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Capital Structure: Limits to the Use of Debt 15

OPENING CASE

In 2015, the gamble on casino operator Caesars Entertainment Operating Company, the largest unit of Caesars Entertainment, went bust as it filed Chapter 11 bankruptcy. The unit included 18 properties and casinos, but 38 properties in the company's other unit were not included in the bankruptcy. At the time of its filing, the unit listed $18.4 billion in debt and about $12.4 billion in assets. The company was burning through about $1.5 million in cash per week.

Also in 2015, as fuel prices dropped, oil and gas companies came up dry as 42 companies in that industry filed for bankruptcy, with a total of $17.85 billion in debt. The debt was evenly split between secured and unsecured creditors. The largest bankruptcy was Samson Resources, which listed $4.3 billion in debt. The company had been purchased in 2011 at a price of $7.1 billion, but interest payments and declining natural gas prices resulted in losses of $4.5 billion between the buyout and bankruptcy filing.

As these situations point out, there is a limit to the financial leverage a company can use, and a risk of too much leverage is bankruptcy. In this chapter, we discuss the costs associated with bankruptcies and how companies attempt to avoid this process.

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15.1 COSTS OF FINANCIAL DISTRESS

One limiting factor affecting the amount of debt a firm might use comes in the form of *bankruptcy costs*. As the debt–equity ratio rises, so too does the probability that the firm will be unable to pay its bondholders what was promised to them. When this happens, ownership of the firm's assets is ultimately transferred from the stockholders to the bondholders.

In principle, a firm becomes bankrupt when the value of its assets equals the value of its debt. When this occurs, the value of equity is zero, and the stockholders turn over control of the firm to the

bondholders. When this takes place, the bondholders hold assets whose value is exactly equal to what is owed on the debt. In a perfect world, there are no costs associated with this transfer of ownership, and the bondholders don't lose anything.

This idealized view of bankruptcy is not, of course, what happens in the real world. Ironically, it is expensive to go bankrupt. As we discuss, the costs associated with bankruptcy may eventually offset the tax-related gains from leverage.

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Direct Bankruptcy Costs

When the value of a firm's assets equals the value of its debt, then the firm is economically bankrupt in the sense that the equity has no value. However, the formal turning over of the assets to the bondholders is a *legal* process, not an economic one. There are legal and administrative costs to bankruptcy, and it has been remarked that bankruptcies are to lawyers what blood is to sharks.

To give you some idea of the costs associated with a bankruptcy, consider the case of financial giant Lehman Brothers, which filed for bankruptcy in September 2008. Three-and-a-half years later, Lehman emerged from bankruptcy as a liquidating company whose main business was paying back its creditors and investors. By that time, lawyers, consultants, accountants, and other professionals had earned more than *$2.2 billion* in fees. The next largest bankruptcy-related fees appear to have been paid to those involved in the Enron bankruptcy, where fees reached a mere $1 billion. In comparison, the WorldCom and General Motors bankruptcies appear to have only cost about $600 million.

Because of the expenses associated with bankruptcy, bondholders won't get all that they are owed. Some fraction of the firm's assets will "disappear" in the legal process of going bankrupt. These are the legal and administrative expenses associated with the bankruptcy proceeding. We call these costs **direct bankruptcy costs**.

These direct bankruptcy costs are a disincentive to debt financing. If a firm goes bankrupt, then, suddenly, a piece of the firm disappears. This amounts to a bankruptcy "tax." So, a firm faces a trade-off: Borrowing saves a firm money on its corporate taxes, but the more a firm borrows, the more likely it is that the firm will become bankrupt and have to pay the bankruptcy tax.

Indirect Bankruptcy Costs

Because it is expensive to go bankrupt, a firm will spend resources to avoid doing so. When a firm is having significant problems in meeting its debt obligations, we say that it is experiencing financial distress. Some financially distressed firms ultimately file for bankruptcy, but most do not because they are able to recover or otherwise survive.

The costs of avoiding a bankruptcy filing incurred by a financially distressed firm are called **indirect bankruptcy costs**. We use the term **financial distress costs** to refer generically to the direct and indirect costs associated with going bankrupt and/or avoiding a bankruptcy filing.

Cutler and Summers examine the costs of the well-publicized Texaco bankruptcy.[1] In January 1984, Pennzoil reached what it believed to be a binding agreement to acquire three-sevenths of Getty Oil. However, less than a week later, Texaco acquired all of Getty at a higher per-share price. Pennzoil then sued Getty for breach of contract. Because Texaco had previously indemnified Getty against litigation, Texaco became liable for damages.

In November 1985, the Texas State Court awarded damages of $12 billion to Pennzoil, although this amount was later reduced. As a result, Texaco filed for bankruptcy. Cutler and Summers identify nine important events over the course of the litigation. They find that Texaco's market value (stock price times number of shares outstanding) fell a cumulative $4.1 billion over these events, whereas Pennzoil's value rose only $682 million. Thus, Pennzoil gained about one-sixth of what Texaco lost, resulting in a net loss to the two firms of almost $3.5 billion.

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What could explain this net loss? Cutler and Summers suggest that it is likely due to costs that Texaco and Pennzoil incurred from the litigation and subsequent bankruptcy. The authors argue that direct bankruptcy fees represent only a small part of these costs, estimating Texaco's aftertax legal expenses to be about $165 million. Legal costs to Pennzoil were more difficult to assess, because Pennzoil's lead lawyer, Joe Jamail, stated publicly that he had no set fee. However, using a clever statistical analysis, the authors estimate his fee to be about $200 million. Thus, one must search elsewhere for the bulk of the costs.

Indirect costs of financial distress may be the culprit here. An affidavit by Texaco stated that, following the lawsuit, some of its suppliers were demanding cash payments. Other suppliers halted or canceled shipments of crude oil. Certain banks restricted Texaco's use of futures contracts on foreign exchange. The affidavit stressed that these constraints were reducing Texaco's ability to run its business, leading to deterioration of its financial condition. Could these sorts of indirect costs explain the $3.5 billion disparity between Texaco's drop and Pennzoil's rise in market value? Unfortunately, although it is quite likely that indirect costs play a role here, there is no way to obtain a decent, quantitative estimate for them.

Agency Costs

When a firm has debt, conflicts of interest arise between stockholders and bondholders. Because of this, stockholders are tempted to pursue selfish strategies. These conflicts of interest, which are magnified when financial distress is incurred, impose **agency costs** on the firm. We describe three kinds of selfish strategies that stockholders use to hurt the bondholders and help themselves. These strategies are costly because they will lower the market value of the whole firm.

Selfish Investment Strategy 1: Incentive to Take Large Risks Firms near bankruptcy often take great chances, because they believe that they are playing with someone else's money. To see this, imagine a levered firm considering two *mutually exclusive* projects, a low-risk one and a high-risk one. There are two equally likely outcomes, recession and boom. The firm is in such dire straits that should a recession hit, it will come near to bankruptcy with one project and actually fall into bankruptcy with the other. The cash flows for the entire firm if the low-risk project is taken can be described as:

VALUE OF ENTIRE FIRM IF LOW-RISK PROJECT IS CHOSEN

	PROBABILITY	VALUE OF FIRM	=	STOCK	+	BONDS
Recession	.5	$100	=	$ 0	+	$100
Boom	.5	200	=	100	+	100

If a recession occurs, the value of the firm will be $100, and if a boom happens, the value of the firm will be $200. The expected value of the firm is $150 (= .5 × $100 + .5 × $200).

The firm has promised to pay bondholders $100. Shareholders will obtain the difference between the total payoff and the amount paid to the bondholders. In other words, the bondholders have the prior claim on the payoffs, and the shareholders have the residual claim.

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Now suppose that another, riskier project can be substituted for the low-risk project. The payoffs and probabilities are as follows:

VALUE OF ENTIRE FIRM IF HIGH-RISK PROJECT IS CHOSEN						
	PROBABILITY	VALUE OF FIRM	=	STOCK	+	BONDS
Recession	.5	$ 50	=	$ 0	+	$ 50
Boom	.5	240	=	140	+	100

The expected value of the *firm* is \$145 (= .5 × \$50 + .5 × \$240), which is lower than the expected value of the firm with the low-risk project. Thus, the low-risk project would be accepted if the firm were all equity. However, note that the expected value of the *stock* is \$70 (= .5 × 0 + .5 × \$140) with the high-risk project, but only \$50 (= .5 × 0 + .5 × \$100) with the low-risk project. Given the firm's present levered state, stockholders will select the high-risk project, even though the high-risk project has a *lower* NPV.

The key is that, relative to the low-risk project, the high-risk project increases firm value in a boom and decreases firm value in a recession. The increase in value in a boom is captured by the stockholders, because the bondholders are paid in full (they receive \$100) regardless of which project is accepted. Conversely, the drop in value in a recession is lost by the bondholders, because they are paid in full with the low-risk project but receive only \$50 with the high-risk one. The stockholders will receive nothing in a recession anyway, whether the high-risk or low-risk project is selected. Thus, financial economists argue that stockholders expropriate value from the bondholders by selecting high-risk projects.

A story, perhaps apocryphal, illustrates this idea. It seems that Federal Express was near financial collapse within a few years of its inception. The founder, Frederick Smith, took \$20,000 of corporate funds to Las Vegas in despair. He won at the gaming tables, providing enough capital to allow the firm to survive. Had he lost, the banks would have received \$20,000 less when the firm reached bankruptcy.

Selfish Investment Strategy 2: Incentive Toward Underinvestment Stockholders of a firm with a significant probability of bankruptcy often find that new investment helps the bondholders at the stockholders' expense. The simplest case might be a real estate owner facing imminent bankruptcy. If he took \$100,000 out of his own pocket to refurbish the building, he could increase the building's value by, say, \$150,000. Though this investment has a positive net present value, he will turn it down if the increase in value cannot prevent bankruptcy. "Why," he asks, "should I use my own funds to improve the value of a building that the bank will soon repossess?"

This idea is formalized by the following simple example. Consider a firm with \$4,000 of principal and interest payments due at the end of the year. It will be pulled into bankruptcy by a recession because its cash flows will be only \$2,400 in that state. The firm's cash flows are presented in the left-hand side of Table 15.1. The firm could avoid bankruptcy in a recession by raising new equity to invest in a new project. The project costs \$1,000 and brings in \$1,700 in either state, implying a positive net present value. Clearly it would be accepted in an all-equity firm.

However, the project hurts the stockholders of the levered firm. To see this, imagine the old stockholders contribute the $1,000 *themselves*.[2] The expected value of the stockholders' interest without the project is $500 (= .5 × $1,000 + .5 × 0). The expected value with

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the project is \$1,400 (= .5 × \$2,700 + .5 × \$100). The stockholders' interest rises by only \$900 (= \$1,400 − 500) while costing \$1,000. page 455

TABLE 15.1 Example Illustrating Incentive to Underinvest

	FIRM WITHOUT PROJECT		FIRM WITHOUT PROJECT	
	BOOM	RECESSION	BONDS	RECESSION
Firm cash flows	\$5,000	\$2,400	\$6,700	\$4,100
Bondholders' claim	4,000	2,400	4,000	4,000
Stockholders' claim	\$1,000	\$ 0	\$2,700	\$ 100

The project has positive NPV. However, much of its value is captured by bondholders. Rational managers, acting in the stockholders' interest, will reject the project.

The key is that the stockholders contribute the full \$1,000 investment, but the stockholders and bondholders *share* the benefits. The stockholders take the entire gain if boom times occur. Conversely, the bondholders reap most of the cash flow from the project in a recession.

The discussion of selfish Strategy 1 is quite similar to the discussion of selfish Strategy 2. In both cases, an investment strategy for the levered firm is different from the one for the unlevered firm. Thus, leverage results in distorted investment policy. Whereas the unlevered corporation always chooses projects with positive net present value, the levered firm may deviate from this policy.

Selfish Investment Strategy 3: Milking the Property Another strategy is to pay out extra dividends or other distributions in times of financial distress, leaving less in the firm for the bondholders. This is known as *milking the property*, a phrase taken from real estate. Strategies 2 and 3 are very similar. In Strategy 2, the firm chooses not to raise new equity. Strategy 3 goes one step further, because equity is actually withdrawn through the dividend.

SUMMARY OF SELFISH STRATEGIES The above distortions occur only when there is a probability of bankruptcy or financial distress. Thus, these distortions *should not* affect, say, General Electric because bankruptcy is not a realistic possibility for a diversified blue-chip firm such as this. In other words, General Electric's debt will be virtually risk-free, regardless of the projects it accepts. The same argument could be made for regulated companies that are protected by state utility commissions. However, smaller firms in risky industries, such as computers, might be very much affected by these distortions. Firms in the computer industry generally have significant potential future investment opportunities as compared to assets in place and face intense competition and uncertain future revenues. Because the distortions are related to financial distress, we have included them in our discussion of the indirect costs of financial distress. For firms that face these distortions, debt will be difficult and costly to obtain. These firms will have low leverage ratios.

Who pays for the cost of selfish investment strategies? We argue that it is ultimately the stockholders. Rational bondholders know that, when financial distress is imminent, they cannot expect help from stockholders. Rather, stockholders are likely to choose investment strategies that reduce the value of the bonds. Bondholders protect themselves accordingly by raising the interest rate that they require on the bonds. Because the stockholders must pay these high rates, they ultimately bear the

costs of selfish strategies. The relationship between stockholders and bondholders is very similar to the relationship between Errol Flynn and David Niven, good friends and movie stars in the 1930s. Niven reportedly said that the good thing about Flynn was that you knew exactly where you stood with him. When you needed his help, you could always count on him to let you down.

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15.2 CAN COSTS OF DEBT BE REDUCED?

As U.S. senators are prone to say, "A billion here, a billion there. Pretty soon it all adds up."[3] Each of the costs of financial distress we mentioned previously is substantial in its own right. The sum of them may well affect debt financing severely. Thus, managers have an incentive to reduce these costs. We now turn to some of their methods. However, it should be mentioned at the outset that the methods below can, at most, reduce the costs of debt. They cannot *eliminate* them entirely.

Protective Covenants

As we discussed in a previous chapter, loan agreements and bond indentures frequently include protective covenants. These covenants should reduce the costs of bankruptcy, ultimately increasing the value of the firm. Thus, stockholders are likely to favor all reasonable covenants. To see this, consider three choices by stockholders to reduce bankruptcy costs:

1. *Issue No Debt*. Because of the tax advantages to debt, this is a very costly way of avoiding conflicts.
2. *Issue Debt with No Restrictive and Protective Covenants*. In this case, bondholders will demand high interest rates to compensate for the unprotected status of their debt.
3. *Write Protective and Restrictive Covenants into the Loan Contracts*. If the covenants are clearly written, the creditors may receive protection without large costs being imposed on the shareholders. The creditors will gladly accept a lower interest rate.

Thus, bond covenants, even if they reduce flexibility, can increase the value of the firm. They can be the lowest-cost solution to the stockholder-bondholder conflict. A list of typical bond covenants and their uses appears in Table 15.2.

TABLE 15.2 Loan Covenants

COVENANT TYPE	SHAREHOLDER ACTION OR FIRM CIRCUMSTANCES	REASON FOR COVENANT
Financial statement signals 1. Working capital requirement 2. Interest coverage 3. Minimum net worth	As firm approaches financial distress, shareholders may want firm to make high-risk investments.	Shareholders lose value before bankruptcy; bondholders are hurt much more in bankruptcy than shareholders (limited liability); bondholders are hurt by *distortion of investment that leads to increases in risk.*

Restrictions on asset disposition 1. Limit dividends 2. Limit sale of assets 3. Collateral and mortgages	Shareholders attempt to transfer corporate assets to themselves.	This limits the ability of shareholders to transfer assets to themselves and to *underinvest.*
Restrictions on switching assets	Shareholders attempt to increase risk of firm.	Increased firm risk helps shareholders; bondholders are hurt by *distortion of investment that leads to increases in risk.*
Dilution 1. Limit on leasing 2. Limit on further borrowing	Shareholders may attempt to issue new debt of equal or greater priority.	This restricts *dilution of the claim of existing bondholders.*

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Consolidation of Debt

One reason bankruptcy costs are so high is that different creditors (and their lawyers) contend with each other. This problem can be alleviated by proper arrangement of bondholders and stockholders. For example, perhaps one, or at most a few, lenders can shoulder the entire debt. Should financial distress occur, negotiating costs are minimized under this arrangement. In addition, bondholders can purchase stock as well. In this way, stockholders and debtholders are not pitted against each other, because they are not separate entities. This appears to be the approach in Japan, where large banks generally take significant stock positions in the firms to which they lend money. Debt–equity ratios in Japan are far higher than those in the United States.

15.3 INTEGRATION OF TAX EFFECTS AND FINANCIAL DISTRESS COSTS

Modigliani and Miller argue that the firm's value rises with leverage in the presence of corporate taxes. Because this implies that all firms should choose maximum debt, the theory does not predict the behavior of firms in the real world. Other authors have suggested that bankruptcy and related costs reduce the value of the levered firm.

The integration of tax effects and distress costs appears in Figure 15.1. At the top of the figure, the diagonal straight line represents the value of the firm in a world without bankruptcy costs. The ∩-shaped curve represents the value of the firm with these costs. This curve rises as the firm moves from all equity to a small amount of debt. Here, the present value of the distress costs is minimal because the probability of distress is so small. However, as more and more debt is added, the present value of these costs rises at an *increasing* rate. At some point, the increase in the present value of these costs from an additional dollar of debt equals the increase in the present value of the tax shield. This is the debt level maximizing the value of the firm and is represented by B^* in Figure 15.1. In other words, B^* is the optimal amount of debt. Bankruptcy costs increase faster than the tax shield beyond this point, implying a reduction in firm value from further leverage. At the bottom of Figure 15.1, the weighted average cost of capital (R_{WACC}) goes down as debt is added to the capital structure. After reaching B^*, the weighted average cost of capital goes up. The optimal amount of debt also produces the lowest weighted average cost of capital.

Our discussion implies that a firm's capital structure decisions involve a trade-off between the tax benefits of debt and the costs of financial distress. In fact, this approach is frequently called the *trade-off* or the *static trade-off* theory of capital structure. The implication is that there is an optimum amount of debt for any individual firm. This amount of debt becomes the firm's target debt level. (In the real world of finance, this optimum is frequently referred to as the firm's *debt capacity*.) Because financial distress costs cannot be expressed in a precise way, no formula has yet been developed to determine a firm's optimal debt level exactly. However, the last section of this chapter offers some rules of thumb for selecting a debt–equity ratio in the real world. Our situation reminds us of a quote attributed to John Maynard Keynes. He reputedly said that, although most historians would agree that

Queen Elizabeth I was both a better monarch and an unhappier woman than Queen Victoria, no one has yet been able to express the statement in a precise and rigorous formula.

Pie Again

Critics of the MM theory often say that MM fails when we add such real-world issues as taxes and bankruptcy costs. Taking that view, however, blinds critics to the real value of the MM theory. The pie approach offers a more constructive way of thinking about these matters and the role of capital structure.

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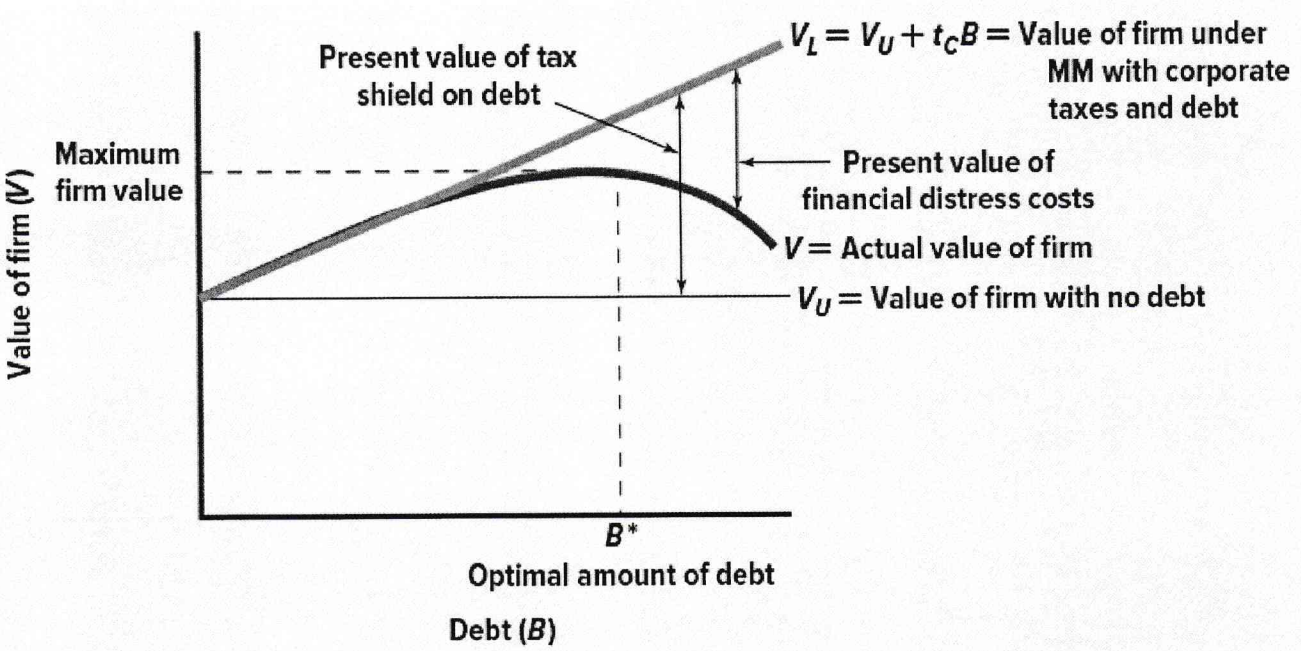
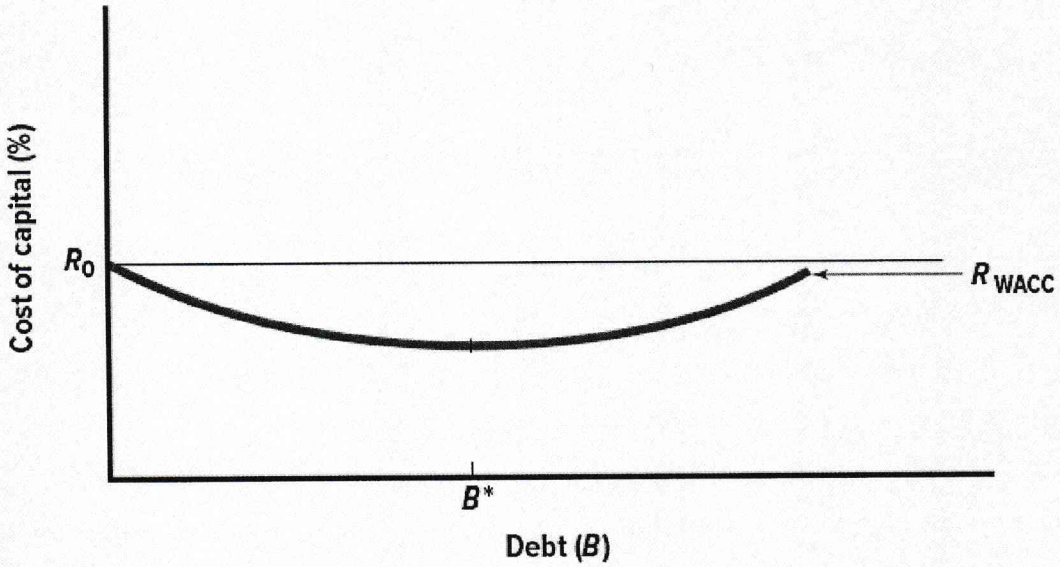
FIGURE 15.1
The Optimal Amount of Debt and the Value of the Firm



The tax shield increases the value of the levered firm. Financial distress costs lower the value of the levered firm. The two offsetting factors produce an optimal amount of debt at B^*.



According to the static theory, the R_{WACC} falls initially because of the tax advantage of debt. Beyond point B^*, it begins to rise because of financial distress costs.

Taxes are just another claim on the cash flows of the firm. Let G (for government and taxes) stand for the value of the firm's taxes. Bankruptcy costs are also another claim on the cash flows. Let us label their value with an L (for lawyers). The pie theory says that these claims are paid from only one source, the cash flows (CF) of the firm. Algebraically, we must have:

CF = Payments to stockholders (S)
+
Payments to bondholders (B)
+
Payments to the government (G)
+
Payments to lawyers (L)
+
Payments to any and all other claimants to the cash flows of the firm

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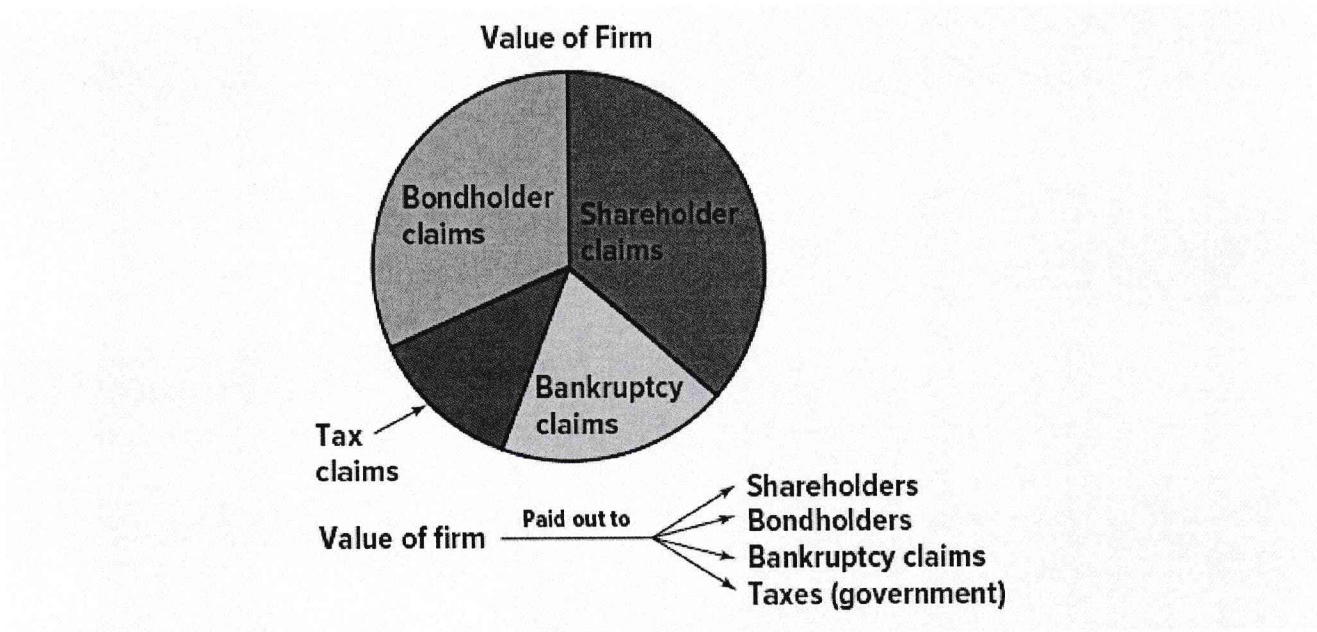
Figure 15.2 shows the new pie. No matter how many slices we take and no matter who gets them, they must still add up to the total cash flow. The total value of the firm, V_T, is unaltered by the capital structure. Now, however, we must be broader in our definition of the firm's value:

FIGURE 15.2
The Pie Model with Real-World Factors



$$V_T = S + B + G + L$$

We previously wrote the firm's value as:

$$S + B$$

when we ignored taxes and bankruptcy costs.

We have not even begun to exhaust the list of financial claims to the firm's cash flows. To give an unusual example, everyone reading this book has an economic claim to the cash flows of General Motors. After all, if you are injured in an accident, you might sue GM. Win or lose, GM will expend resources dealing with the matter. If you think this is farfetched and unimportant, ask yourself what GM might be willing to pay every man, woman, and child in the country to have them promise that they would never sue GM, no matter what happened. The law does not permit such payments, but that does not mean that a value to all of those potential claims does not exist. We guess that it would run into the billions of dollars, and, for GM or any other company, there should be a slice of the pie labeled *LS* for "potential lawsuits."

This is the essence of the MM intuition and theory: *V* is *V*(CF) and depends on the total cash flow of the firm. The capital structure cuts it into slices.

There is, however, an important difference between claims such as those of stockholders and bondholders on the one hand and those of government and potential litigants in lawsuits on the other. The first set of claims are **marketed claims**, and the second set are **nonmarketed claims**. One difference is that the marketed claims can be bought and sold in financial markets, and the nonmarketed claims cannot.

When we speak of the *value of the firm*, we are referring just to the value of the marketed claims, V_M, and not the value of nonmarketed claims, V_N. What we have shown is that the total value:

$$V_T = S + B + G + L$$
$$= V_M + V_N$$

is unaltered. But, as we saw, the value of the marketed claims, V_M, can change with changes in the capital structure.

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By the pie theory, any increase in V_M must imply an identical decrease in V_N. Rational financial managers will choose a capital structure to maximize the value of the marketed claims, V_M. Equivalently, rational managers will work to minimize the value of the nonmarketed claims, V_N. These are taxes and bankruptcy costs in the previous example, but they also include all the other nonmarketed claims such as the *LS* claim.

15.4 SIGNALING

The previous section pointed out that the corporate leverage decision involves a trade-off between a tax subsidy and financial distress costs. This idea was graphed in Figure 15.1, where the marginal tax subsidy of debt exceeds the distress costs of debt for low levels of debt. The reverse holds for high levels of debt. The firm's capital structure is optimized where the marginal tax subsidy to debt equals the marginal cost.

Let's explore this idea a little more. What is the relationship between a company's profitability and its debt level? A firm with low anticipated profits will likely take on a low level of debt. A small interest deduction is all that is needed to offset all of this firm's pretax profits. And too much debt would raise the firm's expected distress costs. A more successful firm would probably take on more debt. This firm could use the extra interest to reduce the taxes from its greater earnings. Being more financially secure, this firm would find its extra debt increasing the risk of bankruptcy only slightly. In other words, rational firms raise debt levels (and the concomitant interest payments) when profits are expected to increase.

How do investors react to an increase in debt? Rational investors are likely to infer a higher firm value from a higher debt level. Thus, these investors are likely to bid up a firm's stock price after the firm has, say, issued debt in order to buy back equity. We say that investors view debt as a *signal* of firm value.

Now we get to the incentives of managers to fool the public. Consider a firm whose level of debt is optimal. That is, the marginal tax benefit of debt exactly equals the marginal distress costs of debt. However, imagine that the firm's manager desires to increase the firm's current stock price, perhaps because he knows that many of his stockholders want to sell their stock soon. This manager might want to increase the level of debt just to make investors *think* that the firm is more valuable than it really is. If the strategy works, investors will push up the price of the stock.

The above implies that firms can fool investors by taking on *some* additional leverage. Now let's ask the big question. Are there benefits to extra debt but no costs, implying that all firms will take on as much debt as possible? The answer, fortunately, is that there are costs as well. Imagine that a firm has issued extra debt just to fool the public. At some point, the market will learn that the company is not that valuable after all. At this time, the stock price should actually fall *below* what it would have been had the debt never been increased. Why? Because the firm's debt level is now above the optimal level. That is, the marginal tax benefit of debt is below the marginal cost of debt. Thus, if the current stockholders plan to sell, say, half of their shares now and retain the other half, an increase in debt will help them on immediate sales but likely hurt them on later ones.

Now here is the important point: We said earlier that, in a world where managers do not attempt to fool investors, valuable firms issue more debt than less valuable ones. It turns out that, even when managers attempt to fool investors, the more valuable firms will still want to issue more debt than the less valuable firms. That is, while all firms will increase debt levels somewhat to fool investors, the cost of extra debt prevents the less valuable firms from issuing more debt than the more valuable firms issue. Thus, investors can still treat debt level as a signal of firm value. In other words, investors can still view an announcement of debt as a positive sign for the firm.

The above is a simplified example of debt signaling, and one can argue that it is too simplified. For example, perhaps the stockholders of some firms want to sell most of

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their stock immediately while the stockholders of other firms want to sell only a little of theirs now. It is impossible to tell here whether the firms with the most debt are the most valuable or merely the ones with the most impatient stockholders. Since other objections can be brought up as well, signaling theory is best validated by empirical evidence. And, fortunately, the empirical evidence tends to support the theory.

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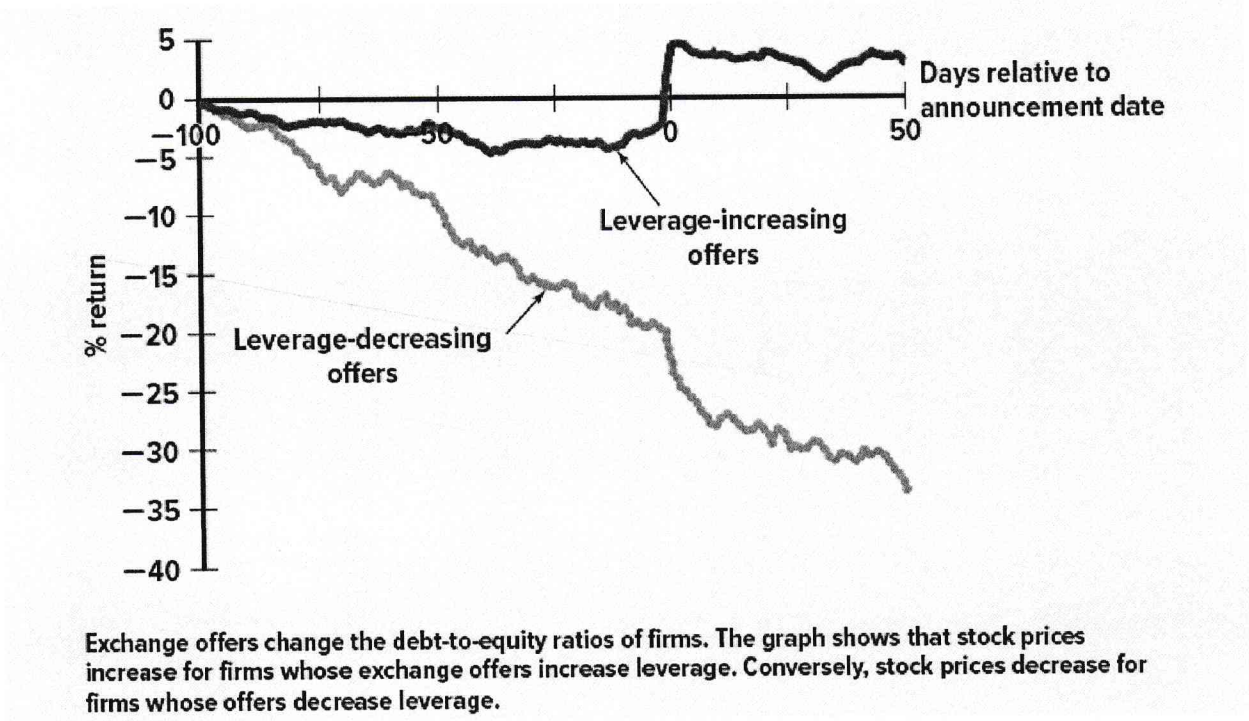
FIGURE 15.3
Stock Returns at the Time of Announcements of Exchange Offers



Exchange offers change the debt-to-equity ratios of firms. The graph shows that stock prices increase for firms whose exchange offers increase leverage. Conversely, stock prices decrease for firms whose offers decrease leverage.

Source: K. Shah, "The Nature of Information Conveyed by Pure Capital Structure Changes," *Journal of Financial Economics* 36 (August 1994).

For example, consider the evidence concerning **exchange offers**. Firms often change their debt levels through exchange offers, of which there are two types. The first type of offer allows stockholders to exchange some of their stock for debt, thereby increasing leverage. The second type allows bondholders to exchange some of their debt for stock, decreasing leverage. Figure 15.3 shows the stock price behavior of firms that change their proportions of debt and equity via exchange offers. The purple line in the figure indicates that stock prices rise substantially on the date when an exchange offering increasing leverage is announced. (This date is referred to as Date 0 in the figure.) Conversely, the blue line in the figure indicates that stock prices fall substantially when an offer decreasing leverage is announced.

The market infers from an increase in debt that the firm is better off, leading to a stock price rise. Conversely, the market infers the reverse from a decrease in debt, leading to a stock price fall. Thus, we say that managers signal information when they change leverage.

15.5 SHIRKING, PERQUISITES, AND BAD INVESTMENTS: A NOTE ON AGENCY COST OF EQUITY

The previous section introduced the static trade-off model, where a rise in debt increases both the tax shield and the costs of distress. We now extend the trade-off model by considering an important agency cost of equity. A discussion of this cost of equity is contained in a well-known quote from Adam Smith.[4]

> The directors of such [joint-stock] companies, however, being the managers rather of other people's money than of their own, it cannot well be expected, that they should watch over it with the same anxious vigilance with which the partners in a private copartnery frequently

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watch over their own. Like the stewards of a rich man, they are apt to consider attention to small matters as not for their master's honor, and very easily give themselves a dispensation from having it. Negligence and profusion, therefore, must always prevail, more or less, in the management of the affairs of such a company. page 462

This elegant prose can be restated in modern day vocabulary. An individual will work harder for a firm if she is one of its owners rather than just an employee. In addition, the individual will work harder if she owns a large percentage of the company rather than a small percentage. This idea has an important implication for capital structure, which we illustrate with the following example.

EXAMPLE 15.1

Shirking and Perks

Ms. Pagell is an owner-entrepreneur running a computer services firm worth $1 million. She currently owns 100 percent of the firm. Because of the need to expand, she must raise another $2 million. She can either issue $2 million of debt at 12 percent interest or issue $2 million in stock. The cash flows under the two alternatives are presented below:

	DEBT ISSUE				STOCK ISSUE			
	CASH FLOW	INTEREST	CASH FLOW TO EQUITY	CASH FLOW TO MS. PAGELL (100% OF EQUITY)	CASH FLOW	INTEREST	CASH FLOW TO EQUITY	CASH FLOW TO MS. PAGELL (33⅓% OF EQUITY)
6-hour days	$300,000	$240,000	$ 60,000	$ 60,000	$300,000	0	$300,000	$100,000
10-hour days	400,000	240,000	160,000	160,000	400,000	0	400,000	133,333

Like any entrepreneur, Ms. Pagell can choose the degree of intensity with which she works. In our example, she can either work a 6- or a 10-hour day. With the debt issue, the extra work brings her $100,000 (= $160,000 − 60,000) more income. However, let's assume that with a stock issue she retains only a one-third interest in the equity. Here, the extra work brings her merely $33,333 (= $133,333 − 100,000). Being only human, she is likely to work harder if she issues debt. In other words, she has more incentive to *shirk* if she issues equity.

In addition, she is likely to obtain more *perquisites* (a big office, a company car, more expense account meals) if she issues stock. If she is a one-third stockholder, two-thirds of these costs are paid for by the other stockholders. If she is the sole owner, any additional perquisites reduce her equity stake alone.

Finally, she is more likely to take on capital budgeting projects with negative net present values. It might seem surprising that a manager with any equity interest at all would take on negative NPV projects, since the stock price would clearly fall here. However, managerial salaries generally rise with firm size, indicating that managers have an incentive to accept some unprofitable projects after all the profitable ones have been taken on. That is, when an unprofitable project is accepted, the loss in stock value to a manager with only a small equity interest may be less than the increase in salary. In fact, it is our opinion that losses from accepting bad projects are far greater than losses from either shirking or excessive perquisites. Hugely unprofitable projects have bankrupted whole firms, something that even the largest of expense accounts is unlikely to do.

Thus, as the firm issues more equity, our entrepreneur will likely increase leisure time, work-related perquisites, and unprofitable investments. These three items are called agency costs because managers of the firm are agents of the stockholders.[5]

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This example is quite applicable to a small company considering a large stock offering. Because a manager-owner will greatly dilute his or her share of the total equity in this case, a significant drop in work intensity or a significant increase in fringe benefits is possible. However, the example may be less applicable for a large corporation with many stockholders. For example, consider a large company such as General Electric issuing stock for the umpteenth time. The typical manager there already has such a small percentage stake in the firm that any temptation for negligence has probably been experienced before. An additional offering cannot be expected to increase this temptation.

Who bears the burden of these agency costs? If the new stockholders invest with their eyes open, they do not. Knowing that Ms. Pagell may work shorter hours, they will pay only a low price for the stock. Thus, it is the owner who is hurt by agency costs. However, Ms. Pagell can protect herself to some extent. Just as stockholders reduce bankruptcy costs through protective covenants, an owner may allow monitoring by new stockholders. However, though proper reporting and surveillance may reduce the agency costs of equity, these techniques are unlikely to eliminate them.

It is commonly suggested that leveraged buyouts (LBOs) significantly reduce the cost of equity. In an LBO, a purchaser (usually a team of existing management) buys out the stockholders at a price above the current market. In other words, the company goes private since the stock is placed in the hands of only a few people. Because the managers now own a substantial chunk of the business, they are likely to work harder than when they were hired hands.[6]

Effect of Agency Costs of Equity on Debt–Equity Financing

The preceding discussion on the agency costs of equity should be viewed as an extension of the static trade-off model. That is, we stated in Section 15.3 that the change in the value of the firm when debt is substituted for equity is the difference between (1) the tax shield on debt and (2) the increase in the costs of financial distress (including the agency costs of debt). Now the change in the value of the firm is (1) the tax shield on debt plus (2) the reduction in the agency costs of equity, minus (3) the increase in the costs of financial distress (including the agency costs of debt). The optimal debt–equity ratio would be higher in a world with agency costs of equity than in a world without these costs. However, because costs of financial distress are so significant, the costs of equity do not imply 100 percent debt financing.

Free Cash Flow

Any reader of murder mysteries knows that a criminal must have both motive and opportunity. The above discussion was about motive. Managers with only a small ownership interest have an incentive for wasteful behavior. For example, they bear only a small portion of the costs of, say, excessive expense accounts, and reap all of the benefits.

Now let's talk about opportunity. A manager can only pad his expense account if the firm has the cash flow to cover it. Thus, we might expect to see more wasteful activity in a firm with a capacity to generate large cash flows than in one with a capacity to generate only small flows. This very simple idea is formally called the *free cash flow hypothesis*.

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A fair amount of academic work supports the hypothesis. For example, a frequently cited paper found that firms with high free cash flow are more likely to make bad acquisitions than firms with low free cash flow.[7]

The hypothesis has important implications for capital structure. Since dividends leave the firm, they reduce free cash flow. Thus, according to the free cash flow hypothesis, an increase in dividends should benefit the stockholders by reducing the ability of managers to pursue wasteful activities. Furthermore, since interest and principal also leave the firm, debt reduces free cash flow as well. In fact, interest and principal should have a greater effect than dividends on the free-spending ways of managers, because bankruptcy will occur if the firm is unable to make future debt payments. By contrast, a future dividend reduction will cause fewer problems for managers, since the firm has no legal obligation to pay dividends. Because of this, the free cash flow hypothesis argues that a shift from equity to debt will boost firm value.

In summary, the free cash flow hypothesis provides still another reason for firms to issue debt. We previously discussed the cost of equity; new equity dilutes the holdings of managers with equity interests, increasing their *motive* to waste corporate resources. We now state that debt reduces free cash flow because the firm must make interest and principal payments. The free cash flow hypothesis implies that debt reduces the *opportunity* for managers to waste resources.

15.6 THE PECKING-ORDER THEORY

Although the trade-off theory has dominated corporate finance circles for a long time, attention is also being paid to the *pecking-order theory*. To understand this view of the world, let's put ourselves in the position of a corporate financial manager whose firm needs new capital. The manager faces a choice between issuing debt and issuing equity. Previously, we evaluated the choice in terms of tax benefits, distress costs, and agency costs. However, there is one consideration that we have so far neglected: timing.

Imagine the manager saying:

> I want to issue stock in one situation only—when it is overvalued. If the stock of my firm is selling at $50 per share, but I think that it is actually worth $60, I will not issue stock. I would actually be giving new stockholders a gift, because they would receive stock worth $60, but would only have to pay $50 for it. More importantly, my current stockholders would be upset, because the firm would be receiving $50 in cash, but giving away something worth $60. So if I believe that my stock is undervalued, I would issue bonds. Bonds, particularly those with little or no risk of default, are likely to be priced correctly. Their value is primarily determined by the marketwide interest rate, a variable that is publicly known.
>
> But, suppose that our stock is selling at $70. Now I'd like to issue stock. If I can get some fool to buy our stock for $70 while the stock is really only worth $60, I will be making $10 for our current shareholders.

Although this may strike you as a cynical view, it seems to square well with reality. Before the United States adopted insider trading and disclosure laws, many managers were alleged to have unfairly trumpeted their firm's prospects prior to equity issuance. And, even today, managers seem more willing to issue equity after the price of their stock has risen than after their stock has fallen in

price. Thus, timing might be an important motive in equity issuance, perhaps even more important than those motives in the trade-off model. After all, the firm in the preceding example *immediately* makes $10 by properly timing the issuance of equity. Ten dollars' worth of agency and bankruptcy cost reduction might take many years to realize.

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The key that makes the example work is asymmetric information; the manager must know more about his firm's prospects than does the typical investor. If the manager's estimate of the true worth of the company is no better than the estimate of a typical investor, any attempts by the manager to time the issuance of equity will fail. This assumption of asymmetry is quite plausible. Managers should know more about their company than do outsiders, because managers work at the company every day. (One caveat is that some managers are perpetually optimistic about their firm, blurring good judgment.)

But we are not done with this example yet; we must consider the investor. Imagine an investor saying:

> I make investments carefully, because it involves my hard-earned money. However, even with all the time I put into studying stocks, I can't possibly know what the managers themselves know. After all, I've got a day job to be concerned with. So, I watch what the managers do. If a firm issues stock, the firm was likely overvalued beforehand. If a firm issues debt, it was likely undervalued.

When we look at both issuers and investors, we see a kind of poker game, with each side trying to outwit the other. There are two prescriptions to the issuer in this poker game. The first one, which is fairly straightforward, is to issue debt instead of equity when the stock is undervalued. The second, which is more subtle, is to issue debt also when the firm is *overvalued*. After all, if a firm issues equity, investors will infer that the stock is overvalued. They will not buy it until the stock has fallen enough to eliminate any advantage from equity issuance. In fact, only the most overvalued firms have any incentive to issue equity. Should even a moderately overpriced firm issue equity, investors will infer that this firm is among the *most* overpriced, causing the stock to fall more than is deserved. Thus, the end result is that virtually no one will issue equity.

This result that essentially all firms should issue debt is clearly an extreme one. It is as extreme as (1) the Modigliani-Miller (MM) result that, in a world without taxes, firms are indifferent to capital structure and (2) the MM result that, in a world of corporate taxes but no financial distress costs, all firms should be 100 percent debt financed. Perhaps we in finance have a penchant for extreme models!

But, just as one can temper MM's conclusions by combining financial distress costs with corporate taxes, we can temper those of the pure pecking-order theory. This pure version assumes that timing is the financial manager's only consideration. In reality, a manager must consider taxes, financial distress costs, and agency costs as well. Thus, a firm may issue debt only up to a point. If financial distress becomes a real possibility beyond that point, the firm may issue equity instead.

Rules of the Pecking Order

The above discussion presented the basic ideas behind the pecking-order theory. What are the practical implications of the theory for financial managers? The theory provides the following two rules for the real world.

RULE #1 USE INTERNAL FINANCING For expository purposes, we have oversimplified by comparing equity to *riskless* debt. Managers cannot use special knowledge of their firm to determine if this type of debt is mispriced, because the price of riskless debt is determined solely by the marketwide interest rate. However, in reality, corporate debt has the possibility of default. Thus, just

as managers have a tendency to issue equity when they think it is overvalued, managers also have a tendency to issue debt when they think it is overvalued.

When would managers view their debt as overvalued? Probably in the same situations when they think their equity is overvalued. For example, if the public thinks that the firm's prospects are rosy but the managers see trouble ahead, these managers would view their debt—as well as their equity—as being overvalued. That is, the public might see the debt as nearly risk-free, whereas the managers see a strong possibility of default.

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Thus, investors are likely to price a debt issue with the same skepticism that they have when pricing an equity issue. The way managers get out of this box is to finance projects out of retained earnings. You don't have to worry about investor skepticism if you can avoid going to investors in the first place. Thus, the first rule of the pecking order is:

Use internal financing.

RULE #2 ISSUE SAFE SECURITIES FIRST Although investors fear mispricing of both debt and equity, the fear is much greater for equity. Corporate debt still has relatively little risk compared to equity because, if financial distress is avoided, investors receive a fixed return. Thus, the pecking-order theory implies that, if outside financing is required, debt should be issued before equity. Only when the firm's debt capacity is reached should the firm consider equity.

Of course, there are many types of debt. For example, because convertible debt is more risky than straight debt, the pecking-order theory implies that one should issue straight debt before issuing convertibles. Thus, the second rule of the pecking-order theory is:

Issue the safest securities first.

Implications

There are a number of implications associated with the pecking-order theory that are at odds with the trade-off theory:

1. *There Is No Target Amount of Leverage*. According to the trade-off model, each firm balances the benefits of debt, such as the tax shield, with the costs of debt, such as distress costs. The optimal amount of leverage occurs where the marginal benefit of debt equals the marginal cost of debt.

   By contrast, the pecking-order theory does not imply a target amount of leverage. Rather, each firm chooses its leverage ratio based on financing needs. Firms first fund projects out of retained earnings. This should lower the percentage of debt in the capital structure, because profitable, internally funded projects raise both the book value and the market value of equity. Additional cash needs are met with debt, clearly raising the debt level. However, at some point the debt capacity of the firm may be exhausted, giving way to equity issuance. Thus, the amount of leverage is determined by the happenstance of available projects. Firms do not pursue a target ratio of debt to equity.
2. *Profitable Firms Use Less Debt*. Profitable firms generate cash internally, implying less need for outside financing. Because firms desiring outside capital turn to debt first, profitable firms end up relying on less debt. The trade-off model does not have this implication. The greater cash flow of more profitable firms creates greater debt capacity. These firms will use that debt capacity to capture the tax shield and the other benefits of leverage.
3. *Companies Like Financial Slack*. The pecking-order theory is based on the difficulties of obtaining financing at a reasonable cost. A skeptical investing public thinks a stock is overvalued if the managers try to issue more of it, thereby leading to a stock-price decline. Because this happens with bonds only to a lesser extent, managers rely first on bond financing.

However, firms can only issue so much debt before encountering the potential costs of financial distress.

Wouldn't it be easier to have the cash ahead of time? This is the idea behind *financial slack.* Because firms know that they will have to fund profitable projects at various times in the future, they accumulate cash today. They are then not forced to go to the capital markets when a project comes up. However, there is a limit to the amount of cash a firm will want to accumulate. As mentioned earlier in this chapter, too much free cash may tempt managers to pursue wasteful activities.

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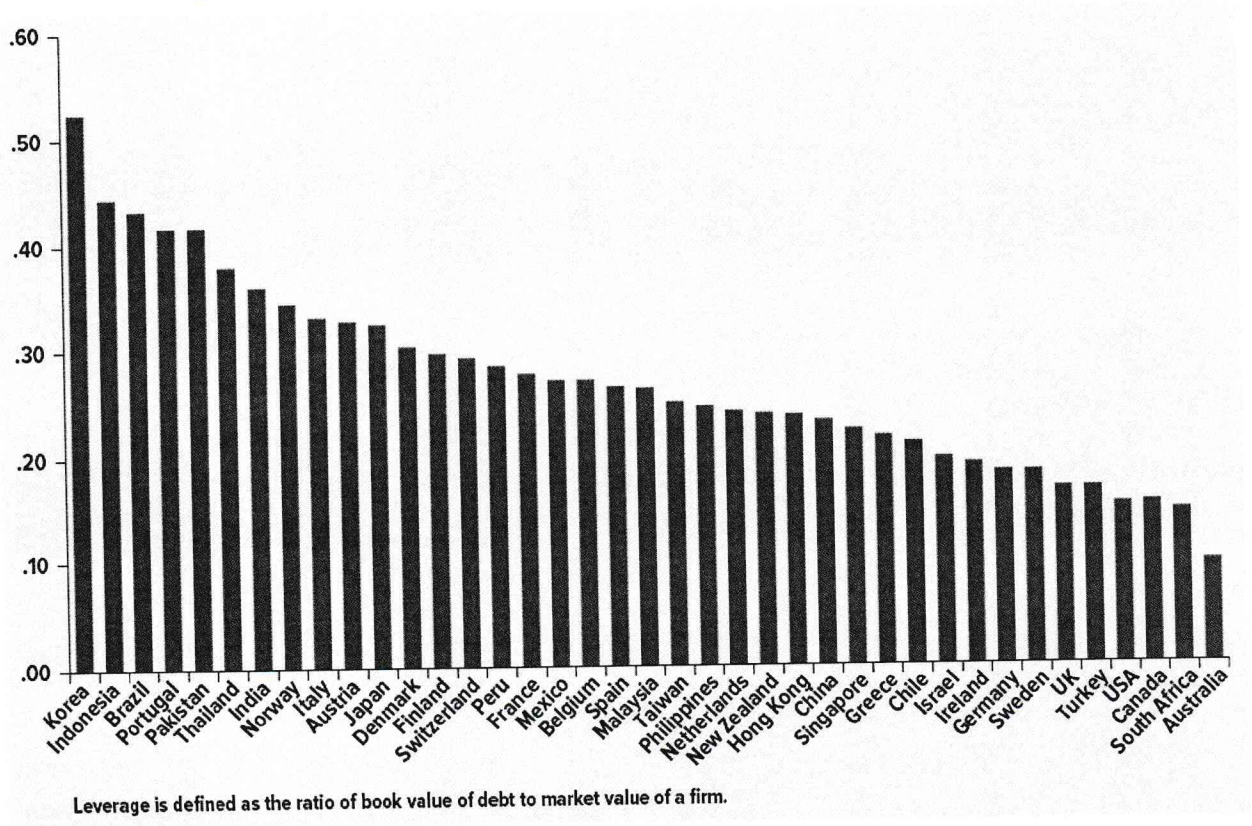
15.7 HOW FIRMS ESTABLISH CAPITAL STRUCTURE

The theories of capital structure are among the most elegant and sophisticated in the field of finance. Financial economists should (and do!) pat themselves on the back for contributions in this area. However, the practical applications of the theories are less than fully satisfying. Consider that our work on net present value produced an *exact* formula for evaluating projects. Prescriptions for capital structure under either the trade-off model or the pecking-order theory are vague by comparison. No exact formula is available for evaluating the optimal debt–equity ratio. Because of this, we turn to evidence from the real world.

The following empirical regularities are worth considering when formulating capital structure policy:

1. *Most Nonfinancial Corporations Have Relatively Low Debt-Asset Value Ratios.* How much debt is used in the real world? Figure 15.4 shows the median debt-to-value ratio, defined as book value of debt to market value of the firm, in each of 39 different countries. This ratio ranges from slightly over 50 percent for Korea to slightly under 10 percent for Australia. The ratio for U.S. companies is the fourth lowest.

FIGURE 15.4
Median Leverage Ratio of Sample Firms in 39 Different Countries (1991–2006)



Source: Joseph P. H. Fan, Sheridan Titman, and Garry Twite, "An International Comparison of Capital Structure and Debt Maturity Choices," *Journal of Financial and Quantitative Analysis*, Vol. 47, No. 1, February 2012, pp. 23–56.

Should we view these ratios as being high or low? Because academics generally see corporate tax reduction as a chief motivation for debt, we might wonder if real-world companies issue enough debt to greatly reduce, if not downright eliminate, corporate taxes. The empirical evidence suggests that this is not the case. For example, corporate income taxes in the United States for 2015 were about $400 billion. Most large U.S. public companies pay some income taxes

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but a few do not.[8] Thus, it is clear that corporations do not issue debt up to the point where tax shelters are completely used up.[9] There are clearly limits to the amount of debt corporations can issue, perhaps because of the financial distress costs discussed earlier in this chapter.

2. *A Number of Firms Use No Debt*. Strebulaev and Yang examined the capital structures of large U.S. public firms from 1962 to 2009 and found 10.2 percent on average had zero debt and about 22 percent had less than 5 percent debt.[10] Bessler, Drobetz, Haller and Meir looked at zero debt firms in the G7 countries (U.S., U.K., Canada, France, Germany, Italy and Japan). Their overall findings were similar to the U.S. findings; namely about 10 percent of G7 firms over an 11 year period used no debt. Both studies found zero debt behavior to be significant and showed no tendency to decrease over time.[11]

   Zero debt behavior is evident even when firms have cash balances, pay high taxes and pay high dividends. Typically the top management in these firms has high equity ownership. Furthermore, there is significantly greater family involvement. Clearly management and governance characteristics are related to the zero debt behavior but financial distress appears not to be a major factor.

   Thus, a possible story emerges. Control is important to the top managers of all equity firms but they are less diversified than managers of similar, but levered firms. Because of this, leverage represents an added but unwanted risk.

3. *There Are Differences in the Capital Structures of Different Industries*. There are significant interindustry differences in debt ratios that persist over time. As can be seen in Table 15.3, debt ratios tend to be quite low in high-growth industries with ample future investment opportunities, such as the drug and electronics industries. This is true even when the need for external financing is great. Industries with large investments in tangible assets, such as building construction, tend to have high leverage.

TABLE 15.3 Capital Structure Ratios for Selected U.S. Nonfinancial Industries (medians), Five-Year Average

	DEBT* AS A PERCENTAGE OF THE MARKET VALUE OF EQUITY AND DEBT (INDUSTRY MEDIANS)
High Leverage	
Radio and television broadcasting stations	59.60
Air transport	45.89
Hotels and motels	45.55
Building construction	42.31
Natural gas distribution	33.11
Low Leverage	
Electronic equipment	10.58
Computers	9.53
Educational services	8.93
Drugs	8.79
Biological products	8.05

*Debt is defined as the total of short-term debt and long-term debt.

SOURCE: *Ibbotson 2011 Cost of Capital Yearbook* (Chicago: Morningstar, 2011).

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To give a more specific example of industry effects, we looked up some capital structure information on Johnson & Johnson (JNJ) and Consolidated Edison (ED) using the financials area of www.reuters.com. Johnson & Johnson's capital structure looks like this (note that leverage ratios are expressed as percentages on this site):

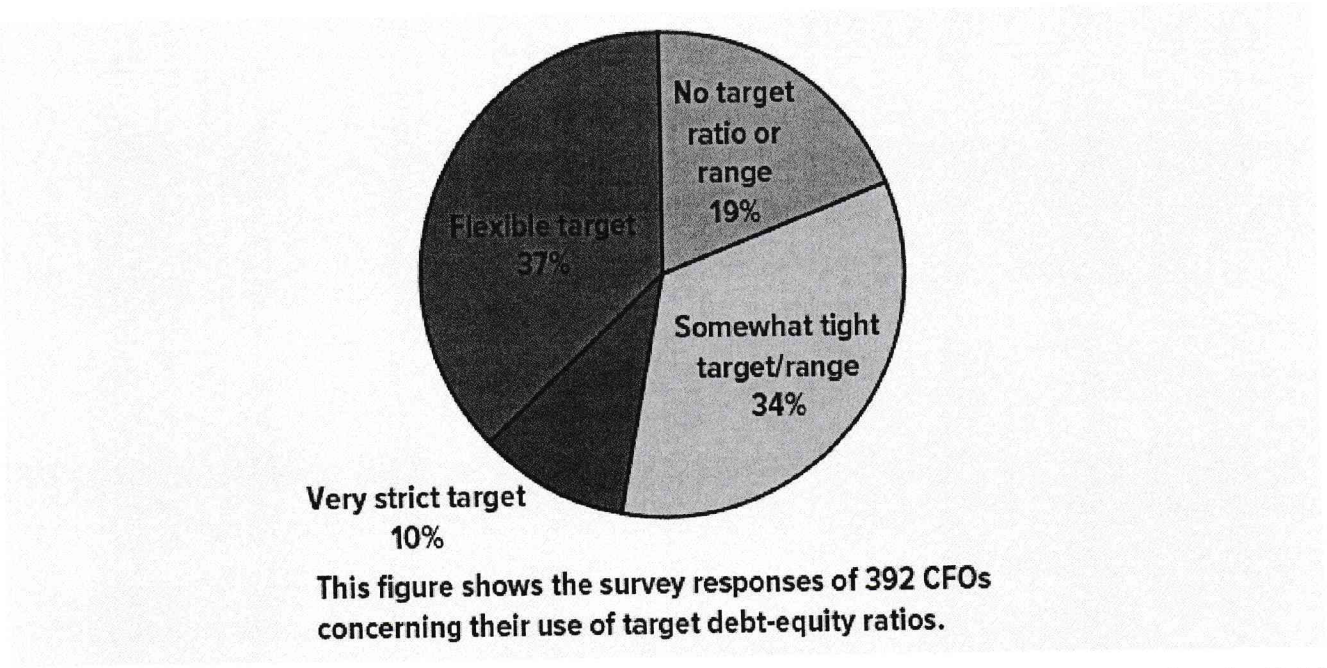
	COMPANY	INDUSTRY	SECTOR
Quick Ratio (MRQ)	1.88	2.03	2.23
Current Ratio (MRQ)	2.17	2.82	3.04
LT Debt to Equity (MRQ)	18.07	5.91	8.50
Total Debt to Equity (MRQ)	27.91	8.91	11.78
Interest Coverage (TTM)	50.62	164.30	147.85

For every dollar of equity, Johnson & Johnson has long-term debt of $.1807 and total debt of $.2791. Compare this result to Consolidated Edison:

	COMPANY	INDUSTRY	SECTOR
Quick Ratio (MRQ)	.74	1.01	1.81
Current Ratio (MRQ)	.81	1.10	1.96
LT Debt to Equity (MRQ)	91.99	121.02	97.72
Total Debt to Equity (MRQ)	109.36	141.86	108.95
Interest Coverage (TTM)	4.09	6.77	10.49

For every dollar of equity, Consolidated Edison has $.9199 of long-term debt and total debt of $1.0936. When we examine the industry and sector averages, the differences are again apparent. The pharmaceutical industry on average has only $.0591 of long-term debt and $.0891 of total debt for every dollar of equity. By comparison, the electric utility industry on average has $1.2102 of long-term debt and $1.4186 of total debt for every dollar of equity. Thus, we see that choice of capital structure is a management decision, but it is clearly also influenced by industry characteristics.

FIGURE 15.5
Survey Results on the Use of Target Debt–Equity Ratios



This figure shows the survey responses of 392 CFOs concerning their use of target debt-equity ratios.

Source: John R. Graham and Campbell R. Harvey, "The Theory and Practice of Corporate Finance: Evidence from the Field," *Journal of Financial Economics* (May/June 2001).

4. *Most Corporations Employ Target Debt–Equity Ratios*. Graham and Harvey asked 392 chief financial officers (CFOs) whether their firms use target debt–equity ratios, with the results being presented in Figure 15.5.[12] As can be seen, the great majority of the firms use targets, though the strictness of the targets varies across companies. Only 19 percent of the firms avoid target ratios. Results elsewhere in the paper indicate that large firms are more likely than

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small firms to employ these targets. The CFOs did not specify what they meant by either *flexible* or *strict* targets. However, elsewhere in the study the respondents indicated that, by and large, they did not rebalance in response to changes in their firm's stock price, suggesting flexibility in target ratios. page 470

5. *Capital Structures of Individual Firms Can Vary Significantly over Time*. While Graham and Harvey report that most firms use target leverage ratios, a recent paper nevertheless concludes that capital structures of individual firms often vary widely over time.[13] For example, consider Figure 15.6, which presents leverage ratios for General Motors, IBM, and Eastman Kodak since 1926. Both book leverage (total book value of debt divided by total assets) and market leverage (total book value of debt divided by total book debt plus market value of common stock) are shown. Regardless of the measure, all three companies display significant variations in leverage. Large variations in individual firm leverage over time is evidence that variations in individual firm investment opportunities and the need for financing are important determinants of capital structure and of the importance of financial slack (i.e., firms borrow money when they have projects worth spending it on).[14]

How should companies establish target debt–equity ratios? While there is no mathematical formula for establishing a target ratio, we present four important factors affecting the ratio:

- *Flexibility*. Establishing a firm's capital structure will probably include some kind of a debt to equity target. However, the targeting should allow for a wide range of variation and adjustments over time.
- *Taxes*. As we pointed out earlier, firms can deduct interest for tax purposes only to the extent of their profits before interest. Thus, highly profitable firms are more likely to have larger target ratios than less profitable firms.[15]
- *Types of Assets*. Financial distress is costly with or without formal bankruptcy proceedings. The costs of financial distress depend on the types of assets that the firm has. For example, if a firm has a large investment in land, buildings, and other tangible assets, it will have smaller costs of financial distress than a firm with a large investment in research and development. Research and development typically has less resale value than land; thus, most of its value disappears in financial distress. Therefore, firms with large investments in tangible assets are likely to have higher target debt–equity ratios than firms with large investments in research and development.
- *Uncertainty of Operating Income*. Firms with uncertain operating income have a high probability of experiencing financial distress, even without debt. Thus, these firms must finance mostly with equity. For example, pharmaceutical firms have uncertain operating income because no one can predict whether today's research will generate new, profitable drugs. Consequently, these firms issue little debt. By contrast, the operating income of firms in regulated industries, such as utilities, generally has low volatility. Relative to other industries, utilities use a great deal of debt.

One final note is in order. Because no formula supports them, the preceding points may seem too nebulous to assist financial decision making. Instead, many real-world firms base their capital structure decisions on industry averages and the need for a certain amount of

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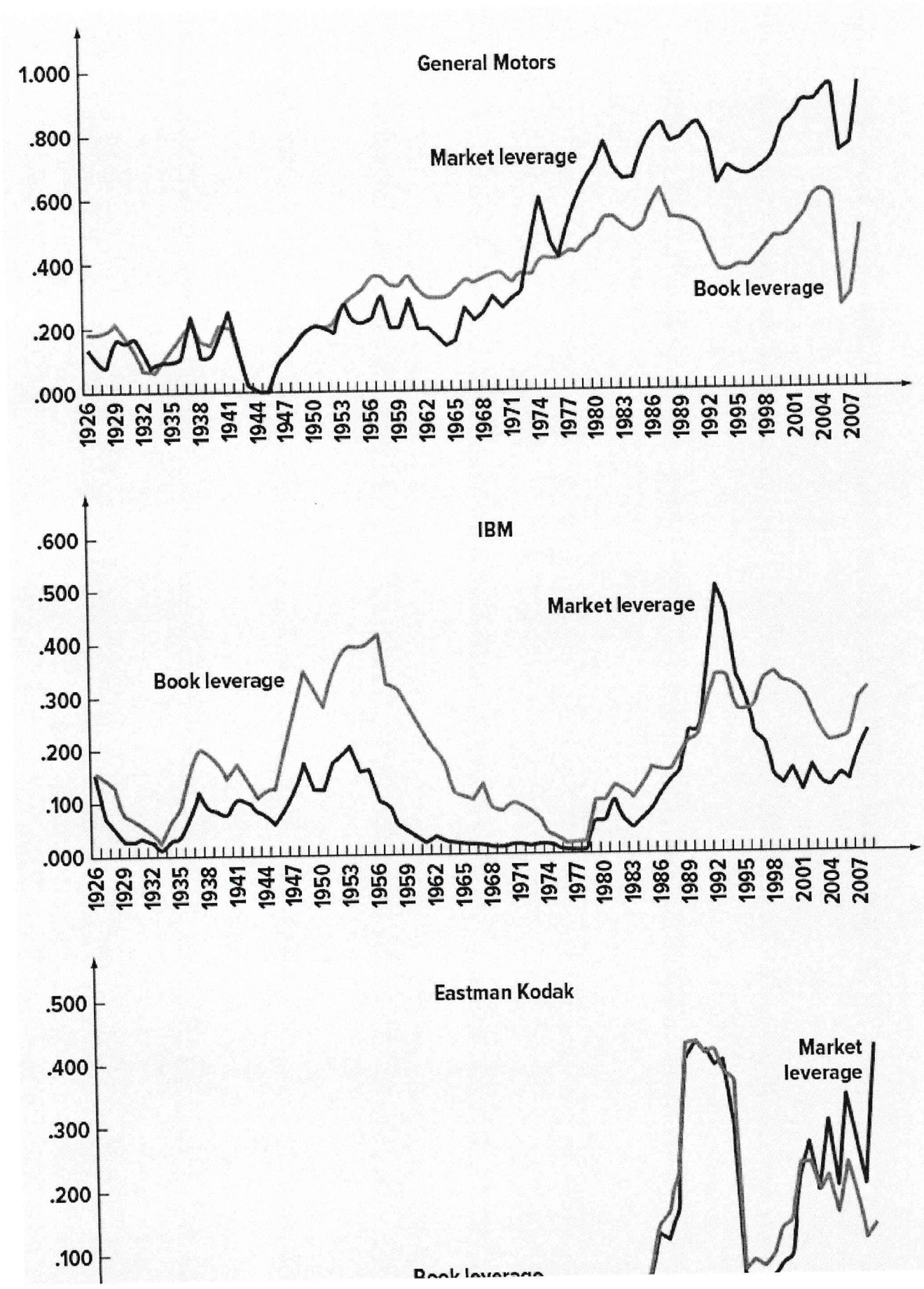
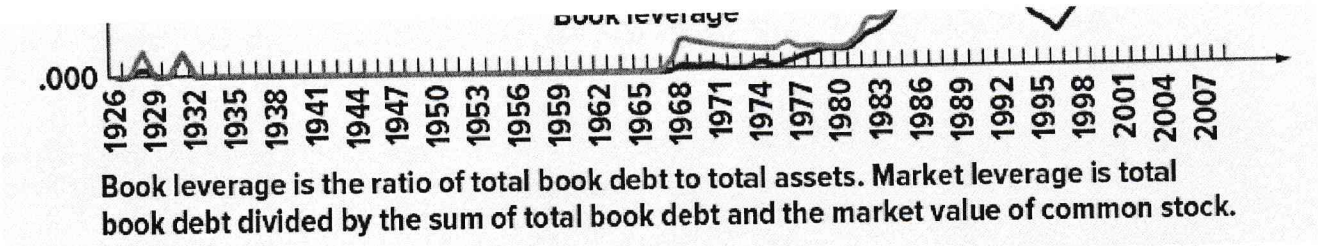
financial slack. This may strike some as a cowardly approach, but it at least keeps firms from deviating far from accepted practice. After all, the existing firms in any industry are the survivors. Therefore we should pay at least some attention to their decisions. However, firms sometimes deviate substantially from their target capital structure, especially when there is a need to issue transitory debt because of positive NPV investment opportunities.

FIGURE 15.6
Leverage Ratios of General Motors, IBM, and Eastman Kodak over Time


General Motors
Market leverage
Book leverage
1.000
.800
.600
.400
.200
.000
1926 1929 1932 1935 1938 1941 1944 1947 1950 1953 1956 1959 1962 1965 1968 1971 1974 1977 1980 1983 1986 1989 1992 1995 1998 2001 2004 2007
IBM
Market leverage
Book leverage
.600
.500
.400
.300
.200
.100
.000
1926 1929 1932 1935 1938 1941 1944 1947 1950 1953 1956 1959 1962 1965 1968 1971 1974 1977 1980 1983 1986 1989 1992 1995 1998 2001 2004 2007
Eastman Kodak
Market leverage
.500
.400
.300
.200
.100



Book leverage is the ratio of total book debt to total assets. Market leverage is total book debt divided by the sum of total book debt and the market value of common stock.

Source: Harry DeAngelo and Richard Roll, "How Stable Are Corporate Capital Structures?" *Journal of Finance* (2015), Figure 1.

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15.8 A QUICK LOOK AT THE BANKRUPTCY PROCESS

As we have discussed, one of the consequences of using debt is the possibility of financial distress, which can be defined in several ways:

The SEC provides a good overview of the bankruptcy process: www.sec.gov.

1. *Business Failure*. This term is usually used to refer to a situation in which a business has terminated with a loss to creditors, but even an all-equity firm can fail.
2. *Legal Bankruptcy*. Firms or creditors bring petitions to a federal court for bankruptcy. **Bankruptcy** is a legal proceeding for liquidating or reorganizing a business.
3. *Technical Insolvency*. Technical insolvency occurs when a firm is unable to meet its financial obligations.
4. *Accounting Insolvency*. Firms with negative net worth are insolvent on the books. This happens when the total book liabilities exceed the book value of the total assets.

We now very briefly discuss some of the terms and more relevant issues associated with bankruptcy and financial distress.

Liquidation and Reorganization

Firms that cannot or choose not to make contractually required payments to creditors have two basic options: liquidation or reorganization. **Liquidation** means termination of the firm as a going concern and involves selling off the assets of the firm. The proceeds, net of selling costs, are distributed to creditors in order of established priority. **Reorganization** is the option of keeping the firm a going concern; it often involves issuing new securities to replace old securities. Both liquidation and reorganization are the result of a bankruptcy proceeding. Which occurs depends on whether the firm is worth more "dead or alive."

BANKRUPTCY LIQUIDATION Chapter 7 of the Federal Bankruptcy Reform Act of 1978 deals with "straight" liquidation. The following sequence of events is typical:

1. A petition is filed in a federal court. Corporations may file a voluntary petition, or involuntary petitions may be filed against the corporation by several of its creditors.
2. A trustee-in-bankruptcy is elected by the creditors to take over the assets of the debtor corporation. The trustee will attempt to liquidate the assets.
3. When the assets are liquidated, after payment of the bankruptcy administration costs, the proceeds are distributed among the creditors.
4. If any proceeds remain, after expenses and payments to creditors, they are distributed to the shareholders.

The distribution of the proceeds of the liquidation occurs according to the following priority list:

1. Administrative expenses associated with the bankruptcy.
2. Other expenses arising after the filing of an involuntary bankruptcy petition but before the appointment of a trustee.
3. Wages, salaries, and commissions.
4. Contributions to employee benefit plans.
5. Consumer claims.
6. Government tax claims.

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Payment to unsecured creditors.

•

Payment to preferred stockholders.

•

Payment to common stockholders.

This priority list for liquidation is a reflection of the **absolute priority rule (APR)**. The higher a claim is on this list, the more likely it is to be paid. In many of these categories, there are various limitations and qualifications that we omit for the sake of brevity.

Two qualifications to this list are in order. The first concerns secured creditors. Such creditors are entitled to the proceeds from the sale of the security and are outside this ordering. However, if the secured property is liquidated and provides insufficient cash to cover the amount owed, the secured creditors join with unsecured creditors in dividing the remaining liquidated value. In contrast, if the secured property is liquidated for proceeds greater than the secured claim, the net proceeds are used to pay unsecured creditors and others. The second qualification to the APR is that, in reality, what happens and who gets what in the event of bankruptcy is subject to much negotiation, and, as a result, the APR is frequently not followed.

BANKRUPTCY REORGANIZATION Corporate reorganization takes place under Chapter 11 of the Federal Bankruptcy Reform Act of 1978. The general objective of a proceeding under Chapter 11 is to plan to restructure the corporation with some provision for repayment of creditors. The typical sequence of events is as follows:

Get the latest on bankruptcy at www.bankruptcydata.com.

1. A voluntary petition can be filed by the corporation, or an involuntary petition can be filed by creditors.
2. A federal judge either approves or denies the petition. If the petition is approved, a time for filing proofs of claims is set.
3. In most cases, the corporation (the "debtor in possession") continues to run the business.
4. The corporation (and, in certain cases, the creditors) submits a reorganization plan.
5. Creditors and shareholders are divided into classes. A class of creditors accepts the plan if a majority of the class agrees to the plan.
6. After its acceptance by creditors, the plan is confirmed by the court.
7. Payments in cash, property, and securities are made to creditors and shareholders. The plan may provide for the issuance of new securities.
8. For some fixed length of time, the firm operates according to the provisions of the reorganization plan.

The corporation may wish to allow the old stockholders to retain some participation in the firm. Needless to say, this may involve some protest by the holders of unsecured debt. In some cases, the bankruptcy procedure is needed to invoke the "cram-down" power of the bankruptcy court. Under

certain circumstances, a class of creditors can be forced to accept a bankruptcy plan even if they vote not to approve it, hence the remarkably apt description "cram down."

So-called prepackaged bankruptcies are a relatively common phenomenon. What happens is that the corporation secures the necessary approval of a bankruptcy plan from a majority of its creditors first, and then it files for bankruptcy. As a result, the company enters bankruptcy and reemerges almost immediately.

For example, on August 13, 2015, offshore drilling company Hercules Offshore filed a prepack bankruptcy. Under the terms of the deal, lenders York Capital Management Global Advisors, Bowery GP, Carval Investors, and Centerbridge Credit Partners LP, among others, agreed to exchange $1.2 billion in outstanding debt for 97 percent of the company's equity when it emerged from bankruptcy. During the bankruptcy process, the company raised another $450 million to fund operations when it came out of bankruptcy. Eighty-five days later, the company emerged from bankruptcy.

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In 2005, Congress passed the most significant overhaul of U.S. bankruptcy laws in the last 25 years, the Bankruptcy Abuse Prevention and Consumer Protection Act of 2005 (BAPCPA). Most of the changes were aimed at individual debtors, but corporations were also affected. Before BAPCPA, a bankrupt company had the exclusive right to submit reorganization plans to the bankruptcy court. It has been argued that this exclusivity is one reason some companies have remained in bankruptcy for so long. Under the new law, after 18 months, creditors can submit their own plan for the court's consideration. This change is likely to speed up bankruptcies and also lead to more prepacks.

One controversial change made by BAPCPA has to do with so-called key employee retention plans or KERPs. Strange as it may sound, bankrupt companies routinely give bonus payments to executives, even though the executives may be the same ones who led the company into bankruptcy in the first place. Such bonuses are intended to keep valuable employees from moving to more successful firms, but critics have argued they are often abused. The new law permits KERPs only if the employee in question actually has a job offer from another company.

Recently, Section 363 of the bankruptcy code has been in the news. In a traditional Chapter 11 filing, the bankruptcy plan is described to creditors and shareholders in a prospectuslike disclosure. The plan must then be approved by a vote involving the interested parties. A Section 363 bankruptcy is more like an auction. An initial bidder, known as a *stalking horse*, bids on all or part of the bankrupt company's assets. Other bidders are then invited into the process to determine the highest bid for the company's assets. The main advantage of a Section 363 bankruptcy is speed. Since a traditional bankruptcy requires the approval of interested parties, it is not uncommon for the process to take several years, whereas a Section 363 bankruptcy is generally much quicker. For example, in the middle of 2009, both General Motors and Chrysler sped through the bankruptcy process in less than 45 days with the help of Section 363 sales.

Financial Management and the Bankruptcy Process

It may seem a little odd, but the right to go bankrupt is very valuable. There are several reasons why this is true. First of all, from an operational standpoint, when a firm files for bankruptcy, there is an immediate "stay" on creditors, usually meaning that payments to creditors will cease and creditors will have to await the outcome of the bankruptcy process to find out if and how much they will be paid. This stay gives the firm time to evaluate its options, and it prevents what is usually termed a "race to the courthouse steps" by creditors and others.

Beyond this, some bankruptcy filings are actually strategic actions intended to improve a firm's competitive position, and firms have filed for bankruptcy even though they were not insolvent at the time. Probably the most famous example is Continental Airlines. In 1983, following deregulation of the airline industry, Continental found itself competing with newly established airlines that had much lower labor costs. Continental filed for reorganization under Chapter 11 even though it was not insolvent.

Continental argued that, based on pro forma data, it would become insolvent in the future, and a reorganization was therefore necessary. By filing for bankruptcy, Continental was able to terminate its existing labor agreements, lay off large numbers of workers, and slash wages for the remaining employees. In other words, at least in the eyes of critics, Continental essentially used the bankruptcy process as a vehicle for reducing labor costs. Congress subsequently modified bankruptcy laws to

make it more difficult, though not impossible, for companies to abrogate a labor contract through the bankruptcy process. Continental merged with United Airlines in 2010.

Other famous examples of strategic bankruptcies exist. For example, Manville (then known as Johns-Manville) and Dow Corning filed for bankruptcy because of expected future losses resulting from litigation associated with asbestos and silicone breast implants, respectively. In fact, by 2015, almost 100 companies had filed for Chapter 11 bankruptcy because of asbestos litigation. In 2001, for example, W.R. Grace, a well-known

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chemical and plastics company, threw in the towel and filed for bankruptcy. Six years later, in November 2007, the company filed a reorganization plan with the bankruptcy court. At that time, the company reported that it had incurred $21.3 million in bankruptcy-related expenses in the third quarter of 2007 alone, up from $12 million in the third quarter of 2006. Estimates of the total costs related to asbestos bankruptcy litigation for all firms involved put the bill at over $200 billion. Other notable companies that have filed for bankruptcy due to the asbestos nightmare include Congoleum, Federal-Mogul, and two subsidiaries of Halliburton.

Agreements to Avoid Bankruptcy

When a firm defaults on an obligation, it can avoid a bankruptcy filing. Because the legal process of bankruptcy can be lengthy and expensive, it is often in everyone's best interest to devise a "workout" that avoids a bankruptcy filing. Much of the time, creditors can work with the management of a company that has defaulted on a loan contract. Voluntary arrangements to restructure or "reschedule" the company's debt can be and often are made. This may involve *extension*, which postpones the date of payment, or *composition*, which involves a reduced payment.

SUMMARY AND CONCLUSIONS

1. We mentioned in the last chapter that according to theory, firms should create all-debt capital structures under corporate taxation. Because firms generally assume moderate amounts of debt in the real world, the theory must have been missing something at that point. We state in this chapter that costs of financial distress cause firms to restrain their issuance of debt. These costs are of two types: direct and indirect. Lawyers' and accountants' fees during the bankruptcy process are examples of direct costs. We mention four examples of indirect costs:
   - Impaired ability to conduct business.
   - Incentive to take on risky projects.
   - Incentive toward underinvestment.
   - Distribution of funds to stockholders prior to bankruptcy.
2. Because the above costs are substantial and the stockholders ultimately bear them, firms have an incentive for cost reduction. We suggest two cost reduction techniques:
   - Protective covenants.
   - Consolidation of debt.
3. Because costs of financial distress can be reduced but not eliminated, firms will not finance entirely with debt. Figure 15.1 illustrates the relationship between firm value and debt. In the figure, firms select the debt-to-equity ratio at which firm value is maximized.
4. Signaling theory argues that profitable firms are likely to increase their leverage because the extra interest payments will offset some of the pretax profits. Rational stockholders will infer higher firm value from a higher debt level. Thus, investors view debt as a signal of firm value.
5. Managers who own a small proportion of a firm's equity can be expected to work less, maintain more lavish expense accounts, and accept more pet projects with negative NPVs than

managers who own a large proportion of equity. Since new issues of equity dilute a manager's percentage interest in the firm, the above agency costs are likely to increase when a firm's growth is financed through new equity rather than through new debt.

6. The pecking-order theory implies that managers prefer internal to external financing. If external financing is required, managers tend to choose the safest securities, such as debt. Firms may accumulate slack to avoid external financing.

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Debt-to-equity ratios vary across industries. We present three factors determining the target debt-to-equity ratio: page 476

a. *Taxes.* Firms with high taxable income should rely more on debt than firms with low taxable income.
b. *Types of Assets.* Firms with a high percentage of intangible assets such as research and development should have low debt. Firms with primarily tangible assets should have higher debt.
c. *Uncertainty of Operating Income.* Firms with high uncertainty of operating income should rely mostly on equity.

8. We closed the chapter with a brief look at the bankruptcy process and some financial aspects of bankruptcy.

CONCEPT QUESTIONS

1. **Bankruptcy Costs** What are the direct and indirect costs of bankruptcy? Briefly explain each.
2. **Stockholder Incentives** Do you agree or disagree with the following statement: A firm's stockholders will never want the firm to invest in projects with negative net present values. Why?
3. **Capital Structure Decisions** Due to large losses incurred in the past several years, a firm has $2 billion in tax loss carryforwards. This means that the next $2 billion of the firm's income will be free from corporate income taxes. Security analysts estimate that it will take many years for the firm to generate $2 billion in earnings. The firm has a moderate amount of debt in its capital structure. The firm's CEO is deciding whether to issue debt or equity in order to raise the funds needed to finance an upcoming project. Which method of financing would you recommend? Why?
4. **Cost of Debt** What steps can stockholders take to reduce the costs of debt?
5. **MM and Bankruptcy Costs** How do the existence of financial distress costs and agency costs affect Modigliani and Miller's theory in a world where corporations pay taxes?
6. **Agency Costs of Equity** What are the sources of the agency costs of equity?
7. **Observed Capital Structures** Refer to the observed capital structures given in Table 15.3 of the text. What do you notice about the types of industries with respect to their average debt –equity ratios? Are certain types of industries more likely to be highly leveraged than others? What are some possible reasons for this observed segmentation? Do the operating results and tax history of the firms play a role? How about their future earnings prospects? Explain.
8. **Bankruptcy and Corporate Ethics** As mentioned in the text, some firms have filed for bankruptcy because of actual or likely litigation-related losses. Is this a proper use of the bankruptcy process?
9. **Bankruptcy and Corporate Ethics** Firms sometimes use the threat of a bankruptcy filing to force creditors to renegotiate terms. Critics argue that in such cases, the firm is using bankruptcy laws "as a sword rather than a shield." Is this an ethical tactic?

10. **Bankruptcy and Corporate Ethics** As mentioned in the text, Continental Airlines filed for bankruptcy, at least in part, as a means of reducing labor costs. Whether this move was ethical or proper was hotly debated. Give both sides of the argument.

QUESTIONS AND PROBLEMS

Basic (Questions 1–5)

1. **Firm Value** Connor Corp. has an EBIT of $460,000 per year that is expected to continue in perpetuity. The unlevered cost of equity for the company is 13.2 percent, and the corporate tax rate is 35 percent. The company also has a perpetual bond issue outstanding with a market value of $950,000.

   a. What is the value of the company?

   b. The CFO of the company informs the company president that the value of the company is $2.4 million. Is the CFO correct?