Making Capital Investment Decisions

http://www2.gsu.edu/~fnecwh/pdf/rwjch6v2overview.pdf

http://www.westga.edu/~chodges/pdf/capbudhint.pdf

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Key Concepts and Skills

- Understand how to determine the relevant cash flows for various types of capital investments
- Be able to compute depreciation expense for tax purposes
- Incorporate inflation into capital budgeting
- Understand the various methods for computing operating cash flow
- Not likely to apply the Equivalent Annual Cost approach

Chapter Outline

6.1 Incremental Cash Flows
6.2 The Baldwin Company: An Example
6.3 Inflation and Capital Budgeting
6.4 Alternative Definitions of Cash Flow
6.5 Investments of Unequal Lives: The Equivalent Annual Cost Method

6.1 Incremental Cash Flows

- Future, Operating, Incremental, After-Tax Cash Flows matter
- Cash flows matter—not accounting earnings.
- Sunk costs do not matter.
- Incremental cash flows matter.
- Opportunity costs matter.
- Side effects like cannibalism and erosion matter.
- Taxes matter: we want incremental after-tax cash flows.
- Inflation matters.

Estimating Cash Flows

- Cash Flow from Operations
  - Recall that:
    - OCF = EBIT - Taxes + Depreciation
- Net Capital Spending
  - Do not forget salvage value (after tax, of course).
- Changes in Net Working Capital
  - Recall that when the project winds down, we enjoy a return of net working capital.

A general approach to Cash Flow Analysis

- Two-pass method
  - Read the problem (X, o, check)
  - Apply checklist
- Cash Flows can be
  - Initial
  - Operating
  - Terminal
**Initial Cash Flows**

- 1. Cost of new equipment including shipping and installation (this is the number that will be depreciated (depreciable basis)), always a cash outflow (-).
- 2. Change in working capital (increases in assets are a use (-) of cash, increases in liabilities are a source (+) of cash).
- 3. Tax impact of new equipment (usually not tested).
- Replacement only, 4. Salvage Value of Old Equipment, always a cash inflow (+).
- Replacement only, 5. Tax impact of Old Equipment (\(=((\text{Book Value} \text{ – Salvage Value}) \times \text{tax rate})\)), may be inflow or outflow.

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**Operating Cash Flows**

- A modified income statement for each year of the Project
  - Look at Changes only
  - There can be changes to the balance sheet (e.g., change in working capital) are listed separate from the operating cash flows
  - Sales
  - Variable Operating Expenses
  - Fixed Operating Expenses
  - Depreciation (depreciable basis \(\times\) depreciation percentage)
  - \(\text{EBIT}\)
  - \(\text{Taxes}\)
  - \(\text{NOPAT}\)
  - \(\text{Depreciation}\)
  - \(\text{Operating Cash Flows}\)

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**Terminal Cash Flows**

- 1. Salvage Value of the now old New Equipment, always a cash inflow.
- 2. Tax impact of Old Equipment (\(=((\text{Book Value} \text{ – Salvage Value}) \times \text{tax rate})\)). Note, book value = purchase price – accumulated depreciation. If you sell machine for more than book value, this is a profit that creates a tax liability or a cash outflow (-). If you sell the machine for less than book value, this is a loss/reduction in profits that creates a tax credit or a cash inflow (+).
- 3. Recovery of Working Capital (the exact same number as line 2 in Initial Cash Flows with the opposite sign).
- Replacement Problems Only, 4. Opportunity Cost of not receiving Salvage Value for Old Equipment, which is always a cash outflow (-). This is because if you sell the old machine at time 0 (a cash inflow) you cannot later sell it at the end of the project. Thus we record the selling price we do not receive as a negative number.
- Replacement Problems Only, 5. Opportunity Cost of tax impact of not receiving Salvage Value for Old Equipment (\(=((\text{Book Value} - \text{Opportunity Salvage}) \times \text{tax rate})\)). Note the negative sign prior to book value, since line 4 is always a cash outflow, we reverse the sign for the tax impact.

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**Inflation and Capital Budgeting**

- For low rates of inflation, this is often approximated:
  \[\text{Real Rate} \approx \text{Nominal Rate} - \text{Inflation Rate}\]
- While the nominal rate in the U.S. has fluctuated with inflation, the real rate has generally exhibited far less variance than the nominal rate.
- In capital budgeting, one must compare real cash flows discounted at real rates or nominal cash flows discounted at nominal rates.

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**6.4 Other Methods for Computing OCF**

- **Bottom-Up Approach**
  - Works only when there is no interest expense
  - \(\text{OCF} = \text{NI} + \text{depreciation}\)
- **Top-Down Approach**
  - \(\text{OCF} = \text{Sales} - \text{Costs} - \text{Taxes}\)
  - Do not subtract non-cash deductions
- **Tax Shield Approach**
  - \(\text{OCF} = (\text{Sales} - \text{Costs})(1 - T) + \text{Depreciation}\times T\)

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**6.5 Investments of Unequal Lives**

- If our investment choices have different life spans, there are times when application of the NPV rule can lead to the wrong decision.
- Be careful, this may be a time to apply Real Options analysis, it may be a time to modify based on unequal lives.
Equivalent Annual Cost (EAC)

The EAC is the value of the level payment annuity that has the same PV as our original set of cash flows.

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