Construction Accounting and Financial Management

Chapter 17
Tools for Making Financial Decisions

Types of Alternatives

- **Independent**
  - Does not preclude accepting another alternative

- **Mutually exclusive**
  - Precludes accepting all other alternatives

- **Contingent**
  - Must be selected with another alternative

- **"Do nothing"**

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Pool of Possible Alternatives

- May be a single alternative or combination of alternative

- Must be mutually exclusive

- Must meet the desired objectives without going over budget

Sunk Costs

- Sunk costs are:
  - Costs already incurred
  - Costs that have been committed to be paid that cannot be canceled

- Sunk costs should not be used in decision making because the money has already been spent

Minimum Attractive Rate of Return (MARR)

- Interest rate at which alternatives will be evaluated

- Should cover cost of capital and minimum acceptable profit
  - Profit covers risk

Study Period

- The period of time over which the alternatives will be studied

- All alternatives must have the same life span as the study period

Adjusting Live Spans

- Shorten by adding salvage value

- Lengthen by adding maintenance cost at end of life
  - For example, upgrading a computer

- Repurchase alternative
  - May be done until all alternatives end at the same time

- Combination of above

Net Present Value (NPV) or Present Worth

- Determine present value (at beginning of the study period) for each alternative's cash flows

- Select alternative with largest NPV

- If:

  NPV >0: Alternative has return > MARR

  NPV =0: Alternative has return = MARR

  NPV <0: Alternative has return < MARR

Incremental Net Present Value

- Alternatives compared by the differences in their cash flows

Incremental Net Present Value—Steps

- Step 1: Rank alternative based upon initial cost (low to high)

- Step 2: Alternative with lowest cost is "current best alternative"

- Step 3: Compare "current best alternative" with next alternative based upon net present value

Incremental Net Present Value—Steps

- Step 4: if:
  - If NPV is positive the next alternative becomes the "current best alternative"
  - If NPV is zero or negative the "current best alternative" remains the "current best alternative"

- Step 5: Repeat Step 4 until all alternatives have been considered

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Future Worth (FW)

- Determine future worth (at end of the study period) for each alternative's cash flows

- Select alternative with largest future worth

- If:

  FW >0: Alternative has return > MARR

  FW =0: Alternative has return = MARR

  FW <0: Alternative has return < MARR

Future Worth (FW)

- Selects the same alternative as the net present value

- Future Worth = NPV $(1 + MARR)^{Years}$

Annual Equivalent (AE)

- Determine annual equivalent for each alternative's cash flows

- Study periods may be different
  - Assumes alternatives are repurchased
  - Need not adjust lives

- Select alternative with largest annual equivalent

Annual Equivalent (AE)

- If:

    AE >0: Alternative has return > MARR

    AE =0: Alternative has return = MARR

    AE <0: Alternative has return < MARR

- Selects the same alternative as the net present value and future worth

- AE = NPV $[i(1 + i)^n]/[(1 + i)^n - 1]$

- AE = FW $[i(1 + i)^n]/[(1 + i)^n - 1]$

Rate of Return

- Interest rate that produces a NPV of zero

- Select alternative with largest rate of return

- If best rate of return is less than the MARR consider rejecting all alternative

Incremental Rate of Return

- Alternatives compared in the differences in their cash flows

Incremental Rate of Return—Steps

- Step 1: Rank alternative based upon initial cost (low to high)

- Step 2: Alternative with lowest cost is "current best alternative"

- Step 3: Compare "current best alternative" with next alternative based on rate of return

Incremental Net Present Value—Steps

- Step 4: if:
    - If the rate of return in greater than the MARR the next alternative becomes the "current best alternative"
    - If the rate of return is less than or equal to the MARR the "current best alternative" remains the "current best alternative"

- Step 5: Repeat Step 4 until all alternatives have been considered

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Capital Recovery with Return

- Similar to annual equivalent except it only looks at capital costs

- Identifies how much revenue an alternative must generate to cover it capital cost with a return on investment
    - Useful when trying to determine revenues

Payback Period without Interest

- How long does it take to recover initial costs?

- Ignores:
  - Interest on the initial costs
  - Salvage value

- If payback period without interest is longer than the life of the alternative, the alternative should be rejected

Payback Period with Interest

- How long does it take to recover initial costs plus interest?

- Includes interest on the capital investment

- Ignores the salvage value

- If payback period with interest is longer than the life of the alternative, the alternative should be rejected

Project Balance

- Show:
  - Potential profit or loss at any time
  - Future worth, which is related to NPV
  - Show payback period with interest

- Useful for:
  - Risky alternatives
  - Comparing alternatives with similar NPVs

Project Balance