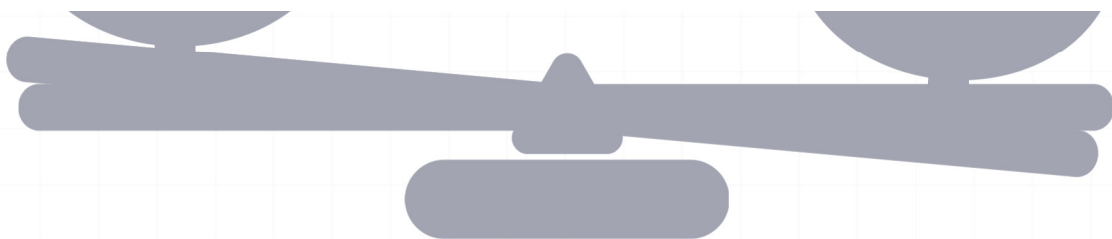


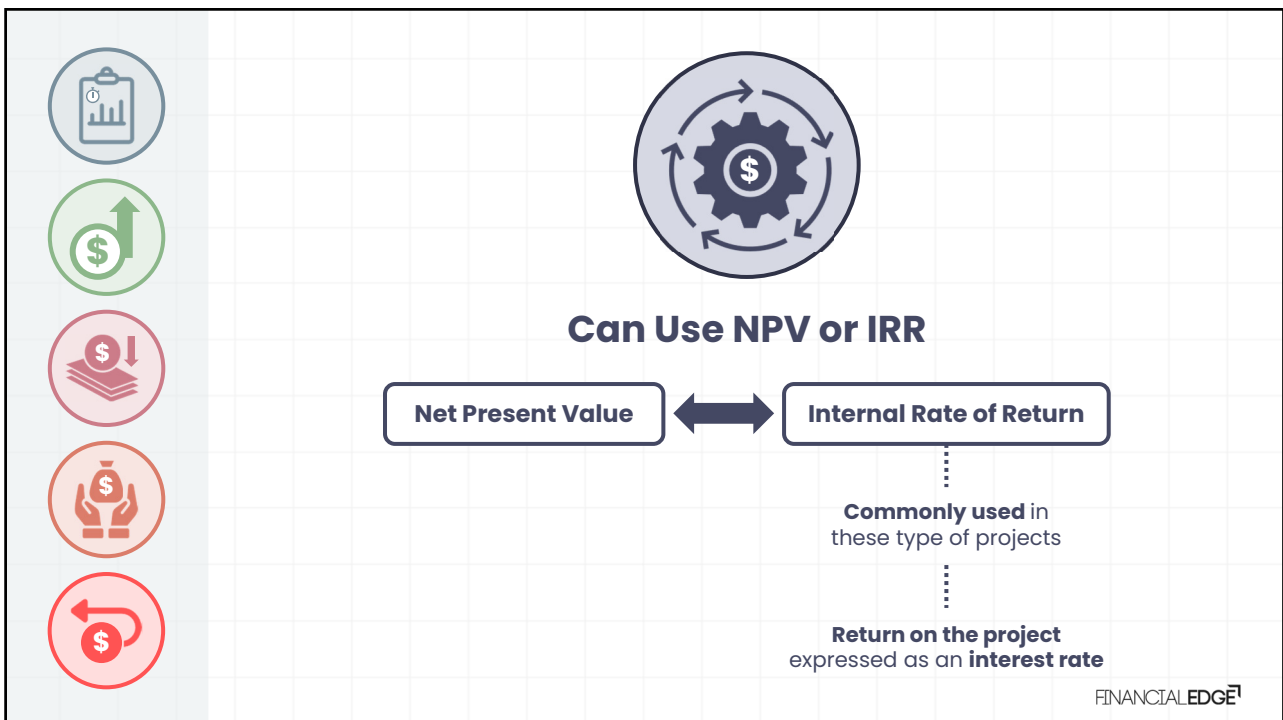



## Project Finance Returns

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## Profitability to Shareholders

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The diagram features a vertical sidebar on the left with five circular icons: a gear with a dollar sign, a green circle with a dollar sign and an upward arrow, a red circle with a dollar sign and a downward arrow, a red circle with a dollar sign and hands, and a red circle with a dollar sign and a curved arrow. The main content area has a large blue circle containing a clipboard icon with a bar chart and a clock. Below this is the title "IRR Method" and a text box stating "The **most frequent method** of evaluating these projects".

## IRR Method

The **most frequent method** of evaluating these projects

FINANCIALEDGE<sup>1</sup>



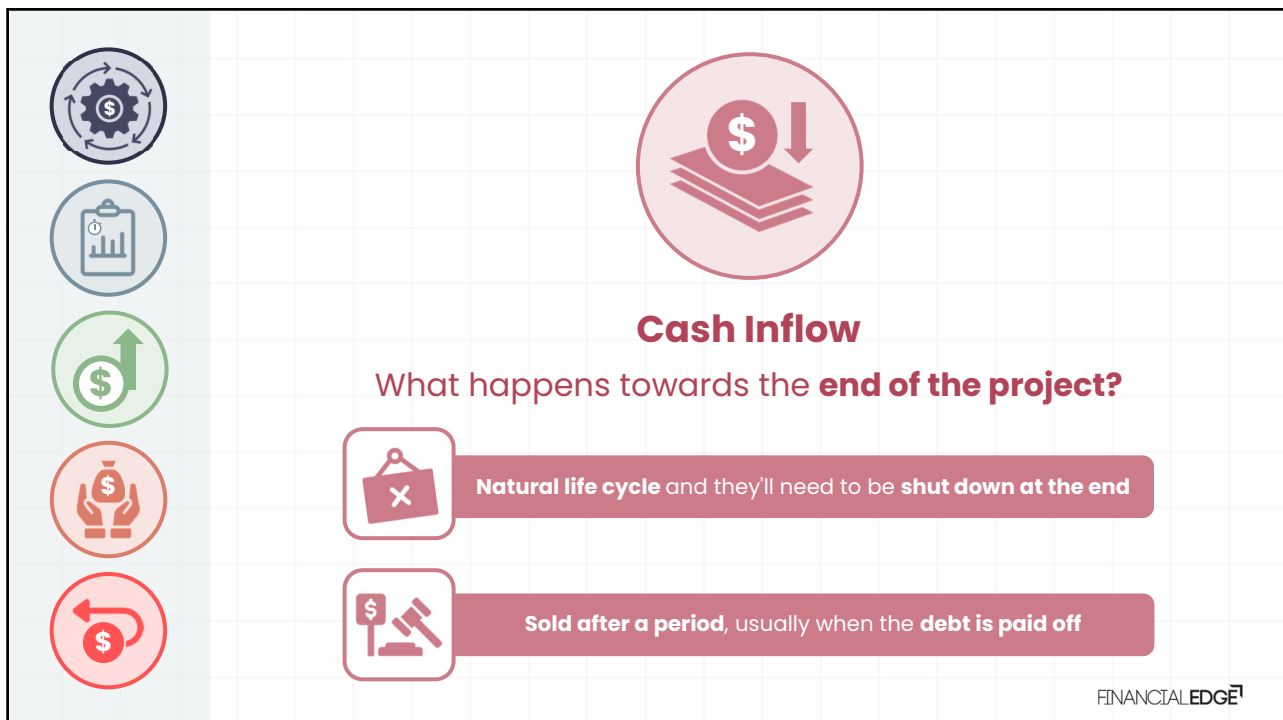
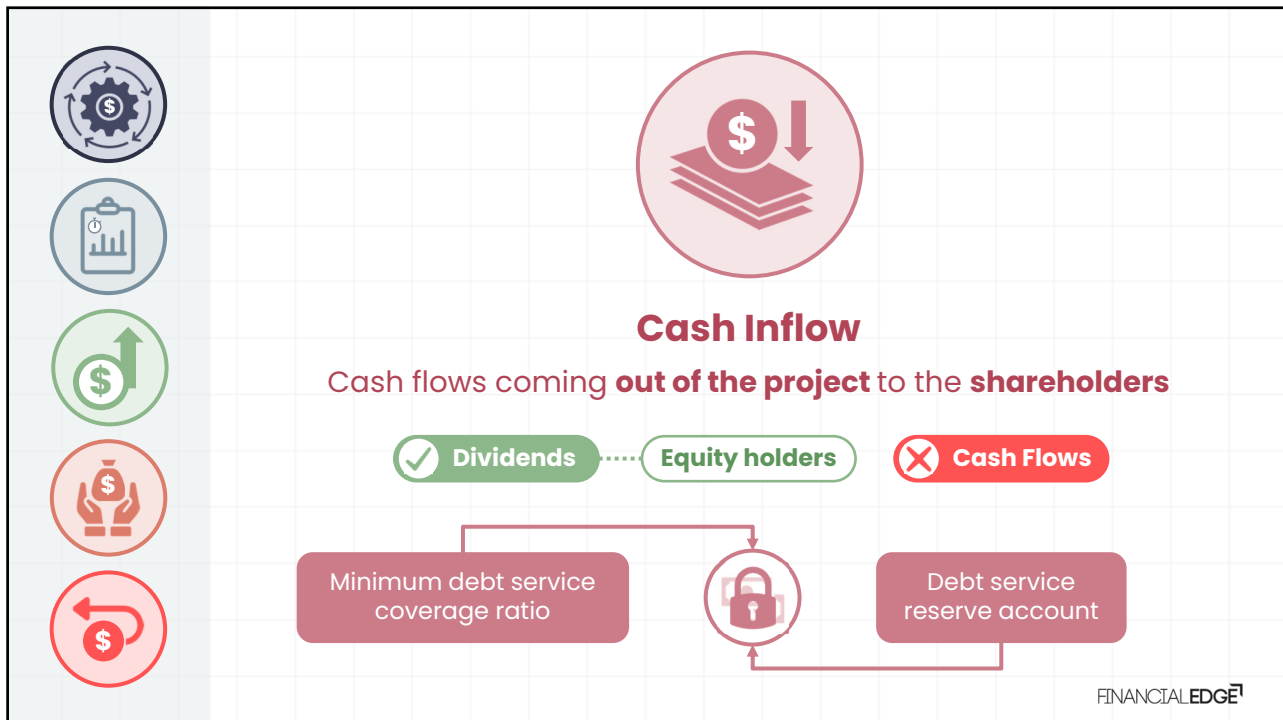
The diagram features a vertical sidebar on the left with five circular icons: a gear with a dollar sign, a blue circle with a clipboard icon, a red circle with a dollar sign and a downward arrow, a red circle with a dollar sign and hands, and a red circle with a dollar sign and a curved arrow. The main content area has a large green circle containing a dollar sign and an upward arrow. Below this is the title "Cash Outflow" and two boxes: "Investment into the project" and "Contributions during construction phase". These two boxes are connected by a bracket to a central dollar sign icon, which is then connected to a green oval at the bottom containing three stylized people icons and the text "Shareholders perspective".

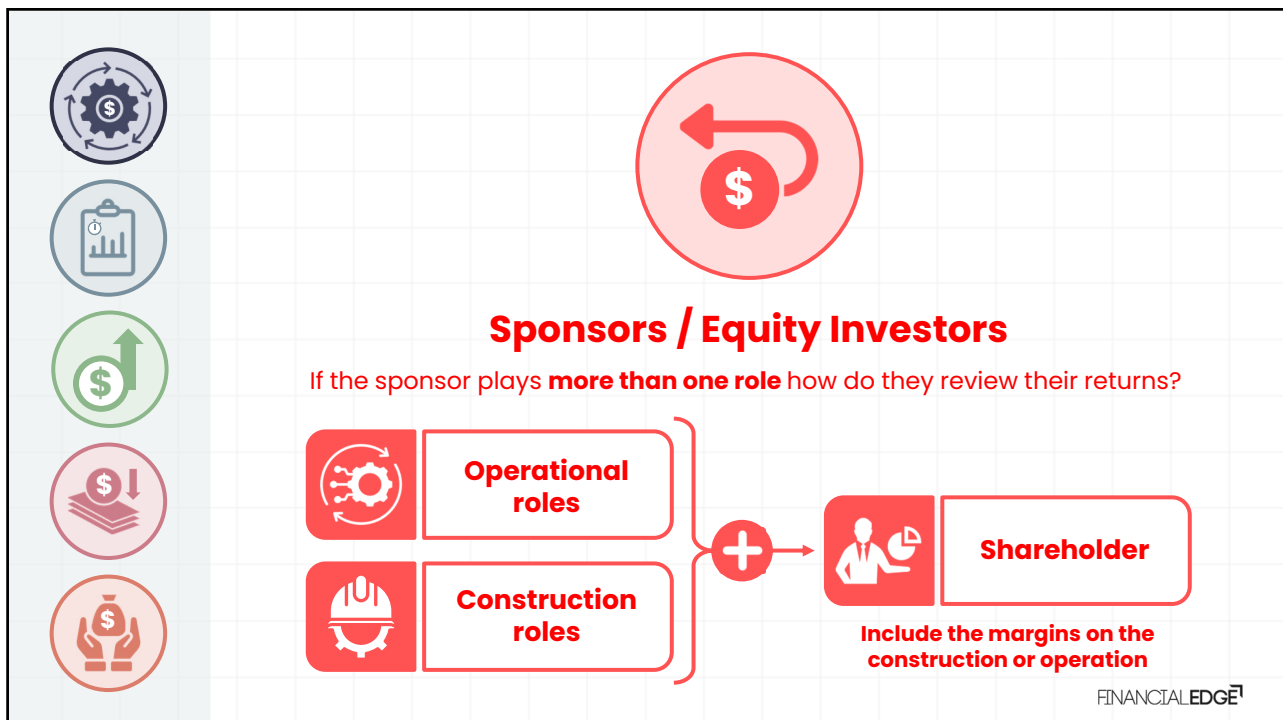
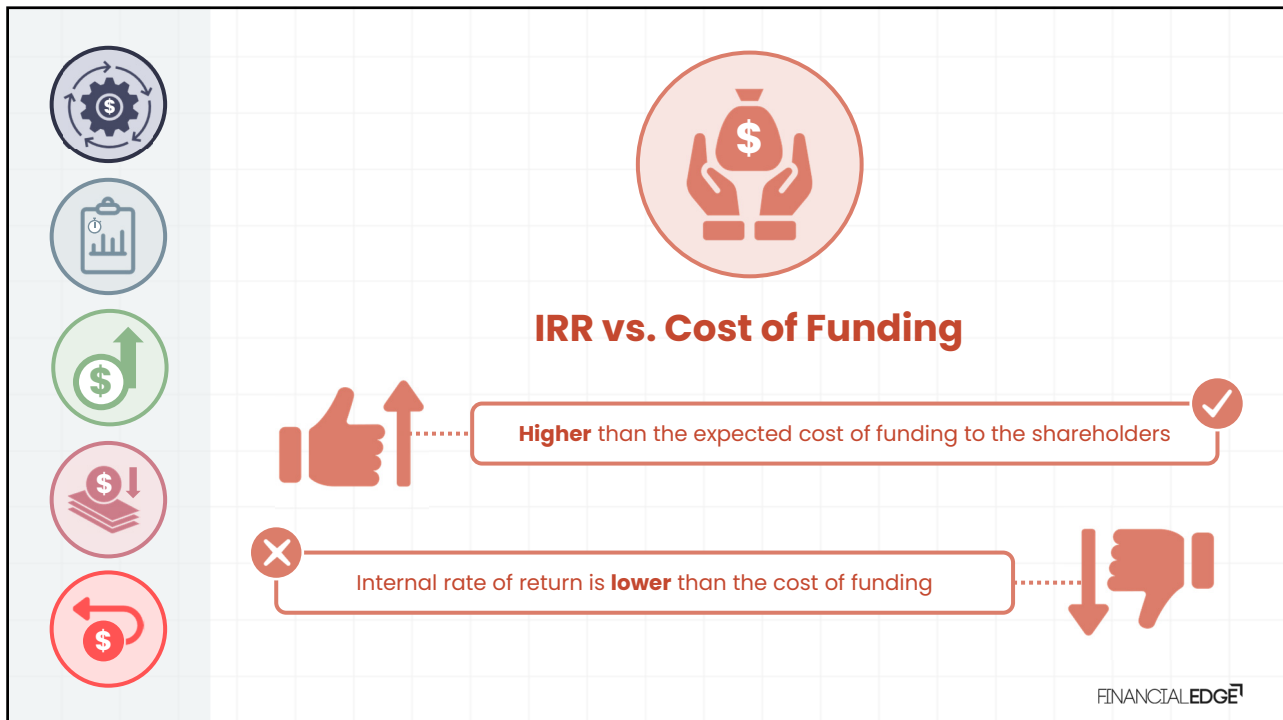
## Cash Outflow

Investment into the project      Contributions during construction phase

Shareholders perspective

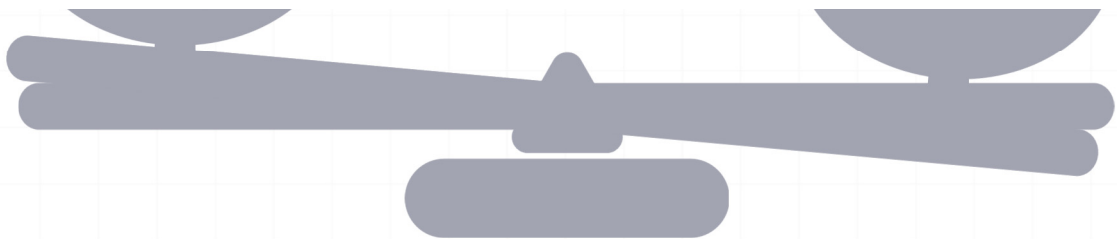
FINANCIALEDGE<sup>1</sup>







# Calculating the IRR

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## Iterative Calculation



**Newton  
Raphson Search**

Difficult

Time consuming to do manually

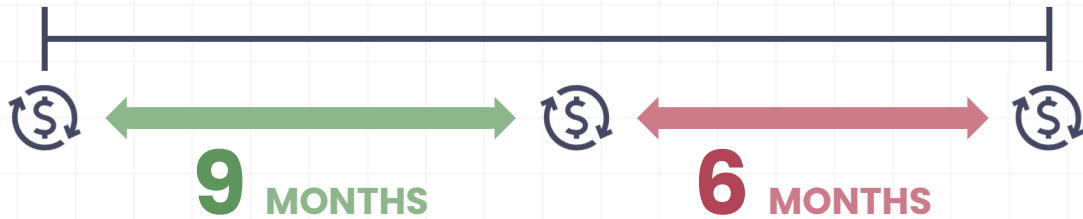


**Excel**

FINANCIALEDGE<sup>7</sup>

Use the **=IRR()** function for **unequal cash flows**

For **more accuracy** use the **XIRR()** function to **specifically date the cash flows**

FINANCIALEDGE<sup>7</sup>

Use the **=IRR()** function for **unequal cash flows**

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FINANCIALEDGE<sup>7</sup>

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For **more accuracy** use the **XIRR()** function to **specifically date the cash flows**

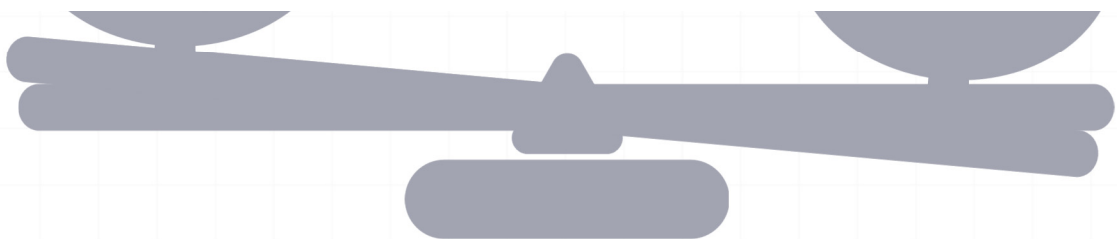
|   | A                       | B     | C           | D      | E      | F      | G      | H      | I      | J      | K      |
|---|-------------------------|-------|-------------|--------|--------|--------|--------|--------|--------|--------|--------|
| 1 |                         |       | Year 1      | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 | Year 7 | Year 8 | Year 9 |
| 2 | Cash flows              |       | (20.0)      | (50.0) | (40.0) | 5.0    | 10.0   | 20.0   | 25.0   | 30.0   | 210.0  |
| 3 | Internal rate of return | 18.1% | =IRR(C2:K2) |        |        |        |        |        |        |        |        |

For **repeating cash flows** use the **=RATE()** function

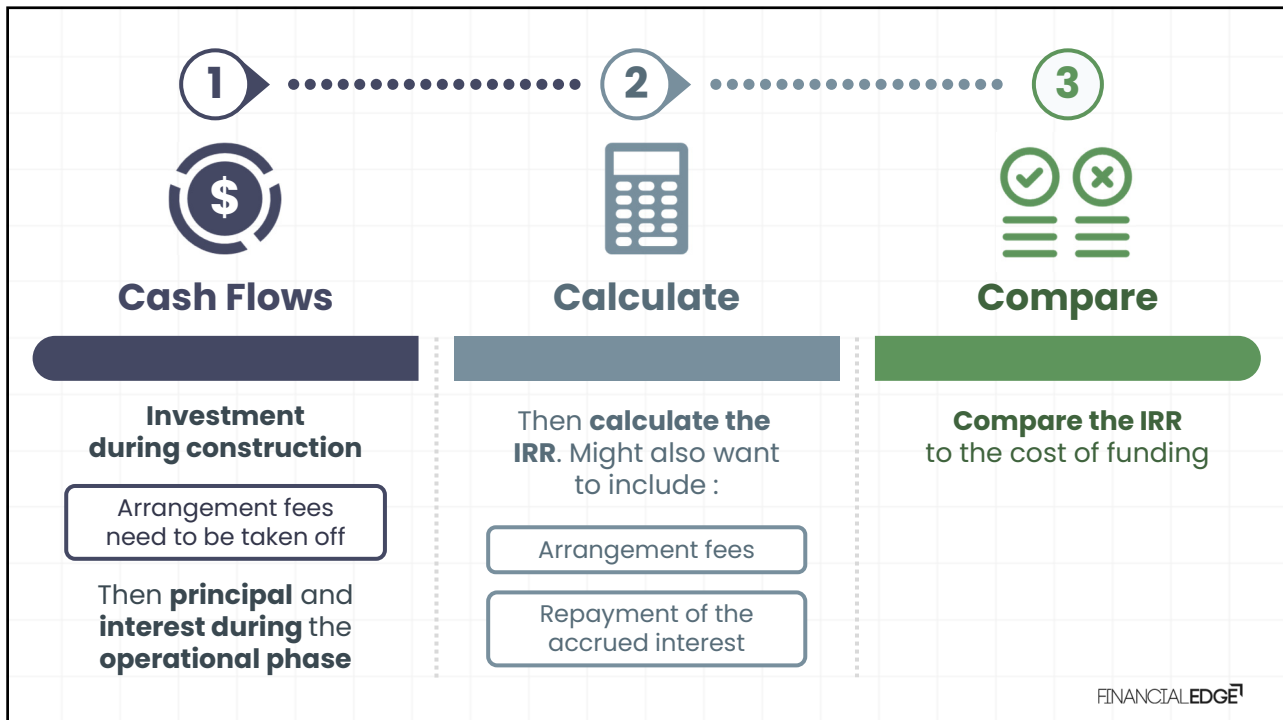
|   | A                       | B     | C                             | D | E | F |
|---|-------------------------|-------|-------------------------------|---|---|---|
| 1 | Principal               | 100.0 |                               |   |   |   |
| 2 | Interest rate           | 5.0%  |                               |   |   |   |
| 3 | Arrangement fee         | 2.0%  |                               |   |   |   |
| 4 | Maturity                | 10.0  |                               |   |   |   |
| 5 | Effective interest rate | 5.3%  | =RATE(B4,B2*B1,-B1*(1-B3),B1) |   |   |   |

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## Returns to Creditors

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## Three Types of Loan, Same IRR, Which is Better?

| Loan 1 – bullet repayment |         |        |        |        |        |        |        |        |        |        |         |
|---------------------------|---------|--------|--------|--------|--------|--------|--------|--------|--------|--------|---------|
|                           | Year 0  | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 | Year 7 | Year 8 | Year 9 | Year 10 |
| Beginning balance         |         | 100.0  | 100.0  | 100.0  | 100.0  | 100.0  | 100.0  | 100.0  | 100.0  | 100.0  | 100.0   |
| Repayment                 |         | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | (100.0) |
| Ending balance            | 100.0   | 100.0  | 100.0  | 100.0  | 100.0  | 100.0  | 100.0  | 100.0  | 100.0  | 100.0  | 0.0     |
| Interest % 5%             |         | 5.0    | 5.0    | 5.0    | 5.0    | 5.0    | 5.0    | 5.0    | 5.0    | 5.0    | 5.0     |
| Cash flows                | (100.0) | 5.0    | 5.0    | 5.0    | 5.0    | 5.0    | 5.0    | 5.0    | 5.0    | 5.0    | 105.0   |
| IRR                       | 5.0%    |        |        |        |        |        |        |        |        |        |         |

| Loan 2 – PIK interest |         |        |        |        |        |        |        |        |        |        |         |
|-----------------------|---------|--------|--------|--------|--------|--------|--------|--------|--------|--------|---------|
|                       | Year 0  | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 | Year 7 | Year 8 | Year 9 | Year 10 |
| Beginning balance     |         | 100.0  | 105.0  | 110.3  | 115.8  | 121.6  | 127.6  | 134.0  | 140.7  | 147.7  | 155.1   |
| Interest % 5%         |         | 5.0    | 5.3    | 5.5    | 5.8    | 6.1    | 6.4    | 6.7    | 7.0    | 7.4    | 7.8     |
| Repayment             |         | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | (162.9) |
| Ending balance        | 100.0   | 105.0  | 110.3  | 115.8  | 121.6  | 127.6  | 134.0  | 140.7  | 147.7  | 155.1  | 162.9   |
| Cash flows            | (100.0) | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 162.9   |
| IRR                   | 5.0%    |        |        |        |        |        |        |        |        |        |         |

| Loan 3 – staggered repayment |         |        |        |        |        |        |        |        |        |        |         |
|------------------------------|---------|--------|--------|--------|--------|--------|--------|--------|--------|--------|---------|
|                              | Year 0  | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 | Year 7 | Year 8 | Year 9 | Year 10 |
| Beginning balance            |         | 100.0  | 95.0   | 85.0   | 65.0   | 40.0   | 10.0   | 0.0    | 0.0    | 0.0    | 0.0     |
| Repayment                    |         | (5.0)  | (10.0) | (20.0) | (25.0) | (30.0) | (10.0) | 0.0    | 0.0    | 0.0    | 0.0     |
| Ending balance               | 100.0   | 95.0   | 85.0   | 65.0   | 40.0   | 10.0   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0     |
| Interest % 5%                |         | 5.0    | 4.8    | 4.3    | 3.3    | 2.0    | 0.5    | 0.0    | 0.0    | 0.0    | 0.0     |
| Cash flows                   | (100.0) | 10.0   | 14.8   | 24.3   | 28.3   | 32.0   | 10.5   | 0.0    | 0.0    | 0.0    | 0.0     |
| IRR                          | 5.0%    |        |        |        |        |        |        |        |        |        |         |

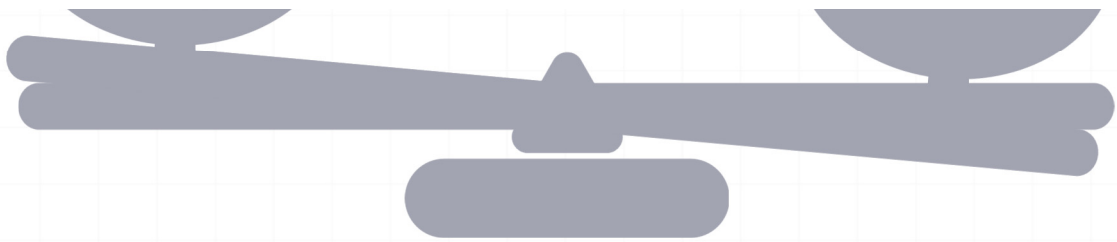
2<sup>ND</sup> PLACE

3<sup>RD</sup> PLACE

1<sup>ST</sup> PLACE










## Problems with the IRR

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You have to be careful when using  
**internal rate of return** for evaluating different...

**Investments****Repayment  
Patterns****Maturities**FINANCIALEDGE<sup>1</sup>

| IRR  | Ratios  |
|--|---|
| <p>Although <b>different investments</b> get the <b>same IRR</b></p> <p><b>Getting your money faster is better:</b></p> <div>  <p><b>Amortizing loan (best) – least counterparty risk</b></p> </div> <div>  <p><b>Bullet bond</b></p> </div> <div>  <p><b>PIK bond</b></p> </div> | <p>However, also <b>look at ratios:</b></p> <div>  <p><b>Calculate average life</b></p> </div> <div>  <p><b>Cash flow to cover interest and repayment</b></p> </div> <div>  <p><b>Debt service coverage ratio (DSCR)</b></p> </div> <div>  <p><b>Loan life coverage ratio (LLCR)</b></p> </div> |

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