FINANCIAL MANAGEMENT

Lecture No. 21

بسم الله الرحمن الرحيم

FACUALTY PROFILE

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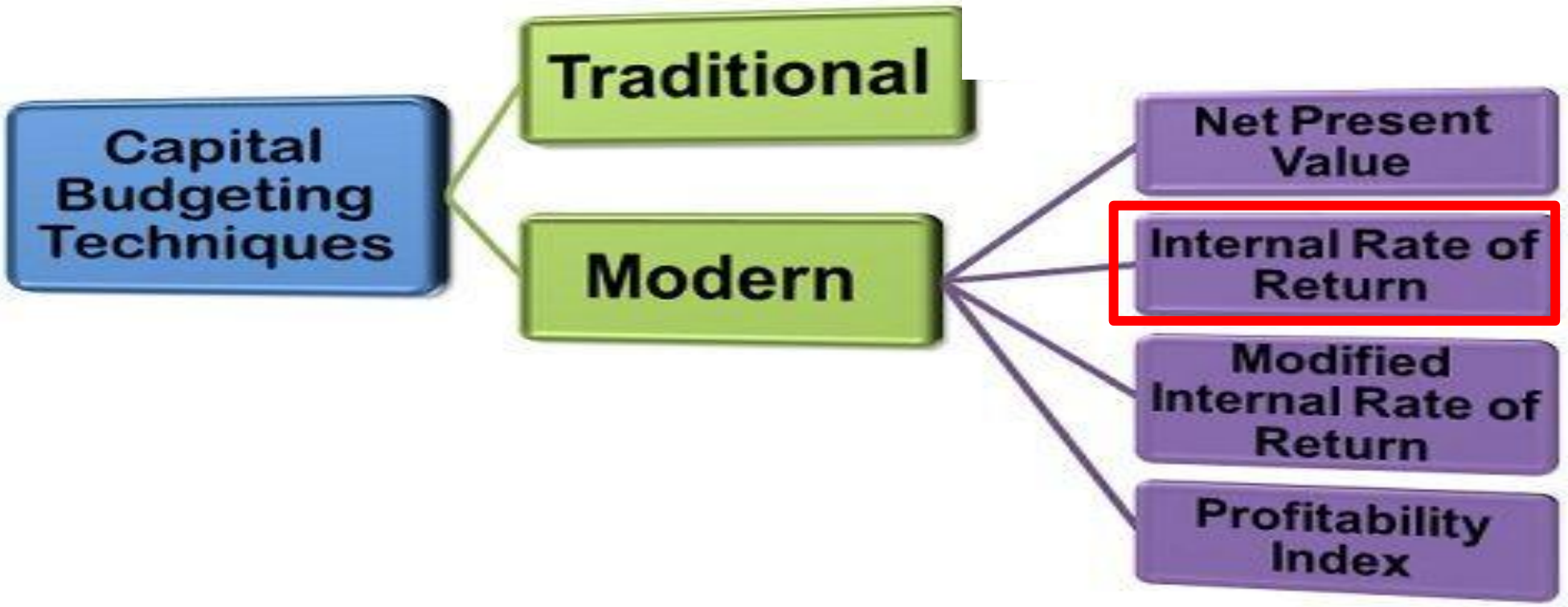
Capital Budget


Capital Budgeting Techniques
Traditional
Modern
Net Present Value
Internal Rate of Return
Modified Internal Rate of Return
Profitability Index

3. Internal Rate of Return

Definition:

The discount rate that equates the present value of the ***project's free cash flows*** *(inflow) with the project's* ***initial cash outlay.***

Accept/Reject criteria

IRR > firm's required rate of return or cost of capital: accept

IRR < firm's required rate of return or cost of capital: reject

What is the IRR Formula?

The IRR formula is as follows:

$$0 = CF_0 - \frac{CF_1}{(1+IRR)} + \frac{CF_2}{(1+IRR)^2} + \frac{CF_3}{(1+IRR)^3} + \ldots + \frac{CF_n}{(1+IRR)^n}$$

Firm accepted or required rate of return.
Firm desired rate

Where:

CF_0 = Initial Investment / Outlay

$CF_1, CF_2, CF_3 \ldots CF_n$ = Cash flows

n = Each Period

N = Holding Period

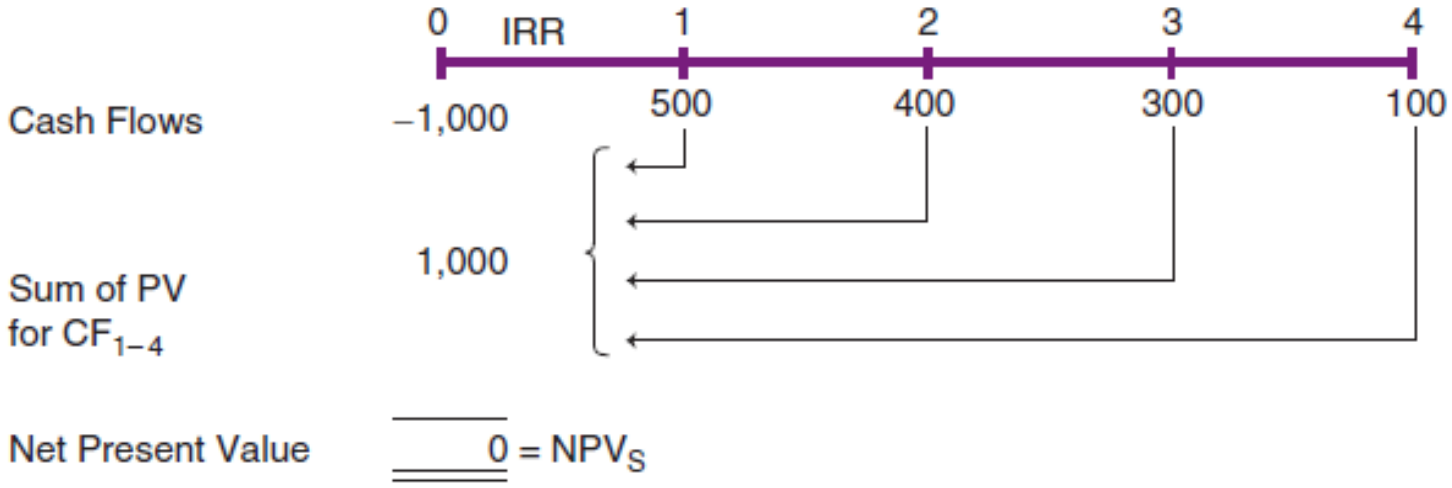
NPV = Net Present Value

IRR = Internal Rate of Return

Lakshmi company has a project to invest Rs 1000 which earn to Rs. 1300 in four years with cash flow of 500 in 1st year and 400 in 2nd year 300 in 3rd and 100 in 4th year. If cost of capital is 15%.

we should accept this project or not??

Internal Rate of Return (IRR)



$$0 = \frac{500}{(1 + IRR)^1} + \frac{400}{(1 + IRR)^2} + \frac{300}{(1 + IRR)^3} + \frac{100}{(1 + IRR)^4} - 1000$$

How to find terminated value

What is the IRR Formula?

The IRR formula is as follows:

$$0 = CF_0 + \frac{CF_1}{(1+IRR)} + \frac{CF_2}{(1+IRR)^2} + \frac{CF_3}{(1+IRR)^3} + \ldots + \frac{CF_n}{(1+IRR)^n}$$

IRR= lowest rate of return + $\dfrac{\text{(higher rate – lower rate) (highest amount – initial investment)}}{\text{(Higher amount- lower amount)}}$

IRR calculation with example

IIR Inspectors company have a project to invest RS.80000 with proposal to cost of capital is 12%. Further his future free cash flows are 15000 in 1st year, then 20000 in 2nd 25000 in 3rd yead, 30000 and 35000 in 4th and 5th respectively.

Should guys you want to invest in this project???

With your strong suggestion with the help of IRR concept with analysis

So our formula to find a % (terminated value) which equate our invest ZERO as we early understand.

$$IRR = \text{lowest rate of return} + \frac{(\text{Higher rate IRR} - \text{lower rate IRR})\ (\text{highest amount} - \text{initial investment})}{(\text{Higher amount} - \text{lower amount})}$$

According to formula IRR first we need to find two rates of return or IRR for formula

Highest rate ?
Lowest rate?
Highest Amount positive NPV?
Lowest Amount Negative NPV ?

Solution

years	cash flows
0	-80000
1	15000
2	20000
3	25000
4	30000
5	35000
total cash inflows	125000

We need to find PV with a rate with equated 125000 to 80000.

years	cash flows	PV formula
0	-80000	
1	15000	FV/(1+IIR)^1
2	20000	FV/(1+IIR)^2
3	25000	FV/(1+IIR)^3
4	30000	FV/(1+IIR)^4
5	35000	FV/(1+IIR)^5

IIR Inspectors company have a project to invest RS.80000 with proposal to cost of capital is 12%.

Solution

Lets start with 15%

years	cash flows	PV formula	IRR 15%
0	-80000		
1	15000	FV/(1+IIR)^1	Rs13,043
2	20000	FV/(1+IIR)^2	Rs15,123
3	25000	FV/(1+IIR)^3	Rs16,438
4	30000	FV/(1+IIR)^4	Rs17,153
5	35000	FV/(1+IIR)^5	Rs17,401
total cash inflows	**125000**		**Rs79,158**

Near and just below to 80000

Lowest Amount Negative NPV ?

Solution

			Lets start with 15%	Lets start with 13%
years	cash flows	PV formula	IRR 15%	IIR 13%
0	-80000			
1	15000	FV/(1+IIR)^1	Rs13,043	Rs13,274
2	20000	FV/(1+IIR)^2	Rs15,123	Rs15,663
3	25000	FV/(1+IIR)^3	Rs16,438	Rs17,326
4	30000	FV/(1+IIR)^4	Rs17,153	Rs18,400
5	35000	FV/(1+IIR)^5	Rs17,401	Rs18,997
total cash inflows	125000		Rs79,158	Rs83,660
			Near and just below to 80000	it is so high from 80000

Highest Amount positive NPV?

Solution

			Lets start with 15%	Lets start with 13%	Lets start with 14%
years	cash flows	PV formula	IRR 15%	IIR 13%	NPV 14%
0	-80000				
1	15000	FV/(1+IIR)^1	Rs13,043	Rs13,274	Rs13,158
2	20000	FV/(1+IIR)^2	Rs15,123	Rs15,663	Rs15,389
3	25000	FV/(1+IIR)^3	Rs16,438	Rs17,326	Rs16,874
4	30000	FV/(1+IIR)^4	Rs17,153	Rs18,400	Rs17,762
5	35000	FV/(1+IIR)^5	Rs17,401	Rs18,997	Rs18,178
total cash inflows	125000		Rs79,158	Rs83,660	Rs81,362
			Near and just below to 80000	it is so high from 80000	Near and just above to 80000

$$\text{IRR} = \text{lowest rate of return} + \frac{(\text{higher rate} - \text{lower rate})\,(\text{highest amount} - \text{initial investment})}{(\text{Higher amount} - \text{lower amount})}$$

$$\text{IRR} = 14 + \frac{(15\%-14\%)(81361-80000)}{(81361-79159)}$$

$$14 + \frac{(1)(1361)}{(2202)} = 14.61\%$$

14.61%

So this is the rate of Actual IRR

Where

0=80000-80000

Now project is accepted or rejected???

IIR Inspectors company have a project to invest RS.80000 with proposal to cost of capital is 12%.

Thank
You

Q&A
If you have
Questions
We have
Answers