

## **Subject: Internal Rate of Return**

# What is IRR

- The internal rate of return allows investments to be analyzed for profitability by calculating the expected growth rate of an investment's returns and is expressed as a percentage.
- Internal rate of return is calculated such that the net present value of an investment yields zero, and therefore allows the comparison of the performance of unique investments over varying periods of time
- The internal rate of return's shortcomings derive from the assumption that all future reinvestments will take place at the same rate as the initial rate.
- Modified internal rate of return allows the comparison of the fund when different rates are calculated for the initial investment and the capital cost of reinvestment which often differ.
- When investments have cash flows that move up and down at various times in the year, the above models return inaccurate numbers, and the XIRR function within excel allows the internal rate of return to account for the date ranges selected and return a more accurate result.

# The IRR Formula

- $NPV = \sum_{t=0}^n \frac{CF_t}{(1+r)^t}$

**where:**  $CF_t$  = net after-tax cash inflow outflows during a single period

$r$  = internal rate of return that could be earned in alternative investments

$t$  = time period cash flow is received

$n$  = number of individual cash flows

Or this calculation could be broken out by individual cash flows. The formula for a project that has an initial capital outlay and three cash flows follows:

$$NPV = (1+r)^0 CF_0 + (1+r)^{-1} CF_1 + (1+r)^{-2} CF_2 + (1+r)^{-3} CF_3$$

# Why IRR is Important

The IRR helps managers determine which potential projects add value and are worth undertaking.

The advantage of expressing project values as a rate is the clear hurdle it provides. As long as the financing cost is less than the rate of potential return, the project adds value.

The disadvantage to this tool is that the IRR is only as accurate as of the assumptions that drive it and that a higher rate does not necessarily mean the highest value project in dollar terms.

Multiple projects can have the same IRR but dramatically different returns due to the timing and size of cash flows, the amount of leverage used, or differences in return assumptions.

IRR analysis also assumes a constant reinvestment rate, which may be higher than a conservative reinvestment rate.

# Limitations of IRR

- IRR allows managers to rank projects by their overall [rates of return](#) rather than their net present values. The investment or project with the highest IRR is usually preferred. This easy comparison makes IRR attractive, but there are limits to its usefulness:
- IRR works only for investments that have an initial cash outflow (the purchase of the investment) followed by one or more cash inflows. RR can't be used if the investment generates interim negative cash flows.
- IRR does not measure the absolute size of the investment or the return. This means that IRR can favor investments with high rates of return, even if the dollar amount of the return is very small.

For example, a \$1 investment returning \$3 will have a higher IRR than a \$1 million investment returning \$2 million. The latter, however, brings in \$1 million dollars (instead of just \$2).
- Overall, IRR is best-suited for analyzing venture capital and private equity investments. These typically have multiple cash investments and a single cash outflow at the end via sale.

# Difference between IRR and NPV

- IRR projects the rate of return that a project or investment can generate. . By contrast, net present value (NPV) measures how much value (in dollars) a project or investment could add.

- Both IRR and NPV can give analysts a clearer picture of projects or investments that can add the most value to an organization.

- Let's look back at the example from earlier:

The \$300,000 machine would return \$460,000 in additional profits ( $\$150,000 + \$150,000 + \$150,000 + \$10,000 = \$460,000$ ).

- Assuming a 5% discount rate and running the numbers through a NPV calculator the result is a net present value of \$116,714.23.

That NPV figure gives a dollar amount of value, providing more information to make a better-informed decision.

Thank You..