ADVANCED CAPITAL BUDGETING

Impact of Inflation on Capital Budgeting Decisions

- **Adjustment for inflation** is a necessity for **capital investment appraisal** because inflation will **raise the revenues & costs** of the project.
- Net revenues after adjustment for inflation = net revenues in current terms.
- Tax benefits accruing from depreciation charges do not keep parity with inflation.
- Interest expense is ignored.

Calculation of Annual Cash flows for the project:

Particulars	Amount (₹)
Revenue/ Sales	xxx
Less: Cost (VC/FC)	(xxx)
EBITDA	xxx
Less: Depreciation	(xxx)
EBIT or EBT	xxx
Less: Tax	(xxx)
NOPAT or PAT	**xxx**
Add: Depreciation	xxx
Cash Inflows	**xxx**

Conversion of Real to Nominal & Nominal to Real

➢ **Cashflows:**

Real Cash Flows (RCF) → Discounted with → Real Discounting Factor (RDR)

Nominal Cash Flows (NCF) → Discounted with → Nominal Discounting Factor (NDR)

➢ **Conversion of Real Cash flow (without inflation) to Nominal Cash flow (with inflation):**

Nominal cash flow = (Real cash flow) (1+ Inflation rate)

➢ **Discounting Rate:**

Nominal Rate = (1 + Real Rate)x(1+ Inflation Rate) -1

Statistical Techniques

- **Expected Net Cash flows:** The sum of the likely Cash flows of the Projected multipled by the probability of cash flows.
- Steps for **Calculation of Risk** (Standard Deviation (S.D)):

Step 1: Calculation of Expected NPV (ENPV):

Expected NPV = ΣPX = Σ (Probability x NPV)

Step 2: Calculation of Variance & Standard Deviation:

$$\text{Variance } (\sigma^2 x) = \sum(x - \bar{x})^2 p$$

$$\text{Standard Deviation } (\sigma_x) = \sqrt{\sum(x - \bar{x})^2 p}$$

Step 3: Calculation of Co-efficient of variation: Higher CV means Higher risk.

$$CV = \frac{\text{Standard Deviation}}{\text{Expected Return/ Expected Cash Flow}} = \frac{\sigma_x}{\bar{x}}$$

- **Probability Index:** $\frac{\text{Present Value of Future Cash Flows}}{\text{Initial Investment}}$

Scenario Analysis

- Scenario analysis examine the risk of investment, to analyse the impact of alternative combinations of variables, on the project's NPV (or IRR).
- There is a limitation of sensitivity Analysis that one factor will change at one time; it means factors are independent.
- In Scenario Analysis, we change All factors of project simultaneously & calculate NPV in different-different scenario.

Conventional Techniques

- **Risk Adjusted Discount Rate (RADR):** The use of RADR is based on concept that the investors demand higher returns from risky projects.

Calculation of RADR:

RADR: Risk Free Rate + Risk Premium ($R_f + R_p$)

Risk Premium = [Minimum Required Return of firm – Risk Free Rate] x Risk Index

- **Certainty Equivalent (CE):** Expected Future Cash Flows from the Project (which are risky) are converted in certain cash flows using Certainty Equivalent Co-efficient. **Calculation:** Multiply each risky CF by CE co-efficient.
- **Utility Approach:** Expected Future Cash Flows from the Project are assigned utility values. Highest Expected Utility Value is selected.

Expected Utility Value of the project = Σ (Utility Value$_1$ x Probability$_1$) + (Utility Value$_2$ x Probability$_2$) + …. + (Utility Value$_n$ x Probability$_n$)

Sensitivity Analysis

- In a project, several variables operate simultaneously. The changes in these variables impact the outcome of the project. The more sensitive is the NPV (or IRR), the more critical is that variable.
- Methods:

Sensitivity of Project considering a fixed % adverse change/ variance in each factor:	Sensitivity of Project in relation to each factor such that NPY of Project becomes Zero (0):
Calculate Existing NPV of the Project considering existing value of factors.	Calculate Existing NPV of the Project considering exiting value of factors.
Calculate Revised NPV of the Project considering a fixed % (Given in Question) adverse change in each factor independently, keeping other factors same.	Calculate value of each factor independently, keeping other factors same, so that NPV of the project will be Zero (0).
% Change in NPV: $\frac{\text{Existing NPV - Revised NPV}}{\text{Existing NPV}} \times 100$	**% Change each factor:** $\frac{\text{Revised Value factor- Existing Value}}{\text{Existing Value factor}} \times 100$
*Repeat this Step 2 Process for each factors.	*Repeat this Step 2 Process for each factors.
Determine the Most Sensitive factor → Factor which leads to highest % Change in NPV	**Determine the Most Sensitive factor → Factor which have lowest % Change.**

Replacement Cost

Replacement Decision: Old machine in use but new with better technology available then decision is taken based on Incremental Cash flows whether old machine to be replaced or not

Particulars	Amount
(A) Incremental Cash outflow	
Cost of New Machine	xxx
Less: Sale of Old Machine (Net of Tax)	xxx
(A)	**xxx**
(B) Incremental Cash inflow	
Incremental CFAT	xxx
Incremental Terminal Value	xxx
(B)	**xxx**
NPV (B – A)	**xxx**

Selection of Asset using Equivalent Annual Cost [EAC]: Asset with different useful life are available but to choose any 1 Asset, EAC Method is used.

Asset having Lowest EAC should be selected.

EAC of an Asset = $\frac{\text{PV of Cash Outflows of Asset}}{\text{PVAF@ Discount Rate for Life of Asset}}$

PV of Cash Outflows of Asset	Amount
Initial Investment in Asset	xxx
(+) PV of Annual Running Costs of Asset	xxx
(-) PV of Salvage Value of Asset	xxx
	XXX