18

Income Taxes and Financial Decisions

In this chapter you learn how income taxes can affect the attractiveness of financial decisions and how to incorporate income taxes into the decision-making tools from Chapter 17. If income taxes affected all alternatives the same, income taxes would not be an issue; however, income taxes prefer some financial alternatives. With income tax rates of up to 38% financial managers must take income taxes into account by weighing financial alternatives.

Throughout Chapter 17 we ignored the effects of income taxes when making our decisions. In this chapter we look at how income taxes affect the decision process. Because income tax law is constantly changing, the general principles of taxation as they apply to the decision-making process are discussed. Also, there are many exceptions to these rules that are beyond the scope of this chapter. For these two reasons, the reader is advised to consult with a tax accountant or tax attorney for the current regulations regarding any investment.

If all cash flows were treated the same for income tax purposes and taxed at the same rate, income taxes would have little effect on the decision-making process set forth in Chapter 17. For the net present value, incremental net present value, future worth, annual equivalent, and capital recovery with return, the after-tax solutions could be calculated by multiplying the before-tax solutions found by the methods in Chapter 17 by the result of one minus the tax rate in decimal format. For example, if a company had to pay taxes at a rate of 34%, the after-tax solution from these quantitative methods would be 66% ($1 - 0.33$) of the before-tax solution found using the methods in Chapter 17. Because all alternatives would be multiplied by the same number, the order of their financial attractiveness would not change. Also, all positive values would remain positive and all negative values would remain negative; therefore, these quantitative methods would lead to the same conclusion. The rate of return, incremental rate of return, payback period without interest, and payback period with interest would remain unchanged—because all cash flows would be multiplied by one

minus the tax rate—once again leading to the same conclusion. However, this is not the case for the following reasons:

1. Some losses must be carried forward, deferring the tax savings associated with the losses.
2. The tax rates vary based on the size of the taxable income and may vary from year to year.
3. Capital investments—such as investments in equipment and buildings—must be depreciated.
4. Some revenues are taxed at a reduced rate—such as some capital gains.
5. There are tax credits that reduce the actual taxes due rather than reduce the taxable income.

This chapter looks at the effects of each of these on the decision-making process.

Losses Carried Forward

When a company has losses that must be carried forward, the tax benefits of these losses are deferred into future years. Unless there is a change in the marginal tax rate, the deferral of these tax benefits reduces their value due to the time value of money, which in turn reduces the present value for the alternative.

> **Example 18-1:**   A C corporation is looking at investing in one of two investments. Both investments have a before-tax cash flow of $-\$20,000$ for the first year and a before-tax cash flow of $\$40,000$ for the second year. The first investment is a passive investment and the losses from the first year must be carried forward to the second year. For the second investment, the company may write the first year's losses off against other income earned by the company during the first year. Using a marginal tax rate of 34% and a MARR of 15% compare the net present values of the after-tax cash flows for these two investments. How do the after-tax net present values compare to the before-tax net present values?
>
> **Solution:**   No tax savings occur during the first year for the first investment because the loss must be carried forward. The taxable income for the second year is $20,000 ($40,000 − $20,000). The tax liability for the second year is as follows:
>
> $$\text{Tax}_2 = \$20,000(0.34) = \$6,800$$
>
> The after-tax cash flows for the first investment are as follows:
>
> $$\text{Cash Flow}_1 = -\$20,000$$
> $$\text{Cash Flow}_2 = \$40,000 - \$6,800 = \$33,200$$

The net present value for the first investment is calculated using Eq. (15-3) as follows:

$$\text{NPV} = -\$20,000/(1 + 0.15)^1 + \$33,200/(1 + 0.15)^2 = \$7,713$$

The second investment may take the tax savings in year 1. The tax liabilities for the second investment are as follows:

$$\text{Tax}_1 = -\$20,000(0.34) = -\$6,800$$
$$\text{Tax}_2 = \$40,000(0.34) = \$13,600$$

The after-tax cash flows for the second investment are as follows:

$$\text{Cash Flow}_1 = -\$20,000 - (-\$6,800) = -\$13,200$$
$$\text{Cash Flow}_2 = \$40,000 - \$13,600 = \$26,400$$

The net present value for the second investment is calculated using Eq. (15-3) as follows:

$$\text{NPV} = -\$13,200/(1 + 0.15)^1 + \$26,400/(1 + 0.15)^2 = \$8,484$$

The before-tax net present value for both investments is calculated using Eq. (15-3) as follows:

$$\text{NPV} = -\$20,000/(1 + 0.15)^1 + \$40,000/(1 + 0.15)^2 = \$12,854$$

The net present value of the first investment is $771 ($8,484 − $7,713) less than the net present value of the second investment because the company had to carry the first year loss forward. Taxes reduce the net present value of the first investment by $5,141 ($12,854 − $7,713) and the net present value of the second investment by $4,370 ($12,854 − $8,484).

In Example 18-1 we see that both investments have the same pretax net present values and are equally attractive. When taxes are taken into account the second alternative is more attractive because it has a higher net present value. The higher net present value is the result of being able to take the tax loss during the first year.

In Chapter 17 we looked at an example where the revenues were ignored because they were similar for all alternatives and the alternatives were compared based on their costs. This may be done when including income taxes in the analysis of alternatives provided that the revenues are similar and the company has sufficient taxable income that may be used to offset the costs. If a company lacks sufficient taxable income to offset the costs, the company will be carrying losses into other tax years and will need to include revenues in the analysis.

DIFFERENT TAX RATES

Fluctuations in a company's tax rate can affect the attractiveness of investments. Investments that produce positive taxable income during years of low tax rates and negative taxable income during years of high tax rates are favored by fluctuations in the tax rate.

Example 18-2: You are looking at setting up a C corporation to develop real estate. The company is looking at two alternatives. The first alternative produces a taxable income for the company of $10,000, $100,000, and $10,000 for the next three years. The second alternative produces a taxable income for the company of $35,000, $40,000, and $45,000 for the next three years. Compare the net present values before taxes to the net present value after taxes for both of these investments using the corporate federal tax rates for the year 2006 and a MARR of 15%. How do taxes affect the result of the net present value analysis?

Solution: The pretax net present value for the first alternative is calculated using Eq. (15-3) as follows:

$$NPV = (\$10,000)/(1 + 0.15)^1 + (\$100,000)/(1 + 0.15)^2 \\ + (\$10,000)/(1 + 0.15)^3$$
$$NPV = \$90,885$$

The pretax net present value for the second alternative is calculated using Eq. (15-3) as follows:

$$NPV = (\$35,000)/(1 + 0.15)^1 + (\$40,000)/(1 + 0.15)^2 \\ + (\$45,000)/(1 + 0.15)^3$$
$$NPV = \$90,269$$

Based on the pretax net present values one would have chosen the first alternative. The annual income taxes for the first alternative are as follows:

$$Tax_1 = \$10,000(0.15) = \$1,500$$
$$Tax_2 = \$13,750 + \$25,000(0.34) = \$22,250$$
$$Tax_3 = \$10,000(0.15) = \$1,500$$

The after-tax cash flows for the first alternative are as follows:

$$Cash\ Flow_1 = \$10,000 - \$1,500 = \$8,500$$
$$Cash\ Flow_2 = \$100,000 - \$22,250 = \$77,750$$
$$Cash\ Flow_3 = \$10,000 - \$1,500 = \$8,500$$

The after-tax net present value for the first alternative is calculated using Eq. (15-3) as follows:

$$NPV = \$8,500/(1 + 0.15)^1 + \$77,750/(1 + 0.15)^2 \\ + \$8,500/(1 + 0.15)^3$$
$$NPV = \$71,770$$

The annual income taxes for the second alternative are as follows:

$$Tax_1 = \$35,000(0.15) = \$5,250$$
$$Tax_2 = \$40,000(0.15) = \$6,000$$
$$Tax_3 = \$45,000(0.15) = \$6,750$$

The after-tax cash flows for the second alternative are as follows:

$$\text{Cash Flow}_1 = \$35,000 - \$5,250 = \$29,750$$
$$\text{Cash Flow}_2 = \$40,000 - \$6,000 = \$34,000$$
$$\text{Cash Flow}_3 = \$45,000 - \$6,750 = \$38,250$$

The after-tax net present value for the second alternative is calculated using Eq. (15-3) as follows:

$$NPV = \$29,750/(1 + 0.15)^1 + \$34,000/(1 + 0.15)^2$$
$$+ \$38,250/(1 + 0.15)^3$$
$$NPV = \$76,728$$

Based on the after-tax net present values one would have chosen the second alternative. We see that the most financially attractive alternative changes from the first alternative to the second alternative after taxes are included in our analysis because the first alternative pays a higher tax rate in the second year due to the effects of the income tax brackets.

DEPRECIATION

Depreciation is not an actual cash flow; therefore, it is not included in the sum of the cash flows used to analyze an alternative. However, because depreciation affects the taxes paid on an alternative, depreciation will affect the taxes due during each period depreciation occurs, which is a cash flow that is included in analysis of an alternative. Depreciation affects the cash flows of the alternatives by deferring the tax savings to future years. For example, when a company purchases a piece of construction equipment, rather than takes the tax savings during the year the equipment was purchased, the company may be required to take the tax savings over a six-year period.

Example 18-3: A company has purchased a small pickup truck for $20,000. Compare writing the truck off in the year it was purchased under Section 179 (see Chapter 5) versus depreciating it using 200% declining balance and the half-year convention. The company's marginal tax rate is 34% and its MARR is 15%.

Solution: If the truck were to be written off during the year it was purchased the company's tax savings would be as follows:

$$\text{Tax}_1 = -\$20,000(0.34) = -\$6,800$$

The cash flow for writing the truck off is as follows:

$$\text{Cash Flow}_1 = -\$20,000 - (-\$6,800) = -\$13,200$$

The after-tax net present cost for writing the truck off is calculated using Eq. (15-3) as follows:

$$\text{NPV} = -\$13{,}200/(1 + 0.15)^1 = -\$11{,}478$$

Using Table 5-6, the annual depreciation for the truck is as follows:

$$\text{Depreciation}_1 = \$20{,}000(0.2000) = \$4{,}000$$
$$\text{Depreciation}_2 = \$20{,}000(0.3200) = \$6{,}400$$
$$\text{Depreciation}_3 = \$20{,}000(0.1920) = \$3{,}840$$
$$\text{Depreciation}_4 = \$20{,}000(0.1152) = \$2{,}304$$
$$\text{Depreciation}_5 = \$20{,}000(0.1152) = \$2{,}304$$
$$\text{Depreciation}_6 = \$20{,}000(0.0576) = \$1{,}152$$

The annual tax savings are as follows:

$$\text{Tax}_1 = \$4{,}000(0.34) = \$1{,}360$$
$$\text{Tax}_2 = \$6{,}400(0.34) = \$2{,}176$$
$$\text{Tax}_3 = \$3{,}840(0.34) = \$1{,}306$$
$$\text{Tax}_4 = \$2{,}304(0.34) = \$783$$
$$\text{Tax}_5 = \$2{,}304(0.34) = \$783$$
$$\text{Tax}_6 = \$1{,}152(0.34) = \$392$$

The annual cash flows are as follows:

$$\text{Cash Flow}_1 = -\$20{,}000 - (-\$1{,}360) = -\$18{,}640$$
$$\text{Cash Flow}_2 = \$2{,}11{,}440.00 - \$5{,}000.00)(0.34)/4 = -\$302.60$$
$$\text{Cash Flow}_3 = \$1{,}306$$
$$\text{Cash Flow}_4 = \$783$$
$$\text{Cash Flow}_5 = \$783$$
$$\text{Cash Flow}_6 = \$392$$

The after-tax net present cost for depreciating the truck is calculated using Eq. (15-3) as follows:

$$\text{NPV} = -\$18{,}640/(1 + 0.15)^1 + \$2{,}176/(1 + 0.15)^2 + \$1{,}306/(1 + 0.15)^3 + \$783/(1 + 0.15)^4 + \$783/(1 + 0.15)^5 + \$392/(1 + 0.15)^6$$
$$\text{NPV} = -\$12{,}698$$

We see that by depreciating the truck the net present cost has increased by $1,220 ($12,698 − $11,478).

CAPITAL GAINS

Capital gains and losses are gains and losses on the sale or disposition of capital assets, depreciable property, and real property. Throughout history tax breaks have been given to capital gains held for certain lengths of time in order

to stimulate long-term investment over short-term investment. Because preferential tax treatment is given to capital investments held for longer periods of time, capital gains often affect the decision-making process when one compares short-term investments to long-term investments.

> **Example 18-4:** On November 30 of last year your company invested $1,000,000 in an office-building complex and has the opportunity to sell its interest in the complex for $1,220,000 in November. If the complex is sold in November, your company will have held the asset for a year or less, and it will be taxed as ordinary income at a rate of 34%. Your company has the option to wait and sell its interest in the complex for $1,200,000 in December. If the complex is sold in December, your company will have held the asset for more than a year and it will be taxed as a long-term capital gain at a rate of 20%. Using a MARR of 15% determine the net present value for each of these sales. Which alternative is more financially attractive?
>
> **Solution:** For this problem all cash flows that occur during the year will be lumped together. Selling the property in November will result in a capital gain of $220,000 ($1,220,000 − $1,000,000) that will be taxed at a rate of 34%. The income tax due on the sale is $74,800 ($220,000 × 0.34) for an after-tax cash flow of $1,145,200. The net present value for this option is calculated using Eq. (15-3) as follows:
>
> $$\text{NPV} = -\$1,000,000 + \$1,145,200/(1 + 0.15)^1 = -\$4,174$$
>
> Selling the property in December will result in a long-term capital gain of $200,000 ($1,200,000 − $1,000,000) that will be taxed at a rate of 20%. The income tax due on the sale is $40,000 ($200,000 0.20) for an after-tax cash flow of $1,160,000. The net present value for this option is calculated using Eq. (15-3) as follows:
>
> $$\text{NPV} = -\$1,000,000 + \$1,160,000/(1 + 0.15)^1 = \$8,696$$
>
> By waiting a month to sell the asset, although the sale price is reduced by $20,000, the price reduction is more than offset by tax savings. In fact, by waiting a month, the net present value of the sale for the asset goes from an unacceptable (a negative) net present value to an acceptable (a positive) net present value.

TAX CREDITS

Tax credits reduce the tax liability and as a result affect the attractiveness of an investment. For example, when tax credits are given to hire and train members of a targeted group a company may reduce its tax liability by a percentage of the wages paid to the target group, in lieu of writing off that same percentage of wages as an expense, thereby reducing its taxable income and tax liability. This preferential tax treatment favors the alternatives receiving the tax credit.

Example 18-5: Your company is looking at leasing office space for the next three years and has identified two options. The first option is to lease space for $13,200 per year. The second option is to lease space for $10,800 per year; however, the second option will require you to spend $10,000 during the first year to comply with the Americans with Disability Act. Your company can claim a tax credit equal to 50% of the costs of the modifications made to comply with the Americans with Disability Act. Both leases may be treated as an operating lease. Using a MARR of 15% and a marginal tax rate of 35%, determine the before-tax and after-tax net present values (costs) for both options. How do taxes affect your decision?

Solution: Determine the before-tax net present cost for the first option using Eq. (15-3) as follows:

$$\text{NPV} = (-\$13{,}200)/1.15^1 + (-\$13{,}200)/1.15^2 + (-\$13{,}200)/1.15^3$$
$$\text{NPV} = -\$30{,}139$$

The cash flow for the first year of the second option is a cash disbursement of $20,800 ($10,800 + $10,000). Determine the before-tax net present cost for the second option using Eq. (15-3) as follows:

$$\text{NPV} = (-\$20{,}800)/1.15^1 + (-\$10{,}800)/1.15^2 + (-\$10{,}800)/1.15^3$$
$$\text{NPV} = -\$33{,}354$$

Based on the before-tax net present cost the first option is more attractive. The annual tax savings and the after-tax cash flow for the first option is as follows:

$$\text{Tax}_{1-3} = \$13{,}200(0.35) = \$4{,}620$$
$$\text{Cash Flow}_{1-3} = -\$13{,}200 + \$4{,}620 = -\$8{,}580$$

The after-tax net present cost for the first option is calculated using Eq. (15-3) as follows:

$$\text{NPV} = (-\$8{,}580)/1.15^1 + (-\$8{,}580)/1.15^2 + (-\$8{,}580)/1.15^3$$
$$\text{NPV} = -\$19{,}590$$

The annual tax savings for the second option are as follows:

$$\text{Tax}_1 = \$20{,}800(0.35) + \$10{,}000(0.50) = \$12{,}280$$
$$\text{Tax}_{2-3} = \$10{,}800(0.35) = \$3{,}780$$

The after-tax cash flows for the second option are as follows:

$$\text{Cash Flow}_1 = -\$20{,}800 + \$12{,}280 = -\$8{,}520$$
$$\text{Cash Flow}_{2-3} = -\$10{,}800 + \$3{,}780 = -\$7{,}020$$

The after-tax net present cost for the second option is calculated using Eq. (15-3) as follows:

$$\text{NPV} = (-\$8{,}520)/1.15^1 + (-\$7{,}020)/1.15^2 + (-\$7{,}020)/1.15^3$$
$$\text{NPV} = -\$17{,}333$$

Based on the after-tax net present cost the second option is more attractive. The most financially attractive alternative changes from the first alternative to the second alternative after taxes are included in our analysis because the second alternative gets a $5,000 tax credit.

AFTER-TAX CASH FLOWS

Now that we have discussed a number of tax provisions that affect the financial attractiveness of alternatives, we are ready to incorporate them into the comparison of alternatives. A common decision that must be compared on an after-tax basis is the comparison of leasing a vehicle versus purchasing a vehicle. In the next example we compare three alternatives of obtaining a vehicle: the purchase of the vehicle using cash, the purchase of the vehicle through financing, and leasing the vehicle with an operating lease.

Example 18-6: Your S corporation needs a new truck for its operations and is looking at three alternatives. The first alternative is to lease the truck for sixty months. The monthly lease payment is $525 per month with the first payment due in April. At the end of the lease the truck will be returned to the dealer. The lease is considered an operating lease and excludes all maintenance and operational costs. The second alternative is to purchase the truck with a sixty-month loan at an interest rate of 9% (APY 9.38). The loan has $250 in origination fees. The truck's entire sales price of $25,000—including the loan origination fees—can be financed. The first payment is due in April. The third alternative is to purchase the truck with cash for $25,000 in April. If your company purchases the truck, the estimated salvage value of the truck at the end of five years is $5,000. Gains and losses on the sale of the truck will be treated as ordinary income. The truck may be depreciated using the half-year convention. For all three alternatives, the truck is to be placed in service in April. Your company's tax year is the same as the calendar year and its marginal tax rate is 34%. Using the net present value (cost) method, which of the above alternatives is the best for your company if your minimal acceptable rate of return (MARR) is 1% per month? Assume that there is sufficient taxable income to use all tax savings in the year they occur.

Solution: The costs for each month can be easily determined; therefore, we use a period length of one month. Because the company is an S corporation that will pay income taxes at the individual level, periodic tax payments are due in April, June, September, and January of the following year. The useful life of the truck will be from April of the first year to March of the sixth year. The income tax savings or costs for the sixth year will occur in April, June, and September of the sixth year and January of the seventh year; therefore, the study period will be from April of the first year to January of

the seventh year. Solving this problem is best done using a spreadsheet because each option will require seventy periods to cover the study period. The spreadsheet solutions are shown in Figures 18-1, 18-4, and 18-5.

First, we calculate the net present value for the first alternative, leasing the truck. The after-tax cost for each month is the lease payment less the tax savings, which occur only in the months of April, June, September, and January. The tax savings for the first year are divided equally among the four months and are calculated as follows:

$$\text{Tax Savings}_1 = \$525.00/\text{month}(9 \text{ months})(0.34)/4 = \$401.63$$

The after-tax cost for the first month—April—is calculated as follows:

$$\text{After-Tax Cost}_1 = -\$525.00 + \$401.63 = -\$123.37$$

The present value of the after-tax cost for the first month is calculated using Eq. (15-3) as follows:

$$P_1 = -\$123.37/(1 + 0.01)^1 = -\$122.15$$

Because no tax savings occur in the second month—May—the after-tax cost equals the costs of the lease. The present value of the after-tax cost for the second month is calculated using Eq. (15-3) as follows:

$$P_2 = -\$525.00/(1 + 0.01)^2 = -\$514.66$$

The after-tax costs and present values of the third through seventienth months are calculated in a similar manner. Keep in mind that the lease cost will go to zero in the sixty-first month, the tax savings will change beginning with the thirteenth month—April of the second year and again beginning with the sixty-first month—April of the sixth year. The tax savings for the thirteenth and sixty-first months are calculated as follows:

$$\text{Tax Savings}_{13} = \$525.00/\text{month}(12 \text{ months})(0.34)/4 = \$535.50$$
$$\text{Tax Savings}_{61} = \$525.00/\text{month}(3 \text{ months})(0.34)/4 = \$133.88$$

The spreadsheet solution for the lease option is shown in Figure 18-1. The differences between the spreadsheet solution and this example are because of rounding errors in the example.

Summing the present values, we get a net present cost of $15,686.

Next, we calculate the net present value for the second alternative, purchasing the truck with a sixty-month loan. The after-tax cost for each month is the loan payment less the tax savings. As in the lease option, the tax savings are spread equally among the months of April, June, September, and January. The tax savings result from the interest paid on the loan and the depreciation of the truck. To calculate the tax savings, the interest paid on the loan each year needs to be calculated. This may be done in two ways.

The first way is to use Eq. (16-7) to determine the monthly payment, Eq. (16-13) to determine the outstanding balance at the end of each year,

MARR	1.00%
Marginal Tax Rate	34.00%
Lease Payment	525.00

Leasing

Month				April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Period				1	2	3	4	5	6	7	8	9
Lease Payment				(525.00)	(525.00)	(525.00)	(525.00)	(525.00)	(525.00)	(525.00)	(525.00)	(525.00)
Less Tax Savings				401.63	—	401.63	—	—	401.63	—	—	—
After-Tax Cost				(123.38)	(525.00)	(123.38)	(525.00)	(525.00)	(123.38)	(525.00)	(525.00)	(525.00)

Month	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Period	10	11	12	13	14	15	16	17	18	19	20	21
Lease Payment	(525.00)	(525.00)	(525.00)	(525.00)	(525.00)	(525.00)	(525.00)	(525.00)	(525.00)	(525.00)	(525.00)	(525.00)
Less Tax Savings	401.63	—	—	535.50	—	535.50	—	—	535.50	—	—	—
After-Tax Cost	(123.38)	(525.00)	(525.00)	10.50	(525.00)	10.50	(525.00)	(525.00)	10.50	(525.00)	(525.00)	(525.00)

Month	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Period	22	23	24	25	26	27	28	29	30	31	32	33
Lease Payment	(525.00)	(525.00)	(525.00)	(525.00)	(525.00)	(525.00)	(525.00)	(525.00)	(525.00)	(525.00)	(525.00)	(525.00)
Less Tax Savings	535.50	—	—	535.50	—	535.50	—	—	535.50	—	—	—
After-Tax Cost	10.50	(525.00)	(525.00)	10.50	(525.00)	10.50	(525.00)	(525.00)	10.50	(525.00)	(525.00)	(525.00)

Month	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Period	34	35	36	37	38	39	40	41	42	43	44	45
Lease Payment	(525.00)	(525.00)	(525.00)	(525.00)	(525.00)	(525.00)	(525.00)	(525.00)	(525.00)	(525.00)	(525.00)	(525.00)
Less Tax Savings	535.50	—	—	535.50	—	535.50	—	—	535.50	—	—	—
After-Tax Cost	10.50	(525.00)	(525.00)	10.50	(525.00)	10.50	(525.00)	(525.00)	10.50	(525.00)	(525.00)	(525.00)

Month	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Period	46	47	48	49	50	51	52	53	54	55	56	57
Lease Payment	(525.00)	(525.00)	(525.00)	(525.00)	(525.00)	(525.00)	(525.00)	(525.00)	(525.00)	(525.00)	(525.00)	(525.00)
Less Tax Savings	535.50	—	—	535.50	—	535.50	—	—	535.50	—	—	—
After-Tax Cost	10.50	(525.00)	(525.00)	10.50	(525.00)	10.50	(525.00)	(525.00)	10.50	(525.00)	(525.00)	(525.00)

Month	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Period	58	59	60	61	62	63	64	65	66	67	68	69
Lease Payment	(525.00)	(525.00)	(525.00)	—	—	—	—	—	—	—	—	—
Less Tax Savings	535.50	—	—	133.88	—	133.88	—	—	133.88	—	—	—
After-Tax Cost	10.50	(525.00)	(525.00)	133.88	—	133.88	—	—	133.88	—	—	—

Month	Jan.
Period	70
Lease Payment	—
Less Tax Savings	133.88
After-Tax Cost	133.88

Net Present Value	(15,686)

Figure 18-1 Spreadsheet Solution for Leasing the Truck

and Eq. (16-14) to determine the annual interest costs. The periodic rate is calculated using Eq. (16-3) as follows:

$$i = 0.09/12 = 0.0075$$

The initial loan value equals $25,250—the cost of the truck plus the loan origination fees. Using Eq. (16-7) to calculate the monthly loan payments we get the following:

$$A = \$25,250[0.0075(1+0.0075)^{60}]/[(1+0.0075)^{60} - 1] = \$524.15$$

The outstanding balance on the loan for years 1 through 6 is calculated using Eq. (16-13) as follows:

$$U_9 = \$524.15[(1+0.0075)^{60-9} - 1]/[0.0075(1+0.0075)^{60-9}]$$
$$U_9 = \$22,145.11$$
$$U_{21} = \$524.15[(1+0.0075)^{60-21} - 1]/[0.0075(1+0.0075)^{60-21}]$$
$$U_{21} = \$17,666.63$$
$$U_{33} = \$524.15[(1+0.0075)^{60-33} - 1]/[0.0075(1+0.0075)^{60-33}]$$
$$U_{33} = \$12,768.03$$
$$U_{45} = \$524.15[(1+0.0075)^{60-45} - 1]/[0.0075(1+0.0075)^{60-45}]$$
$$U_{45} = \$7,409.91$$
$$U_{57} = \$524.15[(1+0.0075)^{60-57} - 1]/[0.0075(1+0.0075)^{60-57}]$$
$$U_{57} = \$1,549.15$$
$$U_{60} = \$524.15[(1+0.0075)^{60-60} - 1]/[0.0075(1+0.0075)^{60-60}]$$
$$= \$0$$

The annual interest paid each year is calculated using Eq. (16-14) as follows:

$$I_{1-9} = 9(\$524.15) + \$22,145.11 - \$25,250.00 = \$1,612.46$$
$$I_{10-21} = 12(\$524.15) + \$17,666.63 - \$22,145.11 = \$1,811.32$$
$$I_{22-33} = 12(\$524.15) + \$12,768.03 - \$17,666.63 = \$1,391.20$$
$$I_{34-45} = 12(\$524.15) + \$7,409.91 - \$12,768.03 = \$931.68$$
$$I_{46-57} = 12(\$524.15) + \$1,549.15 - \$7,409.91 = \$429.04$$
$$I_{58-60} = 3(\$524.15) + \$0 - \$1,549.15 = \$23.30$$

The second way is to prepare a loan amortization schedule. Because the payments are made monthly, the amortization schedule will cover sixty months beginning with April of year 1 and ending in March of year 6. The amortization schedule for the loan is shown in Figures 18-2 and 18-3 and was prepared as shown in Chapter 16. Included on the amortization schedule is a column showing the year-to-date totals for both the monthly payments and the interest paid. Note that the last payment is slightly smaller due to rounding of the monthly payment and monthly interest.

For income tax purposes, the loan payment is not deductible; however, the interest on the loan is deductible. The interest itself is not a cash flow because it has already been included in the cash flow for the loan payment.

APR: 9.00%   Page 1
Term (Months): 60 Months
Loan Amount: $25,250.00
Monthly Payment: $524.15

Year	Month	Beginning Principal	Monthly Interest	Monthly Payment	Ending Principal	Year to Date Interest	Year to Date Payment
	0				25,250.00		
1	1	25,250.00	189.38	524.15	24,915.23	189.38	524.15
1	2	24,915.23	186.86	524.15	24,577.94	376.24	1,048.30
1	3	24,577.94	184.33	524.15	24,238.12	560.57	1,572.45
1	4	24,238.12	181.79	524.15	23,895.76	742.36	2,096.60
1	5	23,895.76	179.22	524.15	23,550.83	921.58	2,620.75
1	6	23,550.83	176.63	524.15	23,203.31	1,098.21	3,144.90
1	7	23,203.31	174.02	524.15	22,853.18	1,272.23	3,669.05
1	8	22,853.18	171.40	524.15	22,500.43	1,443.63	4,193.20
1	9	22,500.43	168.75	524.15	22,145.03	1,612.38	4,717.35
2	10	22,145.03	166.09	524.15	21,786.97	166.09	524.15
2	11	21,786.97	163.40	524.15	21,426.22	329.49	1,048.30
2	12	21,426.22	160.70	524.15	21,062.77	490.19	1,572.45
2	13	21,062.77	157.97	524.15	20,696.59	648.16	2,096.60
2	14	20,696.59	155.22	524.15	20,327.66	803.38	2,620.75
2	15	20,327.66	152.46	524.15	19,955.97	955.84	3,144.90
2	16	19,955.97	149.67	524.15	19,581.49	1,105.51	3,669.05
2	17	19,581.49	146.86	524.15	19,204.20	1,252.37	4,193.20
2	18	19,204.20	144.03	524.15	18,824.08	1,396.40	4,717.35
2	19	18,824.08	141.18	524.15	18,441.11	1,537.58	5,241.50
2	20	18,441.11	138.31	524.15	18,055.27	1,675.89	5,765.65
2	21	18,055.27	135.41	524.15	17,666.53	1,811.30	6,289.80
3	22	17,666.53	132.50	524.15	17,274.88	132.50	524.15
3	23	17,274.88	129.56	524.15	16,880.29	262.06	1,048.30
3	24	16,880.29	126.60	524.15	16,482.74	388.66	1,572.45
3	25	16,482.74	123.62	524.15	16,082.21	512.28	2,096.60
3	26	16,082.21	120.62	524.15	15,678.68	632.90	2,620.75
3	27	15,678.68	117.59	524.15	15,272.12	750.49	3,144.90
3	28	15,272.12	114.54	524.15	14,862.51	865.03	3,669.05
3	29	14,862.51	111.47	524.15	14,449.83	976.50	4,193.20
3	30	14,449.83	108.37	524.15	14,034.05	1,084.87	4,717.35
3	31	14,034.05	105.26	524.15	13,615.16	1,190.13	5,241.50
3	32	13,615.16	102.11	524.15	13,193.12	1,292.24	5,765.65
3	33	13,193.12	98.95	524.15	12,767.92	1,391.19	6,289.80

FIGURE 18-2   Loan Amortization Schedule

In addition to interest, depreciation is also tax deductible. Like interest, depreciation is not a cash flow but is necessary to calculate the cash flow due to tax savings. From Table 5-6 the depreciation for the truck is calculated as follows:

$$D_{1-9} = (\$25,000)0.2000 = \$5,000$$
$$D_{10-21} = (\$25,000)0.3200 = \$8,000$$
$$D_{22-33} = (\$25,000)0.1920 = \$4,800$$
$$D_{34-45} = (\$25,000)0.1152 = \$2,880$$
$$D_{46-57} = (\$25,000)0.1152 = \$2,880$$
$$D_{58-60} = (\$25,000)0.0576 = \$1,440$$

APR: 9.00%   Page 2
Term (Months): 60 Months
Loan Amount: $25,250.00
Monthly Payment: $524.15

Year	Month	Beginning Principal	Monthly Interest	Monthly Payment	Ending Principal	Year to Date Interest	Year to Date Payment
4	34	12,767.92	95.76	524.15	12,339.53	95.76	524.15
4	35	12,339.53	92.55	524.15	11,907.93	188.31	1,048.30
4	36	11,907.93	89.31	524.15	11,473.09	277.62	1,572.45
4	37	11,473.09	86.05	524.15	11,034.99	363.67	2,096.60
4	38	11,034.99	82.76	524.15	10,593.60	446.43	2,620.75
4	39	10,593.60	79.45	524.15	10,148.90	525.88	3,144.90
4	40	10,148.90	76.12	524.15	9,700.87	602.00	3,669.05
4	41	9,700.87	72.76	524.15	9,249.48	674.76	4,193.20
4	42	9,249.48	69.37	524.15	8,794.70	744.13	4,717.35
4	43	8,794.70	65.96	524.15	8,336.51	810.09	5,241.50
4	44	8,336.51	62.52	524.15	7,874.88	872.61	5,765.65
4	45	7,874.88	59.06	524.15	7,409.79	931.67	6,289.80
5	46	7,409.79	55.57	524.15	6,941.21	55.57	524.15
5	47	6,941.21	52.06	524.15	6,469.12	107.63	1,048.30
5	48	6,469.12	48.52	524.15	5,993.49	156.15	1,572.45
5	49	5,993.49	44.95	524.15	5,514.29	201.10	2,096.60
5	50	5,514.29	41.36	524.15	5,031.50	242.46	2,620.75
5	51	5,031.50	37.74	524.15	4,545.09	280.20	3,144.90
5	52	4,545.09	34.09	524.15	4,055.03	314.29	3,669.05
5	53	4,055.03	30.41	524.15	3,561.29	344.70	4,193.20
5	54	3,561.29	26.71	524.15	3,063.85	371.41	4,717.35
5	55	3,063.85	22.98	524.15	2,562.68	394.39	5,241.50
5	56	2,562.68	19.22	524.15	2,057.75	413.61	5,765.65
5	57	2,057.75	15.43	524.15	1,549.03	429.04	6,289.80
6	58	1,549.03	11.62	524.15	1,036.50	11.62	524.15
6	59	1,036.50	7.77	524.15	520.12	19.39	1,048.30
6	60	520.12	3.90	524.02	—	23.29	1,572.32

FIGURE 18-3   Loan Amoritzation Schedule

The disposal of the truck will result in a gain or loss, which will be treated as ordinary income or ordinary loss. The book value will be equal to the purchase price less the depreciation taken and is calculated as follows:

$$BV_{60} = \$25,000 - \$5,000 - \$8,000 - \$4,800 - \$2,880 - \$2,880 - \$1,440$$

$$BV_{60} = \$0$$

Because the truck is sold for more that its book value, a gain will occur in the sixth year. The gain is equal to the difference in the salvage value and the book value and is calculated as follows.

$$\text{Capital Gain} = \$5,000 - \$0 = \$5,000$$

The tax savings are equal to the sum of the interest paid and the depreciation multiplied by the marginal tax rate. The tax savings are similar to a cash receipt and as such are positive. The tax savings will change at the

beginning of the first, thirteenth, twenty-fifth, thirty-seventh, forty-ninth, and sixty-first months and is calculated as follows:

$$\text{Tax Savings}_1 = (\$1{,}612.46 + \$5{,}000.00)(0.34)/4 = \$562.05$$
$$\text{Tax Savings}_{13} = (\$1{,}811.32 + \$8{,}000.00)(0.34)/4 = \$833.96$$
$$\text{Tax Savings}_{25} = (\$1{,}391.20 + \$4{,}800.00)(0.34)/4 = \$526.25$$
$$\text{Tax Savings}_{37} = (\$931.68 + \$2{,}880.00)(0.34)/4 = \$323.99$$
$$\text{Tax Savings}_{49} = (\$429.04 + \$2{,}880.00)(0.34)/4 = \$281.27$$

In the sixty-first month there will be an increase in tax liability due to gains on the truck, which will be taxed at the rate of 34%. The tax savings beginning in the sixty-first month is calculated as follows:

$$\text{Tax Savings}_{61} = (\$23.30 + \$1{,}440.00 - \$5{,}000.00)(0.34)/4$$
$$\text{Tax Savings}_{61} = -\$300.62$$

The after-tax costs and present value are calculated in the same manner as they were calculated for the lease option. The spreadsheet solution for the purchase of the truck with a loan is shown in Figure 18-4. The differences between the spreadsheet solution and this example are because of rounding errors in the example.

Summing the present values, we get a net present cost of $13,378.

Next, we calculate the net present value for the third alternative, which is to purchase the truck outright for $25,000. The purchase of the truck occurs during April. For this alternative, only depreciation will be tax deductible. The depreciation will be the same for this alternative as for the second alternative. Similar the disposal of the truck in the sixth year will result in a capital gain of $5,000.

The tax savings are equal to the depreciation multiplied by the marginal tax rate and are divided among the four payments that occur during the year. The tax savings are similar to a cash receipt and as such are positive. The tax savings will change at the beginning of the first, thirteenth, twenty-fifth, thirty-seventh, forty-ninth, and sixty-first months and is calculated as follows:

$$\text{Tax Savings}_1 = \$5{,}000.00(0.34)/4 = \$425$$
$$\text{Tax Savings}_{13} = \$8{,}000.00(0.34)/4 = \$680$$
$$\text{Tax Savings}_{25} = \$4{,}800.00(0.34)/4 = \$408$$
$$\text{Tax Savings}_{37} = \$2{,}880.00(0.34)/4 = \$244.80$$
$$\text{Tax Savings}_{49} = \$2{,}880.00(0.34)/4 = \$244.80$$

In the sixty-first month there will be an increase in tax liability due to gains on the truck, which will be taxed at the rate of 34%. The tax savings beginning in the sixty-first month is calculated as follows:

$$\text{Tax Savings}_{61} = (\$1{,}440.00 - \$5{,}000.00)(0.34)/4 = -\$302.60$$

The after-tax costs and present value are calculated in the same manner as they were calculated for the lease option. The spreadsheet solution for the purchasing the truck is shown in Figure 18-5. The differences between the

MARR	1.00%	
Marginal Tax Rate	34.00%	
Purchase Price	25,000	
Loan Interest Rate	9.00%	
Loan Fees	250.00	
Salvage Value	5,000	

Loan

Month	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Period	1	2	3	4	5	6	7	8	9
Loan Payment	(524.15)	(524.15)	(524.15)	(524.15)	(524.15)	(524.15)	(524.15)	(524.15)	(524.15)
Salvage Value	—	—	—	—	—	—	—	—	—
Less Tax Savings	562.05	—	562.05	—	—	562.05	—	—	—
After-Tax Cost	37.90	(524.15)	37.90	(524.15)	(524.15)	37.90	(524.15)	(524.15)	(524.15)

Month	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Period	10	11	12	13	14	15	16	17	18	19	20	21
Loan Payment	(524.15)	(524.15)	(524.15)	(524.15)	(524.15)	(524.15)	(524.15)	(524.15)	(524.15)	(524.15)	(524.15)	(524.15)
Salvage Value	—	—	—	—	—	—	—	—	—	—	—	—
Less Tax Savings	562.05	—	—	833.96	—	833.96	—	—	833.96	—	—	—
After-Tax Cost	37.90	(524.15)	(524.15)	309.81	(524.15)	309.81	(524.15)	(524.15)	309.81	(524.15)	(524.15)	(524.15)

Month	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Period	22	23	24	25	26	27	28	29	30	31	32	33
Loan Payment	(524.15)	(524.15)	(524.15)	(524.15)	(524.15)	(524.15)	(524.15)	(524.15)	(524.15)	(524.15)	(524.15)	(524.15)
Salvage Value	—	—	—	—	—	—	—	—	—	—	—	—
Less Tax Savings	833.96	—	—	526.25	—	526.25	—	—	526.25	—	—	—
After-Tax Cost	309.81	(524.15)	(524.15)	2.10	(524.15)	2.10	(524.15)	(524.15)	2.10	(524.15)	(524.15)	(524.15)

Month	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Period	34	35	36	37	38	39	40	41	42	43	44	45
Loan Payment	(524.15)	(524.15)	(524.15)	(524.15)	(524.15)	(524.15)	(524.15)	(524.15)	(524.15)	(524.15)	(524.15)	(524.15)
Salvage Value	—	—	—	—	—	—	—	—	—	—	—	—
Less Tax Savings	526.25	—	—	323.99	—	323.99	—	—	323.99	—	—	—
After-Tax Cost	2.10	(524.15)	(524.15)	(200.16)	(524.15)	(200.16)	(524.15)	(524.15)	(200.16)	(524.15)	(524.15)	(524.15)

Month	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Period	46	47	48	49	50	51	52	53	54	55	56	57
Loan Payment	(524.15)	(524.15)	(524.15)	(524.15)	(524.15)	(524.15)	(524.15)	(524.15)	(524.15)	(524.15)	(524.15)	(524.15)
Salvage Value	—	—	—	—	—	—	—	—	—	—	—	—
Less Tax Savings	323.99	—	—	281.27	—	281.27	—	—	281.27	—	—	—
After-Tax Cost	(200.16)	(524.15)	(524.15)	(242.88)	(524.15)	(242.88)	(524.15)	(524.15)	(242.88)	(524.15)	(524.15)	(524.15)

Month	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Period	58	59	60	61	62	63	64	65	66	67	68	69
Loan Payment	(524.15)	(524.15)	(524.15)	—	—	—	—	—	—	—	—	—
Salvage Value	—	—	5,000.00	—	—	—	—	—	—	—	—	—
Less Tax Savings	281.27	—	—	(300.62)	—	(300.62)	—	—	(300.62)	—	—	—
After-Tax Cost	(242.88)	(524.15)	4,475.85	(300.62)	—	(300.62)	—	—	(300.62)	—	—	—

Month	Jan.
Period	70
Loan Payment	—
Salvage Value	—
Less Tax Savings	(300.62)
After-Tax Cost	(300.62)
Net Present Value	(13,378)

FIGURE 18-4 Spreadsheet Solution for Purchasing the Truck with a Loan

MARR	1.00%											
Marginal Tax Rate	34.00%											
Purchase Price	25,000											
Salvage Value	5,000											

Purchase

Month				Apr.	May.	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
Period				1	2	3	4	5	6	7	8	9
Purchase				(25,000.00)	—	—	—	—	—	—	—	—
Salvage Value				—	—	—	—	—	—	—	—	—
Less Tax Savings				425.00	—	425.00	—	—	425.00	—	—	—
After-Tax Cost				(24,575.00)	—	425.00	—	—	425.00	—	—	—

Month	Jan.	Feb.	Mar.	Apr.	May.	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
Period	10	11	12	13	14	15	16	17	18	19	20	21
Purchase	—	—	—	—	—	—	—	—	—	—	—	—
Salvage Value	—	—	—	—	—	—	—	—	—	—	—	—
Less Tax Savings	425.00	—	—	680.00	—	680.00	—	—	680.00	—	—	—
After-Tax Cost	425.00	—	—	680.00	—	680.00	—	—	680.00	—	—	—

Month	Jan.	Feb.	Mar.	Apr.	May.	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
Period	22	23	24	25	26	27	28	29	30	31	32	33
Purchase	—	—	—	—	—	—	—	—	—	—	—	—
Salvage Value	—	—	—	—	—	—	—	—	—	—	—	—
Less Tax Savings	680.00	—	—	408.00	—	408.00	—	—	408.00	—	—	—
After-Tax Cost	680.00	—	—	408.00	—	408.00	—	—	408.00	—	—	—

Month	Jan.	Feb.	Mar.	Apr.	May.	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
Period	34	35	36	37	38	39	40	41	42	43	44	45
Purchase	—	—	—	—	—	—	—	—	—	—	—	—
Salvage Value	—	—	—	—	—	—	—	—	—	—	—	—
Less Tax Savings	408.00	—	—	244.80	—	244.80	—	—	244.80	—	—	—
After-Tax Cost	408.00	—	—	244.80	—	244.80	—	—	244.80	—	—	—

Month	Jan.	Feb.	Mar.	Apr.	May.	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
Period	46	47	48	49	50	51	52	53	54	55	56	57
Purchase	—	—	—	—	—	—	—	—	—	—	—	—
Salvage Value	—	—	—	—	—	—	—	—	—	—	—	—
Less Tax Savings	244.80	—	—	244.80	—	244.80	—	—	244.80	—	—	—
After-Tax Cost	244.80	—	—	244.80	—	244.80	—	—	244.80	—	—	—

Month	Jan.	Feb.	Mar.	Apr.	May.	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
Period	58	59	60	61	62	63	64	65	66	67	68	69
Purchase	—	—	—	—	—	—	—	—	—	—	—	—
Salvage Value	—	—	5,000.00	—	—	—	—	—	—	—	—	—
Less Tax Savings	244.80	—	—	(302.60)	—	(302.60)	—	—	(302.60)	—	—	—
After-Tax Cost	244.80	—	5,000.00	(302.60)	—	(302.60)	—	—	(302.60)	—	—	—

Month	Jan.
Period	70
Purchase	—
Salvage Value	—
Less Tax Savings	(302.60)
After-Tax Cost	(302.60)

Net Present Value	(16,265)

FIGURE 18-5   Spreadsheet Solution for Purchasing the Truck Outright

spreadsheet solution and this example are because of rounding errors in the example.

Summing the present values, we get a net present cost of $16,265.

The purchase with a loan has the lowest net present cost; therefore, purchasing the truck with the loan is the most financially attractive alternative.

Conclusion

The point in time when cash flows are subject to income tax can greatly change the attractiveness of an investment. This may happen due to a company having to carry losses forward or having to depreciate assets over a specified recovery period. Alternatives that take tax write-offs in the early years of the alternative are usually favored over alternatives that take the tax write-offs in the later years of an alternative's life. Preferential treatment from an income tax standpoint, such as reduced taxes on capital gains and tax credits, favors alternatives which may take advantage of these tax savings. Finally, the tax brackets may favor alternatives with more uniform cash flows over alternatives with highly variable cash flow for all companies that are not in the top tax bracket.

Problems

1. Solve Example 18-6 using a spreadsheet. You should be able to determine the new net present value by changing the MARR, marginal tax rate, purchase price, salvage value, loan interest rate, loan fees, or lease payment.

2. Solve the following problem using a spreadsheet. Your S corporation needs a new track hoe for its operations and is looking at three alternatives. The first alternative is to lease the track hoe for sixty months. The monthly lease payment is $2,200 per month. At the end of the lease the track hoe will be returned to the dealer. The lease excludes all maintenance and operational costs. The second alternative is to purchase the track hoe with a sixty-month loan at an interest rate of 7.5% (APY 7.76). The loan has $500 in origination fees. The track hoe's entire sales price of $110,000—including the loan origination fees—can be financed. The first payment is due in July. The second alternative is to purchase the track hoe with cash for $110,000. If your company purchases the track hoe, the estimated salvage value of the track hoe at the end of five years is $15,000. Gains and losses on the sale of the track hoe will be treated as ordinary income. The track hoe may be depreciated using the half-year convention. For all three alternatives, the track hoe is to be placed in service on July 1. Your company's tax year is the same as the calendar year and its marginal tax rate is 35%. Using the net present value (cost) method, which of the above alternatives is the best for your company if your minimal acceptable rate of return (MARR) is

1.25% per month? Assume that there is sufficient taxable income to use all tax savings in the year they occur.

3. Solve the following problem using a spreadsheet. Your S corporation needs a specialized piece of excavating equipment to complete a project. The excavator will need to be available for three years beginning in July of this year. Your company is looking at two alternatives. The first alternative is to lease the excavator for thirty-six months. The monthly lease payment is $7,100 per month. At the end of the lease the excavator will be returned to the dealer. The lease excludes all maintenance and operational costs. The second alternative is to purchase the excavator with cash for $250,000. If your company purchases the excavator, the estimated salvage value of the excavator at the end of three years is $95,000. Gains and losses on the sale of the excavator will be treated as ordinary income. The excavator may be depreciated using the half-year convention. Your company's tax year is the same as the calendar year and its marginal tax rate is 35%. Using the net present value (cost) method, which of the above alternatives is the best for your company if your minimal acceptable rate of return (MARR) is 1.5% per month? Assume that there is sufficient taxable income to use all tax savings in the year they occur.