KEY QUESTIONS FOR CONSULTANTS

ECONOMIC ANALYSIS OF PROJECTS

Project Economic Evaluation Division
Economics and Development Resource Center
In February 1997, the Asian Development Bank approved Guidelines for the Economic Analysis of Projects. The purpose of the guidelines is to assist the Bank and executing agencies in deciding what is the best way to achieve project objectives, and to determine if the best project alternative is economically worthwhile.

Every project is different. Each will have different costs and different benefits. Each will involve a different set of economic and financial prices. The guidelines, however, interpret the economic analysis of projects broadly, and include the basic principles for estimating the project's economic returns. They also are concerned with a comparison between the economic and financial returns, the financial sustainability of projects, the inclusion of environmental effects, and the analysis of the distribution of net benefits.

The first part of this pamphlet contains a checklist of Key Questions that the economic analysis should address in every project. The methods for addressing these Key Questions are outlined in the guidelines themselves. A summary of the principles concerned is contained in the second part of this pamphlet.

It is hoped that this pamphlet will encourage users to review the methods of the guidelines, and apply them in their project preparation work. The main users of the guidelines are expected to be Bank staff, officials working in government departments and corporations associated with Bank assisted projects, and consultants employed in project preparation.

Project Economic Evaluation Division
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The economic analysis of projects is carried out prior to their financing and when necessary throughout the project cycle. Economic analysis seeks to promote the best use of a country’s resources, consistent with national and sector development goals. The rationale for a project in terms of market or government failure, and the country’s national and sector development goals needs to be stated. Where possible, the costs and benefits of the best project alternative, defined and valued from the perspective of the national economy, are compared to assess economic efficiency. If benefits cannot be valued, economic costs are assessed against project objectives with a view to minimizing the cost of achieving them.

An assessment of project risks, producer incentives, and fiscal impact is made to improve the sustainability of project activities. Environmental costs and benefits are included as far as possible. A statement should be provided of the main project benefits and beneficiaries. Economic analysis is undertaken in addition to technical, institutional, financial, environmental, and social analysis.
KEY QUESTIONS

Project Rationale

1. What is the rationale of the project: what market or government failure does it address?
2. What is the rationale for public sector involvement/private sector operations?
3. What is the main alternative to the project?
4. Are changes in policy considered as an alternative to investments?
5. Are efficiency improvements compared with capacity expansions?

Macroeconomic and Sectoral Context

1. How does the project relate to the overall development strategy?
2. What particular development problem does it address?
3. What is the policy environment for the project: taxes and subsidies, trade controls, exchange rate and interest rate policy?
4. How does the project relate to the sectoral strategy?
5. What is the sectoral policy context in terms of market structure and regulation?
6. Is the project a priority public investment?

Project Alternatives

1. Are project alternatives considered in terms of location, scale, and timing?
2. How was the best alternative chosen?
3. Are the subprojects ranked in an appropriate way?
4. Is the least-cost alternative identified for the project or major subprojects?
5. Is cost-effectiveness analysis used when benefits cannot be quantified or valued?
6. Is the most cost-effective means identified?
7. Is it also the most effective means?
8. What is the additional cost of the most effective means?
9. Does the project have several outcomes: how are they weighted to assess cost effectiveness?

Demand Analysis

1. What is the basis for projecting the demand for project output?
2. How will demand be affected by income growth?
3. What other sources of supply are there for meeting the demand?
4. How will demand be affected by an increase in price or user charge?

Identification of Costs and Benefits

1. Are the without- and with-project situations both described?
2. Are all project costs, comparing the without- and with-project situations identified?
3. Are all project benefits, comparing the without- and with-project situations, identified?
4. Which benefits are quantified and valued, and which are not?

Use of Shadow Prices

1. Was an economic rate of return calculated?
2. What numeraire is used in the application of shadow prices? Is it used consistently?
3. Are project outputs identified as nonincremental and incremental?
4. Are they valued appropriately?
5. Was all the data available for valuing the project outputs and inputs?
6. Are the major project costs identified as incremental or nonincremental, and valued appropriately?
7. Are benefits and costs broken down into traded and nontraded items?
8. What value of the SERF/SCF* is used: is it correctly applied?
9. Are more specific conversion factors used for some items: how were they derived?
10. What discount rate is used: to choose between alternatives, and to assess economic viability?

Sensitivity Analysis

1. What type of sensitivity analysis was applied?
2. Does it relate to the underlying benefit and cost variables?
3. Are the key variables identified?
4. Are switching values calculated?
5. What measures are proposed to monitor the key variables?

Risk Analysis

1. Is there a quantitative risk analysis?
2. Are probabilities attached to any of the key sensitivity variables?
3. Are institutional risks assessed?
4. Are there sufficient incentives for government participants in the project?
5. What measures are proposed to reduce project risks?

Financial and Fiscal Sustainability

1. Is the FIRR** for the project calculated?

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* SERF/SCF = shadows exchange rate factor/standard conversion factor
** FIRR = financial internal rate of return
2. Are the financial returns to different project participants calculated?
3. Are they adequate to attract investment/ensure active involvement?
4. What is the level of charges for goods and services? Is the economic analysis related to the charge level?
5. What is the difference between the FIRR and EIRR, and what accounts for the difference?
6. Are the average incremental financial and economic costs calculated?
7. What is the level of cost recovery?
8. Is there any explicit or implicit subsidy to the project? What is the justification for the subsidy?
9. Was the fiscal impact on the capital and recurrent budget calculated?
10. What will be the source of funds to meet the net fiscal requirements: extra taxation, extra borrowing, or a reallocation of expenditure?

Environmental Sustainability

1. Are the environmental effects of the project identified: costs and benefits?
2. How are they quantified and valued?
3. Are they expressed in the same numeraire as the basic economic analysis?
4. Are they integrated into the economic analysis: for choosing between project alternatives; for assessing economic viability?
5. Are the required mitigatory and monitoring expenditures identified?

Distribution Analysis

1. Is there a distribution analysis for the project? Are levels of income projected both without and with the project?

*** EIRR = economic internal rate of return
2. Is the effect of the different levels of charges for goods and services assessed for operators, customers and government?
3. Is the distribution of costs, especially to the poor, identified?
4. Is the distribution of benefits, especially to the poor, identified?
5. What proportion of the net benefits will go to poor people?
6. Is the distribution of costs and benefits analyzed by gender?
7. Is there a substantial foreign involvement in investment and operation?
8. Is the proportion of incomes and revenues going to foreign investors, lenders, and workers identified?
9. For subregional projects, is the distribution of costs and benefits between countries calculated?

**Benefit Monitoring and Evaluation**

1. What are the key variables necessary to identify the impact of the project during implementation and operation?
2. Do these include key performance variables, physical or financial, for the implementing agency?
3. Is a system in place to collect data on all the key variables?

**Overall Assessment**

1. Are the major conclusions of the economic analysis clearly spelled out?
2. Does the project incorporate the best alternative?
3. Is the project economically viable?
4. Are any policy changes necessary to complement project implementation?
5. Are any capacity-building measures necessary to provide incentives or training to the executing agency and other participants?
OPERATIONAL PROCEDURES

Introduction

The economic analysis of projects attempts to determine whether a particular project provides an acceptable level of economic benefits relative to economic costs. For the full economic net benefits to occur, financial sustainability must also be assured.

Bank practice is guided by the Guidelines for the Economic Analysis of Projects (1997). These guidelines outline the principles on which the economic analysis of projects should be based. In practice, depending upon the data available and the cost of obtaining more, it may not always be possible to quantify and value all the costs and benefits of a particular project. Not every form of analysis will be equally applicable to every project. While attempting as full an analysis as possible, the principles of the guidelines need to be adapted to the circumstances of each project being analyzed.

Procedures for the economic analysis of projects cover the following steps: (i) assessing the rationale for a project, (ii) defining project objectives, (iii) forecasting effective demand for project outputs, (iv) choosing the least-cost design for meeting demand or the most cost-effective way of attaining the project objectives, (v) determining whether economic benefits provide an adequate return on economic costs, (vi) assessing whether the project's net benefits will be sustainable throughout the life of the project, (vii) analyzing the sensitivity of project decisions and the risks associated with the project, (viii) identifying the distribution of project effects, and (ix) enumerating the nonquantifiable effects of the project that may influence project design and the investment
decision. Not all projects or project components produce benefits that can be measured in monetary terms. In such cases, procedures for economic analysis comprise all of the above steps except (v).

Economic analysis is undertaken at constant prices, that is, without allowing for the effects of general inflation on costs or benefits, but incorporating projected relative price changes for key items.

**Project Rationale**

The main rationale for Bank operations is the failure of markets to adequately provide what society wants. Investments or policy changes are related to the extent of externalities in the production of public goods, the need to regulate monopoly suppliers, or the perceived level of risk for private investors. Project proposals should be derived from sector analysis of future demands and supply. The macroeconomic and sectoral policy environment and its effect on the project should be assessed.

**Demand Analysis**

A demand analysis or forecast provides the basis for the estimation of the scale and economic benefits of a project. 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. Project demand for an input and the market demand for an output or need for a service are examined in the context of total demand and supply for the good or service, to determine whether total demand or supply, and hence prices, are likely to be affected by the implementation of the project.
Least-cost Analysis

Having determined the scope of a project on the basis of demand and other factors, least-cost analysis is undertaken to identify the most cost-effective way of achieving project objectives. Economic costs are used to examine the scale, location, technology, and timing of alternative project designs. Because output demand, supply cost, and price charged tend to be interrelated, least-cost analysis should account for the effects of any demand uncertainty. Cost-effectiveness analysis to identify the lowest cost means of achieving a unit increase in project indicators can be applied where outputs are quantified but not valued. In some cases, project investments are part of a larger network. The project investments should be analyzed as part of the least-cost network expansion for overall planned investments.

Comparing Costs and Benefits

The economic analysis of projects is based on comparing benefits and costs in the situation without the project with what would occur with the project in place. The without- and with-project situations both have to be projected. Certain effects of a project do not impose a cost or confer a benefit within the confines of the project itself, and therefore are excluded in the analysis of financial benefits and costs. However external effects on consumers or other producers, such as environmental costs and benefits, are included in an economic analysis.

Project outputs need to be separated into two categories. Some project outputs will substitute for other outputs without the project. The rest of the project outputs will add to total supply. Project outputs that substitute for without-project supplies are valued at the cost savings of not acquiring those alternative supplies. Project outputs that add to the total supply are valued through the
willingness to pay of the users. The willingness to pay should take into account any reduction in price brought about by the extra project supplies. Where a project output consists of an intermediate good, its value can also be assessed through the net economic value of extra productive activities generated as a result of the project.

Similarly, some project inputs will come from extra supplies and some will be drawn away from other users. Where project demands induce greater production of an input domestically that cannot be imported or exported, the input is valued through the extra cost of production to supply it. Where inputs are competed away from other uses, the input is valued through the willingness to pay of existing users to retain supplies, or of the project to obtain them.

To be able to compare costs and benefits, items valued at international prices and items valued at domestic prices need to be valued using the same numeraire, that is, at the same price level and in the same currency. The shadow exchange rate factor is used to revalue costs and benefits valued at international prices to the domestic price level. Alternatively, the standard conversion factor is used to revalue costs and benefits valued at the domestic price level to the world price level.

When economic costs and benefits are valued using the same numeraire, project criteria can be applied to choose the best project alternative and to test whether it is economically worthwhile. In choosing between mutually exclusive alternatives for directly productive projects, the alternative with the highest economic net present value at the economic rate of discount is chosen. In choosing between alternatives where benefits are not valued, the alternative with the lowest present value of costs at the economic discount rate is chosen.
The basic criteria for a project's acceptability are the expected economic net present value (ENPV) and the expected economic internal rate of return (EIRR) of the best alternative. For the project (or subproject) to be acceptable, the EIRR should be equal to or exceed the economic opportunity cost of capital (EOCK) for the borrower country. In Bank practice, given the complexity of estimating country-specific EOCKs, an economic discount rate is set regardless of the country concerned. This rate is from 12 to 10 percent in constant economic prices, depending on the extent of unquantified net benefits associated with the project.

**Sensitivity and Risk**

Sensitivity analysis is undertaken to identify those parameters that are both uncertain and for which the project decision, taken through the ENPV or EIRR, is sensitive. Switching values showing the change in a variable required for the project decision to change from acceptance to rejection are presented for key variables and can be compared with postevaluation results for similar projects. For large projects and those close to the cut-off rate, a quantitative risk analysis incorporating different ranges for key variables and the likelihood of their occurring simultaneously is recommended. Sensitivity and risk analysis should lead to improved project design, with actions mitigating against major sources of uncertainty being outlined.

**Sustainability**

A project is sustainable if its net benefits endure throughout its life at a level sufficient to meet the economic viability criteria. Sustainability is enhanced where external environmental effects are internalized in prices facing the operating agency. Economic benefits also depend on
financial and institutional sustainability. Sustainability analysis of projects incorporates a financial analysis at constant market prices for the main project participants, to ensure sufficient incentive for producers and sufficient funds for investment. This includes an analysis of the self-financing capacity of the project-operating entity through prices or user charges. The Bank seeks to minimize financial subsidies that cannot be justified on economic efficiency grounds, although exceptions may occur in the provision of basic foodstuffs, basic water, primary health care, and basic education. Where goods or services are provided directly through government budget expenditures, an assessment of the fiscal impact of the project in implementation and operation should be made.

Beneficiaries

The main project beneficiaries and the extent to which they benefit should be identified. Project benefits will accrue directly to beneficiaries from project outputs or as external benefits from the provision of public goods. Where project effects are intended to benefit a target group, the proportion of net benefits going to that group should be assessed.