**ECO 403: FINANCE**

**Group B: Financial Economics**

**Topic 4: Techniques of Capital Budgeting**

Capital budgeting is the method of determining the feasibility to long-term investments on purchase or replacement of property plant and equipment, new product line or other projects.

Capital budgeting is an essential tool in financial management. Capital budgeting provides a wide scope for financial managers to evaluate different projects in terms of their viability to be taken up for investments. It helps in exposing the risk and uncertainty of different projects. It helps in keeping a check on over or under investments. The management is provided with an effective control on cost of capital expenditure projects. Ultimately the fate of a business is decided on how optimally the available resources are used

Capital budgeting consists of various techniques used by managers such as:

1. [Payback Period](https://xplaind.com/849768/payback-period)
2. [Discounted Payback Period](https://xplaind.com/572953/discounted-payback-period)
3. [Net Present Value](https://xplaind.com/478294/npv)
4. [Accounting Rate of Return](https://xplaind.com/393885/arr)
5. [Internal Rate of Return](https://xplaind.com/484996/irr)
6. [Profitability Index](https://xplaind.com/946228/profitability-index)

All of the above techniques are based on the comparison of cash inflows and outflow of a project however they are substantially different in their approach.

* **Payback Period** measures the time in which the initial cash flow is returned by the project. Cash flows are not discounted. Lower payback period is preferred.
* **Net Present Value (NPV)** is equal to initial cash outflow less sum of discounted cash inflows. Higher NPV is preferred and an investment is only viable if its NPV is positive.
* **Accounting Rate of Return (ARR)** is the profitability of the project calculated as projected total net income divided by initial or average investment. Net income is not discounted.
* **Internal Rate of Return (IRR)** is the discount rate at which net present value of the project becomes zero. Higher IRR should be preferred.
* **Profitability Index (PI)** is the ratio of present value of future cash flows of a project to initial investment required for the project.

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

## Example

|  |  |  |  |
| --- | --- | --- | --- |
|  | Project A |  | Project B |
| Cost | 1,00,000 |  | 1,00,000 |
| Expected future cash flow |  |  |  |
| Year 1 | 50,000 |  | 1,00,000 |
| Year 2 | 50,000 |  | 5,000 |
| Year 3 | 1,10,000 |  | 5,000 |
| Year 4 | None |  | None |
| TOTAL | 2,10,000 |  | 1,10,000 |
| Payback | 2 years |  | 1 year |

Payback period of project B is shorter than A, but project A provides higher returns. Hence, project A is superior to B.

**Accounting rate of return method (ARR):**

This method helps to overcome the disadvantages of the payback period method. The rate of return is expressed as a percentage of the earnings of the investment in a particular project. It works on the criteria that any project having ARR higher than the minimum rate established by the management will be considered and those below the predetermined rate are rejected.

**ARR= Average income/Average Investment**

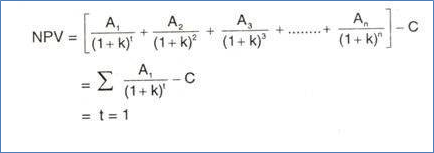
**Discounted cash flow method:**

The discounted cash flow technique calculates the cash inflow and outflow through the life of an asset. These are then discounted through a discounting factor. The discounted cash inflows and outflows are then compared. This technique takes into account the interest factor and the return after the payback period.

**Net present Value (NPV) Method:**

This is one of the widely used methods for evaluating capital investment proposals. In this technique the cash inflow that is expected at different periods of time is discounted at a particular rate. The present values of the cash inflow are compared to the original investment. If the difference between them is positive (+) then it is accepted or otherwise rejected.

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



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**

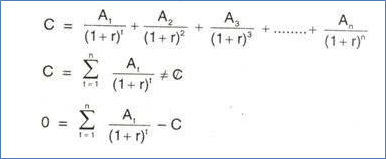
**PVC = Present value of Costs**

**Internal Rate of Return (IRR):**

This is defined as the rate at which the net present value of the investment is zero. The discounted cash inflow is equal to the discounted cash outflow.

It is called internal rate because it depends solely on the outlay and proceeds associated with the project and not any rate determined outside the investment.

It can be determined by solving the following equation:



**If IRR > WACC then the project is profitable.**

**If IRR > k = accept**

**If IR < k = reject**

**Profitability Index (PI):**

It is the ratio of the present value of future cash benefits, at the required rate of return to the initial cash outflow of the investment. It may be gross or net, net being simply gross minus one. The formula to calculate profitability index (PI) or benefit cost (BC) ratio is as under:

**PI = PV cash inflows/Initial cash outlay A,**



**PI = NPV (benefits) / NPV (Costs)**

**All projects with PI > 1.0 is accepted.**

## Importance of Capital Budgeting

1)**Long term investments involve risks.** That is why proper planning through capital budgeting is needed.

2)As the investments are huge but the funds are limited, proper planning through capital expenditure is a pre-requisite. Also, the capital investment decisions are irreversible in nature, i.e. once a permanent asset is purchased its disposal shall incur losses.

3) Capital budgeting reduces the costs as well as brings changes in the profitability of the company. Proper planning and analysis of the projects helps in the long run.