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Paper

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Assignment :- Chapter #6.  
Net Present Value & Other Investment Rules

~~NPV~~ This chapter aims to explore the basic techniques & rules needed by an individual or institutional investor at the time of making an investment decision in a particular project.

The very first and main technique is the NPV (Net Present Value), then the PBP (Pay back Period), IRR (Internal Rate of Return), AAR (Average Accounting Rate), & PI (Profitability Index) are also explained.

The above techniques are also known as capital budgeting techniques.

Ex: NPV:- Net Present value is the decision-making process that either rejects or accepts a particular investment project. It is the difference between the present value of all the future cash flows and initial cash outflow of a project. Mathematically shown as:

$$NPV = \left( \sum \frac{F.V_i}{(1+i)^n} \right) - IC_0$$



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Basic rules for the NPV are as under;

- \* Accept the investment project if the NPV is greater than zero.
- \* Reject the project if the NPV is zero or negative.

xi PBP:- payback period is the amount of time in which our initial investment comes back to us. The payback period is used as an alternative to the NPV; in payback period, an investor sets a cut off time, so if the payback time of an investment is equal to or less than the cut off time the project will be accepted and vice versa.

~~However~~ the decision although the NPV & PBP techniques are said to be used alternatively, but the decisions made upon both of the techniques for a single project, are not identical because of several issues associated with simple payback technique. i.e

① Timing of cashflows within the same PBP.

This issue arise when two projects have



The same PBP results but different NPVs for example:-

project - ①

-140  
\$ 50  
\$ 40  
\$ 30  
\$ 20

payback period 4 years.

project - ②

-140  
\$ 20  
\$ 30  
\$ 40  
\$ 50

payback period 4 years.

The NPVs of the above projects are different because of difference of timing of the cash flows. So here PBP cannot be used alternatively to NPV.

② The second problem with PBP is that it does not consider the payments that ~~are~~ occur after the cut off time.

③ This is but the most important problem that exists in the PBP is that, it does not take the TVM (Time Value of Money) into consideration.



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\* Discounted payback period:-  
The discounted payback period technique is more reliable and can be used as an alternative to other investment techniques when needed. This technique discounts the cash flows to the initial investments.

\* AAR:- The Average Accounting Return method computes the average earnings of a project after deducting the tax and depreciation, and divides it by the average book value of the project. This technique was widely used among investors but this is really a technique full of flaws and misleads the investor.

Here first of all the <sup>periodic</sup> ~~average~~ net incomes of the project are added, <sup>and</sup> the tax & depreciation amounts are deducted. Then the derived amount is divided by the number of years in which the profit was realized. It makes the AVERAGE NET INCOME.



Then the average investment is calculated by adding the book's value of the investment at the end of each year and divided by total number of years.

When the above calculations get completed, divide the Average Net Income by Average Investment and get the AAR. Mathematically shown as follows.

$$\text{AAR} = \frac{\text{Average Net Income}}{\text{Average Investment}}$$

~~Internal Rate~~ IRR - Internal Rate of Return is a discount rate that equates NPV to zero. This rate is totally intrinsic to the project & does not depend on the market rates or calculations, the only thing that is needed for this rate is the internal information of the project. It has nothing to do with the market rates or calculations.



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The basic rationale behind IRR is that it provides a single number summarizing the merits of the project. For the IRR can be calculated through trial-and-error procedure.

The basic rule regarding IRR is as under;

- \* Accept the investment project if the IRR is greater than the discount rate.
- \* Reject the project if the IRR is less than the discount rate.

ix) PI :- The Profitability Index is another technique used to evaluate the project for investment purpose.

The profitability index is a ratio of the present value of all the future cash flows after initial investment and the total amount of the initial investment. Mathematically shown as under:

$$PI = \frac{\text{Present Value of C.F.s after investment}}{\text{initial investment}}$$



The Profitability Index is calculated as;

→ discount the cashflows subsequent to the initial investment.

$$\text{discounted C.F.s} = \frac{C_1}{1+i} + \frac{C_2}{(1+i)^2} + \frac{C_3}{(1+i)^3} + \dots + \frac{C_n}{(1+i)^n}$$

→ Divided the sum of the discounted C.F.s by the initial investment amount.

$$P.I = \frac{\sum \text{Discounted C.F.s}}{\text{initial investment}}$$

\* In case of the Independent Projects:-  
 → Accept an independent project if  $PI > 1$   
 → Reject the independent project if  $PI < 1$ .

\* Mutually exclusive projects:

problem arises with mutually exclusive projects where the NPV of a large project would be high but on the other hand, the PI of a small project will be greater than the PI of a large project. This problem arises because of the scale issues.

The PI ignores the scales of the projects as this is just a ratio. This problem can be overcome through incremental cash flows.



