

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”

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

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 in 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

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

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
- $\text{AE} = \text{NPV} [i(1+i)^n]/[(1+i)^n - 1]$
- $\text{AE} = \text{FW} [i(1+i)^n]/[(1+i)^n - 1]$

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 is 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

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 its 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

