SEMESTER – **B.Com, SEMESTER 6**

SUBJECT – **FINANCIAL MANAGEMENT**

NAME OF THE TEACHER – DEEPASHREE CHATTERJEE

LECTURE NO. – 3

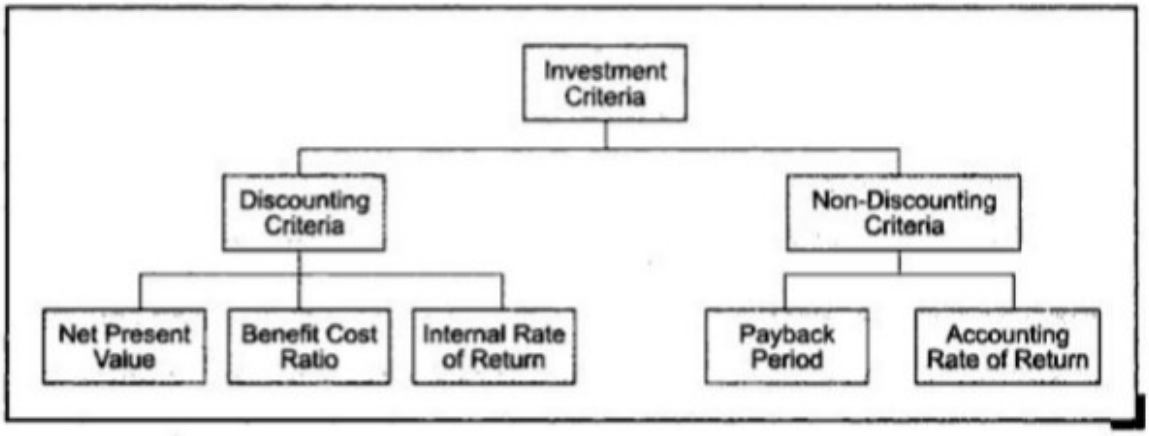
CAPITAL BUDGETING cont..

Techniques of Capital Budgeting

Capital budgeting decisions needs to be evaluated carefully as it involves large amount of investment & they are irreversible. The techniques of evaluation help in selecting of the most profitable projects. There are various methods of appraising the investment proposals which can be classified into two broad categories:

(1) Traditional – These methods do not take into consideration the time value of money and hence use non discounting crtiteria

(2) Time adjusted - These methods take into consideration the time value of money and hence use discounting crtiteria.



Traditional techniques also known as Non-discounting techniques uses the following methods: 1) Payback 2) Accounting rate of return.

The time adjusted and discounting techniques normally use the following techniques to assess the viability of a project:

1. Net Present Value technique

2. Internal rate of Return

3. Profitability Index

Now let us discuss each technique in detail.

Traditional Methods or Non discounting techniques:

1) **Accounting Rate of Return**: This method ranks the capital investment projects based on the rate of return of each project over its life. It is based on accounting information rather than cash flow of a firm.

Some know this technique as Return on investment. Its calculation can be done in two ways: In order to calculate the accounting rate of return, the return on original investment can be considered and in this case the formula would be

Accounting rate of return = (Average Annual EAT or PAT) / Original Investment *100

The accounting rate of return is also known as **Average rate of return.** It is defined as:

Average Rate of Return or ARR = (Average annual profits after taxes) / (Average investment over the life of the project) x 100

The average profits after taxes are determined by adding up the after tax profits expected for each year of projects' life and dividing the result by the number of years. In the case of annuity, the average after tax profits is equal to any years of profits.

The denominator can be calculated in the following manner:

For Original Investment = Original investment + additional net working capital + installation charges+ Transportation charges.

For Average Investment, average investment may be computed as:

Average Investment= (Initial cost + Installation expenses- salvage value) / 2 +Additional Net Working Capital + Salvage Value.

Now let us understand this technique with a numerical example:

Example 1

Year	Investment	PAT
1	190000	120000
2	180000	122000
3	170000	124000
4	160000	126000
5	150000	128000

Calculate ARR.

The accounting rate of return = (Average annual profits after taxes) / (Average investment over the life of the project) x 100

Average Profit = (120000+122000+124000+126000+128000)/5 = 124000

Average Investment= (190000+180000+170000+160000 +150000) / 5 = 170000

ARR = (124000/170000) x100 = 72.9%

Decision criterion:

The higher the accounting rate of return, the better the project. If the ARR is more than the cut off rate, the project is accepted and if lower than the cut off rate project is rejected.

Let us consider another example:

Example 2

If the initial investment of the XYZ ltd. in buying a machine is Rs 1, 21, 000, salvage value is Rs 11,000, working capital is Rs 12000 & life of the machine is 5 years. SLM of depreciation is adopted. Calculate the average investment.

Solution: By using the formula,

Average Investment= (original Investment- scrap value)/2 +Additional Net Working Capital + Scrap Value.

Average investment = ½ (121000 - 11000) + 12000 + 11000

= ½ (110000) + 23000

= Rs (55000 + 23000) = Rs 78000

Example 3

If two machines details are given, which one would you choose on the basis of ARR.

Capital Outlay	A	B
	1,56,125	1,56,125

Annual estimated Income After depreciation & Income-tax

	Machine A	Machine B
Year	PAT	PAT
1	13,375	21,375
2	15,375	19,375
3	17,375	17,375
4	19,375	15,375
5	21,375	13,375
Total	86,875	86,875

Estimated life for both the machines is five years.

Estimated salvage value for both the machines are 13000 each. Depreciation has been charged on straight line basis solution.

Solution: The first step is to calculate Average income by dividing 86875 by five for the first machine and second machine. We will get 17,375. Then using the formula for the average investment we will calculate the average investment for both the machines.

ARR= (Average income / Average Investment) x 100

Average investment= 13000 + ½ (156125 - 13000) = Rs (13000+ 71563) = Rs 845625

ARR = Average PAT / Average Investment

= Rs 17,375 / Rs 845625 = 20.54%

From the numerical example, any machine can be chosen as both the machines gives the similar results but the fact is in case of the B machine the return are higher in the earlier years which is ignored by this technique.

So the limitations of this technique are:

1) The method is based on accounting profits instead of actual cash flows after taxes in evaluating the projects.
2) It ignores the time value of money.
3) The technique is incompatible with the objective of wealth maximization to the equity shareholders

Pay Back Techniques

It is a technique by which the company gets to know that in how much time the initial investment would be recovered. It answers the question that how many years will it take for the cash inflows to recover the original cost of an investment without considering the salvage value.

There are two ways of calculating the payback period.

If the nature of cash flow is annuity (when the cash flows are uniform), then in such a situation PB can be calculated by using, Investment / constant annual cash flow.

Example 4

An investment of Rs 160000 in a machine is expected to produce CFAT of Rs 20000 for 10 years calculate the payback period.

Pay Back Period = Investment / constant annual cash flow.

= 160000 / 20000 = 8 years

However, if the cash flows are not uniform and vary from year to year then payback is calculated by the process of cumulative cash flows till the time of cumulative cash flows becoming equal to the original investment outlay.

Example 5

Calculate the payback period from the following:

Year	**Annual CFAT**		**Cumulative CFAT**	
	A	B	A	B
1	24000	32000	24000	32000
2	26000	30000	50000	62000
3	28000	28000	78000	90000
4	30000	26000	108000	116000
5	35000	27000	143000	143000

Solution: If the initial investment in A machine is Rs 75000 then machine A's investment will be recovered in 2.35 years. The sum of Rs 74000 can be recovered in 2 years and the balance of 1000 Rs will be recovered in the third year. The CFAT is Rs 28000 so the pay back fraction is therefore 1000/28000=0.35. Therefore the pay back period is 2.35 years.

For machine B the payback period would be calculated in this way. In the first year 32000 would be recovered and in the second year 30000 would be recovered so a fraction of 13000/28000 = 0.464 would be recovered in the third year Therefore the payback period is 2.464 years.

The pay back for machine A is lower than the second machine that is B.

Accept reject criteria:

The payback period can be used as decision criteria to accept or reject investment proposals. A machine should be accepted whose payback is a smaller period. Pay back period is simple to calculate and simple to understand. The problem with payback is that it completely ignores all cash inflows after the payback period. This can be misleading in such decisions. It also ignores time value of money and ignores the entire life of the project. As a result projects with large cash inflows in the latter part of their lives may be rejected in favour of less profitable projects.

To summarize, the traditional methods suffers from two serious drawbacks. They do not consider the total benefits and the timing of cash flows.