium as it can for its stockholders. Several factors, however, will act as constraints. They include

1. *The market price of the target firm, if it is publicly traded, prior to the acquisition:* Since acquisitions have to be based on the current market price, the greater the current market value of equity, the lower the potential for gain to the acquiring firm's stockholders. For instance, if the market price of a poorly managed firm already

reflects a high probability that the management of the firm will be changed, there is likely to be little or no value gained from control.

2. *The relative scarcity of the specialized resources that the target and the acquiring firm bring to the merger:* Since the bidding firm and the target firm are both contributors to the creation of synergy, the sharing of the benefits of synergy among the two parties will depend in large part on whether the bidding firm's contribution to the creation of the synergy is unique or easily replaced. If it can be easily replaced, the bulk of the synergy benefits will accrue to the target firm. If it is unique, the benefits will be shared much more equitably. Thus, when a firm with cash slack acquires a firm with many high-return projects, value is created. If there are a large number of firms with cash slack and relatively few firms with high-return projects, the bulk of the value of the synergy will accrue to the latter.
3. *The presence of other bidders for the target firm:* When there is more than one bidder for a firm, the odds are likely to favor the target firm's stockholders. Bradley, Desai, and Kim (1988) examined an extensive sample of 236 tender offers made between 1963 and 1984 and concluded that the benefits of synergy accrue primarily to the target firms when multiple bidders are involved in the takeover. They estimated the market-adjusted stock returns around the announcement of the takeover for the successful bidder to be 2% in single bidder takeovers and -1.33% in contested takeovers.

### ***Payment for the Target Firm***

Once a firm has decided to pay a given price for a target firm, it has to follow up by deciding how it is going to pay for this acquisition. In particular, a decision has to be made about the following aspects of the deal.

1. *Debt versus Equity:* A firm can raise the funds for an acquisition from either debt or equity. The mix will generally depend upon both the excess debt capacities of the acquiring and the target firm. Thus, the acquisition of a target firm that is significantly under levered may be carried out with a larger proportion of debt than the acquisition of one that is already at its optimal debt ratio. This, of course, is reflected in the value of the firm through the cost of capital. It is also possible that the acquiring firm has

excess debt capacity and that it uses its ability to borrow money to carry out the acquisition. Although the mechanics of raising the money may look the same in this case, it is important that the value of the target firm not reflect this additional debt. As we noted in the last section, the cost of capital used in valuing the acquisition should not reflect this debt raised. The additional debt has nothing to do with the target firm and building it into the value will only result in the acquiring firm paying a premium for a value enhancement that rightfully belongs to its own stockholders.

2. *Cash versus Stock*: There are three ways in which a firm can use equity in a transaction. The first is to use cash balances that have been built up over time to finance the acquisition. The second is to issue stock to the public, raise cash and use the cash to pay for the acquisition. The third is to offer stock as payment for the target firm, where the payment is structured in terms of a stock swap – shares in the acquiring firm in exchange for shares in the target firm. The question of which of these approaches is best utilized by a firm cannot be answered without looking at the following factors.
  - *The availability of cash on hand*: Clearly, the option of using cash on hand is available only to those firms that have accumulated substantial amounts of cash.
  - *The perceived value of the stock*: When stock is issued to the public to raise new funds or when it is offered as payment on acquisitions, the acquiring firm's managers are making a judgment about what the perceived value of the stock is. In other words, managers who believe that their stock is trading at a price significantly below value should not use stock as currency on acquisitions, since what they gain on the acquisitions can be more than what they lost in the stock issue. On the other hand, firms that believe their stocks are overvalued are much more likely to use stock as currency in transactions. The stockholders in the target firm are also aware of this and may demand a larger premium when the payment is made entirely in the form of the acquiring firm's stock.
  - *Tax factors*; When an acquisition is a stock swap, the stockholders in the target firm may be able to defer capital gains taxes on the exchanged shares. Since this benefit can be significant in an acquisition, the potential tax gains from a stock swap may be large enough to offset any perceived disadvantages.

The final aspect of a stock swap is the setting of the terms of the stock swap, i.e., the number of shares of the acquired firm that will be offered per share of the acquiring firm. While this amount is generally based upon the market price at the time of the acquisition, the ratio that results may be skewed by the relative mispricing of the two firm's securities, with the more overpriced firm gaining at the expense of the more underpriced (or at least, less overpriced) firm. A fairer ratio would be based upon the relative values of the two firm's shares. This can be seen quite clearly in the illustration below.

*Illustration 25.6: Setting the Exchange Ratio*

We will begin by reviewing our valuation for Digital in Figure 25.5. The value of Digital with the synergy and control components is \$6,964 million. This is obtained by adding the value of control of \$2422 million and the value of synergy of \$2421 million to the status quo value of \$2,110 million. Digital also has \$1,006 million in debt and 146.789 million shares outstanding. The maximum value per share for Digital can then be estimated.

$$\begin{aligned} \text{Maximum value per share for Digital} &= \frac{\text{Firm Value} - \text{Debt}}{\text{Number of shares outstanding}} \\ &= \frac{\$6,964 - \$1,006}{146.789} \\ &= \$40.59 \end{aligned}$$

The estimated value per share for Compaq is \$27, based upon the total value of the firm of \$38,546.91 million, the debt outstanding of \$3.2 billion and 1,305.76 million shares.

$$\text{Value per share for Compaq} = \frac{38,546.91 - 3,200}{1,305.76} = \$27.00$$

The appropriate exchange ratio, based upon value per share, can be estimated.

$$\begin{aligned} \text{Exchange ratio}_{\text{Compaq, Digital}} &= \frac{\text{Value per share}_{\text{Digital}}}{\text{Value per share}_{\text{Compaq}}} \\ &= \frac{\$40.59}{\$27.00} \\ &= 1.50 \text{ Compaq shares/Digital share} \end{aligned}$$

If the exchange ratio is set above this number, Compaq stockholders will lose at the expense of Digital stockholders. If it is set below, Digital stockholders will lose at the expense of Compaq stockholders.


In fact, Compaq paid \$ 30 in cash and offered 0.945 shares of Compaq stock for every Digital share. Assessing the value of this offer,

Value per Digital share (Compaq offer) = \$ 30 + 0.945 (\$27.07) = \$55.58

Value per Digital share (Assessed value) = \$40.59

Over payment by Compaq = \$14.99

Based on our assessments of value and control, Compaq over paid on this acquisition for Digital.

 *exchratio.xls*: This spreadsheet allows you to estimate the exchange ratio on an acquisition, given the value of control and synergy.



**Figure 25.5: Valuing Digital with Control and Synergy**

Component	Valuation Guidelines	Value
Synergy	<p><i>Value the combined firm with synergy built in.</i> In the case of Compaq/Digital, the synergy comes from</p> <ol style="list-style-type: none"> <li>1. Annual cost savings, expected to be \$100 million</li> <li>2. Slightly higher growth rate</li> </ol>	\$ 2,422 million
Control Premium	<p>Value Digital as if optimally managed. This was done by assuming</p> <ol style="list-style-type: none"> <li>1. Higher margins and a return on capital equal to the cost of capital</li> <li>2. Higher debt ratio and a lower cost of capital</li> </ol>	\$ 2,421 million
Status Quo Valuation	Value Digital as is, with existing inputs for investment, financing and dividend policy.	\$ 2,110 million

### *Accounting Considerations*

There is one final decision that, in our view, seems to play a disproportionate role in the way in which acquisitions are structured and in setting their terms, and that is the accounting treatment. In this section, we describe the accounting choices and examine why firms choose one over the other.

#### *Purchase versus Pooling*

There are two basic choices in accounting for a merger or acquisition. In **purchase accounting**, the entire value of the acquisition is reflected on the acquiring firm's balance sheet and the difference between the acquisition price and the restated<sup>10</sup> value of the assets of the target firm is shown as goodwill for the acquiring firm. The goodwill is then written off (amortized) over a period of 40 years, reducing reported earnings in each year. The amortization is not tax deductible and thus does not affect cash flows. If an acquisition qualifies for **pooling**, the book values of the target and acquiring firms are aggregated. The premium paid over market value is not shown on the acquiring firm's balance sheet.

For an acquisition to qualify for pooling, the merging firms have to meet the following conditions.

- Each of the combining firms has to be independent; pooling is not allowed when one of the firms is a subsidiary or division of another firm in the two years prior to the merger.
- Only voting common stock can be issued to cover the transaction; the issue of preferred stock or multiple classes of common stock is not allowed.
- Stock buybacks or any other distributions that change the capital structure prior to the merger are prohibited.
- No transactions that benefit only a group of stockholders are allowed.
- The combined firm cannot sell a significant portion of the existing businesses of the combined companies, other than duplicate facilities or excess capacity.

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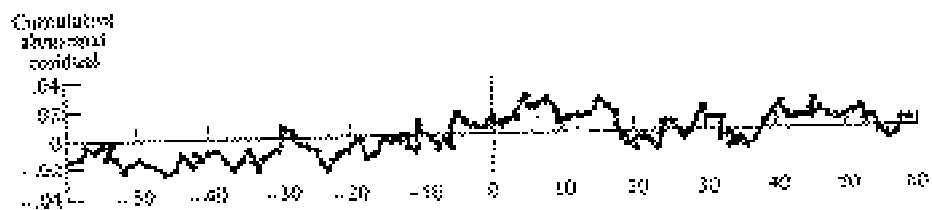
<sup>10</sup> The acquiring firm is allowed to restate the assets that are on the books at fair value. This changes the tax basis for the assets and can affect depreciation in subsequent periods.

The question whether an acquisition will qualify for pooling seems to weigh heavily on the managers of acquiring firms. Some firms will not make acquisitions if they do not qualify for pooling, or they will pay premiums to ensure that they do qualify. Furthermore, as the conditions for pooling make clear, firms are constrained in what they can do after the merger. Firms seem to be willing to accept these constraints, such as restricting stock buybacks and major asset divestitures, just to qualify for pooling.

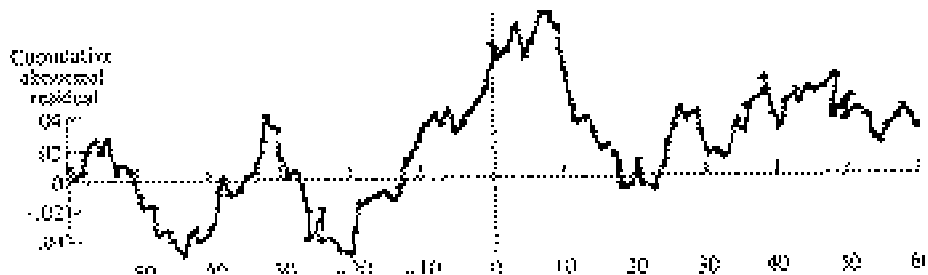
The bias toward pooling may seem surprising, since this choice does not affect cash flows and value, but it is really not surprising, when we consider the source of the bias. Firms are concerned about the effects of the goodwill amortization on their earnings and about stockholder reactions to the lower earnings. Are firms that use purchase accounting punished by markets when they report lower earnings in subsequent periods? Hong, Kaplan and Mandelkar (1978) examined the monthly excess returns of 122 firms that acquired other firms between 1954 and 1964 using the pooling technique for 60 months after the acquisition. They compared these findings to 37 acquisitions that used the purchase approach to see if markets were fooled by the pooling technique. They found no evidence that the pooling raised stock prices or that the purchase technique lowered prices. The results are shown in Figure 25.6.

*Figure 25.6: Pooling versus Purchase Accounting: Effect on Excess Returns*

*Panel A: Excess Returns for 122 firms that used Pooling*



*Panel B: Excess Returns for 37 firms that used Purchase Accounting*



Note that there are no positive excess returns associated with pooling in the 60 months following the merger, nor are there negative excess returns associated with purchase in the same time period. Lindenberg and Ross (1999) studied 387 pooling and 1055 purchase transactions between 1990 and 1999. They find that the stock price reaction to the acquisition announcement is more positive for purchase transactions than for pooling transactions and that the market value of firms that use purchase accounting is not adversely affected by the reduction in earnings associated with amortization. They conclude that the earnings multiples of firms that use purchase accounting adjust to offset the decrease in earnings caused by amortization. To illustrate, a 10% decrease in earnings because of goodwill amortization is accompanied by a 12.1% increase in the price earnings ratio; the net effect is that stock price does not drop. Thus, markets seem to discount the negative earnings effect of amortizing goodwill.

There is another consideration, as well. When pooling is used, the shareholders of the acquired firm can transfer their cost basis<sup>11</sup> to the shares they receive in the acquiring firm and not pay taxes until they sell these shares. When purchase accounting is used, the stockholders of the acquired firm have to recognize the capital gain at the time of the transaction, even if they receive stock in the acquiring firm. Given the substantial premiums paid on acquisitions, this may be a significant factor in why firms choose to use pooling.

### *In-process R&D*

In the last few years, another accounting choice has entered the mix, especially for acquisitions in the technology sector. Here, firms that qualify can follow up an acquisition by writing off all or a significant proportion of the premium paid on the acquisition as **in-process R&D**. The net effect is that the firm takes a one-time charge at the time of the acquisition that does not affect operating earnings<sup>12</sup>, and it eliminates or drastically reduces the goodwill that needs to be amortized in subsequent periods. The one-time

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<sup>11</sup> For tax purposes, the cost basis reflects what you originally paid for the shares. When pooling is used, the stockholders in the target firm can transfer the cost basis of the shares they have in the target firm to those that they receive in exchange. This allows them to defer the capital gains tax until they sell the stock.

<sup>12</sup> The write-off of in-process R&D is viewed as a non-recurring charge and is shown separately from operating income.

expense is not tax deductible and has no cash flow consequences. In acquisitions such as Lotus by IBM and MCI by Worldcom, the in-process R&D charge allowed the acquiring firms to write off a significant portion of the acquisition price at the time of the deal.

The potential to reduce the dreaded goodwill amortization with a one-time charge is appealing for many firms and studies find that firms try to take maximum advantage of this option. Lev (1998) documented this tendency and also noted that firms that qualify for this provision tend to pay significantly larger premiums on acquisitions than firms that do not.

In early 1999, as both the accounting standards board and the SEC sought to crack down on the misuse of in-process R&D, the top executives at high technology firms fought back, claiming that many acquisitions that were viable now would not be in the absence of this provision. It is revealing of managers' obsession with reported earnings that a provision that has no effects on cash flows, discount rates and value is making such a difference in whether acquisitions get done.

### *Final Considerations*

The managers of acquiring firms clearly weigh in the accounting effects of acquisitions, even when accounting choices have little or no effect on cash flows. This behavior is rooted in a fear of how much financial markets will punish firms that report lower earnings, largely as a consequence of the write off of goodwill. Given the transparency of this write off (firms report earnings before and after goodwill amortization), we believe that this fear is misplaced and the empirical evidence backs us up.

When accounting choices weigh disproportionately in the outcome, the results can be expensive for stockholders in the acquiring firm. In particular,

- Firms will reject some good acquisitions simply because they fail to meet the pooling test or because in-process R&D cannot be written off.
- Firms will overpay on acquisitions, just to qualify for favorable accounting treatment.
- To meet the requirements for pooling, firms will often acquire entire firms rather than the divisions that they are interested in and defer asset divestitures that make economic sense.

If the signals emerging from both the SEC and FASB have any basis, the rules for both pooling and writing off in-process R&D will be substantially tightened. In fact, it looks likely that firms will not be able to use pooling past 2001 and that they will have to write off goodwill over a much shorter period than the current 40 years<sup>13</sup>. These changes, though bitterly opposed by many top managers, should be welcomed by stockholders.

### **Improving the odds of success on mergers**

The evidence on mergers adding value is murky at best and negative at worst. Considering all the contradictory evidence contained in different studies<sup>14</sup>, we conclude that:

- Mergers of equals (firms of equal size) seem to have a lower probability of succeeding than acquisitions of a smaller firm by a much larger firm<sup>15</sup>.
- Cost saving mergers, where the cost savings are concrete and immediate, seem to have a better chance of delivering on synergy than mergers based upon growth synergy.
- Acquisition programs that focus on buying small private businesses for consolidations have had more success than acquisition programs that concentrate on acquiring publicly traded firms.
- Hostile acquisitions seem to do better at delivering improved post-acquisition performance than friendly mergers.

### **Analyzing Management and Leveraged Buyouts**

In the first section, when describing the different types of acquisitions, we pointed out two important differences between mergers and buyouts. The first is that, unlike a merger, a buyout does not involve two firms coming together and creating a consolidated entity. Instead, the target firm is acquired by a group of investors that may include the management of the firm. The second is that the target firm in a buyout usually becomes a private business. Some buyouts in the 1980s also used large proportions of

<sup>13</sup> Given the formidable lobbying skills of incumbent managers, we would not be surprised to see this change modified or delayed.

<sup>14</sup> Some of this evidence is anecdotal and is based upon the study of just a few mergers.

debt, leading to their categorization as leveraged buyouts. Each of these differences does have an effect on how we approach the valuation of buyouts.

### ***The Valuation of a Buyout***

The fact that buyouts involve only the target firm and that there is no acquiring firm to consider makes valuation much more straightforward. Clearly, there is no potential for synergy and therefore no need to value it. However, the fact that the managers of a firm are also the acquirers of the firm does create two issues. The first is that managers have access to information that investors do not have. This information may allow managers to conclude, with far more certainty than would an external acquirer, that their firm is under valued. This may be one reason for the buyout. The second is that the management of the firm remains the same after the buyout, but the way in which investment, financing and dividend decisions are made may change. This happens because managers, once they become owners, may become much more concerned about maximizing firm value.

The fact that firms that are involved in buyouts become private businesses can also have an effect on value. In Chapter 24, we noted that investments in private businesses are much more difficult to liquidate than investments in publicly traded firms. This can create a significant discount on value. One reason this discount may be smaller in the case of buyouts is that many of them are done with the clear intention, once the affairs of the firm have been put in order, of taking the firm public again.

If going private is expected to increase managers' responsiveness to value maximization in the long term — since they are part owners of the firm — the way to incorporate this in value is to include it in the cash flows. The increased efficiency can be expected to increase cash flows if it increases operating margins. The emphasis on long-term value should be visible in investment choices and should lead to a higher return on capital and higher growth. This advantage has to be weighed against the capital rationing the firm might face because of limited access to financial markets, which might reduce future growth and profits. The net effect will determine the change in value. The empirical

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<sup>15</sup> This might well reflect the fact that failures of mergers of equal are much more visible than failures of the small firm/large firm combinations.

evidence on going-private transactions, however, is clear cut. DeAngelo, DeAngelo and Rice (1984) report, for example, an average abnormal return of 30% for 81 firms in their sample that went private. Thus, financial markets, at least, seem to believe that there is value to be gained for some public firms in going private.

### ***Valuing a Leveraged Buyout***

We have seen that leveraged buyouts are financed disproportionately with debt. This high leverage is justified in several ways. First, if the target firm initially has too little debt relative to its optimal debt ratio, the increase in debt can be explained partially by the increase in value moving to the optimal ratio provides. The debt level in most leveraged buyouts exceeds the optimal debt ratio, however, which means that some of the debt will have to be paid off quickly in order for the firm to reduce its cost of capital and its default risk. A second explanation is provided by Michael Jensen, who proposes that managers cannot be trusted to invest free cash flows wisely for their stockholders; they need the discipline of debt payments to maximize cash flows on projects and firm value. A third rationale is that the high debt ratio is temporary and will disappear once the firm liquidates assets and pays off a significant portion of the debt.

The extremely high leverage associated with leveraged buyouts creates two problems in valuation, however. First, it significantly increases the riskiness of the cash flows to equity investors in the firm by increasing the fixed payments to debt holders in the firm. Thus, the cost of equity has to be adjusted to reflect the higher financial risk the firm will face after the leveraged buyout. Second, the expected decrease in this debt over time, as the firm liquidates assets and pays off debt, implies that the cost of equity will also decrease over time. Since the cost of debt and debt ratio will change over time as well, the cost of capital will also change in each period.

In valuing a leveraged buyout, then, we begin with the estimates of free cash flow to the firm, just as we did in traditional valuation. However, instead of discounting these cash flows back at a fixed cost of capital, we discount them back at a cost of capital that will vary from year to year. Once we value the firm, we then can compare the value to the total amount paid for the firm.



*Illustration 25.7: Valuing A Leveraged Buyout: Congoleum Inc.<sup>16</sup>*

The managers of Congoleum Inc targeted the firm for a leveraged buyout in 1979. They planned to buy back the stock at \$38 per share (it was trading at \$24 prior to the takeover) and to finance the acquisition primarily with debt. The breakdown of the cost and financing of the deal.

*Cost of Takeover:*

Buy back stock: \$38 * 12.2 million shares	: \$463.60 million
Expenses of takeover:	: \$ 7.00 million
Total Cost	: \$ 470.60 million

*Financing Mix for takeover:*

Equity:	: \$ 117.30 million
Debt:	: \$ 327.10 million
Preferred Stock (@13.5%):	: \$ 26.20 million
Total Proceeds	: \$ 470.60 million

There were three sources of debt:

1. Bank debt of \$125 million, at a 14% interest rate, to be repaid in annual installments of \$16.666 million, starting in 1980.
2. Senior notes of \$115 million, at 11.25% interest rate, to be repaid in equal annual installments of \$7.636 million each year from 1981.
3. Subordinated notes of \$92 million, at 12.25% interest, to be repaid in equal annual installments of \$7.636 million each year from 1989.

The firm also assumed \$12.2 million of existing debt, at the advantageous rate of 7.50%; this debt would be repaid in 1982. The debt value exceeds the transaction amount reflecting transaction costs.

The firm projected operating income (EBIT), capital spending, depreciation and change in working capital from 1980 to 1984 as shown in Table 25.5 (in millions of dollars):

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<sup>16</sup> The numbers in this illustration were taken from the Harvard Business School case titled "Congoleum". The case is reprinted in Fruhan, Kester, Mason, Piper and Ruback (1992).

*Table 25.5: EBIT, Net Cap Ex and Changes in Working Capital – Congoleum*

Year	EBIT	Capital Spending	Depreciation	Working Capital
Current	\$ 89.80	\$ 6.80	\$ 7.5	\$ 4.0
1980	\$ 71.69	\$ 15.0	\$ 35.51	\$ 2.0
1981	\$ 90.84	\$ 16.2	\$ 36.26	\$ 14.0
1982	\$115.73	\$ 17.5	\$ 37.07	\$ 23.3
1983	\$133.15	\$ 18.9	\$ 37.95	\$ 11.2
1984	\$137.27	\$ 20.4	\$ 21.93	\$ 12.8

The earnings before interest and taxes were expected to grow 8% after 1984, and the capital spending is expected to be offset by depreciation<sup>17</sup>.

Congoleum had a beta of 1.25 in 1979, prior to the leveraged buyout. The treasury bond rate at the time of the leveraged buyout was 9.5%.

We begin the analysis by estimating the expected cash flows to the firm from 1980 to 1985. To obtain these estimates, we subtract the net capital expenditures and changes in working capital from the after-tax operating income.

*Table 25.6: Projected Cash Flows to Equity and Firm: Congoleum*

	1980	1981	1982	1983	1984	1985
EBIT	\$71.69	\$90.84	\$115.73	\$133.15	\$137.27	\$148.25
- EBIT (t)	\$34.41	\$43.60	\$55.55	\$63.91	\$65.89	\$71.16
= EBIT (1-t)	\$37.28	\$47.24	\$60.18	\$69.24	\$71.38	\$77.09
+ Depreciation	\$35.51	\$36.26	\$37.07	\$37.95	\$21.93	\$21.62
- Capital Exp.	\$15.00	\$16.20	\$17.50	\$18.90	\$20.40	\$21.62
- WC	\$2.00	\$14.00	\$23.30	\$11.20	\$12.80	\$5.00
= FCFF	\$55.79	\$53.30	\$56.45	\$77.09	\$60.11	\$72.09

We follow up by estimating the cost of capital for the firm each year, based upon our estimates of debt and equity each year. The value of debt for future years is estimated based upon the repayment schedule and it decreases over time. The value of equity in

<sup>17</sup> We have used the assumptions provided by the investment banker, in this case. It is troubling, however, that the firm has an expected growth rate of 8% a year forever without reinvesting any money back.

each of the future years is estimated by discounting the expected cash flows in equity beyond that year at the cost of equity.

*Table 25.7: Cost of Capital – Congoleum*

	1980	1981	1982	1983	1984	1985
Debt	\$327.10	\$309.96	\$285.17	\$260.62	\$236.04	\$211.45
Equity	\$275.39	\$319.40	\$378.81	\$441.91	\$504.29	\$578.48
Preferred Stock	\$26.20	\$26.20	\$26.20	\$26.20	\$26.20	\$26.20
Debt/Capital	52.03%	47.28%	41.32%	35.76%	30.79%	25.91%
Equity/Capital	43.80%	48.72%	54.89%	60.64%	65.79%	70.88%
Preferred Stock/Capital	4.17%	4.00%	3.80%	3.60%	3.42%	3.21%
Beta	2.02547	1.87988	1.73426	1.62501	1.54349	1.4745
Cost of Equity	20.64%	19.84%	19.04%	18.44%	17.99%	17.61%
After-tax cost of debt	6.53%	6.53%	6.53%	6.53%	6.53%	5.00%
Cost of preferred stock	13.51%	13.51%	13.51%	13.51%	13.51%	13.51%
Cost of Capital	13.00%	13.29%	13.66%	14.00%	14.31%	14.21%

An alternative approach to estimating equity, which does not require iterations or circular reasoning, is to use the book value of equity rather than the estimated market value in calculating debt-equity ratios.<sup>18</sup>

The cash flows to the firm and the cost of capital in the terminal year (1985), in conjunction with the expected growth rate of 8%<sup>19</sup>, are used to estimate the terminal value of equity (at the end of 1984):

<sup>18</sup> The book value of equity can be obtained as follows:


$$\text{BV of Equity}_t = \text{BV of Equity}_{t-1} + \text{Net Income}_t$$

It is assumed that there will be no dividends paid to equity investors in the initial years of a leveraged buyout.

<sup>19</sup> While this may seem to be a high growth rate to sustain forever, it would have been appropriate in 1979. Inflation and interest rates were much higher then than in the 1990s.

$$\begin{aligned}
 &= \frac{\text{FCFE}_{1985}}{(k_{e,1985} - 0.08)} \\
 \text{Terminal value of firm (end of 1984)} &= \frac{\$72.09}{0.1421 - 0.08} \\
 &= \$1161 \text{ million}
 \end{aligned}$$

The expected cash flows to the firm and the terminal value were discounted back to the present at the cost of capital to yield a present value of \$820.21 million<sup>20</sup>. Since the acquisition of Congoleum cost only \$470.6 million, this acquisition creates value for the acquiring investors.

 *merglbo.xls*: This spreadsheet allows you to evaluate the cash flows and the value of a leveraged buyout.

## Summary

Acquisitions take several forms and occur for different reasons. Acquisitions can be categorized, based upon what happens to the target firm after the acquisition. A target firm can be consolidated into the acquiring entity (merger), create a new entity in combination with the acquiring firm or remain independent (buyout).

There are four steps in analyzing acquisitions. First, we specify the reasons for acquisitions and list five: the undervaluation of the target firm, benefit from diversification, the potential for synergy, the value created by changing the way the target firm is run and management self-interest. Second, we choose a target firm whose characteristics make it the best candidate, given the motive chosen in the first step. Third, we value the target firm, assuming it would continue to be run by its current managers and then revalue it assuming better management. We define the difference between these two values as the value of control. We also value each of the different sources of operating and financial synergy and considered the combined value as the value of total synergy. Fourth,

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<sup>20</sup> When the cost of capital changes on a year-to-year basis, the discounting has to be based upon a cumulative cost. For instance, the cash flow in year 3 will be discounted back as follows:

$$\text{PV of cash flow in year 3} = \frac{56.45}{(1.13)(1.1329)(1.1366)}$$

we look at the mechanics of the acquisition. We examine how much the acquiring firm should consider paying, given the value estimated in the prior step for the target firm, including control and synergy benefits. We also look at whether the acquisition should be financed with cash or stock and how the choice of the accounting treatment of the acquisition affects this choice.

Buyouts share some characteristics with acquisitions, but they also vary on a couple of important ones. The absence of an acquiring firm, the fact that the managers of the firm are its acquirers and the conversion of the acquired firm into a private business all have implications for value. If the buyout is financed predominantly with debt, making it a leveraged buyout, the debt ratio will change in future years, leading to changes in the costs of equity, debt and capital in those years.

### Problems

1. The following are the details of two potential merger candidates, Northrop and Grumman, in 1993.

	<i>Northrop</i>	<i>Grumman</i>
Revenues	\$4,400.00	\$3,125.00
Cost of Goods Sold (w/o Depreciation)	87.50%	89.00%
Depreciation	\$200.00	\$74.00
Tax Rate	35.00%	35.00%
Working Capital	10% of Revenue	10% of Revenue
Market Value of Equity	\$2,000.00	\$1,300.00
Outstanding Debt	\$160.00	\$250.00

Both firms are expected to grow 5% a year in perpetuity. Capital spending is expected to be offset by depreciation. The beta for both firms is 1 and both firms are rated BBB, with an interest rate on their debt of 8.5% (the treasury bond rate is 7%).

As a result of the merger, the combined firm is expected to have a cost of goods sold of only 86% of total revenues. The combined firm does not plan to borrow additional debt.

- a. Estimate the value of Grumman, operating independently.
  - b. Estimate the value of Northrop, operating independently.
  - c. Estimate the value of the combined firm, with no synergy.
  - d. Estimate the value of the combined firm, with synergy.
  - e. How much is the operating synergy worth?
2. In the Grumman-Northrop example described in the previous question, the combined firm did not take on additional debt after the acquisition. Assume that, as a result of the merger, the firm's optimal debt ratio increases to 20% of total capital from current levels. (At that level of debt, the combined firm will have an A rating, with an interest rate on its debt of 8%.) If it does not increase debt, the combined firm's rating will be A+ (with an interest rate of 7.75%.)
- a. Estimate the value of the combined firm if it stays at its existing debt ratio.

- b. Estimate the value of the combined firm if it moves to its optimal debt ratio.
- c. Who gains this additional value if the firm moves to the optimal debt ratio?
3. In April 1994, Novell, Inc. announced its plan to acquire WordPerfect Corporation for \$1.4 billion. At the time of the acquisition, the relevant information about the two companies was as follows:

	<i>Novell</i>	<i>WordPerfect</i>
Revenues	\$1,200.00	\$600.00
Cost of Goods Sold (w/o Depreciation)	57.00%	75.00%
Depreciation	\$42.00	\$25.00
Tax Rate	35.00%	35.00%
Capital Spending	\$75.00	\$40.00
Working Capital (as % of Revenue)	40.00%	30.00%
Beta	1.45	1.25
Expected Growth Rate in Revenues/EBIT	25.00%	15.00%
Expected Period of High Growth	10 years	10 years
Growth rate After High-Growth Period	6.00%	6.00%
Beta After High-Growth period	1.10	1.10

Capital spending will be offset by depreciation after the high-growth period. Neither firm has any debt outstanding. The treasury bond rate is 7%.

- a. Estimate the value of Novell, operating independently.
- b. Estimate the value of WordPerfect, operating independently.
- c. Estimate the value of the combined firm, with no synergy.
- d. As a result of the merger, the combined firm is expected to grow 24% a year for the high-growth period. Estimate the value of the combined firm with the higher growth.
- e. What is the synergy worth? What is the maximum price Novell can pay for WordPerfect?
4. Assume, in the Novell-WordPerfect merger described above, that it will take five years for the firms to work through their differences and start realizing their synergy benefits. What is the synergy worth, under this circumstance?

5. In 1996, Aetna, a leading player in health insurance, announced its intentions to acquire U.S. Healthcare, the nation's largest HMO, and provided synergy as a rationale. On the announcement of the merger, Aetna's stock price which was \$57 dropped to \$52.50, while U.S. Healthcare's stock price surged from \$31 to \$37.50. Aetna had 400 million shares and U.S. Healthcare had 50 million shares outstanding at the time of the announcement.

- a. Estimate the value, if any, that financial markets are attaching to synergy in this merger.
- b. How would you reconcile the market reaction to the rationale presented by management for the acquisition?

6. IH Corporation, a farm equipment manufacturer, has accumulated almost \$2 billion in losses over the last seven years of operations and is in danger of not being able to carry forward these losses. EG Corporation, an extremely profitable financial service firm, which had \$3 billion in taxable income in its most recent year, is considering acquiring IH Corporation. The tax authorities will allow EG Corporation to offset its taxable income with the carried-forward losses. The tax rate for EG Corporation is 40% and the cost of capital is 12%.

- a. Estimate the value of the tax savings that will occur as a consequence of the merger.
- b. What is the value of the tax savings, if the tax authorities allow EG Corporation to spread the carried-forward losses over four years, i.e., allow \$200 million of the carried forward losses to offset income each year for the next four years.

7. You are considering a takeover of PMT Corporation, a firm that has significantly underperformed its peer group over the last five years and you wish to estimate the value of control. The data on PMT Corporation, the peer group, and the best managed firm in the group are given below.

	<i>PMT Corp.</i>	<i>Peer Group</i>	<i>Best Managed</i>
Return on Assets (After-tax)	8.00%	12.00%	18.00%
Dividend Payout Ratio	50.00%	30.00%	20.00%
Debt Equity Ratio	10.00%	50.00%	50.00%
Interest Rate on Debt	7.50%	8.00%	8.00%





= EBIT	\$745,360	\$819,896	\$869,090
(Less) Interest	\$252,000	\$216,000	\$180,000
Taxable Income	\$493,360	\$603,896	\$689,090
(Less) Tax	\$197,344	\$241,558	\$275,636
= Net Income	\$296,016	\$362,338	\$413,454

The capital expenditures are expected to be \$120,000 next year and to grow at the same rate as revenues for the rest of the period. Working capital will be kept at 20% of revenues (Revenues this year were \$1,000,000).

The leveraged buyout will be financed with a mix of \$1,000,000 of equity and \$3,000,000 of debt (at an interest rate of 12%). Part of the debt will be repaid by the end of year 5 and the debt remaining at the end of year 5 will remain on the books permanently.

- Estimate the cash flows to equity and the firm for the next five years.
- The cost of equity in year 1 has been computed. Compute the cost of equity each year for the rest of the period (use book value of equity for the calculation).

<i>Item</i>	<i>I</i>
Equity	1,000,000
Debt	3,000,000
Debt/Equity Ratio	3
Beta	2.58
Cost of Equity	24.90%

- Compute the terminal value of the firm.
- Evaluate whether the leveraged buyout will create value.

13. J & L Chemical is a profitable chemical manufacturing firm. The business, however, is highly cyclical and the profits of the firm have been volatile. The management of the firm is considering acquiring a food processing firm to reduce the earnings volatility and their exposure to economic cycles.

- Would such an action be in the best interests of their stockholders? Explain.

- b. Would your analysis be any different if they were a private firm? Explain.
- c. Is there any condition under which you would argue for such an acquisition for a publicly traded firm?