

## **Evaluation Criteria**

A wide range of criteria are available to judge the worthwhileness of investment projects. The important investment criteria are classified into two broad categories – discounting criteria and non-discounting criteria. The discounting criteria take into account the time value of money whereas the non-discounting criteria ignore the time value of money. The discounting criteria are Net present value, internal rate of return and profitability index. The non-discounting criteria are payback period and accounting rate of return.

### **Net Present Value**

The net present value of a project is the sum of the present values of all the cash flows – positive as well as negative – that are expected to occur over the life of the project. The formula of NPV is:

$$\text{NPV} = - \text{Initial investment}$$

Where,  $C_t$  is the cashflow at the end of the year  $t$

$n$  is the life of the project

$r$  is the discount rate.

#### **Accept or reject criterion:**

If NPV is positive, the project should be accepted. If NPV is negative the project should be rejected.

Accept or reject criterion can be summarized as given below:

1.  $\text{NPV} > \text{Zero} = \text{accept}$
2.  $\text{NPV} < \text{Zero} = \text{reject}$

### **Evaluation of NPV method**

#### **Merits:**

1. It takes into account the time value of money.
2. It considers cash flows occurring over the entire life of the project.
3. NPV method is consistent the goal of maximizing the net wealth of the company.
4. It analyses the merits of relative capital investments.

5. Since cost of capital of the firm is the hurdle rate, the NPV ensures that the project generates profits from the investment made for it.

#### **Demerits:**

1. Forecasting of cash flows is difficult as it involves dealing with the effect of elements of uncertainties on operating activities of the firm.
2. To decide on the discounting factor, there is the need to assess the investor's required rate of return. But it is not possible to compute the discount rate precisely.
3. There are practical problems associated with the evaluation of projects with unequal lives or under funds constraints.

#### **Benefit-Cost Ratio**

Benefit-cost ratio also called profitability index may be defined in two ways:

Benefit-cost ratio:  $BCR =$

Net benefit-cost ratio:  $NBCR = BCR - 1$

#### **Accept or Reject Criterion:**

1. Accept the project if BCR is greater than 1 or NBCR is greater than 0.
2. Reject the project if BCR is less than 1 or NBCR is less than 0.

#### **Evaluation of PI**

##### **Merits:**

1. It takes into account the time value of money
2. It is consistent with the principle of maximization of share holders wealth.
3. It measures the relative profitability.

##### **Demerits:**

1. Estimation of cash flows and discount rate cannot be done accurately with certainty.
2. A conflict may arise between NPV and profitability index if a choice between mutually exclusive projects has to be made.

#### **Internal Rate of Return**

The internal rate of return (IRR) of a project is the discount rate which makes its NPV equal to zero. Put, differently, it is the discount rate which equates the present value of future cash flows with the initial investment. It is the value of  $r$  in the following equation:

Investment =

Where,  $C_t$  is the cash flow at the end of the year  $t$ ,  $r$  is the internal rate of return (IRR) and  $n$  is the life of the project.

### **Accept or Reject Criterion:**

If the project's internal rate of return is greater than the firm's cost of capital, accept the proposal.

Otherwise reject the proposal.

### **Evaluation of IRR**

#### **Merits:**

1. IRR takes into account the time value of money
2. IRR calculates the rate of return of the project, taking into account the cash flows over the entire life of the project.
3. It gives a rate of return that reflects the profitability of the project.
4. It is consistent with the goal of financial management i.e maximization of net wealth of share holders
5. IRR can be compared with the firm's cost of capital.
6. To calculate the NPV the discount rate normally used is cost of capital. But to calculate IRR, there is no need to calculate and employ the cost of capital for discounting because the project is evaluated at the rate of return generated by the project. The rate of return is internal to the project.

#### **Demerits:**

1. IRR does not satisfy the additive principle.
2. Multiple rates of return or absence of a unique rate of return in certain projects will affect the utility of this technique as a tool of decision making in project evaluation.
3. In project evaluation, the projects with the highest IRR are given preference to the ones with low internal rates. Application of this criterion to mutually exclusive projects may lead under certain situations to acceptance of projects of low profitability at the cost of high profitability projects.
4. IRR computation is quite tedious.

### **PayBack Period**

Payback period is the length of time required to recover the initial cash outlay on the project.

#### **Accept or reject criterion**

According to the payback criterion, the shorter the payback period, the more desirable is the project. Firm using this criterion generally specify the maximum accepted payback period. If this is  $n$  years, projects with a payback period of  $n$  years or less are deemed worthwhile and projects with a payback period exceeding  $n$  years are considered unworthy.

#### **Evaluation of payback period:**

##### **Merits:**

1. Simple in concept and application.

2. Since emphasis is on recovery of initial cash outlay it is the best method for evaluation of projects with very high uncertainty.
3. With respect to accept or reject criterion pay back method favors a project which is less than or equal to the standard pay back set by the management. In this process early cash flows get due recognition than later cash flows. Therefore, pay back period could be used as a tool to deal with the ranking of projects on the basis of risk criterion.
4. For firms with shortage funds this is preferred because it measures liquidity of the project.

**Demerits:**

1. It ignores time value of money.
2. It does not consider the cash flows that occur after the pay back period.
3. It does not measure the profitability of the project.
4. It does not throw any light on the firm's liquidity position but just tells about the ability of the project to return the cash out lay originally made.
5. Project selected on the basis of pay back criterion may be in conflict with the wealth maximization goal of the firm.

**Discounted payback period:** A major shortcoming of the conventional payback period is that it does not take into consideration the time value of money. To overcome this limitation, the discounted payback period has been suggested. In this modified method cash flows are first converted into their present values (by applying suitable discounting factors) and then added to ascertain the period of time required to recover the initial outlay on the project.

**Accounting Rate of Return**

The accounting rate of return, also called the average rate of return, is defined as:

The numerator of this ratio may be measured as the average annual post-tax profit over the life of the investment and the denominator as the average book value of investment in the project.

**Accept or Reject criterion**

Obviously, the higher the accounting rate of return, the better the project. In general the projects that have an accounting rate of return equal to or greater than a pre-specified cut-off rate of return – which is usually between 20% and 30% - are accepted; others are rejected.

**Evaluation of Accounting rate of return**

**Merits:**

1. It is based on accounting information.
2. Simple to understand.
3. It considers the profits of entire economic life of the project.
4. Since it is based on accounting information the business executives familiar with the accounting information understand this technique.

**Demerits:**

1. It is based on accounting income and not based on cash flows, as the cash flow approach is considered superior to accounting information based approach.
2. It does not consider the time value of money.
3. Different investment proposals which require different amounts of investment may have the same accounting rate of return. The ARR fails to differentiate projects on the basis of the amount required for investment.

4. ARR is based on the investment required for the project. There are many approaches for the calculation of denominator of average investment. Existence of more than one basis for arriving at the denominator of average investment may result in adoption of many arbitrary bases. Because of this the reliability of ARR as a technique of appraisal is reduced when two projects with the same ARR but with differing investment amounts are to be evaluated.