Lecture 18

Income Taxes

Rate of return

- Rate of return:
  - Before-tax = B
  - After-tax = A
- As an approximation:
  - $B = A/(1-T)$, where T = tax rate
    - Note that $A < B$ *(always!)*
    - If $A = .1$ and $T = .49$, then $B = .196$

Rate of return

- Why is this only approximate?
  - Speed of depreciation may differ
  - Tax rate may change during study period
  - Capital gain or loss may be involved
    - May be OK, but only if all projects are similar
- Better to find after-tax rate of return from after-tax cash flows
  - Requires more detailed tax knowledge

Definitions

- Tax *deduction*:
  - Expense deducted from taxable *income*
    - Saving = (deduction) x (tax rate)
- Tax *credit*:
  - Expense deducted from *taxes*
    - Saving = 100% of tax credit
- Tax *exemption*:
  - *Income* that is not taxable

Definitions

- Book value:
  - Purchase price
    - (for land, stocks)
  - Depreciated value
    - (for physical assets, patents)

Definitions

- Capital gains:
  - Item sold for greater than purchase price
- Depreciation recapture:
  - Item sold for greater than book value
    - (Up to purchase price)
    - Taxed as ordinary income
- Capital loss:
  - Item sold for less than book value

Capital gain/loss

- Generally attributed to year of sale
- Long-term capital gains (> 1 year)
  - Used to be taxed less than ordinary income
- Capital loss not deducted from income:
  - Only from capital gains (for companies)
  - Limited deductions from income (personal)
    - *Losses can be carried over to future years!*

Capital gain/loss

- Carrying backward or forward:
  - Some businesses are very volatile
    - E.g., oil prospecting!
  - Some years may have net losses
  - Can use past losses to offset future gains
    - (But not on some state returns)
    - Can carry forward for up to 5 years,
      - Or *backward* for up to 3 years

Example

- Investment with depreciation
- Buy equipment for $110K for 10 years:
  - No salvage value
  - Straight-line depreciation

Example

- Sell for $30K in year 8:
  - Book value = $22K
  - Depreciation recapture = $8K
  - Taxed as ordinary income
- Sell for $20K in year 8:
  - Capital loss = $2K
  - *Cannot* deduct from ordinary income
    - Deduct from *gain* (now or in another year)

Non-depreciable example

- Investment with *no* depreciation
- Buy *land* for $110K
- Sell for $130K:
  - Capital gain = $20K
  - Taxed as ordinary income
- Sell for $100K:
  - Capital loss = $10K (offset against gains)

Capital gain/loss

- Taxable income =
  - Gross income (i.e., revenues or receipts)
    - Minus operating expenses
    - Minus depreciation
    - *Plus* depreciation recapture
    - *Plus* capital gains
    - Minus capital losses
      - (up to size of capital gains, but no greater)

Personal income tax

- Same general issues as corporate tax:
  - Tax exempt income
    - (E.g., government bonds, *personal exemption*)
  - Tax deductions
    - Standard versus *itemized* deductions
      - (E.g., charitable donations, interest payments)

Tax-exempt example

- Purchase \$5K bond (20 years)
  - From phone company at 11%:
    - \$550/year, paid as \$275 every 6 months
  - Municipal bond from at 7.5%:
    - \$375/year, paid as \$187.50 every 6 months
- Assume marginal tax rates:
  - $s = 8\%$ (state), $f = 28\%$ (federal)
    - Total tax rate $= s + (1-s) f = 33.8\%$

Tax-exempt example

- Phone company bond at 11%:
  - $550/year, paid as $275 every 6 months
  - Tax = ($550) x (33.8%) = $185.9
  - *After-tax* income
    - $550 - $185.9 = $364.10
- Municipal bond at 7.5%:
  - $375/year (after-tax income greater!)
  - *Desirability will vary with income!* (tax rate)

Observation

- Tax-exempt bond at 7.5% may give higher income than 11% bond!
- Desirability will vary with income:
  - Higher income gives higher tax rate
  - Tax exemption becomes more desirable

Charitable deduction example

- Assume marginal tax rates:
  - s = 8% (state), f = 33% (federal)
    - Total tax rate = $s + (1-s) f$ = 38.4%
- Charitable gift of $1000:
  - Must be *charity*, not *political!*
  - ($1000) x (38.4%) = $384
  - *True* cost of gift = $1000 - $384 = $616
    - Government is encouraging charity!

Interest deduction example

- Tax rate = 39.7%
- Pay $36K for property:
  - $6K cash (paid in year 0)
  - $30K loan for 15 years
    - Pay $2000 of principal each year,
    - Plus 12% interest on remainder
  - Property taxes
    - Pay $800 per year

Interest deduction example

- Interest payments and property taxes are both tax-deductible
- *Not* repayment of principal!
  - (Not an expense, just exchange of assets)

Interest deduction example

- Year 1 tax deduction:
  - \$800 + 12% of \$30K = \$4400
    - Reduction in taxes = \$4400 x (.397) = \$1747
    - Cash flow = \$2000 + \$800 + \$3600 - \$1747
      - = \$4653 (versus \$6400 without tax savings)
- Year 2 tax deduction:
  - \$800 + 12% of \$28K = \$4160
    - Reduction in taxes = \$4160 x (.397) = \$1652

Observation

- Government encourages people to *own* rather than rent:
  - Interest payments are tax deductible
  - Rent payments are *not!*
  - Why???
- When business is financed by borrowing
  - Income also reduced by amount of interest

Review

- We learned how to analyze capital gains and losses
- We saw effects of personal income tax