



TenStep Supplemental Paper

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Net Present Value

The Net Present Value (NPV) is a discounted cash flow approach to the appraisal and selection of a project. It is also useful in capital budgeting decisions. The NPV of an investment proposal is the present value of net cash inflows, less the initial cash outflow of the project. It is also represented as:

$$\begin{aligned} NPV &= \frac{CF_0}{(1+k)^0} + \frac{CF_1}{(1+k)^1} + \frac{CF_2}{(1+k)^2} + \dots + \frac{CF_n}{(1+k)^n} \\ &= \sum_{t=0}^n \frac{CF_t}{(1+k)^t} \end{aligned}$$

Where:

- NPV = net present value
- CF_t = cash flow occurring at the end of year t (t = 0, 1, ...n)
- Cash inflow will have a positive or no sign and cash outflow will have a negative sign.
- n = life of the project
- k = cost of capital

To illustrate the calculation of NPV, consider the following project cash flow stream:

Year	Cash Flows (in \$)
0	-15,000,000
1	1,000,000
2	3,000,000
3	5,000,000
4	6,000,000
5	7,000,000

Now, if the cost of capital (k) is 10%, then the net present value of the project is:

$$\begin{aligned} NPV &= \frac{(-)15,00,000}{(1.10)^0} + \frac{1,00,000}{(1.10)^1} + \frac{3,00,000}{(1.10)^2} + \frac{5,00,000}{(1.10)^3} + \frac{6,00,000}{(1.10)^4} + \frac{7,00,000}{(1.10)^5} \\ &= \$58,953.40 \end{aligned}$$

Rationale of the NPV Method

If the NPV of any project is zero, it means that the return from the project is equal to the outflow of the project. There is no chance of making a profit from the project. A positive



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NPV indicates that the project earns more than its cash outflow and is profitable. In the case of a negative NPV, the implication is vice-versa.

Accept-reject rule

- The proposal for investment will be accepted if the NPV is positive, and rejected if the NPV is negative.
- If the NPV is zero, then the project is in an indifferent position.
- If a choice has to be made between two projects, the project with higher NPV will be accepted for investment.

Like other appraisal criteria, NPV has some benefits and drawbacks. The pros and cons are as follows:

Pros

- The most significant benefit of NPV is that it considers the time value of money in calculations.
- It considers the total benefit of an investment proposal over its lifetime.
- Changes in the discount rate are easily reflected in the evaluation process.
- NPV allows easy comparisons of returns from different projects, which enables rational resource allocation decisions to be made

Cons

- NPV cannot differentiate between a project with higher cash flows and a project with lesser cash flows in the early years
- It does not provide the same base for comparison between two projects with different lives of cash outflow
- It is an absolute measure and does not consider initial cash outlays. Therefore, it may not provide dependable results.