

Investment Appraisal

A) DEFINITION

This is the process of assessing whether it is worthwhile to invest funds in a project. Projects such as replacing Fixed Assets, introducing new products etc usually involve making a choice whether or not to proceed with the project, which assets to buy, which new products to introduce and so on.

B) NEW TERMS

1. **Sunk Costs** – expenditure incurred before a new project has been considered.
Example : machines that will be used in the new project but which were bought years ago.
SUNK COSTS DO NOT FORM PART OF INITIAL CAPITAL INVESTED IN A PROJECT. (SUNK COSTS ARE IGNORED IN ALL CALCULATIONS)
2. **Opportunity Costs** – this is the value of a benefit which will be sacrificed if a new project is undertaken. In other words, it is the cost of the next best alternative choice which was not chosen.
Example – if a machine has been earning \$40 000 in revenue. This revenue will be lost if the machine is used for a new project.
3. **Incremental Profits and Cash Flows** – these are the additional profits and cash flows resulting from a new project.

C) FINANCIAL TECHNIQUES OF APPRAISAL

The techniques you will learn in this section are only Financial – in other words they do not take into account the effects of a project on the environment (pollution); whether one machine is more dangerous to use than another; how quickly a machine can be delivered and installed etc.

1. Accounting rate of return (ARR)

$$\text{ARR} = \frac{\text{Average profit}}{\text{Average investment}} \times 100$$

Average profit is the *additional revenues* less the *additional expenses (including depreciation)*. **The average is the Total Profit divided by the number of years of the project**

Average investment is: $\frac{\text{amount of initial investment} + \text{scrap value}}{2}$

The return on capital from the project should be compared to the return on capital already invested by the business.

Advantages

1. easy to calculate
2. the expected profitability can be compared with the present profitability of the .business.

Disadvantages

1. the average profit is unlikely to be earned in any one year
2. the time-value of money is ignored
3. the timing of cash flows is ignored
4. the life expectancy of the project is ignored

2. Payback Period

This method calculates the length of time (years and months) it takes for Net Cash Receipts (cash inflow – cash outflow) to cover the initial capital invested in a project. The shorter the payback period the better.

NB depreciation (and any other non-cash items) does not enter into the calculations of the Payback Period as this method is only concerned with cash flows.

Advantages

1. simple to calculate
2. easy to see which project may be more risky
3. highlights the timing and size of cash flows
4. shorter payback periods result in increased liquidity for the business

Disadvantages

1. life expectancy of the project is ignored (cash flows after the payback period)
2. ignores the time value of money
3. two projects may have different cash flow patterns but the same payback period

3. Net Present Value (Discounted Cash Flow)

This method takes into account the time value of money by comparing future net cash receipts with the present capital outlay. A Net Present Value Table is used in this method (one will be provided in examination questions).

IMPORTANT

1. If the assets of the project are to be sold at the end of the project then the cash received from the sale must be included in the net receipts for the last year.
2. The discounting rate for net present values is the cost of capital (interest rate paid for borrowed capital ; or the dividend rate if shares were issued to finance the project).
3. If the NPV is a **positive figure** then the project warrants further investigation.

$$\text{NPV} = \text{Total of Discounted Cash Flows} - \text{Capital invested}$$

4. The higher the NPV the better.

4. Internal Rate of Return

The IRR is the percentage required to discount cash flows to give a NPV of ZERO. Once calculated, the IRR can be compared with then cost of capital.

If the cost of capital is lower than the IRR then the project should be accepted.

Method:

a) Choose two rates for discounting back future cash flows – one of the rates to give a positive NPV and another to give a negative NPV.

b) Calculate the NPV's at the rates in (a) above.

c) then apply the formula below:

$$\text{IRR} = \text{lower rate} + (\% \text{ difference between rates}) \times \frac{\text{NPV of lower rate}}{\text{Difference between the NPV's}}$$

D) SENSITIVITY ANALYSIS

The decision to accept or reject a future project is based on *estimated* Profitability and Cash Flows.

Inaccuracies in the estimates may be very misleading. Long time spans covered by projects and the large sums of money involved make reliable forecasts difficult to make. For this reason, acceptable margins of error should be recognized and set. Sensitivity Analysis indicates the maximum acceptable margin of error. It shows how sensitive the outcome of a project is to different costs and receipts.

Calculate the Total Discounted Cash Flow. Two margins can then be set:

1. The amount by which the capital invested may rise before it exceeds the Total Discounted Cash Flow (in other words the NPV amount).

2. The lowest amount which annual net cash receipts should be Capital invested divided by the NPV table rate.