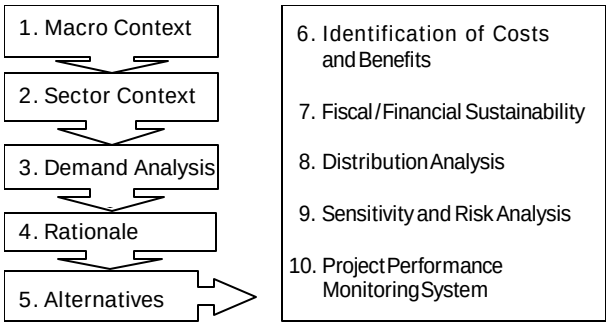
KEY AREAS OF ECONOMIC ANALYSIS OF PROJECTS

An Overview

ECONOMIC ANALYSIS AND
OPERATIONS SUPPORT DIVISION (EREA)
ECONOMICS AND RESEARCH DEPARTMENT (ERD)

November 2003

CONTENTS



INTRODUCTION

The economic analysis of projects helps identify and select public investments that will sustainably improve the welfare of beneficiaries and a country as a whole. This 2nd edition pamphlet[1] outlines key areas of economic analysis. It emphasizes that analysis begins at the first stages of project identification, during country strategy studies and programming, and continues iteratively throughout the project cycle. Economic analysis is coordinated with institutional, financial, environmental, social and poverty analyses, forming an integral part of investment appraisal.

Part I of the pamphlet summarizes the principles and key areas of analysis needed to appraise the economic feasibility of every project. The detailed assessment methods are outlined in ADB's *Guidelines for the Economic Analysis of Projects* (1997). Part II summarizes the main issues to be addressed in each of the 10 key areas of analysis (AAs). Part III outlines the stages of the project cycle when analyses need to be carried out.

In practice, each sector, situation and set of problems to be addressed is different. Basic principles of analysis need to be followed, although analytical approaches and data requirements need to be adapted to different circumstances. Selecting the appropriate level of analysis to inform project decision-making is key to sound economic analysis.

The pamphlet is intended to help ADB staff, consultants and Developing Member Country (DMC) counterpart staff apply the principles of project economic analysis at each stage of the project development process.

[1] The pamphlet was first published as *Economic Analysis of Projects: Key Questions for Consultants*, EDRC, Manila, 1998.

PART I: SCOPE OF PROJECT ECONOMIC ANALYSIS

Macroeconomic Context

What macroeconomic factors influence target sectors and vice versa?

A project cannot be designed and implemented in isolation from the rest of the economy. An understanding is needed of an economy's overall performance and outlook and how macroeconomic factors may affect project performance. This includes understanding how the sectors of an economy contribute to the overall growth and development process and influence macroeconomic performance. Key macroeconomic factors include, for example, exchange rate changes that affect the price and competitiveness of traded goods, and economy-wide structural policies that influence prices and affect consumer and producer incentives and behavior. The fiscal management situation needs to be understood for the purposes of assessing and ensuring financial sustainability of projects that draw on public resources.

Sector Context

What are the binding constraints to the functioning of markets and efficient and equitable provision of public services?

Where markets provide private goods and services, dimensions of the sector setting that need to be understood include: key sector production and supply systems; prices and incentives that affect consumer and producer behavior, and; the supporting market and public institutional framework. Understanding is needed of: industry and market structures, conduct and performance; the global context of internationally traded goods and services; policy-caused price distortions (the main reason for differences between financial and economic prices); and assessment of private sector constraints that affect the function and performance of market-related institutions and determine the transaction costs of doing business, such as the legal and enabling environment.

In cases where markets fail to provide goods and services that society wants, public provision can become a critical matter of inquiry. Understanding the role and performance of public institutions in, for example, service delivery requires equally careful assessment. This includes assessing the policy and legal framework, public goods delivery mechanism and performance, fiscal and public expenditure management, and the size and distribution of benefit incidence. As with the private sector, the organization and performance of public institutions can greatly affect the transaction costs in delivering public goods and services. Where public institutions and agencies fail to effectively provide public goods or deliver services, the causes need to be identified.

Analysis of markets and public institutions provide the basis for problem identification, usually a market or institutional failure or imperfection. The sector analysis is the essential step to identifying key problems, their causes and effects, and consequently the basic rationale for a project and its objectives. Problem and objective tree analysis are established techniques in guiding a systematic diagnosis. The more clearly defined a problem and its causes are at the sector analysis stage, together with the objective for a possible project, the more focused project appraisal will likely be.

Demand Analysis

How much of the output is wanted? How much are users willing to pay for the output?

A demand analysis provides the basis for identifying the goods and services needed by users and the estimation of the economic benefits from a project. A project that does not meet the consumer or user demand for particular goods and services will not meet its objectives, or generate benefits, resulting in resource wastage and non-viability.

Market research and user surveys may be undertaken to increase the reliability of estimates and to assess the demand response to price changes and income growth. Research can also be used to identify the potential and options for beneficiaries' willingness to pay for project goods and services. Project demand for an input and the market demand for an output or need for a service should also be assessed in the context of total demand and supply for the good or service, to determine whether total demand or supply, and prices, are likely to be affected by project output.

Economic Rationale

Why should there be public sector intervention?

The main rationale for public sector operations is to address failure or limitations of markets to adequately and efficiently provide what society wants. Market function imperfections can arise from, for example, sub-optimal market structures, and high transaction costs and risks due to unclear property rights, asymmetric information and poor contract enforcement.

Missing markets can arise from the non-rival, non-excludable nature of goods and services that makes cost recovery and financially viable private provision difficult. Here, public provision is usually justified. Public goods include services such as public health, basic education and law and order.

Imperfections and failures in public goods and service provision also arise. These include inefficient public provision that raises costs in relation to benefits, and leakages from intended beneficiaries (e.g. from the poor to the non-poor). Public institutions responsible for public goods and service provision may need strengthening through capacity building or restructuring.

A clear economic rationale will help narrow the possible alternative ways of addressing a development problem, and help identify key performance indicators. Importantly, the basic economic rationale for a public sector operation is established at the time of sector assessment.

Alternatives and Least-Cost Analysis

What is the best way of addressing the market or institutional failure or problem?

Having established the problem to be addressed, and the rationale and objective for a project, the next question is what are the alternative, mutually exclusive ways to meet the objective? This includes asking what will happen without the project – that is, what is the counterfactual? Considerations include comparison of allocative efficiency and operational improvements with capacity expansions, and the scale, location, technology, and timing of alternative project designs.

With the analysis on causes and effects of market and institutional failures in mind, the alternatives analysis can better consider alternative designs, institutional and financing arrangements. The basis for selecting the preferred alternative should be clearly explained, particularly if it is not the least-cost alternative in economic terms.

Comparing Benefits and Costs

Will the project benefits exceed project costs?

With the project alternative selected, the next step is to determine whether the project is worthwhile, by comparing the costs with the benefits. The benefits of the project must be identified and measured relative to what might happen without the project, or the counterfactual. The without-project scenario need not be the same as the current situation. For example, if the current situation is expected to deteriorate further, the project impact must be measured relative to falling performance.

Once the project's inputs, and related costs, and outputs, and related benefits, are identified they need to be measured in physical terms and the unit and total value estimated. Estimate valuation must distinguish between project inputs and outputs that replace current supplies (non-incremental), or add to total supplies (incremental) as different methods apply. External effects, such as environmental impacts as a result of the project, must also be quantified, valued, and costs or benefits incorporated.

The price level, either the domestic or world levels, and the unit of account (numeraire), either domestic or an international currency, must be consistently used in comparing alternatives. The without-project scenario should be the same one analyzed in the alternatives.

The economic justification of the project is based on comparing the values of the benefits and costs. A project investment is economically justified if the estimated economic internal rate of return (EIRR) exceeds the economic opportunity cost of capital (EOCC) for the country. Given the difficulty of estimating country-specific EOCCs, the EOCC for all ADB DMCs is 12 percent. An EIRR between 10 and 12 percent is acceptable if there are significant unquantified net benefits.

If the value of a project's outputs cannot be measured, then the economic analysis can be based on a cost-effectiveness analysis. A project is cost-effective if it has the lowest average cost per unit of output. A cost-effectiveness analysis alone, though, is not sufficient. If benefits cannot be estimated, other economic and social arguments must be developed to establish the project's justification.

Financial and Institutional Sustainability

Are there enough resources to ensure the flow of project benefits?

Project economic viability depends on and thus calls for detailed financial and institutional sustainability analysis. For example, financial sustainability assessment for revenue-generating projects incorporates an analysis of the financial performance of project related enterprises. A key assessment is whether there is sufficient incentive for respective project participants from a financial returns point of view, and whether participants have sufficient funds for investment, operation and maintenance. Where relevant, analysis is also needed of the self-financing capacity of the project-operating entity through prices or user charges.

For both revenue and especially non-revenue generating projects, the fiscal impact of the project should be carefully considered. Where goods or services are funded directly through the government budget, an assessment of the fiscal impact of the project arising from, for example, operation and maintenance should be made.

ADB supports minimal use of financial subsidies. Exceptions may occur in the provision of basic foodstuffs, basic water, primary health care, and basic education, but clear justification for financial subsidies needs to be established.

Assessment of institutional sustainability focuses on identifying the functions, form and

capacity of agencies, whether public, non-government or private, that are being considered for a role in implementation. A clear and distinct role for public and/or private agencies will need to be established based on systematic assessment of institutional factors that might underlie the market or institutional failure, and capacity to assume an identified role. The envisaged project implementation period should also consider the capacity of implementing agencies to achieve time targets, as delays can result in increased costs and delayed benefits.

Distribution Analysis

Who benefits from this project, and by how much?

The main project beneficiary and stakeholder groups and the extent to which they gain from benefits, or bear costs, should be identified. Where project effects are intended to benefit a target group, the proportion of net benefits going to that group should be assessed.

Sensitivity and Risk Analysis

What are the chances that the benefits and costs will be realized as anticipated?

As there is always a degree of uncertainty about future events, it is necessary to understand the parameters in an economic analysis that are subject to risk, the source of those risks and the probable extent of variation. Sensitivity analysis is undertaken to identify those parameters that are both uncertain and for which the project decision, taken through the economic net present value (ENPV) or EIRR, is sensitive. Switching values showing the change in a parameter required for the project decision to change from acceptance to rejection are presented for key parameters and can be compared with post-evaluation results for similar projects. A quantitative risk analysis is recommended for large projects, those projects with an EIRR close to the 12% EOCC, and those with high risks. The analysis should incorporate different ranges for key parameters, and the likelihood of their occurring simultaneously. Sensitivity and risk analysis should lead to improved project design, and an outline of actions mitigating against major sources of uncertainty.

Monitoring and Evaluation

Do the initial assumptions maintain their validity throughout the project life?

The economic analysis often has to make assumptions about key parameters. Monitoring is needed of actual outcomes for the purposes of managing implementation and assessing impact. This is especially important for the increasing number of process type projects that do not identify, for example, specific production models in advance, as well as sector projects for which only indicative models may be appraised.

ADB's Project Performance Monitoring System (PPMS) provides the framework for laying out key parameters that require monitoring through appropriate data collection systems both as indicators in themselves and as inputs for on-going analysis. Analysis can inform the need for course changes and assessing real-time or ex-post impact.

PART II: THE 10 AREAS OF ANALYSIS (AAs)

Covering the 10 AAs requires many specific tasks. The following list identifies the most important tasks for each AA. The list is not comprehensive, and other tasks may be required, depending on the circumstances of the project. The AAs are numbered in the order in which they generally would be addressed, but the tasks for each AA can be overlapping, and are not strictly sequential. A task listed under one AA, for example, may be required before previous AAs are completed.

1. Assess Macroeconomic Context

- Review recent economic performance including key trends sources of growth to identify sector needs for improving growth potential.

- Assess macroeconomic policies, issues, and indicators such as debt levels, balance of payments, inflation, exchange rate movements, and public financial management as related to the target sector and area.

- Assess economy-wide structural policies that may affect market functions and service provision to the target sector, including trade, financial, labor, and governance structures.

- Assess economic outlook and projections for key indicators critical to sector and project performance.

- Assess critical linkages, and assumptions that affect target sector performance and possible investments, including feedback mechanisms and effects from the sector to the macro economy and other sectors.

- Estimate country-wide economic parameters such as standard conversion factors or shadow exchange rate factors.

2. Assess Sector Context

- Assess overall sector growth and performance, and area-specific performance.

- Assess resource availability and utilization, and determine comparative advantage of various economic activities.

- Assess market-related institution performance:
  - Extent of property rights and contracts definition and enforcement and the effect on access to resources and income sources;
  - Industry or service structure conduct and performance; availability and access to factors of production; supply chain, marketing, and service delivery issues; issues influencing transaction costs; and effects of taxes, subsidies, quotas;
  - Effectiveness of information flows on market conditions and goods to existing and potential participants;
  - Extent to which public and private institutions increase or inhibit competition in markets.

- Assess public institution performance:
  - Role and functions of government and institutional framework in economic activity and service provision;
  - Vertical and horizontal institutional arrangements including decentralization measures as appropriate;

- ❖ Efficiency and effectiveness of public institutions in policy making, regulation and service delivery;
- ❖ Allocation and management of public expenditure and benefit incidence.

- Identify other supply sources or service providers: government, private sector, non-government organizations (NGOs), etc.

- Assess the policy environment including price, market-institution or public institution policies.

- Assess patterns of public and private investment in the sector and conduciveness of the sector context to investment activities.

- Identify the priority binding constraints to sector performance and development in terms of market and non-market failures. Assess whether problems and their solutions should be addressed concurrently or sequentially.

- Identify the most appropriate form of developmental support: advisory technical assistance, policy-related or investment type operation.

3. Assess Demand

- Assess demand for goods and services produced/provided by the sector, and the size of the market in terms of the demand to be met by a possible project.

- Identify and distinguish demand shifting and changing factors including income, demography and substitutable and complementary goods and services.

- Assess consumer/client's degree of satisfaction with the existing quantity and quality of goods and services produced/provided

- Identify potential and options for beneficiaries' willingness-to-pay for project goods and services.

- Assess how demand will be affected by price and user charges.

4. Identify Economic Rationale

- Describe the market or institutional failure that needs to be addressed.

- Establish the rationale for public sector involvement. Justify what the government can do that the private sector cannot.

- Clarify and evaluate the strategic relevance of the proposed project-type operation, in the country or sector context.

- Justify the role and form of ADB's possible involvement.

5. Identify Project Alternatives

- Identify without- and with-project situations. Develop the basis for counterfactual analysis.

- Identify possible project alternatives in terms of location, scale, timing of investments, as well as policy changes.

- Identify inputs and outputs as traded/ nontraded, and incremental/ nonincremental.

- Describe and assess each alternative's benefits and costs, including possible environmental impacts and identify the least-cost alternative for the project.

- Choose the preferred alternative and explain the basis for choosing it.

6. Identify and Compare Benefits and Costs

- Identify the types of benefits, and main areas of costs that need to be further assessed.

- Identify and measure the main project benefits and costs, comparing with- and without-project situations for each alternative.

- Review the methods for measuring each type of benefit and cost, considering analytical effort, ease of explanation and understanding, and robustness of results.

- Choose the method/s of measuring benefits and costs. If it is not feasible to measure benefits, determine alternative method of analysis such as cost-effectiveness analysis.

- Establish the basis for shadow pricing by choosing the numeraire and price level.

- Estimate the EIRR and ENPV for each independent subcomponent of the project, and for the project as a whole.

- Explain any expected difficulties in completing the cost-benefit analysis, and how such difficulties may be overcome.

- For unquantified benefits, explain why the benefits were not measured. Describe the benefits qualitatively.

- Assess and justify the time to be taken to complete the project and implications for cost and benefit realization.

- Spell out the major conclusions of the economic analysis, and assess whether the project is economically justified.

7. Assess Financial and Institutional Sustainability

- If the project generates revenue, estimate the financial internal rate of return (FIRR) and compare to the weighted average cost of capital (WACC). Analyze and explain any difference between the FIRR and EIRR.

- Estimate the financial returns to different project participants. Evaluate whether the financial returns are adequate to attract investment or ensure active involvement.

- Explain any cost recovery measures or charges for goods and services, including how charges were incorporated into the demand and rate of return analysis.

- Analyze the project and associated enterprises for both external and internal (cross-) subsidies. Evaluate and explain the basis for any identified subsidies.

- Evaluate the financial sustainability of the project, both with and without any subsidies.

- Evaluate the fiscal impact of the project on the capital and recurrent budget, and identify and evaluate the source of funds to meet net fiscal requirements.

- Use the institutional assessment results to identify how functions, form and capacity of

project related agencies are likely to affect project-related input and service delivery and implementation. Identify implications for likely implementation schedules.

8. Undertake Distribution Analysis

- Identify stakeholders affected by the project and how the project affects them including access to project inputs and outputs and the distribution of benefit incidence.
- Identify which stakeholders pay for project inputs, and their response.
- Determine appropriate approaches to the distribution analysis (e.g. quantitative and qualitative methods)
- Estimate the distribution of benefits and costs, including the distribution relative to targeted project beneficiaries (e.g. the poor).

9. Undertake Sensitivity and Risk Analyses

- Identify the plausible range of variability for key parameters or assumptions.
- Estimate the switching value for each parameter, and compare to the plausible range.
- Use the results to identify the key parameters that affect the financial and economic performance of the project.

- Propose and explain measures for monitoring each key parameter.
- Assess and explain the institutional risks, such as capacity limitations.
- Specify a probability distribution over the plausible range of each key parameter, and explain the basis for the distribution.
- Conduct quantitative risk analysis for key parameters. Use results to identify major risks to the economic basis of the project.
- Propose and explain measures for managing or reducing the project's major risks.

10. Establish a Project Performance Monitoring System (PPMS)

- List the key parameters necessary to identify project impact during implementation and operation.
- Ensure that this includes key performance parameters, physical or financial, for the implementing agency.
- Identify the requirements to collect data on all the key parameters.

PART III: AREAS OF ANALYSIS IN ADB's PROJECT PROCESSING CYCLE

Step	A. Country Strategy and Programming	B. TA Fact-Finding	C. TA Implementation	D. Loan Fact-Finding	E. MRM, SRC
Activity	1. Macroeconomic context assessment 2. Sector context assessment 3. Demand Analysis 4. Identification of economic rationale and prospects for an operations	1, 2, 3. Update of macroeconomic, sector context, demand analyses 4. Confirmation of economic rationale 5. Identification of project alternatives 6. Preliminary identification of benefits and costs, and distributional issues 7. Identify fiscal and financial sustainability issues	2, 3. Sector and project demand analysis 5. Confirmation of the optimal alternative 6. Full identification of costs and benefits, including methods of valuation measurement 1-7. Overall assessment of the developing project investment	1-5. Overall Assessment of developing project investment 6. Validation of cost-benefit analysis 7. Financial and institutional sustainability analysis 8. Distribution analysis 9. Sensitivity and risk analysis 10. PPMS	1-10. Full confirmation of the project's economic viability and resolution of outstanding economic issues
Output	**CSP / Project Concept Paper**	**TA Paper**	**Interim Reports**	**Draft Final Report / Draft RRP with Supplementary Appendices**	**RRP**