

ADVANCED CAPITAL BUDGETING DECISIONS

CLASS 9

Topic Conceptual Sums

Question 6:

GNIT Ltd. is planning to set up an education division to offer commercial training in software development. The target debt-equity ratio of the company is 1.5 and tax rate is 30%. The cash flows expected from the division and their probabilities are as follows :

	Cash flow (Rs. lakhs)	Probability (%)
Year 1	10	30
	25	60
	20	10
Year 2	30	40
	35	20
	25	40
Year 3	40	15
	45	50
	35	35

The initial investment required is Rs.60 lakhs. The analyst of the company estimates that:

- The long term fund providers of the company generally expect a premium of 5% on the risk-free rate.
- The cost of equity and debt are 20% and 14% respectively.
- The cash flows of different years are independent.
- The management of the company wants that the probability of the NPV being negative should not be more than 10%.
- Assume Normal Distribution

Advise: Should the company proceed with the investment? Support your answer with relevant calculations.

(Source: FOD)

① Step 1: Calculate of k_c & R_f :-

$$D/E = 1.5 \Rightarrow w_d = \frac{1.5}{2.5} = 0.6 \therefore w_e = 0.4$$

$$k_e = 20\%, \quad t = 30\%$$

$$k_d = 14 \times 0.7 = 9.8\%$$

$$\therefore k_c = w_d k_d + w_e k_e$$

$$= 0.6 \times 9.8 + 0.4 \times 20$$

$$k_c = 13.88\%$$

$$R_f = \frac{1.1388}{1.05} - 1 = 8.46\% \quad (RP = 5\%)$$

② Step 2: Calculation of mean & σ^2 of CFs of different years :-

Year 1				Year 2				Year 3			
CF(x)	P	Px	$P(x-\bar{x})^2$	CF(x)	P	Px	$P(x-\bar{x})^2$	CF(x)	P	Px	$P(x-\bar{x})^2$
10	0.3	3	30	30	0.4	12	0.4	40	0.15	6	0.084
25	0.6	15	15	35	0.2	7	7.2	45	0.5	22.5	9.031
20	0.1	2	0	25	0.4	10	6.4	35	0.35	12.25	11.572
		$\bar{x} =$	$\sigma_1^2 =$			$\bar{x} =$	$\sigma_2^2 =$			$\bar{x} =$	$\sigma_3^2 =$
		20	45			29	14			40.75	20.69

③ Calculation of Expected NPV :-

Years	Expected CF	Df @ 8.46%	Present Value
1	20	0.922	18.44
2	29	0.850	24.65
3	40.75	0.784	31.95
			75.04
		(-) I. Invest ^{mt}	(60.00)
		Exp. NPV	15.04 lakh

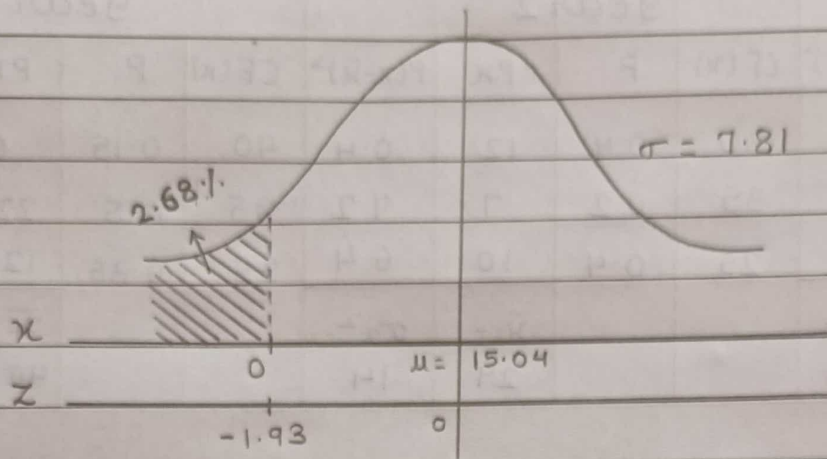
④ Step 4: Calculation of σ of NPV - Hilliers model

Years (t)	σ_t^2 of CF	Df @ 8.46% for 2t years	Present Value
1	45	0.850	38.25
2	14	0.723	10.12
3	20.69	0.614	12.70
			61.07

σ^2 of NPV = 61.07 lakhs

σ of NPV = 7.81 lakhs

⑤ Step 5 : Normal Distribution



$$Z = \frac{X - \mu}{\sigma} = \frac{0 - 15.04}{7.81} = -1.93$$

1.90	→	0.0287
1.95	→	0.0256

$$\text{method 1} = 0.0287 - 0.0186 = 0.0268 \quad \text{i.e. } 2.68\%$$

$$\text{method 2} = \frac{0.0287 + 0.0256}{2} = 0.027 \quad \text{i.e. } 2.7\%$$

So, prob. of negative NPV = 2.68%
 which lies within the tolerance
 level of 10% - So, the project is accepted.