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Digital Area for Networking
Teachers and Educators



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Net present Value

NPV, PV Annuity factor, Adjusted NPV, Inflation impact



Outline

- **NPV**
- **Present Value Annuity factor**
- **Adjusted NPV**
- **The impact of inflation on investment appraisal using NPV**



NPV – meaning

- Net Present Value (NPV) is **the value of all future cash flows (positive and negative)** over the entire life of an investment **discounted to the present.**
- NPV analysis is a form of intrinsic valuation and is used extensively across finance and accounting for determining the value of a business, investment security, capital project, new venture, cost reduction program, and anything that involves cash flow.



NPV – formula

- NPV is the difference between the discounted cash receipts from an investment project and the discounted capital expenditures associated with the project:

$$NPV = \sum_{t=1}^n \frac{P_t}{(1+i)^t} - \sum_{t=1}^n \frac{K_t}{(1+i)^t}$$

- P_t – monetary income in individual years of life (CF+)
- K_t – monetary expenditure in individual years of life (CF-)
- i – required rate of return / hurdle rate (mind the risk premium)
- t – individual years of IP duration
- n – total years of IP duration



NPV – usage

- **NPV of a Business**

- To value a business, an analyst will build a detailed discounted cash flow DCF model in Excel. This financial model will include all revenues, expenses, capital costs, and details of the business. Once the key assumptions are in place, the analyst can build a five-year forecast of the three financial statements (income statement, balance sheet, and cash flow) and calculate the free cash flow of the firm (FCFF), also known as the unlevered free cash flow. Finally, a terminal value is used to value the company beyond the forecast period, and all cash flows are discounted back to the present at the firm's weighted average cost of capital. To learn more, check out CFI's free detailed financial modeling course.

- **NPV of a Project**

- To value a project is typically more straightforward than an entire business. A similar approach is taken, where all the details of the project are modeled into Excel, however, the forecast period will be for the life of the project, and there will be no terminal value. Once the free cash flow is calculated, it can be discounted back to the present at either the firm's WACC or the appropriate hurdle rate.



PV – Annuity Factor

- An ordinary annuity is a series of equal payments, with all payments being made at the end of each successive period = the sum of discounting factors for n periods:

$$PV \text{ Annuity Factor} = \frac{1 - (1 + i)^{-n}}{i}$$

- It is used to calculate the present value of the annuity stream to be made over the „n“ number of periods and at the required rate of return „i“.

NPV = Net Cash Flow x PV Annuity Factor – Discounted Capital Investment



Adjusted NPV

- The NPV of the project adjusted for the additional effects of debt financing, if the project is financed solely by equity and debt:
 - a) issuance of new shares (issuance costs)
 - b) debt financing by taking loans → higher interest rates, a company gets an interest tax shield
 - c) subsidy

$$ANPV = NPV \pm A$$

A – the present value of other financing benefits (or additional debt effects).



Adjustment for inflation in NPV

- Nominal method

Nominal discount rate = $(1 + \text{Real discount rate}) \times (1 + \text{Inflation rate}) - 1 = \text{Real disc. rate} + \text{Inflation rate}$

- Real method

Real discount rate = $(1 + \text{Nominal discount rate}) / (1 + \text{Inflation rate}) - 1 = \text{Nominal disc. rate} - \text{Inflation rate}$



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