

Investment Appraisal

AAT Level III Management Accounting and Finance (MAF)

Amsaleka Chandrasegaran
BBA. (Finance) Sp., AAT Passed Finalist, CMA Passed Finalist

CHAPTER 01

INVESTMENT APPRAISAL

The reasons required for the methodical system in evaluating long term investment.

1. The amount of money involved in investments is comparatively large in amount.
2. Returns of the investment made in present are received in the future.
3. Entire growth of the business is ultimately based on the long term investments.
4. Investment decisions taken cannot be changed in between.

Capital budgeting process

- Generation of investment proposals
- Estimation of cash flows
- Evaluation of cash flows
- Risk analysis
- Selection of best proposal
- Proper funding strategy
- Implementation
- Continual re-evaluation

Techniques of investment appraisal

1. Non discounted cash flow techniques
 - Payback period(PBP)
 - Accounting rate of return(ARR)
2. Discounted cash flow techniques
 - Net present value(NPV)
 - Internal rate of return
 - Discounted payback period (DPBP)
 - Profitability index(PI)

Non - discounted cash flow techniques

1. Pay Back Period (PBP)

The time which takes to equal cash inflow to cash outflows of a project.in other words the time taken to cover the initial investment of a project.

Question 01:

The cash flows related to ABC LTD which currently evaluates three projects are given below.

Year	Project A	Project B	Project C
0	(20000)	(20000)	(20000)
1	8000	3000	6000
2	7000	5000	7000
3	5000	8000	5000
4		8000	2000

- You are required to calculate PBP for each project and advice the management.

Question 02:

XYZ LTD is evaluating the following 05 projects which are mutually exclusive.

Year	P	Q	R	S	T
0	(30000)	(25000)	(30000)	(28000)	(32000)
1	6000	9000	10000	12000	22000
2	8000	4000	28000	19000	5000
3	20000	16000	14000	7000	8000
4	3000		6000		1000

- You are required to calculate PBP for each project and advice the management.

Advantages of PBP

- Easy to understand.
- Easy to calculate.
- It is complied with the objective of liquidity.
- Since the shortest PBP is selected, the time related risk is minimized.

Disadvantages of PBP

- The cash flows generated after PBP are not considered.
- Time value of money is not considered.
- Impossible to determine the targeted PBP.
- It influences to invest in short term project.

2. Accounting Rate of Return (ARR)

It represents the ratio of which return on the project to the amount invested.

$$ARR = \frac{\text{Average annual profit from the investment}}{\text{Average investment}}$$

Question 01:

The company PQR is evaluating the following projects. Rate of return on the earning of the targeted capital is 20%. Cost of asset investment is Rs. 80000.

Year	Targeted profit before depreciation
1	20,000
2	25,000
3	35,000
4	25,000

- Capital asset will be depreciated at the rate of 25% on cost
- No residual value is expected
- ✓ You are required to calculate ARR and decide whether such project will be selected or not.

Question 02:

IQ LTD is considering 2 investments and willing to invest in one of the followings and targeted ARR is 25%.

Description	Project alpha	Project beta
Basic investment	2,500,000	3,000,000
Life time of the project	04	04
Scrap value	100,000	200,000
<u>Net profit after depreciation (years)</u>	Rs.	Rs.
1	1,000,000	90,000
2	620,000	(40,000)
3	840,000	950,000
4	(50,000)	730,000

- ✓ You are required to calculate ARR and decide which project should be selected.

Question 03:

ABC LTD is considering about the following project and the targeted ARR is 5%.

- Basic investment Rs. 1,750,000
- Life time 5 years
- Scrap value 150,000
- Net profit after depreciation (years)
 1. 280,000
 2. 130,000
 3. 80,000
 4. (70,000)
 5. (120,000)

- You are required to calculate ARR and decide whether this project is selected or not.

Question 04:

The company PQR is evaluating the following project. The rate of return on the targeted capital is 20%. The capital cost of the asset is Rs. 9000.

Year	Revenue	Out of pocket cost
1	12000	6000
2	10000	5000
3	8000	4000

- You are required to calculate ARR and decide whether this project is selected or not.

Advantages of ARR

- Easy to calculate.
- Easy to understand.
- Total income of the project is considered.

Disadvantages of ARR

- Time value of money is not considered.
- Impossible to calculate targeted ARR.
- It does not care about the life time of the project.

Discounted cash flow techniques

Since the returns of the project present investment are received in the future, it is not reasonable to compare the future returns with the present cost.

That is the value of a rupee at this moment is greater the value of a rupee receiving in the future.

1. Net Present Value (NPV)

The difference between the present value of the future cash inflow and the present value of the cash outflow is known as Net Present Value.

Question 01

Mr. John decided to make a capital investment of Rs.1500000, but he is unaware whether to invest in on of the following 02 projects. The net cash inflow from the projects are given below.

Year	X PLC	Y PLC
1	900,000	70,000
2	600,000	70,000
3	50,000	70,000

- Company's cost of capital is 10%.
- ✓ You are required to calculate NPV and decide whether this project is selected or not.

NOTE:

Annuity method

An annuity is an agreement whereby a person pays or receives a fixed amount at the end or the beginning of each period.

$$\text{Present value} = \frac{1-(1+r)^{-n}}{r} \times \text{fixed amount}$$

Question 02:

ABC Company is considering 02 projects with the expected lifetime of 3 years. Investment out claim will be Rs. 1000000. Cost of capital is 10 %. The estimated net for each project given below.

Year	Project – A	Project – B
1	300,000	600,000
2	1,000,000	600,000
3	400,000	600,000

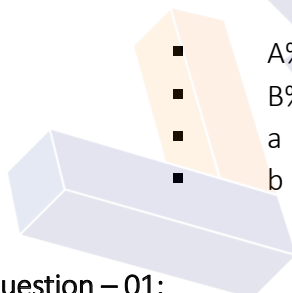
You are required to determine which project should be selected.

2. Internal Rate of return (IRR)

It is discounting rate which indicates net present value (NPV) is zero (0). In other words it is the discounting rate by which the present value of future cash inflow equal to present value of cash outflow. (Basic investment)

Following formula can be used to calculate the IRR.

$$IRR = A\% + \left(\frac{a}{a - b} \right) \times (B\% - A\%)$$



- A% - The Lower of cost capital
- B% - The Higher of cost of capital
- a - NPV of the Lower of cost of capital
- b - NPV of the Higher of cost of capital

Question – 01:

Year	Cash Flows' 000
0	1000
1	300
2	400
3	500

- You are required to calculate IRR.

Question 02:

PQR Company is considering 02 projects and the estimated net cash flows are given below.

PROJECT A

Year	Net Cashflows'000
0	(1750)
1	600
2	450
3	400
4	250
5	350

PROJECT B

Year	Net Cashflows'000
0	(2400)
1	1030
2	705
3	590
4	355
5	450

- You are required to calculate IRR for the both projects.

3. Profitability Ratio (PI)

The ratio which represents the present value of the future cash inflow of the business to the basic investment.

$$\text{Profitability index} = \frac{\text{Present value of future cashinflows}}{\text{Basic investment}}$$

OR

$$\text{Profitability index} = \frac{\text{Basic investment} + \text{NPV}}{\text{Basic investment}}$$

DECISION RULE

- ❖ If PI is greater than 01: Accept the project.
- ❖ If PI is lower than 01: Reject the project.
- ❖ If PI equals 01: Accept or reject depends on management decision.

Question 01:

Cash flow related to project Y is given below.

year	Cashflows'000
0	(200)
1	20
2	80
3	100
4	150

- Cost of capital is 12%
- You are required to calculate PI and advise the management

4. Discounted Pay Back Period (DPBP)

The computation of payback period using discounted cash flow technique is known as discounted payback period.

Question 01

AZ Company is evaluating project X with the following cash flows.

Year	Cashflows'000
0	(100)
1	20
2	15
3	30
4	45
5	80

- Cost of capital is 10%
- You are required to calculate DPBP and advise the management on the acceptance of this project

NOTE:

PRESENT VALUE OF PERPETUITY

If a similar amount of cash is received in every year to the infinity time period then the computation of the present value of such cash flows is given below

$$PV = CashFlow \times \frac{1}{r} \text{ OR } \frac{Cash Flow}{r}$$

Question 01:

The following information is given below to the project A of Zee Ltd.

- Basic investment – Rs.2000000
- Annual cash receipts up to infinity - Rs. 20000
- Cost of capital – 9%

- You are required to calculate present value and advice the management on the acceptance of this project.

Calculation of NPV of the project having unequal lifetime

In the computation of NPV of the project having unequal lifetime, the equivalent annual value (EAV) of each project should be considered.

$$EAV = \frac{NPV \text{ of the project}}{\text{Annuity factor}}$$

Question 01:

Aqua LTD is considering 02 projects namely X & Y where investment should be made by Rs.1500000 for each project.

Following information is given below.

Description	Project X	Project Y
Expected life time	4	5
Scrap value	350,000	350,000
<u>Expected NCF – years</u>	Rs.	Rs.
1	640,000	580,000
2	460,000	400,000
3	480,000	385,000
4	600,000	540,000
5		580,000

- Cost of capital is 14%.
- ✓ You are required to calculate NPV and advice the management on the acceptance of this project.

Adjustment for taxation on project appraisal

Tax is paid on the profit generated by a project. The taxable profit is concerned as a profit and not the accounting profit. Taxable is calculated as follows.

Accounting profit	XXX
(+) depreciation	(XXX)
(-) capital allowance	XXX
Taxable profit	XXX

If there is any taxable profit on disposal then it should be calculated as follows.

Residual value	XXX	
Tax written down value(WDV)		
Cost	XXX	
(-)capital allowance	(XXX)	(XXX)
Taxable profit in disposal	XXX	

If there is any loss on disposal then there is a tax savings on the loss on disposal.

Question 01:

A machine estimated at Rs.20000 is required for the project X, produced by the company ABC.

A life time of the project is 4 years. Scarp value is estimated for Rs.5000 end of the life time.

The targeted profit before depreciation is Rs.8000 annually. It is expected to invest furthermore working capital in the beginning of the year and received end of the lifetime. The relevant capital allowance is 25%. Tax rate is 35%. Cost of capital is 15%.

✓ You are required to advise the management on the acceptance of this project.

Adjustment for inflation on project appraisal

The average amount increases of the prices or decreases in the real value of money is known as inflation.

Inflation affects to the charges on the cash flows related to the followings.

- To increase income
- To increase cost
- To increase interest and debt liabilities

There are two types of interest rate considered as follows

1. Nominal interest rate/Money interest rate
2. Real interest rate

Therefore,

$$(1+N) = (1+R) + (1+I)$$

N=nominal interest rate

I=inflation rate

R=real inert rate

Question 01:

The relevant cash flow of the project is given below.

Year	Cashflows'000
0	(100)
1	20
2	30
3	40
4	40
5	50

- It is expected the inflation level would be at the rate of 5% during the next 05 years. The discounting factor not adjusted for inflation is 10%.
 - ✓ You are required to compute NPV and advice the management.

Question 02:

A company intends to purchase a new machine with expected life time of 03 years for the project of producing bags. The cost of the machine is Rs. 5 Million and no scarp value is expected at the end of the project lifetime. It is expected to incur additional fixed cost of Rs. 3 Million each year for this project.

Expected income and cost of the project per unit is given below

- Selling price Rs.15
- Direct material cost Rs.2
- Direct labour cost Rs.3
- Variable overhead cost Rs.2
- Expected sales volume per year is 1000000 units

Inflation rate is given below

- Selling price 2% per annum
- Direct labour 12% per annum
- All other costs 8% per annum

- ✓ You are required to compute NPV and advice the management on the acceptance of the project.