

# I. INTRODUCTION

1. The Agreement Establishing the Asian Development Bank (ADB Charter) requires staff to “take the necessary measures to ensure that the proceeds of any loan made, guaranteed or participated in by the Bank are used only for the purposes for which the loan was granted and with due attention to considerations of economy and efficiency” (Article 14.11). It also states that “only economic considerations shall be relevant to their decisions” (Article 36.2).<sup>1</sup> Project economic analysis is a key tool to ensure that ADB operations comply with the mandate of the ADB Charter and contribute to the broad objectives of poverty reduction, inclusive economic growth, environmental sustainability, and regional integration.

2. Project economic analysis aims to ensure that scarce resources are allocated efficiently, and investment brings benefits to a country and raises the welfare of its citizens. All resource inputs used by a project have an opportunity cost because, without the project, they could create value elsewhere in the economy. An economically viable project requires that, first, it represents the least-cost or most efficient option to achieve the intended project outcomes; second, it generates an economic surplus above its opportunity cost; and third, it will have sufficient funds and the necessary institutional structure for successful operation and maintenance. ADB’s development mandate also requires that an ADB-financed project distribute benefits and costs in a way consistent with its intended development objectives and that it can internalize the environmental effects.

3. The guidelines outlined in this publication set a general approach to the economic analysis of projects for application by ADB. They are a revised version of the edition published in 1997. The revisions respond to the findings of ADB’s economic analysis retrospectives and quality-at-entry (QAE) assessments in recent years, which highlight the weaknesses in project economic analysis as applied in ADB operations. One of the recommendations was that more methodological work be carried out to guide ADB staff and consultants for better QAE. The revisions also consider the changing development context and ADB operational priorities, as well as methodological developments in project economic analysis.

4. The revised guidelines incorporate a number of changes from the 1997 edition. First, the minimum required economic internal rate of return (EIRR) for investment decisions has been revised. Second, several issues that have emerged or become more important since the adoption of the 1997 edition are introduced, including economic analysis under various financing modalities, the treatment of the social cost of carbon, and economic analysis of regional economic cooperation

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<sup>1</sup> ADB. 1965. *Agreement Establishing the Asian Development Bank*. Manila.

projects. Third, a new chapter on benefit valuation by sector has been added, which details the method for valuing project benefits in major sectors of ADB operations. Fourth, appendixes have been updated. And fifth, the presentation of the guidelines has been made less technical and more user-friendly.

5. ADB's project portfolio now covers a wide range of sectors, encompassing physical infrastructure and social sectors and both public and private sector operations. The purpose of the guidelines is to provide general principles of project economic analysis, which should be read in conjunction with various handbooks, technical reports, and other reference materials on project economic analysis that have been produced by ADB and which give more detailed guidance relating to appraisal in individual sectors. A list of these is provided in Appendix 1.

## II. SCOPE OF PROJECT ECONOMIC ANALYSIS

6. A well-conducted economic analysis should show that (i) a project is in line with the development context of a borrowing country and ADB's country partnership strategy (CPS); (ii) there is strong rationale for the public sector and ADB to finance the project; and (iii) the selected project represents the most efficient or least-cost option among all the feasible alternatives for achieving the intended project benefits and, when benefit can be valued, it will generate a positive economic net present value (ENPV) using the minimum required economic internal rate of return (EIRR) as the discount rate, i.e., the project has an EIRR higher than the discount rate.

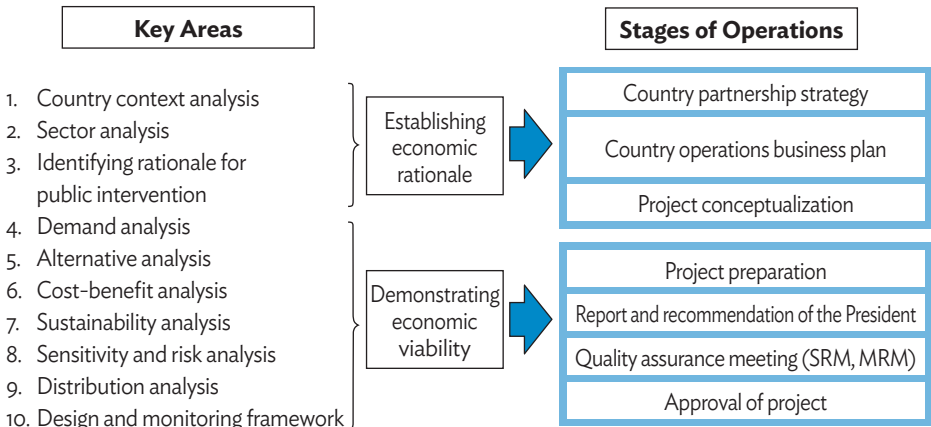
### A. Key Areas of Economic Analysis

7. Economic analysis involves analyzing a number of issues related to the economic viability of a project. In ADB, these analyses are carried out at different stages of a project operational cycle (Figure 1).

#### *Country context analysis*

8. A project cannot be isolated from the wider development context of a borrowing country. Country context analysis looks at the development constraints of a developing member country (DMC) and how the proposed project can contribute to a DMC's development objectives. It explains where the project fits in the DMC's development plan and ADB's CPS. It also examines how the economy of the borrowing country is likely to evolve over a project's life and how changes in

**Figure 1: Project Economic Analysis at ADB—Key Areas and Operational Cycle**



MRM = Management Review Meeting, SRM = Staff Review Meeting.

Source: ADB Economic Research and Regional Cooperation Department.

key macroeconomic indicators—such as the exchange rate, interest rates, and the government budget position—may impact on a project. Country context analysis should be carried out as part of CPS, country operations and business plan (COBP), or project conceptualization.

## Sector analysis

9. Sector analysis is critical to understanding binding constraints to the effective functioning of a concerned sector, why a project is proposed, and how it will help address the sector constraints. Sector constraints can be related to policy and incentives, the relevant legal and regulatory framework, or physical infrastructure. In cases where public enterprises are the primary provider of goods and services, the performance, management, and financial sustainability of these enterprises; the adequacy of fiscal allocation to the sector; and the government's sector development plan should be assessed. Sector analysis should be carried out as part of CPS, COBP, or project conceptualization.

10. Sector analysis also involves the examination of (i) current and future demand; (ii) existing sources of supply, their costs, and any intended investment that may compete with the project; (iii) the contribution of the proposed project to sector demand, cost reduction, or technological innovation; (iv) the extent of direct government involvement in the sector either as a producer or financier and any

government subsidy to or taxation of the sector; and (v) whether additional physical investment embodied in the project under consideration is the best solution to the problem at hand.

### *Identifying the rationale for public involvement*

11. The case for public support in the form of ADB funding should be set out as part of the initial assessment of a project (in the CPS, the COBP, or the project concept). A clear economic rationale for public sector involvement helps to narrow the range of alternative ways of addressing a development problem. Public intervention is justified when a market fails to deliver goods and services efficiently. Market failures can arise from various factors such as increasing returns to scale, externalities, asymmetric information, unspecified property rights, coordination failures, and specific characteristics of certain public goods that make their use non-rival and non-excludable.

12. When the private sector fails to produce a socially optimal level of output, public sector involvement is justified. The public sector may use public ownership as a means of providing goods and services. Alternatively, public sector involvement can take the form of providing financing or fiscal incentives, such as subsidies or tax credits, while leaving the private sector to produce the required output. Economic analysis should justify both the choice of public involvement and the form it takes. Where goods and services are produced in relatively monopolized markets, ADB funding of a new project should be combined with the development of a legal and regulatory framework. Where ADB finances private sector operations, the justification for this with regard to the additionality brought by ADB funding should be made clear.

### *Demand analysis*

13. As part of project preparation or feasibility study, demand analysis establishes the existing and future consumer demand for goods and services to be produced by a project and provides a basis for estimating the project's economic benefits. A project that fails to attract an adequate level of demand for its output, at an appropriate price, will not be operating efficiently and will create a misuse of scarce resources. Market research and user surveys can be used to estimate demand at different price levels. Project demand should also be assessed in the context of the likely total future demand for and supply of the product to establish how far the project will take market share from existing producers and whether its output will have an impact on the market price. Decisions on project scale should allow for the impact of proposed tariffs on the level and timing of project demand.

## Alternative analysis

14. Economic efficiency requires that the proposed project represents the most efficient option among available feasible alternatives for addressing the identified problem. In many cases, this means that the selected project should have the lowest discounted cost per unit of output or outcome. However, when project alternatives have very different benefit flows, for example, because of quality differences, alternative analysis cannot be based on the cost comparison alone, and the most efficient project option is the one with the highest ENPV, provided that its investment is within budget. In some cases, alternative analysis may be supplemented by multi-criteria analysis,<sup>2</sup> depending on the data available. Alternative analysis should be carried out as part of project preparation.

## Cost–benefit analysis

15. Estimating economic benefits and costs associated with the proposed project requires establishing the with project and without project scenarios and comparing the two. The without project scenario is not necessarily the business-as-usual case, as there may be instances where the current position is untenable and some steps toward mitigation are needed even without the proposed project. Monetary values of project benefits and costs, associated with outputs and inputs, must be identified in the years in which they arise. Any external effects affecting the rest of the economy but not reflected in market transactions by the project itself—such as adverse or beneficial environmental impacts—where they can be identified, must also be included.

16. The ENPV and the EIRR should be calculated for all projects in which benefits can be valued. The general criterion for accepting a project is achieving a positive ENPV discounted at the minimum required EIRR, or achieving the minimum required EIRR. ADB's newly adopted minimum required EIRR is 9%. However, for social sector projects, selected poverty-targeting projects (such as rural roads and rural electrification), and projects that primarily generate environmental benefits

<sup>2</sup> Multi-criteria analysis (MCA) is a tool used to assess the different investment alternatives available to achieve a given set of outcomes. Typically, the appraiser would have a predefined set of criteria that are aligned to the intended outcomes of the proposed investment, with weights assigned to each criterion. In cases where standard cost-benefit analysis or cost-effectiveness analysis is not possible or inadequate, MCA helps to decide the most preferred option among investment alternatives with clearly laid-out criteria and transparency. For more details on MCA in the context of project economic analysis, see European Investment Bank. 2013. *The Economic Appraisal of Investment Projects at the EIB*. [http://www.eib.org/attachments/thematic/economic\\_appraisal\\_of\\_investment\\_projects\\_en.pdf](http://www.eib.org/attachments/thematic/economic_appraisal_of_investment_projects_en.pdf); and European Commission. 2014. *Guide to Cost-Benefit Analysis of Investment Projects*. Brussels.

(such as pollution control, protection of the ecosystem, flood control, and control of deforestation), the minimum required EIRR can be lowered to 6%. Where a project's benefits cannot be adequately quantified in monetary terms, its cost-effectiveness must be demonstrated as part of alternative analysis.

### *Sustainability analysis*

17. Economic viability requires that a project is designed such that its net economic benefits are sustained during the project's economic life. This includes demonstration of the financial and institutional sustainability of a project. Assessing financial sustainability requires two types of analysis: financial evaluation of the project and financial analysis of the project-executing and/or implementing entity. The former focuses on the ability of the project to generate sufficient incremental cash flows to cover its financial costs (capital and recurrent costs). In this regard, analysis of the cost-recovery objectives and mechanisms of the project is important. Without full cost recovery, a financial evaluation will be meaningless. In the case of full cost recovery, the financial net present value discounted at the project's weighted average cost of capital (WACC) must be greater than zero, and the financial internal rate of return (FIRR) must be greater than WACC. Financial analysis of the project-executing and/or implementing entity aims to evaluate whether the concerned entity is financially robust enough to undertake the project and operate and maintain the project assets. This involves assessing the ability of the entity to operate as a going concern, to operate and maintain the entire network of assets including the project, and to fund recurrent costs.<sup>3</sup> The institutional capacity of the project-operating entity to implement the project should also be assessed.

18. To address environmental concerns, a project should pay the full cost for its use of natural and environmental resources and, where this causes long-term environmental damage, be required to undertake appropriate expenditure for mitigation. Similarly, the environmental benefits created by a project need to be valued and included in the project economic analysis. A project can also be affected by the environment effects, and ADB policy now requires that climate-proofing issues be considered in project design to minimize the negative impact of long-term environmental effects, such as droughts, soil erosion, or floods, on projects. The economic benefits from ancillary investment designed to protect the project from potential climatic change must be assessed and compared with the cost of this protection.<sup>4</sup>

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<sup>3</sup> See ADB Operations Manual, Section G2. *Financial Management, Cost Estimates, Financial Analysis, and Financial Performance Indicators*.

<sup>4</sup> See ADB. 2015. *Economic Analysis of Climate-Proofing Investment Projects*. Manila.

### *Risk and sensitivity analysis*

19. Project economic analysis should highlight the factors that are important to the success of the project but subject to risk, the sources of risk, and possible mitigating measures. Sensitivity analysis must assess the impact of changing values of the different parameters on project outcome. Switching values—showing the change in a parameter required for the project decision to shift from acceptance to rejection—should be presented for key parameters. Project economic analysis may draw on ex post evaluation results for similar projects to assess the likelihood of these switching values actually occurring. For projects that involve large investment, a quantitative risk analysis applying a probability distribution to key variables can be applied.

### *Distribution analysis*

20. Assessing how far different stakeholder groups gain or lose from a project should also be part of economic analysis. Where a project is targeted at a particular social group, it will be important to assess the proportion of project benefits that go to this group. It is also important to assess who bears the project cost and how far the incentives implied by the income changes identified in the distribution analysis are compatible with the assumptions in the project's design and monitoring framework (DMF).

## **B. Difference between Economic Analysis and Financial Evaluation**

21. Project economic analysis and financial evaluation both involve the identification of project benefits and costs during the years in which they occur and converting all future cash flows to their present value using the technique of discounting. Both analyses generate net present value (NPV) and internal rate of return (IRR) indicators, termed economic NPV (ENPV) and economic IRR (EIRR) in the case of economic analysis and financial NPV (FNPV) and financial IRR (FIRR) in the case of financial evaluation.

22. However, the perspectives and objectives of the two analyses differ. Financial evaluation is carried out from the perspective of the project, and considers incremental cash flows (both revenues and costs) generated by the project. The purpose of financial evaluation is to assess the ability of the project to generate adequate incremental cash flows to recover its financial costs (capital and recurrent costs) without external support. On the other hand, economic analysis is carried out from the perspective of the entire economy, and it assesses overall impact of a project on the welfare of all the citizens of the country concerned. The purpose of project economic analysis is to assess whether a project is economically viable for the country.

23. The different perspectives and objectives between the two analyses mean that there are major differences in the specification and valuation of project benefits and costs. Financial evaluation is based on market prices that are actually paid or received by a project, and it focuses on financial values of project costs and benefits. Economic analysis uses economic prices, also called “shadow prices,” and it focuses on economic values of project costs and benefits. Deviations of financial values from economic values of project costs and benefits arise from two major sources: price distortions and nonmarketed impacts.

### *Price distortions*

24. Price distortions are often created by government interventions such as taxes, subsidies, and price controls, or by imperfect competition (monopoly):

- (i) Taxes and subsidies are transfer payments, which affect the distribution of financial costs and benefits between the project entity and other stakeholders, such as the government and households, but do not reduce or increase the amount of resources available for the country as a whole;
- (ii) Price controls are imposed by the government or regulatory bodies and often involve setting prices below their market-clearing levels, making them only partially reflect the true value of the goods or services to consumers and resulting in unsatisfied demand;
- (iii) Monopolistic pricing is where producers take advantage of their dominant market position to set prices above the long-run cost of supply.

### *Nonmarketed outputs, inputs, and impacts*

25. Some public sector projects produce outputs that are not transacted through markets. The typical examples are public schools or public health facilities; non-toll roads; and environmental protection. In other cases, project impacts are incompletely marketed such as water and sanitation. Many projects, although they produce outputs that are transacted through markets, generate externalities that affect the society at large but are not internalized—that is, not reflected in market prices of their outputs and inputs. Externalities can be negative, such as pollution from a coal-fired power plant; or positive, such as reduced incidences of disease outbreaks due to a water and sanitation project.

26. For these types of projects, the lack of market prices for their outputs, inputs, or impacts means alternative measures of economic benefits and costs are needed. For example, economic benefits of investment in public schools can be measured by education’s contribution to productivity growth; benefits of road improvements can be measured by reduced vehicle operating cost and time savings; and benefits



of environmental protection can be measured by savings in health expenditure or avoided output losses.

27. Economic prices reflect the economic value of goods and services and provide important guidance on the choice of public sector projects. Conceptually, economic price can be defined as the gain (or loss) in social welfare associated with consuming an additional unit of a commodity. Social welfare can be measured by the consumption of commodities or services available to a society, whether these are sold or not sold in a market. Thus, economic benefits of project output are their contribution to increasing the consumption available to society. Economic costs of project inputs reflect consumption sacrificed elsewhere by diverting the resources to the project from other uses. The value of the total net change in consumption available to the society represents the net economic impact of the project.

## C. Economic Analysis and Financing Modalities

28. ADB projects are financed under various modalities such as investment projects, sector projects, a multitranche financing facility (MFF), financial intermediation loans (FILs), sector development programs, emergency assistance loans (EALs), and results-based lending.<sup>5</sup> Regardless of funding modality, where tangible and measurable outputs and associated cost streams can be identified and attributed to a specific project, project economic analysis should be carried out. The analysis can be applied to the entire project, or a specific component of the project. However, the guidelines do not apply to ADB's policy-based lending that focuses on policy and institutional reforms, and the countercyclical support facility that provides budget support.<sup>6</sup>

### *Project lending*

29. Project lending is the most commonly used funding modality in ADB. It requires physical investments and produces tangible outputs such as roads, electricity, and drinking water; and services such as transport, education, and health. Typically, investment projects are narrowly focused and have a clearly defined and known scope at the time of project preparation. Economic analysis should be thorough, with in-depth due diligence across all the key areas.

<sup>5</sup> This sections should be read in conjunction with the various sections of the ADB Operations Manual. <http://www.adb.org/documents/operations-manual>

<sup>6</sup> For economic analysis of policy-based lending, see Bolt, R., M. Fujimura, C. Houser, F. De Guzman, F. Nixon, and J. Weiss. 2004. *Economic Analysis of Policy-Based Operations: Key Dimensions*. Manila: ADB.

### *Sector lending*

30. Sector projects are a form of project-related investments aimed to assist in developing a sector or subsector by financing a series of investments. A sector project could also focus on improvements in sector policies and strengthen institutional capacity. Sector lending is expected to achieve greater impact on a sector than a stand-alone project would by enabling an integrated focus on sector development plans and policies and on the adequacy of institutions to formulate and manage such plans.

31. Unlike an investment project, the full details of a sector project's scope are not usually known at the time of project preparation, and only a handful of subprojects may have been identified. Even in cases where all the subprojects have been identified, the full range of investment costs and benefits for individual subprojects may not be known. Given this, the economic analysis of a sector project can focus on a set of representative subprojects at the project preparation stage. If the selection of subprojects is completed only during project implementation, economic considerations should form part of the selection criteria to be developed at the project preparation stage.

### *Multitranche financing facility*

32. The MFF is a flexible financing modality that supports a DMC's medium- to long-term investment plan in a given sector or subsector. An MFF can support multiple projects, or large stand-alone projects requiring multiple components to be implemented over a long period. Approval of MFFs is a two-stage process, with the ADB Board approving the overall MFF investment program and ADB Management approving the individual periodic financing requests.

33. When an MFF consists of multiple projects each with multiple subprojects, it becomes similar to a sector project, in which some of the representative subprojects are known at the outset, but the entire scope is not known. In such cases, the economic analysis for individual projects can follow the approach described for the sector project, and economic considerations should form a key part of the selection criteria to ensure that subsequent projects and subprojects funded under the MFF are economically viable. Furthermore, economic analysis will need to be updated every time ADB receives a new periodic financing request to ensure that the proposed projects are economically viable.

34. If an MFF is composed of several independent projects, the economic analysis will treat each individual project as a stand-alone investment project and

demonstrate its economic viability. In other words, each periodic financing request will include an economic analysis for the requested investment.

35. When an MFF has a number of interlinked components of a large and complex project, the economic analysis will analyze the overall MFF as one single investment and evaluate its economic viability. In such cases, each periodic financing request will update the original analysis based on the most recent cost and benefit estimates and implementation time line.

36. Given that an MFF may be implemented over a period of up to 10 years, the analysis should include sensitivity tests at the outset to ensure that a slippage in implementing one or more projects does not have undue effects on the MFF's viability.

### *Financial intermediation loans*

37. FILs are provided to one or more entities that then channel the loans to the final borrowers for eligible subprojects. FILs can be provided on a stand-alone basis, or as components of sector development programs or sector or project loans. Examples may include provision of a credit line to one or more commercial banks that then lend to end borrowers for setting up or expanding small and medium-sized enterprises. For FILs, in addition to the rationale, demand analysis, and sustainability considerations, a thorough analysis is needed to assess the financial performance of participating financial institutions and their capacity to carry out due diligence to ensure the loans will be in compliance with ADB policies. In some cases where FILs are used to finance large infrastructure investments and the projects to be financed are well defined, economic analysis of representative projects should demonstrate that such investment will be economically viable. When representative projects cannot be identified, project selection criteria should include economic considerations.

### *Sector development program*

38. A sector development program is a hybrid modality, which includes both investment (investment project or sector project) and policy-based (program) components. The integrated approach combining investments and reforms helps meet a sector's needs in a comprehensive and integrated manner. An example could be a sector development program for agriculture, in which the investment component focuses on rural infrastructure investments (for example, irrigation or rural roads) and the policy-based component focuses on policy impediments to growth in agricultural productivity. Given that it has distinct investment and policy-based components, economic analysis for these components should follow the approach that is appropriate for each particular modality.

### *Emergency assistance loans*

39. ADB provides EALs to its DMCs to help rebuild high-priority physical assets and restore economic, social, and governance activities after emergencies. EALs, however, are not meant to provide relief or support comprehensive reconstruction activities. Given that EALs are prepared in response to an emergency situation and usually under a tight time frame, it is typically not possible to complete all the required due diligence during the preparatory stage. In the aftermath of a disaster-related emergency, it typically takes some time and effort before the extent of damage and needs can be assessed and the individual subprojects can be fully conceptualized and designed. In such cases, the EAL typically outlines the types of activities it will support and identifies the criteria for selecting subprojects during the implementation phase. As in the case of sector projects, the selection criteria need to incorporate economic considerations to ensure that the individual subprojects will be economically viable.

### *Results-based lending*

40. Results-based lending is to assist DMCs in designing and implementing government-owned sector programs. In general, ADB finances only a portion of a much larger program. Given this and that financing is not earmarked for any specific activities within the program, in many cases it is not possible to do a standard cost-benefit analysis and, instead, a review of the results-based lending should focus mainly on the rationale for the program, its expected economic impact, and its sustainability. However, when the projects to be financed by ADB under the program are well-defined and when specific components can be identified, standard economic analysis could be applied to demonstrate the economic viability of the projects.

## **D. Design and Monitoring Framework**

41. Investment projects generally have a diverse set of effects, and project economic analysis provides a systematic framework to identify, quantify, value, and compare the economic costs and benefits of a project. It summarizes a variety of disparate effects over time into a common monetary measure, ENPV or EIRR. ADB's development mandate requires that this measure be complemented by checklists of other project impacts, for example, social or environmental, and these can be specified in a DMF.

42. The DMF is a tool used by ADB to improve the design and implementation of projects and it should be applied in conjunction with economic analysis. The DMF sets out the links between the long-term strategic priority for a project (the impact) and the goal needed to be met in the medium term to achieve this (the outcome).