

Handbook for  
**Integrating Risk Analysis**  
in the  
**Economic Analysis**  
**of Projects**

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# Foreword

This Handbook is an output of a study undertaken by the Economics and Research Department (ERD) of the Asian Development Bank (ADB). Nigel C. Rayner directed the conduct of the study, assisted by Anneli Lagman-Martin. Overall supervision of the initial stages was provided by David Edwards, then Assistant Chief Economist, while Xianbin Yao, Assistant Chief Economist, supervised the study through to its conclusion. Keith Ward (Staff Consultant) provided extensive technical inputs and advice throughout the study. Support for word processing requirements was provided by Ma. Nieva Baguisa.

Preparation of the Handbook benefited from a participatory approach through consultation meetings and individual interviews. At various stages of the study, ADB staff were given the opportunity to review and comment on the draft reports. The study benefited from substantive comments from Stephen Curry, Manabu Fujimura, and Bo Lin. The Handbook was further enhanced with the inclusion of case studies, based on work undertaken by Manabu Fujimura, Vincent de Wit, Bo Lin, William Loxley, and Keith Ward. During an in-house seminar on project economic analysis, the results of the study were disseminated and the use of risk analysis software was demonstrated.

This Handbook further develops the discussion of the principles on risk analysis that is contained in Chapter XI (Uncertainty: Sensitivity and Risk Analysis) of ADB's *Guidelines for the Economic Analysis of Projects* (1997). The Handbook contains detailed discussions of current risk analysis practice, the theory and application of various risk analysis techniques, and recommended applications for risk analysis, including a summary of typical risk circumstances on a sector-by-sector basis. To illustrate the ease of use of quantitative risk analysis software, the Handbook includes case studies based on actual ADB projects in the agriculture, education, health, and power sectors. A summary version of this Handbook is available as ERD Technical Note No. 2 Integrating Risk into ADB's Economic Analysis of Projects.

The Handbook provides guidance with respect to the integration of risk analysis in the design and analysis of projects. It also provides direction on how the analysis of risk can be used to improve the focus on poverty reduction. While the Handbook is primarily targeted to ADB staff and officials of its developing member countries, it may also be of interest to others involved in development assistance.

## Abbreviations and Acronyms

ADB	Asian Development Bank
ADF	French Development Agency
CAPM	capital asset pricing model
CAMEL	capital adequacy, assets quality, management quality, earnings and liquidity
CDF	cumulative distribution function
DFID	Department for International Development (UK)
EIRR	economic internal rate of return
ENPV	economic net present value
EOCC	economic opportunity cost of capital
FI	financial institutions
FIRR	financial internal rate of return
FNPV	financial net present value
NPV	net present value
PBL	policy-based lending
PFI	Private Finance Initiative (UK)
PIA	policy impact analysis (matrix)
PIR	poverty impact ratio
PPTA	project preparatory technical assistance
RRP	report and recommendation of the President
SAR	staff appraisal report (World Bank)
SERF	shadow exchange rate factor
SI	sensitivity indicator
SV	switching value
UK	United Kingdom
VaR	value at risk
VOC	vehicle operating cost
WTP	willingness-to-pay

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