Learning Objectives

After studying this chapter, readers will be able to

- describe the two primary types of leases,
- explain how lease financing affects financial statements and taxes,
- conduct a basic lease analysis from the perspective of the lessee,
- discuss the factors that create value in lease transactions,
- explain in general terms how businesses are valued, and
- conduct a business valuation using discounted cash flow and market multiple approaches.

Introduction

This chapter covers two unrelated topics: lease financing and business valuation. Leasing is a substitute for debt financing and hence expands the range of financing alternatives available to businesses (and to individuals). However, leasing should be used only when it offers some advantage over conventional financing. We begin this chapter by discussing factors that contribute to the large amount of leasing activity among healthcare businesses and how businesses analyze lease transactions.

The valuation of entire businesses, as opposed to capital projects, is a critical step in the merger and acquisition process. In addition, business valuation plays an important role when one owner is bought out by other owners and when businesses are inherited. The second part of this chapter discusses two techniques used to value businesses.

Leasing Basics

Businesses generally own fixed assets, but it is the use of buildings and equipment that is important, not their ownership. One way to obtain the use of assets is to raise debt or equity capital and then use this capital to buy them. An alternative way to obtain the use of assets is by leasing. Before the 1950s, leasing was generally associated with real estate (land and buildings), but today it is possible to lease almost any kind of asset. Although leasing is used extensively across all industries, it is especially prevalent in the health services industry, primarily in the use of medical equipment and information technology hardware and software.

Note that every lease transaction has two parties: the user of the leased asset is called the lessee, while the owner of the property, usually the manufacturer
or a leasing company, is called the lessor. (The term lessee is pronounced “less-ee,” not “lease-ee,” and “lessor” is pronounced “less-or.”)

Leases are commonly classified into two categories: operating leases and financial leases. These informal classifications are discussed in the following sections. In later sections, we will discuss the more formal classifications used by the IRS and by accountants in the preparation of financial statements.

**Operating Leases**

Operating leases, sometimes called service leases, generally provide both financing and maintenance. IBM was one of the pioneers of operating lease contracts, and computers and office copying machines, together with automobiles, trucks, and medical diagnostic equipment, are the primary types of equipment involved in operating leases. Operating leases typically require the lessor to maintain and service the leased equipment; the cost of maintenance is built into the lease payments.

Additionally, operating leases are not fully amortized, in that the payments required under the lease contract are not sufficient for the lessor to recover the full cost of the equipment. However, the lease contract is written for a period considerably shorter than the expected useful life of the leased asset, and the lessor expects to recover all costs eventually either by lease renewal payments or by sale of the equipment.

A final feature of operating leases is that they frequently contain a cancellation clause that gives the lessee the right to cancel the lease and return the equipment to the lessor before the lease expires. This clause is important to the lessee because it allows the equipment to be returned if it is rendered obsolete by technological developments or is no longer needed because of a decline in the lessee's business.

Note that lease (rental) payments on operating leases can be structured in two different ways. Under conventional terms, fixed payments are made to the lessor periodically, usually monthly. With this type of payment, the cost to the lessee (and the return to the lessor) is known with some certainty. Under per procedure terms, a fixed amount is paid each time the equipment is used—for example, for each X-ray taken. Here, the cost to the lessee and return to the lessor are not known with some certainty; rather, they depend on volume. In essence, a per procedure lease converts a fixed cost for the equipment, which is independent of volume, into a variable cost, which is directly related to volume. We will further discuss per procedure leases later in the chapter.

**Financial Leases**

Financial leases, sometimes called capital leases, are different from operating leases in that they (1) typically do not provide for maintenance, (2) typically are not cancelable, (3) are generally for a period that approximates the useful life of the asset, and, hence, (4) are fully amortized.

In a typical financial lease, the lessee selects the item it requires and negotiates the price and delivery terms with the manufacturer. The lessee then arranges to have a leasing firm (lessor) buy the equipment from the manufacturer, and the lessee simultaneously executes a lease agreement with the lessor. The terms of a financial lease call for full amortization of the lessor's investment, plus a rate of return on the lease that is close to the percentage
rate the lessee would have paid on a secured term loan. For example, if a radiology group practice has to pay 10 percent for a term loan to buy an x-ray machine, the lessor would build in a return on the lease of about 10 percent. The parallel to borrowing is obvious in a financial lease. Under a secured loan arrangement, the lender would normally receive a series of equal payments just sufficient to amortize the loan and to provide a specified rate of return on the outstanding loan balance. Under a financial lease, the lease payments are set up exactly the same way; the payments are just sufficient to return the full purchase price to the lessor plus a stated return on the lessor's investment. At the end of a financial lease, the ownership of the leased asset is transferred from the lessor to the lessee.

A sale and leaseback is a special type of financial lease, often used with real estate, that can be arranged by a user that currently owns some asset. Here, the user sells the asset to another party and simultaneously executes an agreement to lease the property back for a stated period under specific terms. In a sale and leaseback, the lessee receives an immediate cash payment in exchange for a future series of lease payments that must be made to rent the use of the asset sold.

Although the distinction between operating and financial leases has historical significance, today many lessors offer leases under a wide variety of terms. Therefore, in practice, leases often do not fit exactly into the operating lease or financial lease category but combine features of both.

Self-Test Questions

What is the difference between an operating lease and a financial lease?

What is a sale and leaseback?

How do per procedure payment terms differ from conventional terms?

Tax Effects

For both investor-owned and not-for-profit businesses, tax effects can play an important role in the lease-versus-buy decision.

Investor-Owned (Taxable) Businesses

For investor-owned businesses, the full amount of each lease payment is a tax-deductible expense for the lessee provided that the IRS agrees that the contract is a genuine lease. Lease contracts must be written in a form acceptable to the IRS. A lease that complies with all of the IRS requirements for taxable businesses is called a guideline, or tax-oriented, lease. In a guideline lease, ownership (depreciation) tax benefits accrue to the lessor and the lessee's lease payments are fully tax deductible. A lease that does not meet the tax guidelines is called a non-tax-oriented lease. For this type of lease, the lessee can deduct only the implied interest portion of each lease payment. However, the lessee is effectively the owner of the leased equipment; thus, the lessee obtains the tax depreciation benefits.

The reason for the IRS's concern about lease terms is that, without restrictions, a business could set up a lease transaction that calls for rapid lease payments, which would be deductible from taxable income. The effect would be to depreciate the equipment over a much shorter period than the IRS allows in its depreciation guidelines. Therefore, if any type of contract could be
called a lease and given tax treatment as a lease, the contract could be a greater tax shelter than that available through depreciation. This acceleration would benefit the business, but it would be costly to the government and, hence, to individual taxpayers. For this reason, the IRS has established rules that define a lease for tax purposes.

The primary point here is that if investor-owned businesses are to obtain tax benefits from leasing, the lease contract must be written in a manner that will qualify it as a true lease under IRS guidelines. The potential lessee must resolve any questions about the tax status of a lease contract before signing it.

**Not-for-Profit (Tax-Exempt) Businesses**

Not-for-profit lessees also benefit from tax laws, but in a different way. Because not-for-profit firms do not obtain tax benefits from depreciation, the ownership of assets has no tax value. However, lessors, who are all taxable businesses, do benefit from ownership. In essence, when assets are owned by not-for-profit firms, the depreciation tax benefit is lost, whereas when assets are leased, the tax benefit is realized by the lessor rather than the lessee. This realized benefit, in turn, can be shared with the lessee in the form of lower rental payments. Note, however, that the cost of tax-exempt debt to not-for-profit firms can be lower than the after-tax cost of debt to taxable firms, so leasing is not automatically less costly to not-for-profit firms than borrowing in the tax-exempt markets and buying.

A special type of financial transaction has been created for not-for-profit businesses, called a tax-exempt lease. The major difference between a tax-exempt lease and a conventional lease is that the implied interest portion of the lease payment is not classified as taxable income to the lessor. Thus, the return portion of the lessor's payment is exempt from federal income taxes. The rationale for this tax treatment is that the interest paid on most debt financing used by not-for-profit organizations is tax-exempt to the lender, and a lessor is actually a lender. Tax-exempt leases provide a greater after-tax return to lessors than do conventional leases, so some of this extra return could be passed back to the lessee in the form of lower lease payments. Thus, the lessee's payments on tax-exempt leases could be lower than payments on assets acquired by a not-for-profit business through a conventional lease.

**Self-Test Questions**

What is the difference between a tax-oriented (guideline) lease and a non-tax-oriented lease?

Why should the IRS care about lease provisions?

What is a tax-exempt lease?

**Financial Statement Effects**

Regardless of the type of lease, the lessee reports lease payments as an expense item on the income statement in the year they are made. Furthermore, as discussed in the following sections, if the lease is a capital lease, and hence is listed on the balance sheet, the leased asset is depreciated each year and the annual depreciation expense is reported on the income statement. However, under certain conditions, neither the leased asset nor the contract liabilities (present value of lease payments) appear on the lessee's balance sheet.
sheet. For this reason, leasing is often called off-balance sheet financing. This point is illustrated by the balance sheets of two hypothetical healthcare providers: B and L.

Before asset increase:

<table>
<thead>
<tr>
<th>Firms B and L</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current assets</td>
</tr>
<tr>
<td>Fixed assets</td>
</tr>
<tr>
<td>Total assets</td>
</tr>
<tr>
<td>Debt/assets ratio</td>
</tr>
</tbody>
</table>

After asset increase:

<table>
<thead>
<tr>
<th>Firm B</th>
<th>Firm L</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current assets</td>
<td>$50</td>
</tr>
<tr>
<td>Fixed assets</td>
<td>150</td>
</tr>
<tr>
<td>Total assets</td>
<td>$200</td>
</tr>
<tr>
<td>Debt/assets ratio</td>
<td>75%</td>
</tr>
</tbody>
</table>

Initially, the balance sheets of both firms are identical, and they both have debt ratios of 50 percent. Next, each firm decides to acquire a fixed asset that costs $100. Firm B borrows $100 and buys the asset, so both an asset and a liability are entered on its balance sheet, and its debt ratio rises from 50 to 75 percent. Firm L leases the equipment. The lease may call for fixed charges as high as or even higher than the loan, and the obligations assumed under the lease may have equal or even more potential to force the business into bankruptcy, but the firm's debt ratio remains at 50 percent.

To correct this accounting deficiency, accounting rules require businesses that enter into certain leases to restate their balance sheets to report the leased asset as a fixed asset and the present value of the future lease payments as a liability. This process is called capitalizing the lease; hence, such a lease is called a capital lease. The net effect of capitalizing the lease is to cause Firms B and L to have similar balance sheets, both of which will, in essence, resemble the one shown for Firm B.

The logic here is as follows. If a firm signs a capital lease contract, its obligation to make lease payments is just as binding as if it had signed a loan agreement; the failure to make lease payments has the potential to bankrupt a firm just as the failure to make principal and interest payments on a loan can result in bankruptcy. Therefore, under most circumstances, a capital lease has the same impact on a business's financial risk as does a loan. This being the case, if a firm signs a capital lease agreement, it raises its effective debt ratio. Therefore, to maintain the firm's established target capital structure, the lease financing requires additional equity support exactly like debt financing. In other words, leasing uses up a business's debt capacity.

Note, however, that there are some legal differences between loans and leases, mostly involving the rights of lessors versus lenders when a business in financial distress reorganizes or liquidates under bankruptcy. In most financial distress situations, lessors fare better than lenders, so lessors may be more willing to deal with firms in poor financial condition than lenders may be. At a minimum, lessors may be willing to accept lower rates of return than lenders when dealing with financially distressed businesses because the risks are lower.

If disclosure of the lease in our example were not made, then Firm L's investors might be deceived into thinking that its financial position is stronger than it really is. Thus, even before businesses were required to place
some leases on the balance sheet, they were required to disclose the existence of all leases longer than one year in the footnotes of their financial statements. At that time, some people argued that investors fully recognized the impact of leases and, in effect, would have concluded that Firms B and L were essentially in the same financial position. Conversely, other people argued that investors would be better served if all leases were capitalized (shown directly on the balance sheet). Current accounting requirements are a compromise between these two positions, although one that is tilted heavily toward those who favor capitalization.

A lease is classified as a capital lease and thus is shown directly on the balance sheet if one or more of the following conditions exist:

1. Under the terms of the lease, ownership of the property is effectively transferred from the lessor to the lessee.
2. The lessee can purchase the property at less than its true market value when the lease expires.
3. The lease runs for a period equal to or greater than 75 percent of the asset's life. Thus, if an asset has a ten-year life and the lease is written for eight years, the lease must be capitalized.
4. The present value of the lease payments, when discounted at the rate of interest the lessee would have to pay if the asset were debt financed, is equal to or greater than 90 percent of the initial value of the asset. Note that any maintenance payments embedded in the lease payment must be stripped out before checking this condition.

These rules, together with strong footnote disclosure rules for noncapitalized (operating) leases, are sufficient to ensure that no one will be fooled by lease financing. In effect, a capital lease for a particular asset has the same economic consequences for the business as does a loan in which the asset is pledged as collateral. Thus, leases are regarded as debt for capital structure purposes, and they have roughly the same effect as debt on the financial condition of the firm.

Note that, in most cases, leases that meet IRS guidelines are operating leases that will not be capitalized, whereas leases that do not meet IRS guidelines are financial leases that will be capitalized. Remember, however, that even operating (noncapitalized) leases must be disclosed in the footnotes of the firm's financial statements.

Self-Test Questions

Why is lease financing sometimes called off-balance sheet financing?

How are leases accounted for on a business's balance sheet? On its income statement?

Lease Evaluation

Leases are evaluated by both the lessee and the lessor. The lessee must determine whether leasing an asset is less costly than obtaining equivalent alternative financing and buying the asset, and the lessor must decide what the lease payments must be to produce a rate of return consistent with the riskiness of the investment. Here, we will cover only the lessee's analysis.
To begin, note that a degree of uncertainty exists regarding the correct way to evaluate lease-versus-purchase decisions, and complex decision models have been developed to aid in the analysis. However, the simple analysis given here, coupled with judgment, is sufficient to prevent situations in which a lessee enters into a lease agreement that is clearly not in the business's best interests. In the typical case, the events that lead to a lease arrangement are as follows:

1. The business decides to acquire a building or piece of equipment. (This decision is based on the capital budgeting procedures discussed in chapters 9 and 10.) The decision to acquire the asset is not an issue in a typical lease analysis; this decision was made previously as part of the capital budgeting process. In lease analysis, we are concerned simply with whether to obtain the use of the property by lease or by purchase.

2. Once the business has decided to acquire the asset, the next question is how to finance its acquisition. A well-run business does not have excess cash lying around, and even if it does, there are opportunity costs associated with its use.

3. Funds to purchase the asset could be obtained from excess cash, by borrowing, or, if the business is investor-owned, by selling new equity. Alternatively, the asset could be leased.

As indicated previously, a lease is comparable to a loan in the sense that the business is required to make a specified series of payments and that failure to meet these payments could result in bankruptcy. Thus, the most appropriate comparison when making lease decisions is the cost of lease financing versus the cost of debt financing, regardless of how the asset actually would be financed if it were not leased. The asset may be purchased with available cash if not leased or financed by a new equity sale, but because leasing is a substitute for debt financing, the appropriate comparison would still be to debt financing.

To illustrate the basic elements of lease analysis, consider this simplified example. Nashville Radiology Group (the Group) requires the use of an x-ray machine for two years that costs $100, and the Group must choose between leasing and buying the equipment. (The actual cost is $100,000, but let's keep the numbers simple.) If the machine is purchased, the bank would lend the Group the needed $100 at a rate of 10 percent on a two-year, simple interest loan. Thus, the Group would have to pay the bank $10 in interest at the end of each year, plus return the $100 in principal at the end of Year 2. For simplicity, assume that the Group could depreciate the entire cost of the machine over two years for tax purposes by the straight-line method if it were purchased, resulting in tax depreciation of $50 in each year. Furthermore, the Group's tax rate is 40 percent. Thus, the depreciation expense produces a tax savings, or tax shield, of $50 x .40 = $20 each year. Also, for simplicity, assume the equipment's value at the end of two years (its residual value) is estimated to be $0.

Alternatively, the Group could lease the asset under a guideline lease for two years for a payment of $55 at the end of each year. The analysis for the lease-versus-buy decision consists of (1) estimating the cash flows associated with borrowing and buying the asset, (2) estimating the cash flows associated with leasing the asset, and (3) comparing the two financing methods to determine which has the lower cost. Here are the borrow and buy flows:
Cash flows if the group buys:

<table>
<thead>
<tr>
<th></th>
<th>Year 0</th>
<th>Year 1</th>
<th>Year 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equipment cost</td>
<td>($100)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Loan amount</td>
<td>100</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interest expense</td>
<td>($10)</td>
<td>($10)</td>
<td></td>
</tr>
<tr>
<td>Tax savings from interest</td>
<td>4</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>Principal repayment</td>
<td></td>
<td>(100)</td>
<td></td>
</tr>
<tr>
<td>Tax savings from depreciation</td>
<td>20</td>
<td></td>
<td>20</td>
</tr>
<tr>
<td>Net cash flow</td>
<td>$ 0</td>
<td>$14</td>
<td>($86)</td>
</tr>
</tbody>
</table>

The net cash flow is zero in Year 0, positive in Year 1, and negative in Year 2. Because the operating cash flows (the revenues and operating costs) will be the same regardless of whether the equipment is leased or purchased, they can be ignored. Cash flows that are not affected by the decision at hand are said to be nonincremental to the decision. Here are the cash flows associated with the lease:

Cash flows if the group leases:

<table>
<thead>
<tr>
<th></th>
<th>Year 0</th>
<th>Year 1</th>
<th>Year 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lease payment</td>
<td>($55)</td>
<td>($55)</td>
<td></td>
</tr>
<tr>
<td>Tax savings from payments</td>
<td>22</td>
<td></td>
<td>22</td>
</tr>
<tr>
<td>Net cash flow</td>
<td>30</td>
<td>($33)</td>
<td>($33)</td>
</tr>
</tbody>
</table>

Note that the two sets of cash flows reflect the tax savings associated with interest expense, depreciation, and lease payments, as appropriate. If the lease had not met IRS guidelines, then ownership would effectively reside with the lessee, and the Group would depreciate the asset for tax purposes whether it was "leased" or purchased. Furthermore, only the implied interest portion of the lease payment would be tax deductible. Thus, the analysis for a nonguideline lease would consist of simply comparing the after-tax financing flows on the loan to the after-tax lease-payment stream.

To compare the cost streams of buying and leasing, we must put them on a present value basis. As we explain later, the correct discount rate is the after-tax cost of debt, which for the Group is 10% x (1 - T) = 10% x (1 - .4) = 6%. Applying this rate, we find the present value cost of buying to be $63.33 and the present value cost of leasing to be $60.50. Because leasing has the lower present value cost, it is the less-costly financing alternative, so the Group should lease the asset.

This simplified example shows the general approach used in lease analysis, and it also illustrates a concept that can simplify the cash flow estimation process. Look back at the loan-related cash flows if the Group buys the machine. The after-tax loan-related flows are -$6 in Year 1 and -$106 in Year 2. When these flows are discounted to Year 0 at the 6 percent after-tax cost of debt, their present value is -$100, which is the negative of the loan amount shown in Year 0. This equality results because we used the cost of debt to estimate the future financing flows and then used this same rate to discount the flows back to Year 0, all on an after-tax basis. In effect, the loan amount positive cash flow and the loan cost negative cash flows cancel one another out. Here is the cash flow stream associated with buying the asset after the Year 0 loan amount and the related Year 1 and Year 2 financing flows have been removed:

Cash flows if the group buys:

<table>
<thead>
<tr>
<th></th>
<th>Year 0</th>
<th>Year 1</th>
<th>Year 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost of asset</td>
<td>($100)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The present value cost of buying here is, of course, $63.33, which is the same amount we found earlier. The consistency between the two approaches will always occur regardless of the terms of the debt financing. As long as the discount rate is the after-tax cost of debt, the cash flows associated with the loan can be ignored.

To examine a more realistic example of lease analysis, consider the following lease-versus-buy decision that faces the Nashville Radiology Group:

1. The Group plans to acquire a new computer system that will automate the Group's clinical records as well as its accounting, billing, and collection processes. The system has an economic life of eight years and costs $200,000, delivered and installed. However, the Group plans to lease the equipment for only four years because it believes that computer technology is changing rapidly, and it wants the opportunity to reevaluate the situation at that time.

2. The Group can borrow the required $200,000 from its bank at a before-tax cost of 10 percent.

3. The system's estimated scrap value is $5,000 after eight years of use, but its estimated residual value, which is the value at the expiration of the lease, is $20,000. Thus, if the Group buys the equipment, it would expect to receive $20,000 before taxes when the equipment is sold in four years.

4. The Group can lease the equipment for four years at a rental charge of $57,000, payable at the beginning of each year. However, the lessor will own the equipment at lease expiration. (The potential lessor establishes the lease payment schedule, and the Group can accept it, reject it, or attempt to negotiate the terms.)

5. The lease contract stipulates that the lessor will maintain the computer at no additional charge to the Group. However, if the Group borrows and buys the computer, it will have to bear the cost of maintenance, which would be performed by the equipment manufacturer at a fixed contract rate of $2,500 per year, payable at the beginning of each year.

6. The computer falls into the MACRS five-year class life, the Group's marginal tax rate is 40 percent, and the lease qualifies as a guideline lease under a special IRS ruling.

**Dollar Cost Analysis**

Exhibit 15.1 illustrates a complete dollar cost analysis. Again, our approach here is to compare the dollar cost of owning (borrowing and buying) the computer to the cost of leasing the computer. All else the same, the lower cost alternative is preferable. Part I of the table is devoted to the costs of borrowing and buying. Here, Line 1 gives the equipment's cost, and Line 2 shows the maintenance expense, both of which are shown as outflows. Note that whenever an analyst is setting up cash flows on a time line, one of the first decisions to be made is what time interval will be used—that is, months, quarters, years, or some other period. As a starting point, we generally assume that all cash flows occur at the end of each year. If, at some point later in
the analysis, we conclude that another interval is better, we will change it. Longer intervals, such as years, simplify the analysis but introduce some inaccuracies because not all cash flows occur at year-end. For example, tax benefits occur quarterly because businesses pay taxes on a quarterly basis. On the other hand, shorter intervals, such as months, often are used in lease analyses because lease payments typically occur monthly. For ease of illustration, we are using annual flows in this example.

Exhibit 15.1
Nashville Radiology Group: Dollar Cost Analysis

<table>
<thead>
<tr>
<th>Year 0</th>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
<th>Year 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. Cost of owning:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Net purchase price</td>
<td>($200,000)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Maintenance cost</td>
<td>($2,500)</td>
<td>($2,500)</td>
<td>($2,500)</td>
<td>($2,500)</td>
</tr>
<tr>
<td>3. Maintenance tax savings</td>
<td>1,000</td>
<td>1,000</td>
<td>1,000</td>
<td>1,000</td>
</tr>
<tr>
<td>4. Depreciation tax savings</td>
<td>16,000</td>
<td>25,600</td>
<td>15,200</td>
<td>$9,600</td>
</tr>
<tr>
<td>5. Residual value</td>
<td>20,000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Residual value tax</td>
<td></td>
<td></td>
<td></td>
<td>5,600</td>
</tr>
<tr>
<td>7. Net cash flow</td>
<td>($201,500)</td>
<td>$14,500</td>
<td>$24,100</td>
<td>$13,700</td>
</tr>
<tr>
<td>8. PV cost of owning</td>
<td>($126,987)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>II. Cost of leasing:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Lease payment</td>
<td>($57,000)</td>
<td>($57,000)</td>
<td>($57,000)</td>
<td>($57,000)</td>
</tr>
<tr>
<td>10. Tax savings</td>
<td>22,800</td>
<td>22,800</td>
<td>22,800</td>
<td>22,800</td>
</tr>
<tr>
<td>11. Net cash flow</td>
<td>($34,200)</td>
<td>($34,200)</td>
<td>($34,200)</td>
<td>($34,200)</td>
</tr>
<tr>
<td>12. PV cost of leasing</td>
<td>($125,617)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>III. Cost comparison:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13. Net advantage to leasing (NAL) = PV cost of leasing - PV cost of owning</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>= -$125,617 - (-$126,987)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>= $1,370.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: The MACRS depreciation allowances are .20, .32, .19, and .12 in Years 1 through 4, respectively.

Line 3 shows the maintenance tax savings. Because maintenance expense is tax deductible, the Group saves .40 x $2,500 = $1,000 in taxes by paying the maintenance fee.

Line 4 shows the depreciation tax savings, which equals the depreciation expense times the tax rate. For example, the MACRS allowance for the first year is 20 percent, so the depreciation expense is .20 x $200,000 = $40,000 and the depreciation tax savings is .40 x $20,000 = $16,000.

Lines 5 and 6 show the residual value cash flows. The residual value is estimated to be $20,000, but the tax book value after four years of depreciation is $200,000 - $40,000 - $64,000 - $38,000 - $24,000 = $34,000. (See the note at the bottom of Exhibit 15.1.) Thus, the Group is losing $14,000 for tax purposes, which results in the .4 x $14,000 = $5,600 tax savings shown as an inflow in Line 6.
Line 7, which sums the component cash flows, shows the net cash flows associated with borrowing and buying.

Part II of Exhibit 15.1 is an analysis of the cost of leasing. The lease payments, shown in Line 9, are $57,000 per year; this rate, which includes maintenance, was established by the prospective lessor and offered to the Group. If the Group accepts the lease, the full amount will be a deductible expense, so the tax savings, shown in Line 10, is \[0.40 \times \text{lease payment} = 0.40 \times 57,000 = 22,800 \]. The net cash flows associated with leasing are shown in Line 11.

The final step is to compare the net cost of owning with the net cost of leasing, so we must put the annual cash flows associated with owning and leasing on a common basis by converting them to present values, which raises the question of the proper rate at which to discount the net cash flows. We know that the riskier the cash flows, the higher the discount rate that should be applied to find the present value. This principle was applied in both security valuation and capital budgeting analysis, and it also applies to lease analysis.

Just how risky are the cash flows under consideration here? Most of them are relatively certain, at least when compared with the types of cash flows associated with stock investments or with the Group's operations. For example, the loan payment schedule is set by contract, as is the lease payment schedule. Depreciation expenses are established by law and not subject to change, and the annual maintenance fee is fixed by contract as well. The tax savings are somewhat uncertain because they depend on the Group's future marginal tax rates. The residual value is the riskiest of the cash flows, but, even here, the Group's management believes that its risk is minimal.

Because the cash flows under the lease and under the borrow and purchase alternatives are both relatively certain, they should be discounted at a relatively low rate. Most analysts recommend that the firm's cost of debt financing be used, and this rate seems reasonable in our example. However, the Group's cost of debt—10 percent—must be adjusted to reflect the tax deductibility of interest payments because this benefit of borrowing and buying is not accounted for in the cash flows.

Thus, the Group's effective cost of debt becomes \[\text{Before-tax cost} \times (1 - \text{Tax rate}) = 10\% \times 0.6 = 6\%.\] Accordingly, the cash flows in Lines 7 and 11 are discounted at a 6 percent rate. The resulting present values are $126,987 for the cost of owning and $125,617 for the cost of leasing, as shown in Lines 8 and 12. Leasing is the lower-cost financing alternative, so the Group should lease, rather than buy, the computer.

The cost comparison can be formalized by defining the net advantage to leasing (NAL) as follows:

\[
\text{NAL} = \text{PV cost of leasing} - \text{PV cost of owning} = -$125,617 - (-$126,987) = $1,370.
\]

The positive NAL shows that leasing creates more value than buying, so the Group should lease the equipment. Indeed, the value of the Group increases by $1,370 if it leases, rather than buys, the computer system.
Percentage Cost Analysis

The Group's lease-versus-buy decision can also be analyzed by looking at the effective cost rate on the lease and comparing it to the after-tax cost rate on the loan. If the cost rate implied in the lease contract is less than the 6 percent after-tax loan cost, there is an advantage to leasing.

Exhibit 15.2 sets forth the cash flows needed to determine the percentage cost of the lease.

---

Exhibit 15.2
Nashville Radiology Group: Percentage Cost Analysis

<table>
<thead>
<tr>
<th>Year 0</th>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
<th>Year 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leasing cash flow</td>
<td>($34,200)</td>
<td>($34,200)</td>
<td>($34,200)</td>
<td>$0</td>
</tr>
<tr>
<td>Owning cash flow</td>
<td>(201,500)</td>
<td>14,500</td>
<td>24,100</td>
<td>13,700</td>
</tr>
<tr>
<td>Leasing - Owning CF</td>
<td>$167,300</td>
<td>($48,700)</td>
<td>($58,300)</td>
<td>($47,900)</td>
</tr>
</tbody>
</table>

NAL = $1,370.
IRR = 5.6%.
---

Here is an explanation of the exhibit:

1. The first step is to calculate the leasing-versus-owning cash flows, which are obtained by subtracting the owning cash flows (Line 7 from Exhibit 15.1) from the leasing cash flows shown in Line 11. The differences, shown in Line 3 of Exhibit 15.2, are the incremental cash flows to the Group if it leases rather than buys the computer.

2. Note that Exhibit 15.2 consolidates the analysis shown in Exhibit 15.1 into a single set of cash flows. At this point, we can discount the consolidated cash flows by 6 percent to obtain the NAL of $1,370. In Exhibit 15.1, we discounted the owning and leasing cash flows separately and then subtracted their present values to obtain the NAL. In Exhibit 15.2, we subtracted the cash flows first to obtain a single set of incremental flows and then found their present value. The end result is the same.

3. The consolidated cash flows provide a good insight into the economics of leasing. If the Group leases the computer, it avoids the Year 0 $167,300 net cash outlay required to buy the equipment, but it is then obligated to a series of cash outflows for four years. In marketing materials, leasing companies are quick to point out the fact that leasing avoids a large, upfront cash outlay ($167,300 in this example). However, they are not so quick to mention that the "cost" to save this outlay is an obligation to make payments over the next four years. Leasing makes sense financially (disregarding other factors) only if the savings up front are worth the cost over time.

4. By inputting the leasing-versus-owning cash flows listed in Exhibit 15.2 into the cash flow registers of a calculator and solving for IRR (or by using a spreadsheet's IRR function), we can find the cost rate inherent
in the cash flow stream—5.6 percent. This rate is the equivalent after-tax cost rate implied in the lease contract. Because this cost rate is less than the 6 percent after-tax cost of a loan, leasing is less expensive than borrowing and buying. Thus, the percentage cost analysis confirms the dollar cost (NAL) analysis.

**Some Additional Points**

So far, we have discussed the main features of a lessee's analysis. Here are some additional points of relevance:

1. The dollar cost and percentage cost approaches will always lead to the same decision. Thus, one method is as good as the other from a decision standpoint.

2. If the net residual value cash flow (residual value and tax effect) is considered to be much riskier than the other cash flows in the analysis, it is possible to account for this risk by applying a higher discount rate to this flow, which results in a lower present value. Because the net residual value flow is an inflow in the cost of owning analysis, a lower present value leads to a higher present value cost of owning. Thus, increasing residual value risk decreases the attractiveness of owning an asset. To illustrate the concept, assume that the Group's managers believe that the computer's residual value is much riskier than the other flows in Exhibit 15.1. Furthermore, they believe that 10 percent, rather than 6 percent, is the appropriate discount rate to apply to the residual value flows. When the analysis is modified to reflect this risk, the present value cost of owning increases to $129,780, while the NAL increases to $4,163. The riskier the residual value, all else the same, the more favorable leasing becomes because residual value risk is borne by the lessor.

3. Remember that net present value (NPV) is the dollar present value of a project, assuming that it is financed using debt and equity financing. In lease analysis, the NAL is the additional dollar present value of a project attributable to leasing, as opposed to conventional (debt) financing. Thus, as an approximation of the value of a leased asset to the business, the project's NPV can be increased by the amount of NAL:

   \[
   \text{Adjusted NPV} = \text{NPV} + \text{NAL}.
   \]

   In some cases, the value added through leasing can turn unprofitable (negative NPV) projects into profitable (positive adjusted NPV) projects.

**Self-Test Questions**

Explain how the cash flows are structured in conducting a dollar cost (NAL) analysis.

What discount rate should be used when lessees perform lease analyses?

What is the economic interpretation of the net advantage to leasing?

What is the economic interpretation of a lease's IRR?

**Motivations for Leasing**
Although we do not prove it here, leasing is a zero-sum game—that is, when both the lessor and the lessee have the same inputs (equal costs, tax rates, residual value estimates, and so on), a positive NAL for the lessee creates an equal, but negative, return (NPV) for the lessor. Thus, under symmetric conditions, it would be impossible to structure a lease that would be acceptable to both the lessee and lessor, and, hence, no leases would be written. The large amount of leasing activity that takes place is driven by differentials between the lessee and the lessor. In this section, we discuss some of the differentials that motivate lease agreements.

**Tax Differentials**

Many leases are driven by tax differentials. Historically, the typical tax asymmetry arose between highly taxed lessors and lessees with sufficient tax shields (primarily depreciation) to drive their tax rates down significantly, even to zero. In these situations, the asset's depreciation tax benefits could be taken by the lessor, and then this value would be shared with the lessee. In addition, other possible tax motivations exist, including tax differentials between not-for-profit providers (with zero taxes) and investor-owned lessors (with positive tax rates).

**The Alternative Minimum Tax (AMT)**

Taxable corporations are permitted to use accelerated depreciation and other tax shelters to reduce taxable income but, at the same time, use straight-line depreciation for stockholder reporting. Thus, under the normal procedure for determining federal income taxes, many profitable businesses report large net incomes but pay little or no federal income taxes. The alternative minimum tax (AMT), which roughly amounts to 20 percent of profits as reported to shareholders, is designed to force profitable firms to pay at least some taxes. Firms that are exposed to heavy tax liabilities under the AMT naturally seek ways to reduce reported income. One way is to use high-payment short-term leases, which increase the business's expenses and consequently lowers reported profits and AMT liability. Note that the lease payments do not have to qualify as a deductible expense for regular tax purposes; all that is needed is that they reduce reported income shown on the income statement.

**Ability to Bear Obsolescence (Residual Value) Risk**

Leasing is an attractive financing alternative for many high-tech items that are subject to rapid and unpredictable technological obsolescence. For example, assume that a small, rural hospital plans to acquire a magnetic resonance imaging (MRI) device. If it buys the MRI equipment, it is exposed to the risk of technological obsolescence. In a relatively short time, some new technology might be developed that makes the current system nearly worthless, which could create a financial burden on the hospital. Because it does not use much equipment of this nature, the hospital would bear a great deal of risk if it buys the MRI device.

Conversely, a lessor that specializes in state-of-the-art medical equipment might be exposed to significantly less risk. By purchasing and then leasing many different high-tech items, the lessor benefits from portfolio diversification; over time, some items will lose more value than the lessor expected, but these losses will be offset by other items that retain more value than expected. Also, because specialized lessors are familiar with the markets for used medical equipment, they can both estimate residual values better and negotiate better prices when the asset is resold (or leased to another
business) than can a hospital. Because the lessor is better able than the hospital to bear residual value risk, the lessor could charge a premium for bearing this risk that is less than the risk premium inherent in ownership.

Some lessors also offer programs that guarantee that the leased asset will be modified as necessary to keep abreast of technological advancements. For an increased rental fee, lessors will provide upgrades to keep the leased equipment current regardless of the cost. To the extent that lessors are better able to forecast such upgrades, negotiate better terms from manufacturers, and, by greater diversification, control the risks involved with such upgrades, it may be cheaper for users to ensure state-of-the art equipment by leasing than by buying.

**Ability to Bear Utilization Risk**

A type of lease that is gaining popularity among healthcare providers is the *per procedure lease*. In this type of lease, instead of a fixed annual or monthly payment, the lessor charges the lessee a fixed amount for each procedure performed. For example, the lessor may charge the hospital $300 for every scan performed using a leased MRI device, or it may charge $400 per scan for the first 50 scans in each month and $200 for each scan above 100. Because the hospital's reimbursement for MRI scans typically depends primarily on the amount of utilization, and because the per procedure lease changes the hospital's costs for the MRI from fixed to variable, the hospital's risk is reduced.

However, the conversion of the payment to the lessor from a known amount to an uncertain stream increases the lessor's risk. In essence, the lessor is now bearing the utilization (operating) risk of the MRI. Although the passing of risk often produces no net benefit, a per procedure lease can be beneficial to both parties if the lessor is better able than the lessee to bear the utilization risk. As before, if the lessor has written a large number of per procedure leases, some of the leases will be more profitable than expected and some will be less profitable than expected; but if the lessor's expectations are unbiased, the aggregate return on all leases will be quite close to that expected.

**Ability to Bear Project Life Risk**

Leasing can also be attractive when a business is uncertain about how long an asset will be needed. To illustrate the concept, consider the following example. Hospitals sometimes offer services that are dependent on a single staff member—for example, a physician who performs liver transplants. To support the physician's practice, the hospital might have to invest millions of dollars in equipment that can be used only for this procedure. The hospital will charge for the use of the equipment, and if things go as expected, the investment will be profitable. However, if the physician dies or leaves the hospital staff, and if no other qualified physician can be recruited to fill the void, the project must be abandoned and the equipment becomes useless to the hospital. In this situation, the annual usage may be quite predictable, but the need for the asset could suddenly cease.

A lease with a cancellation clause would permit the hospital to simply return the equipment to the lessor. The lessor would charge something for the cancellation clause because such clauses increase the riskiness of the lease to the lessor. The increased lease cost would lower the expected profitability of the project, but it would provide the hospital with an option to abandon the
equipment, and such an option could have a value that exceeds the incremental cost of the cancellation clause. The leasing company would be willing to write this option because it is in a better position to remarket the equipment, either by writing another lease or by selling it outright.

Maintenance Services

Some businesses find leasing attractive because the lessor is able to provide better or less expensive (or both) maintenance services. For example, MEDTRANS, Inc., a for-profit ambulance and medical transfer service that operates in Pennsylvania, recently leased 25 ambulances and transfer vans. The lease agreement, with a lessor that specializes in purchasing, maintaining, and then reselling automobiles and trucks, permitted the replacement of an aging fleet that MEDTRANS had built up over seven years. “We are pretty good at providing emergency services and moving sick people from one facility to another, but we aren't very good at maintaining an automotive fleet,” said MEDTRANS's CEO.

Lower Information Costs

Leasing may be financially attractive to smaller businesses that have limited access to debt markets. For example, a small, recently formed physician group practice may need to finance one or more diagnostic devices, such as an EKG machine. The group has no credit history, so it would be relatively difficult, and hence costly, for a bank to assess the group's credit risk. Some banks might think the loan is not even worth the effort. Others might be willing to provide the loan, but only after building the high cost of credit assessment into the cost of the loan. On the other hand, some lessors specialize in leasing to medical practices, so their analysts have assessed the financial worthiness of hundreds, or even thousands, of such businesses. Thus, it would be relatively easy for them to make the credit judgment, and, hence, they might be more willing than conventional lenders to provide the financing and charge lower rates.

Lower Risk in Bankruptcy

Finally, leasing may be less expensive than buying to firms that are poor credit risks. As discussed earlier, in the event of financial distress leading to reorganization or liquidation, lessors generally have more secure claims than do lenders. Thus, lessors may be willing to write leases to firms with poor financial characteristics that are less costly than loans offered by lenders, if such loans are even available.

There are other reasons that might motivate businesses to lease an asset rather than buy it. Often, these reasons are difficult to quantify, so they cannot be easily incorporated into a numerical analysis. Nevertheless, a sound lease analysis must begin with a quantitative analysis, and then qualitative factors can be considered before making the final lease-or-buy decision.

Self-Test Questions

What are some economic factors that motivate leasing—that is, what asymmetries might exist that make leasing beneficial to both lessors and lessees?

Would it ever make sense to lease an asset that has a negative NAL when evaluated by a conventional lease analysis? Explain your answer.

Business Valuation
We now move to the second topic of this chapter, *business valuation*. Entire businesses, as opposed to individual projects, are valued for many reasons, including acquisitions, buyouts, and the assessment of taxes. Although many different approaches can be used to value businesses, we will focus on the two most commonly used in the health services industry: the discounted cash flow and market multiple approaches.

Regardless of the valuation approach, it is crucial to understand three concepts that affect valuations. First, if the valuation is for acquisition purposes, the business being valued typically will not continue to operate as a separate entity but will become part of the acquiring business's portfolio of assets. Thus, any changes in ownership form or operations that occur as a result of the proposed merger that would affect the value of the business must be considered in the analysis. Second, the goal of most valuations is to estimate the equity value of the business because most valuations are done to assess the value of ownership. Thus, although we use the phrase *business valuation*, the ultimate goal is to value the ownership stake in the business rather than its total value. Finally, *business valuation is an imprecise process*. The best that can be done, even by professional appraisers who conduct these valuations on a regular basis, is to attain a reasonable valuation rather than a precise one.

**Discounted Cash Flow Approach**

The discounted cash flow (DCF) approach to valuing a business involves the application of classic capital budgeting procedures to an entire business. To apply this approach, two key items are needed: (1) a set of statements that estimate the cash flows expected from the business; and (2) a discount rate to apply to these cash flows.

The development of accurate cash flow forecasts is, by far, the most important step in the DCF approach. Exhibit 15.3 contains projected profit and loss statements for Doctors' Hospital, an investor-owned hospital that is being valued by its owners for possible future sale. Doctors' Hospital currently uses 50 percent debt (at book values), and it has a 40 percent marginal federal-plus-state tax rate.

<table>
<thead>
<tr>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
<th>Year 4</th>
<th>Year 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Net revenues</td>
<td>$105.0</td>
<td>$126.0</td>
<td>$151.0</td>
<td>$174.0</td>
</tr>
<tr>
<td>2. Patient services expenses</td>
<td>80.0</td>
<td>94.0</td>
<td>111.0</td>
<td>127.0</td>
</tr>
<tr>
<td>3. Other expenses</td>
<td>9.0</td>
<td>12.0</td>
<td>13.0</td>
<td>16.0</td>
</tr>
<tr>
<td>4. Depreciation</td>
<td>8.0</td>
<td>8.0</td>
<td>9.0</td>
<td>9.0</td>
</tr>
<tr>
<td>5. Earnings before interest and taxes</td>
<td>$ 8.0</td>
<td>$ 12.0</td>
<td>$ 18.0</td>
<td>$ 22.0</td>
</tr>
<tr>
<td>6. Interest</td>
<td>4.0</td>
<td>4.0</td>
<td>5.0</td>
<td>5.0</td>
</tr>
<tr>
<td>7. Earnings before taxes (EBT)</td>
<td>$ 4.0</td>
<td>$ 8.0</td>
<td>$ 13.0</td>
<td>$ 17.0</td>
</tr>
<tr>
<td>8. Taxes (40 percent)</td>
<td>1.6</td>
<td>3.2</td>
<td>5.2</td>
<td>6.8</td>
</tr>
<tr>
<td>9. Net profit</td>
<td>$ 2.4</td>
<td>$ 4.8</td>
<td>$ 7.8</td>
<td>$ 10.2</td>
</tr>
<tr>
<td>1. Estimated retentions</td>
<td>$ 4.0</td>
<td>$ 4.0</td>
<td>$ 7.0</td>
<td>$ 9.0</td>
</tr>
</tbody>
</table>

Line 1 of Exhibit 15.3 contains the forecast for Doctors' net revenues, including patient services revenue and other revenue. Note that all contractual
allowances and other adjustments to charges, including collection delays, have been considered, so Line 1 represents actual cash revenues. Lines 2 and 3 show the cash expense forecasts, while Line 4 lists depreciation—a noncash expense. Line 5, which is merely Line 1 minus Lines 2, 3, and 4, shows the earnings before interest and taxes (EBIT) projection for each year. Note that if the valuation were being conducted by another business that was considering making an acquisition bid for Doctors' Hospital, the revenue and expense amounts would reflect any utilization, reimbursement, and cost efficiencies that would occur as a result of the acquisition.

Note that the interest expense values shown in Line 6 include interest on current debt as well as interest on debt issued to fund growth. In addition to interest expense, any debt principal repayments that will not be funded by new debt must be reflected in Exhibit 15.3. Because such payments are made from after-tax income, they would be placed on a line below net profit—say, on a new Line 9a. Line 7 shows the earnings before taxes (EBT), and Line 8 lists the taxes based on Doctors’ 40 percent marginal rate. Note here that any tax rate changes that would result from an acquisition must be incorporated into the profit and loss statement forecasts. Line 9 lists each year’s net profit.

Finally, because some of Doctors' assets are expected to wear out or become obsolete, and because the hospital must grow its assets to support projected revenue growth, some equity funds (shown in Line 10) must be retained and reinvested in the subsidiary to pay for asset replacement and growth. These retentions, which would be matched by equal amounts of new debt, are not available for distribution to shareholders.

Exhibit 15.4

<table>
<thead>
<tr>
<th>Selected Cost of Capital Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost of equity</td>
</tr>
<tr>
<td>Cost of debt</td>
</tr>
<tr>
<td>Proportion of debt financing</td>
</tr>
<tr>
<td>Proportion of equity financing</td>
</tr>
<tr>
<td>Tax rate</td>
</tr>
</tbody>
</table>

\[
CCC = \left[ w_d \times R_d \times (1 - T) \right] + \left[ w_e \times R_e \right] \\
= \left[ .50 \times 10\% \times (1 - .40) \right] + \left[ .50 \times 18\% \right] \\
= 3\% + 9\% = 12\%.
\]

Note: If necessary, see Chapter 8 for a discussion of the corporate cost of capital (CCC).

Exhibit 15.4 provides relevant cost of capital data for Doctors' Hospital. These data will be used to set the discount rate used in the DCF valuation. As with many healthcare valuations, there is no market beta available to help establish the cost of equity. Doctors’ Hospital is investor-owned but not publicly traded, whereas in other situations, the business could be not-for-profit. However, we can obtain market betas of the stocks of the major investor-owned hospital chains, and this value could be used to help estimate the cost of equity given earlier. It is important to realize that the discount rate used in the DCF valuation must reflect the riskiness of the cash flows being discounted. If the valuation is for acquisition purposes, and if the riskiness of the cash flows will be affected by the acquisition, the cost of

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capital calculated for the business must be adjusted to reflect any expected changes in risk.

The cost of equity estimate in Exhibit 15.4 merits additional discussion. The cost of equity estimate based on market data, which is what we have focused on in the text thus far, is applicable to large publicly traded companies whose stock is owned by well-diversified investors. For example, in the Doctors' Hospital illustration, the cost of equity of large hospital management companies was estimated to be 14 percent. However, such companies are highly diversified both geographically and in the types of services provided. In addition, equity (stock) ownership in such companies is highly liquid; if a stockholder wants out, he or she simply calls a broker and sells the shares. Thus, a “traditional” large company cost of equity estimate does not reflect the added risks inherent in an equity position in a small, undiversified business whose stock is illiquid.

Therefore, it is necessary to add an additional premium to account for the added risks associated with ownership of a small company. This premium, called the size premium, is thought to be about four percentage points. Thus, Doctors' cost of equity estimate is actually based on a 14 percent estimate for similar large companies plus a four percentage point size premium: 14% + 4% = 18%. If there were other factors in addition to size—such as heavy use of new, unproven technology, extreme illiquidity, or lack of portfolio diversification—they would increase the risk of ownership even more, and an additional risk premium would be added to compensate for the unique riskiness inherent in that small company. We will use 18 percent as our estimate for Doctors' cost of equity, but an even higher rate probably could be justified.

At this point, there are several alternative cash flow/discount rate combinations that could be used to complete the DCF valuation. The most widely used DCF method for business valuation, the free equity cash flow method, focuses on cash flows that accrue solely to equityholders (owners). Free equity cash flow is defined as net profit plus noncash expenses (depreciation), less equity cash flow needed for reinvestment in the business. Exhibit 15.5 uses the data from Exhibit 15.3 to forecast the free equity cash flows for Doctors' Hospital. In valuation analyses, the term free means cash flows that are available to the owners after all other expenses, including asset replacement to support growth, have been taken into account.

<table>
<thead>
<tr>
<th>Exhibit 15.5</th>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
<th>Year 4</th>
<th>Year 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Net profit</td>
<td>$2.4</td>
<td>$4.8</td>
<td>$7.8</td>
<td>$10.2</td>
<td>$13.2</td>
</tr>
<tr>
<td>2. Plus depreciation</td>
<td>8.0</td>
<td>8.0</td>
<td>9.0</td>
<td>9.0</td>
<td>10.0</td>
</tr>
<tr>
<td>3. Less retentions</td>
<td>4.0</td>
<td>4.0</td>
<td>7.0</td>
<td>9.0</td>
<td>12.0</td>
</tr>
<tr>
<td>4. Free equity cash flow</td>
<td>$6.4</td>
<td>$5.8</td>
<td>$9.8</td>
<td>$10.2</td>
<td>$11.2</td>
</tr>
</tbody>
</table>

The next step in the DCF valuation process is to choose the appropriate discount rate (opportunity cost of capital). Unlike a typical capital budgeting analysis that focuses on operating cash flows, our DCF business valuation focuses on equity flows. Thus, the discount rate applied must reflect the riskiness of cash flows (which have greater risk than do operating flows) after interest expense is deducted. What capital cost reflects the riskiness of these
higher-risk equity flows? The answer is the cost of equity, which means that
the appropriate discount rate to apply to the Exhibit 15.5 cash flows is the 18
percent cost of equity, not the 12 percent corporate cost of capital.

Because we have projected only five years of cash flows, and because Doctors' Hospital will generate cash flows for many years (perhaps 20 or 30 years or more), it is necessary to estimate a terminal value. If the free equity cash flows given in Exhibit 15.5 are assumed to grow at a constant rate after Year 5, the constant growth model can be used to estimate the value of all free equity cash flows that would occur in Year 6 and beyond. Assuming a constant 3 percent growth rate in free equity cash flow forever, the terminal value at the end of Year 5 is estimated to be $76.9 million:

\[
\text{Terminal value} = \frac{\text{Year 5 free equity cash flow} \times (1 + \text{Growth rate})}{\text{Required rate of return} - \text{Growth rate}}
\]

\[
= \frac{($11.2 \times 1.03)}{(0.18 - 0.03)}
= $11.54 \div 0.15
= $76.9\text{ million}.
\]

Combining the free equity cash flows from Exhibit 15.5 with this terminal value produces the following set of flows (in millions):

<table>
<thead>
<tr>
<th>Year</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>$6.4</td>
</tr>
<tr>
<td>2</td>
<td>$8.8</td>
</tr>
<tr>
<td>3</td>
<td>$9.8</td>
</tr>
<tr>
<td>4</td>
<td>$10.2</td>
</tr>
<tr>
<td>5</td>
<td>$11.2</td>
</tr>
<tr>
<td></td>
<td>$76.9</td>
</tr>
<tr>
<td></td>
<td>$88.1</td>
</tr>
</tbody>
</table>

The final step in the DCF valuation process is to discount the cash flows at
the cost of equity–18 percent. The resulting present (Year 0) value is $61.5 million. Thus, the DCF method estimates a value for Doctors' Hospital of about $60 million.

Note that the final value estimate of Doctors' Hospital probably would be higher than the DCF value. The reason is that the DCF method values only the operations of the business. Thus, $60 million represents only the value of all of the business's assets that support operations. Many businesses hold nonoperating assets, such as marketable securities in excess of that required for operations or real estate that will not be needed in the future to support operations.

The overall value of a business is the sum of its operational value, as estimated by the DCF method, plus the market values of any nonoperating assets. In this example, we assume that Doctors' Hospital does not have material nonoperating assets, so a reasonable estimate of its value is $60 million. Although we will not illustrate it here, the valuation would include a risk analysis of the cash flows that is similar to that performed on capital budgeting flows. Generally, scenario analysis (and perhaps Monte Carlo simulation) would be used to obtain some feel for the degree of uncertainty in the final estimate, which might further be used to set a valuation range rather than focus on a single estimate.
A second method for valuing entire businesses is market multiple analysis, which applies a market-determined multiple to some proxy for value—typically some measure of revenues or earnings. Like the DCF valuation approach, the basic premise here is that the value of any business depends on the cash flows that the business produces. The DCF approach applies this premise in a precise manner, whereas market multiple analysis is more ad hoc.

To illustrate the concept, suppose that recent data of for-profit hospitals indicate that equity values average about four to five times the business's EBITDA, which means earnings before interest, taxes, depreciation, and amortization. Thus, we would say that the EBITDA market multiple is in the range of 4 to 5. To estimate the value of Doctors' equity using this method, note that Doctors' Year 1 EBITDA estimate is $8 million in EBIT plus $8 million in depreciation, or $16 million. Multiplying EBITDA by the 4.5 average market multiple results in an equity value of $72 million. Because of the uncertainties involved in the market multiple process, we will use $70 million as our estimate.

To illustrate another, less direct proxy, consider the nursing home industry. In recent years, prices paid for nursing home acquisitions have been in the range of $80,000 to $120,000 per bed, with an average of roughly $100,000. Thus, using number of beds as the proxy for value, a nursing home with 50 beds would be valued at 50 x $100,000 = $5 million.

Comparison of the Valuation Methods

Clearly, the valuation of any business can be considered only a rough estimate. In the Doctors' Hospital illustration, we obtained values for the business of $60 and $70 million. Thus, we might conclude that the value of Doctors' Hospital falls somewhere in the range of $60 to $70 million. In many real-world valuations, the range is even larger than in our example. Because the estimates of the two methods can differ by large amounts, it is important to understand the advantages and disadvantages of each method.

Although the DCF approach has strong theoretical support, one has to be very concerned over the validity of the estimated cash flows and the discount rate applied to those flows. Sensitivity analyses demonstrate that it doesn't take much change in the terminal value growth rate or discount rate estimates to create large differences in estimated value. Thus, the theoretical superiority of the DCF approach is offset to some degree by the difficulties inherent in estimating the model's input values.

The market multiple method is more ad hoc, but its proponents argue that a proxy estimate for a single year, such as measured by EBITDA, is more likely to be accurate than a multiple-year cash flow forecast. Furthermore, the market multiple approach avoids the problem of having to estimate a terminal value. Of course, the market multiple approach has problems of its own. One concern is the comparability between the business being valued and the firm (or firms) that set the market multiple. Another concern is how well one year, or even an average of several years, of EBITDA (or some other value proxy) captures the value of a business that will operate for many years into the future. After all, if the valuation is for merger purposes, merger-related synergies could cause the target’s EBITDA to soar in coming years.
The bottom line here is that problems are inherent in both methods. In general, business valuations should use both the DCF and market multiple methods, as well as other available methods. Then, a great deal of judgment must be applied to reconcile the valuation differences that typically occur.

**Self-Test Questions**

Briefly describe two approaches commonly used to value businesses.

What are some problems that occur in the valuation process?

Which approach do you believe to be best? Explain your answer.

**Key Concepts**

In this chapter, we discussed both leasing decisions and business valuation. The key concepts of this chapter are as follows:

- Lease agreements are informally categorized as either operating leases or financial (capital) leases.

- The IRS has guidelines that apply to lease arrangements. A lease that meets these guidelines is called a guideline, or tax-oriented, lease because the IRS permits the lessee to deduct the lease payments. A lease that does not meet IRS guidelines is called a non-tax-oriented lease. In such leases, ownership effectively resides with the lessee rather than the lessor.

- Accounting rules spell out the conditions under which a lease must be capitalized (shown directly on the balance sheet), as opposed to shown only in the notes of the financial statements. Generally, leases that run for a period equal to or greater than 75 percent of the asset's life must be capitalized.

- The lessee's analysis consists of a comparison of the costs and benefits associated with leasing the asset and the costs and benefits associated with owning (borrowing and buying) the asset. There are two analytical techniques that can be used: the dollar-cost (NAL) method and the percentage-cost (IRR) method.

- One of the key issues in the lessee's analysis is the appropriate discount rate. Because the cash flows in a lease analysis are known with relative certainty, the appropriate discount rate is the lessee's after-tax cost of debt. A higher discount rate may be used on the residual value if it is substantially riskier than the other flows.

- Leasing is motivated by differentials between lessees and lessors. Some of the more common reasons for leasing are (1) tax rate differentials, (2) alternative minimum taxes, (3) residual risk bearing, and (4) lack of access to conventional debt markets.

- The two approaches most commonly used to value businesses are the discounted cash flow approach and the market multiple approach.
• The free equity cash flow approach, which is a commonly used DCF method, focuses on the cash flows that are available to equity investors. (The free operating cash flow approach focuses on cash flows that are available to service both debt and equity investors.)

• The market multiple approach identifies some proxy for value, such as earnings before interest, taxes, depreciation, and amortization (EBITDA), and then multiplies it by a multiple derived from recent market data.

• The discounted cash flow approach has the strongest theoretical basis, but its inputs—the projected cash flows and discount rate—are difficult to estimate. The market multiple approach is somewhat ad hoc but requires a much simpler set of inputs.