FINANCIAL TERMINOLOGIES

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TOPICS

Financial Terminologies

Future Value of Money

Present Value of Money

Net Present Value

Internal Rate of Return

Hurdle Rate

Annuity Based Payment

FUTURE VALUE OF MONEY

Future value measures the nominal future sum of money that a given sum of money is "worth" at a specified time in the future assuming a certain interest rate, or more generally, rate of return.

For example
Suppose you invest INR 100 at the rate of 10%
After one year the value of that money would be
$100 \times (1 + 0.1)$
110

- After two years the value of that money would be
  $110 \times (1 + 0.1)$
  $100 \times (1 + 0.1) \times (1 + 0.1)$
  $100 \times (1 + 0.1)^2$

- After nth year the value of that money would be

  $100 \times (1 + 0.1)^n$

PRESENT VALUE OF MONEY

Present value is the value on a given date of a future payment or series of future payments, discounted to reflect the time value of money

For example
Suppose you receive INR 121 at the rate of 10%
Before one year the value of that money was

$$= 121 / (1 + 0.1)$$

$$= 110$$

– Before two years the value of that money was

$$= 121 / (1 + 0.1) / (1 + 0.1)$$

$$= 110 / (1 + 0.1)$$

$$= 121 / (1 + 0.1)^2$$

– Before n year the value of that money was

$$= 100 / (1 + 0.1)^n$$

NET PRESENT VALUE

The net present value (NPV) of a time series of cash flows, both incoming and outgoing, is defined as the sum of the present values (PVs) of the individual cash flows

For example

- Suppose you invest INR 100 now and receive INR 50 in the first year , INR 60 in the second year and INR 45 in the third year. The rate of return is 10%

- Net Present value of the investment would be

= $- (100 / (1 + 0.1)^0) + (50 / (1 + 0.1)^1) + (60 / (1 + 0.1)^2) + (45 / (1 + 0.1)^3)$

= $- 100 + 45.45 + 49.59 + 33.81$

= 28.85

> Projects with higher NPV are more profitable in nature

INTERNAL RATE OF RETURN (1/2)

- The internal rate of return (IRR) is a rate of return used in capital budgeting to measure and compare the profitability of investments.

- The internal rate of return on an investment or project is the annualized effective compounded return rate or discount rate that makes the net present value of all cash flows (both positive and negative) from a particular investment equal to zero.

- **For example**

  - Suppose you invest INR 100 now and receive INR 60 in the first year , INR 60 in the second year.

  - IRR can be calculated as

    IRR = - (100 / (1 + IRR)^0) + (60 / (1 + IRR)^1) + (60 / (1 + IRR)^2)

    IRR   = 13.06 %

INTERNAL RATE OF RETURN (2/2)

- In case returns are different each year

Initial investment	= INR 16.91
First year returns	= INR 12.90
Second year returns	= INR 04.08
Third year returns	= INR 04.28
Fourth year returns	= INR 04.53
Fifth year return	= INR 04. 81
IRR calculated	= 31.02%

- NPV $= -16.91 + 12.90 / (1 + 0.31)^1 + 4.08 / (1 + 0.31)^2 + 4.28 / (1 + 0.31)^3 + 4.53 / (1 + 0.31)^4 + 4.81 / (1 + 0.31)^5$

  $= -16.91 + 9.84 + 2.38 + 1.9 + 1.54 + 1.24$

  $= 0$

  - Projects with higher IRR are more profitable
  - If IRR and NPV give conflicting results, selection should be based on NPV

HURDLE RATE FOR AN ORGANIZATION

- Hurdle rate is the minimum rate that a company requires for investing in a project i.e. it is company's required rate of return or target rate.

- In order for a project to be accepted, its internal rate of return must equal or exceed the hurdle rate.

- Hurdle rate in most cases is the Weighted Average Cost of Capital (WACC) for the organization.

- WACC can be calculated as:

$$WACC = \frac{E}{V} \times R_e + \frac{D}{V} \times R_d \times (1 - T)$$

R_e = cost of equity as defined by the shareholder
R_d = cost of debt
E = market value of the firm's equity
D = market value of the firm's debt
V = E + D = total market value of the firm's financing (equity & debt)
T = corporate tax rate

ANNUITY BASED PAYMENT

Annuity is the fixed annual payment with an organization pays to the investor or project implementer throughout the life of the project to recover initial capital investment, cost of equity, interest on debt and any other expenses incurred by the investor or project implementer as agreed in the agreement between the two.

Annuity calculation is a two step process:

- Calculation of NPV of the all the investments and expenses (including cost of capital)

- Calculation of annual payment for the project hurdle rate or WACC

End of Training Module

THANK YOU