

***ADVANCED CAPITAL
BUDGETING DECISIONS***

CLASS 3-HW-Q7

Topic Simulation

Question 7:

Uncertainty associated with two aspects of the project: Annual Net Cash Flow & Life of the project. NPV model for the project is

$$\sum_{t=1}^n \left[\frac{CF_t}{(1+i)^t} \right] - I$$

Where $i \rightarrow$ Risk free interest rate, $I \rightarrow$ initial investment are parameters, CF = Annual Cash Flow

With $i = 10\%$, $I = ₹ 1,30,000$, CF_t & n stochastic exogenous variables with the following distribution will be as under:

Annual Cash Flow		Project Life	
Value (₹)	Probability	Value (Year)	Probability
10,000	0.02	3	0.05
15,000	0.03	4	0.10
20,000	0.15	5	0.30
25,000	0.15	6	0.25
30,000	0.30	7	0.15
35,000	0.20	8	0.10
40,000	0.15	9	0.03
		10	0.02

Ten manual simulation runs are performed for the project. To perform this operation, values are generated at random for the two exogenous variables viz., Annual Cash Flow and Project Life. For this purpose, we take following steps

1. set up correspondence between values of exogenous variables and random numbers
2. choose some random number generating device.

Correspondence between Values of Exogenous Variables and two Digit Random Numbers:

Annual Cash Flow				Project Life			
Value (₹)	Probability	Cumulative Probability	Two Digit Random No.	Value (Year)	Probability	Cumulative Probability	Two Digit Random No.
10,000	0.02	0.02	00 – 01	3	0.05	0.05	00 – 04
15,000	0.03	0.05	02 – 04	4	0.10	0.15	05 – 14
20,000	0.15	0.20	05 – 19	5	0.30	0.45	15 – 44
25,000	0.15	0.35	20 – 34	6	0.25	0.70	45 – 69
30,000	0.30	0.65	35 – 64	7	0.15	0.85	70 – 84
35,000	0.20	0.85	65 – 84	8	0.10	0.95	85 – 94

40,000	0.15	1.00	85 - 99	9	0.03	0.98	95 - 97
				10	0.02	1.00	98 - 99

Random Number

53479	81115	98036	12217	59526
97344	70328	58116	91964	26240
66023	38277	74523	71118	84892
99776	75723	03172	43112	83086
30176	48979	92153	38416	42436
81874	83339	14988	99937	13213
19839	90630	71863	95053	55532
09337	33435	53869	52769	18801
31151	58295	40823	41330	21093
67619	52515	03037	81699	17106

For random numbers, we can begin from any-where taking at random from the table and read any pair of adjacent columns, column/row wise. For the first simulation run we need two digit random numbers (1) For Annual Cash Flow (2) For Project Life. The numbers are 53 & 97 and corresponding value of Annual Cash Flow and Project Life are ₹ 3,000 and 9 years respectively.

Simulation Results

1	53	30,000	97	9	5.759	42,770
2	66	35,000	99	10	6.145	85,075
3	30	25,000	81	7	4.868	(8,300)
4	19	20,000	09	4	3.170	(66,600)
5	31	25,000	67	6	4.355	(21,125)
6	81	35,000	70	7	4.868	40,380
7	38	30,000	75	7	4.868	16,040
8	48	30,000	83	7	4.868	16,040
9	90	40,000	33	5	3.791	21,640
10	58	30,000	52	6	4.355	650