What is Internal Rate of Return (IRR)?

Worksheet

IRR is the discount rate where NPV = 0. It's the break-even return rate. Compare projects: choose the one with the highest IRR, or accept if IRR exceeds the required return (discount rate / hurdle rate).

$$0 = \sum_{t=1}^{n} \frac{\text{CF}_t}{(1+r^*)^t} - I_0$$

Questions

1. A project has IRR = 9%, and the company's hurdle rate is 12%. Decision?

A) Accept-IRR is positive
B) Reject-IRR is below hurdle rate
C) Calculate NPV first
D) Accept if it's the only project

2. Which is correct: IRR is the rate where

A) Profit is maximized
B) NPV = 0
C) Cash flow is highest
D) Risk is eliminated

3. Project A: IRR = 20%, Project B: IRR = 15%. Both have positive NPV. Best choice?

A) Project A has higher return
B) Project B is safer
C) Need more info (size, risk)
D) Choose based on size only

4. IRR assumes cash flows are

A) Reinvested at 0%
B) Reinvested at the IRR rate
C) Not reinvested
D) Lost

5. A project costs $100,000, generates $30,000/year for 5 years. Estimate IRR.

6. Compare two projects: A generates 15% IRR, B generates 12% IRR, both have positive NPV. Which to choose?

7. Your company's hurdle rate is 10%. Project has 12% IRR. Recommendation?

8. Define: What is IRR?

9. Define: IRR vs NPV: What's the difference?

10. Define: Decision rule: When to accept a project using IRR?

Answer Key

1. B) Reject-IRR is below hurdle rate - If IRR < Hurdle Rate, the project doesn't meet the minimum return requirement. Reject it.

2. B) NPV = 0 - IRR is defined as the discount rate where NPV equals zero - the break-even return rate.

3. A) Project A has higher return - Project A's 20% IRR > B's 15% IRR indicates higher return per dollar. If risks are similar and capital is not constrained, A is better.

4. B) Reinvested at the IRR rate - IRR calculation assumes intermediate cash flows are reinvested at the IRR rate itself - an assumption that may not hold.

5. Total cash inflow = $150,000 Approximate IRR = ((150,000 / 100,000)^(1/5) 1) 100 = (1.5^0.2 1) 100 = (1.084 1) 100 = 8.4% This is the breakeven rate; if required return is 8%, accept the project.

6. Project A (15% IRR) is better if both investments are the same size and risk profile. However, if capital is limited, also check NPV and profitability index. The higher IRR signals higher return per dollar invested.

7. Accept the project. IRR (12%) > Hurdle Rate (10%), meaning the project's return exceeds the required rate. This project adds value.

8. Internal Rate of Return - the discount rate that makes NPV = 0. It's the project's break-even return rate.

9. NPV is a dollar amount (value added); IRR is a percentage return. Both use discounting, but IRR solves for the rate, NPV for the value.

10. Accept if IRR > Hurdle Rate (required return). Reject if IRR < Hurdle Rate.