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FINAL CA
MAY '19
REVISION NOTES
Strategic Financial Management

Risk Analysis

RISK ANALYSIS

Q.1. Determine the Risk Adjusted Net Present Value of the following projects :

	A	B	C
Net cash outlays (₹)	1,00,000	1,20,000	2,10,000
Project life	5 years	5 years	5 years
Annual cash inflow (₹)	30,000	42,000	70,000
Coefficient of Variation	0.4	0.8	1.2

The company selects the risk – adjusted rate of discount on the basis of the Coefficient of Variation:

Coefficient of Variation	Risk adjusted rate of discount rate of discount	Present value factor 1 to 5 years at risk adjusted
0.0	10%	3.791
0.4	12%	3.605
0.8	14%	3.433
1.2	16%	3.274
1.6	18%	3.127
2.0	22%	2.864
More than 2.0	25%	2.689

Q.2. ABC and Co. is considering two mutually exclusive machines X and Y. The company uses a Certainty Equivalent approach to evaluate the proposals. The estimated cash flow and certainty equivalents for both machines are as follows :

	Machine X		Machine Y	
Year	Cash flow	Certainty Equivalent	Cash flow	Certainty Equivalent
0	₹ - 30,000	1.00	₹ - 40,000	1.00
1	15,000	0.95	25,000	0.90
2	15,000	0.85	20,000	0.80
3	10,000	0.70	15,000	0.70
4	10,000	0.65	10,000	0.60

Which machine should be bought, if the risk free discount rate is 5 per cent?

Q.3. XYZ Ltd. is evaluating two equal size mutually exclusive proposals X and Y for which the respective cash flows together with associated probabilities are as follows :

Project X		Project Y	
Cash Flows (₹)	Probabilities	Cash Flows (₹)	Probabilities
2,000	0.3	1,000	0.1
4,000	0.4	3,000	0.1
6,000	0.3	5,000	0.4
		7,000	0.3
		9,000	0.1

Find out the risks of the proposals in terms of the standard deviation and coefficient of variation.

Q.4. A company is considering investing in a new product with an expected life of three years. It is estimated that if the demand for the product is favourable in the first year, then it is certain to be favourable in the subsequent years. And if it is low in the first year, it would remain low in years 2 and 3. The company feels that cash flows over time are perfectly correlated. The cost of the project is ` 50,000 and the possible cash flows for three years are :

Year 1		Year 2		Year 3	
Cash flow	**Probability**	**Cash flow**	**Probability**	**Cash flow**	**Probability**
----	0.10	₹ 5,000	0.15	----	0.15
₹ 10,000	0.20	20,000	0.20	₹ 7,500	0.20
20,000	0.40	35,000	0.30	15,000	0.30
30,000	0.20	50,000	0.20	22,500	0.20
40,000	0.10	65,000	0.15	30,000	0.15

Assume a risk free discount rate of 5 per cent. Calculate the expected value and standard deviation of the probability distribution of possible net present values. Assuming a normal distribution, what is the probability of the project providing a net present value of (i) zero or less (ii) ₹ 15,000 or more?

Q.5. A firm has an investment proposal, requiring an outlay of ₹ 40,000. The investment proposal is expected to have 2 year's economic life with no salvage value. In year I there is a 0.4 probability that cash inflow after tax will be ₹ 25,000 and 0.6 probability that cash inflow after tax will be ₹ 30,000. The probabilities assigned to cash inflows after tax for the year II are as follows :

The Cash inflow year I	₹ 25,000		₹ 30,000	
The Cash inflow year II		Probability		Probability
	₹ 12,000	0.2	₹ 20,000	0.4
	₹ 16,000	0.3	₹ 25,000	0.5
	₹ 22,000	0.5	₹ 30,000	0.1

The firm uses a 10% discount rate for this type of investment.

Required :

(a) Construct a decision tree for the proposed investment project.

(b) What net present value will the project yield if worst outcome is realised? What is the probability of occurrence of this NPV?

(c) What will be the best and the probability of that occurrence?

(d) Will the project be accepted?

(10% Discount factor 1 year 0.909
2 year 0.826)

Q.6. A company in the North of a country is engaged in the manufacture and installation of a new leisure activity. Progress has been made in creating a market. A short lease on its existing temporary premises will expire at the end of this year and will not be renewable. Market research has shown that the demand for new installation is likely to end after a further eight years. In this period it is foreseen that in the first four years there is a 70% chance that new work will be mainly in the south. Thereafter there is a forecast reversal of demand source with a 60% chance of most new work originating in the north.

No suitable rented accommodation is available. The cost of premises is ₹ 3,00,000 in the north and ₹ 4,00,000 in the south. Of these sums, 20% is the cost of land and the remainder the cost of specialised buildings. The buildings will have no further use after eight years. The land is assumed to retain its original value and will be sold when it is no longer required for the project.

To relocate after four years would involve dismantling and re - erecting buildings, a loss of business during the changeover, staff transfers and variations in the cost of services. The overall cost at the end of year four would be :
North to south ₹ 1,50,000
South to north ₹ 1,00,000
The annual net cash flow for the company is expected to be ₹1,20,000. The extra cost of transport and communication expense would reduce this annual income by ₹ 40,000 a year if the premises were located in the area away from the major business.
The cost of capital to the company is 12% per annum.
You are required, from the information given, to :
(a) Prepare a decision tree of the options open to the company ;
(b) Decide on a net present value (NPV) basis which option is the most attractive financially.

Q.7. A company is considering a project involving the outlay of ₹ 3,00,000 which it estimates will generate cash flows over its two - year life with the probabilities shown below.

Cash flows for project Year 1 Cash flow	Probability
₹	
1,00,000	0.25
2,00,000	0.50
3,00,000	0.25
	1.00

Year 2 If cash flow in Year 1 is :	there is a probability of :	that cash flow in Year 2 will be:
₹		₹
1,00,000	0.25	Nil
	0.50	1,00,000
	0.25	2,00,000
	1.00	
2,00,000	0.25	1,00,000
	0.50	2,00,000
	0.25	3,00,000
	1.00	
3,00,000	0.25	2,00,000
	0.50	3,00,000
	0.25	3,50,000
	1.00	

All cash flows should be treated as being received at the end of the year.
The company has a choice of undertaking this project at either of two sites (A or B) whose costs are identical and are included in the above outlay. In terms of the technology of the project itself, the location will have no effect on the outcome.
If the company chooses sits B, it has the facility to abandon the project at the end of the first year and to sell the site to an interested purchaser for ₹ 1,50,000. This facility is not available at site A.
The company's investment criterion for this type of project is 10% DCF. Its policy would be to abandon the project on site B and to sell the site at the end of the year 1 if its expected future cash flows for year 2 were less than the disposal value.
Required :
(a) Calculate the NPV of the project on site A.

(b) (i) Explain, based on the data given, the specific circumstances in which the company would abandon the project on site B.
(ii) Calculate the NPV of the project on site B taking account of the abandonment facility.

(c) Calculate the financial effect of the facility for abandoning the project on site B stating whether it is positive or negative.

Ignore tax and inflation.

Q.8. An investor has two alternative proposals for evaluation on the basis of the following information:

Project A		Project B	
Cash inflows	**Probability**	**Cash inflows**	**Probability**
₹ 75,000	0.6	₹ 52,500	1
₹ 25,000	0.4		

His utility function states that he will get utilities of 6, 4, 2 and 1 from the first ₹ 25,000, second ₹ 25,000, third ₹ 25,000 and the fourth ₹ 25,000 respectively. Evaluate the proposals with and without utility function.

Q.9. TMC is a venture capital financier. It received a proposal for financing requiring an investment of ₹ 45 crores which returns ₹ 600 crores after 6 years, if succeeds. However, it may be possible that the project may fail at any time during the six years.
The following table provide the estimates of probabilities of the failure of the projects.

Year	**1**	**2**	**3**	**4**	**5**	**6**
Probability of failure	0.28	0.25	0.22	0.18	0.18	0.10

In the above table, the probability that the project fails in the second year is given that it has survived throughout year 1. Similarly, for year 2 and so forth.
TMC is considering an equity investment in the project. The beta of this type of project is 7. The market return and risk free rate of return are 8% and 6% respectively.
You are required to compute the expected NPV of the venture capital project and advice of TMC.

TABLE : AREAS UNDER THE STANDARD NORMAL CURVE FROM 0 TO Z.

Z	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
.0	.0000	.0040	.0080	.0120	.0160	.0199	.0239	.0279	.0319	.0359
.1	.0398	.0438	.0478	.0517	.0557	.0596	.0636	.0675	.0714	.0753
.2	.0793	.0832	.0871	.0910	.0948	.0987	.1026	.1064	.1103	.1141
.3	.1179	.1217	.1255	.1293	.1331	.1368	.1406	.1443	.1480	.1517
.4	.1554	.1591	.1628	1664	.1700	.1736	.1772	.1808	.1844	.1879
.5	.1915	.1950	.1985	.2019	.2054	.2088	.2123	.2157	.2190	.2224
.6	.2257	.2291	.2324	.2357	.2389	.2422	.2454	.2486	.2518	.2549
.7	.2580	.2612	.2642	.2673	.2704	.2734	.2764	.2794	.2823	.2852
.8	.2881	.2910	.2939	.2967	.2995	.3023	.3051	.3078	.3106	.3133
.9	.3159	.3186	.3212	.3238	.3264	.3289	.3315	.3340	.3365	.3389
1.0	.3413	.3438	.3461	.3485	.3508	.3531	.3554	.3577	.3599	.3621
1.1	.3643	.3665	.3686	.3708	.3729	.3749	.3770	.3790	.3810	.3830
1.2	.3849	.3869	.3888	.3907	.3925	.3944	.3962	.3980	.3997	.4015
1.3	.4032	.4049	.4066	.4082	.4099	.4115	.4131	.4147	.4162	.4177
1.4	.4192	.4207	.4222	.4236	.4251	.4265	.4279	.4252	.4306	.4319
1.5	.4332	.4345	.4357	.4370	.4382	.4394	.4406	.4418	.4429	.4441
1.6	.4452	.4463	.4474	.4484	.4495	.4505	.4515	.4525	.4535	.4545
1.7	.4554	.4564	.4573	.4582	.4591	.4599	.4608	.4616	.4625	.4633
1.8	.4641	.4649	4656	.4664	.4671	.4678	.4686	.4693	.4699	.4706
1.9	4713	.4719	.4726	.4732	.4738	.4744	.4750	.4756	.4761	.4767
2.0	4772	.4778	.4783	.4788	.4793	.4798	.4803	4808	.4812	.4817
2.1	.4821	4826	.4830	.4834	.4838	.4842	.4846	.4850	.4854	.4857
2.2	4861	4864	.4868	.4871	.4875	.4878	.4881	.4884	.4887	4890
2.3	.4893	.4896	.4898	.4901	.4904	.4906	.4909	.4911	.4913	.4916
2.4	.4918	.4920	.4922	.4925	.4927	.4931	.4931	.4932	.4934	.4936
2.5	.4938	.4940	.4941	.4943	.4945	.4946	.4948	.4949	.4951	.4952
2.6	.4953	.4955	.4956	.4957	.4959	.4960	.4961	.4962	.4963	.4964
2.7	4965	.4966	.4967	.4968	.4969	.4970	.4971	.4972	.4973	.4974
2.8	.4974	.4975	.4976	.4977	.4977	.4978	.4979	.4979	.4980	.4981
2.9	.4981	.4982	.4982	.4983	.4984	.4984	.4985	.4985	.4986	.4986
3.0	.49865	.4987	.4987	.4988	.4988	.4989	.4989	.4989	.4990	.4990
4.0	.4999683									

Illustration: For Z = 1.72, shaded area is .4573 out of total area of 1.