



chapter 20

Lease Financing

Some of the biggest players in the airline business have never issued a ticket, lost a passenger's luggage, or landed a plane in bad weather. They are the aircraft leasing companies—the merchant bankers of aviation—and their role is to help finance aircraft and enable airlines to respond more quickly and efficiently to market changes. Among the major players in aircraft leasing are GPA Group, a closely held company based in Ireland, and International Lease Finance of Beverly Hills.

Aircraft leasing companies purchase airplanes from manufacturers such as Boeing and Airbus and then lease them, often on a relatively short-term basis, to carriers such as American, British Airways, Delta, Lufthansa, and United, as well as to small, regional companies all over the world. Leasing separates the risks and rewards of owning aircraft from those of operating them. Currently, leasing companies buy about 50% of all new commercial aircraft.

The airline industry has been undergoing major changes due to global deregulation. In the days of regulation, airlines knew precisely the routes they would serve, and they could raise prices to cover all cost increases. Thus, airlines could buy planes confident that route structures would be relatively stable and that revenues would cover financing costs. Now, however, airlines are constantly dropping and adding routes in response to changing competitive conditions. Because different types of aircraft are better suited for some routes than

others, airlines must frequently restructure their fleets for optimal operations. If an airline had purchased all of its aircraft, it would be more difficult to respond quickly to changing conditions. The leasing companies, on the other hand, lease all types of aircraft to all types of airlines, and there is usually some airline somewhere in the world that would be interested in a leased aircraft when it is returned to the leasing company. Therefore, leasing improves airlines' flexibility and efficiency.

Note, too, that global deregulation also spawned a host of start-up airlines in the United States, Europe, Africa, and Asia. Start-up airlines typically are in a precarious financial condition, and leasing companies are often more willing than banks and other lenders to take on the financing risk because lessors are in a relatively favorable legal position should the airline actually go bankrupt. Thus, it is easier for a leasing company to repossess and redeploy aircraft than it would be for a lender.

Interestingly, Airbus Industrie, the European aircraft consortium, has adopted short-term leases as a sales tool. In recent years, Delta and United "bought" aircraft from Airbus on "walkaway" leases under which airplanes with a 30-year life could be returned to the manufacturer in less than a year. U.S. manufacturers complained that Airbus can offer such terms only because it is subsidized by the four European countries that back the consortium.

Firms generally own fixed assets and report them on their balance sheets, but it is the use of assets that is important, not their ownership per se. One way to obtain the *use* of facilities and equipment is to buy them, but an alternative is to lease them. Prior to the 1950s, leasing was generally associated with real estate—land and buildings. Today, however, it is possible to lease virtually any kind of fixed asset, and currently over 30% of all new capital equipment is financed through lease arrangements.¹



e-resource

The textbook's Web site contains an *Excel* file that will guide you through the chapter's calculations. The file for this chapter is **FM12 Ch 20 Tool Kit.xls**, and we encourage you to open the file and follow along as you read the chapter.

20.1 Types of Leases

Lease transactions involve two parties: the lessor, who owns the property, and the lessee, who obtains use of the property in exchange for one or more lease, or rental, payments. (Note that the term *lessee* is pronounced “less-ee,” not “lease-ee,” and *lessor* is pronounced “less-or.”) Because both parties must agree before a lease transaction can be completed, this chapter discusses leasing from the perspectives of both the lessor and the lessee.

Leasing takes several different forms, the five most important being (1) operating leases, (2) financial, or capital, leases, (3) sale-and-leaseback arrangements, (4) combination leases, and (5) synthetic leases.

Operating Leases

Operating leases generally provide for both *financing* and *maintenance*. IBM was one of the pioneers of the operating lease contract, and computers and office copying machines, together with automobiles, trucks, and aircraft, are the primary types of equipment involved in operating leases. Ordinarily, operating leases require the lessor to maintain and service the leased equipment, and the cost of the maintenance is built into the lease payments.

Another important characteristic of operating leases is the fact that they are *not fully amortized*. In other words, the rental payments required under the lease contract are not sufficient for the lessor to recover the full cost of the asset. However, the lease contract is written for a period considerably shorter than the expected economic life of the asset, so the lessor can expect to recover all costs either by subsequent renewal payments, by releasing the asset to another lessee, or by selling the asset.

A final feature of operating leases is that they often contain a *cancellation clause* that gives the lessee the right to cancel the lease and return the asset before the expiration of the basic lease agreement. This is an important consideration to the lessee, for it means that the asset can be returned if it is rendered obsolete by technological developments or is no longer needed because of a change in the lessee's business.

Financial, or Capital, Leases

Financial leases, sometimes called **capital leases**, are differentiated from operating leases in that they (1) *do not* provide for maintenance service, (2) *are not*

¹For a detailed treatment of leasing, see James S. Schallheim, *Lease or Buy? Principles for Sound Decision Making* (Boston: Harvard Business School Press, 1994).

cancellable, and (3) *are* fully amortized (that is, the lessor receives rental payments equal to the full price of the leased equipment plus a return on invested capital). In a typical arrangement, the firm that will use the equipment (the lessee) selects the specific items it requires and negotiates the price with the manufacturer. The user firm then arranges to have a leasing company (the lessor) buy the equipment from the manufacturer and simultaneously executes a lease contract. The terms of the lease generally call for full amortization of the lessor's investment, plus a rate of return on the unamortized balance that is close to the percentage rate the lessee would have paid on a secured loan. For example, if the lessee had to pay 10% for a loan, then a rate of about 10% would be built into the lease contract.

The lessee is generally given an option to renew the lease at a reduced rate upon expiration of the basic lease. However, the basic lease usually cannot be cancelled unless the lessor is paid in full. Also, the lessee generally pays the property taxes and insurance on the leased property. Since the lessor receives a return *after*, or *net of*, these payments, this type of lease is often called a “net, net” lease.

Sale-and-Leaseback Arrangements

Under a **sale-and-leaseback** arrangement, a firm that owns land, buildings, or equipment sells the property to another firm and simultaneously executes an agreement to lease the property back for a stated period under specific terms. The capital supplier could be an insurance company, a commercial bank, a specialized leasing company, the finance arm of an industrial firm, a limited partnership, or an individual investor. The sale-and-leaseback plan is an alternative to a mortgage.

Note that the seller immediately receives the purchase price put up by the buyer. At the same time, the seller-lessee retains the use of the property. The parallel to borrowing is carried over to the lease payment schedule. Under a mortgage 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 sale-and-leaseback arrangement, the lease payments are set up exactly the same way—the payments are just sufficient to return the full purchase price to the investor, plus a stated return on the lessor's investment.

Sale-and-leaseback arrangements are almost the same as financial leases, the major difference being that the leased equipment is used, not new, and the lessor buys it from the user-lessee instead of a manufacturer or a distributor. A sale-and-leaseback is thus a special type of financial lease.

Combination Leases

Many lessors now 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 some features of each. Such leases are called **combination leases**. To illustrate, cancellation clauses are normally associated with operating leases, but many of today's financial leases also contain cancellation clauses. However, in financial leases these clauses generally include prepayment provisions whereby the lessee must make penalty payments sufficient to enable the lessor to recover the unamortized cost of the leased property.

Synthetic Leases

A fifth type of lease, the synthetic lease, should also be mentioned. These leases were first used in the early 1990s, and they became very popular in the mid- to late-1990s, when companies such as Enron and Tyco, as well as “normal” companies, discovered that synthetic leases could be used to keep debt off their balance sheets. In a typical **synthetic lease**, a corporation that wanted to acquire an asset—generally real estate, with a very long life—with debt would first establish a *special-purpose entity*, or SPE. The SPE would then obtain financing, typically 97% debt provided by a financial institution and 3% equity provided by a party other than the corporation itself.² The SPE would then use the funds to acquire the property, and the corporation would lease the asset from the SPE, generally for a term of 3 to 5 years but with an option to extend the lease, which the firm generally expected to exercise. Because of the relatively short term of the lease, it was deemed to be an operating lease and hence did not have to be capitalized and shown on the balance sheet.

A corporation that set up SPEs was required to do one of three things when the lease expired: (1) pay off the SPE’s 97% loan, (2) refinance the loan at the currently going interest rate, if the lender was willing to refinance at all, or (3) sell the asset and make up any shortfall between the sale price and the amount of the loan. Thus, the corporate user was guaranteeing the loan, yet it did not have to show an obligation on its balance sheet.

Synthetic leases stayed under the radar until 2001. As we discuss in the next section, long-term leases must be capitalized and shown on the balance sheet. Synthetic leases were designed to get around this requirement, and neither corporations such as Enron and Tyco that used them nor accounting firms such as Arthur Andersen that approved them wanted to have anyone look closely at them. However, after the scandals of the early 2000s, security analysts, the SEC, banking regulators, the FASB, and even corporate boards of directors began to seriously discuss SPEs and synthetic leases. Investors and bankers subjectively downgraded companies that made heavy use of them, and boards of directors began to tell their CFOs to stop using them and to close down the ones that existed. Moreover, the accounting regulatory bodies are in the process of revising the terms under which synthetic leases can be structured. It is not clear exactly how things will end up, but at this point the most likely outcomes are (1) that SPEs and synthetic leases will be much less important in the future than they were in the past; (2) that a lot more than 3% equity will be required to set up an SPE, meaning that the corporation will have less exposure and the lending institution more exposure; and (3) that some corporations with several synthetic leases outstanding are going to have difficulties in the near future, when those leases expire and the firms must either restructure the leases under more stringent terms or else pay off the SPE loans.

SELF-TEST

Who are the two parties to a lease transaction?

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

What is a sale-and-leaseback transaction?

What is a combination lease?

What is a synthetic lease?

²Enron’s CFO, Andy Fastow, and other insiders provided the equity for many of Enron’s SPEs. Also, a number of Merrill Lynch’s executives provided SPE equity, allegedly to enable Merrill Lynch to obtain profitable investment banking deals. The very fact that SPEs are so well suited to conceal what’s going on helped those who used them engage in shady deals that would have at least raised eyebrows had they been disclosed. In fact, Fastow pled guilty to two counts of conspiracy in connection with Enron’s accounting fraud and ultimate bankruptcy. For more on this subject, see W. R. Pollert and E. J. Glickman, “Synthetic Leases Under Fire,” at <http://www.strategicfinancemag.com>, October 2002.

20.2 Tax Effects

The full amount of the lease payments is a tax-deductible expense for the lessee *provided the Internal Revenue Service agrees that a particular contract is a genuine lease and not simply a loan called a lease*. This makes it important that a lease contract be written in a form acceptable to the IRS. A lease that complies with all IRS requirements is called a **guideline**, or **tax-oriented, lease**, and the tax benefits of ownership (depreciation and any investment tax credits) belong to the lessor. The main provisions of the tax guidelines are as follows:

1. The lease term (including any extensions or renewals at a fixed rental rate) must not exceed 80% of the estimated useful life of the equipment at the commencement of the lease transaction. Thus, an asset with a 10-year life can be leased for no more than 8 years. Further, the remaining useful life must not be less than 1 year. Note that an asset's expected useful life is normally much longer than its MACRS depreciation class life.
2. The equipment's estimated residual value (in constant dollars without adjustment for inflation) at the expiration of the lease must be at least 20% of its value at the start of the lease. This requirement can have the effect of limiting the maximum lease term.
3. Neither the lessee nor any related party can have the right to purchase the property at a predetermined fixed price. However, the lessee can be given an option to buy the asset at its fair market value.
4. Neither the lessee nor any related party can pay or guarantee payment of any part of the price of the leased equipment. Simply put, the lessee cannot make any investment in the equipment, other than through the lease payments.
5. The leased equipment must not be "limited use" property, defined as equipment that can be used only by the lessee or a related party at the end of the lease.

The reason for the IRS's concern about lease terms is that, without restrictions, a company could set up a "lease" transaction calling for very rapid payments, which would be tax deductible. The effect would be to depreciate the equipment over a much shorter period than its MACRS class life. For example, suppose a firm planned to acquire a \$2 million computer that had a 3-year MACRS class life. The annual depreciation allowances would be \$660,000 in Year 1, \$900,000 in Year 2, \$300,000 in Year 3, and \$140,000 in Year 4. If the firm were in the 40% federal-plus-state tax bracket, the depreciation would provide a tax savings of \$264,000 in Year 1, \$360,000 in Year 2, \$120,000 in Year 3, and \$56,000 in Year 4, for a total savings of \$800,000. At a 6% discount rate, the present value of these tax savings would be \$714,567.

Now suppose the firm could acquire the computer through a 1-year lease arrangement with a leasing company for a payment of \$2 million, with a \$1 purchase option. If the \$2 million payment were treated as a lease payment, it would be fully deductible, so it would provide a tax savings of $0.4(\$2,000,000) = \$800,000$ versus a present value of only \$714,567 for the depreciation shelters. Thus, the lease payment and the depreciation would both provide the same total amount of tax savings (40% of \$2,000,000, or \$800,000), but the savings would come in faster, hence have a higher present value, with the 1-year lease. Therefore, if just any type of contract could be called a lease and given tax treatment as a lease, then the timing of the tax shelters could be speeded up as compared with ownership depreciation tax shelters. This speedup would benefit companies, but it would be

costly to the government. For this reason, the IRS has established the rules described above for defining a lease for tax purposes.

Even though leasing can be used only within limits to speed up the effective depreciation schedule, there are still times when very substantial tax benefits can be derived from a leasing arrangement. For example, if a firm has incurred losses and hence has no current tax liabilities, then its depreciation shelters are not very useful. In this case, a leasing company set up by profitable companies such as GE or Philip Morris can buy the equipment, receive the depreciation shelters, and then share these benefits with the lessee by charging lower lease payments. This point will be discussed in detail later in the chapter, but the point now is that if firms 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. If there is any question about the legal status of the contract, the financial manager must be sure to have the firm's lawyers and accountants check the latest IRS regulations.³

Note that a lease that does not meet the tax guidelines is called a **non-tax-oriented lease**. For this type of lease, the lessee (1) is the effective owner of the leased property, (2) can depreciate it for tax purposes, and (3) can deduct only the interest portion of each lease payment.

SELF-TEST

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

What are some lease provisions that would cause a lease to be classified as a non-tax-oriented lease?

Why does the IRS place limits on lease provisions?

20.3 Financial Statement Effects⁴

Under certain conditions, neither the leased assets nor the liabilities under the lease contract appear directly on the firm's balance sheet. For this reason, leasing is often called **off-balance sheet financing**. This point is illustrated in Table 20-1 by the balance sheets of two hypothetical firms, B (for "borrow") and L (for "lease"). Initially, the balance sheets of both firms are identical, and they both have debt ratios of 50%. Next, each firm decides to acquire a fixed asset costing \$100. Firm B borrows \$100 and buys the asset, so both an asset and a liability go on its balance sheet, and its debt ratio rises from 50% to 75%. 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 be equally or more dangerous from the standpoint of potential bankruptcy, but the firm's debt ratio remains at only 50%.

To correct this problem, the Financial Accounting Standards Board issued FASB Statement 13, which requires that, for an unqualified audit report, firms that enter into financial (or capital) leases must restate their balance sheets and 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**, and its net effect is to

³In 1981, Congress relaxed the normal IRS rules to permit *safe harbor leases*, which had virtually no IRS restrictions and which were explicitly designed to permit the transfer of tax benefits from unprofitable companies that could not use them to high-profit companies that could. The point of safe harbor leases was to provide incentives for capital investment to companies that had little or no tax liability—under safe harbor leasing, companies with no tax liability could sell the benefit to companies in a high marginal tax bracket. In 1981 and 1982, literally billions of dollars were paid by such profitable firms as IBM and Philip Morris for the tax shelters of such unprofitable ones as Ford and Eastern Airlines. However, in 1983, Congress curtailed the use of safe harbor leases.

⁴FASB Statement 13, "Accounting for Leases," spells out in detail both the conditions under which the lease must be capitalized and the procedures for capitalizing it. Also, see Schallheim, *op. cit.*, Chapter 4, for more on the accounting treatment of leases. However, note that lease accounting is currently under review, and FASB 13 will probably be replaced in the near future.

Table 20-1

Balance Sheet Effects of Leasing

Before Asset Increase				After Asset Increase							
Firms B and L				Firm B, Which Borrows and Buys				Firm L, Which Leases			
Current assets	\$ 50	Debt	\$ 50	Current assets	\$ 50	Debt	\$150	Current assets	\$ 50	Debt	\$ 50
Fixed assets	50	Equity	50	Fixed assets	150	Equity	50	Fixed assets	50	Equity	50
	<u>\$100</u>		<u>\$100</u>		<u>\$200</u>		<u>\$200</u>		<u>\$100</u>		<u>\$100</u>
Debt/assets ratio:			<u>50%</u>				<u>75%</u>				<u>50%</u>

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 behind Statement 13 is as follows. If a firm signs a financial 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 can bankrupt a firm just as fast as the failure to make principal and interest payments on a loan. Therefore, for all intents and purposes, a financial lease is identical to a loan.⁵ This being the case, if a firm signs a financial lease agreement, this has the effect of raising its true debt ratio, and thus its true capital structure is changed. Therefore, if the firm had previously established a target capital structure, and if there is no reason to think that the optimal capital structure has changed, then lease financing requires additional equity support, exactly like debt financing.

If disclosure of the lease in our Table 20-1 example were not made, then Firm L's investors could be deceived into thinking that its financial position is stronger than it really is. Thus, even before FASB Statement 13 was issued, firms were required to disclose the existence of long-term leases in footnotes to their financial statements. At that time, it was debated as to whether or not investors recognized fully the impact of leases and, in effect, would see that Firms B and L were in essentially the same financial position. Some people argued that leases were not fully recognized, even by sophisticated investors. If this were the case, then leasing could alter the capital structure decision in a significant manner—a firm could increase its true leverage through a lease arrangement, and this procedure would have a smaller effect on its cost of conventional debt, r_d , and on its cost of equity, r_s , than if it had borrowed directly and reflected this fact on its balance sheet. These benefits of leasing would accrue to existing investors at the expense of new investors who would, in effect, be deceived by the fact that the firm's balance sheet did not reflect its true financial leverage.

⁵There are, however, certain legal differences between loans and leases. In the event of liquidation in bankruptcy, a lessor is entitled to take possession of the leased asset, and if the value of the asset is less than the required payments under the lease, the lessor can enter a claim (as a general creditor) for one year's lease payments. Also, after bankruptcy has been declared but before the case has been resolved, lease payments may be continued, whereas all payments on debts are generally stopped. In a reorganization, the lessor receives the asset plus three years' lease payments if needed to cover the value of the lease. The lender under a secured loan arrangement has a security interest in the asset, meaning that if it is sold, the lender will be given the proceeds, and the full unsatisfied portion of the lender's claim will be treated as a general creditor obligation. It is not possible to state, as a general rule, whether a supplier of capital is in a stronger position as a secured creditor or as a lessor. However, in certain situations, lessors may bear less risk than secured lenders if financial distress occurs.

The question of whether investors were truly deceived was debated but never resolved. Those who believed strongly in efficient markets thought that investors were not deceived and that footnotes were sufficient, while those who questioned market efficiency thought that all leases should be capitalized. Statement 13 represents a compromise between these two positions, though one that is tilted heavily toward those who favor capitalization.

A lease is classified as a capital lease, hence must be capitalized and 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% of the asset's life. Thus, if an asset has a 10-year life and the lease is written for 8 years, the lease must be capitalized.
4. The present value of the lease payments is equal to or greater than 90% of the initial value of the asset.⁶

These rules, together with strong footnote disclosure rules for operating leases, were supposed to be sufficient to ensure that no one would be fooled by lease financing. Thus, leases should be regarded as debt for capital structure purposes, and they should have the same effects as debt on r_d and r_s . Therefore, leasing is not likely to permit a firm to use more financial leverage than could be obtained with conventional debt.⁷

SELF-TEST

Why is lease financing sometimes referred to as off-balance sheet financing?

What is the intent of FASB Statement 13?

What is the difference in the balance sheet treatment of a lease that is capitalized versus one that is not?

20.4 Evaluation by the Lessee

Leases are evaluated by both the lessee and the lessor. The lessee must determine whether leasing an asset is less costly than buying it, and the lessor must decide whether the lease payments provide a satisfactory return on the capital invested in the leased asset. This section focuses on the lessee's analysis.

In the typical case, the events leading to a lease arrangement follow the sequence described below. We should note that a degree of uncertainty exists regarding the theoretically correct way to evaluate lease-versus-purchase decisions, and some very complex decision models have been developed to aid in the analysis. However, the simple analysis given here leads to the correct decision in all the cases we have ever encountered.

1. The firm decides to acquire a particular building or piece of equipment; this decision is based on regular capital budgeting procedures. Whether or not to acquire the asset is *not* part of the typical lease analysis—in a lease analysis, we



e-resource

See **FM12 Ch 20 Tool Kit.xls** at the textbook's Web site for all calculations.

⁶The discount rate used to calculate the present value of the lease payments must be the lower of (1) the rate used by the lessor to establish the lease payments (this rate is discussed later in the chapter) or (2) the rate of interest that the lessee would have to pay for new debt with a maturity equal to that of the lease. Also, note that any maintenance payments embedded in the lease payment must be stripped out prior to checking this condition.

⁷Note that Statement 13 was written many years before synthetic leases were developed. Synthetic leases can undercut FASB 13, but we anticipate new rules on lease accounting that will return the situation to that envisioned under FASB 13 at the time it was written.

are concerned simply with whether to obtain the use of the machine by lease or by purchase. Thus, for the lessee, the lease decision is typically just a financing decision. However, if the effective cost of capital obtained by leasing is substantially lower than the cost of debt, then the cost of capital used in the capital budgeting decision would have to be recalculated, and perhaps projects formerly deemed unacceptable might become acceptable. See *Web Extension 20B* at the textbook's Web site for more information on such feedback effects.

2. Once the firm has decided to acquire the asset, the next question is how to finance it. Well-run businesses do not have excess cash lying around, so capital to finance new assets must be obtained from some source.
3. Funds to purchase the asset could be obtained from internally generated cash flows, by borrowing, or by selling new equity. Alternatively, the asset could be leased. Because of the capitalization/disclosure provision for leases, leasing normally has the same capital structure effect as borrowing.
4. As indicated earlier, a lease is comparable to a loan in the sense that the firm is required to make a specified series of payments, and a failure to meet these payments could result in bankruptcy. If a company has a target capital structure, then \$1 of lease financing displaces \$1 of debt financing. Thus, the most appropriate comparison is lease financing versus debt financing. Note that the analysis should compare the cost of leasing with the cost of debt financing *regardless* of how the asset purchase is actually financed. The asset may be purchased with available cash or cash raised by issuing stock, but since leasing is a substitute for debt financing and has the same capital structure effect, the appropriate comparison would still be with debt financing.

To illustrate the basic elements of lease analysis, consider this simplified example (*FM12 Ch 20 Tool Kit.xls* at the textbook's Web site shows this analysis). The Thompson-Grammatikos Company (TGC) needs a 2-year asset that costs \$100, and the company must choose between leasing and buying the asset. TGC's tax rate is 40%. If the asset is purchased, the bank would lend TGC the \$100 at a rate of 10% on a 2-year, simple interest loan. Thus, the firm would have to pay the bank \$10 in interest at the end of each year, plus return the \$100 of principal at the end of Year 2. For simplicity, assume (1) that TGC could depreciate the asset over 2 years for tax purposes by the straight-line method if it is purchased, resulting in tax depreciation of \$50 and tax savings of $T(\text{Depreciation}) = 0.4(\$50) = \$20$ in each year, and (2) that the asset's value at the end of 2 years will be \$0.

Alternatively, TGC could lease the asset under a guideline lease (by a special IRS ruling) for 2 years for a payment of \$55 at the end of each year. The analysis for the lease-versus-borrow decision consists of (1) estimating the cash flows associated with borrowing and buying the asset, that is, the flows associated with debt financing; (2) estimating the cash flows associated with leasing the asset; and (3) comparing the two financing methods to determine which has the lower present value costs. Here are the borrow-and-buy flows, set up to produce a cash flow time line:

Cash Flows if TGC Buys	Year 0	Year 1	Year 2
Equipment cost	(\$100)		
Inflow from loan	100		
Interest expense		(\$10)	(\$ 10)
Tax savings from interest		4	4
Principal repayment			(100)
Tax savings from depreciation		20	20
Net cash flow (time line)	<u>\$ 0</u>	<u>\$14</u>	<u>(\$ 86)</u>

The net cash flow is zero in Year 0, positive in Year 1, and negative in Year 2. The operating cash flows are not shown, but they must, of course, have a PV greater than the PV of the financing costs or else TGC would not want to acquire the asset. Because the operating cash flows will be the same regardless of whether the asset is leased or purchased, they can be ignored.

Here are the cash flows associated with the lease:

Cash Flows if TGC Leases	Year 0	Year 1	Year 2
Lease payment		(\$55)	(\$55)
Tax savings from payment	—	<u>22</u>	<u>22</u>
Net cash flow (time line)	<u>\$0</u>	<u>(\$33)</u>	<u>(\$33)</u>

Note that the two sets of cash flows reflect the tax deductibility of interest and depreciation if the asset is purchased, and the deductibility of lease payments if it is leased. Thus, the net cash flows include the tax savings from these items.⁸

To compare the cost streams of buying versus 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 TGC is $10\%(1 - 0.4) = 6.0\%$. Applying this rate, we find the present value cost of buying to be \$63.33 versus a present value cost of leasing of \$60.50. Since leasing has the lower present value of costs, the company should lease this particular asset.

Now we examine a more realistic example, one from the Anderson Company, which is conducting a lease analysis on some assembly line equipment that it will procure during the coming year (*FM12 Ch 20 Tool Kit.xls* at the textbook's Web site shows this analysis). The following data have been collected:

1. Anderson plans to acquire automated assembly line equipment with a 10-year life at a cost of \$10 million, delivered and installed. However, Anderson plans to use the equipment for only 5 years and then discontinue the product line.
2. Anderson can borrow the required \$10 million at a before-tax cost of 10%.
3. The equipment's estimated scrap value is \$50,000 after 10 years of use, but its estimated salvage value after only 5 years of use is \$2,000,000. Thus, if Anderson buys the equipment, it would expect to receive \$2,000,000 before taxes when the equipment is sold in 5 years. Note that in leasing, the asset's value at the end of the lease is called its **residual value**.
4. Anderson can lease the equipment for 5 years for an annual rental charge of \$2,600,000, payable at the beginning of each year, but the lessor will own the equipment upon the expiration of the lease. (The lease payment schedule is established by the potential lessor, as described in the next major section, and Anderson can accept it, reject it, or negotiate.)
5. The lease contract stipulates that the lessor will maintain the equipment at no additional charge to Anderson. However, if Anderson borrows and buys, it will have to bear the cost of maintenance, which will be done by the equipment manufacturer at a fixed contract rate of \$500,000 per year, payable at the beginning of each year.
6. The equipment falls in the MACRS 5-year class, Anderson's marginal tax rate is 35%, and the lease qualifies as a guideline lease.

⁸If the lease had not met IRS guidelines, then ownership would effectively reside with the lessee, and TGC would depreciate the asset for tax purposes whether it was leased or purchased. However, 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 with the after-tax lease payment stream.

Table 20-2 shows the steps involved in the analysis. Part I of the table analyzes the costs of borrowing and buying. The company borrows \$10 million and uses it to pay for the equipment, so these two items net out to zero and thus are not shown in Table 20-2. Then, the company makes the *after-tax* payments shown in Line 1. In Year 1, the after-tax interest charge is $0.10(\$10 \text{ million})(0.65) = \$650,000$, and other payments are calculated similarly. The \$10 million loan is repaid at the end of Year 5. Line 2 shows the maintenance cost. Line 3 gives the maintenance tax savings. Line 4 contains the depreciation tax savings, which is the depreciation expense times the tax rate. The notes to Table 20-2 explain the depreciation calculation. Lines 5 and 6 contain the residual (or salvage) value cash flows. The tax is on the excess of the residual value over the asset's book value, not on the full residual value. Line 7 contains the net cash flows, and Line 8 shows the net present value of these flows, discounted at 6.5%.

Part II of Table 20-2 analyzes the lease. The lease payments, shown in Line 9, are \$2,600,000 per year; this rate, which includes maintenance, was established by the prospective lessor and offered to Anderson Equipment. If Anderson accepts the lease, the full amount will be a deductible expense, so the tax savings, shown in Line 10, is $0.35(\text{Lease payment}) = 0.35(\$2,600,000) = \$910,000$. Thus, the after-tax cost of the lease payment is $\text{Lease payment} - \text{Tax savings} = \$2,600,000 - \$910,000 = \$1,690,000$. This amount is shown in Line 11, Years 0 through 4.

The next step is to compare the net cost of owning with the net cost of leasing. However, we must first put the annual cash flows of leasing and borrowing on a common basis. This requires converting them to present values, which brings up the question of the proper rate at which to discount the costs. Because leasing is a substitute for debt, most analysts recommend that the company's cost of debt be used, and this rate seems reasonable in our example. Further, since the cash flows are after taxes, *the after-tax cost of debt, which is $10\% (1 - T) = 10\%(0.65) = 6.5\%$, should be used*. Accordingly, we discount the net cash flows in Lines 7 and 11 using a rate of 6.5%. The resulting present values are \$7,534,000 for the cost of owning and \$7,480,000 for the cost of leasing, as shown in Lines 8 and 12. The financing method that produces the smaller present value of costs is the one that should be selected. We define the **net advantage to leasing (NAL)** as follows (see Note e to Table 20-2):

$$\begin{aligned} \text{NAL} &= \text{PV cost of owning} - \text{PV cost of leasing} \\ &= \$7,534,000 - \$7,480,000 \\ &= \$54,000. \end{aligned}$$

The PV cost of owning exceeds the PV cost of leasing, so the NAL is positive. Therefore, Anderson should lease the equipment.⁹

⁹The more complicated methods that exist for analyzing leasing generally focus on the issue of the discount rate that should be used to discount the cash flows. Conceptually, we could assign a separate discount rate to each individual cash flow component, then find the present values of each of the cash flow components, and finally sum these present values to determine the net advantage or disadvantage to leasing. This approach has been taken by Stewart C. Myers, David A. Dill, and Alberto J. Bautista (MDB) in "Valuation of Financial Lease Contracts," *Journal of Finance*, June 1976, pp. 799–819, among others. MDB correctly note that the use of a single discount rate is valid only if (1) leases and loans are viewed by investors as being equivalent and (2) all cash flows are equally risky, hence appropriately discounted at the same rate. The first assumption is probably valid for most financial leases, and even where it is not, no one knows how to adjust properly for any capital structure effects that leases might have. Regarding the second assumption, advocates of multiple discount rates often point out that the residual value is less certain than are the other cash flows, and they thus recommend discounting it at a higher rate. However, there is no way of knowing precisely how much to increase the after-tax cost of debt to account for the increased riskiness of the residual value cash flow. Further, in a market risk sense, all cash flows could be equally risky even though individual items such as the residual value might have more or less total variability than others. To complicate matters even more, the market risk of the residual value will usually be different than the firm's market risk. For more on residual value risk, see Schallheim, *op. cit.*, Chapter 8. For an application of option pricing techniques in the evaluation of the residual value, see Wayne Y. Lee, John D. Martin, and Andrew J. Senchack, "The Case for Using Options to Evaluate Salvage Values in Financial Leases," *Financial Management*, Autumn 1982, pp. 33–41.

Table 20-2

Anderson Company: Dollar Cost Analysis (Thousands of Dollars)

	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
I. Cost of Owning (Borrowing and Buying)						
1. After-tax loan payments		(\$ 650)	(\$ 650)	(\$ 650)	(\$ 650)	(\$10,650)
2. Maintenance cost	(\$ 500)	(500)	(500)	(500)	(500)	
3. Maintenance tax savings	175	175	175	175	175	
4. Depreciation tax savings		700	1,120	665	420	385
5. Residual value						2,000
6. Tax on residual value						(490)
7. Net cash flow (time line)	<u>(\$ 325)</u>	<u>(\$ 275)</u>	<u>\$ 145</u>	<u>(\$ 310)</u>	<u>(\$ 555)</u>	<u>(\$ 8,755)</u>
8. PV cost of owning at 6.5% =	<u>(\$7,534)</u>					
II. Cost of Leasing						
9. Lease payment	(\$2,600)	(\$2,600)	(\$2,600)	(\$2,600)	(\$2,600)	
10. Payment tax savings	<u>910</u>	<u>910</u>	<u>910</u>	<u>910</u>	<u>910</u>	
11. Net cash flow (time line)	<u>(\$1,690)</u>	<u>(\$1,690)</u>	<u>(\$1,690)</u>	<u>(\$1,690)</u>	<u>(\$1,690)</u>	<u>\$ 0</u>
12. PV cost of leasing at 6.5% =	<u>(\$7,480)</u>					
III. Cost Comparison						
13. Net advantage to leasing (NAL) =	PV cost of owning – PV cost of leasing					
	= \$7,534 – \$7,480 = \$54.					

Notes:

^aThe after-tax loan payments consist of after-tax interest for Years 1–4 and after-tax interest plus the principal amount in Year 5.

^bThe net cash flows shown in Lines 7 and 11 are discounted at the lessee's after-tax cost of debt, 6.5%.

^cThe MACRS depreciation allowances are 0.20, 0.32, 0.19, 0.12, and 0.11 in Years 1 through 5, respectively. Thus, the depreciation expense is $0.20(\$10,000) = \$2,000$ in Year 1, and so on. The depreciation tax savings in each year is $0.35 \times (\text{Depreciation})$.

^dThe residual value is \$2,000 while the book value is \$600. Thus, Anderson would have to pay $0.35(\$2,000 - \$600) = \$490$ in taxes, producing a net after-tax residual value of $\$2,000 - \$490 = \$1,510$. These amounts are shown in Lines 5 and 6 in the cost-of-owning analysis.

^eSee *FM12 Ch 20 Tool Kit.xls* at the textbook's Web site for all calculations.

^fIn the NAL equation in Line 13, the PV costs are stated as absolute values. Therefore, a positive result means that leasing is beneficial, while a negative result means that leasing is not beneficial.

In this example, Anderson did not plan on using the equipment beyond Year 5. But if Anderson instead had planned on using the equipment after Year 5, the analysis would be modified. For example, suppose Anderson planned on using the equipment for 10 years and the lease allowed Anderson to purchase the equipment at the residual value. First, how do we modify the cash flows due to owning? Lines 5 and 6 (for residual value and tax on residual value) in Table 20-2 will be zero at Year 5, because Anderson will not sell the equipment then.¹⁰ However, there will be the additional remaining year of depreciation tax savings in Line 4 for Year 6. There will be no entries for Years 6–10 for Line 1, the after-tax loan payments, because the loan is completely repaid at Year 5. Also, there will be no incremental maintenance costs and tax savings in Lines 2 and 3 for Years 6–10 because

¹⁰There might be a salvage value in Line 5 at Year 10 (and a corresponding tax adjustment in Line 6) if the equipment is not completely worn out or obsolete.

Anderson will have to do its own maintenance on the equipment in those years whether it initially purchases the equipment or whether it leases the equipment for 5 years and then purchases it. Either way, Anderson will own the equipment in Years 6–10 and must pay for its own maintenance. Second, how do we modify the cash flows if Anderson leases the equipment and then purchases it at Year 5? There will be a negative cash flow at Year 5 reflecting the purchase. Because the equipment was originally classified with a MACRS 5-year life, Anderson will be allowed to depreciate the purchased equipment (even though it is not new) with a MACRS 5-year life. Therefore, in Years 6–10, there will be after-tax savings due to depreciation.¹¹ Given the modified cash flows, we can calculate the NAL just as we did in Table 20-2.

In this section, we focused on the dollar cost of leasing versus borrowing and buying, which is analogous to the NPV method used in capital budgeting. A second method that lessees can use to evaluate leases focuses on the percentage cost of leasing and is analogous to the IRR method used in capital budgeting. The percentage approach is discussed in *Web Extension 20A* at the textbook's Web site.

SELF-TEST

Explain how the cash flows are structured in order to estimate the net advantage to leasing.

What discount rate should be used to evaluate a lease? Why?

Define the term "net advantage to leasing, NAL."

20.5 Evaluation by the Lessor

Thus far we have considered leasing only from the lessee's viewpoint. It is also useful to analyze the transaction as the lessor sees it: Is the lease a good investment for the party who must put up the money? The lessor will generally be a specialized leasing company, a bank or bank affiliate, an individual or group of individuals organized as a limited partnership or limited liability corporation, or a manufacturer such as IBM or GM that uses leasing as a sales tool. The specialized leasing companies are often owned by profitable companies such as General Electric, which owns General Electric Capital, the largest leasing company in the world. Investment banking houses such as Merrill Lynch also set up and/or work with specialized leasing companies, where brokerage clients' money is made available to leasing customers in deals that permit the investors to share in tax shelters provided by leases.

Any potential lessor needs to know the rate of return on the capital invested in the lease, and this information is also useful to the prospective lessee: Lease terms on large leases are generally negotiated, so the lessee should know what return the lessor is earning. The lessor's analysis involves (1) determining the net cash outlay, which is usually the invoice price of the leased equipment less any lease payments made in advance; (2) determining the periodic cash inflows, which consist of the lease payments minus both income taxes and any maintenance expense the lessor must bear; (3) estimating the after-tax residual value of the property when the lease expires; and (4) determining whether the rate of return on the lease exceeds the lessor's opportunity cost of capital or, equivalently, whether the NPV of the lease exceeds zero.

¹¹There will also be an after-tax cash flow at Year 10 that depends on the salvage value of the equipment at that date.

Analysis by the Lessor

To illustrate the lessor's analysis, we assume the same facts as for the Anderson Company lease, plus the following: (1) The potential lessor is a wealthy individual whose current income is in the form of interest and whose marginal federal-plus-state income tax rate, T , is 40%. (2) The investor can buy 5-year bonds that have a 9% yield to maturity, providing an after-tax yield of $(9\%)(1 - T) = (9\%)(0.6) = 5.4\%$. This is the after-tax return that the investor can obtain on alternative investments of similar risk. (3) The before-tax residual value is \$2,000,000. Because the asset will be depreciated to a book value of \$600,000 at the end of the 5-year lease, \$1,400,000 of this \$2 million will be taxable at the 40% rate because of the recapture of depreciation rule, so the lessor can expect to receive $\$2,000,000 - 0.4(\$1,400,000) = \$1,440,000$ after taxes from the sale of the equipment after the lease expires.

The lessor's cash flows are developed in Table 20-3. Here we see that the lease as an investment has a net present value of \$81,000. On a present value basis, the investor who invests in the lease rather than in the 9% bonds (5.4% after taxes) is better off by \$81,000, indicating that he or she should be willing to write the lease. As we saw earlier, the lease is also advantageous to Anderson Company, so the transaction should be completed.

The investor can also calculate the lease investment's IRR based on the net cash flows shown in Line 9 of Table 20-3. The IRR of the lease, which is that discount rate that forces the NPV of the lease to zero, is 5.8%. Thus, the lease provides a 5.8% after-tax return to this 40% tax rate investor. This exceeds the 5.4% after-tax return on 9% bonds. So, using either the IRR or the NPV method, the lease would appear to be a satisfactory investment.¹²

Setting the Lease Payment

In the preceding sections we evaluated the lease assuming that the lease payments had already been specified. However, in large leases the parties generally sit down and work out an agreement on the size of the lease payments, with these payments being set so as to provide the lessor with some specific rate of return. In situations in which the lease terms are not negotiated, which is often the case for small leases, the lessor must still go through the same type of analysis, setting terms that provide a target rate of return and then offering these terms to the potential lessee on a take-it-or-leave-it basis.

To illustrate all this, suppose the potential lessor described earlier, after examining other alternative investment opportunities, decides that the 5.4% after-tax bond return is too low to use to evaluate the lease and that the required after-tax return on the lease is 6.0%. What lease payment schedule would provide this return?

To answer this question, note again that Table 20-3 contains the lessor's cash flow analysis. If the basic analysis is computerized, it is easy to first change the discount rate to 6% and then change the lease payment—either by trial and error or by using the goal-seeking function—until the lease's NPV = \$0 or, equivalently, its IRR = 6.0%. When we did this using *FM12 Ch 20 Tool Kit.xls*, we found that the lessor must set the lease payment at \$2,621,232 to obtain an after-tax rate of



e-resource

See *FM12 Ch 20 Tool Kit.xls* for details.

¹²Note that the lease investment is actually slightly more risky than the alternative bond investment because the residual value cash flow is less certain than a principal repayment. Thus, the lessor might require an expected return somewhat above the 5.4% promised on a bond investment.

Table 20-3

Lease Analysis from the Lessor's Viewpoint (Thousands of Dollars)

	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
1. Net purchase price	(\$10,000)					
2. Maintenance cost	(500)	(\$ 500)	(\$ 500)	(\$ 500)	(\$ 500)	
3. Maintenance tax savings	200	200	200	200	200	
4. Depreciation tax savings ^a		800	1,280	760	480	\$ 440
5. Lease payment	2,600	2,600	2,600	2,600	2,600	
6. Tax on lease payment	(1,040)	(1,040)	(1,040)	(1,040)	(1,040)	
7. Residual value						2,000
8. Tax on residual value ^b						(560)
9. Net cash flow	<u>(\$ 8,740)</u>	<u>\$2,060</u>	<u>\$2,540</u>	<u>\$2,020</u>	<u>\$1,740</u>	<u>\$1,880</u>

$$\text{NPV} = \sum_{t=0}^5 \frac{\text{NCF}_t}{(1+r)^t} = \$81 \text{ when } r = 5.4\%$$

$$\text{IRR: NPV} = 0 = \sum_{t=0}^5 \frac{\text{NCF}_t}{(1+\text{IRR})^t}; \text{IRR} = 5.8\%$$

Notes:

^aDepreciation times the lessor's tax rate.^b(Residual value – Book value)T.

e-resource

See **FM12 Ch 20 Tool Kit.xls** at the textbook's Web site for all calculations.

return of 6.0%. If this lease payment is not acceptable to the lessee, Anderson Company, then it may not be possible to strike a deal. Naturally, competition among leasing companies forces lessors to build market-related returns into their lease payment schedules.¹³

If the inputs to the lessee and the lessor are identical, then a positive NAL to the lessee implies an equal but negative NPV to the lessor. *However, conditions are often such that leasing can provide net benefits to both parties. This situation arises because of differentials in taxes, in borrowing rates, in estimated residual values, or in the ability to bear the residual value risk.* We will explore these issues in detail in a later section.

Note that the lessor can, under certain conditions, increase the return on the lease by borrowing some of the funds used to purchase the leased asset. Such a lease is called a **leveraged lease**. Whether or not a lease is leveraged has no effect on the lessee's analysis, but it can have a significant effect on the cash flows to the lessor, hence on the lessor's expected rate of return. We discuss leveraged leases in more detail in **Web Extension 20C** at the textbook's Web site.



e-resource

SELF-TEST

What discount rate is used in a lessor's NPV analysis?

What is the relationship between the lessor's IRR and the size of the lease payments?

¹³For a discussion of realized returns on lease contracts, see Ronald C. Lease, John J. McConnell, and James S. Schallheim, "Realized Returns and the Default and Prepayment Experience of Financial Leasing Contracts," *Financial Management*, Summer 1990, pp. 11–20.

20.6 Other Issues in Lease Analysis

The basic methods of analysis used by lessees and lessors were presented in the previous sections. However, some other issues warrant discussion.¹⁴

Estimated Residual Value

It is important to note that the lessor owns the property upon expiration of a lease; hence the lessor has claim to the asset's residual value. Superficially, it would appear that if residual values are expected to be large, owning would have an advantage over leasing. However, this apparent advantage does not hold up. If expected residual values are large—as they may be under inflation for certain types of equipment and also if real estate is involved—competition between leasing companies and other financing sources, as well as competition among leasing companies themselves, will force leasing rates down to the point where potential residual values are fully recognized in the lease contract. Thus, the existence of large residual values is not likely to result in materially higher costs for leasing.

Increased Credit Availability

As noted earlier, leasing is sometimes said to be advantageous for firms that are seeking the maximum degree of financial leverage. First, it is sometimes argued that firms can obtain more money, and for longer terms, under a lease arrangement than under a loan secured by a specific piece of equipment. Second, since some leases do not appear on the balance sheet, lease financing has been said to give the firm a stronger appearance in a *superficial* credit analysis and thus to permit the firm to use more leverage than would be possible if it did not lease.

There may be some truth to these claims for smaller firms, but since firms are required to capitalize financial leases and to report them on their balance sheets, this point is of questionable validity for any firm large enough to have audited financial statements. However, leasing can be a way to circumvent existing loan covenants. If restrictive covenants prohibit a firm from issuing more debt but fail to restrict lease payments, then the firm could effectively increase its leverage by leasing additional assets. Also, firms that are in very poor financial condition and facing possible bankruptcy may be able to obtain lease financing at a lower cost than comparable debt financing because (1) lessors often have a more favorable position than lenders should the lessee actually go bankrupt and (2) lessors that specialize in certain types of equipment may be in a better position to dispose of repossessed equipment than banks or other lenders.

Real Estate Leases

Most of our examples have focused on equipment leasing. However, leasing originated with real estate, and such leases still constitute a huge segment of total lease financing. (We distinguish between housing rentals and long-term business leases; our concern is with business leases.) Retailers lease many of their stores. In some situations, retailers have no choice but to lease—this is true of locations in malls and

¹⁴For a description of lease analysis in practice, as well as a comprehensive bibliography of the leasing literature, see Tarun K. Mukherjee, "A Survey of Corporate Leasing Analysis," *Financial Management*, Autumn 1991, pp. 96–107.

What You Don't Know *Can* Hurt You!

A leasing decision seems to be pretty straightforward, at least from a financial perspective: Calculate the NAL for the lease and undertake it if the NAL is positive. Right? But tracking down all the financial implications from lease contract provisions can be difficult, requiring the lessee to make assumptions about future costs that are not explicitly spelled out in the lease contract. For example, consider the purchase option embedded in the lease that Rojacks Food Stores undertook with GE Capital for restaurant equipment. The lease allowed Rojacks either to purchase the equipment at the current market value when the lease expired, or return the equipment. When the lease expired, GE set a purchase price that was much higher than Rojacks expected. Rojacks needed the equipment for its day-to-day operations so it couldn't just return the equipment without disrupting its business. Ultimately, Rojacks hired an independent appraiser for the equipment and negotiated a lower purchase price, but without the appraiser, Rojacks would have been stuck with the price GE decided to set for the equipment.

The Rojacks-GE situation isn't that unusual. Lessors often use high expected residual values or high expected penalties to offset low lease payments. In addition, some contracts may require that (1) all of the equipment covered under a lease must either be purchased or returned in its entirety, (2) equipment that is moved must be purchased, (3) large fees must be paid even for minor damage or missing parts, and/or (4) equipment must be returned in its original packaging. These conditions impose costs on the lessee when the lease is terminated and should be considered explicitly when making the leasing decision. The moral of the story for lessees is to read the fine print and request changes to objectionable terms before signing the lease. Here are some ways to reduce the likelihood of unanticipated costs: (1) specify residual value as a percentage of the initial cost of the equipment, (2) allow for portions of the equipment to be returned and portions to be purchased at the end of the lease, and (3) specify that disagreements will be adjudicated by arbitration.

Source: Linda Corman, "{Don't} Look Deep Into My Lease," *CFO*, July 2006, pp. 71–75.

certain office buildings. In other situations, they have a choice of building and owning versus leasing. Law firms and accounting firms, for example, can choose between buying their own facilities or leasing on a long-term basis (up to 20 or more years).

The type of lease-versus-purchase analysis we discussed in this chapter is just as applicable for real estate as for equipment—conceptually, there is no difference. Of course, such things as maintenance, who the other tenants will be, what alterations can be made, who will pay for alterations, and the like, become especially important with real property, but the analytical procedures upon which the lease-versus-buy decision is based are no different from any other lease analysis.

Vehicle Leases

Vehicle leasing is very popular today, both for large corporations and for individuals, especially professionals such as MBAs, doctors, lawyers, and accountants. For corporations, the key factor involved with transportation is often maintenance and disposal of used vehicles—the leasing companies are specialists here, and many businesses prefer to “outsource” services related to autos and trucks. For individuals, leasing is often more convenient, and it may be easier to justify tax deductions on leased than on owned vehicles. Also, most auto leasing to individuals is through dealers. These dealers (and manufacturers) use leasing as a sales tool, and they often make the terms quite attractive, especially when it comes to the down payment, which may be nonexistent in the case of a lease.

Vehicle leasing also permits many individuals to drive more expensive cars than would otherwise be possible. For example, the monthly payment on a new

Lease Securitization

Compared with many markets, the leasing market is fragmented and inefficient. There are millions of potential lessees, including all equipment users. Some are in high tax brackets, some in low brackets. Some are financially sophisticated, some are not. Some have excellent credit ratings, some have poor credit. On the other side of the market are millions of potential lessors, including equipment manufacturers, banks, and individual investors, with different tax brackets and risk tolerances. If each lessee had to negotiate a separate deal for each lease, information and search costs would be so high that few leases would be written.

Tax laws complicate the picture. For example, the alternative minimum tax often has the effect of limiting the amount of depreciation a firm can utilize. In addition, a firm can't take a full half-year's depreciation on purchases in the fourth quarter if those purchases comprise more than 40% of total annual purchases. Instead, it can take only a half-quarter's depreciation, which is the equivalent of one-eighth of a year's depreciation.

Lease brokers have for many years served as facilitators in this complicated and inefficient market. Working with many different equipment manufacturers and lenders, brokers are in a position to match

lessees with appropriate lessors in such a way that the full benefit of tax laws can be utilized.

Lease securitization, a new procedure, is the ultimate method of matching lessees with appropriate lessors. The first step is to create a portfolio consisting of numerous leases. The second step is to divide the leasing cash flows into different streams of income, called *tranches*. For example, one tranche might contain only lease payments, which would appeal to an investor in a low tax bracket. A second tranche might consist of depreciation, which a high-tax-bracket investor could use to shelter income from other sources. A third might contain the residual cash flows, which will occur in the future when the leases end. This tranche would appeal to a high-tax-bracket investor who can take some risk. Tranches can also be allocated according to the credit rating of the lessees, allowing investors with different risk tolerances to take on their desired level of risk.

In addition, a company might obtain a lease in its fourth quarter, but if this is the third quarter of the lessor's fiscal year, the lessor can take a full half-year's depreciation.

Sound complicated? It is, but it's an efficient answer to an inefficient market.

Source: SMG Fairfax, Knoxville, Tennessee.

BMW might be \$1,000 when financed with a 3-year loan, but the same car, if leased for 3 years, might cost only \$499 a month. At first glance, it appears that leasing is less expensive than owning because the monthly payment is so much lower. However, such a simplistic analysis ignores the fact that payments end after the loan is paid off but continue indefinitely under leasing. By using the techniques described in this chapter, individuals can assess the true costs associated with auto leases and then rationally judge the merits of each type of auto financing.

Leasing and Tax Laws¹⁵

The ability to structure leases that are advantageous to both lessor and lessee depends in large part on tax laws. The four major tax factors that influence leasing are (1) investment tax credits, (2) depreciation rules, (3) tax rates, and (4) the alternative minimum tax. In this section, we briefly discuss each of these factors and how they influence leasing decisions.

The investment tax credit (ITC), when it is allowed, is a direct reduction of taxes that occurs when a firm purchases new capital equipment. Prior to 1987, firms could immediately deduct up to 10% of the cost of new capital investments from their corporate tax bills. Thus, a company that bought a \$1,000,000 mainframe

¹⁵See Schallheim, *op. cit.*, Chapters 3 and 6, for an in-depth discussion of tax effects on leasing.

computer system would get a \$100,000 reduction in current-year taxes. Because the ITC goes to the owner of the capital asset, low-tax-bracket companies that could not otherwise use the ITC could use leasing as a vehicle to pass immediate tax savings to high-tax-bracket lessors. The ITC is not currently in effect, but it could be reinstated in the future. If the ITC is put back into law, leasing will become especially attractive to low-tax-bracket firms.

Owners recover their investments in capital assets through depreciation, which is a tax-deductible expense. Because of the time value of money, the faster an asset can be depreciated, the greater the tax advantages of ownership. Recent tax law changes have tended to slow depreciation write-offs, thus reducing the value of ownership. This has also reduced the advantage to leasing by low-tax-bracket lessees from high-tax-bracket lessors. Any move to liberalize depreciation rules would tend to make leasing more desirable in many situations. The value of depreciation also depends on the firm's tax rate, because the depreciation tax saving equals the amount of depreciation multiplied by the tax rate. Thus, higher corporate tax rates mean greater ownership tax savings, hence more incentive for tax-driven leases.

Finally, the alternative minimum tax (AMT) also affects leasing activity. Corporations are permitted to use accelerated depreciation and other tax shelters on their tax books but then use straight-line depreciation for reporting results to shareholders. Thus, some firms report to the IRS that they are doing poorly and hence pay little or no taxes, but report high earnings to shareholders. The corporate AMT, which is roughly computed by applying a 20% tax rate to the profits reported to shareholders, is designed to force highly profitable companies to pay at least some taxes even if they have tax shelters that push their taxable income to zero. In effect, all firms (and individuals) must compute the "regular" tax and the AMT tax, and then pay the higher of the two.

Companies with large AMT liabilities look for ways to reduce their tax bills by lowering reported income. Leasing can be beneficial here—a relatively short-term lease with high annual payments will increase reported expenses and thus lower reported profits. Note that the lease does not have to qualify as a guideline lease and be deducted for regular tax purposes—all that is needed is to lower reported income as shown on the income statement.

We see that tax laws and differential tax rates between lessors and lessees can be a motivating force for leasing. However, as we discuss in the next section, there are some sound nontax economic reasons why firms lease plant and equipment.

SELF-TEST

Does leasing lead to increased credit availability?

How do tax laws affect leasing?

20.7 Other Reasons for Leasing

Up to this point, we have noted that tax rate or other differentials are generally necessary to make leasing attractive to both the lessee and lessor. If the lessee and lessor are facing different tax situations, including the alternative minimum tax, then it is often possible to structure a lease that is beneficial to both parties. However, there are other reasons firms might want to lease an asset rather than buy it.

More than half of all commercial aircraft are leased, and smaller airlines, especially in developing nations, lease an especially high percentage of their planes. One of the reasons for this lease usage is that airlines can reduce their risks

by leasing. If an airline purchased all its aircraft, it would be hampered in its ability to respond to changing market conditions. Because they have become specialists at matching airlines with available aircraft, the aircraft lessors (which are multibillion-dollar concerns) are quite good at managing the changing demand for different types of aircraft. This permits them to offer attractive lease terms. In this situation, *leasing provides operating flexibility*. Leasing is not necessarily less expensive than buying, but the operating flexibility is quite valuable.

Leasing is also an attractive alternative for many high-technology items that are subject to rapid and unpredictable technological obsolescence. Say a small rural hospital wants to buy a magnetic resonance imaging (MRI) device. If it buys the MRI equipment, it is exposed to the risk of technological obsolescence. In a short time some new technology might lower the value of the current system and thus render the project unprofitable. Since it does not use much equipment of this nature, the hospital would bear a great deal of risk if it bought the MRI device. However, a lessor that specializes in state-of-the-art medical equipment would be exposed to significantly less risk. By purchasing and then leasing many different items, the lessor benefits from diversification. Of course, over time some items will probably lose more value than the lessor expected, but this will be offset by other items that retained more value than was expected. Also, because such a leasing company will be especially familiar with the market for used medical equipment, it can refurbish the equipment and then get a better price in the resale market than could a remote rural hospital. For these reasons, leasing can reduce the risk of technological obsolescence.

Leasing can also be attractive when a firm is uncertain about the demand for its products or services and thus about how long the equipment will be needed. Again, consider the hospital industry. Hospitals often offer services that are dependent on a single staff member—for example, a physician who does liver transplants. To support the physician's practice, the hospital might have to invest millions in equipment that can be used only for this particular 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 leaves the hospital, and if no replacement can be recruited, then the project is dead and the equipment becomes useless to the hospital. In this case, a lease with a cancellation clause would permit the hospital to simply return the equipment. The lessor would charge something for the cancellation clause, and this would lower the expected profitability of the project, but it would provide the hospital with an option to abandon the equipment, and the value of the option could easily exceed 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.

The leasing industry recently introduced a type of lease that even transfers some of a project's operating risk from the lessee to the lessor and also motivates the lessor to maintain the leased equipment in good working order. Instead of making a fixed rental payment, the lessee pays a fee each time the leased equipment is used. This type of lease originated with copy machines, where the lessee pays so much per month plus an additional amount per copy made. If the machine breaks down, no copies are made, and the lessor's rental income declines. This motivates the lessor to repair the machine quickly.

This type of lease is also used in the health care industry, where it is called a "per-procedure lease." For example, a hospital might lease an X-ray machine for a fixed fee per X-ray, say, \$5. If demand for the machine's X-rays is less than expected by the hospital, revenues will be lower than expected, but so will the machine's

capital costs. Conversely, high demand would lead to higher than expected lease costs, but these would be offset by higher than expected revenues. By using a per-procedure lease, the hospital is converting a fixed cost for the equipment into a variable cost, hence reducing the machine's operating leverage and break-even point. The net effect is to reduce the project's risk. Of course, the expected cost of a per-procedure lease might be more than the cost of a conventional lease, but the risk reduction benefit could be worth the cost. Note too that if the lessor writes a large number of per-procedure leases, much of the riskiness inherent in such leases could be eliminated by diversification, so the risk premiums that lessors build into per-procedure lease payments could be low enough to attract potential lessees.

Some companies also find leasing attractive because the lessor is able to provide servicing on favorable terms. For example, Virco Manufacturing, a company that makes school desks and other furniture, recently leased 25 truck tractors and 140 trailers that it uses to ship furniture from its plant. The lease agreement, with a large leasing company that specializes in purchasing, maintaining, and then reselling trucks, permitted the replacement of an aging fleet that Virco had built up over the years. "We are pretty good at manufacturing furniture, but we aren't very good at maintaining a truck fleet," said Virco's CFO.

There are other reasons that might cause a firm to lease an asset rather than buy it. Often, these reasons are difficult to quantify; hence they cannot be easily incorporated into an NPV or IRR analysis. Nevertheless, a sound lease decision must begin with a quantitative analysis, and then qualitative factors can be considered before making the final lease-or-buy decision.¹⁶

SELF-TEST

Describe some economic factors that might provide an advantage to leasing.

Summary

In the United States, more than 30% of all equipment is leased, as is a great deal of real estate. Consequently, leasing is an important financing vehicle. In this chapter, we discussed the leasing decision from the standpoints of both the lessee and lessor. The key concepts covered are listed below:

- The five most important types of lease agreement are (1) **operating lease**, (2) **financial, or capital, lease**, (3) **sale-and-leaseback**, (4) **combination lease**, and (5) **synthetic lease**.
- The IRS has specific 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 lessor to deduct the asset's depreciation and allows the lessee to deduct the lease payments. A lease that does not meet the IRS guidelines is called a **non-tax-oriented lease**, in which case ownership for tax purposes resides with the lessee rather than the lessor.
- **FASB Statement 13** spells out the conditions under which a lease must be **capitalized** (shown directly on the balance sheet) as opposed to shown only in the notes to the financial statements. Generally, leases that run for a period equal to or greater than 75% of the asset's life must be capitalized.

¹⁶For more on leasing, see Thomas J. Finucane, "Some Empirical Evidence on the Use of Financial Leases," *The Journal of Financial Research*, Fall 1988, pp. 321–333; and Lawrence D. Schall, "The Evaluation of Lease Financing Opportunities," *Midland Corporate Finance Journal*, Spring 1985, pp. 48–65.

- The lessee's analysis consists basically of a comparison of the PV of costs associated with leasing versus the PV of costs associated with owning. The difference in these costs is called the **net advantage to leasing (NAL)**.
- One of the key issues in the lessee's analysis is the appropriate discount rate. Because a lease is a substitute for debt, because the cash flows in a lease analysis are stated on an after-tax basis, and because they 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.
- The lessor evaluates the lease as an **investment**. If the lease's NPV is greater than zero, or if its IRR is greater than the lessor's opportunity cost, then the lease should be written.
- Leasing is motivated by various differences between lessees and lessors. Three of the most important reasons for leasing are (1) **tax rate differentials**, (2) leases in which the lessor is better able to bear the **residual value risk** than the lessee, and (3) situations where the lessor can maintain the leased equipment more efficiently than the lessee.

Questions

- (20-1) Define each of the following terms:
- Lessee; lessor
 - Operating lease; financial lease; sale-and-leaseback; combination lease; synthetic lease; SPE
 - Off-balance sheet financing; capitalizing
 - FASB Statement 13
 - Guideline lease
 - Residual value
 - Lessee's analysis; lessor's analysis
 - Net advantage to leasing (NAL)
 - Alternative minimum tax (AMT)
- (20-2) Distinguish between operating leases and financial leases. Would you be more likely to find an operating lease employed for a fleet of trucks or for a manufacturing plant?
- (20-3) Would you be more likely to find that lessees are in high or low income tax brackets as compared with lessors?
- (20-4) Commercial banks moved heavily into equipment leasing during the early 1970s, acting as lessors. One major reason for this invasion of the leasing industry was to gain the benefits of accelerated depreciation and the investment tax credit on leased equipment. During this same period, commercial banks were investing heavily in municipal securities, and they were also making loans to real estate investment trusts (REITs). In the mid-1970s, these REITs got into such serious difficulty that many banks suffered large losses on their REIT loans. Explain how its investments in municipal bonds and REITs could reduce a bank's willingness to act as a lessor.
- (20-5) One alleged advantage of leasing voiced in the past is that it kept liabilities off the balance sheet, thus making it possible for a firm to obtain more leverage than it

otherwise could have. This raised the question of whether or not both the lease obligation and the asset involved should be capitalized and shown on the balance sheet. Discuss the pros and cons of capitalizing leases and related assets.

- (20-6) Suppose there were no IRS restrictions on what constituted a valid lease. Explain, in a manner that a legislator might understand, why some restrictions should be imposed. Illustrate your answer with numbers.
- (20-7) Suppose Congress enacted new tax law changes that would (1) permit equipment to be depreciated over a shorter period, (2) lower corporate tax rates, and (3) reinstate the investment tax credit. Discuss how each of these potential changes would affect the relative volume of leasing versus conventional debt in the U.S. economy.
- (20-8) In our Anderson Company example, we assumed that the lease could not be cancelled. What effect would a cancellation clause have on the lessee's analysis? On the lessor's analysis?

Self-Test Problem Solution Appears in Appendix A

(ST-1)
Lease versus Buy

The Randolph Teweles Company (RTC) has decided to acquire a new truck. One alternative is to lease the truck on a 4-year guideline contract for a lease payment of \$10,000 per year, with payments to be made at the *beginning* of each year. The lease would include maintenance. Alternatively, RTC could purchase the truck outright for \$40,000, financing the purchase by a bank loan for the net purchase price and amortizing the loan over a 4-year period at an interest rate of 10% per year. Under the borrow-to-purchase arrangement, RTC would have to maintain the truck at a cost of \$1,000 per year, payable at year end. The truck falls into the MACRS 3-year class. It has a residual value of \$10,000, which is the expected market value after 4 years, when RTC plans to replace the truck irrespective of whether it leases or buys. RTC has a marginal federal-plus-state tax rate of 40%.

- What is RTC's PV cost of leasing?
- What is RTC's PV cost of owning? Should the truck be leased or purchased?
- The appropriate discount rate for use in the analysis is the firm's after-tax cost of debt. Why?
- The residual value is the least certain cash flow in the analysis. How might RTC incorporate differential riskness of this cash flow into the analysis?

Problems Answers Appear in Appendix B

Easy Problems 1–2

(20-1)
Balance Sheet Effects

Reynolds Construction needs a piece of equipment that costs \$200. Reynolds either can lease the equipment or borrow \$200 from a local bank and buy the equipment. If the equipment is leased, the lease would *not* have to be capitalized. Reynolds's balance sheet prior to the acquisition of the equipment is as follows:

Current assets	\$300	Debt	\$400
Net fixed assets	<u>500</u>	Equity	<u>400</u>
Total assets	<u>\$800</u>	Total claims	<u>\$800</u>

- a. (1) What is Reynolds's current debt ratio?
 (2) What would be the company's debt ratio if it purchased the equipment?
 (3) What would be the debt ratio if the equipment were leased?
- b. Would the company's financial risk be different under the leasing and purchasing alternatives?

(20-2)
Lease versus Buy

Assume that Reynolds's tax rate is 40% and the equipment's depreciation would be \$100 per year. If the company leased the asset on a 2-year lease, the payment would be \$110 at the beginning of each year. If Reynolds borrowed and bought, the bank would charge 10% interest on the loan. In either case, the equipment is worth nothing after 2 years and will be discarded. Should Reynolds lease or buy the equipment?

Intermediate Problems 3-4

(20-3)
Balance Sheet Effects

Two companies, Energen and Hastings Corporation, began operations with identical balance sheets. A year later, both required additional manufacturing capacity at a cost of \$50,000. Energen obtained a 5-year, \$50,000 loan at an 8% interest rate from its bank. Hastings, on the other hand, decided to lease the required \$50,000 capacity for 5 years, and an 8% return was built into the lease. The balance sheet for each company, before the asset increases, follows:

		Debt	\$ 50,000
		Equity	<u>100,000</u>
Total assets	<u>\$150,000</u>	Total claims	<u>\$150,000</u>

- a. Show the balance sheets for both firms after the asset increases and calculate each firm's new debt ratio. (Assume that the lease is not capitalized.)
- b. Show how Hastings's balance sheet would look immediately after the financing if it capitalized the lease.
- c. Would the rate of return (1) on assets and (2) on equity be affected by the choice of financing? How?

(20-4)
Lease versus Buy

Big Sky Mining Company must install \$1.5 million of new machinery in its Nevada mine. It can obtain a bank loan for 100% of the purchase price, or it can lease the machinery. Assume that the following facts apply:

- (1) The machinery falls into the MACRS 3-year class.
- (2) Under either the lease or the purchase, Big Sky must pay for insurance, property taxes, and maintenance.
- (3) The firm's tax rate is 40%.
- (4) The loan would have an interest rate of 15%.
- (5) The lease terms call for \$400,000 payments at the end of each of the next 4 years.
- (6) Assume that Big Sky Mining has no use for the machine beyond the expiration of the lease. The machine has an estimated residual value of \$250,000 at the end of the 4th year.

What is the NAL of the lease?

Challenging Problem 5

(20-5)
Lease versus Buy

Sadik Industries must install \$1 million of new machinery in its Texas plant. It can obtain a bank loan for 100% of the required amount. Alternatively, a Texas

investment banking firm that represents a group of investors believes that it can arrange for a lease financing plan. Assume that these facts apply:

- (1) The equipment falls in the MACRS 3-year class.
- (2) Estimated maintenance expenses are \$50,000 per year.
- (3) The firm's tax rate is 34%.
- (4) If the money is borrowed, the bank loan will be at a rate of 14%, amortized in 3 equal installments at the end of each year.
- (5) The tentative lease terms call for payments of \$320,000 at the end of each year for 3 years. The lease is a guideline lease.
- (6) Under the proposed lease terms, the lessee must pay for insurance, property taxes, and maintenance.
- (7) Sadik must use the equipment if it is to continue in business, so it will almost certainly want to acquire the property at the end of the lease. If it does, then under the lease terms it can purchase the machinery at its fair market value at that time. The best estimate of this market value is \$200,000, but it could be much higher or lower under certain circumstances.

To assist management in making the proper lease-versus-buy decision, you are asked to answer the following questions:

- a. Assuming that the lease can be arranged, should the firm lease or borrow and buy the equipment? Explain. (Hint: In this situation, the firm plans to use the asset beyond the term of the lease. Thus, the residual value becomes a *cost* to leasing in Year 3. The firm will depreciate the equipment it purchases under the purchase option starting in Year 3, using the MACRS 3-year class schedule. Depreciation will begin in the year in which the equipment is purchased, which is Year 3.)
- b. Consider the \$200,000 estimated residual value. Is it appropriate to discount it at the same rate as the other cash flows? What about the other cash flows—are they all equally risky? (Hint: Riskier cash flows are normally discounted at higher rates, but when the cash flows are *costs* rather than *inflows*, the normal procedure must be reversed.)

Spreadsheet Problem

(20-6)

Build a Model: Lessee's Analysis



Start with the partial model in the file *FM12 Ch 20 P06 Build a Model.xls* at the textbook's Web site. As part of its overall plant modernization and cost reduction program, Western Fabrics' management has decided to install a new automated weaving loom. In the capital budgeting analysis of this equipment, the IRR of the project was found to be 20% versus the project's required return of 12%.

The loom has an invoice price of \$250,000, including delivery and installation charges. The funds needed could be borrowed from the bank through a 4-year amortized loan at a 10% interest rate, with payments to be made at the end of each year. In the event the loom is purchased, the manufacturer will contract to maintain and service it for a fee of \$20,000 per year paid at the end of each year. The loom falls in the MACRS 5-year class, and Western's marginal federal-plus-state tax rate is 40%.

Aubey Automation Inc., maker of the loom, has offered to lease the loom to Western for \$70,000 upon delivery and installation (at $t = 0$) plus 4 additional annual lease payments of \$70,000 to be made at the end of Years 1 to 4. (Note that there are 5 lease payments in total.) The lease agreement includes maintenance and servicing. Actually, the loom has an expected life of 8 years, at which time its expected salvage value is zero; however, after 4 years, its market value is expected to equal its book value of \$42,500. Western plans to build an entirely new plant in 4 years, so it has no interest in either leasing or owning the proposed loom for more than that period.

- Should the loom be leased or purchased?
- The salvage value is clearly the most uncertain cash flow in the analysis. What effect would a salvage value risk adjustment have on the analysis? (Assume that the appropriate salvage value pre-tax discount rate is 15%.)
- Assuming that the after-tax cost of debt should be used to discount all anticipated cash flows, at what lease payment would the firm be indifferent to either leasing or buying?



Cyberproblem

Please go to the textbook's Web site to access any Cyberproblems.

Mini Case



Lewis Securities Inc. has decided to acquire a new market data and quotation system for its Richmond home office. The system receives current market prices and other information from several online data services and then either displays the information on a screen or stores it for later retrieval by the firm's brokers. The system also permits customers to call up current quotes on terminals in the lobby.

The equipment costs \$1,000,000, and, if it were purchased, Lewis could obtain a term loan for the full purchase price at a 10% interest rate. Although the equipment has a 6-year useful life, it is classified as a special-purpose computer, so it falls into the MACRS 3-year class. If the system were purchased, a 4-year maintenance contract could be obtained at a cost of \$20,000 per year, payable at the beginning of each year. The equipment would be sold after 4 years, and the best estimate of its residual value at that time is \$200,000. However, since real-time display system technology is changing rapidly, the actual residual value is uncertain.

As an alternative to the borrow-and-buy plan, the equipment manufacturer informed Lewis that Consolidated Leasing would be willing to write a 4-year guideline lease on the equipment, including maintenance, for payments of \$260,000 at the beginning of each year. Lewis's marginal federal-plus-state tax rate

is 40%. You have been asked to analyze the lease-versus-purchase decision, and in the process to answer the following questions:

- a.
 - (1) Who are the two parties to a lease transaction?
 - (2) What are the five primary types of leases, and what are their characteristics?
 - (3) How are leases classified for tax purposes?
 - (4) What effect does leasing have on a firm's balance sheet?
 - (5) What effect does leasing have on a firm's capital structure?
 - b.
 - (1) What is the present value cost of owning the equipment? (Hint: Set up a time line that shows the net cash flows over the period $t = 0$ to $t = 4$, and then find the PV of these net cash flows, or the PV cost of owning.)
 - (2) Explain the rationale for the discount rate you used to find the PV.
 - c. What is Lewis's present value cost of leasing the equipment? (Hint: Again, construct a time line.)
 - d. What is the net advantage to leasing (NAL)? Does your analysis indicate that Lewis should buy or lease the equipment? Explain.
 - e. Now assume that the equipment's residual value could be as low as \$0 or as high as \$400,000, but that \$200,000 is the expected value. Since the residual value is riskier than the other cash flows in the analysis, this differential risk should be incorporated into the analysis. Describe how this could be accomplished. (No calculations are necessary, but explain how you would modify the analysis if calculations were required.) What effect would increased uncertainty about the residual value have on Lewis's lease-versus-purchase decision?
 - f. The lessee compares the cost of owning the equipment with the cost of leasing it. Now put yourself in the lessor's shoes. In a few sentences, how should you analyze the decision to write or not write the lease?
 - g.
 - (1) Assume that the lease payments were actually \$280,000 per year, that Consolidated Leasing is also in the 40% tax bracket, and that it also forecasts a \$200,000 residual value. Also, to furnish the maintenance support, Consolidated would have to purchase a maintenance contract from the manufacturer at the same \$20,000 annual cost, again paid in advance. Consolidated Leasing can obtain an expected 10% pre-tax return on investments of similar risk. What would Consolidated's NPV and IRR of leasing be under these conditions?
 - (2) What do you think the lessor's NPV would be if the lease payment were set at \$260,000 per year? (Hint: The lessor's cash flows would be a "mirror image" of the lessee's cash flows.)
 - h. Lewis's management has been considering moving to a new downtown location, and they are concerned that these plans may come to fruition prior to the expiration of the lease. If the move occurs, Lewis would buy or lease an entirely new set of equipment, and hence management would like to include a cancellation clause in the lease contract. What effect would such a clause have on the riskiness of the lease from Lewis's standpoint? From the lessor's standpoint? If you were the lessor, would you insist on changing any of the lease terms if a cancellation clause were added? Should the cancellation clause contain any restrictive covenants and/or penalties of the type contained in bond indentures or provisions similar to call premiums?
-

Selected Additional Cases

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

Klein-Brigham Series:

Case 25, "Environmental Sciences, Inc.," Case 49, "Agro Chemical Corporation," and Case 65,

"Friendly Food Stores, Inc.," and Case 26, "Prudent Solutions, Inc.," all of which examine the lease decision from the perspectives of both the lessee and the lessor.

Brigham-Buzzard Series:

Case 12, "Powerline Network Corporation (Leasing)."