

FINANCIAL MANAGEMENT

14 XB 205

UNIT II

INVESTMENT DECISION

Topics to be Covered are:

- ✓ Capital Budgeting Decision
- ✓ Evaluation Techniques or Methods
 - Payback (PB) Period
 - Average Rate of Return (ARR)
 - Net Present Value (NPV)
 - Internal Rate of Return (IRR)
 - Net Terminal Value Method
 - Profitability Index (PI)

Nature of Investment Decisions

- The investment decisions of a firm are known as the **capital budgeting**, or **capital expenditure decisions**.
- A capital budgeting decision - firm's *decision to invest its current funds most efficiently in the long-term assets* in anticipation of *benefits over a series of years*.
- The long-term assets are those that affect the firm's operation beyond the one-year period.
- The firm's investment decisions include **Revenue Expansion & Cost Reduction** – (expansion, acquisition, modernization and replacement of the long-term assets).

Overview of Capital Budgeting

- **Capital budgeting** is the process of evaluating and selecting long-term investments that are consistent with the firm's goal of wealth maximization.
- A **capital expenditure** is an outlay of funds by the firm that is expected to produce benefits over a period of time *greater than* 1 year.
- An **operating expenditure** is an outlay of funds by the firm resulting in benefits received *within* 1 year.



Types of Capital Budgeting Decisions

The business firms are confronted with three types of capital budgeting decisions.

(i) The accept-reject decisions

(ii) mutually exclusive decisions

(iii) capital rationing decisions

1. Accept-Reject Decisions

- Business firm is confronted with alternative investment proposals.
- All those investment proposals which *yield a rate of return greater than cost of capital* are accepted and the others are rejected.
- Under this criterion, all the independent proposals are accepted.

2. Mutually Exclusive Decisions

- It includes all those projects which *serve the same purpose and compete with each other* in a way that acceptance of one eliminates the acceptance of other or others.
- The alternatives are mutually exclusive and *only one may be chosen*.
- The *acceptance of best alternative automatically eliminates the other alternatives*.

3. Capital Rationing Decisions

- Capital budgeting decision is a simple process in those firms where fund is not the constraint but for the firms those have fixed capital budget. So *large amount of projects compete for these limited budgets.*
- Capital rationing refers to the situations where the firm has more acceptable investment requiring greater amount of finance than is available with the firm.
- It is concerned with the selection of a group of investment out of many investment proposals ranked in the descending order of the rate or return.

Importance of Investment Decisions

- They influence the firm's growth in the long run
- They affect the risk of the firm
- They involve commitment of large amount of funds
- They are irreversible, or reversible at substantial loss
- They are among the most difficult decisions to make

Capital Budgeting Process

The **capital budgeting process** consists of five steps:

1. ***Proposal generation:*** Proposals for new investment projects are made at all levels within a business organization and are reviewed by finance personnel.
2. ***Review and analysis:*** Financial managers perform formal review and analysis to assess the merits of investment proposals.
3. ***Decision making:*** Firms typically delegate capital expenditure decision making on the basis of fund limits.
4. ***Implementation:*** Following approval, expenditures are made and projects implemented. Expenditures for a large project often occur in phases.
5. ***Follow-up:*** Results are monitored and actual costs and benefits are compared with those that were expected. Action may be required if actual outcomes differ from projected ones.

Evaluation Techniques

There are different methods adopted for capital budgeting.

1. The traditional Techniques

- a) Payback period (PB)
- b) Accounting rate of return method (ARR)

2. The Discounted Cash Flow (DCF) Methods / Time-Adjusted Methods

- a) Net Present Value Method (NPV)
- b) Internal Rate of Return Method (IRR)
- c) Net Terminal Value Method (NTV)
- d) Profitability Index Method (PI)

The Traditional Techniques

1. Accounting Rate of Return Method (ARR)

- The average rate of return (accounting rate of return) measures the average income as a percent of the average investment.

$$\text{Average Rate of Return} = \frac{\text{Estimated Average Annual Income}}{\text{Average Investment}}$$

- Assuming straight-line depreciation, the average investment is computed as follows:

$$\text{Average Investment} = \text{Net Working Capital} + \text{Salvage Value} + \frac{\text{Cost of Machine} - \text{Salvage Value}}{2}$$

Accept - Reject Rule

- Accept the project only if its ARR is equal to or greater than the required accounting rate of return.
- Reject the project only if its ARR is lesser than the required accounting rate of return.
- In case of mutually exclusive projects, accept the one with highest ARR.

- *Advantages*

- ✓ It is easy to compute.
- ✓ It includes the entire amount of income earned over the life of the proposal.
- ✓ It emphasizes accounting income, which is often used by investors and creditors in evaluating management performance.

- *Disadvantages*

- ✓ It does not directly consider the expected cash flows from the proposal.
- ✓ It does not directly consider the timing of the expected cash flows.
- ✓ It does not differentiate between the size of the investment required for each project.

2) Payback Period

- Is the time required for a firm to recover its original investment.
- Payback period tells how long it will take a project to break even.
- In case they are even, the formula to calculate payback period is:

$$\textit{Payback period (PB)} = \textit{Original investment} \div \textit{Annual cash flows}$$

- When cash inflows are uneven, we need to calculate the cumulative net cash flow for each period.

Accept - Reject Rule

- Accept project if payback period $<$ maximum acceptable payback period.
- Reject project if payback period $>$ maximum acceptable payback period.
- Mutually Exclusive Projects: The project with the shortest payback ranks first

- *Advantages*

- ✓ Payback period is very simple to calculate.
- ✓ It can be a measure of risk inherent in a project. Since cash flows that occur later in a project's life are considered more uncertain, payback period provides an indication of how certain the project cash inflows are.
- ✓ For companies facing liquidity problems, it provides a good ranking of projects that would return money early.

- *Disadvantages*

- ✓ Payback period does not take into account the time value of money.
 - ✓ It does not take into account, the cash flows that occur after the payback period.
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The Discounted Cash Flow (DCF) Methods

/ Time-Adjusted Methods

- Considers time-value of money while evaluating the cost and benefits of the projects
- Cash flows are discounted at certain rate (Cost of Capital, K)
- CoC is the minimum discount rate earned on a project
- Considers the costs and benefits occurring during the entire life of the project

1) Net Present Value (NPV) Method

- Net Present Value (NPV) is the difference between the present value of cash inflows and the present value of cash outflows.
- Net Present Value(NPV) is used to determine the present value of an investment by the discounted sum of all cash flows received from the project.

$$NPV = PVB - PVC \quad (\text{Or}) \quad \sum_{t=1}^n \frac{C_t}{(1+k)^t} - C_0$$

where,

PVB = Present value of benefits

PVC = Present value of Costs

Accept - Reject Rule

- Accept the project only if its NPV is positive.
- Reject the project having negative NPV.
- If NPV is zero then it means you're paying exactly what the asset is worth.
- While comparing two or more exclusive projects having positive NPVs, accept the one with highest NPV.

- *Advantages*

- ✓ NPV gives important to the time value of money.
- ✓ In the calculation of NPV, both after cash flow and before cash flow over the life span of the project are considered.
- ✓ Profitability and risk of the projects are given high priority.
- ✓ NPV helps in maximizing the firm's value..

- *Disadvantages*

- ✓ NPV is difficult to calculate and use.
- ✓ NPV can not give accurate decision if the amount of investment of mutually exclusive projects are not equal.
- ✓ It is difficult to calculate the appropriate discount rate.
- ✓ NPV may not give correct decision when the projects are of unequal life.

2) Internal Rate of Return (IRR) Method

- Is the rate of interest (discount rate) at which the present value of expected cash inflows from a project Equals the present value of expected cash outflows of the project.
- IRR is the discount rate (or rate of return) at which the net present value is zero.
- *By setting the NPV formula to zero and treating the rate of return as the unknown*, the IRR is given by:

$$\sum_{t=1}^n \frac{C_t}{(1+k)^t} - C_0 = 0$$

Accept - Reject Rule

- A project is accepted if the internal rate of return exceeds the required rate of return (k).

➤ If $IRR > RRR \implies$ Accept

➤ If $IRR = RRR \implies$ Accept

➤ If $IRR < RRR \implies$ Reject

- *Advantages*

- ✓ Perfect Use of Time Value of Money Theory.
- ✓ All Cash Flows are Equally Important .
- ✓ Uniform Ranking .
- ✓ Maximum profitability of Shareholder. ($IRR > \text{cut off rate}$)

- *Disadvantages*

- ✓ To understand IRR is difficult .
- ✓ Unrealistic Assumption.
- ✓ Not Helpful for comparing two mutually exclusive investment.

3) Profitability Index (PI)

- The profitability Index (PI) - the ratio of discounted benefits over the discounted costs. That is the *ratio of discounted sum of cash inflow to the discounted sum of cash outflow*.

- It is an evaluation of the profitability of an investment and can be compared with the profitability of other similar investments which are under consideration. Profitability Index =
$$\frac{\sum_{t=0}^n \frac{\text{Benefit}_t}{(1+i)^t}}{\sum_{t=0}^n \frac{\text{Cost}_t}{(1+i)^t}} \quad (\text{Or}) \quad \text{PI} = \text{PVB} / \text{PVC}$$

i = the interest rate per period (discount rate).

n = the number of periods.

- The profitability index is also referred to as *benefit-cost ratio, cost-benefit ratio, or capital rationing*.

Accept - Reject Rule

- *Accept* if a project has a profitability index *greater than 1*
- *Reject* if a project has a profitability index *lesser than 1*
- The value of *1 is the point of indifference* regarding whether to accept or reject the project.
- *NPV vs PI*: In terms of net present value, a ratio greater than 1 means that the project's NPV is positive and it should be accepted, and a value lower than 1 means a negative NPV.

- *Advantages*

- ✓ The profitability index tells about an investment increasing or decreasing the firm's value.
- ✓ It takes into consideration all cash flows of the project.
- ✓ It takes the time value of money into consideration.
- ✓ It considers the risk involved in future cash flows with the help of cost of capital.
- ✓ It is also helpful in ranking and picking projects while rationing of capital.

- *Disadvantages*

- ✓ An estimate about the cost of capital is required. Estimates may be biased and thus be inaccurate.
 - ✓ It is difficult to calculate profitability index if two projects having different useful life.
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4) Modified Internal Rate of Return / Net Terminal Value

(TV)

- Terminal value is the value of a security or a project at some future date beyond which more precise cash flows projection is not possible.
- It is also called *horizon value or continuing value*.
- The assumption behind the TV approach is that each cash inflow is reinvested in another asset at a certain rate of return from a moment it is received until the termination of the project.

$$\text{NTV} = \text{PVTS} - \text{PVO}$$

Where,

PVTS - Present value of the sum total of the compounded reinvested cash inflows (PVTS)

PVO - Present value of the outflows

Accept - Reject Rule

- Accept if the project has the positive NTV
- Reject if the project has the negative NTV
- *NPV vs NTV*: In NPV method values are discounted whereas in NTV method values are compounded.