Net Present Value and Capital Budgeting (CB)

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

- CFs are in future → 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 after-tax cash flows*
Project CFs (A Simplification)

\[ PCF_t = Pr. OCF_t - \text{changes in NWC} - \text{Capital Spending}_t \]

\[ OCF_t = \text{Revenues (R)} - \text{Expenses (E)} - \text{Taxes} \]

\[ \text{Taxes} = T_c \times (R - E - \text{Depreciation}) \]

\[ OCF_t = (R - E) \times (1 - T_c) + D \times T_c \]

(Revenues - Expenses) on an After-tax basis + Depreciation tax shield

\[ \text{Tax on Salvage Value} = T_c \times (\text{salvage value} - \text{book value}) \]
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.

<table>
<thead>
<tr>
<th></th>
<th>Revenues</th>
<th>Operating costs</th>
<th>Depreciation</th>
</tr>
</thead>
<tbody>
<tr>
<td>New</td>
<td>$600</td>
<td>100</td>
<td>500</td>
</tr>
<tr>
<td>Old</td>
<td>$600</td>
<td>300</td>
<td>200</td>
</tr>
<tr>
<td>Diff.</td>
<td>$0</td>
<td>$-200</td>
<td>$300</td>
</tr>
</tbody>
</table>

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