

**Module 1: Corporate Finance and the Role of Venture Capital Financing
Time Value of Money**

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3.0 Internal Rate of Return (IRR)

The Internal Rate of Return (IRR) of a particular cash flow series is the compound interest rate or discount rate that will cause the present value of the positive cash flows in the series to be equal to the present value of the negative cash flows in the same series. Stated another way, it is the interest rate that will cause the net present value (NPV) of the cash flow series to be equal to zero.

Example

If an investment of \$10,000 today (negative cash flow) is redeemed for \$11,000 (positive cash flow) one year from today, the IRR on the investment is 10%. The present value of \$11,000 received one year from today, discounted at 10% is \$10,000, which, when added to the negative cash flow investment of \$10,000, yields a net present value of \$0.

Most financial calculators and electronic spreadsheets will calculate the IRR of a cash flow series, given the cash flows, their timing, and a discount rate. The IRR can also be calculated by trial-and-error. The NPV of the cash flow series is calculated with successive discount rates until a discount rate is found that yields a NPV that approximates \$0. That discount rate is the IRR.

Example

A venture capital investor invests \$1.0 million in a company today and expects to sell her shares in the company 5 years from today for \$2.0 million. If this assumption proves to be true, what internal rate of return (IRR) will she realize on her investment?

Since her investment will double, the compound interest rate that will yield that result can be approximated by the Rule of 72.

$$i \text{ to double} = 72/n = 72/5 = 14.5\%$$

at $i = 14.5\%$

$$NPV = (-\$1,000,000) + \$2,000,000/(1+0.145)^5$$

$$NPV = \$0$$

Therefore, the IRR on her investment is 14.5%



3.01 IRR and Venture Capital

IRR is used extensively in analysis of venture capital deals because it lends itself to an examination of the rate of return that the expected cash flows arising from the investment will produce, and how that projected IRR compares with the target rate of return of the venture capitalist.

