The Internal Rate of Return, The IRR

Evaluating the Financial Viability of a Project

Most businesses evaluate the financial "worthiness" of a project using 3 common financial metrics:

- ✓ Net Present Value (NPV)
- ✓ Internal Rate of Return (IRR)
- ✓ Payback Period (PBP)

And in special cases:

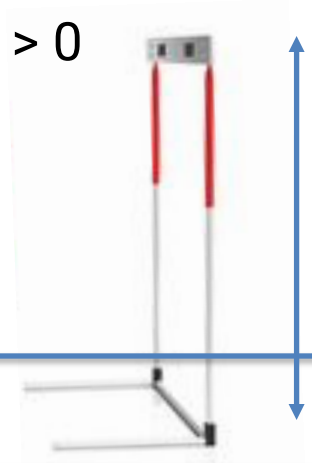
- ✓ Modified Internal Rate of Return (MIRR)

NPV and Rate of Return…

The NPV is calculated using the company's discount (hurdle) rate.

This project is a good one…

Project NPV > 0

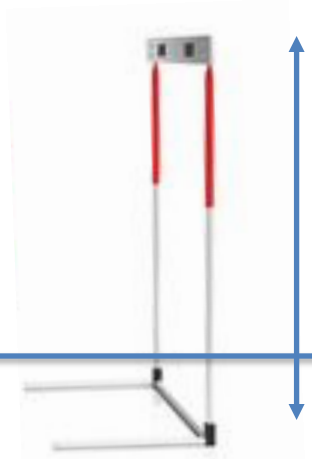


The "Hurdle Rate"
(minimum acceptable rate of return)

NPV and Rate of Return…

The NPV is calculated using the company's discount (hurdle) rate.

This project is not a good one…



The "Hurdle Rate"
(minimum acceptable rate of return)

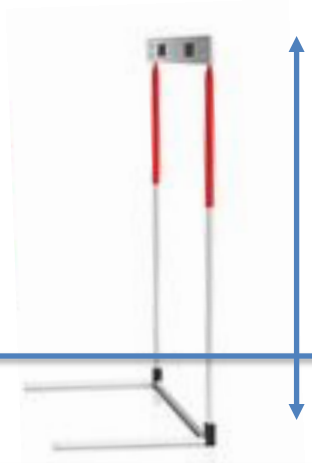
Project NPV < 0

NPV and Rate of Return…

The NPV is calculated using the company's discount (hurdle) rate.

Project NPV >>> 0

This project is a great one!



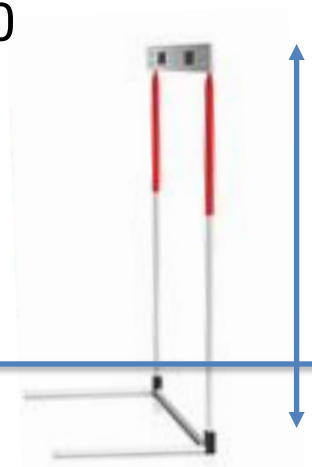
The "Hurdle Rate"
(minimum acceptable rate of return)

NPV and Rate of Return…

Project NPV >>> 0

Project NPV > 0

Project NPV < 0



NPV >>> 0

NPV > 0

NPV < 0

The "Hurdle Rate"
(or minimum acceptable rate of return)

The NPV is related to the project's actual rate of return…

Internal Rate of Return, IRR

The IRR is defined as the rate of return that makes the present value of future cash inflows (benefits) equal to the present value of the cash outflows (investment or costs).

In other words, when i = IRR, then

$$PV_{Inflows} = PV_{Outflows}$$

The IRR is just the actual rate of return for a project.

Therefore:

$$NPV = 0$$

The project is financially justified if the IRR > Discount Rate

The project is a good one when the actual rate of return is greater than the company's minimum rate of return!

Internal Rate of Return, IRR

A rather confusing point:

Net Present Value: determined at the discount rate (MARR)

if the $PV_{inflows} \geq P_0$, then NPV will be ≥ 0.

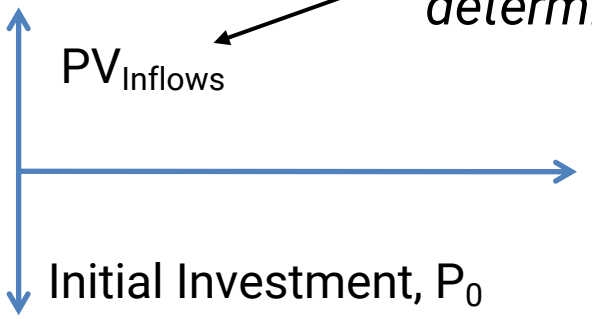
Internal Rate of Return: calculated using the Rate of Return that forces the $PV_{inflows} = P_0$, in which results in the NPV to be = 0.

If the NPV = 0 when determined at the Discount Rate, then the IRR is equal to the Discount Rate

If the NPV > 0 when determined at the Discount Rate, then the IRR is greater than the Discount Rate

Internal Rate of Return, IRR

IRR (Internal Rate of Return)

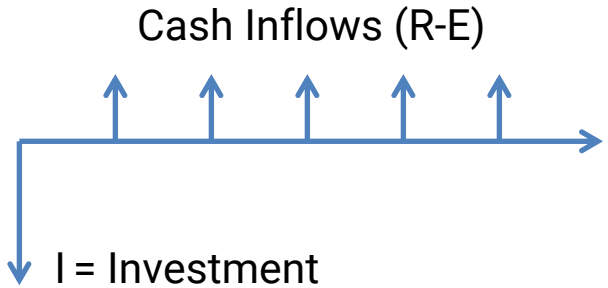


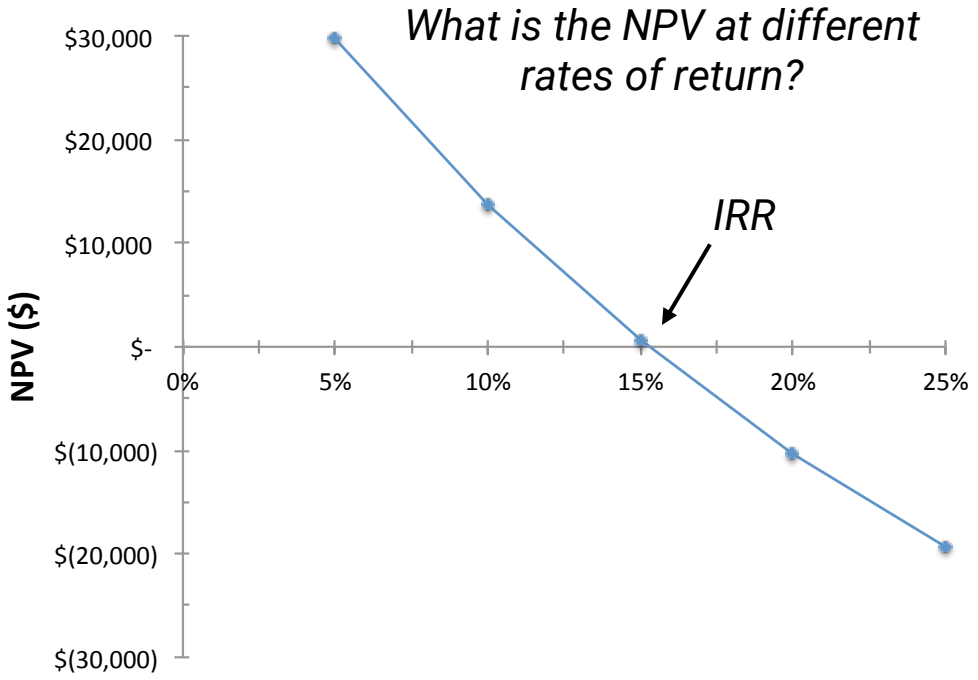
$$PV_{inflow} = P_0$$

and therefore:

$$NPV = (PV_{Inflow} - P_0) = 0$$

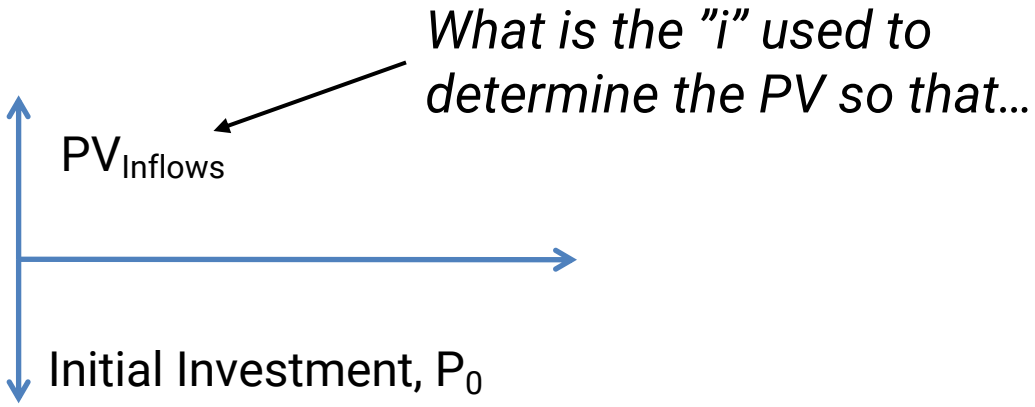
When this is true, the selected rate of return is the IRR.





Internal Rate of Return, IRR

IRR (Internal Rate of Return)



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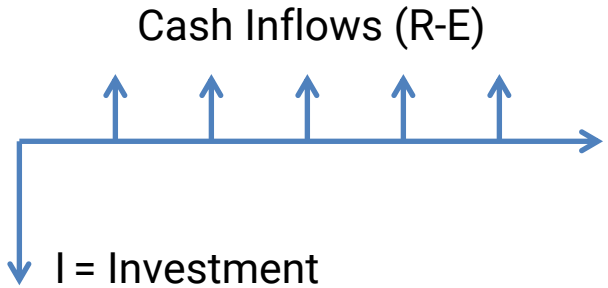

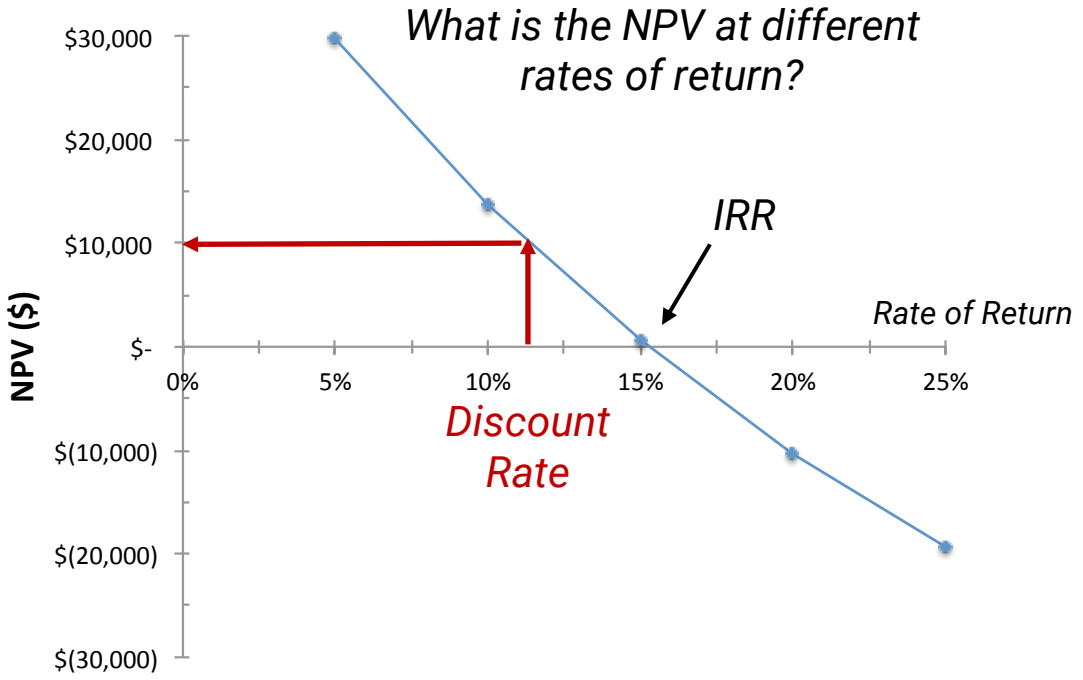

Next Time…Some Examples with Excel

Credits & References

Slide 1: Concept of IRR - Internal Rate of Return by Elnur, Adobe Stock (399233762.jpeg).

Slide 3-6: Hurdles, isolated on white background, side view, banner, 3d illustration by Rawf8, Adobe Stock (232291335.jpeg). Person Jumping Over Hurdles silhouette icon. Clipart image isolated on white background by dzm1try, Adobe Stock (451242920.jpeg).

Slide 11: Coffee break napkin concept by MarekPhotoDesign.com, Adobe Stock (129813869.jpeg).