Net present value is the present value of the cash flows at the required rate of return of your project compared to your initial investment.

The net present value formula calculates NPV, which is the difference between the present value of cash inflows and the present value of cash outflows, over a period of time. Net present value (NPV) determines the total current value of all cash flows generated, including the initial capital investment, by a project.

$$NPV = \frac{\text{Cash flow}}{(1+i)^t} - \text{initial investment}$$

where:

$i = $ Required return or discount rate

$t = $ Number of time periods

Present value, PV $= \dfrac{\text{cash value at time period}}{(1+\text{rate of return})^{\text{time period}}}$

Present Value Formula

$$PV = \sum_{n=1}^{N} \frac{C_n}{(1+r)^n}$$

- N = Total number of time periods
- n = Time period
- Cn = Net cash flow at time period
- r = Internal rate of return

Example 1: An investor made an investment of $500 in property and gets back $570 the next year. If the rate of return is 10%. Calculate the net present value.

Solution

Given:

Amount invested = $500

Money received after a year = $570

Rate of return = 10% = 0.1

Using net present value formula,

Present value, PV = $\dfrac{\text{cash value at time period}}{(1+\text{rate of return})^{\text{time period}}}$

PV = $\dfrac{\$570}{(1+0.1)^1}$

PV = $570/1.1

PV = $518.18

Net Present Value = $518.18 − $500.00 = $18.18

Therefore, for 10% rate of return, investment has NPV = $18.18.

Example 2: Sam bought a house for $750,000 and sells it a year later for $990,000, after deducting any realtor's fees and taxes. Calculate net present value, if the rate of return is 5%.

Solution:

Given:

Investment on buying the house = $750,000

Monet received from sale a year later = $990,000

Rate of return = 5% = 0.05

Using net present value formula,

Present value, $PV = \dfrac{\text{cash value at time period}}{(1+\text{rate of return})^{\text{time period}}}$

$PV = \dfrac{\$990,000}{(1+0.05)^1}$

PV = $990,000/1.05

PV = $942,857.143

Net Present Value = $942,857.143 − $750,000 = $192,857.143

Therefore, for 5% rate of return, investment has NPV = $192,857.143

Project 1

- Initial investment: $10,000

- Discount rate: 10%

- Year 1: $5,000

- Year 2: $15,000

- Year 3: $9,000

- Year 4: $18,000

Let's calculate the present values for each year of the project:

Let's calculate the present values for each year of the project:

- Year 1: $5,000/(1 + .10)^1 = $4,545$

- Year 2: $15,000/(1 + .10)^2 = $12,397$

- Year 3: $9,000/(1 + .10)^3 = $6,762$

- Year 4: $18,000/(1 + .10)^4 = $12,294$

Find the summation of these present values and subtract the initial investment amount to find the net present value.

$$NPV = (\$4,545 + \$12,397 + \$6,762 + \$12,294) - \$10,000$$

$$NPV = \$25,998$$

Project 2

- Initial investment: $5,000

- Discount rate: 10%

- Year 1: $8,000

- Year 2: $16,000

Let's calculate the present values for each year of the project:

- Year 1: 8,000/(1 + .10)^1 = $7,273

- Year 2: 16,000/(1 + .10)^2 = $13,223

Here is the resulting formula after the present value is calculated for each cash flow and time period:

$$NPV = (\$7,273 + \$13,223) - \$5,000$$

$$NPV = \$15,496$$

https://blog.hubspot.com/sales/net-present-value

https://www.cuemath.com/net-present-value-formula/