

Accounting for Financial and Managerial Decision and Control [AFMDC]

Unit 13

Investment Decision Under Condition of Certainty

Structure

- Concept, need and objectives of investment analysis
- Concept, need, computation and analysis of evaluation techniques: net present value, profitability index and internal rate of return

After the completion of this unit, you should be able to:

- Understand the concept and meaning of investment analysis
- Demonstrate the need and importance of capital budgeting
- Explain the different types of investment proposals
- Estimate cash flows: initial cash outlay (net investment), annual cash flow and final year cash flow
- Evaluate the investment proposals by using net present value, profitability index and internal rate of return

13.1 Concept and meaning of capital budgeting (investment analysis)

An airline business organization is considering investment in additional fleet of jets, a manufacturing industry is planning to buy new plant for replacing an old plant, a commercial bank is thinking to introduce the highly sophisticated advance computerisation programme. Is it technically and financially viable for all above decision problems for making additional investment? All these situations involve a capital expenditure decision or capital budgeting.

Capital budgeting is the decision-making regarding long-term assets or fixed assets which are in operation and yield returns over a period of time exceeding one year. Capital expenditure is a cash outlay which is expected to generate benefits that extends beyond one year. Thus capital budgeting involves a decision regarding current outlay of funds with the expectation to yield results in the future years. So that the purpose of capital budgeting is to evaluate expenditure decisions involving current outlays with the probability to produce benefits over a longer period usually exceeding one year. Such benefits may either be in the form of enhanced revenues or reduced costs. In this way, the scope of capital budgeting is to spread addition, disposition, modification, new project, mutually exclusive projects and even replacement of fixed assets.

13.2 Importance of capital budgeting

The following points highlight the importance of capital budgeting:

1. These decisions affect the profitability
2. It affects the enterprise's future cost structure
3. These decisions once taken are not reversible without much financial loss

4. It involves costs and has a bearing on scarce capital (commitment of large amount of fund) and
5. They have long-term implications for the enterprise and can influence its risk complexion.

13.3 Need of capital budgeting

1. Involvement of Heavy Funds
2. Long-term Commitments of Funds
3. They are not Reversible
4. Difficulties of Investment Decision
5. Long-term Effect on Profitability

13.4 Types of investment proposal

Capital expenditure can be classified as follows:

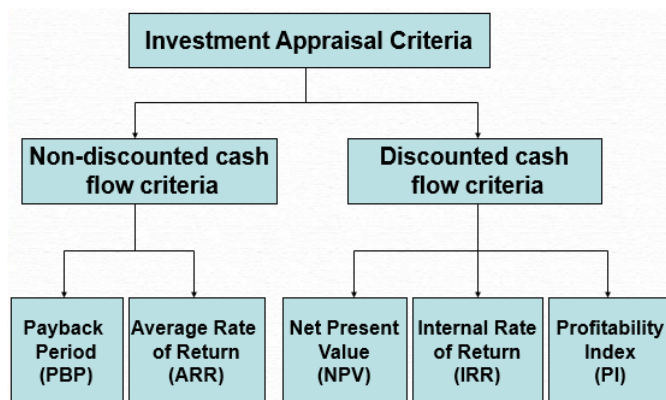
1. Mutually exclusive investments
2. Independent investments
3. Contingent investments
4. Replacement

13.5 Methods of investment proposal appraisal

Is the investment project worthwhile? Every individual, capital expenditure decision needs to be thoroughly analysed first as it has long-term repercussions. This is the essence of efficient capital expenditure management. A wide range of project evaluation criteria has been suggested to judge the worthwhileness of investment projects. The important investment appraisal criteria classified into two broad categories – non discounted and discounted criteria are as follows:

1. Non-discounted Cash Flow Criteria or Traditional Method
 - i. Payback Period
 - ii. Average Rate of Return
2. Discounted Cash Flow Criteria
 - i. Net Present Value.
 - ii. Profitability Index or Benefit Cost Ratio.
 - iii. Internal Rate of Return.

It can be shown in the figure below and subsequent sections describe and evaluate these criteria in some details.



13.6 Payback Period

The payback period is the expected number of years required to recover the original investment. This is the most popular and widely accepted method to evaluate capital budgeting project. The exact payback period for even cash flow or uneven cash flow can be found as follows:

$$\text{Payback Period} = \text{Year before Fully Recovery} + \frac{\text{Unrecovered Cost at Start of Year}}{\text{Cash Flow During the Year}}$$

Rule of Acceptance

The shorter the payback period, the better it will be. A project will be accepted if the calculated payback period is less than standard payback period set by management. The project will be rejected if it is otherwise. When the management is to choose between two mutually exclusive projects, the project with shortest payback will be selected as it gives back the original investment within the shortest possible time.

Merits of Payback Period

1. It is simple to understand, follow and easy to calculate.
2. As compared to other techniques, it requires less time to calculate and does not require using sophisticated equipments.
3. It highlights the liquidity aspect of the project.

Shortcomings of Payback Period

1. It does not take any recognition of cash inflows after the payback period.
2. It fails to consider the timing and magnitude of cash inflows and thus it gives equal weight to equal amount even though they occur in different time periods. In other words, we can say that it ignores the time value of money.
3. Deciding a maximum payback period is a subjective decision as there is no rational basis for setting the maximum acceptable payback period.
4. It does not consider salvage value of assets at the end of its useful life.

13.7 Average Rate of Return

The average rate of return, also called the accounting rate of return involves accounting profits (i.e. net profit after tax) not cash flows and is similar to the performance measure of return on capital employed. It can be calculated as below:

$$\text{Average Rate of Return} = \frac{\text{Average Annual Net Profit after Tax}}{\text{Average Investment Over the Life of the Project}} \times 100$$

Where,

$$\text{Average Net Profit after Tax} = \frac{\text{Total Net Profit after Tax of all Years}}{\text{Number of Years}}$$

$$\text{Average Investment} = \frac{\text{Initial Investment} + \text{Salvage Value if Any}}{2}$$

Rule of Acceptance

If the average rate of return is equal or more than the pre-determined rate of return fixed by management, the project is accepted. The project is rejected if the average rate of return is less than the rate of return fixed by management.

Merits of Average Rate of Return

1. It is very simple and easy to follow and use
2. Using the accounting data, it can be easily calculated
3. The entire stream of income is used in calculating the average rate of return.

Shortcomings of Average Rate of Return

1. This method uses only accounting profits, not the net cash flows.
2. This method ignores the time value of money, as profits occurring in different periods are valued equally.
3. This method does not give any weightage to the length of project life period.
4. This method does not consider that the profits earned can be reinvested for return.

13.8 Net Present Value

Net present value method is one of the discounted cash flow techniques used for evaluating the investment projects. This method recognizes the time value of money. So the academic literature presents the net present value as the best all-round method of capital investment appraisal. It takes the time value of money into account by discounting the cash flows at the enterprise's cost of capital. After discounts, the differences arise between the present values of predicted cash inflows and the predicted cash outflows become net present value.

Rule of Acceptance

The net present value represents the benefit over and above the compensation of time and risk. So, it accepts the project if the net present value is positive and rejects the project if net present value is negative. If the net present value is zero, it is the matter of indifference. This method also helps us in making a selection in mutually exclusive projects by preferring the highest net present value criteria in investment.

Merits of Net Present Value

1. The most significant merit is that it recognizes the time value of money and thus it is scientific in approach.
2. It considers the total benefits arising out of the proposal over its lifetime.
3. This method of asset selection is very much suitable in achieving the objective of the shareholders' wealth maximization.

Shortcoming of Net Present Value

1. It is comparatively difficult to understand and use.
2. It is quite difficult to calculate the required rate of return to discount the cash flows.
3. In the case of the projects involving different outlays, the present value method may not give dependable results.
4. In the case of two projects having different effective lives, the present value method may also not give satisfactory results.

13.9 Profitability index

The profitability index method is also known as the benefit cost ratio. It is an extension of the net present value. Dividing the total present value of future cash inflow after tax by the present

value of initial cash outflow derives profitability index. The gross profitability index can be computed as under:

$$\text{Gross Profitability Index} = \frac{\text{Present Value of Future Cash Inflow after Tax}}{\text{Present Value of Initial Cash Outflow}}$$

Rule of Acceptance

If gross profitability index is greater than one, the project should be accepted as it will have the positive net present value. If gross profitability index is lesser than one, the project should be rejected as it will not be beneficial for the project. If mutually exclusive projects, preference should be given to the highest profitability index.

Merits of Profitability Index

1. This method takes into consideration the time value of money as the total benefits spread also throughout the lifespan of the project. It can be employed safely as sound investment evaluation criteria.
2. The profitability index method is a better evaluation technique than the net present value method in a situation of capital rationing.

Shortcomings of Profitability Index

Profitability index method does not suffer from the serious drawback. But it is difficult to understand and use in practice. It involves more calculations than the non-discounting cash flows but definitely less than that of internal rate of return.

13.10 Internal Rate of Return

Internal rate of return (IRR) is that cost of capital at which the net present value (NPV) of a project is exactly equal to Rs. 0. It gives us a breakeven view of a project that tells us the maximum cost of capital of the project. So internal rate of return can be defined as the rate that equates the present value of cash inflows with the present value of cash outflows and on such rate, the net present value of the investment is zero. This technique is also known as yield on investment, marginal efficiency of capital, marginal productivity of capital, rate of return, time-adjusted rate of return and so on. There are two basic approaches for calculating the IRR of project, graphically and by trial and error. We will study using trial and error below.

Determination of Internal Rate of Return

The following steps should be fulfilled for the determination of internal rate of return :

Step 1 :	To find out factor, dividing net investment by average cash flow, i.e. $\text{Factor} = \frac{\text{Net Investment}}{\text{Average Cash Flow}}$
Step 2 :	Locate the factor in annuity table on the line of period representing final year of the project and find out the rate which is equal or nearest to factor. Then compute total present value that rate.

Step 3 :	Compare total present value with net investment. If these are equal, the assumed rate is known as I.R.R. If those are not equal assume another rate and calculate total present value again.
Step 4 :	Take two total present value, one more than investment and another less than investment. Interpolate them and find out I.R.R.
Step 5 :	The maximum rate of return is acceptable among the mutually exclusive proposals. For the acceptability of the project, IRR should be greater than cost of capital.

Rule of Acceptance

If IRR is greater than required rate of return (or cost of capital or cut-off rate or hurdle rate), the project should be accepted. Obviously if the IRR is lower than the required rate of return, the project is rejected. If mutually exclusive projects, preference should be given to the highest IRR.

Merits of Internal Rate of Return

1. It takes into the account the time value of money.
2. The cash inflows over the entire life of the project are duly considered.
3. It makes sense to businessmen who are wanted to think in terms of the rate of return.
4. IRR method gives a good idea regarding the profitability of the project even in the absence of the cost of capital because it gives the maximum rate of return from the project.

Shortcomings of Internal Rate of Return

1. IRR method implies that intermediate cash inflows generated by the project are re-invested at the internal rate of the project that may not be convinced.
2. The IRR criteria can be misleading when choosing between mutually exclusive projects that have substantially different in their (i) size, (ii) time and (iii) life.
3. Under certain cases, it gives multiple rates which can be confusing.

References

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