

CHAPTER 13:

THE LEASING DECISION

13-1

a. If treated as an operating lease, Net Income will drop by $\$300,000 = \$500,000 (1-.4)$
There will be no effect on the balance sheet.

b. If treated as a capital lease,

Capitalized Value of Lease = $\$500,000 (PVA, 10\%, 5) = \$1,895,393$

Depreciation each year = $\$1,895,393/5 = \$379,079$

Interest Expense in year 1 = $\$1,895,393 * .1 = \$189,539$

In year 1, Net Income will be reduced by : $(\$379,079 + \$189,539) * 0.6 = \$341,171$

There will be a liability of $\$1,895,393$ on the balance sheet.

13-2

	Operating Lease	Capital Lease
EBIT	\$3,500,000	\$3,620,921
EBIT (1-t)	\$2,100,000	\$2,172,553
Capital	\$8,000,000	\$9,895,393
ROC	26.25%	21.96%
Net Income	\$1,500,000	\$1,458,829
Equity	\$6,000,000	\$6,000,000
ROE	25.00%	24.31%
EBIT	\$3,500,000	\$3,620,921
Interest Exp.	\$1,000,000	\$1,189,539
Int. Cov. Ratio	3.50	3.04
Debt	\$2,000,000	\$3,895,393
Equity	\$6,000,000	\$6,000,000
D/(D+E)	25.00%	39.37%

13-3

a.

Without Correction	QuickShop	LoMart
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Debt	0	50
Equity	100	100
D/(D+E)	0	0.33

If operating leases are capitalized,
capitalized leases for QuickShop = \$10 million (PVA,9%,10) = \$57.76 million

b.

	QuickShop	LoMart
Debt	\$57.76	\$50
Equity	\$100	\$100
D/(D+E)	36.61%	33.33%

13-4

a:

Year	Lease Payment	Tax savings
1	\$1,000,000	\$400,000
2	\$1,000,000	\$400,000
3	\$1,000,000	\$400,000
4	\$1,000,000	\$400,000
5	\$1,000,000	\$400,000

b. Tax Deductions as Operating Lease

Year	Depreciation	Interest Expense	Tax Savings	Remaining Principal
1	\$777,930	\$350,069	\$451,200	\$3,239,720
2	\$777,930	\$291,575	\$427,802	\$2,531,295
3	\$777,930	\$227,817	\$402,299	\$1,759,111
4	\$777,930	\$158,320	\$374,500	\$917,431
5	\$777,930	\$82,569	\$344,200	

PV of Lease Payments at 9% = \$1,000,000 (PVA,9%,5) = \$3,889,651

c. In nominal terms, the savings are \$2 million in either case.

In PV terms, the savings are:

With Operating Lease: \$1,712,808

With Capital Lease: \$1,724,814

The after-tax cost of debt was used as the discount rate in both cases.

13-5

Lease Option

Year	Lease Payment	Lease Payment (1-t)
1	\$(1,500,000)	\$(1,050,000)
2	\$(1,500,000)	\$(1,050,000)
3	\$(1,500,000)	\$(1,050,000)
4	\$(1,500,000)	\$(1,050,000)
5	\$(1,500,000)	\$(1,050,000)

6	\$(1,500,000)	\$(1,050,000)
7	\$(1,500,000)	\$(1,050,000)
8	\$(1,500,000)	\$(1,050,000)
9	\$(1,500,000)	\$(1,050,000)
10	\$(1,500,000)	\$(1,050,000)
	NPV =	(\$7,374,761)

Borrow and Buy Option

Year	Interest(1-t)	Depreciation(t)	Principal Pmt.	Maint. Exp.(1-t)	ATCF
1	\$700,000	\$240,000	\$627,454	\$70,000	\$(1,157,454)
2	\$656,078	\$240,000	\$690,199	\$70,000	\$(1,176,278)
3	\$607,764	\$240,000	\$759,219	\$70,000	\$(1,196,984)
4	\$554,619	\$240,000	\$835,141	\$70,000	\$(1,219,760)
5	\$496,159	\$240,000	\$918,655	\$70,000	\$(1,244,814)
6	\$431,853	\$240,000	\$1,010,521	\$70,000	\$(1,272,374)
7	\$361,117	\$240,000	\$1,111,573	\$70,000	\$(1,302,690)
8	\$283,307	\$240,000	\$1,222,730	\$70,000	\$(1,336,037)
9	\$197,715	\$240,000	\$1,345,003	\$70,000	\$(1,372,719)
10	\$103,565	\$240,000	\$1,479,504	\$70,000	\$(1,413,069)
			Sum		(\$7,789,293)

Year	Differential CF	Interest	Remaining Principal
1	\$457,453.95	\$1,000,000.00	\$9,372,546.05
2	\$476,277.57	\$937,254.61	\$8,682,346.71
3	\$496,983.55	\$868,234.67	\$7,923,127.43
4	\$519,760.13	\$792,312.74	\$7,087,986.22
5	\$544,814.36	\$708,798.62	\$6,169,330.90
6	\$572,374.02	\$616,933.09	\$5,158,810.04
7	\$602,689.65	\$515,881.00	\$4,047,237.09
8	\$636,036.84	\$404,723.71	\$2,824,506.85
9	\$672,718.74	\$282,450.69	\$1,479,503.59
10	\$713,068.84	\$147,950.36	

a . See column under lease payment (1-t)

b. See column under ATCF: There will also be a salvage value of \$2 million in year 10.

c. NPV of Leasing = -\$7,374,761

NPV of Buying = -\$7,789,293

d. Net Advantage of Leasing = -7374,761 - (-7,789,293) = \$414,532

13-6

Lease Option

Year	Lease Revenues	Lease Revenues (1-t)
1	\$1,500,000.00	\$750,000.00
2	\$1,500,000.00	\$750,000.00
3	\$1,500,000.00	\$750,000.00
4	\$1,500,000.00	\$750,000.00
5	\$1,500,000.00	\$750,000.00
6	\$1,500,000.00	\$750,000.00
7	\$1,500,000.00	\$750,000.00
8	\$1,500,000.00	\$750,000.00
9	\$1,500,000.00	\$750,000.00
10	\$1,500,000.00	\$750,000.00
NPV =		\$6,083,171.83

Borrow and Buy Option:

Interest (1-t)	Depreciation (t)	Principal Pmt.	Maint. Exp (1-t)	ATCF	Differential CF
\$400,000.00	\$400,000.00	\$690,294.89	\$50,000.00	\$(740,294.89)	\$1,490,294.89
\$372,388.20	\$400,000.00	\$745,518.48	\$50,000.00	\$(767,906.68)	\$1,517,906.68
\$342,567.47	\$400,000.00	\$805,159.96	\$50,000.00	\$(797,727.42)	\$1,547,727.42
\$310,361.07	\$400,000.00	\$869,572.75	\$50,000.00	\$(829,933.82)	\$1,579,933.82
\$275,578.16	\$400,000.00	\$939,138.57	\$50,000.00	\$(864,716.73)	\$1,614,716.73
\$238,012.61	\$400,000.00	\$1,014,269.66	\$50,000.00	\$(902,282.27)	\$1,652,282.27
\$197,441.83	\$400,000.00	\$1,095,411.23	\$50,000.00	\$(942,853.06)	\$1,692,853.06
\$153,625.38	\$400,000.00	\$1,183,044.13	\$50,000.00	\$(986,669.51)	\$1,736,669.51
\$106,303.61	\$400,000.00	\$1,277,687.66	\$50,000.00	\$(1,033,991.27)	\$1,783,991.27
\$55,196.11	\$400,000.00	\$1,379,902.67	\$50,000.00	\$(1,085,098.78)	\$1,835,098.78
				\$(5,810,058.14)	

NPV = \$6,083,171.83 + \$(5,810,058.14) = \$273,114

a. The lease makes sense. The NPV of lease revenues exceeds the NPV of the cost of buying and servicing the asset.

b. The differences can be attributed to the differences in default risk (interest rate) and tax rates.

13-7

a. If the asset is bought by DP Capital,

Annual Payment on Loan = \$5,000,000 (APV,8%,5) = \$1,252,282
 Depreciation per year = \$1,000,000

Year	Int. Expense	Interest Expense(1-t)	Depreciation (t)	Principal Repaid	ATCF
1	\$400,000	\$240,000	\$400,000	\$852,282	\$(692,282)
2	\$331,817	\$199,090	\$400,000	\$920,465	\$(719,555)
3	\$258,180	\$154,908	\$400,000	\$994,102	\$(749,010)
4	\$178,652	\$107,191	\$400,000	\$1,073,630	\$(780,821)
5	\$92,762	\$55,657	\$400,000	\$1,159,521	\$(815,178)

PV of ATCF = \$(3,046,991)

Minimum After-tax Lease Charge = \$3,046,991 (APV,7.2%,5) = \$(747,117)

Minimum Pre-tax Lease Charge = \$747,117/.6 = \$1,247,494

b. If the asset is bought by CEF,

Annual Payment on Loan = \$5 million (APV,12%,5) = \$1,387,048.66

There are no depreciation tax benefits since the firm has net operating losses, and the interest payment is not providing a tax deduction.

The maximum payment that CEF will pay on the lease is therefore \$1,387,049

13-8

a. The car rental companies might lease rather than buy for a number of reasons:

1. They may face lower tax rates than the automobile firms.
2. They might need to replace the cars very frequently. It might be less expensive for them to lease rather than buy, since they do not have to incur the costs of selling the cars themselves.
3. The automobile manufacturers may provide them with maintenance and other services, which they would have had to incur themselves.

b. Highly levered firms have far less need for tax deductions than do lightly levered firms. Consequently they might not care as much about the depreciation and other tax benefits that accrue from buying.

c. The high maintenance costs and technological know-how needed to maintain a large number of computers may sway large companies without this expertise to lease the computers rather than buy them.

d. High bond ratings are a sign of low default risk and low interest rates. Since one of the benefits of leasing arises from the lessor having a lower interest rate than the lessee, this may encourage them to be lessors.

13-9

a. Capitalized Value of Operating Lease Payments

= 120 growing 3% a year for 5 years + Perpetuity after that

= 120 (PV of Annuity, g = 3%, r = 8%, n = 5 years) + (120 (1.03)^5/.08)/1.08^5 = \$1,689.92

b. Market Value of Equity = \$25 * 100 million = \$2,500

Debt Ratio without Capitalized Lease Payments = 0%

Debt Ratio with Capitalized Lease Payments = \$1689/(\$1689+\$2500) = 40.32%

13-10

Lease Option

Year	Lease Payments	Lease Payments (1-t)
1	\$(850,000.00)	\$(510,000.00)
2	\$(850,000.00)	\$(510,000.00)
3	\$(850,000.00)	\$(510,000.00)

Borrow and Buy Option

Year	Interest	Interest (1-t)	Depreciation (t)	Principal Pmt.	Maint. Exp (1-t)	ATCF	Differential CF
1	\$160,000.00	\$96,000	\$200,000	\$616,067.03	\$120,000	\$(632,067.03)	\$1,490,294.89
2	\$110,714.64	\$66,428.78	\$200,000	\$665,352.39	\$120,000	\$(651,781.17)	\$1,517,906.68
3	\$57,486.45	\$34,491.87	\$200,000	\$718,580.58	\$120,000	\$(673,072.45)	\$1,547,727.42

Annual Payment on Loan = \$776,067

PV of AT Lease Payments = (\$1,394,078)

PV of ATCF on Buy Decision w/Salvage of \$500,000 at end of 3 years = \$(1,346,925)

It is cheaper to buy.

b. Break-even AT Lease Payment = \$1,346,925 (APV, 4.8%, 5) = \$492,750

Pre-tax lease payment = \$497,750/0.6 = \$821,250

13-11

Year	Lease Option					
	Lease Payment	Lease Pmt (1-t)	Interest (1-t)	Principal Pmt.	Maint. Exp (1-t)	ATCF
1	\$ (24,000)	\$ (14,400)	\$ 10,200	\$ 13,482	\$ -	\$ (23,682)
2	\$ (24,000)	\$ (14,400)	\$ 9,512	\$ 14,627	\$ -	\$ (24,140)
3	\$ (24,000)	\$ (14,400)	\$ 8,766	\$ 15,871	\$ -	\$ (24,637)
4	\$ (24,000)	\$ (14,400)	\$ 7,957	\$ 17,220	\$ -	\$ (25,177)
5	\$ (24,000)	\$ (14,400)	\$ 7,079	\$ 18,684	\$ -	\$ (25,762)
6	\$ (24,000)	\$ (14,400)	\$ 6,126	\$ 20,272	\$ -	\$ (26,398)
7	\$ (24,000)	\$ (14,400)	\$ 5,092	\$ 21,995	\$ -	\$ (27,087)
8	\$	\$	\$	\$	\$ -	\$

	(24,000)	(14,400)	3,970	23,864		(27,835)
9	\$	\$	\$	\$	\$ -	\$
	(24,000)	(14,400)	2,753	25,893		(28,646)
10	\$	\$	\$	\$	\$ -	\$
	(24,000)	(14,400)	1,433	28,094		(29,526)
	NPV =	(\$110,655)		(Includes salvage of real estate)		(\$36,554)

Maintenance expense applies in both scenarios and is ignored.

Year	Differential CF	Interest	Remaining Principal
1	\$457,453.95	\$17,000.00	\$186,518.46
2	\$476,277.57	\$15,854.07	\$171,890.99
3	\$496,983.55	\$14,610.73	\$156,020.18
4	\$519,760.13	\$13,261.72	\$138,800.35
5	\$544,814.36	\$11,798.03	\$120,116.84
6	\$572,374.02	\$10,209.93	\$99,845.23
7	\$602,689.65	\$8,486.84	\$77,850.54
8	\$636,036.84	\$6,617.30	\$53,986.29
9	\$672,718.74	\$4,588.83	\$28,093.59
10	\$713,068.84	\$2,387.95	\$(0.00)

a. Based upon the present value of the cash flows, I would buy the office space.

b. Since the analysis is heavily driven by the expected terminal value of real estate, I would be more likely certain to lease if I were uncertain about how long I was going to be in business.

13-12

a. If there is a 7% appreciation in lease payments at the end of each 3-year period, the PV of lease payments will increase.

b. If there is uncertainty about the expected salvage value, I would increase the pre-tax discount rate to 10.5% which works out to an after-tax rate of 6.3%, for just the salvage value. PV of Cash Flows from Buying = -\$54,095

13-13

PV of Lease Payments = \$4 million (PVA, 10%, 10) = \$24,578,268

PV of Expected Salvage in 10 years = \$10 million / 1.1¹⁰ = \$3,855,433

This is less than the estimated market value of \$50 million; the firm does not get any benefits from depreciation. Therefore, it should sell the trucks to GE Capital and lease them back.

13-14

Borrow and Buy Option

Year	Lease Revenues	Lease Revenues (1-t)	Interest (1-t)	Depreciation (t)	Principal Payment.	ATCF	Differential CF	Interest Payment
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1	\$4 m	\$2.4 m	\$2,100,000	\$1.6 m	\$3,618,875.14	\$(4,118,875.14	3,500,000	46,381,124.86
2	\$4 m	\$2.4 m	\$1,948,007	\$1.6 m	\$3,872,196.40	\$(4,220,203.64	3,246,678.74	42,508,928.47
3	\$4 m	\$2.4 m	\$1,785,375	\$1.6 m	\$4,143,250.14	\$(4,328,625.14	2,975,624.99	38,365,678.32
4	\$4 m	\$2.4 m	\$1,611,358	\$1.6 m	\$4,433,277.65	\$(4,444,636.14	2,685,597.48	33,932,400.67
5	\$4 m	\$2.4 m	\$1,425,161	\$1.6 m	\$4,743,607.09	\$(4,568,767.92	2,375,268.05	29,188,793.58
6	\$4 m	\$2.4 m	\$1,225,929	\$1.6 m	\$5,075,659.59	\$(4,701,588.92	2,043,215.55	24,113,134.00
7	\$4 m	\$ 2.4 m	\$1,012,752	\$1.6 m	\$5,430,955.76	\$(4,843,707.38	1,687,919.38	18,682,178.24
8	\$4 m	\$ 2.4 m	\$784,651	\$1.6 m	\$5,811,122.66	\$(4,995,774.15	1,307,752.48	12,871,055.58
9	\$4 m	\$2.4 m	\$540,584	\$1.6 m	\$6,217,901.25	\$(5,158,485.58	900,973.89	6,653,154.33
10	\$4 m	\$2.4 m	\$279,432	\$1.6 m	\$6,653,154.33	\$(5,332,586.82	465,720.80	(0.00)
	NPV =	\$19,273,777				\$(30,523,727)		

$$NPV_{\text{Lease}} = \$19,273,777$$

$$NPV_{\text{Buy}} = \$(30,523,727)$$

$$\text{Annual Payment on Loan} = \$7,118,875$$

a. No. The present value of the lease revenues does not exceed the present value of the costs of borrowing and buying the assets.

b. While in this case, it does not work out in GE's favor, GE Capital pays a high tax rate and has low default risk. It could have charged, say \$ 7 million on the lease, and ended up with a positive net present value while the lessee would also have gained.

13-15

$$\text{a. PV of Lease Payments} = \$19,964$$

$$\text{PV of Buying} = \$30,000 - (\$10,000/1.08^5) = \$23,194$$

It is cheaper to lease.

$$\text{b. After-tax lease payment} = \$3,250$$

$$\text{PV of AT Lease Payments at 5.2\%} = \$13,993$$

Year	Interest Exp.	Interest (1-t)	Principal Paid	Remaining Balance	Depreciation (t)	ATCF
1	\$2,400	\$1,560	\$5,114	\$24,886	1,400	\$(5,274)
2	\$1,991	\$1,294	\$5,523	\$19,364	1,400	\$(5,417)
3	\$1,549	\$1,007	\$5,965	\$13,399	1,400	\$(5,572)
4	\$1,072	\$697	\$6,442	\$6,957	1,400	\$(5,739)
5	\$557	\$362	\$6,957	\$0	1,400	\$(5,919)

Annual Payment on Loan = \$7,514

PV of Buying at 5.2% (including salvage of \$10,000 at end of 5 years) = \$(16,211)

No. It is still better to lease rather than buy.

13-16

a. Value of capitalized lease = \$1 million (PVA,8%,25) = \$10,674,776

b. Imputed Interest Payment in year 1 = 8% of \$10,674,776 = \$853,982

Imputed Depreciation (assuming straight line and no salvage) = \$426,991