Accounting for Financial and Managerial Decision and Control [AFMDC]

Unit 13

Investment Decision Under Condition of Certainty

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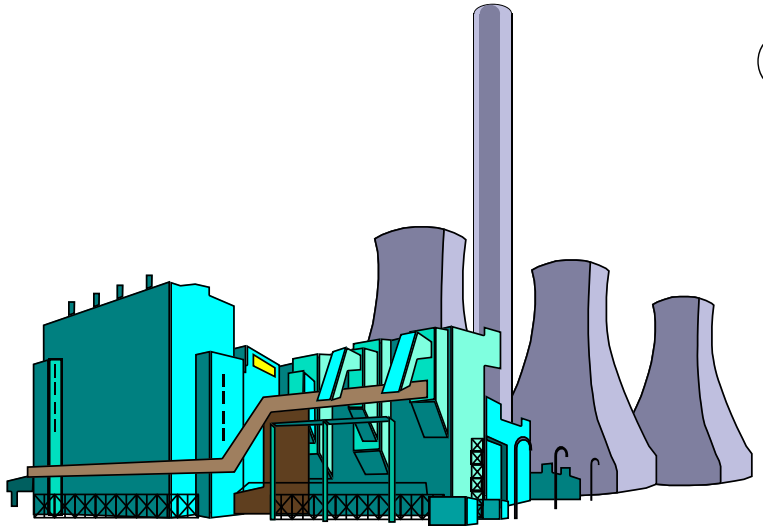
Contents

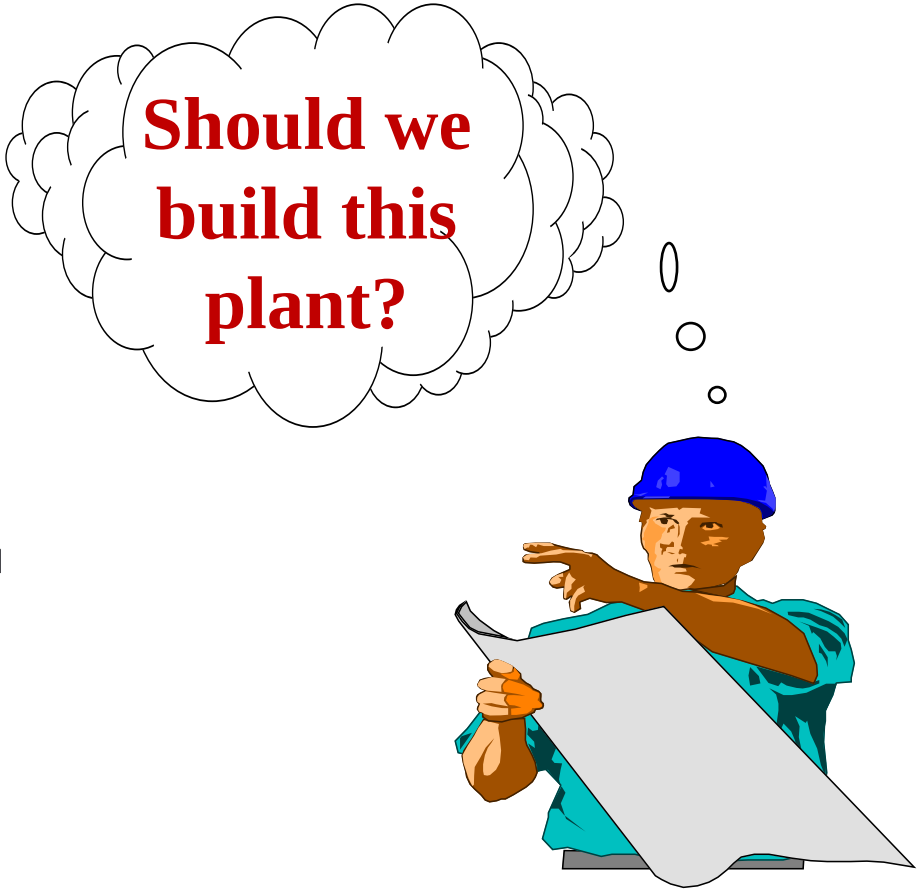
- Concept, need and objectives of investment analysis
- Concept, need, computation and analysis of evaluation techniques: net present value, profitability index and internal rate of return

Learning Objectives

- Understand the concept and meaning of investment analysis
- Demonstrate the need and importance of capital budgeting
- Explain the different types of investment proposals
- Estimate cash flows: initial cash outlay (net investment), annual cash flow and final year cash flow
- Evaluate the investment proposals by using net present value, profitability index and internal rate of return

Capital Budgeting





Capital Budgeting

Investment in additional fleet of jets?

Is it and financially viable for all decision problems for making additional investment?

What is Capital Budgeting?

- Analysis of potential additions to fixed assets
- Analysis of potential about replacement of equipment
- Long-term decisions; involve large expenditures
- Very important to firm’s future

Importance of Capital Budgeting

- These decisions affect the profitability
- It affects the enterprise's future cost structure
- These decisions once taken are not reversible without much financial loss
- It involves costs and has a bearing on scarce capital (commitment of large amount of fund) and
- They have long-term implications for the enterprise and can influence its risk complexion.

Need of Capital Budgeting

- Involvement of heavy funds
- Long-term commitments of funds
- They are not reversible
- Difficulties of investment decision
- Long-term effect on profitability

Classification of Capital Expenditure

- **Mutually exclusive investments**

  If one investment is undertaken, other will have to excluded

- **Independent investments**

  Individual new projects, which are not dependent

- **Contingent investments (Dependent)**

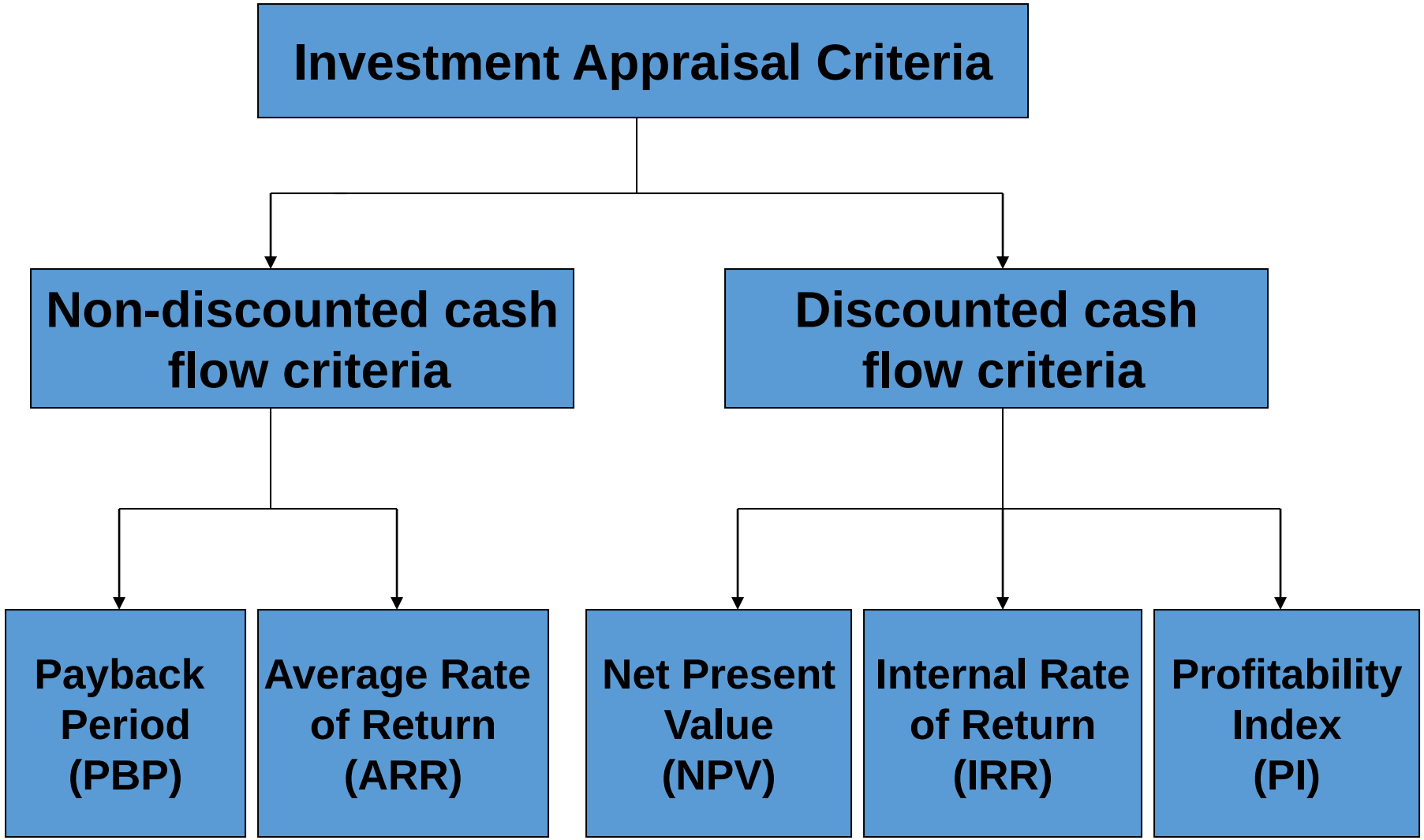
  Contingent investments are dependent projects

  The choice of one investment necessitates that one or more other investments should also be undertaken

- **Replacement**

  Expenditure to replace old equipment

  The purpose of replacement is to increase capacity and reduce costs

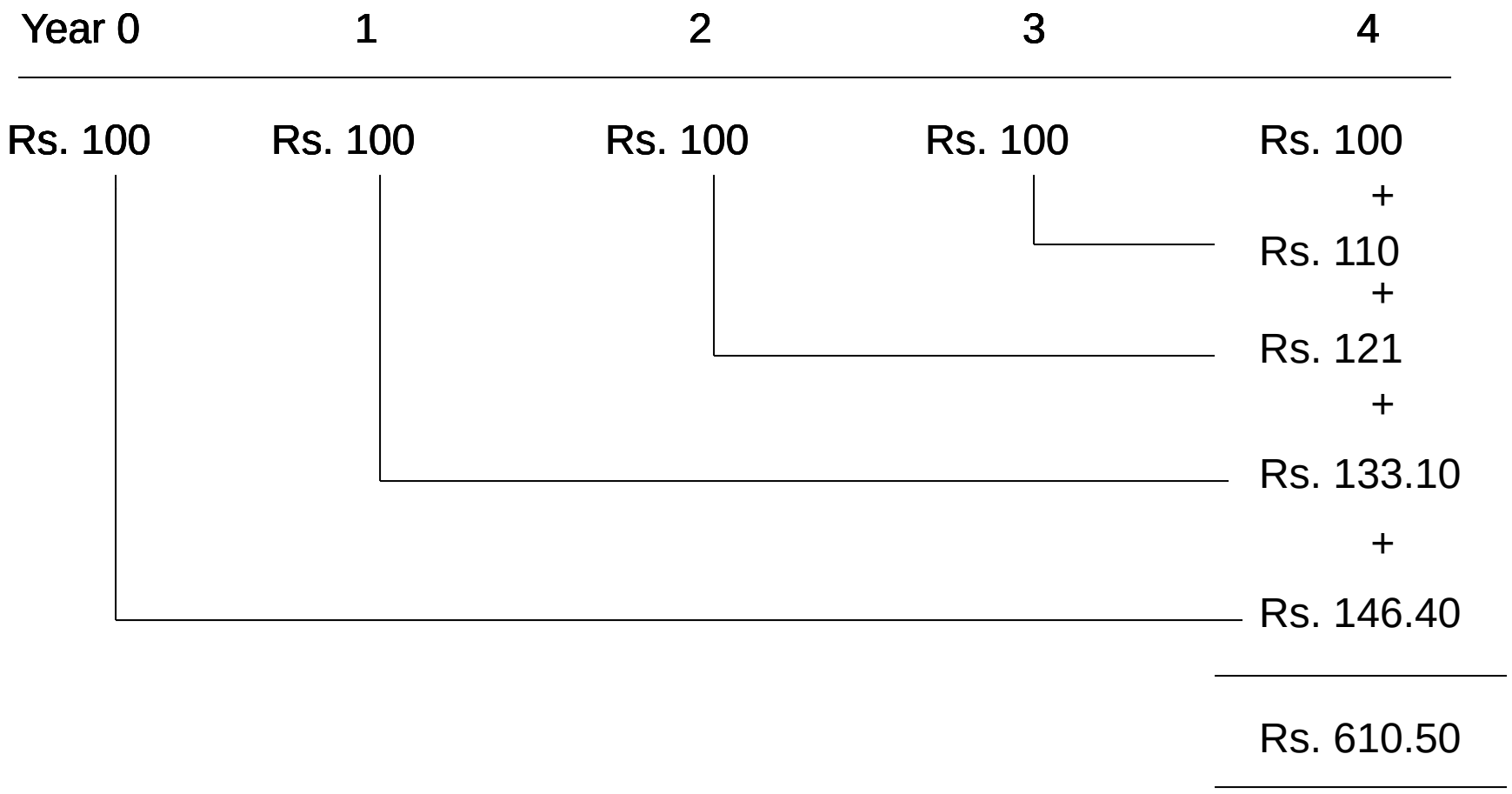

Investment Appraisal Criteria
Non-discounted cash flow criteria
Discounted cash flow criteria
Payback Period (PBP)
Average Rate of Return (ARR)
Net Present Value (NPV)
Internal Rate of Return (IRR)
Profitability Index (PI)

Time Value of Money

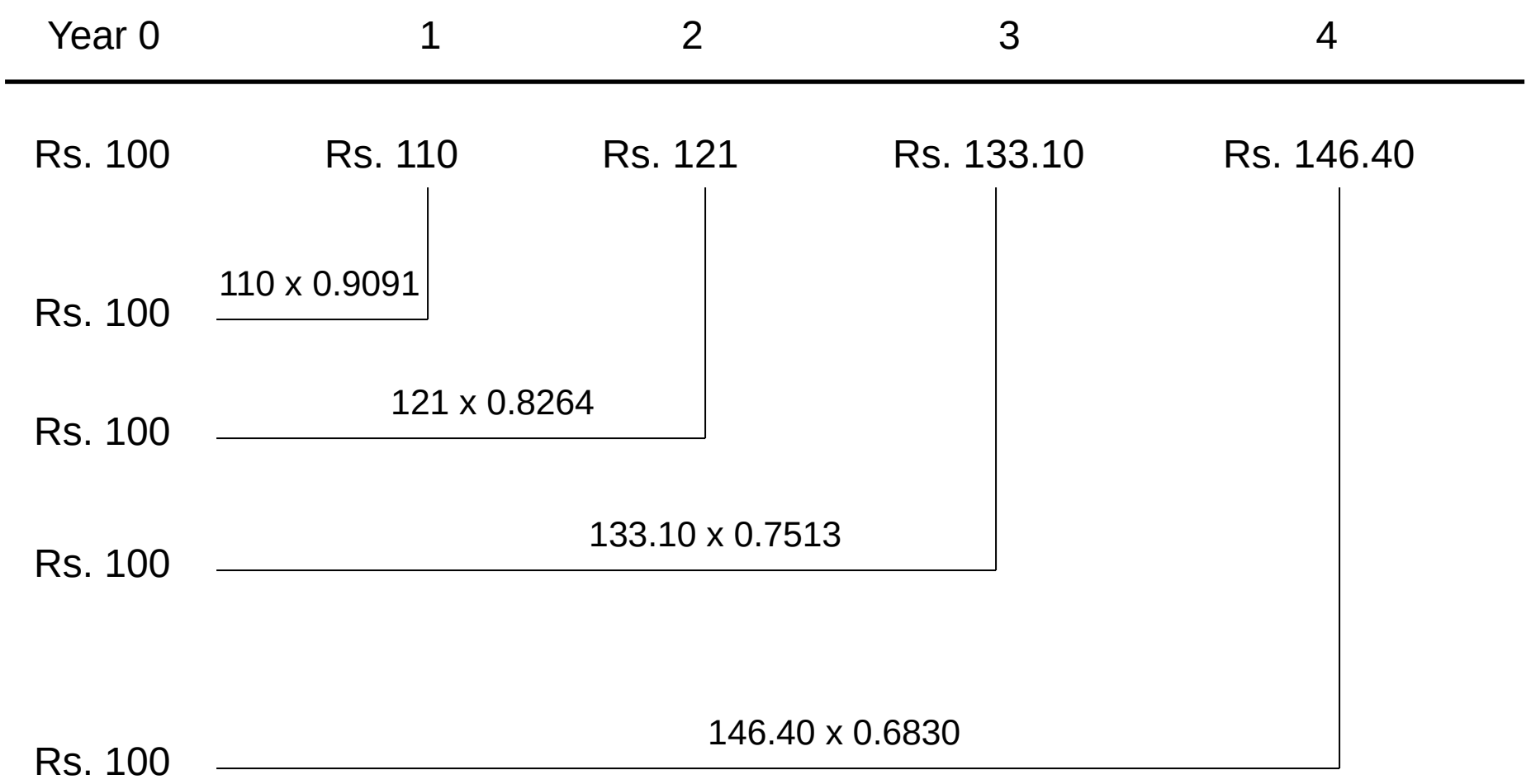
- We can invest the Rs. 100 today at 10% interest. At the end of 1 year, we will have Rs. 110 (=100+10).
- There is a time value associated with money.
- A Rs. 100 cash flow today is not the same as a Rs. 100 cash flow in one year, two years, or five years.

Principal amount at time 0	Rs. 100
Add: Interest earned during year 1 (Rs. 100 x 10%)	10
Amount at time 1	Rs. 110
Add: Interest earned during year 2 (Rs. 110 x 10%)	11
Amount at time 2	Rs. 121

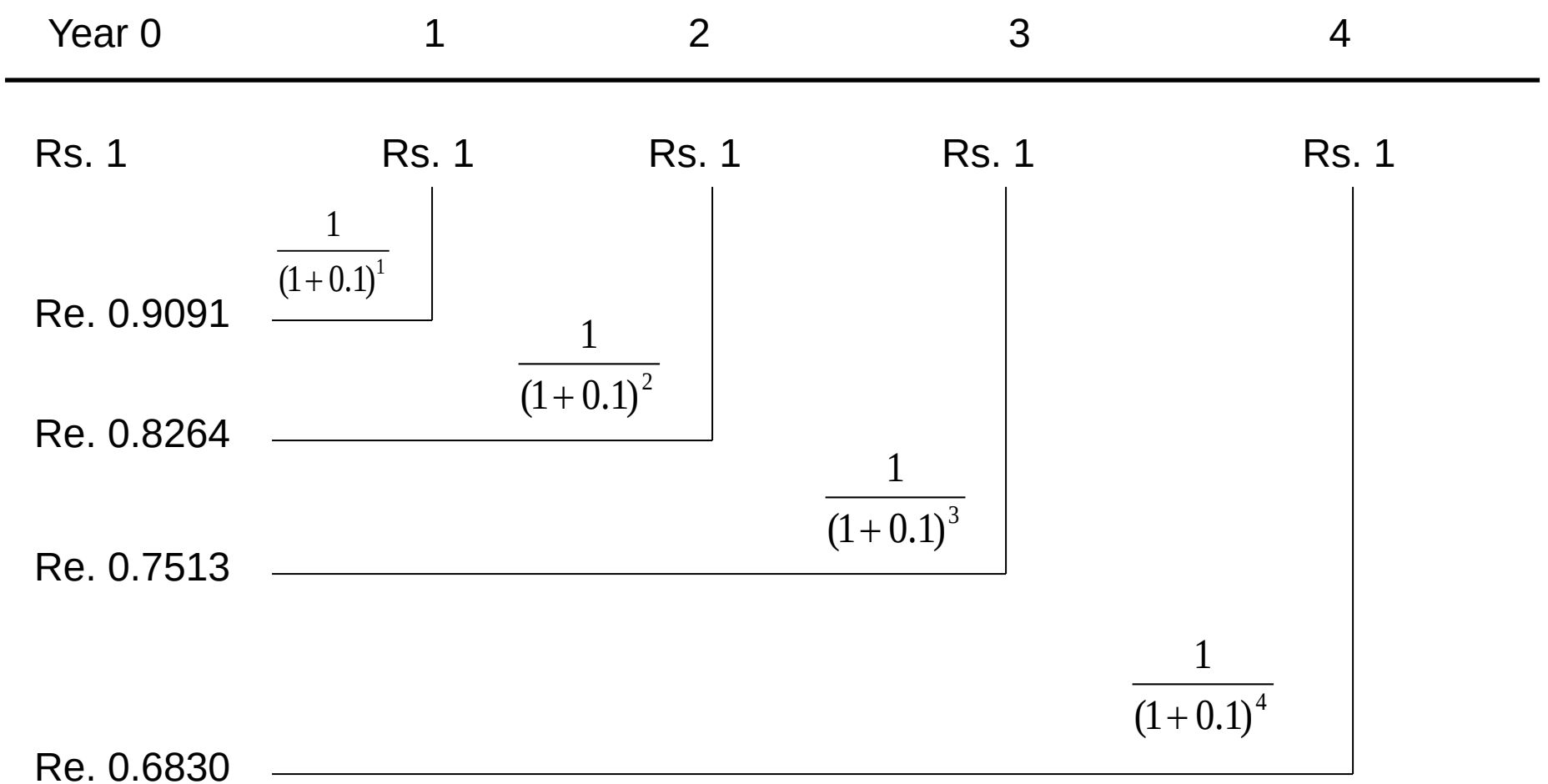
Future Value



Present Value



Present Value Rs. 1 $= \frac{1}{(1+i)^n}$



Evaluation of Independent Projects

Step 1: Net Cash Outlay (NCO)

Cash cost of new project	- xx
Transportation/Installation charges	- xx
Working capital requirement	- xx
Investment tax credit/allowance	+ xx
Other charges	- xx
Net cash outlay (NCO)	- xx

Note: Negative and positive sign refer as cash outflow and inflow

Step 2: Annual Depreciation

Evaluation of Independent Projects (Contd.)

Step 3: Cash flow after tax (CFAT)

Cash sales revenue	xx
Less: Operating cost	xx
Cash flow before depreciation & taxes	xx
Less: Depreciation	xx
Income before taxes	xx
Less: Taxes	xx
Net income	xx
Add: Depreciation	xx
Net cash flow after tax (CFAT)	xx

Evaluation of Independent Projects (Contd.)

Step 4: Estimation of non-operating cash flow at the end of project life

Cash salvage value	xx
Less: Tax payable (gain on sales) or	xx
Add: Tax saved (loss on sales)	xx
Add: Working capital released (increase in year 0)	xx
Final year non-operating CFAT	xx

Evaluation of Independent Projects (Contd.)

Step 5: Evaluate projects using following criteria

(i) PBP

(ii) ARR

(iii) NPV

(IV) IRR

(v) PI

Step 6: Accept or Reject investment project

Evaluation of Replacement of Old Equipment

Step 1: Net Cash Outlay (NCO)

Cash cost of acquisition of new machine	- xx
Transportation/Installation charges	- xx
Additional working capital requirement	- xx
Working capital decreased	+ xx
Proceeds from sales of old machine	+ xx
Tax payable (gain on sales of old machine)	- xx
Tax save (loss on sales of old machine)	+ xx
Investment tax credit/allowance	+ xx
Other charges	- xx
Net cash outlay (NCO)	- xx

Note: Negative and positive sign refer as cash outflow and inflow

Evaluation of Replacement of Old Equipment (Contd.)

Step 2: Differential Annual Depreciation

Depreciation of new machine – Depreciation of old machine

Evaluation of Replacement of Old Equipment

Step 3: Cash flow after tax (CFAT)

Increase in Cash sales revenue	xx
Less: Increase in cash operating cost or	xx
Add: Decrease in cash operating cost	xx
Cash flow before depreciation & taxes	xx
Less: Increase in Depreciation or	xx
Add: Decrease in Depreciation	xx
Income before taxes	xx
Less: Taxes	xx
Net income after taxes	xx
Add: Increase in Depreciation or	xx
Less: Decrease in Depreciation	xx
Net cash flow after tax (CFAT)	xx

Evaluation of Replacement of Old Equipment

Step 4: Estimation of non-operating cash flow at the end of project life

Cash salvage value	xx
Less: Tax payable (gain on sales) or	xx
Add: Tax saved (loss on sales)	xx
Add: Working capital released (increase in year 0)	xx
Less: Working capital tied up (decrease in year 0)	xx
Final year non-operating CFAT	xx

Evaluation of Replacement of Old Equipment

Step 5: Evaluate projects using following criteria

(i) PBP

(ii) ARR

(iii) NPV

(IV) IRR

(v) PI

Step 6: Accept or Reject the proposal of replacement of old equipment

Payback Period (PBP)

- The number of years required to recover a project's cost, or "How long does it take to get our money back?"
- Calculated by adding project's cash inflows to its cost until the cumulative cash flow for the project turns positive.

$$\text{PBP} = \text{Year before fully recovery} + \frac{\text{Unrecovered cost at start of year}}{\text{Cash flow during the year}}$$

- Rule of Acceptance
  - Shorter the PBP, the better it will be
  - Accept project if, calculated PBP < Standard PBP

Strengths and Weaknesses of Payback Period

- Strengths
  - Provides an indication of a project's risk and liquidity
  - Easy to calculate and understand
- Weaknesses
  - Ignores the time value of money
  - Ignores Cash Flows occurring after the payback period

Average Rate of Return (ARR)

- Average Rate of Return, also called the Accounting Rate of Return involves accounting profits (*i.e.* net profit after tax) not cash flows

$$\text{ARR} = \frac{\text{Average annual net profit after tax}}{\text{Average investment over the life of the project}} \times 100$$

$$\text{Average NPAT} = \frac{\text{Total net profit after tax of all years}}{\text{Number of years}}$$

$$\text{Average investment} = \frac{\text{Initial investment} + \text{Salvage value if any}}{2}$$

Average Rate of Return (ARR)

- Rule of Acceptance

  - Accept project if,

    Calculated ARR > Pre-determined rate of return

Strengths and Weaknesses of Average Rate of Return (ARR)

- Strengths
  - The entire stream of income is used in calculating the ARR
  - Easy to calculate and understand
- Weaknesses
  - Ignores the time value of money
  - Ignores Cash Flows and uses only accounting profits

Net Present Value (NPV)

- Sum of the Present Values of all cash inflows and outflows of a project
- NPV = PV of cash inflows – NCO
  = Net gain in wealth
- If projects are independent, accept if the project NPV > 0 (*i.e.* positive NPV).
- If projects are mutually exclusive, accept projects with the highest positive NPV, those that add the most value.

Strengths and Weaknesses of Net Present Value (NPV)

- Strengths
  - Recognizes the time value of money
  - Considers the total benefits arising out of the proposal over its lifetime
- Weaknesses
  - Projects involving different outlays, the present value method may not give dependable results
  - Two projects having different effective lives, the present value method may not give satisfactory results

Internal Rate of Return (IRR)

- IRR is the discount rate that forces PV of cash inflows equal to PV of cash outflows (NCO), and the NPV = 0
- If IRR > WACC, the project's rate of return is greater than its costs. There is some return left over to boost stockholders' returns
- Rule of Acceptance

  If IRR > WACC, accept project

  If IRR < WACC, reject project

Strengths and Weaknesses of Internal Rate of Return (IRR)

- Strengths
  - Recognizes the time value of money
  - Considers the cash inflows over the entire life of the project
  - Focus to the maximization of shareholder’s wealth
- Weaknesses
  - It can be misleading, when choosing between mutually exclusive projects that have substantially different in their size and life
  - Under certain cases, it gives multiple rates which can be confusing

NPV and IRR

NPV Method	IRR Method
Compute the investment proposal's NPV, using the organization's cost of capital (*hurdle rate*) as the discount rate.	Compute the investment proposal's IRR, which is the discount rate that yields a zero net present value for the project.
Accept the investment proposal if its NPV is equal to or greater than zero; otherwise reject it.	Accept the investment proposal if its IRR is equal to or greater than organization's cost of capital (*hurdle rate*); otherwise reject it.

Profitability Index (PI)

- It is also known as the benefit ratio
- It is an extension of the net present value

$$\text{PI} = \frac{\text{PV of future cash inflow after tax}}{\text{PV of initial cash outflow}}$$

- Rule of Acceptance

  If PI > 1, accept project

  If PI < 1, reject project

Question 1 (Mutually Exclusive Projects)

ABC Company limited is considering two mutually exclusive projects. Both require an initial cash outlay of Rs. 10,000 each and a life of five years with zero salvage value. The company's required rate of return is 10% and pays tax at a 50%. The projects will be depreciated on a straight-line basis. The projects are expected to generate a net cash inflow before taxes are as follows:

Years	1	2	3	4	5
Project M	Rs. 4,000	Rs. 4,000	Rs. 4,000	Rs. 4,000	Rs. 4,000
Project N	Rs. 6,000	Rs. 3,000	Rs. 2,000	Rs. 5,000	Rs. 5,000

With the help of the above given information you are required to calculate:

(a) The Payback Period of each Project
(b) The Average Rate of Return for each Project
(c) The Net Present Value of each Project
(d) The Profitability Index of each Project
(e) The Internal Rate of Return for each Project.

On the basis of your calculations advise to the company which project it should accepted giving reasons.

Solution 1 (Mutually Exclusive Projects)

Step 1: NCO = Rs. 10,000

Step 2: Annual Depreciation = (Cost – Salvage Value)/Life

= Rs. 10,000 / 5 Years = Rs. 2,000

Step 3: Calculation of Net Income and Net Cash Flows after Ttaxes (CFAT)

Project	Year	Cash Flows before taxes	Depreciation	Income before Taxes	Taxes 50%	Net Income	Net Cash Flows after Taxes	Cumulative Cash Flow after Tax
M	1	4,000	2,000	2,000	1,000	1,000	3,000	3,000
	2	4,000	2,000	2,000	1,000	1,000	3,000	6,000
	3	4,000	2,000	2,000	1,000	1,000	3,000	9,000
	4	4,000	2,000	2,000	1,000	1,000	3,000	12,000
	5	4,000	2,000	2,000	1,000	1,000	3,000	15,000
N	1	6,000	2,000	4,000	2,000	2,000	4,000	4,000
	2	3,000	2,000	1,000	500	500	2,500	6,500
	3	2,000	2,000	0	0	0	2,000	8,500
	4	5,000	2,000	3,000	1,500	1,500	3,500	12,000
	5	5,000	2,000	3,000	1,500	1,500	3,500	15,500

Solution 1 (Mutually Exclusive Projects)

(a) Payback Period

$$\text{Payback Period} = \text{Year before Fully Recovery} + \frac{\text{Unrecovered Cost at Start of Year}}{\text{Cash Flow during the Year}}$$

$$\text{Payback Period (Project M)} = 3 + \frac{\text{Rs. } 10{,}000 - \text{Rs. } 9{,}000}{\text{Rs. } 3{,}000}$$

$$= 3.3333 \text{ years}$$

$$= 3 \text{ years } 4 \text{ months.}$$

$$\text{Payback Period (Project N)} = 3 + \frac{\text{Rs. } 10{,}000 - \text{Rs. } 8{,}500}{3{,}500}$$

$$= 3.4285 \text{ years}$$

$$= 3 \text{ years, } 5 \text{ months, } 4 \text{ days.}$$

Decision:

As per above results, project M should be taken over, as the payback period shorten in this project is only 3 years 4 months as compare to project N 3 years, 5 months.

Solution 1 (Mutually Exclusive Projects)

(b) Average Rate of Return

$$\text{Average Net Profit after Tax} = \frac{\text{Total Net Profit after Tax of all Years}}{\text{Number of Years}}$$

$$\text{Average Profit after Tax (Project M)} = \frac{\text{Rs. } 1{,}000 + 1{,}000 + 1{,}000 + 1{,}000 + 1{,}000}{5} = \text{Rs. } 1{,}000$$

$$\text{Average Profit after Tax (Project N)} = \frac{\text{Rs. } 2{,}000 + 500 + 0 + 1{,}500 + 1{,}500}{5} = \text{Rs. } 1{,}100$$

$$\text{Average Investment for Both the Projects} = \frac{\text{Initial Investment}}{2} = \frac{\text{Rs. } 10{,}000}{2} = \text{Rs. } 5{,}000$$

Now,

$$\text{Average Rate of Return} = \frac{\text{Average Annual Net Profit after Tax}}{\text{Average Investment Over the Life of the Project}} \times 100$$

$$\text{Average Rate of Return (Project M)} = \frac{\text{Rs. } 1{,}000}{\text{Rs. } 5{,}000} \times 100 = 20\%$$

$$\text{Average Rate of Return (Project N)} = \frac{\text{Rs. } 1{,}100}{\text{Rs. } 5{,}000} \times 100 = 22\%$$

Decision:

Project N is superior to project M as it gives 22% average rate of return as against only 20% average rate of return from project M.

Solution 1 (Mutually Exclusive Projects)

(c) Net Present Value

Computation of Net Present Value for Project M

Years	CFAT	Discount Factor @ 10%	Present Values
1 - 5	3,000	3.791	Rs. 11,373
		Total Present Value	Rs. 11,373
		Less: Net Cash Outlay	Rs. 10,000
		Net Present Value	Rs. 1,373

Computation of Net Present Value for Project N

Years	CFAT	Discount Factor @ 10%	Present Values
1	4,000	0.909	Rs. 3,636
2	2,500	0.826	2,065
3	2,000	0.751	1,502
4	3,500	0.683	2,391
5	3,500	0.620	2,173
		Total Present Value	11,767
		Less: Net Cash Outlay	10,000
		Net Present Value	Rs. 1,767

Decision:

Project N is more superior to project M due to higher positive net present value.

Solution 1 (Mutually Exclusive Projects)

(d) Profitability Index

$$\text{Gross Profitability Index} = \frac{\text{Present Value of Future Cash Inflow after Tax}}{\text{Present Value of Initial Cash Outflow}}$$

$$\text{Gross Profitability Index (Project M)} = \frac{\text{Rs. } 11{,}377}{\text{Rs. } 10{,}000} = 1.138$$

$$\text{Gross Profitability Index (Project N)} = \frac{\text{Rs. } 11{,}767}{\text{Rs. } 10{,}000} = 1.177$$

Decision:

Profitability index of project N is higher than that of project M.

So, the project N is more preferable than project M.

Solution 1 (Mutually Exclusive Projects)

(e) Internal Rate of Return

Project M

$$\text{Annuity Factor} = \frac{\text{Investment}}{\text{Annual Cash Inflows}}$$

$$= \frac{\text{Rs. } 10{,}000}{\text{Rs. } 3{,}000}$$

$$= 3.333$$

In the table of PVIFA for 5 years, the value 3.333 lies in between 15% and 16%. To approximate the actual rate, we interpolate between 15% and 16% as follows:

Years	CFAT	DF @ 15%	Present Value	DF @ 16%	Present Value
1 - 5	Rs. 3,000	3.352	Rs. 10,056	3.274	Rs. 9,822

Interpolation,

$$\text{IRR} = \text{Lower Rate} + \frac{\text{PV at Lower Rate} - \text{Investment}}{\text{PV at Lower Rate} - \text{PV at Higher Rate}} \times (\text{Higher Rate} - \text{Lower Rate})$$

$$= 15\% + \frac{\text{Rs. } 10{,}056 - \text{Rs. } 10{,}000}{\text{Rs. } 10{,}056 - \text{Rs. } 9{,}822} \times (16\% - 15\%)$$

$$= 15.24\%$$

Solution 1 (Mutually Exclusive Projects)

(e) Internal Rate of Return
Project N

$$\text{Annuity Factor} = \frac{\text{Investment}}{\text{Annual Cash Inflows}}$$

$$= \frac{\text{Rs. } 10{,}000}{\text{Rs. } 3{,}100}$$

$$= 3.225$$

In the table of PVIFA for 5 years, the value 3.225 lies in between 16% and 18%. To approximate the actual rate, we interpolate between 16% and 18% as follows:

Years	CFAT	DF @ 16%	Present Value	DF @ 18%	Present Value
1	Rs. 4,000	0.862	Rs. 3,448	0.847	Rs. 3,388
2	2,500	0.743	1,858	0.718	1,795
3	2,000	0.641	1,282	0.609	1,218
4	3,500	0.552	1,932	0.516	1,806
5	3,500	0.476	1,666	0.437	1,529
			10,186		9,736

Interpolation,

$$\text{IRR} = \text{Lower Rate} + \frac{\text{PV at Lower Rate} - \text{Investment}}{\text{PV at Lower Rate} - \text{PV at Higher Rate}} \times (\text{Higher Rate} - \text{Lower Rate})$$

$$= 16\% + \frac{\text{Rs. } 10{,}186 - \text{Rs. } 10{,}000}{\text{Rs. } 10{,}186 - \text{Rs. } 9{,}736} \times (18\% - 16\%)$$

$$= 16.83\%$$

Decision: The internal rate of return of project M is 15.24% whereas the IRR of project N is 16.83%. Hence, project N should be accepted and project M rejected.

Solution 1 (Mutually Exclusive Projects)

Evaluation Criteria	Project M	Project N	Project Selection
Payback Period	3.333 years	3.428 years	M
Average Rate of Return	20%	22%	N
Net Present Value	Rs. 1,373	Rs. 1,767	N
Profitability Index	1.137	1.177	N
Internal Rate of Return	15.24%	16.83%	N

Problem 2

The Ventura Machine Company is considering replacing a machine presently in use and carried on the book value at Rs. 12,000 with new machine costing Rs.25,000. The new machine will make possible cost reductions of Rs. 4,000 annually for 10 years. The old machine that can be sold for Rs. 5,200 now. Assuming the use of straight-line depreciation, a desire rate of return is 20% and an income tax rate is 50%. Should using net present value and internal rate of return make the replacement? Why?

Solution 2

Step 1: Calculation of NCO

Cost of New machine		- 25,000
Cash salvage value of old machine		+ 5,200
Tax saved on loss of old machine sold (Rs. 6,800 ×50%)		+ 3,400
Cash salvage of old machine	5,200	
Book salvage of old machine	12,000	
Loss on sale	6,800	
Net Cash Outlay (NCO)		– 16,400

Step 2: Calculation of differential depreciation

$$\text{Depreciation of old machine} \frac{\text{Rs. 12,000}}{\text{10 years}} = \text{Rs. 1,200}$$

$$\text{Depreciation of new machine} \frac{\text{Rs. 25,000}}{\text{10 years}} = \text{Rs. 2,500}$$

Differential depreciation = Rs. 2,500 – Rs. 1,200 = Rs. 1,300

Solution 2

Step 3: Calculation of CFAT

Cost saving per year	Rs. 4,000
Less: Differential depreciation	1,300
Cash flow before tax	2,700
Less Tax @ 50%	1,350
Cash flow after tax	1,350
Add: Differential depreciation	1,300
CFAT (1 to 10 years)	2,650

Calculation of NPV

Years	CFAT	Discount Factor @ 20%	Present Values
1 to 10	2,650	4.192	11,109
		Total Present Value	11,109
		Less: Net Cash Outlay	16,400
		Net Present Value	(5,291)

Solution 2

Calculation of IRR

$$\text{Annuity Factor} = \frac{\text{Investment}}{\text{Annual Cash Inflows}}$$

$$\frac{16{,}400}{2{,}650}$$

$$= 6.189$$

In the table of PVIFA for 10 years, the value 6.189 lies in between 9% and 10%. To approximate the actual rate, we interpolate between 9% and 10% as follows:

Years	CFAT	DF @ 9%	Present Value	DF @ 10%	Present Value
1 - 10	2,650	6.418	17,007.70	6.145	16,284.25

Interpolation,

$$\text{IRR} = \text{Lower Rate} + \frac{\text{PV at Lower Rate} - \text{Investment}}{\text{PV at Lower Rate} - \text{PV at Higher Rate}} \times (\text{Higher Rate} - \text{Lower Rate})$$

$$= 9.84\%$$

Decision: The replacement of machine has negative NPV. In the same, it has less IRR 9.84% than company's required cost of capital 20%. So that, the new machine should not be replaced.

Question 3

The Kathmandu Manufacturers Ltd. was operating its production schedule with an old machine purchased five years before at a cost of Rs. 8,00,000 with an effective life of 10 years. The company follows a straight-line depreciation policy, and at the end of 5 years from hence the machine would have no book and cash salvage value.

The company is considering replacing this machine by modern and superior machine. The new machine would cost Rs. 6,00,000 and Rs. 2,00,000 as installation cost. The machine is being highly automatic would require additional investment Rs. 2,00,000 in working capital. At the end of 5th year, the machine would have a book and cash salvage value of Rs. 50,000 and Rs. 1,00,000 respectively.

The old machine could be sold at a market value of Rs. 5,00,000 today. The company would be able to save Rs. 2,00,000 in cash for 5 years by using the new machine. The average cost of capital is 10% and effective rate of tax is 40%.

Required: the net present value and the internal rate of return of the proposals to check its desirability.

Solution 3

Step 1: Calculation of NCO

Cost of New machine including installation		- 8,00,000
Additional working capital		- 2,00,000
Cash salvage value of old machine		+ 5,00,000
Tax on gain of old machine sold (Rs. 1,00,000 × 40%)		- 40,000
Cash salvage of old machine	5,00,000	
Book salvage of old machine	4,00,000	
Gain on sale of old machine	1,00,000	
Net Cash Outlay (NCO)		- 5,40,000

Solution 3

Step 2: Calculation of differential depreciation

Depreciation of old machine = Rs. 800,000/10 years
= Rs. 80,000
Depreciation of new machine = (Rs. 800,000 – Rs 50,000)/5 Years
= Rs. 1,50,000
Differential depreciation = Rs. 1,50,000 – Rs. 80,000 = Rs. 70,000 (Additional expenditure)

Solution 3

Step 3: Calculation of CFAT for yearl to year 5

Net annual cash saving	2,00,000
Less: Differential depreciation	70,000
Cash flow before tax	1,30,000
Less Tax @ 40%	52,000
Cash flow after tax	78,000
Add: Differential depreciation	70,000
CFAT (1 to 5 years)	1,48,000

Calculation of CFAT (excluding regular operation) for year 5

Release working capital		2,00,000
Cash salvage value after tax adjustment		80,000
(Rs. 1,00,000 – Rs. 20,000)		
Cash salvage machine	1,00,000	
Book salvage of machine	50,000	
Gain on sale of old machine	50,000	
Tax on gain of old machine sold @ 40%	20,000	
CFAT for year 5		2,80,000

Solution 3

Calculation of NPV

Years	CFAT	Discount Factor @ 10%	Present Values
1 to 5	1,48,000	3.791	5,61,068
5	2,80,000	0.621	1,73,880
		Total Present Value	7,34,948
		Less: Net Cash Outlay	5,40,000
		Net Present Value	1,94,948

Solution 3

Calculation of IRR

Years	CFAT	DF @ 20%	Present Value	DF @ 25%	Present Value
1 - 5	1,48,000	2.991	4,42,668	2.689	3,97,972
5	2,80,000	0.402	1,12,560	0.328	91,840
			5,55,228		4,89,812

Interpolation,

$$\text{IRR} = \text{Lower Rate} + \frac{\text{PV at Lower Rate} - \text{Investment}}{\text{PV at Lower Rate} - \text{PV at Higher Rate}} \times (\text{Higher Rate} - \text{Lower Rate})$$

IRR = 21.16%

Decision: The replacement of machine has positive NPV amounting Rs. 1,94,948. In the same, it has higher IRR 21.16% than company's required cost of capital 10%. So that, the new machine is become very much attractive, should be replaced.

References

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Thank You