Methods or Technique of Capital Budgeting

In most business firms there are more proposals for projects than the firm is able and willing to finance. Some of these proposals are good while others are poor. In view of the utmost importance of the capital budgeting decision, a sound appraisal should be undertaken to measure the economic worth of each of these proposals. A screening process has to be devised for finding out the real content of such proposals. Following are the important methods or technique of capital budgeting Technique of Capital Budgeting:

1. Pay-back Method.

2. Average Rate of Return Method.

3. Discounted Cash Flow Method.

1. Pay - Back Method

Pay back method, also known as pay-out /or pay-off period method, is a simple technique for taking capital budgeting decision. Under this method the investment decision is based on pay-back period. The payback period is the period within which the investment in capital asset will be recovered out of annual savings arising out of investment decision? For example, if a machine is acquired for Rs.1, 50,000 and it fetches Rs. 30,000 as income in the first year, Rs. 60,000 in the second year and Rs. 60,000 in the third year. The total cost of machine will be recovered fully within 3 years hence the payback period is 3 years, me payback period is calculated by following formula

Payback period = Cash outlay (investment) / Annual cash inflow

(Note: Net Cash Inflow refers to earning from investment before charging interest and depreciation but after charging taxes)

All alternative investment proposals are ranked according to the payback period and only that alternative is approved which has relatively lesser payback period.

Advantages

1. It is easy to understand and simple to operate.

2. It is suitable if the firm facing shortage of funds because it gives importance to investments which do speedy recovery of funds.

3. It is suitable if there is a fear of project being obsolete in short period of time.

4. It is suitable for industries where rapid technological changes take place.

5. It is suitable for evaluating the projects where the returns (or savings) beyond three or four years are uncertain hence cannot be considered in making decision.

Disadvantages

1. This method gives undue emphasis on fast recovery of invested fund ignoring the profitability of investments. It ignores the income from investment beyond payback period hence it may lead to wrong decisions.

2. It ignores the 'interest factor' which is very important factor in making investment decisions.

3. It causes management to overlook many profitable investment opportunities because they are slow starters and only gather momentum after few years of operation.

4. It gives importance to return of cash rather than return of profits on investment.

5. It does not make correct appraisal of investments because it does not consider the full economic life of the project but only its early years. Inspite of all these limitations, this method is popularly used in industries where technological changes are frequent, future is uncertain and risk of obsolescence is more, necessitating the prompt pay back of investment in projects.

2. Return on Investment Method

This method is also known as unadjusted Return on Investment Method or Financial Statement Method or Average Rate of Return Method or Accounting Method. Under this Method an attempt is made to measure the rate of return on investment in a project when initial investment is taken into account for calculation it is called Return on Investment (ROI) and when average investment is considered for calculation purpose it is called Average Rate of Return Method (ARR)

ARR= Average income/Average Investment

Advantages

1. It is easy to understand & simple to operate.

2. It takes into account the earning of project over entire period of its economic life.

3. It recognizes the concept of net earnings (i.e., earnings after providing depreciation on capital asset.) which is of vital importance in appraisal of investment proposal.

4. It makes realistic comparison between different projects than the pay back method.

Disadvantages

1. The main disadvantage of this method is that it treats a rupee to be received in future as equal (in value) to a rupee received today. In other words, it neglects the 'interest factor' or 'time value of money' from calculation which leads to a serious mistake in calculations.

2. The variants used in formula have different interpretations. The “earning” may mean earnings before depreciation or after depreciation. Similarly, 'investment' may mean Initial investment or average investment. As a result, different rates of return may be produced leading to confusion.

3. Under this method of ranking the investment proposals a minimum rate of return is always fixed and investments yielding a return higher than this minimum are approved. But determination of this minimum rate of return is arbitrary & left to the discretion of management.

3. The Present Value Method or Discounted Cash-flow Method

This method considers the present value of the net cash benefits at a rate equal to the firm's cost of capital. “The present value of an investment is the maximum amount a firm could pay for the opportunity of making the investment without being financially worse off” Thus, the basic ideology of this method is that Rs.100 of today is not equal to Rs.100 to say 1 or 2 years hence, as the amount increases with interest 238 earned. Under this method we calculate the present worth of earnings (after taxes but before depreciation) after discounting them at a rate of interest which is appropriate to the cost of capital. The timing of cash receipts, rate at which future earnings are to be discounted and the normal rate of return are taken into consideration. The profitability of the projects is studied by comparing the discounted earnings with the cost of investment. If the present value is greater than the cost of investment, the proposal should be accepted and if it is smaller, the proposal should be rejected.

There are two methods:

1) Trial and Error Method and
2) Net Present Value or Net Gain Method.

1. **Trial and Error Method of Internal Rate of Return Method**: This method tries to find out such rate of interest, as it is likely to reduce the net cash flows to its present worth. The internal rate of return is defined as 'the interest that equates the present value of the expected future receipts to the cost of investment outlay.' This rate of interest is traced out by 'trial and error' method i.e. different rates to be tried; taking the first arbitrary rate and rate which ultimately equates the present value with the cost is treated as internal rate of interest.

2. **Net Present Value or Net Gain Method**: The amount of net gain is arrived at as under:

The present value of cash flow

Less: present value of net investment

The present value of cash flow is arrived at by selecting an appropriate rate of interest. However, selection of a appropriate rate is not an easy task. If there is net gain, the project can be accepted and if there is net loss, the project should be rejected.

The equation for the net present value, assuming that all cash outflows are made in the initial year (tg), will be:

$$NPV = \left[\frac{A_1}{(1+k)^1} + \frac{A_2}{(1+k)^2} + \frac{A_3}{(1+k)^3} + \ldots\ldots + \frac{A_n}{(1+k)^n}\right] - C$$

$$= \sum \frac{A_1}{(1+k)^t} - C$$

$$= t = 1$$

Where A1, A2…. represent cash inflows, K is the firm's cost of capital, C is the cost of the investment proposal and n is the expected life of the proposal. It should be noted that the cost of capital, K, is assumed to be known, otherwise the net present, value cannot be known.

NPV = PVB – PVC

Where,

PVB = Present value of benefits

PVC = Present value of Costs

Advantages

1. The method takes into account the time factor. Some assets yield more returns in early period and less later on or vice versa, while other asset may be expected to earn equal proceeds. The duration of earnings period of each asset is different. Under these cases, the discounted cash flow method is the only one to guide regarding the profitability of capital expenditure projects.

2. The method considers the entire economic life of an asset as also income there from.

3. Projected returns on investment can be compared with the cost of borrowing money.

Disadvantages

1. The method is different and complicated, involving good deal of calculations.

2. Economic life of an investment cannot be judged accurately.

3. Selection of an appropriate rate of interest is not an easy task.

Profitability Index (PI):

Profitability index is the ratio which relates the present value of earnings with the investment value.

The formula of the Profitability Index (PI) is:

$$Profitability\ Index = \frac{Discounted\ Cash\ Inflow}{Discounted\ Cash\ Outflow}$$

Or,

$$Profitability\ Index = \frac{\sum_{t=1}^{n} \frac{A_1}{(1+k)^t}}{C}$$

To denote the Profitability Index in percentage, **Profitability Ratio** of a new project is calculated. Its formula is:

$$Profitability\ Ratio = \frac{\sum_{t=1}^{n} \frac{A_1}{(1+k)^t}}{C} \times 100$$

Internal Rate of Return (IRR):

The internal rate of return determines the rate at which the investment amount is recovered by the cash inflows. The net present value of the project is zero in this method. Also, the discounted cash inflow and outflow are the same.

Initially, the Present Value of Cash Outflow (Co) is calculated as follows:

$$C_O = \frac{C_1}{(1+r)^1} + \frac{C_2}{(1+r)^2} + \frac{C_3}{(1+r)^3} + \cdots + \frac{C_n}{(1+r)^n}$$

Where Co is the present value of cash outflow;

C1, C2, C3 are the cash inflows in the consecutive years;

n is the number of years;

r is the expected rate of return.

This is the *cutoff rate* of the project.

The Internal Rate of Return (IRR) formula is:

$$IRR = Lower\ Rate + [\frac{NPV_{LR}}{NPV_{LR} + NPV_{HR}}] \times (Higher\ Rate - Lower\ Rate)$$

Where NPV (LR) is the net present value at a lower rate;

NPV (HR) is the net present value at a higher rate.

Analysis: If the IRR ≥ Co, the project is accepted; but if IRR < Co, the project is rejected.