

Engineering Economics & Management

Financial Management & Economics

11th May 16

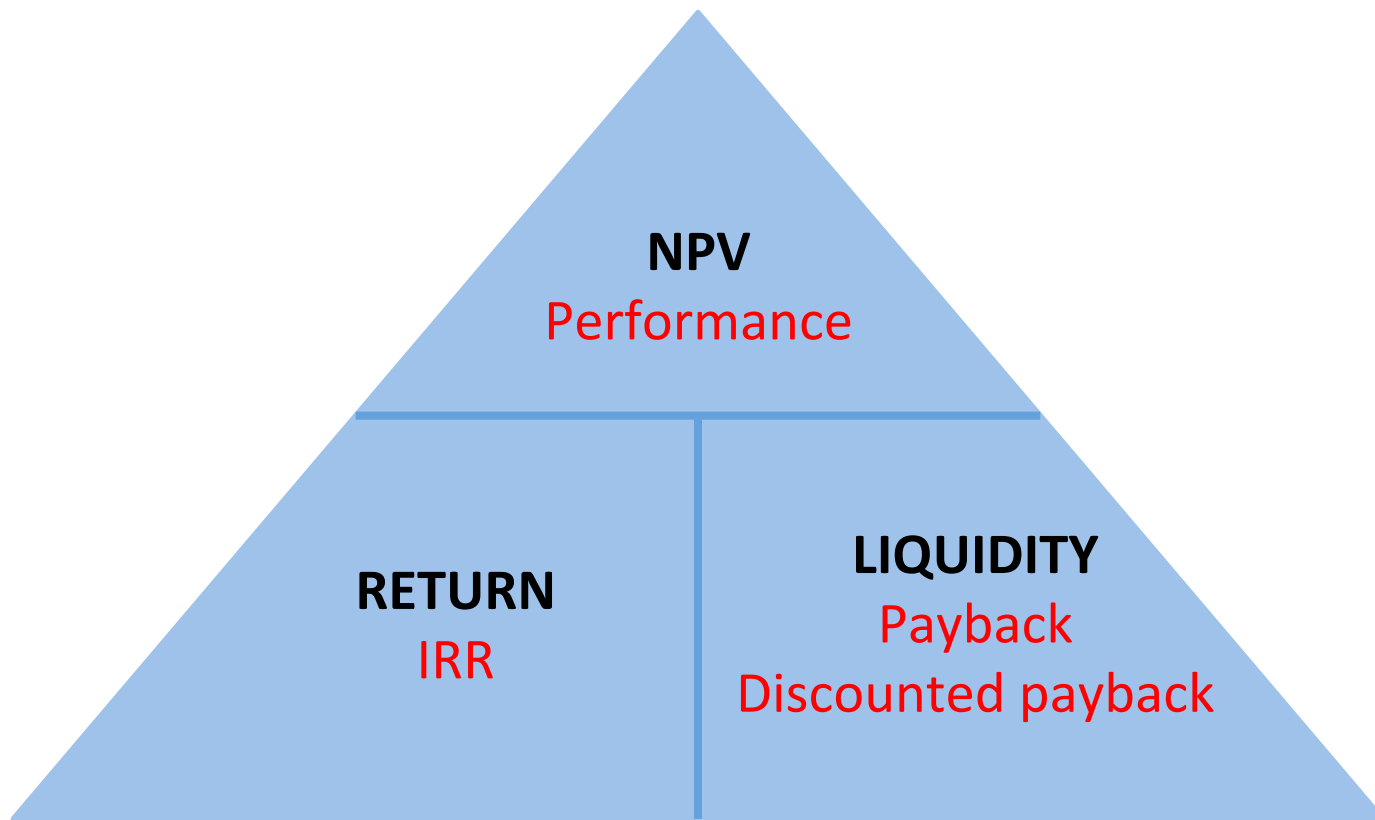
Appraisal Techniques

11th May 16

Flow of Money

11th May 16

Investment Appraisal is about assessing incomes of an investment against the cost of the investment.



Investment Appraisal

11th May 16

Return On investment

$$\text{ROI} = \frac{\text{Net present value}}{\text{Investment}} \times 100\%$$

Internal Rate of Return

$$\text{IRR} = d1 + [(d2-d1) \times \frac{n1}{n1-n2}]$$

d1 = Lowest discount rate

d2 = Highest discount rate

n1 = NPV of lowest discount rate

n2 = NPV of highest discount rate

Example

11th May 16

Avon Ltd is reviewing a new product which is expected to sell for 200 and to have variable costs of 110. The managers expect to sell 3000 units per year for 4 years. Making the product requires machinery that costs 400,000 that will last for 10 years, and will increase fixed cash operating costs by 75000. Tax rate is 40%. Discount rate are 10% and 17%.

- Determine the NPV for both discount rates
- Determine the ROI for both
- Determine the approximate internal rate of return (IRR)

Example

11th May 16

| | | |
|----------------------|---------------------|----------------|
| Sales Revenue | (3,000x200) | 600,000 |
| Variable Costs | (3000x110) | 330,000 |
| Contribution | | |
| Fixed costs | | |
| Income before taxes | | |
| Income taxes | | |
| Net income | | |

Example

11th May 16

| | | |
|----------------------|---------------------|----------------|
| Sales Revenue | (3,000x200) | 600,000 |
| Variable Costs | (3000x110) | 330,000 |
| Contribution | | 270,000 |
| Fixed costs | | |
| Income before taxes | | |
| Income taxes | | |
| Net income | | |

Example

11th May 16

| | | |
|----------------------|---------------------|----------------|
| Sales Revenue | (3,000x200) | 600,000 |
| Variable Costs | (3000x110) | 330,000 |
| Contribution | | 270,000 |
| Fixed costs | (40,000+75000) | 115,000 |
| Income before taxes | | 155,000 |
| Income taxes | | |
| Net income | | |

Example

11th May 16

| | | |
|----------------------|---------------------|----------------|
| Sales Revenue | (3,000x200) | 600,000 |
| Variable Costs | (3000x110) | 330,000 |
| Contribution | | 270,000 |
| Fixed costs | (40,000+75000) | 115,000 |
| Income before taxes | | 155,000 |
| Income taxes | (40% of 155000) | 62000 |
| Net income | | 93000 |

Example

11th May 16

| Year | Net cash flow | First Discount factor (10%) | Present value | Second Discount factor (17%) | Present value |
|------|---------------|-----------------------------|---------------|------------------------------|---------------|
| 0 | -400,000 | 1 | -400,000 | 1 | -400,000 |
| 1 | | | | | |
| 2 | | | | | |
| 3 | | | | | |
| 4 | | | | | |
| | | | | | |

Example

11th May 16

| Year | Net cash flow | First Discount factor (10%) | Present value | Second Discount factor (17%) | Present value |
|------|---------------|-----------------------------|---------------|------------------------------|---------------|
| 0 | -400,000 | 1 | -400,000 | 1 | -400,000 |
| 1 | 93000 | 0.91 | | 0.85 | |
| 2 | 93000 | 0.83 | | 0.73 | |
| 3 | 93000 | 0.75 | | 0.62 | |
| 4 | 93000 | 0.68 | | 0.53 | |
| | | | | | |

Example

11th May 16

| Year | Net cash flow | First Discount factor (10%) | Present value | Second Discount factor (17%) | Present value |
|------|---------------|-----------------------------|---------------|------------------------------|---------------|
| 0 | -400,000 | 1 | -400,000 | 1 | -400,000 |
| 1 | 93000 | 0.91 | 84630 | 0.85 | 79050 |
| 2 | 93000 | 0.83 | 77190 | 0.73 | 67890 |
| 3 | 93000 | 0.75 | 69750 | 0.62 | 57660 |
| 4 | 93000 | 0.68 | 63240 | 0.53 | 49290 |
| | | | -105190 | | -146110 |

Net present value for 10% discount rate is -105190

Net present value for 17% discount rate is -146110

Example

11th May 16

Return of investment

$$\begin{aligned}\text{ROI (10\%)} &= \frac{\text{Net present value}}{\text{Investment}} \times 100\% \\ &= \frac{-105190}{400000} \times 100\% = -26.3\%\end{aligned}$$

$$\begin{aligned}\text{ROI (17\%)} &= \frac{\text{Net present value}}{\text{Investment}} \times 100\% \\ &= \frac{-146110}{400000} \times 100\% = -36.5\%\end{aligned}$$

Investment Appraisal

11th May 16

Internal Rate of Return

$$\text{IRR} = d1 + [(d2-d1) \times \frac{n1}{n1-n2}]$$

d1 = Lowest discount rate

d2 = Highest discount rate

n1 = NPV of lowest discount rate

n2 = NPV of highest discount rate

$$\begin{aligned} \text{IRR} &= 10\% + [(17\% - 10\%) \times \frac{-105190}{-105190 - (-146110)}] \\ &= -15.7\% \end{aligned}$$

Thankyou

11th May 16