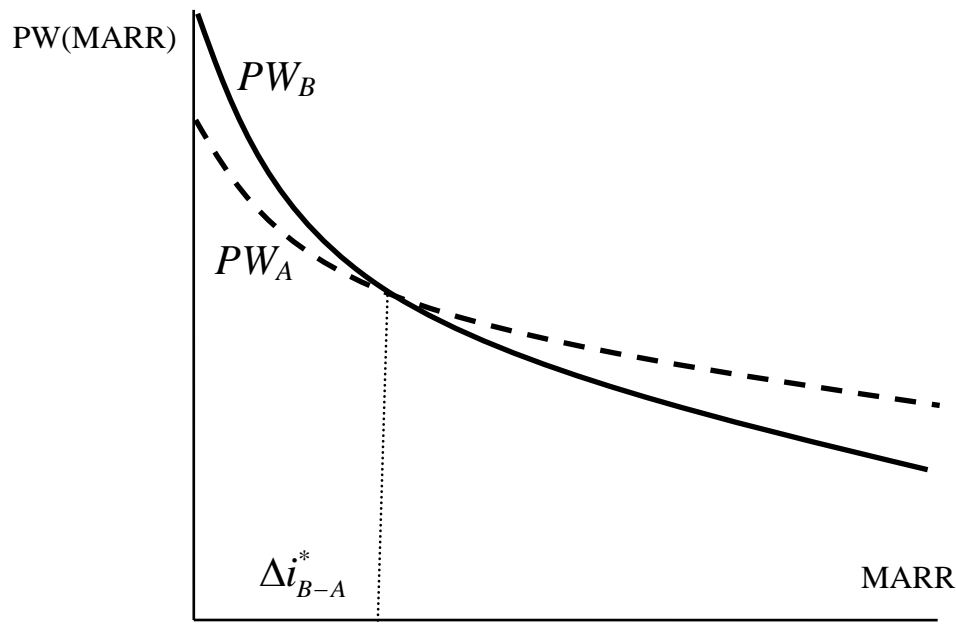


Chapter 8 Rate of Return Analysis: Multiple Alternatives

- **Why incremental analysis is necessary**
 - Comparing ROR values of two or more alternatives will not give the best alternative.
 - This is so because an alternative with high ROR may be actually generating little value.
 - Therefore, to compare alternatives on the basis of ROR, an incremental analysis is necessary.
- **Steps for comparing two alternatives with incremental ROR analysis using PW**
 - For unequal life alternatives, develop the cash flows over the LCM of lives or the study period. (See Chapter 5.)
 - *This assumes implicitly that cash flows repeat.*
 - Designate the alternative with the highest initial investment as B, and the other as A.
 - Evaluate the incremental cash flow series
$$\Delta F_t = FB_t - FA_t, \quad t = 1, 2, \dots, \text{LCM}.$$
 - For the series ΔF_t , find the ROR, denoted by Δi_{B-A}^* , assuming such a ROR is unique.
 - If $\Delta i_{B-A}^* < \text{MARR}$ select A. Otherwise, select B.

- **Justification of the incremental cash flow approach**

- The Δi_{B-A}^* value is the MARR value for which the two alternatives A and B are equivalent in terms of PW.
- If $\text{MARR} \geq \Delta i_{B-A}^*$ (equivalently $\Delta i_{B-A}^* < \text{MARR}$), then $PW_A > PW_B$. Otherwise, if $\text{MARR} < \Delta i_{B-A}^*$, $PW_B \geq PW_A$.



- **Comparing two alternatives with incremental ROR analysis using AW**

- Using AW, Δi_{B-A}^* could be found by solving the equation

$$AW_B(i) - AW_A(i) = 0,$$

over one life cycle of each alternative.

- **Comparing more than two alternatives with incremental ROR analysis**
 - Rank the alternatives from smallest to largest initial investment.
 - Compare first alternative (with smallest initial investment) with the second alternative as discussed above.
 - Compare the winning alternative with the third alternative.
 - Continue with this pair-wise comparison until all alternatives are considered.
- **When you can do nothing**
 - If the do-nothing alternative could be selected, start the analysis by eliminating the alternatives with $ROR < MARR$.
 - If all alternatives have $ROR < MARR$, select the do-nothing alternative wins over other alternatives considered.