

Project Economic and Financial Appraisal & Risk Analysis: A focus on GCF Funding Proposal

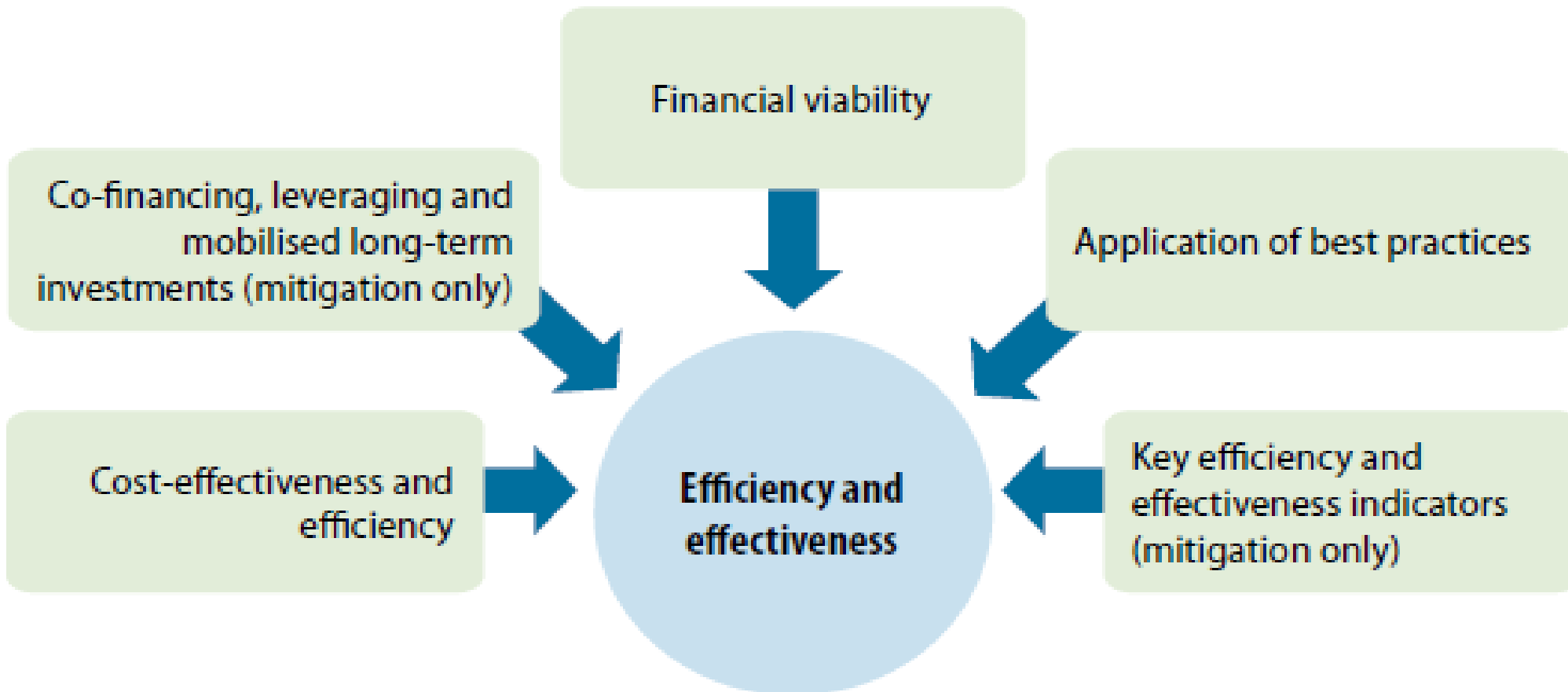
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Outline

- ❑ GCF's Investment criterion no. 6 – efficiency and effectiveness
- ❑ Standard approach/methodology
- ❑ CBA into perspective
- ❑ In-depth look at Project Appraisal and risk analysis
- ❑ Q & A

GCF's Investment criterion 6: Efficiency and Effectiveness

□ Elements of the efficiency and effectiveness criterion



GCF's Investment Criterion 6: Efficiency and Effectiveness

Project proponents should demonstrate the following as relevant.

1. Cost-effectiveness and efficiency:

- How the proposed financial structure (funding amount, financial instrument, tenor and term) is adequate and reasonable in order to achieve the project/programme's objectives, including addressing existing bottlenecks and/or barriers.
- How the structure provides the appropriate concessionality to make the proposal viable, without crowding out private and other public investment.

GCF's Investment criterion 6: Efficiency and Effectiveness...*cont'*

Project proponents should demonstrate the following as relevant *cont'*

2. Co-financing, leveraging and mobilised long-term investments (*mitigation only*).

- For mitigation projects/programmes, the co-financing ratio (total amount of the Fund's investment as percentage of total project costs) should be provided.
- For projects/ programmes that may not leverage a significant level of up-front co-financing, the project proponents may instead demonstrate a significant level of indirect or long-term low-emission investment mobilised as a result of the proposed activities.

GCF's Investment criterion 6: Efficiency and Effectiveness...*cont'*

Project proponents should demonstrate the following as relevant *cont'*

3. Financial Viability

- The economic and financial rate of return (with and without the Fund's support). Other financial indicators, including the debt service coverage ratio, may be provided as applicable.
- A description of the financial soundness in the long term beyond the Fund's intervention, as well as the Fund's financial exit strategy in case of private sector operations, should also be included.

GCF's Investment criterion 6: Efficiency and Effectiveness...*cont'*

Project proponents should demonstrate the following as relevant *cont'*

4. Application of best practices

- How the best available technologies and/or best practices are considered and applied, including if applicable any innovations, modifications or adjustments that are made based on industry best practices.

GCF's Investment criterion 6: Efficiency and Effectiveness...*cont'*

Project proponents should demonstrate the following as relevant *cont'*

5. Key efficiency and effectiveness indicators (mitigation only).

- Estimated cost per t CO₂eq to total investment cost divided by the expected lifetime of emission reductions.
- Expected volume of finance to be leveraged by the proposed project/programme and as a result of the Fund's financing, disaggregated by public and private sources.

The information provided under this section will inform Section E of the GCF Funding Proposal – Expected Performance against the Investment Criteria + other sections.

Approach/Methodology

A. Understanding the project

- Taking into consideration GCF's guidelines/expectations/requirements
- Project objectives
- Project scope – geographical location/counties targeted, Population targeted etc.
- Project duration
- Project implementation arrangements – Targeted beneficiaries, implementing entities, institutional arrangements etc.
- Specific project interventions – nature of the interventions, quantitative and qualitative aspects, primary vs secondary
- etc.

This is achieved during the project design sessions with the Project Design Team(s) (PDT(s)).

Approach/Methodology...*Cont'*

B. Choosing appropriate analysis/appraisal tool

- Cost Benefit Analysis (CBA)
- Cost effectiveness analysis (CEA) (mitigation only)
- Multi-criteria analysis (MCA)
- Interactive risk management (IRM)
- Real Options Analysis (ROA)
- Robust Decision Making (RDM)
- Rule based decision support for uncertainty

CBA into perspective – Financial Analysis

a) Developing a financial analysis model/framework

- ❑ Identification of outcomes i.e. positive (financial receipts) and negative (financial expenditures).
- ❑ Understanding the type of changes that shall be occurring with the interventions of the project.
- ❑ Majorly stakeholder-based (i.e. asking stakeholders {read: PDT(s)} to express what is changing and how) and also desk-based, to test predefined hypothesis on such impacts.

CBA into perspective..cont'

- b) Quantification and monetisation of outcomes including data collection – Secondary and primary
- c) Developing a cash flow statement
- d) Actual financial analysis with aid of a computer software
 - Obtain – Financial Internal Rate of Return (FIRR); Financial Net Present Value (FNPV); etc. Both during the GCF's funding and post GCF funding.
- e) Conducting sensitivity analysis/risk analysis
- f) Feedback to and validation of results by the PDT(s).
- g) Revision of parameters/assumptions/data sets etc. (if need be) and re-analysis.

CBA into perspective – Economic Analysis

a) Developing a economic analysis model/framework

- Identification of economic impacts i.e. positive (economic benefits) and negative (economic costs). I.e. Environmental, social, economic, etc.
- Understanding the type of changes that shall be occurring with the interventions of the project.
- Majorly stakeholder-based (i.e. asking stakeholders {read: PDT(s)} to express what is changing and how) and also desk-based, to test predefined hypothesis on such impacts.
- Identifying specific conversion factors including value for no-market goods and services
- Deciding on parameters and assumptions e.g. inflation, exchange rate etc.

CBA into perspective..cont'

- b) Quantification and monetisation of outcomes including data collection – Secondary and primary. This shall also entail identifying specific conversion factors including value for no-market goods and services.
- c) Developing a resource flow statement
- d) Actual economic analysis with aid of a computer software
 - Obtain – economic Internal Rate of Return (FIRR); economic Net Present Value (FNPV); etc. Both during the GCF's funding and post GCF funding.
- e) Conducting sensitivity analysis/risk analysis
- f) Feedback to and validation of results by the PDT(s).
- g) Revision of parameters/assumptions/data sets etc. (if need be) and re-analysis.

CBA into perspective..cont'

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CBA into perspective. Other steps

- ❑ Writing the Financial and Economic appraisal report of the project to be annexed to the Funding proposal.
 - These shall include interpretation of the results and answering to specific GCF criteria and indicative assessment factors.
- ❑ Populating relevant sections of the funding proposal and ensuring coherence across the documents as far as financial and economic appraisal is concerned i.e. sections: - B.1; B.2; E.3; E.6; F.1; G.1; and, G.2. The feasibility report shall also provide useful information to complement that generated by the economic and financial analysis e.g. for sections G.1 & G.2.
- ❑ Feedback and revisions upon receiving comments from GCF and/or any other stakeholders.

An In-depth look at Project/Investment Appraisal and Risk Analysis.

Concerns About a Project

- Is the project financially or fiscally sustainable?
- Is the project economically worthwhile?
- Who are the stakeholders? How are they impacted?
 - By how much?
- What are the risks associated with the benefits accruing to the stakeholders?
- Are poverty alleviation goals being addressed?
- What is the personality of the project?

Analysis Modules

A. Financial/Budget Module

B. Economic Module

C. Social Appraisal or Distributive and Basic
Needs Analysis

Analysis Module A: Financial/Budget Module

What is done:

- Integration of financial and technical variables from demand module, technical module, and management module – this is not a mechanical exercise;
- Construct cash flow (resource flow) profile of project;
- Identify key variables for doing economic and social analysis.

Key questions:

- What is relative certainty of financial variables?
- What are sources and costs of financing?
- What are minimum cash flow requirements for each of the stakeholders?
- What can be adjusted to satisfy each of the stakeholders?

Analysis Module B: Economic Module

What is done:

- Examines the project using the whole country as the accounting entity
- Evaluation of externalities including environmental

Key questions:

- What are differences between financial and economic values for a variable?
- What causes these differences?
- With what degrees of certainty do we know values of these differences?
- What is the expected value of economic net benefits?
- What is the probability of having positive net economic benefits?

Analysis Module C: Stakeholders and Basic Needs Analysis

What is done:

- Identification and quantification of extra-economic impacts of project;
- Distributive Appraisal;
- Income, Cost, and Fiscal impacts on various stakeholders;
- Poverty Alleviation and Political Necessities;
- Basic Needs: Evaluate the impact of project on achieving basic needs objectives;
- Basic needs will vary from country to country;

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Key Questions:

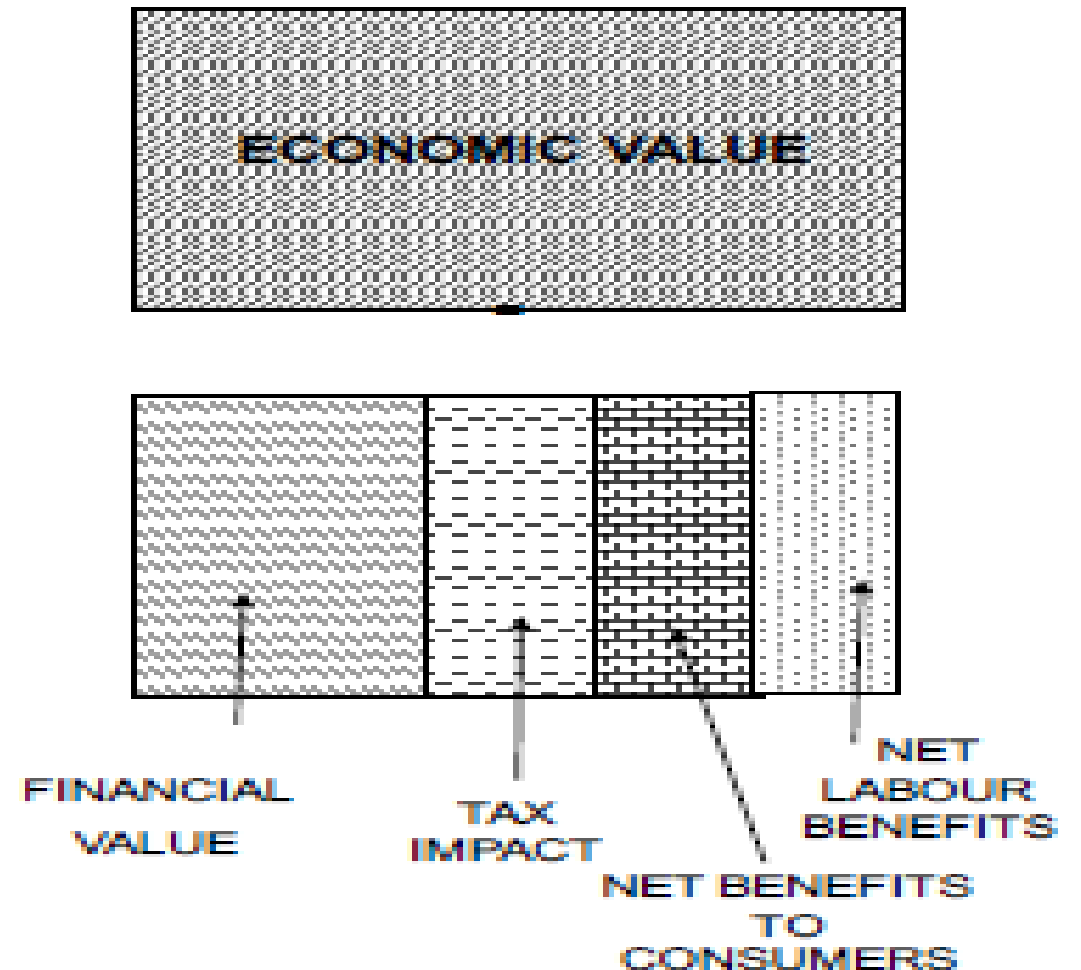
- a. In what ways does project generate beneficial and cost impacts on stakeholders?
- b. What stakeholders could the project impact?
- c. Who benefits and who pay the costs?
- d. What are the basic needs of the society that are relevant in the country?
- e. What impact will the project have on basic needs?
- f. What alternative ways are there to generate desirable social impacts?
- g. Is project relatively cost effective in generation of desirable social impacts?

Projects with Multiple Components

- ❑ Such projects can get very complex and need to be approached cautiously to avoid costly errors.
- ❑ It is possible for the bundled project to be financially and economically viable even though some of the components are not.
- ❑ Dropping the components that generate negative returns will maximize the project's benefits.
- ❑ Defining and understanding the objectives of the project is particularly important when analyzing integrated projects.
- ❑ Ultimately, the 'bundle' that succeeds the most in accomplishing the desired objectives should be undertaken.
- ❑ If the objective of the project analysis is to maximize the wealth of people in Country, then the components or bundle that yields the highest economic NPV should be undertaken.

Economic Value Composition

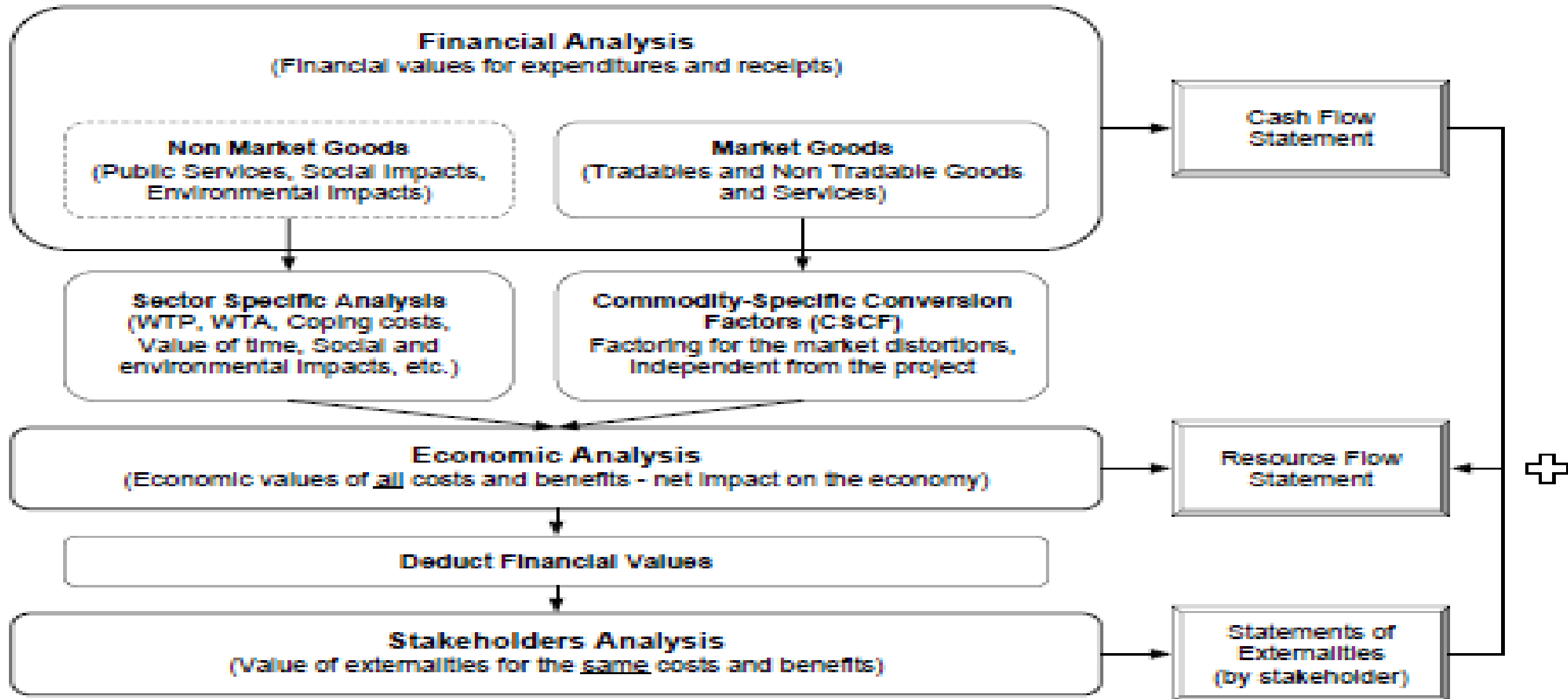
ECONOMIC VALUE
=
FINANCIAL VALUE
+
TAX IMPACT
+
NET BENEFITS TO CONSUMERS
+
NET LABOUR BENEFITS



Summary of Project Decision Criteria

- | | | | |
|----|---|---|------------------------------|
| 1. | Financial NPV | } | Project Owner's View |
| 2. | Financial IRR | | |
| 3. | Annual DSCRs | } | Banker's View |
| 4. | LLCRs | | |
| 5. | Economic NPV | } | Country's View |
| 6. | Economic IRR | | |
| 7. | PV of Impact on Stakeholders | } | Distribution Analysis |
| 8. | Probability of unacceptable outcome
for each of indicators above (risk simulation) | } | Risk
Analysis |

The Big Picture



Alternative Investment Criteria

1. Net Present Value (NPV)
2. Benefit-Cost Ratio (BCR)
3. Pay-out or Pay-back Period
4. Internal Rate of Return (IRR)

Alternative Investment Criteria

1. Net Present Value (NPV)

1. The NPV is the algebraic sum of the discounted values of the incremental expected positive and negative net cash flows over a project's anticipated lifetime.
2. What does net present value mean?
 - Measures the change in wealth created by the project.
 - If this sum is equal to zero, then investors can expect to recover their incremental investment and to earn a rate of return on their capital equal to the private cost of funds used to compute the present values. **In this case there is no change in wealth.**
 - Investors would be no further ahead with a zero-NPV project than they would have been if they had left the funds in the capital market.

Alternative Investment Criteria...

NPV..cont'

- Used as a decision criterion to answer following:
 - a. When to reject projects?
 - b. Select project(s) under a budget constraint?
 - c. Compare mutually exclusive projects?
 - d. How to choose between highly profitable mutually exclusive projects with different lengths of life?

Alternative Investment Criteria

Benefits-costs ratio

- As its name indicates, the benefits-costs ratio (R), or what is sometimes referred to as profitability index, is the ratio of PV of the net cash inflows (or economic benefits) to the PV of the net cash outflows (or economic costs)

$$R = \frac{PV \text{ of Cash Inflows (or Economic Benefits)}}{PV \text{ of Cash Outflows (or Economic Costs)}}$$

Alternative Investment Criteria

Benefits-costs ratio

- As its name indicates, the benefits-costs ratio (R), or what is sometimes referred to as profitability index, is the ratio of PV of the net cash inflows (or economic benefits) to the PV of the net cash outflows (or economic costs)

Basic rule:

If benefit-cost ratio (R) > 1 , then the project should be undertaken.

Problems?

Sometimes it is not possible to rank projects with the Benefit-Cost Ratio

- Mutually exclusive projects of different sizes
- Mutually exclusive projects and recurrent costs subtracted out of benefits or benefits reported gross of operating costs
- Not necessarily true that if $R_A > R_B$, then project “A” is better

Alternative Investment Criteria

3. Pay-out or Pay-back Period

- The pay-out period measures the number of years it will take for the undiscounted net benefits (positive net cash flows) to repay the investment.⁶⁹
- A more sophisticated version of this rule compares the discounted benefits over a given number of years from the beginning of the project with the discounted investment costs.
- An arbitrary limit is set on the maximum number of years allowed and only those investments having enough benefits to offset all investment costs within this period will be acceptable.

Alternative Investment Criteria

Internal Rate of return (IRR)

- IRR is the discount rate (K) at which the present value of benefits are just equal to the present value of costs for the particular project.

$$\sum_{t=0}^n \frac{B_t - C_t}{(1 + K)^t} = 0$$

- Note: the IRR is a mathematical concept, not an economic or financial criterion

- Interpretation:-

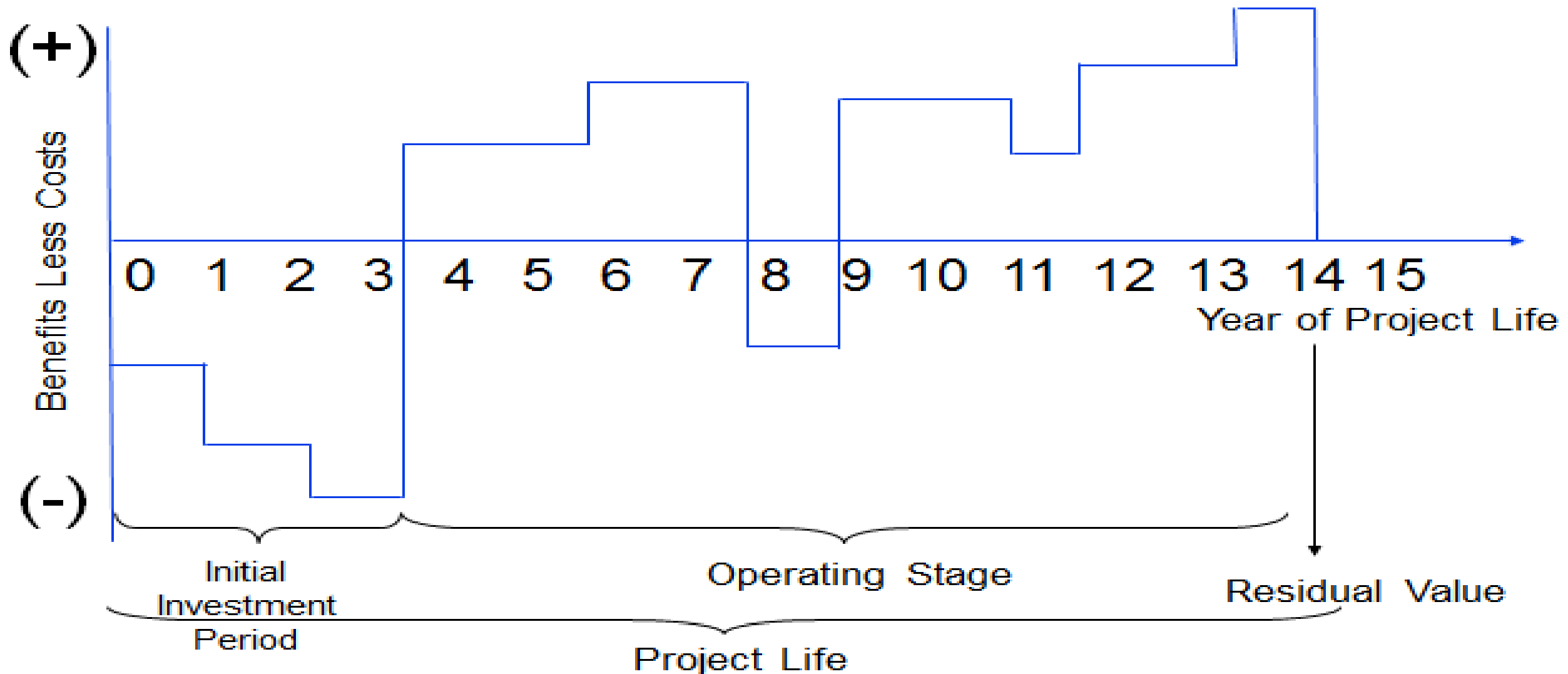
- (a) If the IRR is larger than the cost of funds then the project should be undertaken

- (b) Often the IRR is used to rank mutually exclusive projects.

- The highest IRR project should be chosen

- An advantage of the IRR is that it only uses information from the project

Project Cash Flow Profile



Cash Flow Statement Derivation

□ Two Approaches:

Discussed in this presentation

1) Direct Method:

- In this approach the focus is on expenditures or receipts and when they occur.
- Most suitable method for analysis of a project finance arrangement

2) Indirect Method:

- Derives the net cash flow from the net income statement and the balance sheet
- Natural way of the estimation of net cash flows in corporate finance situations

Moving from Financial to Economic Analysis

1. Restate financial revenues or physical outputs into their economic values – willingness to pay or economic value of resources saved.
2. Restate financial costs to economic opportunity costs.
3. Identify and quantify externalities both positive and negative of project.
4. Estimate economic values of externalities and include them as part of resource flows of the project.
5. Identify sources and magnitudes of risks that affect economic outcomes.
6. Adjust resource flows for the costs of managing such risks.
7. Apply the economic opportunity cost of capital to determine the net economic resource flows to the Economic NPV of project.

Use of Consistent Prices, Exchange Rates, and Interest Rates in Project Evaluation

- Nominal prices(current prices)
- Price levels
- Change in price levels (inflation)
- Real prices
- Changes in real prices
- Inflation adjusted values

Steps for Undertaking Financial Analysis

1. Estimate Real Prices, (P_t^i / P_t level) for project life
2. Make Assumptions about Future Inflation Rate (S)
3. Calculate Changes in Inflation-Adjusted Prices
4. Calculate estimated Nominal Interest Rate
5. Determine Cash Requirements (Nominal)
6. Determine Financing Requirements (Nominal)
7. Estimate Taxable Income and Income Taxes (Nominal)
8. Construct Pro-Forma Cash Flow Statement in Nominal Values
9. Calculate Nominal Net Cash Flows from Different Points of View
10. Calculate Debt Service Coverage Ratios for Total Investment (Banker's) Point of View
11. Deflate Nominal Value by General Price Index for Each Year to Obtain Real Cash Flow Statements
12. Calculate NPV and IRR for Owner's Point of View

Impacts of Inflation

1. Direct Impacts

On Financing of Investments

- Cost Escalation Due to Inflation vs Over Runs of Real Expenditures
- Planning for Cost Escalation Due to Inflation is Normal and Should be Part of Financing Plan

On Nominal Interest Expenses Paid On Real Desired Cash Balances

On Real Accounts Receivable and Accounts Payable

2. Tax Impacts

Interest Expenses Deductions

Depreciation Expenses

Inventories and Cost of Goods Sold

Treatment of Land in Cost Benefit Analysis

Cases:

1. Financial analysis if Land purchased or rented from free market as input to project.
2. Financial analysis if land already owned by enterprise doing project.
3. Financial analysis if land can be obtained only if a specific project is undertaken.
4. Economic analysis, and the economic opportunity cost of land.

Treatment of land in Cost Benefit Analysis...cont'

- ❑ In all cases, land has a cost to the project. There is an opportunity cost, either annual rental value or capital cost to project for time that it uses land
- ❑ In general, there is need to separate investment in land from the investment in project

Exceptions to general rules:

- ❑ If land availability is directly tied to doing the specific project, then capital gains or losses on land is a financial benefit or cost to the project placed on land
- ❑ Direct land improvement or destruction caused by project will affect residual land values at the end of the project

Project Risk Analysis

- ❑ Many types of risks – Pre vs post completion; Environmental, political, currency, market, etc.

Alternative methods of analysing risks of a project

- ❑ Sensitivity analysis – what if analysis; testing the effects of individual underlying variables
- ❑ Scenario analysis – Helps deal with combined correlated effects
- ❑ Monte-carlo risk analysis (simulation analysis) – takes into account probability distributions

Numerous benefits of risk analysis

Q & A

Thank You