-:- A macro or broad overview of Advanced Risk Analysis Techniques -:-

Decision Tree | Simulation | Sensitivity Analysis | Scenario Analysis

Decision Tree is type of scenario analysis where there is sequential decision making .....

Connected

$NPV = f[P, V, Q, \text{cash fixed cost}, k_c, n, I]$

$NPV = [Q(P-V) - \bar{F}] \times PVAF(k_c, \bar{n}) - \bar{I}$

(F, n, I are parameters)

(Q, P, V, k_c - exogeneous variable)

We want to assess that .... jab ye ↑ exogeneous variable change honge to NPV kaise change hoga.

Sensitivity analysis

we find out the sensitivity of NPV w.r.t. each factor, keeping other factors constant.

Problems :-

1) Assumes that factors are independent.
2) Does not respect the probability distribution of factors.

Purpose : Identify critical factor .... jo project ko barbad kr skta hai..... jisme 440 V ka jhatka hai....

Simulation & Scenario

We simultaneously change all factors & find out the impact on NPV.

How ?

Scenario — Subjective
- worst case
- best case
- most likely

Simulation — Using random numbers

Simulation & Scenario ka purpose to generate distribution of NPV - mean, S.D. of NPV. Risk seh paoge kya ?.

Sensitivity ka purpose is not to conclude whether to accept or reject project but to find the critical factors.

Sensitivity Analysis

Step 1 : Calculate expected NPV using -
- Parameters &
- Expected value of exogeneous variables.

Suppose NPV comes to ₹ 120000

Step 2 : Now conduct sensitivity analysis -

Kaise ???

shortcuts allowed & recommended

··· **Style 1 -** Recommended .... students ko pasand hai....

Name: **Shock approach**

Shock each exogeneous variable in adverse direction by a certain %, say 10% & find out the % fall in NPV. (we assume shock % - either given / assume)

(kharab kab hoga - P↓, Q↓, V↑, kc↑, n↓, I↑, SV↓)

Critical factor → jiske shock se NPV ka sabse jada % fall hoga.

Savdhan rahe satark rahe 

If 'n' is an exogeneous variable & expected n = 5 is given. Obviously u have to adversely decrease it to 4 ..... i.e. 20% shock .... in which case shock % for all factors would be 20%.

··· **Style 2 - Margin of Safety method**

For each risk factor, we need to calculate % change that has to take place in the factor to make NPV fall to zero.

Obviously jis factor me MOS sabse kam ayega, wo factor critical hoga....

neither shock nor MOS method depicts the risk taking capacity. It does not depend on project, but is a function of company's makeup i.e. Risk allowed by BOD.

Q.1 pg — 'D' is exogeneous variable in this sum - SAVDHAN

Step 2 :-

$$\text{Expected NPV} = \frac{[20000 \times (60-40)]}{(1.1)^1} + \frac{[30000\,(60-40]}{(1.1)^2} + \frac{[30000 \times (60-40)]}{(1.1)^3} - 1000000$$

$$= 20\,[18181.82 + 24793.39 + 22539.44] - 1000000$$

$$= 20\,(65514.65) - 1000000$$

$$= 1310293 - 1000000$$

$\therefore$ Expected NPV = 310293

Step 2 : Sensitivity analysis -

(1) Method 1 : Shock Approch :

Let us shock each factor by 1/3 i.e. 33.33% in the adverse direction & find out % fall in NPV.

(X) Bohot hi ajib lag raha hai ye 1/3 se shock krna .... chalo style 2 krte hai .... method 1 kisi aur sum me kar lenge

(2) Method 2 : MOS Approach :

Let us calculate MOS for each factor.

a) Selling price p.u. - (p)

$$(p-40) \times (65514.65) - 1000000 = 0$$

$$(p-40) = 15.26$$

$\therefore p = 55.26$ (Breakeven price level)

$$\therefore \text{MOS} = \frac{60 - 55.26}{60} \times 100 = 7.9\%$$

b) Unit Cost - (v)

$$(60 - v) = 15.26$$

$\therefore v = 44.74$ .... expected cost = 40

$$\therefore \text{MOS} = \frac{44.74 - 40}{40} \times 100 = 11.85\%$$

c) Sales Volume :- (Q)

$$MOS = \frac{310293}{1310293} \times 100 = 23.68\%$$

d) Initial Outlay - (I)

$$MOS = \frac{310293}{1000000} \times 100 = 31.03\%$$

e) Project lifetime - (n)

When, $n = 3$: $NPV = 310293$

When, $n = 2$: $NPV = (18181.82 + 24793.39)\,20 - 1000000$

$= -140496$

$n = 3$, $NPV = 310293$

$n = ? \rightarrow NPV = 0$: Breakeven

$n = 2$, $NPV = -140496$

$$\therefore \frac{n-2}{3-2} = \frac{0-(-140496)}{310293-(-140496)}$$

$$\therefore n-2 = \frac{140496}{450789}$$

$$\therefore n-2 = 0.31$$

$$\therefore n \cong 2.31 \text{ years}$$

Expected $n = 3$

$$\therefore MOS = \frac{3-2.31}{3} \times 100 = 23\%$$

→ Summary of Results :-

Selling price is most critical factor as it has least MOS.

Factors	MOS
P	7.9%
V	11.85%
Q	23.68%
I	31.03%
n	23%

1) Explanation of 'C' :

Q ← Q1, Q2, Q3 } Agar dhyan de to uska relation baaki terms k sath (20, 1/1.1, 1/(1.1)², 1/(1.1)³), multiplicative & divisive hai.....

Toh kya kare ?

Jitna % 'Q' change hoga utna hi % 1310293 change hoga

Agar NPV udana hai toh, 1310293 ko kitna change kre ?

Agar Question me, kc exogeneous hota toh....

IRR nikalte na q k at IRR, NPV = 0.

↳ Hum upr k tarah nahi nikate q k - $(1+kc)^{n}$, 'kc' aur 'n' ka rishta exponential hai.