

#### **What Are NPV and IRR?**

Net present value (NPV) is the difference between the present value of cash inflows and the present value of cash outflows over a period of time. By contrast, the internal rate of return (IRR) is a calculation used to estimate the profitability of potential investments.

Both of these measurements are primarily used in capital budgeting, the process by which companies determine whether a new investment or expansion opportunity is worthwhile. Given an investment opportunity, a firm needs to decide whether undertaking the investment will generate net economic profits or losses for the company.

NPV and IRR are two discounted cash flow methods used for evaluating investments or capital projects.

NPV is the dollar amount difference between the present value of discounted cash inflows less outflows over a specific period of time. If a project's NPV is above zero, then it's considered to be financially worthwhile.

IRR estimates the profitability of potential investments using a percentage value rather than a dollar amount.

Each approach has its own distinct advantages and disadvantages.

#### **Determining NPV**

To do this, the firm estimates the future cash flows of the project and discounts them into present value amounts using a discount rate that represents the project's cost of capital and its risk. Next, all of the investment's future positive cash flows are reduced into one present value number. Subtracting this number from the initial cash outlay required for the investment provides the net present value of the investment.

Let's illustrate with an example: suppose JKL Media Company wants to buy a small publishing company. JKL determines that the future cash flows generated by the publisher, when discounted at a 12 percent annual rate, yields a present value of \$23.5 million. If the publishing company's owner is willing to sell for \$20 million, then the NPV of the project would be \$3.5 million ( $\$23.5 - \$20 = \$3.5$ ). The NPV of \$3.5 million represents the intrinsic value that will be added to JKL Media if it undertakes this acquisition.

#### **Determining IRR**

So, JKL Media's project has a positive NPV, but from a business perspective, the firm should also know what rate of return will be generated by this investment. To do this, the firm would simply recalculate the NPV equation, this time setting the NPV factor to zero, and solve for the now unknown discount rate. The rate that is produced by the solution is the project's internal rate of return (IRR).

For this example, the project's IRR could—depending on the timing and proportions of cash flow distributions—be equal to 17.15%. Thus, JKL Media, given its projected cash flows, has a project with a 17.15% return. If there were a project that JKL could undertake with a higher IRR, it would probably pursue the higher-yielding project instead.

Thus, you can see that the usefulness of the IRR measurement lies in its ability to represent any investment opportunity's possible return and compare it with other alternative investments.

#### **Example: IRR vs NPV in Capital Budgeting**

Let's imagine a new project that has the following annual cash flows:

Year 1 = -\$50,000 (initial capital outlay)  
Year 2 = \$115,000 return  
Year 3 = -\$66,000 in new marketing costs to revise the look of the project.

A single IRR can't be used in this case. Recall that IRR is the discount rate or the interest needed for the project to break even given the initial investment. If market conditions change over the years, this project can have multiple IRRs. In other words, long projects with fluctuating cash flows and additional investments of capital may have multiple distinct IRR values.

Another situation that causes problems for people who prefer the IRR method is when the discount rate of a project is not known. In order for the IRR to be considered a valid way to evaluate a project, it must be compared to a discount rate. If the IRR is above the discount rate, the project is feasible. If it is below, the project is considered not doable. If a discount rate is not known, or cannot be applied to a specific project for whatever reason, the IRR is of limited value. In cases like this, the NPV method is superior. If a project's NPV is above zero, then it's considered to be financially worthwhile.

#### **Time value for money**

The time value of money (TVM) is the concept that money you have now is worth more than the identical sum in the future due to its potential earning capacity. This core principle of finance holds that provided money can earn interest, any amount of money is worth more the sooner it is received.