

I'm teaching about NPV and IRR. Could you give the explanation of why we have to use them and give me a numerical example?

Net Present Value (NPV) and Internal Rate of Return (IRR) are two of the most common methods used by financial analysts to evaluate the expected return on investment for capital budgeting decisions. The NPV measures the difference between the present value of a series of future cash flows and the current cost of capital, expressed as the dollar value of the investment. The IRR is the rate of return that makes the NPV of a series of cash flows equal to zero.

When making capital budgeting decisions, NPV and IRR provide insight into the expected return of a given investment. When selecting between two alternative investments, the one with the higher NPV or the higher IRR should be chosen. This is because they offer more return to the investor.

Numerical Example:

Assume an initial investment of \$1000. Suppose an investment option has the following cash flows over 3 years:

Year 1: \$250

Year 2: \$450

Year 3: \$700

The NPV can be calculated by discounting the cash flows back to their present values:

Year 1: $\$250 / (1+r)$

Year 2: $\$450 / (1+r)^2$

Year 3: $\$700 / (1+r)^3$

Where r represents the required rate of return.

Suppose the required rate is 8%. The NPV calculation would be:

$$\text{NPV} = 250 / (1+0.08) + 450 / (1+0.08)^2 + 700 / (1+0.08)^3 = \$2.33$$

The IRR of an investment can be calculated by finding the rate of return that makes the NPV equal to zero. This can be done using a trial and error approach,

or by using a computer program.

In this case, suppose the IRR of the investment is 8%. This means the NPV of the investment should be zero. The calculations would look like this:

$$\text{NPV} = 250 / (1+0.08) + 450 / (1+0.08)^2 + 700 / (1+0.08)^3 = \$2.33$$

This shows that the required rate of return (8%) is the IRR of the investment.