Net Present Value and Capital Budgeting (CB)

Incremental Cash Flows (CFs), Inflation in CB, and Unequal Lives

Cash Flow Estimation

- CFs are in future $\rightarrow$ uncertainty
- What are the **relevant** CFs for a project?
  - *Incremental Cash Flows*
- **Any and all** changes in the **firm's** CFs that are a **direct consequence** of taking the project

Key considerations in Cash Flow Estimation

- When is a CF incremental?
  - *Sunk costs*: cash outlay already incurred; Will **not** be affected by the accept/reject decision
    - Not Incremental & thus**, Not relevant**
  - *Opportunity costs:* resources that could be directed towards other productive uses. Affected by the accept/reject decision
    - Incremental & thus, **Relevant**

Key considerations (Continued)

- When is a cash flow incremental?
  - *Side effects:* effect of proposed project on other parts of the firm. e.g.,
    - *Erosion*: new project revenues gained at the expense of existing products/services
    - Incremental & thus, **Relevant**
  - *Financing Costs:* dividends or interest or principal repayment on debt
    - **Not relevant**

Key considerations (Continued)

- When is a cash flow incremental?
  - *Net Working Capital* (CA - CL)*:* any change in NWC affects CFs. For NWC ⇑ , cash has to be spent: negative CF.
  - No change in NWC from one period to next means NO impact on the CFs.
  - Recovered at the project's end: positive CF
    - Incremental & thus, **Relevant**
- *Other Issues*: Use CFs; not A/C numbers.
- Use <u>after-tax</u> cash flows

Project CFs (A Simplification)

- PCF_t = Pr. OCF_t – changes in NWC - Capital $Spending_t$
- OCF_t = Revenues (R) - Expenses (E) - Taxes
- Taxes = T_c * (R - E - Depreciation). ∴
- $OCF_t = (R - E) *(1 - T_c) + D*T_c$

  (Revenues - Expenses) on an After-tax basis + Depreciation tax shield
- Tax on Salvage Value =

  T_c * (salvage value - book value)

Replacement Problem

- Replace an Old machine with a New one. E.g.,
- Can buy a new computer for $2,000; Old one can be sold for $500. New computer will last for 3 yrs.

	Revenues	Operating costs	Depreciation
New	$600	100	500
Old	$600	300	200
Diff.	$0	$-200	$300

- Incremental CFs?

Inflation & Capital Budgeting

- Real interest rates *vs.* Nominal interest rates
- Real CFs *vs.* Nominal CFs. E.g.:

  Expected sales in year 1 & 2: 500 & 600 units

  Today's unit price: $50

  Price expected to ↑ by inflation rate (6%)
- Nominal CFs? Real CFs?
- Either discount *Real CFs* at *Real Rates* or *Nominal CFs* at *Nominal Rates*.

Investments of Unequal Lives

- Machine ’A’: costs $100 to buy, $10/yr. to operate; Life = 2 years
- Machine ’B’: costs $140, $8/yr. to operate; Life = 3 years; @10%
- NPV_A = $-117.36 NPV_B = $-159.89
- Is ‘A’ better than ‘B’?? NO!!

Investments of Unequal Lives (Continued)

- Equivalent Annual Cost (EAC)
  - is the amount, paid each yr. over the life of the machine, that has the same PV of costs
- EAC_A = -\$67.62; EAC_B = -\$64.29
- H.W. 3, 5-7, 10, 21, 24, 30, 35, 37, 40
- NOTE: work problem #11 as follows: calculate the NPV if MMC will pay \$80,000 for the equipment