

Quadrant II- Notes

Paper Code : COD119

Module Name: Payback period and Accounting Rate of Return

1. Pay Back Period (PBP)

PBP represents the time required for cash receipts to pay the original cost of the investment, normally disregarding salvage value. It is the time taken to recover initial investment. Cash receipts represent Cash Flows After Taxes (CFAT). Thus PBP measures the number of years required for the CFAT to pay back the original outlay of an investment proposal.

The payback period is the time required to recover the initial cost of an investment. It is the number of years it would take to get back the initial investment made for a project. Therefore, as a technique of capital budgeting, the payback period will be used to compare projects and derive the number of years it takes to get back the initial investment. The project with the least number of years usually is selected.

❖ Methods to compute PBP:

There are two methods of calculating the PBP.

(i) The first method can be applied when the cash flow stream is an annuity for each year of the project's life, i.e. CFAT is uniform. In such a situation, the initial cost of the investment is divided by the constant annual cash flow. The PBP will be calculated using following formula:

$$PBP = \frac{\text{Initial Investment}}{\text{Constant Annual Cash Inflow}}$$

ILLUSTRATION 1

If an investment of Rs.1,00,000 in a machine is expected to generate cash inflow of Rs.20,000 p.a. for 10 years. Calculate its pay back period

$$\begin{aligned} \text{Solution PBP} &= \frac{\text{Initial Investment}}{\text{Constant Annual Cash Inflow}} \\ &= \frac{100000}{20000} \end{aligned}$$

= 5 years

(ii) The second method is used when a project's **CFAT are a mixed stream**, i.e. cash inflows are not equal but vary from year to year. In such a situation PBP is calculated by the process of cumulating CFAT till the time when cumulative cash flow becomes equal to the original investment outlay.

Illustration 2 Determine the payback period for project which requires a cash outlay of Rs 10,000 and generates cash inflows Rs 2000, Rs 4000, Rs 3000 and Rs 2000 in the first, second, third year and fourth year respectively

Solution: Total cash outlay = Rs 10000

Total cash Inflow for the first 3 years = Rs 2000+Rs 4000+Rs3000
= Rs 9000

Upto the 3rd year the total cost is not recovered but the total cash inflow for the fourth year are = Rs 11000 i.e. Rs 1000 more than the cost of the project. So the payback period is somewhere between 3 and 4 year

Assuming that cash inflow have occurred evenly through the year, the time required to recover Rs 1000 will be :

= $(1000/2000) \times 12$ months
= 6 months

Therefore the payback period is 3 years and 6 months

Accounting Rate of Return (ARR)

Accounting rate of return is the average net income an asset is expected to generate divided by its average capital cost, expressed as an annual percentage. The ARR is a formula used to make capital budgeting decisions. It is used in situations where companies are deciding on whether or not to invest in an asset (a project, an acquisition, etc.) based on the future net earnings expected compared to the capital cost.

This method of computing ARR is known as **Average investment method**, and uses the following formula:

$$ARR = \frac{\text{Average Annual Profits After Taxes}}{\text{Average Investment}} \times 100$$

Where, $\text{Average profits} = \frac{\text{Total Profits}}{\text{Life of the project}}$

The average profits after tax are determined by adding up the after-tax profits for each year of the project's life and dividing the results by the number of years. (In case of annuity, the average after-tax profits are equal to any year's profits)

$\text{Average investment} = \frac{\text{Net Investment}}{2}$

The average investment is calculated by dividing the net investment by two. This averaging process assumes that the firm is using straight line method of depreciation, in which case the book value of the asset decline at a constant rate from its purchase price to zero, at the end of its depreciable life. This means that on the average, firms will have half of their initial purchase price in the books.

Thus, $\text{Average investment} = \text{Net Working Capital} + \frac{1}{2} (\text{Initial cost of machine} - \text{Salvage Value})$

Illustration 1 A project requires an investment of Rs 500000 and has a scrap value of Rs 20000 after 5 years. It is expected to yield profits after depreciation and taxes during 5 years amounting to Rs 40,000, Rs 60,000, Rs 70,000, Rs 50,000 and Rs 20,000. Calculate the average rate of return on the investments

Solution: Total profit = Rs 40000+60000+70000+50000+20000
= Rs 2,40,000

Average profit = Rs 2,40,000 /5 years = Rs 48000

Net investment in the project = Rs 500000 – Rs 20,000(Scrap Value)
= Rs 4,80,000

Average rate of return = $\frac{\text{Average Annual profit}}{\text{Net investment in the project}} \times 100$

$$\begin{aligned} &= \frac{48,000}{4,80,000} \times 100 \\ &= 10\% \end{aligned}$$