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Discount Cash flow Method:

- It takes into account interest factors and returns after pay back period.

$$F=P(1+r)^n$$

- Net Present value=Present value of cash inflows-present value of cash outflow
- Decision Rule: If the above is +ve then we should accept the period.
- If NPV is –ve then we should reject. If it is zero we need to find out Internal Rate of Return.

Methods of calulating NPV:

Case 1: When annual cash inflows are equal

Step-1:Find Cash Flow After Taxes(CFAT)

CFAT=Net profit- Taxes +Depreciation

Deducted because of cash outflow

Added because of Monetary Expenses

Note:Unpaid and Outstanding expenses also to be added in the profit.

Step-2:Find present values of outflows. It means working capital(So it is asset)
Find out the initial amount.
Step-3:Find present value of CFAT as found in step-1 using present value annuity factor(PVAF) table
Step-4:Deduct present value of cash outflow from the present value of cash inflow i.e. is Step-1.
Note: While calculating PV of CFAT at the ending year, add salvage value if any.

Case-2:
When annual cash flows are unequal or uneven, repeat all the above steps but substitute PVF in the place of PVAF

Problem: Suppose a firm is evaluating a proposal costing Rs.1,60,000/- and expected to generate cash inflows of 40,000/- ,60,000 /-,50,000 /-,50,000 /-,40,000 /- over 5 years. Find NPV of the project at 10% discount rate and decide whether project is feasible

Solution:

Year	CFAT	Present Value Factor	Present Value of Cash inflow
1	40,000	0.909	36,360
2	60,000	0.826	49,560
3	50,000	0.751	37,550
4	50,000	0.683	34,150
5	40,000	0.621	24,840
			1,82,460

NPV=Sum total of column 4-initial cost

=1,82,460-1,60,000

=Rs 22,460/-

Since the value is positive, we accept the project

Suppose in the above problem, the project at the end of 5th year , used machinery fetches Rs.25,000 as salvage or scrap, then Find NPV

Solution:

Then on the 5th year CFAT as is 40,000/- now it will be 40,000+25,000.

Then PV to be found.

Suppose in the 2nd year along with 60,000 extra amount of 30,000 is required, then it will not effect the NPV

i.e., initial outflow + PV of 30,000 i.e.30,000*0.826 will be deducted from the summation of the column 4

Internal rate of Return Method(IRR)

IRR equilibrates Net Present Value to zero. In other words IRR is a situation where the Present value of Cash Inflows are equal to the Cash Outflows.
The following procedure to be adopted to find IRR.
Case 1: Where future inflows are even
Step-1:Find the payback period for the cash outflow

Step 2:Check from PVAF table where the above payback value lies i.e. the upper interval ad lower interval of the pay back value should be found from the corresponding year.

Step 3:Use the upper and lower % of interest found in step-2 to find the present value of cash inflows of the ending year.

Step 4:Use the following formula to find IRR

$$r_1 + (\Delta_1 - \Delta)/(\Delta_1 - \Delta_2)$$

Or

$$r_2 - (\Delta - \Delta_1)/(\Delta_1 - \Delta_2)$$

Where r_1 is the lower rate of interest, r_2 is the lower rate of interest

Δ_1 = The present value of cash inflow at r_1

Δ_2= The present value of cash inflow at r_2

Δ=Initial cash outflow

Case 2:Where cash inflows are uneven

Step 1:Find pay back period

Step 2:Check from PVF table the upper and lower interval of interest rates where the payback values lies.

Step 3:Find the PV of cash inflows for each year (not for the ending year alone) at upper and lower intervals inorder to find Δ_1 and Δ_2

Step 4:

$$r_1 + (\Delta_1 - \Delta)/(\Delta_1 - \Delta_2)$$

Or

$$r_2 - (\Delta - \Delta_1)/(\Delta_1 - \Delta_2)$$

Problem: The proposal project requires the initial cash outflow of Rs.1,00,000/- which fetches annual inflow of 25,000/- for 6 years. Find IRR

Solution: If market or marginal interest rate % is not given ,then assume it to be 10%
Payback period= (1,00,000/ 25,000)=4 years
Now check PVAF table at 4 years
Find value near to 4(Pay back period) one upper limit and one lower limit
Low interest is r_1 =12% i.e. 4.111
High interest r_2 =13% i.e. 3.998

Step 3:Find Δ_1 and Δ_2

Δ_1=6th year cash inflow*discounted value at r_1

=25000*4.111=102775

Δ_2=6th year cash inflow*discounted value at r_2

=25000*3.998=99950

Step 4:$r_1 + (\Delta_1 - \Delta)/(\Delta_1 - \Delta_2)$

Δ=1,00,000(initial cash outflow)

=12%+(102775-100000)/(102775-99950)

=12%+0.98=12.98%

For case 2:The given project requires 1,60,000 of outflow which fetches which fetches 40,000/-, 60,000/-,50,000/-,50,000/-,40,000/-, over 5 years respectively. Find IRR at 10%
Solution: Finding pay back period and put weightage for each cash inflow(also called Hit and Trial Method)

Year	CFAT	Weights	Weight average flows
1	40,000	5	2,00,000
2	60,000	4	2,40,000
3	50,000	3	1,50,000
4	50,000	2	1,00,000
5	40,000	1	40,000
		15	7,30,000

Actual weighted average inflow = weight average cash inflow/Total weights

= 7,30,000/15 = 48,666.66

Step -1: Pay back value= 1,60,000/4867=3.288 i.e 3 to 4 years

Check PVF table. Value lies between 15% to 16%

r_1=15% and r_2=16%

To find out Δ_1 at 15%

Year	CFAT	Present Value Factor	Present Value of Cash inflow
1	40,000	0.870	36,360
2	60,000	0.756	49,560
3	50,000	0.658	37,550
4	50,000	0.572	34,150
5	40,000	0.497	24,840

Referring PVF not PVAF at 15% as inflows are unequal Δ_1=summation at column 4

Δ_2 is at 16%,same procedure. Then put in formulae