



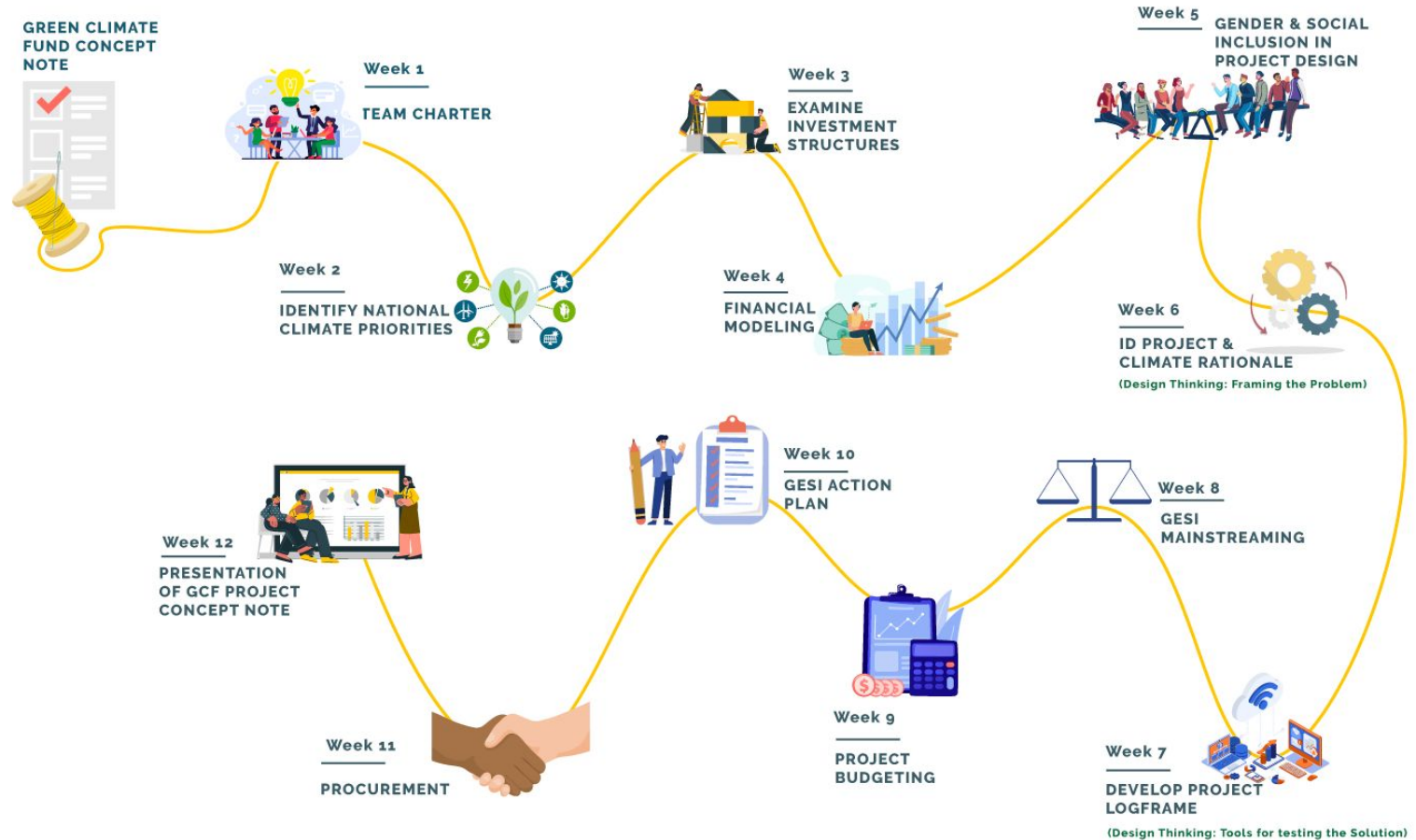
The Southern Africa
Climate Finance Partnership

DESIGNING CLIMATE FINANCE SOLUTIONS IN A SHIFTING INVESTMENT LANDSCAPE

A toolbox for innovative practitioners

Week 4: Financial Modeling - the
basics

GROUP ASSIGNMENT: GOLDEN THREAD

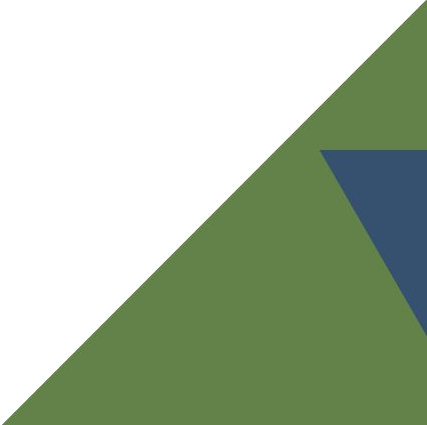


Housekeeping

When you would like to talk: raise your hand, you can unmute yourself and turn your camera on

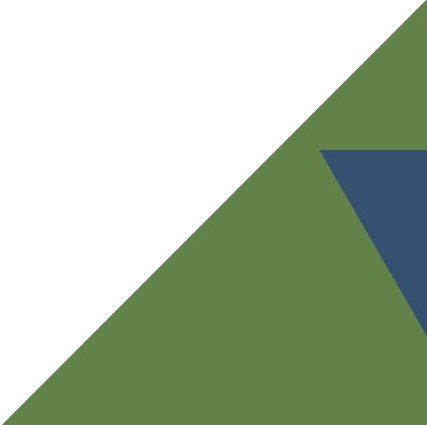
Please ensure you are correctly named on Zoom: Name & Surname, Institution

Group photo



Week 4: Financial Modelling

Learning Objectives

- This lecture will introduce financial modelling basic concepts and techniques with a specific focus on project finance, cash flow modelling and investment selection.
 - Basic concepts and metrics will include:
 - Net Present Value (NPV)
 - Profitability Index (PI)
 - Internal Rate of Return (IRR)
 - Payback Period.
- 

The need for financial modelling

- Investment is paid back from the project profit rather than the general assets or creditworthiness of the project owners.
- For larger projects due to fixed cost to establish
 - Small projects not much benefit.
- Investment in project through special purpose corporations
 - Often joint venture between several parties.
- Need capacity for independent operation
- Benefits
 - Off balance sheet (liabilities do not belong to parent).
 - Limits risk.
 - External investors: reduced agency cost (direct investment in project).
- Drawback
 - Tensions among stakeholders.

To develop or not to develop?



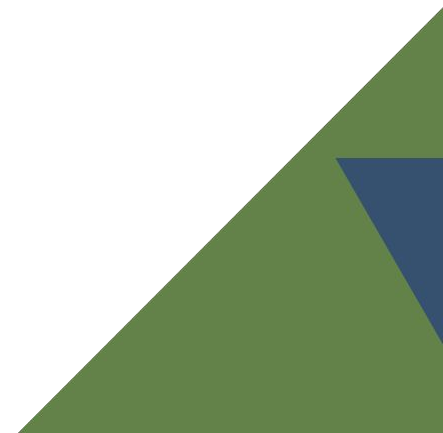
Comparing two investments?

- Project A
- Construction Phase = 5 years
- Costs = USD 1M/year
- Total Cost
- Profit
- Dividend Share

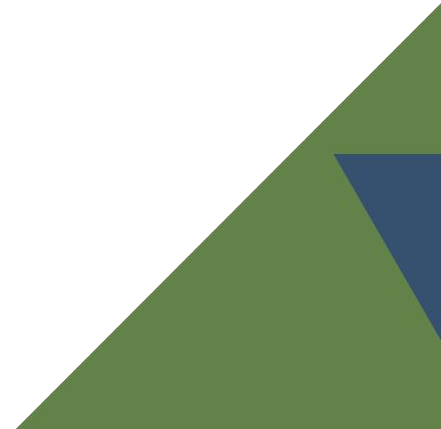
- Project A
- Construction Phase = 2 years
- Costs = USD 200k/year
- Total Cost
- Profit
- Dividend Share

The need for financial models

- Profitability
 - Revenue Streams and Costs
- Opportunity Cost
 - Time Value of Money Principle
 - Different discount rates
 - Social and environmental impacts



Preliminaries



Simple Interest and Compound Interest

$$\text{Simple Interest} = P \times r \times t$$

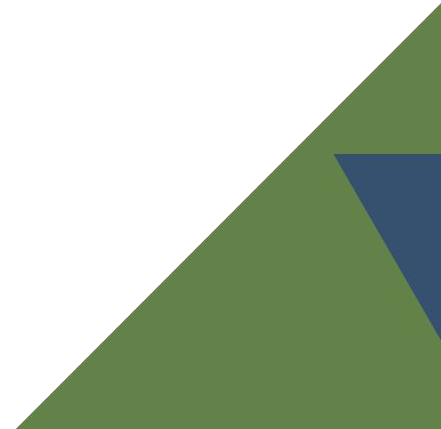
$$\text{Compound Interest} = P \times \left[\left(1 + \frac{r}{n} \right)^{t \times n} - 1 \right]$$

Simple Interest and Compound Interest

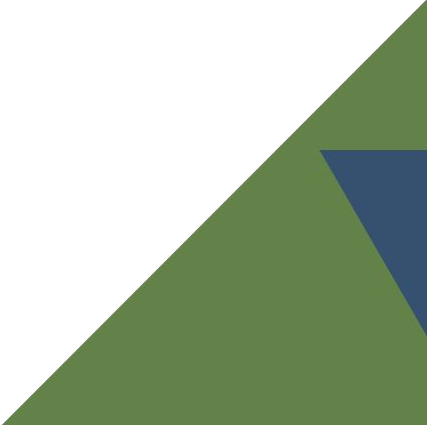
$$\text{Future Value of Money} = PV \times \left(1 + \frac{i}{n}\right)^{(n \times t)}$$

$$\text{Present Value of Money} = \frac{FV}{\left(1 + \frac{i}{n}\right)^{(n \times t)}}$$

DEMONSTRATION ON EXCEL TOOL



Net Present Value

- Example: Take an initial investment amount and a set of cash flows.
 - The NPV is defined as the sum of the present values of all costs and revenues.
 - Revenues are defined as positive cash flows and costs as negative flows.
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Net Present Value Decision Rule

Net Present Value

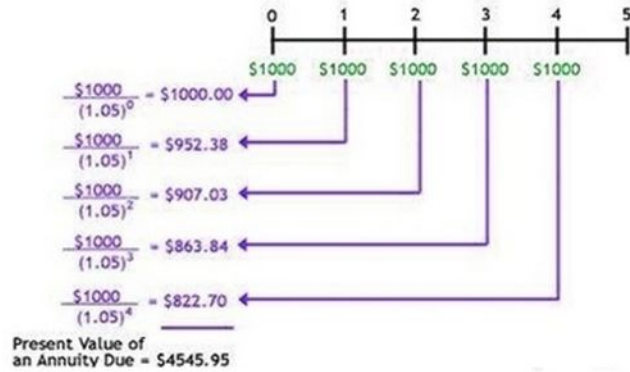
$$NPV = -C_0 + \frac{C_1}{1+r} + \frac{C_2}{(1+r)^2} + \dots + \frac{C_T}{(1+r)^T}$$

$-C_0$ = Initial Investment

C = Cash Flow

r = Discount Rate

T = Time



- Accept a project which has 0 or positive NPV.
- Higher NPV when contrasting projects against each other.

Discount Rate in NPV

- NPV (and PV) is relative to a discount rate
- In the absence of risk or inflation, this is just the interest rate of the “reliable source” (opportunity cost)
- Correct selection of the discount rate is fundamental. If too high, projects that could be profitable can be rejected. If too low, the firm will accept projects that are too risky without proper compensation.
- Its choice can easily change the ranking of projects.
 - Example

Profitability Index



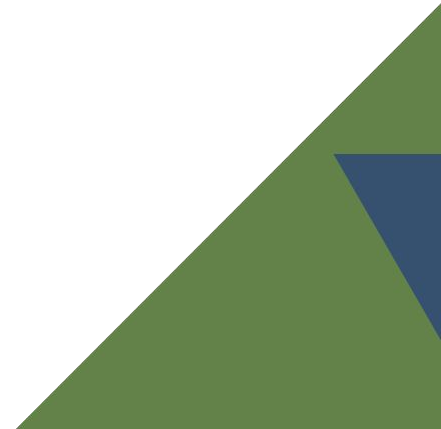
**Profitability
Index Formula**

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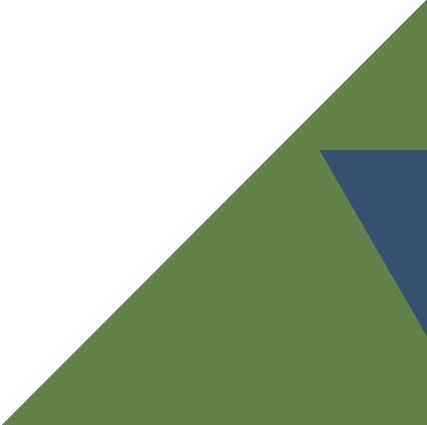
PV of Future Cash Flows
Initial Investment



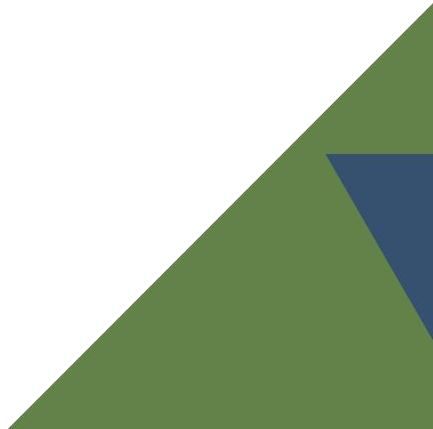
DEMONSTRATION ON EXCEL TOOL: PROFITABILITY INDEX EXAMPLES



Internal Rate of Return (IRR)

- Defined as the rate of return that makes the NPV of the project equal to zero
 - To see whether the project's rate of return is equal to or higher than the rate of the firm to expect to get from the project
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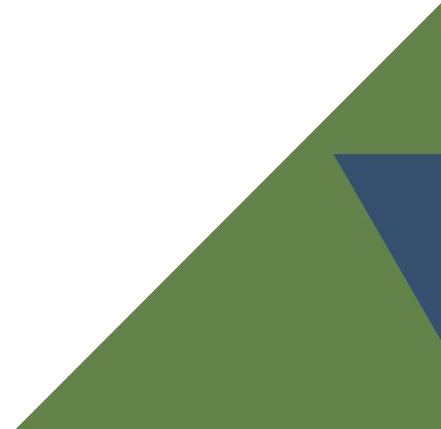
DEMONSTRATION ON EXCEL TOOL: IRR FORMULAE EXAMPLES



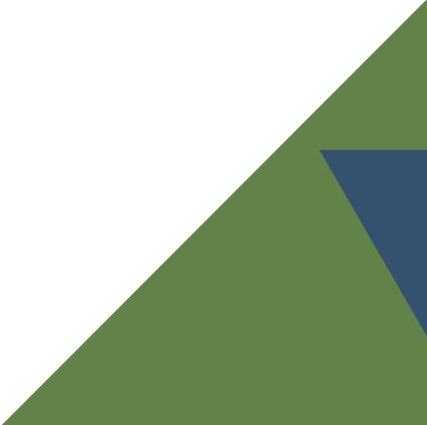
Payback Period

- Payback period (“Time to return”)
 - Minimal length of time over which benefits repay costs
 - Typically, only used as secondary assessment
 - Important for selection when the risk is extremely high
 - Drawbacks
 - Ignores what happens after payback period
 - Does not take into account discounting

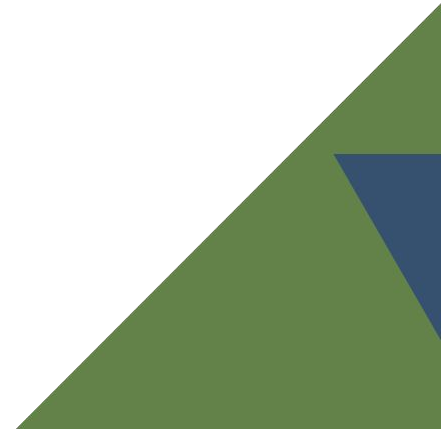
DEMONSTRATION ON EXCEL TOOL: PAYBACK PERIOD FORMULAE EXAMPLES



Comparing Projects

- Financing has major impact on project selection
 - Suppose that one had to choose between 2 investment projects
 - How can one compare them?
 - Use NPV
 - Verify IRR
 - Check payback period
- 

DEMONSTRATION ON EXCEL TOOL: FULL THREE PROJECT COMPARISON EXAMPLE – NPV, IRR, PB and PI.



Group exercise

Group Exercise: Assess a possible financial structure that could be used for your selected project?

- a.) What types of instruments could you use (e.g. loans, grants, equity, and guarantees)?
- b.) Why are the selected instruments suitable?
- c.) Which institutions could be engaged to support the selected financial options?



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THIS PRESENTATION IS AN OUTPUT OF THE SOUTHERN AFRICA CLIMATE FINANCE PARTNERSHIP (SACFP). THE SACFP LOOKS TO SUPPORT THE DEVELOPMENT OF A REGIONAL PARTNERSHIP PROGRAMME TO IMPROVE COUNTRY-OWNED CLIMATE FINANCE PORTFOLIOS. THE INTERNATIONAL DEVELOPMENT RESEARCH CENTRE (IDRC) PROVIDES FINANCIAL SUPPORT FOR THE CURRENT PHASE OF THE SACFP.

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