



SECTION - 5 & 6

SENSITIVITY ANALYSIS FOR CHANGES IN EXPECTED VALUES IN THE MODELS AND FORECASTS

This Section includes

- Sensitivity analysis for changes in expected values

5.1. SENSITIVITY ANALYSIS FOR CHANGES IN EXPECTED VALUES

Sensitivity analysis refers to studying of the impact of changes on one or more variables on the results, which can either be NPV or IRR or EPS etc. This will help in understanding the critical variables on which the results depend. It is also one way of understanding the risks related to a project or policy. The following illustration shows how sensitivity analysis can be performed on a model of projected cash flows for capital budgeting.

- 5.1.1 Sensitivity analysis helps in decision making. When a project proves to be very sensitive to certain aspects such as raw material price, power cost, selling price etc the management has to provide adequate weightage to these aspects before the investment decision is frozen.
- 5.1.2 Likewise, the lending institutions also heavily depend on this analysis before they decide on lending quantum or lending itself. If a project is very sensitive to some parameters and if the lender perceives them as critical, the decision of lending is based very much on that.
- 5.1.3 The ratios after sensitivity and before sensitivity such as IRR and ROCE would indicate the level of sensitivity.

FINANCIAL STRATEGY



Data							
Cost of capital	15%						
Tax rate	35%						
Capital Expenditure	278 million						
Salvage value	30%	(percent of capital expenditure)					
Year	0	1	2	3	4	5	6
Price per unit		250.00	250.00	230.00	225.00	225.00	210.00
Volume(in million)		1.20	2.10	3.00	3.00	2.20	1.40
COGS(per unit)		80.00	80.00	70.00	70.00	70.00	85.00
SG & A(in million)	15.00	15.75	16.75	18.00	19.25	20.50	22.00
Depreciation(%)		20.00%	32.00%	19.20%	11.52%	11.52%	5.76%
Wcap/Forward revenue	9.00%	9.00%	8.00%	7.00%	7.00%	7.00%	
Derivations							
Annual Depreciation		55.60	88.96	53.38	32.03	32.03	16.01
Accumulated Depreciation		55.60	144.56	197.94	229.96	261.99	278.00
Book value	278.00	222.40	133.44	80.06	48.04	16.01	0.00
Working capital	27.00	47.25	55.2	47.25	34.65	20.58	0.00
Salvage value							83.40
Cash flow template							
Revenue		300.00	525.00	690.00	675.00	495.00	294.00
COGS		-96.00	-168.00	-210.00	-210.00	-154.00	-119.00
SG & A(in million)	-15.00	-15.75	-16.75	-18.00	-19.25	-20.50	-22.00
Depreciation		-55.60	-88.96	-53.38	-32.03	-32.03	-16.01
Profit on sale of assets							83.40
Taxable income	-15.00	132.65	251.29	408.62	413.72	288.47	220.39
Tax	5.25	-46.43	-87.95	-143.02	-144.80	-100.97	-77.14
NOPAT	-9.75	86.22	163.34	265.61	268.92	187.51	143.25
Depreciation		55.60	88.96	53.38	32.03	32.03	16.01
Salvage value							-83.40
Operating Cash flow	-9.75	141.82	252.30	318.98	300.95	219.53	75.86
Change in working cap	-27.00	-20.25	-7.95	7.95	12.6	14.07	20.58
Capital Expenditure	-278.00						
Cash from asset sale							83.40
Free cash flow	-314.75	121.57	244.35	326.93	313.55	233.60	179.84
NPV	563.86						
IRR	63%						

- The above financial model shows all the assumptions, derivation of cash flows and the results namely the NPV and IRR, in the context of a capital budgeting project
- This can be a good practice exercise for students in excel

6.1.0 Illustration of sensitivity analysis- Cost of capital and NPV

	Sensitivity analysis	
	Cost capital and NPV	
	563.86	
0.15	563.86	
0.20	450.76	
0.25	358.40	
0.30	282.12	
0.35	218.46	
0.40	164.84	
0.45	119.28	

- The above table shows the impact of cost of capital on the NPV of the project. It shows that even if the cost of capital becomes 45%, the project is viable and shows a positive NPV

6.1.1 Capital expenditure, NPV and IRR

	Sensitivity analysis	
	Capex, NPV and IRR	
	563,86	63%
280	562,51	62,97%
300	549,02	59,66%
350	515,32	52,66%
400	481,61	47,00%
450	447,90	42,33%
500	414,20	38,39%
800	211,96	23,35%
1000	77,13	17,54%
1200	-57,70	13,36%

- This table shows the impact of capital expenditure changes on the results of the project namely the NPV and IRR
- It can be seen that the NPV turns negative only when the investment touches 1200

6.1.2 Capital expenditure and cost of capital on NPV

Sensitivity analysis-Capex, Cost of capital and NPV					
563.9	0.2	0.2	0.3	0.3	0.4
280.0	562.5	449.3	356.9	280.6	216.9
300.0	549.0	435.0	341.9	265.0	200.8
350.0	515.3	399.1	304.3	226.0	160.7
400.0	481.6	363.3	266.7	187.0	120.5
450.0	447.9	327.4	229.1	148.0	80.4
500.0	414.2	291.5	191.5	109.0	40.3
800.0	212.0	76.3	-34.0	-124.9	-200.6
1000.0	77.1	-67.1	-184.4	-280.9	-361.1
1200.0	-57.7	-210.6	-334.7	-436.8	-521.6

- This table shows the impact of cost of capital and capital expenditure on the NPV of the project. It can be seen that at 1200 capital expenditure and a cost of capital of 20%, the project becomes unviable. This will help in controlling the variables, namely cost of capital and capital expenditure within certain boundaries so that the project doesn't become unviable