

Answer on Question #44185 – Economics – Finance

Net present value (NPV) of a time series of cash flows, both incoming and outgoing, is defined as the sum of the present values (PVs) of the individual cash flows of the same entity. In the case when all future cash flows are incoming (such as coupons and principal of a bond) and the only outflow of cash is the purchase price, the NPV is simply the PV of future cash flows minus the purchase price (which is its own PV). NPV is a central tool in discounted cash flow (DCF) analysis and is a standard method for using the time value of money to appraise long-term projects.

Used for capital budgeting and widely used throughout economics, finance, and accounting, it measures the excess or shortfall of cash flows, in present value terms, above the cost of funds.

Given the (period, cash flow) pairs (t, R_t) where N is the total number of periods, the net present value NPV is given by:

$$NPV(i, N) = \sum_{t=0}^N \frac{R_t}{(1+i)^t}$$

But in our case the formula will change, as we have different required rates of return during three years, so

$$NPV = -R + R \cdot (1+r)^t / ((1+i_1) \cdot (1+i_2) \cdot (1+i_3)) =$$
$$= -200,000 + 200,000 \cdot (1+0.07)^3 / ((1+0.083) \cdot (1+0.085) \cdot (1+0.087)) = -8.18,$$

where t - number of periods, r - interest rate.

So, if we count inflation rate as personal required rate of return, NPV = -8.18 and this investment is profitless.