Finance Essentials

An Intuitive Interpretation of Net Present Value

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Suppose a project requires an initial investment of \$5,000,000 and provides cash flows of \$2,300,000, \$2,645,000, and \$1,520,875 over the next three years, and the opportunity cost of capital for the project is 12%, then the project's NPV is calculated as:

$$\text{NPV} = -\$5{,}000{,}000 + \frac{\$2{,}300{,}000}{(1+12\%)} + \frac{\$2{,}645{,}000}{(1+12\%)^2} + \frac{\$1{,}520{,}875}{(1+12\%)^3} = \$244{,}678.02$$

What does it mean to say that the project's NPV is \$244,678.02? Here is an intuitively appealing explanation.

Since the opportunity cost of capital is 12%, let us calculate the amount of investment in the alternative opportunity which is offering a rate of return of 12% to replicate the future cash flows being generated by the project:

- An investment of \$2,053,571.43 at 12% will produce $\$2{,}053{,}571.43 \times (1+12\%) = \$2{,}300{,}000$ in year 1.
- An investment of \$2,108,577.81 at 12% will produce $\$2{,}108{,}577.81 \times (1+12\%)^2 = \$2{,}645{,}000$ in year 2.
- An investment of \$1,082,528.78 at 12% will produce $\$1{,}082{,}528.78 \times (1+12\%)^3 = \$1{,}520{,}875$ in year 3.

Therefore, the alternative investment opportunity requires an initial investment (cost, if you wish) of $\$2{,}053{,}571.43 + \$2{,}108{,}577.81 + \$1{,}082{,}528.78 = \$5{,}244{,}678.02$ to generate the same future cash flows that are being generated by the project for an investment of \$5,000,000. So, by going with the project to generate the same future cash flows, we are saving $\$5{,}244{,}678.02 - \$5{,}000{,}000 = \$244{,}678.02$.

Following this example, we can define NPV as the immediate savings from investing in the project rather than the alternative in order to generate the project's future cash flows. This interpretation of NPV is similar to the savings we create by shopping at one store rather than the competition. In this case of NPV, we are shopping for the future cash flows and the two stores are the project under consideration and the alternative opportunity whose return is being used as the opportunity cost.