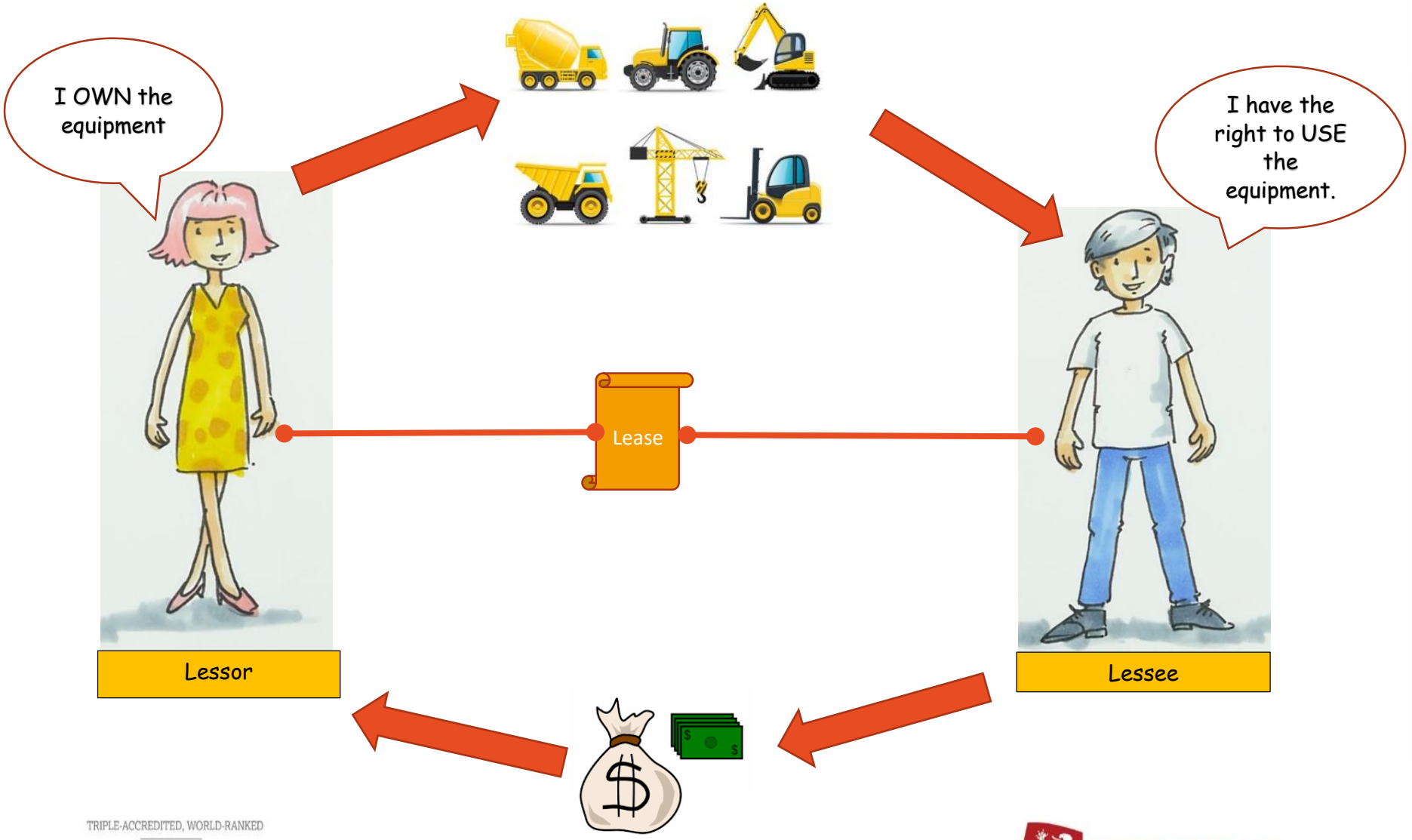
ACF 302: Week 6

Leasing

Berk and DeMarzo Chapter 25

Lecture

25.1 The Basics of Leasing



25.1 The Basics of Leasing

- Lessee
  - The party in a lease liable for periodic payments in exchange for the right to use the asset
- Lessor
  - The party in a lease who is entitled to the lease payments in exchange for lending the asset

- Most leases involve little or no upfront payment.
  - The lessee commits to make regular lease payments for the term of the contract.
  - At the end of the contract term, the lease specifies who will retain ownership of the asset and at what terms.

Why Leasing?

- Leasing is an important and widely used financing solution.
- It allows companies to access and use property and equipment without incurring large cash outflows at the start.
- It also provides flexibility and enables lessees to address the issue of obsolescence and residual value risk.
- Sometimes, leasing is the only way to obtain the use of a physical asset that is not available for purchase.

Examples of Lease Transactions (1 of 4)

- Sales-Type Lease
  - A type of lease in which the lessor is the manufacturer (or primary dealer) of the asset.

IBM xerox

- Direct Lease
  - A type of lease in which the lessor is not the manufacturer but is often an independent company that specializes in purchasing assets and leasing them to customers.

Ryder Logistics & Transportation Solutions Worldwide

Examples of Lease Transactions (2 of 4)

- Sale and Lease-Back
  - Describes a type of lease in which a firm already owns an asset it would prefer to lease.
  - The firm receives cash from the sale of the asset and then makes lease payments to retain the use of the asset.

Examples of Lease Transactions (3 of 4)

- Leveraged Leases
  - A lease in which the lessor borrows from a bank or other lender to obtain the initial capital to purchase an asset, using the lease payments to pay interest and principal on the loan.

Examples of Lease Transactions (4 of 4)

- Special-Purpose Entity (SPE)
  - A separate business partnership created by a lessee for the sole purpose of obtaining a lease.
- Synthetic Lease
  - A lease commonly uses a SPE and is designed to obtain specific accounting and tax treatments.

Lease Payments and Residual Values (1 of 4)

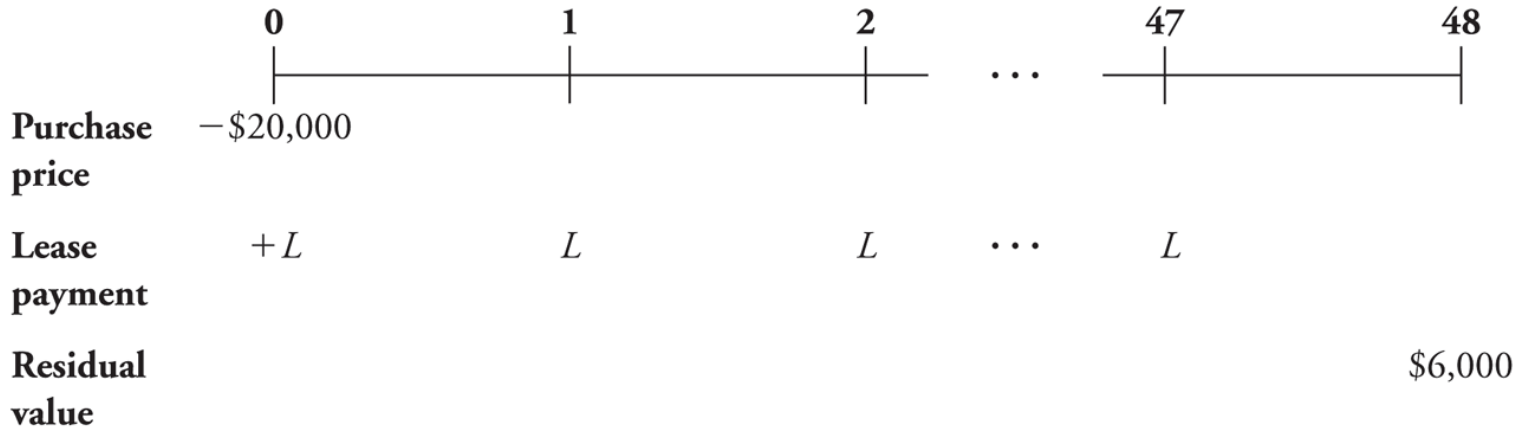
- Residual Value
  - An asset's market value at the end of a lease.
    - The cost of a lease will depend on the asset's **residual value**.

Lease Payments and Residual Values (2 of 4)

- Assume your business needs a new $20,000 forklift and you are considering leasing the forklift for four years.
  - The estimated residual value of the forklift in four years is $6000.

Lease Payments and Residual Values (3 of 4)

- If lease payments of amount *L* are made monthly, then the **lessor**'s cash flows from the transaction are as follows:



  - Note that lease payments are typically made at the beginning of each payment period.

Lease Payments and Residual Values (4 of 4)

- How much should be the cost of leasing?
- **In a perfect market**, the cost of leasing is equivalent to the cost of purchasing and reselling the asset.
- Purchase Price = PV(Lease Payments) + PV(Residual Value)

→

$$PV(\text{Lease Payments}) = \text{Purchase Price} - PV(\text{Residual Value})$$

Textbook Example 25.1 (1 of 3)

Lease Terms in a Perfect Market

Problem

Suppose the purchase price of the forklift is $20,000, its residual value in four years is certain to be $6000, and there is no risk that the lessee will default on the lease. If the risk-free interest rate is a 6% APR with monthly compounding, what would be the monthly lease payment for a four-year lease in a perfect capital market?

Textbook Example 25.1 (2 of 3)

Solution

T = 48 months (4 years)

Because all cash flows are risk free, we can discount them using the risk-free interest rate of r = 6%/12 = 0.5%

PV(Lease Payments) = Purchase Price - PV(Residual Value)

PV(Lease Payments) = $20000 - 6000/(1+0.005)^{48} = 15277.41$

What monthly lease payment L has this present value? We can interpret the lease payments as an annuity. Because the first lease payment starts today, we can view the lease as an initial payment of L plus a 47-month annuity of L. Thus, we need the annuity formula!

Textbook Example 25.1 (3 of 3)

$$PV\ (Lease\ Payments) = L + L \times \frac{1}{r}\left(1 - \frac{1}{(1+r)^{t-1}}\right)$$

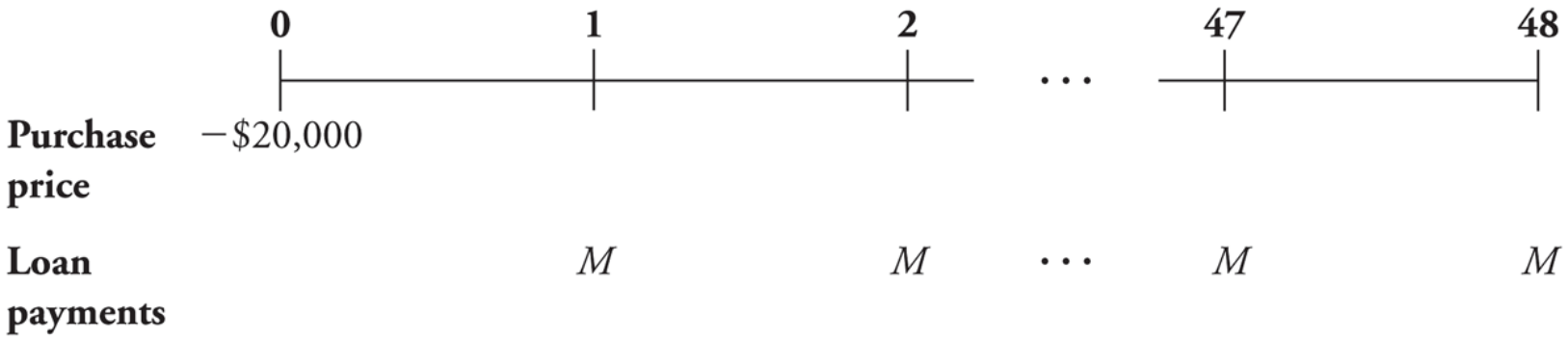
$$\text{PV(Lease Payments)} = \text{L} \times \left[1 + \frac{1}{r}\left(1 - \frac{1}{(1+r)^{t-1}}\right)\right]$$

Solving for L, we get

$$L = \frac{15{,}277.41}{1 + \frac{1}{0.005}\left(1 - \frac{1}{1.005^{47}}\right)} = \$357.01 \text{per month}$$

Leases Versus Loans (1 of 3)

- As an alternative, you could obtain a four-year loan for the purchase price and buy the forklift outright. If *M* is the monthly payment for a fully amortizing loan, the lender's cash flows will be as follows:



Leases Versus Loans (2 of 3)

- If the loan is fairly priced, the loan payments would be such that

$$PV(\text{Loan Payments}) = \text{Purchase Price}$$

  - With a standard loan, the entire cost of the asset is financed.
  - **With a lease, only the cost of the economic depreciation of the asset during the term of the lease is financed.**
    - This causes the loan payments to be **higher** than the lease payments.

Textbook Example 25.2 (1 of 2)

Loan Payments in a Perfect Market

Problem

Suppose that you purchase the forklift for $20,000 by borrowing the purchase price using a four year annuity loan.

What would the monthly loan payment be in a perfect capital market where the risk-free interest rate is a 6% APR with monthly compounding, assuming no risk of default?

How does this compare with the lease payment of Example 25.1?

Textbook Example 25.2 (2 of 2)

Solution

Because all cash flows are risk free, we can discount them using the risk-free interest rate of 6%/12 = 0.5% per month.

Because loan payments are made at the end of each month, using the annuity formula to value the loan payments, Eq. 25.2 becomes

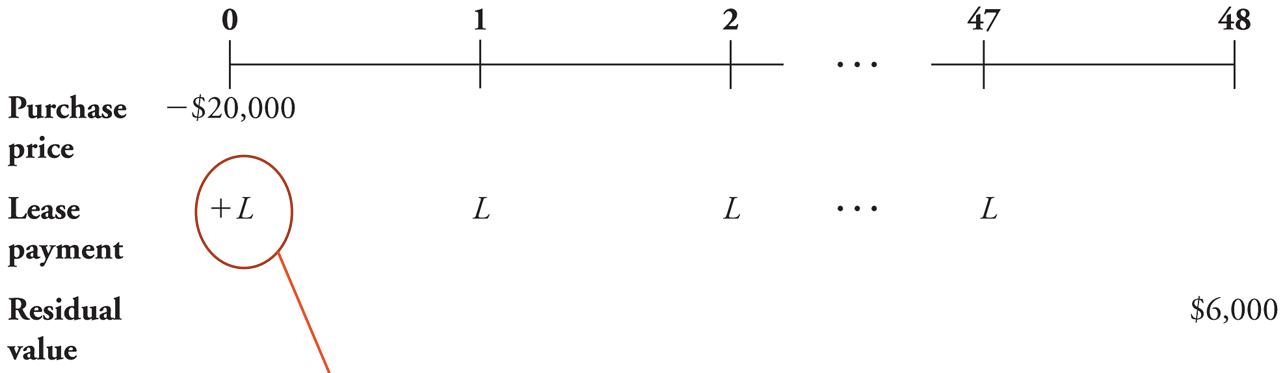
$$M \times \frac{1}{0.005}\left(1 - \frac{1}{1.005^{48}}\right) = 20{,}000$$

Solving for M gives the loan payments of 469.7 per month

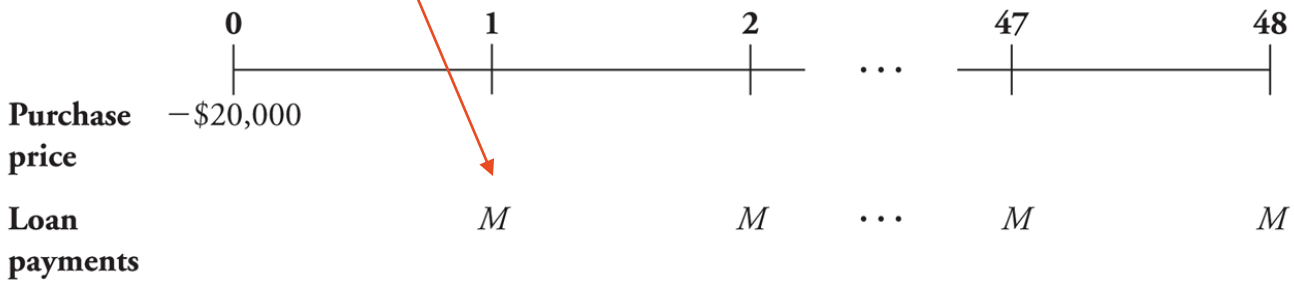
Of course, while the lease payments are lower, with the lease, we have the use of the forklift for four years only. With the loan, we own the forklift for its entire lifetime.

Pay attention! (1 of 2)

- Lease payments are made at the beginning of each period



- Loan payments are made at the END of the month



- This changes the annuity formula!

Pay attention! (2 of 2)

- Lease (L) payments are made at the beginning of each period

$$PV\ (LEASE\ Payments) = L + L \times \frac{1}{r}\left(1 - \frac{1}{(1+r)^{t-1}}\right)$$

- Loan (M) payments are made at the END of the month

$$PV\ (LOAN\ Payments) = M \times \frac{1}{r}\left(1 - \frac{1}{(1+r)^{t}}\right)$$

Leases Versus Loans (3 of 3)

- By the Law of One Price, **in a perfect market, the cost of leasing and then purchasing the residual value of the asset is equivalent to the cost of borrowing to purchase the asset**.

$$PV(\text{Lease Payments}) + PV(\text{Residual Value}) = PV(\text{Loan Payments})$$

End-of-Term Lease Options (1 of 4)

- So far we have assumed that the asset is returned at the end of the Lease. But there are 4 other alternatives:

- 1) Fair Market Value (FMV) Lease
  - A type of lease that gives the lessee the option to purchase the asset at its fair market value at the termination of the lease
    - With perfect capital markets, there is no difference between an FMV lease and a lease in which the assets are retained by the lessor.

End-of-Term Lease Options (2 of 4)

- 2) $1 Out Lease
  - A type of lease in which ownership of the asset transfers to the lessee at the end of the lease for a nominal cost of $1
  - Because the lessee has effectively purchased the asset by making the lease payments, this type of lease is in many ways equivalent to financing the asset with a standard loan.
  - Also known as Finance Lease

End-of-Term Lease Options (3 of 4)

- 3) Fixed Price Lease
  - A type of lease in which the lessee has the option to purchase the asset at the end of the lease for a fixed price that is set upfront in the lease contract
    - This type of lease is very common for consumer leases.
    - Because the lessee has an option to purchase, the lessor will set a higher lease rate to compensate for the value of this option.

End-of-Term Lease Options (4 of 4)

- 4) Fair Market Value Cap Lease
  - A type of lease in which the lessee can purchase the asset at the minimum of its fair market value and a fixed price or “cap”
    - Similar to a fixed price lease, although the option is easier to exercise because the lessee does not have to find a similar asset elsewhere to buy when the fixed price exceeds the market value

Textbook Example 25.3 (1 of 3)

Lease Payments and End-of-Lease Options

Problem

Compute the lease payments for the forklift lease of Example 25.1 if the lease is (a) a fair market value lease, (b) a $1.00 out lease, or (c) a fixed price lease that *allows the lessee to buy the asset at the end of the lease for $4000 (this is an OPTION!)*.

Textbook Example 25.3 (2 of 3)

Solution

a) With the FMV lease, the lessee can buy the forklift for its fair market value of $6000 at the end of the lease. The lessor obtains a residual value of $6000, either from the forklift itself or from the payment from the lessee. Thus, the lease payments will be unchanged from Example 25.1, or $357 per month.

B) With the $1.00 out lease, the lessor receives essentially no residual value. Thus, the lease payments themselves will have to compensate the lessor for the full $20,000 purchase price. The lease payments are therefore

$$L = \frac{20000}{1+\frac{1}{0.005}\left(1-\frac{1}{1.005^{47}}\right)} = 467.36$$

These payments are slightly less than the loan payments of $470 per month calculated in Example 25.2 because the lease payments occur at the beginning-rather than the end-of the month.

Textbook Example 25.3 (3 of 3)

c) With the fixed price lease, because the forklift will be worth $6000 for certain, the lessee will exercise the option to purchase it for $4000. As a result, the lessor will receive only $4000 at the end of the lease. For the lease to have an NPV of zero, the present value of the lease payments must be $\$20{,}000 - \frac{\$4000}{1.005^{48}} = \$16{,}851.61.$

Therefore, the lease payment will be

$$L = \frac{16{,}851.61}{1 + \frac{1}{0.005}\left(1 - \frac{1}{1.005^{47}}\right)} = \$393.79 \text{ per month}$$

This payment exceeds that of the FMV lease due to the lessee's ability to buy the asset at a discount at the end of the lease.

Other Lease Provisions (1 of 2)

- Leases may have many other provisions.
  - Provisions that give valuable options to the lessee raise the amount of the lease payments, while provisions that restrict these options will lower them.

Other Lease Provisions (2 of 2)

- Examples of other lease provisions
  - Early cancellation options that allow the lessee to end the lease early (perhaps for a fee)
  - Buyout options that allow the lessee to purchase the asset before the end of the lease term
  - Clauses may allow the lessee to trade in and upgrade the equipment to a newer model at certain points in the lease

25.2 Accounting, Tax, and Legal Consequences of Leasing (1 of 5)

- Lease Accounting
  - For lessees, the Financial Accounting Standards Board (FASB), distinguishes two types of leases based on the lease terms, and this classification determines the lease's accounting treatment.
    - Operating Lease.
    - Capital Lease.

25.2 Accounting, Tax, and Legal Consequences of Leasing (2 of 5)

- Lease Accounting
  - Operating Lease
    - A type of lease, viewed as a rental for accounting purposes, in which the lessee reports the entire lease payment as an operating expense
      - The lessee does not deduct a depreciation expense for the asset and does not report the asset or the lease payment liability on its balance sheet.
      - Operating leases are disclosed in the footnotes of the lessee's financial statements.

25.2 Accounting, Tax, and Legal Consequences of Leasing (3 of 5)

- Lease Accounting
  - Capital Lease
    - Long-term lease contract that obligates a firm to make regular lease payments in exchange for the use of an asset
      - **Viewed as an acquisition** for accounting purposes; the lessee lists the asset on its balance sheet and incurs depreciation expenses.
      - The lessee also lists the present value of the future lease payments as a liability and deducts the interest portion of the lease payments as an interest expense.

Textbook Example 25.4 (1 of 3)

Leasing and the Balance Sheet

Problem

Harbord Cruise Lines currently has the following balance sheet (in millions of dollars):

Assets		**Liabilities**	
Cash	100	Debt	900
Property, Plant, and Equipment	1500	Equity	700
Total Assets	1600	**Total Debt plus Equity**	1600

Harbord is about to add a new fleet of cruise ships. The price of the fleet is $400 million. What will Harbord's balance sheet look like if (a) it purchases the fleet by borrowing the $400 million, (b) it acquires the fleet through a $400 million capital lease, or (c) it acquires the fleet through an operating lease?

Textbook Example 25.4 (2 of 3)

Solution

For parts (a) and (b), the balance sheet consequences are the same: The fleet becomes a new asset of the firm, and the $400 million becomes an additional liability.

Assets		**Liabilities**	
Cash	100	Debt	1300
Property, Plant, and Equipment	1900	Equity	700
Total Assets	2000	**Total Debt plus Equity**	2000

Note that the firm's debt-equity ratio increases in this case

$$\left(\text{from } \frac{900}{700} = 1.29 \text{ to } \frac{1300}{700} = 1.86 \right).$$

Textbook Example 25.4 (3 of 3)

- If the fleet is acquired through an operating lease, as described in part (c), there is no change in the original balance sheet: The fleet is not listed as an asset, and the lease is not viewed as a liability. Thus, the apparent leverage ratio is unchanged.

25.2 Accounting, Tax, and Legal Consequences of Leasing (4 of 5)

- Lease Accounting
  - A lease is treated as a capital lease for the lessee and must be listed on the firm's balance sheet if it satisfies any of the following four conditions:

1. Title to the property transfers to the lessee at the end of the lease term.
2. The lease contains an option to purchase the asset at a bargain price that is substantially less than its fair market value.

25.2 Accounting, Tax, and Legal Consequences of Leasing (5 of 5)

- Lease Accounting

3. The lease term is 75% or more of the estimated economic life of the asset.
4. The present value of the minimum lease payments at the start of the lease is 90% or more of the asset's fair market value.

Textbook Example 25.5 (1 of 3)

Operating Versus Capital Leases

Problem

Consider a seven-year fair market value lease for a $12.5 million Gulfstream Jet with a remaining useful life of 10 years.

Suppose the monthly lease payments are $175,000 and the appropriate discount rate is a 6% APR with monthly compounding.

Would this lease be classified as an operating lease or a capital lease for the lessee?

What if the lease contract gave the lessee the option to cancel the contract after five years?

Textbook Example 25.5 (2 of 3)

Solution

We compute the present value of the monthly lease payments at the beginning of the lease using the annuity formula with a monthly interest rate of $\frac{6\%}{12} = 0.5\%$ and $7 \times 12 - 1 = 83$ monthly payments after the initial payment. Thus,

$$PV(\text{Lease Payments}) = 175{,}000 \times \left[1 + \frac{1}{0.005}\left(1 - \frac{1}{1.005^{83}}\right)\right] = \$12.04 \text{ million}$$

Because the present value of the lease payments is $\frac{12.4}{12.50} = 96.3\%$ of the value of the jet, the lease satisfies condition 4 and so it is a capital lease.

Textbook Example 25.5 (3 of 3)

If the lessee can cancel the contract after five years, then the minimum number of lease payments is 60 under the contract. In this case,

$$PV\,(\text{Lease Payments}) = 175{,}000 \times \left[1 + \frac{1}{0.005}\left(1 - \frac{1}{1.005^{59}}\right)\right] = \$9.10\,\text{million}$$

This, is only $\frac{9.10}{12.5} = 73$ % of the value of the jet. As no other conditions for a capital lease are satisfied, the lease would be classified as an operating lease.

Changes to accounting standards

- For those accounting under International Accounting Standards, IFRS16 will now bring operating leases **on balance sheet**.

- IFRS 16 is a new International Financial Reporting Standard for lease accounting which came into force on 1 January 2019. It replaced the existing IAS 17 accounting standard and was introduced by the International Accounting Standards Board (IASB).

- The Financial Accounting Standards Board (FASB) introduced a new accounting standard (ASU 2016-02) that requires companies to recognize operating lease assets and liabilities on the balance sheet.

- Accounting standards are always under review and depending on the industry/sector or country your are operating you might be subject to different accounting rules that will determine if at certain point in time you can treat your lease on or off balance sheet.
- **This is a Corporate Finance course**: the important thing to remember is that the inclusion of a Lease in your balance sheet affects the financial situation of the Lessee (balance sheets will grow, leverage ratios will increase, and capital ratios will decrease. This will affect credit ratings and cost of capital).

The Tax Treatment of Leases

- For the rest of this chapter we will consider all leases either “True Tax Lease” or “Non-tax Lease”
- This will be “given”, we will **not** learn in this course the accounting/tax rules used to classify a lease in each type.
- You can read further in the book about the IRS standards applied in the USA, but consider that these accounting standards might change from country to country.

The Tax Treatment of Leases

- True Tax Lease
  - A type of lease in which the lessor receives the depreciation deduction associated with the ownership of the asset.
  - The lessee can deduct the full amount of the lease payments as an operating expense and the lease payments are treated as revenue for the lessor.
  - A Non-Tax Lease
    - A type of lease where there are no tax deductions.

End of Leasing part I

- Stay tuned for Leasing part II: the leasing decision!

Leasing part II: The leasing decision

- Don’t forget to watch Part I for an overview of Lease contracts!

25.3 The Leasing Decision (1 of 3)

- Cash Flows for a True Tax Lease
  - Assume Emory Printing needs a printing press.
    - It can purchase one for $50,000 in cash.
    - The machine will last five years, and it will be depreciated for tax purposes using straight-line depreciation over that period.
      - Emory can deduct $10,000 per year for depreciation.
    - Emory's tax rate is 35%.
      - Thus, Emory will save $3500 per year in taxes from the depreciation deduction.

25.3 The Leasing Decision (2 of 3)

- Cash Flows for a True Tax Lease
  - As an alternative, Emory can lease the machine instead of purchasing it.
    - A five-year lease contract will cost $12,500 per year *(this is given)*.
      - Emory must make these payments at the beginning of each year.
    - Because the lease is a true tax lease, Emory deducts the lease payments as an operating expense when they are paid.
      - The after-tax cost of each lease payment is

$$(1 - 35\%) \times \$12{,}500 = \$8125.$$

25.3 The Leasing Decision (3 of 3)

- Cash Flows for a True Tax Lease
  - As shown on the following slide, the cash flows of leasing differ from buying.
    - A purchase requires a large initial outlay followed by a series of depreciation tax credits.
    - The cost of a leased machine is more evenly spread over time.
      - Note: It is also assumed that the machine has no residual value after five years if it is purchased.

Table 25.1 Spreadsheet Cash Flow ($) Consequences from Leasing Versus Buying

	Year	0	1	2	3	4	5
Buy							
1	Capital Expenditures	(50,000)	—	—	—	—	—
2	Depreciation Tax Shield at 35%	—	3,500	3,500	3,500	3,500	3,500
3	**Free Cash Flow (Buy)**	(50,000)	3,500	3,500	3,500	3,500	3,500
Lease							
4	Lease Payments	(12,500)	(12,500)	(12,500)	(12,500)	(12,500)	—
5	Income Tax Savings at 35%	4,375	4,375	4,375	4,375	4,375	—
6	**Free Cash Flow (Lease)**	(8,125)	(8,125)	(8,125)	(8,125)	(8,125)	—

2) Depreciation is straight line during 5 years: $10000 per year, taxed at 35% create a tax shield of $3500 per year.
4) Lease Payments per year are given at $12500.
5) Income Tax savings are calculated as 35% x 12500

To Lease, to buy or to borrow

- We are going to compare Leasing to two alternatives:

- Lease vs. Buy (compare the lease with buying with our own cash). Note that this is what the textbook calls an “unfair” comparison. I’d argue this is an “incorrect” comparison (more on this later).

- Lease vs. Borrow to buy (we compare leasing with buying the asset with money we borrow).

Lease Versus Buy (An Unfair Comparison) (1 of 6)

- To decide if it is better to lease or buy, we must compute the present value of the cash flows in each transaction.
  - **The risk of the lease payments is no greater than the risk of secured debt**, so it is reasonable to discount the lease payments at the firm's secured borrowing rate.

Lease Versus Buy (An Unfair Comparison) (2 of 6)

- Assuming Emory's borrowing rate is 8%, the cost of buying the machine has a present value of

$$PV(\text{Buy}) = -50{,}000 + \frac{3500}{1.08} + \frac{3500}{1.08^2} + \frac{3500}{1.08^3} + \frac{3500}{1.08^4} + \frac{3500}{1.08^5} = -\$36{,}026$$

Lease Versus Buy (An Unfair Comparison) (3 of 6)

- The cost of leasing the machine has a present value of

$$PV(\text{Lease}) = -8125 - \frac{8125}{1.08} - \frac{8125}{1.08^2} - \frac{8125}{1.08^3} - \frac{8125}{1.08^4} = -\$35{,}036$$

- Leasing is cheaper than buying, with a net savings of $990.

  $36,026 – $35,036 = $990

Lease Versus Buy (An Unfair Comparison) (4 of 6)

- Why is the previous comparison "Unfair"?
  - Because is it too simple. So far we have compared Leasing with buying in Cash (as if the firm already has the cash ready to be spent in t=0 to purchase the machine). However, the preceding analysis ignores an important point:
  - When a firm enters into a lease, it is committing to lease payments that are a fixed future obligation of the firm that effectively adds leverage to its capital structure.
  - Because leasing is a form of financing, it should be compared to other financing options.

Lease Versus Buy (An Unfair Comparison) (5 of 6)

- For example, rather than buy the asset outright, Emory could **borrow** funds to finance the purchase of the machine, thus matching the leverage of the lease.
  - If Emory does borrow, it will also benefit from the interest tax shield provided by the additional leverage *(additional benefit on top of the tax shield calculated before)*.

Lease Versus Buy (An Unfair Comparison) (6 of 6)

- To correctly evaluate a lease, it should be compared to purchasing the asset using an equivalent amount of leverage.
  - The appropriate comparison is not lease versus buy *(with cash),* but rather lease versus borrow *(to buy).*

Lease Versus Borrow (The *Right* Comparison) (1 of 10)

- The Lease-Equivalent Loan
  - Lease-Equivalent Loan
    - A loan that is required for the purchase of an asset that leaves the purchaser with the same net future obligations as a lease would entail

Lease Versus Borrow (The Right Comparison) (2 of 10)

- The Lease-Equivalent Loan
  - In the Emory example, to compute the lease-equivalent loan, the difference between the cash flows from leasing versus buying must first be computed (as shown on the following slide).
    - Relative to buying, leasing saves cash upfront but results in lower future cash flows.

Table 25.2 Spreadsheet Incremental Free Cash Flows of Leasing Versus Buying

	Year	0	1	2	3	4	5
Lease vs. Buy ($)							
1	FCF Lease (Line 6, Table 25.1)	(8,125)	(8,125)	(8,125)	(8,125)	(8,125)	—
2	Less: FCF Buy (Line 3, Table 25.1)	50,000	(3,500)	(3,500)	(3,500)	(3,500)	(3,500)
3	**Lease–Buy**	**41,875**	**(11,625)**	**(11,625)**	**(11,625)**	**(11,625)**	**(3,500)**

Note the change in the sign!

3) is like the net benefit of Leasing instead of buying.
In t=0, we save $41875, but in period t=1 we not only pay the net cost of the leasing but also foregoing the 3500 in depreciation tax shield.

If we borrowed a loan that would make us repay these L-B cash flows, we would be able to borrow more than what we are saving in t=0

Lease Versus Borrow (The Right Comparison) (3 of 10)

- The Lease-Equivalent Loan
  - The initial balance on the lease-equivalent loan is the present value of the incremental cash flows discounted at the after-tax cost of debt.

$$\text{Loan Balance} = PV[\text{Future FCF of Lease Versus Buy at } r_D(1-\tau_c)]$$

Lease Versus Borrow (The Right Comparison) (4 of 10)

- The Lease-Equivalent Loan
  - In the Emory example, the after-tax cost of debt is
    - 8% (1 – 35%) = 5.2%
  - So the initial lease-equivalent loan balance should be

$$\text{Loan Balance} = \frac{11{,}625}{1.052} + \frac{11{,}625}{1.052^2} + \frac{11{,}625}{1.052^3} + \frac{11{,}625}{1.052^4} + \frac{3500}{1.052^5} = \$43{,}747$$

Lease Versus Borrow (The Right Comparison) (5 of 10)

- The Lease-Equivalent Loan
  - Instead of leasing, Emory could instead buy the printing press by borrowing $43,747.
    - By buying and borrowing using the lease-equivalent loan, Emory saves an additional $1872 at time period 0. Leasing the machine is unattractive relative to this alternative.

      $43,747 – $41,875 = $1872

Lease Versus Borrow (The Right Comparison) (6 of 10)

- The Lease-Equivalent Loan
  - As shown on the following slide, the same result can be obtained by computing the cash flows that result from buying the machine and borrowing using the lease-equivalent loan.

Lease Versus Borrow (The Right Comparison) (7 of 10)

- The Lease-Equivalent Loan
  - Comparing the cash flows from buying the printing press and financing it with the lease-equivalent loan with the cash flows of the lease, Emory has a net future obligation of $8125 per year for four years in both cases.

Lease Versus Borrow (The Right Comparison) (8 of 10)

- The Lease-Equivalent Loan
  - While the leverage is the same for the two strategies, the initial cash flow is not.
    - With the lease, Emory will pay $8125 initially.
    - With the loan, Emory will pay $6253.
      - The purchase price of the printing press minus the amount borrowed
      - $50,000 – $43,747 = $6253
  - Again, borrowing to buy the machine is cheaper than the lease with a savings of $1872.
    - $8125 – $6253 = $1872

Lease Versus Borrow (The Right Comparison) (9 of 10)

- A Direct Method
  - **Leasing can be compared to buying the asset using equivalent leverage by discounting the incremental cash flows of leasing versus buying using the after-tax borrowing rate.**

$$PV(\text{Lease Versus Borrow}) = 41{,}875 - \frac{11{,}625}{1.052} - \frac{11{,}625}{1.052^2} - \frac{11{,}625}{1.052^3} - \frac{11{,}625}{1.052^4} - \frac{3500}{1.052^5}$$

$$= -\$1872$$

Lease Versus Borrow (The Right Comparison) (10 of 10)

- The Effective After-Tax Lease Borrowing Rate
  - Leasing and buying can be compared in terms of an effective after-tax borrowing rate associated with the lease. This is given by the IRR of the incremental lease cash flows
    - In Emory's case, the IRR is 7.0%. This option is not attractive compared to the after-tax rate of 5.2% that Emory pays on its debt.

$$41{,}875 - \frac{11{,}625}{1.07} - \frac{11{,}625}{1.07^2} - \frac{11{,}625}{1.07^3} - \frac{11{,}625}{1.07^4} - \frac{3500}{1.07^5} = 0$$

Evaluating a True Tax Lease (1 of 2)

- In summary, when evaluating a true-tax lease, compare the leasing to a purchase that is financed with equivalent leverage.
  - First, compute the incremental cash flows for leasing versus buying, including the depreciation tax shield (if buying) and the tax deductibility of the lease payments if leasing.
  - Then compute the NPV of leasing versus buying using equivalent leverage by discounting the incremental cash flows at the after-tax borrowing rate.

Evaluating a True Tax Lease (2 of 2)

- If the NPV is negative, then leasing is unattractive compared to traditional debt financing.
- If the NPV is positive, then leasing does provide an advantage over traditional debt financing and should be considered.

Textbook Example 25.6 (1 of 3)

Evaluating New Lease Terms

Problem

Suppose Emory rejects the lease we analyzed, and the lessor agrees to lower the lease rate to $11,800 per year. Does this change make the lease attractive?

Textbook Example 25.6 (2 of 3)

Solution

The incremental cash flows are shown in the following table:

	Year	0	1	2	3	4	5
Buy							
1	Capital Expenditures	(50,000)	—	—	—	—	—
2	Depreciation Tax Shield at 35%	—	3,500	3,500	3,500	3,500	3,500
3	**Free Cash Flow (Buy)**	(50,000)	3,500	3,500	3,500	3,500	3,500
Lease							
4	Lease Payments	(11,800)	(11,800)	(11,800)	(11,800)	(11,800)	—
5	Income Tax Savings at 35%	4,130	4,130	4,130	4,130	4,130	—
6	**Free Cash Flow (Lease)**	(7,670)	(7,670)	(7,670)	(7,670)	(7,670)	—
Lease vs. Buy							
7	**Lease–Buy**	**42,330**	**(11,170)**	**(11,170)**	**(11,170)**	**(11,170)**	**(3,500)**

Textbook Example 25.6 (3 of 3)

Using Emory's after-tax borrowing cost of 5.2%, the gain from leasing versus an equivalently leveraged purchase is

$$NPV\,(\text{Lease Versus Borrow}) = 42{,}330 - \frac{11{,}170}{1.052} - \frac{11{,}170}{1.052^2} - \frac{11{,}170}{1.052^3} - \frac{11{,}170}{1.052^4} - \frac{3500}{1.052^5}$$

$$= 42{,}330 - 42{,}141$$

$$= \$189$$

Therefore, the lease is attractive at the new terms.

Evaluating a **Non-tax** Lease (1 of 3)

- Evaluating a non-tax lease is much more straightforward than evaluating a true tax lease.
  - The lessee still receives the depreciation deductions; however, only the interest portion of the lease payment is deductible.

Evaluating a **Non-tax** Lease (2 of 3)

- In terms of cash flows, a non-tax lease is directly comparable to a traditional loan and is attractive only if it offers a better interest rate than would be available with a loan.
  - To determine whether it offers a better rate, discount the lease payments at the firm's **pretax** borrowing rate and compare it to the purchase price of the asset.

Evaluating a **Non-tax** Lease (3 of 3)

- If there is a residual value, differences in the maintenance arrangements with a lease versus a purchase, or any cancellation or other lease options, they should also be included when comparing leasing versus a debt-financed purchase.

Textbook Example 25.7 (2 of 2)

Instead of purchasing the machine for $50,000, Emory will pay lease payments of $11,800 per year. That is, Emory is effectively borrowing $50,000 by making payments of $11,800 per year. Given Emory's 8% borrowing rate, payments of $11,800 per year on a standard loan would allow Emory to borrow

$$PV(\text{Lease Payments}) = 11{,}800 + \frac{11{,}800}{1.08} + \frac{11{,}800}{1.08^2} + \frac{11{,}800}{1.08^3} + \frac{11{,}800}{1.08^4} = \$50{,}883$$

That is, by making the same payments on a loan, Emory could raise more than $50,000. Thus, the lease is not attractive at these terms if it is a non-tax lease.

End of Leasing lecture

- Next steps:
- Revise Chapter 25 from the textbook:
  - I highly encourage you to revise all the exercises and examples in the book. They are really good practice.
- Try to create your own excel spreadsheet to replicate the cash-flows of the examples discussed in the lecture and Chapter 25.
- Give it a try to the exercises we will work during next week's workshop.
- Checkout Moodle for additional (optional) reading material about how accounting rules have changed for leases.