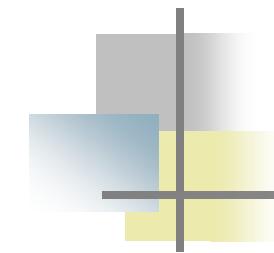


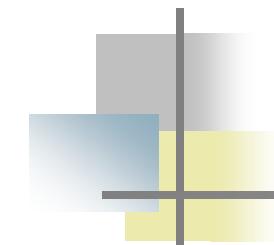
Lecture 17

Income Taxes



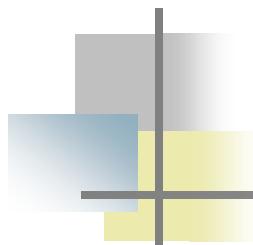
Definitions

- Net versus gross income:
 - Gross income = revenue or receipts
 - Net income = revenue minus expenses
- Corporate tax is on net income (profit)
 - Individual tax is on gross income
 - (You don't get to deduct your rent payments!)
- Income taxes are an additional expense



Example

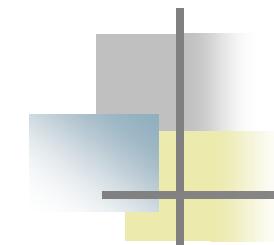
- Investment with 100% salvage value
 - E.g., land
- Buy for \$110K (plus \$3K per year)
 - Or rent for \$25K per year
- Keep for 10 years
- Income tax rate = 40%
- Remember: *Land is not depreciated!*



Example

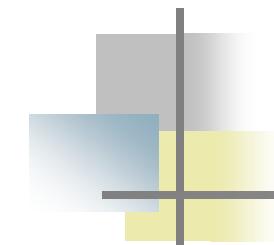
<u>Year</u>	<u>Cash flow</u>	<u>Delta Inc.</u>	<u>Taxes</u>	<u>After-tax cash flow</u>
0	-\$110K			-\$110K
1-10	+\$22K	+\$22K	-\$8.8K	+\$13.2K
10	+\$110K			+\$110K

- Rate of return =
 - 20% before taxes,
 - 12% after taxes!
 - Why lower???



Observations

- Land is *capital*
 - Land purchase is not an expense!
 - Land sale proceeds are not revenue!
 - Just convert cash assets into land, vice versa
- Income taxes are an additional expense
 - *But the timing of this expense is critical!*
 - Things can vary a great deal
 - Depending on the timing of depreciation



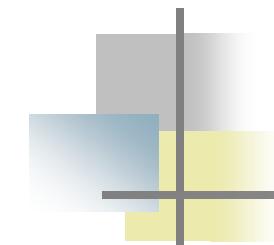
Depreciation example

- Investment with depreciation
- Buy equipment for \$110K for 10 years:
 - No salvage value
 - Straight-line depreciation
 - Savings of \$32K per year
 - Costs of \$5.7K per year
 - Net savings of \$26.3K per year

Depreciation example

<u>Year</u>	<u>Cash flow</u>	<u>Deprec.</u>	<u>Tax. Inc.</u>	<u>Taxes</u>	<u>After-tax cash flow</u>
0	-\$110K				-\$110K
1-10	+\$26.3K	-\$11K	+\$15.3K	-\$6.12K	+\$20.18K

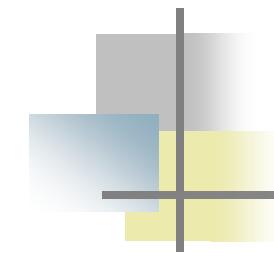
- Taxable income = income - depreciation
 - Depreciation is treated as an expense!
- Rate of return =
 - 20.1% before taxes,
 - 12.9% after taxes



Longer depreciation (25 years)

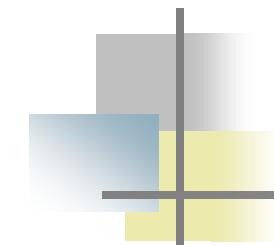
<u>Year</u>	<u>Cash flow</u>	<u>Deprec.</u>	<u>Tax. Inc.</u>	<u>Taxes</u>	<u>After-tax cash flow</u>
0	-\$110K				-\$110K
1-10	+\$26.3K	-\$4.4K	+\$21.9K	-\$8.76K	+\$17.54K
11-25	\$0K	-\$4.4K	-\$4.4K	+\$1.76K	+\$1.76K

- What would you expect:
 - Will IRR go up or down?



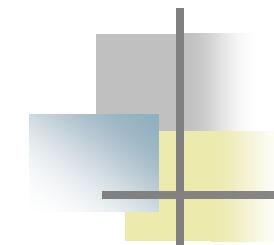
Comparison

- 10 year depreciation schedule:
 - Rate of return =
 - 20.1% before taxes,
 - 12.9% after taxes
- 25 year depreciation schedule:
 - After-tax rate of return = 10.6%
 - Why is it *less?*
 - What happens to **before-tax** rate of return?



Observations

- Depreciation lifetime need not equal actual lifetime!
- After-tax IRR went down
 - Because the tax benefit due to depreciation was *postponed*

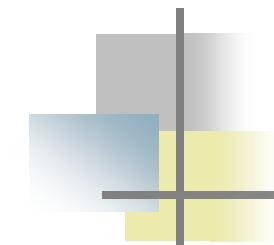


Accelerated depreciation

- 7 year depreciation lifetime:
 - Double declining balance for 4 years
 - Followed by straight line for 3 years
- What would you expect:
 - Will IRR go up or down?

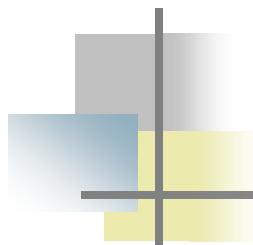
Accelerated depreciation

<u>Year</u>	<u>Cash flow</u>	<u>Deprec.</u>	<u>Tax. Inc.</u>	<u>Taxes</u>	<u>After-tax cash flow</u>
0	-110				-110
1	26.3	31.43	-5.13	-2.05	28.35
2	26.3	22.45	3.85	1.54	24.76
3	26.3	16.03	10.27	4.11	22.19
4	26.3	11.45	14.85	5.94	20.36
5	26.3	9.54	16.76	6.70	19.60
6	26.3	9.54	16.76	6.70	19.60
7	26.3	9.54	16.76	6.70	19.60
8	26.3		26.3	10.52	15.78
9	26.3		26.3	10.52	15.78
10	26.3		26.3	10.52	15.78
Sum		110			



Accelerated depreciation

- How to figure out after-tax IRR?
 - Use column for *after-tax cash flow*
 - After-tax IRR = 14.7%
- Tax benefit of depreciation accelerated,
 - So after-tax IRR went up (>12.9%)
- Note: Change in taxable income can be *negative!* (this is called a “tax loss”)



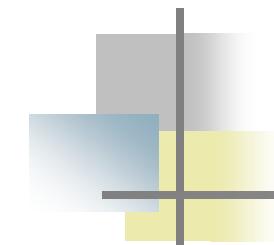
Capital versus expense

- Capital:
 - Acquisition of assets (or life extension)
 - Depreciated only over time
- Expense:
 - Repairs, supplies, etc.
 - “Depreciated” all at once
 - More tax beneficial,
 - Because tax deduction comes *sooner!*

Expense example

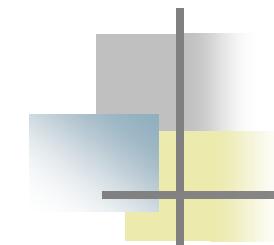
Year	Cash flow	"Deprec."	Tax. Inc.	Taxes	After-tax cash flow
0	-\$110K	-\$110K	-\$110K	+\$44K	-\$66K
1-10	+\$26.3K		+\$26.3K	-\$10.5K	+\$15.8K

- After-tax IRR = 20.1%
 - Same as before-tax IRR
 - The same 40% tax applies to all cash flows
 - *Higher* than after-tax IRR with depreciation
 - May be willing to spend more for expenses than for capital!



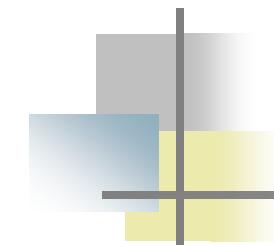
General method

- Determine before-tax cash flows
- Determine change in taxable income:
 - Revenues - depreciation & other expenses
- Compute income taxes:
 - Taxable income times tax rate
- Determine after-tax cash flow:
 - Before-tax cash flow - income taxes



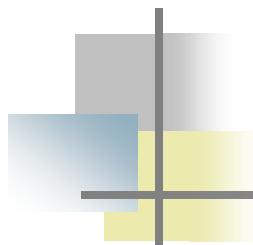
Examples discussed above

- Simplifying assumptions:
 - Actual benefits were equal each year
 - Tax payments at end of year
 - Constant tax rate
- Government gets 40% of next benefit in all cases, but *timing is critical!*
 - Government gets constant dollar amount,
 - *Not constant value!*



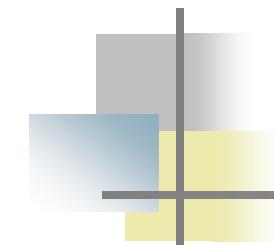
Examples discussed above

- Government gets 40% of next benefit in all cases, but timing is critical!
- Same concept applies to **losses**:
 - Government foregoes tax revenue equal to 40% of depreciation and other expenses



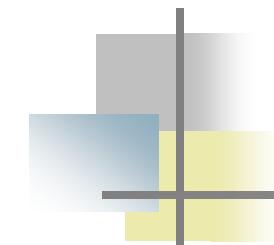
Observation

- In addition to higher IRR,
 - Rapid depreciation also leaves more **cash** available for other investments:
 - May be useful if money is tight
 - Payback period =
 - 4.18 years with immediate depreciation
 - 5.45 years with 10-year depreciation
 - 6.27 years with 25-year depreciation, etc.



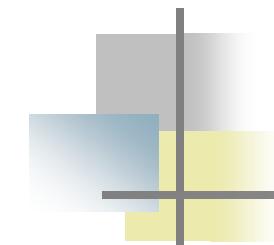
Graduated income tax

- Constant tax rate:
 - “Flat tax”
- If tax rate is not constant:
 - “Graduated” income tax



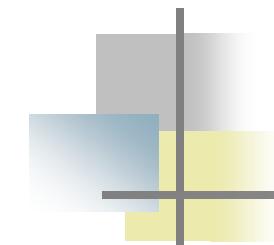
Graduated income tax

- Example:
 - 15% if taxable income < \$50K
 - \$7.5K + 25% of amount above \$50K
 - If taxable income between \$50K and \$75K
 - \$13.75K + 34% of excess over \$75K
 - If taxable income > \$75K



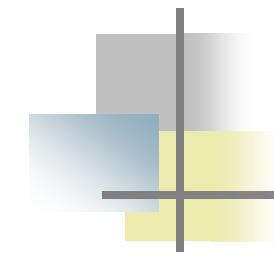
Double taxation

- Corporate income, personal dividends are both taxed:
 - More advantageous to get benefits in form of higher stock price, not dividends!
 - (But partnerships and sole proprietorships are taxed *only* as individual income)
- If key decision makers are stock owners
 - Consider *both* personal and corporate tax!



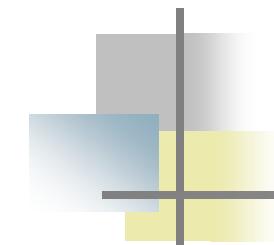
Computation of total tax rate

- State taxes are deductible as expenses on federal tax return:
 - So *total* tax rate = $s + (1-s) f$
 - (if taxable income is defined the same way)
 - where
 - State tax rate = s
 - Federal tax rate = f
 - If $s=9\%$ and $f=34\%$, then $.09+.91(.34)=.4$



Changes over time

- Tax rates may change over time:
 - New laws passed
 - New “tax bracket”
- Use *predicted* tax rate



Review

- We learned how to find after tax-IRR by
 - Determining before-tax cash flows
 - Determining change in taxable income:
 - Revenues - depreciation & other expenses
 - Computing income taxes
 - Determining after-tax cash flow
- We saw effects of depreciation schedule on *after*-tax IRR