

Finance - Investment Analysis

Topic: Expected Rate of Return

Given and Introduction:

- A stock investment is expected to pay dividends over the next four years as follows:
 - \$1.00 in year 1
 - \$1.00 in year 2
 - \$1.50 in year 3
 - \$2.00 in year 4
- The stock price at the end of year 4 is projected to be \$50.00
- The current stock price is \$45.00

To determine the expected rate of return over the next four years, the calculation requires finding the internal rate of return (IRR) where the present value of the future cash flows equals the current stock price.

Step-by-Step Solution:

Step 1: Define Cash Flows and Initial Investment

Cash Flow Year 1: \$1.00

Cash Flow Year 2: \$1.00

Cash Flow Year 3: \$1.50

Cash Flow Year 4: \$2.00 + \$50.00 (End of Year Stock Price) = \$52.00

Initial Investment: -\$45.00 (since this is an outflow)

Explanation: Identifying the expected cash flows and the initial amount invested is essential to calculate the IRR, which reflects the expected rate of return.

Supporting Statement: Establishing initial investment and future cash flows clarifies the inputs needed for the IRR calculation.

Step 2: Set Up the IRR Calculation

IRR Formula:

$$0 = \sum (CF_t / (1 + IRR)^t) - C_0$$

Where:

- **CF_t** = Cash Flow at time t
- **IRR** = Internal Rate of Return
- **C₀** = Initial Investment
- **N** = Number of periods

Explanation: Using the formula for IRR will help in determining the rate at which the present value of future cash flows equals the initial investment.

Supporting Statement: Setting up the IRR formula is foundational to solving for the expected rate of return.

Step 3: Substitute the Given Values

$$0 = 1 / (1 + IRR)^1 + 1 / (1 + IRR)^2 + 1.5 / (1 + IRR)^3 + 52 / (1 + IRR)^4 - 45$$

Explanation: Substituting the cash flows and the initial investment into the IRR formula sets up the equation to be solved.

Supporting Statement: Substituting given values allows the equation to be specific to the problem at hand.

Step 4: Solve for IRR

To solve for IRR, use a financial calculator or software like Excel. In Excel, the IRR function can be used as follows:

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=IRR({-45, 1, 1, 1.5, 52})
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IRR \approx 15.9983%

Explanation: This iterative process/software computation identifies the rate where the net present value equals zero, providing the expected rate of return.

Supporting Statement: Solving using technology ensures accuracy and efficiency in finding the IRR.

Final Solution:

The expected rate of return over the next four years is approximately **15.9983%**.

Explanation: The IRR calculation determines the annual return rate necessary for the present value of future cash flows to equal the initial investment.

Supporting Statement: The final solution provides the investor the necessary insight into the investment's profitability over the specified period.