Economic Analysis of Investment Projects

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Key Areas of Project Economic Analysis

1. Assess macroeconomic context	6. Identify project alternatives and conduct least cost analysis
2. Assess sector context	7. Identify and compare benefits and costs
3. Assess demand	8. Assess sustainability of proposed investment
4. Provide economic rationale and choice of financing modality	9. Undertake sensitivity and risk analysis
5. Establish a project design and monitoring framework (DMF)	10. Undertake distribution analysis

Role of Economic Analysis

- Aim of project economic analysis is to ensure that Bank-funded projects contribute to economic efficiency and thus raise GDP…
- Whilst at the same time where appropriate contribute to the government's broader objectives relating to poverty reduction, social inclusion, and environmental sustainability.
- All resource inputs used by a project have an opportunity cost as without the project they could have created value elsewhere in the economy
- Projects should be chosen where the resources will be used most effectively incorporating externalities

Economically efficient project

This requires

- a project generates an economic surplus above its opportunity cost,
- a project provides sufficient incentives for producers,
- sufficient funds are available to maintain project operations,
- the least cost means of providing project benefits is used,
- the distribution of project benefits and costs is consistent with poverty and inclusion objectives, and
- environmental effects are included in the analysis (either in monetary or qualitative terms).

Questions for project economic analysis

What macroeconomic factors can influence the target sector and vice versa?

- It is important to understand how macroeconomic factors may affect project performance is important.
- Knowing how the sectors contribute to the development process and influence the macroeconomic performance is part of the analysis.
- Some of the key macroeconomic factors include:
  - Exchange rate which can affect price and competitiveness of goods
  - Structural policies that influence prices and affect consumer and producer behavior
  - Fiscal position to assess and/or ensure sustainability of projects that draw on public resources.

Questions for project economic analysis

How does a project fit into a wider sector plan and are there key constraints to growth in that sector?

- Sector analysis is an important step to identify problems a project may face.
- The market structure, the degree of international competition, the level of policy-imposed controls and the general business environment can all influence project success.
- At the sector level information should be provided on
  - forecasts of future demands or needs for the type of output to be produced;
  - existing sources of supply, the costs of this supply, and any intended competing investment;
  - the contribution of the proposed project to meeting sector demands or needs, and any cost reduction or technology innovation it may contribute; and
  - the extent of direct government involvement as a supplier and the extent of any government subsidy to or taxation of the sector.

Questions for project economic analysis

Should there be public sector involvement?

- The case for public support should be set out as part of the initial assessment
- Public intervention is justified where there is clear need that the private sector is unable or unwilling to meet
- Or where there is political wish to use public ownership as a means of implementing a strategy for development.
- The justification for using Bank funds in the proposed project must make clear why a private sector solution is either unlikely to be forthcoming or would be less satisfactory,
- Or why institutional change rather than physical investment is not a better solution.

Questions for project economic analysis

What is the demand for project output?

- Demand analysis is the basis for identifying the goods and services needed by users and for estimating economic benefits.
- A project which has significant unused capacity for which there is no demand at a realistic price, will not be operating efficiently
- Market research and user surveys prior to completion of the appraisal can be used estimate future demand.
- Project demand should be assessed in the context of the likely total future demand and supply for the product, to establish how far the project will take market share from other producers
- And whether its output will have an impact on the market price

Questions for project economic analysis

Is the proposed project the most cost-effective alternative?

- Detailed analysis must focus on the best alternative.
- This will involve a preliminary analysis of options, which can be done by multi-criteria as well as preliminary economic analysis, depending on the data available.
- It will be critical to ensure that the alternative selected for detailed economic analysis is the least cost of the alternatives, allowing where relevant for any difference in output or benefits between alternatives
- The standard approach to cost effectiveness analysis is a comparison of discounted costs per unit of discounted output.

Questions for project economic analysis

Do project benefits exceed costs?

- The comparison is the with-project and without-project situation and requires assumptions about what would happen in the without-project case.
- This need not be a business-as usual scenario where the current position is untenable
- Project outputs and inputs must be identified in the years in which benefits and costs arise
- Any external effects affecting the rest of the economy but not reflected in market transactions by the project itself must also be included, where they can be identified
- The test for an acceptable project is a rate of return can be measured by the Economic Internal Rate of Return (EIRR).
- Asian Development Bank looks for an EIRR of at least 9% and 6% for social sector, poverty targeting and environmental protection projects
- Where a project creates effects (either as benefits or costs) that cannot be valued in monetary terms these must be reported numerically (for example, number of children vaccinated or primary school graduates).

Questions for project economic analysis

Is the project financially sustainable?

- A sustainable project requires that all stakeholders have adequate incentives to behave in the manner required by the project design.
- This means that there must be sufficient funds to operate and maintain the project investment, and that there are adequate financial returns to all project participants
- It will be useful to include information on the estimated fiscal impact for both revenue and non-revenue generating projects, whether in the public or private sectors.
- This will be particularly important where there is a doubt concerning the ongoing funding arrangements to cover operation and maintenance expenditure.
- Wherever a project design involves a subsidy justification must be given, with a projection of how long it will be required.

Questions for project economic analysis

How risky is the project?

- Inevitably uncertainty concerning future events so the analysis must highlight the factors most subject to risk, sources of risk and possible mitigation measures.
- Useful to calculate 'switching values' for key parameters to show how far their values have to change for project to become unacceptable.
- The probability of the EIRR falling below 9% will be a useful piece of information which can be considered in the overall assessment of the project.

Questions for project economic analysis

Who benefits from the project?

- Final dimension is to assess how far different stakeholder groups gain or lose from a project.
- Where a project is targeted at a particular social group, it will be important to assess the proportion of the benefits of the project going to this group.
- Also important to assess who bears cost of the project and how far the incentives implied by the income changes identified in the distribution analysis are compatible with the assumptions in the project plan.

Difference: financial and economic

	Financial	Economic
Output	Total return available to project participants (FNPV, FIRR)	Total return available to whole economy (ENPV, EIRR)
With versus without comparison	Included	Included
Prices	Current prices used in some analyses, otherwise constant base year prices	Constant base year prices
Depreciation	Excluded as a cost	Excluded as a cost, but used in the distribution analysis to estimate tax income for government
Price contingencies	Omitted in constant price analysis	Always omitted
Working capital	Annual increments to total working capital	Annual increments to physical working capital only

Difference: financial and economic

Transfer payments	Included in financial prices	Excluded from financial prices, except for non-incremental inputs and incremental outputs
Prices	Financial prices paid by project	Economic prices reflecting contribution to welfare (consumption equivalent)
Externalities	Excluded	Included where possible
Depletion premium	Excluded unless incorporated in projected market price	Included where possible
Discount rate	Weighted cost of capital	Standard opportunity cost rate
Distribution	Analysis covers government and project investors	Analysis covers all stakeholders

What are the examples of benefits by sector?

Transport projects

- Benefits of Transport projects should include at least the following:
- Travel cost savings
- Willingness to pay for additional travel
- Time saved dividing users into separate categories (work, leisure, driver/operator, passengers) plus spoilage costs avoided for perishable goods in transit
- Change in accident/fatalities
- Any environmental externality (change in CO_2 emissions)

Power projects

- Most of power projects are part of a system network so it is common to appraise power expansion programs considering the entire system without separating returns to generation, distribution or transmission.
- Two-step procedure can be used with first determination of the least-cost expansion plan given the existing configuration of the system, demand forecast, and available alternative system expansion plans
- Secondly, economic analysis to assess the economic viability of the selected least-cost expansion program.

Power projects

- Also possible to assess individual power generation projects as standalone activities if there is adequate surplus capacity in transmission and distribution.
- Projects displacing or rehabilitating old generation facilities reduce generation and operating and maintenance costs, and this cost saving is their benefit.
- For renewable projects that displace fossil fuel generation, benefits will include resource cost saving plus lower CO_2 emissions.
- For projects which have incremental effects electricity can be valued at the prevailing tariff or WTP if there is excess demand

Water Projects

- Sector where surveys used relatively frequently to assess willingness to pay
- Cost saved give non-incremental benefits where alternative water sources (vendors, wells) replaced by mains supply
- Sanitation services provide health benefits which will not be captured by the tariff charged, but may be included in willingness to pay
- Some project may include flood protection valued at damage avoided multiplied by probability of damage without project

Education and TVET

- Benefit valuation based on incremental earnings
- Lifetime earnings profile with and without education project
- Adjustment for education/training premium and possibility of unemployment
- Economic analysis should include project cost plus cost to family when student is outside workforce

Education Projects

- Cost effectiveness analysis requires indicator of education impact to compare with costs for pupils graduating, or test scores achieved
- Impact indicator (pupils graduating) must be discounted and compared with discounted costs
- CEI = PV (Costs)/ PV (Pupils graduating) to give cost per pupil
- Only rough indicator, requires a reference point or norm
- Used where benefit valuation difficult

Health Projects

- Rate of return analysis in health often not done in ADB (see Health Guidelines) because of difficulty of valuing life and good health
- Cost effectiveness analysis requires comparing
- PV(Project costs) with PV (Health impact)
- CEI = PV(Cw - Cwo)/(Hiw - Hiwo) where C is total costs, HI is health impact and w/wo with/without
- Usually discounted at social time preference rate of 2% to 3%

Health Projects

- Main measure of health impact in development context now Disability Adjusted Life Year (DALY)
- Rule of thumb has been put forward as a rough screening device (WHO 2002) that very cost effective intervention is one where cost per DALY is no more than average income per capita in the country concerned
- Interventions that cost up to three times per capita income are still considered cost effective but those that exceed this not cost-effective.

Thank you