Economic Analysis of Projects:

Towards a Results-oriented Approach to Evaluation
ECON REPORT

Summary and Conclusions

1. The OED database records the results of completed Bank-supported projects that have been evaluated by OED. Seventy-five percent of these projects have been rated satisfactory. The other 25 percent have failed. To what extent can better economic analysis enable us to increase the success rate? Can we do better? With these questions in mind, this report reviews the Bank's approach to the economic evaluation of projects. The principal finding is that the Bank is not effectively using economic analysis as a tool of project design, appraisal, and supervision. In the circumstances, it would be surprising if problems were not encountered when projects are evaluated on completion.

2. The report starts with a reconsideration of the Bank's economic appraisal methodology, which underlies OMS 2.21, Economic Analysis of Projects. Distinctive features of this methodology, which was developed during the 1970s, include a focus on social pricing and income distributional weights; the use of "accounting rates of interest" to bridge divergences between consumption and investment interest rates; and disaggregated shadow prices for individual labor and product markets. The paper concludes that these features were never fully operationalized within the Bank, and—contrary to the opinion of some academics1—they are not the most important issues on which the Bank should deploy its scarce project analytic resources in the 1990s. Rather, the mounting evidence2 suggests that the critical methodological and practical issues relate to the evaluation of the impact of policies and institutions on project performance; the building of project evaluations around realistic assessments of the likely environment affecting implementation, including institutional capacity and the macroeconomic framework; and the need for realistic risk/sensitivity analysis as an input into selecting or rejecting projects or project components and to help identify performance and benefit indicators to be monitored during implementation and operation. The importance of these issues is magnified in the context of sector investment operations—where the framework for the appraisal of subprojects is agreed with the borrower.

3. This conclusion is supported by the report's review of current Bank practice.3 The review confirms that appraisal estimates are optimistic and narrowly focused on calculations of economic rates

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3/ The review covers all investment loans/credits approved in FY91.
of return. To be sure, there is considerable variation in the quality of SARs, but even the best do not quantify the risks to project costs and benefits of slippage on the macroeconomic, financial, and institutional capacity/implementation fronts. Yet these are prominent sources of project difficulty and failure. OMS 2.21 notwithstanding, no SARs report truly expected economic rates of return (ERRs), in the sense of their being the mean of the set of possible outcomes. Downside risks are systematically ignored, and as a result projected ERRs are biased upwards.

4. These analytic shortcomings have direct implications for the quality of projects. Since important project risks are not systematically considered, designs for which these risks make the expected ERR too low are not systematically rejected. Quantifying the risks and their implications for project costs and benefits should expose the weaker project elements, which can be dropped, leading to more robust project designs. Even better, sensitivity to macroeconomic, financial, and institutional risks can be considered during project identification, thereby influencing project selection early on. It can be reflected in proxy variables to be monitored during implementation, with a view to triggering remedial action as appropriate and ending the unfortunate syndrome whereby projects are rated as satisfactory throughout supervision only to be downgraded to unsatisfactory on completion.

5. Meanwhile, for projects in the social sectors, which constitute an increasing share of Bank and IDA lending, there are no Bankwide benefit standards for investment operations. Benefits are typically treated exclusively in qualitative terms. But even where benefits are quantified, cost-effectiveness analysis is not provided. In referring to differences across sectors in the degree of quantification appropriate for the analysis and justification of investment operations, OMS 2.21 indicates that “revenue-based measures of benefits may not be feasible or relevant in many cases, especially in sectors such as education, population, nutrition, and health,” although it notes that “it may be possible to use quantitative criteria in such sectors more often than is customary.” In practice, many operations lack clear statements of the criteria for judging success. The majority lack benchmarks for measuring performance during implementation. But without clearly defined success criteria, it is impossible to recognize—and in turn to eliminate—components that are unlikely to succeed. Without performance standards, it is impossible to identify shortfalls during supervision and to set in train corrective measures.

6. This suggests that we have been lax in implementing some areas of the guidelines and that in some areas the guidelines themselves need to be changed. The latter is easier. To this end, the Report’s specific recommendations for the drafting of OD 10.40, Economic Evaluation of Investment Operations are as follows:

- Downgrade the prominence accorded to the theory of differential fiscal and distributional weights, multiple conversion factors, and accounting rates of interest.

- Upgrade the attention paid to realistic evaluations of projected economic impact, based on the lessons of experience with the country, the sector, and the borrower.

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• Ensure that the macroeconomic, institutional, behavioral, and financial assumptions underlying the appraisal analysis are clearly spelled out.

• Establish clear benefit standards—and success criteria—for the evaluation of projects not subject to an ERR test.

• Ensure that a common methodological approach to evaluation obtains throughout the project cycle—from identification through appraisal and implementation to completion and beyond. (See Box 1.)

• Retain the expected ERR—or the alternative success measure—as the primary investment criterion, augmented by an assessment of the cumulative probability of an unsatisfactory outcome.

• Use sensitivity analysis to test the impact of variations in key variables, and to identify appropriate proxy indicators for monitoring—and for reevaluating the project—during implementation.

• Ensure that actions and parameters found to be critical for project viability are reflected in the legal agreements.

• Institute an indicator tracking system, with the indicators identified at appraisal used as a basis for supervision ratings, which in turn trigger possible remedial action.

• For sector investment operations, use the above approach as a basis for borrowers’ evaluations of subprojects.

• Launch studies to test the operational feasibility of (1) widening the coverage of economic cost-benefit analysis of investment lending, to include the evaluation of policies and institutional reforms; (2) valuing (and including as a project cost) deadweight losses associated with revenue measures used to finance the project; (3) valuing the disutility of risk to be applied to the evaluation of large projects; and (4) calculating country-specific opportunity costs of capital.

7. Effectively implementing these recommendations will need to go beyond the drafting of new guidelines. Ask any task manager about project analysis, and the discussion quickly turns to lack of management attention, staff incentives, and perceived pressures to lend. Many staff feel that projects will not be dropped even if the appraisal surfaces problems with a project’s viability. If the Bank is serious about improving project quality: (1) managers will need to worry about the actual on-the-ground impact of investment operations; (2) the Bank will need to provide effective support to project economists in securing appropriate skills, country parameters and analysis, and the relevant lessons of experience for assigning values to key parameters; and (3) chief economists, lead economists, and country economists will need to increase the attention they pay to project evaluation issues.

Box 1: Evaluation Methodology over the Project Cycle

Expected Benefits > Expected Costs

Identification

- ESW suggests a high return activity that the Bank can uniquely assist with
- Back of the envelope calculations used to establish the case
- Unknowns mapped out for study

Preparation

- Compare alternatives
- Pick best, based on realistic assessment of key parameters and risks
- Establish necessary policy and other conditions for achieving success

Appraisal

- Define success criteria on basis of project objectives
- Sensitivity analysis determines indicators to be tracked during implementation
- Assess expected net benefits and cumulative probability of shortfall from satisfactory outcome

Negotiations

- Include in covenants the necessary conditions for achieving success

Implementation

- Track indicators and use for rating projects in Form 590
- Change in development impact rating triggers possible remedial action
- Aggregate project development impact ratings into country portfolio index

Completion

- Formal reevaluation
- Performance rating relative to success criteria established at appraisal
- Transition to and preparation for operation

Operation

- Impact evaluation
- Focus on whether benefit flows will be sustained long enough for ERR > OCC (or alternative measure of success) to be realized
8. How to bring this about? The ECON proposal embodies three actions:

- **Monitor portfolio quality.** The proposed indicator tracking system, if implemented, should provide a means for focusing management attention on the evolution of a project's—or a country portfolio's—projected impact. This should also provide a short enough feedback period to increase managers' concern with impact during the upstream stages of project processing. As a result, managers should become more concerned that projects are designed to be successful and that unjustifiably risky components are weeded out prior to negotiations; they will thus be more concerned with the substance of sensitivity analysis. With Bank managers more focused on in-country results, realistic assessments of likely results will become more valuable to them, and accurate economic and institutional evaluations likewise. These changes should lead to better designs early on in the project cycle so that fewer problems surface at appraisal. But it is likely—and probably suboptimal—for no problems to arise at appraisal. In the event they do, the acid test will be willingness to drop problem projects.

- **Provide institutional support for project economists.** Box 2 contains an operational framework for project analysis. It shows the linkages between project appraisal and supervision, via the tracking indicators to be identified in the project analysis. It would be useful for the Bank to systematically review the lessons of experience and to distill from that review guidance on the macroeconomic, institutional, financial, social, technical, and environmental variables that are critical for project success in the different sectors, and to make available an interactive software package that would provide project economists easy access to the relevant country parameter values.

- **Involve the chief and lead economists.** Given the increasing policy content of investment operations and the importance of the links between investment operations and ESW on the one hand and between investment operations and the macroeconomic framework on the other, lead and chief economists have an important role to play in guiding project economic analysis. They are critical opinion-leaders in the Regions. Their involvement will signal the importance of these issues to other economists. Their involvement at an early stage of project identification and development will help to ensure that probing questions about the underlying economic rationale for a project are asked—in time for major changes in design to be effected in a cost-effective manner. Their involvement in Regional review processes—and in evaluating project quality ex-post—will help to ensure follow-through. Nevertheless, given the other demands on their time, chief and lead economists are likely to play primarily a catalytic role, with country and sector economists playing a stronger project role than at present.

9. This is by no means the whole story. A critical issue is country capacity for project analysis. Once consensus is reached within the Bank on an approach that emphasizes explicit identification of the macroeconomic, institutional, and financial assumptions underlying the analysis, sensitivity analysis covering these and other important assumptions, and reliance on environmental, performance, and benefit indicators to track the value of the project through implementation and operation, we can proceed to discuss the approach more broadly with clients (and donor agencies), inter alia, in the context of public expenditure reviews and sector investment lending operations.

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7/ Ibid.

8/ See also LAC, "Enhancing Quality and Efficiency," April 21, 1992.
**BOX 2: ECON FRAMEWORK FOR EVALUATION OVER THE PROJECT CYCLE**

*What are the project/program outputs? How will we know if the operation has succeeded? What will we measure?*

- Outputs:
- ERR/NPV or cost effectiveness test:

*What are the key assumptions that need to be met for the project to succeed?*

<table>
<thead>
<tr>
<th>Lessons of Experience</th>
<th>Project Assumptions</th>
<th>Rationale for any Differences</th>
<th>Switching Values: Sensitivity of Project Outcome to Deviation1</th>
<th>Probability of Occurrence of Switching Value</th>
<th>Indicator Tracking</th>
</tr>
</thead>
<tbody>
<tr>
<td>Macroeconomic</td>
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<td>Institutional</td>
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<td>Financial</td>
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<td>Procedural</td>
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</tbody>
</table>

*Who needs to do what during implementation for the project/program—or component—to succeed?*

<table>
<thead>
<tr>
<th>Lessons of Experience</th>
<th>Actions</th>
<th>Timing</th>
<th>Covenants/ Remedies</th>
<th>Sensitivity of Project Outcome to Deviation</th>
<th>Compliance Tracking</th>
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<tr>
<td>Government</td>
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<td>Borrower</td>
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<td>Project Entity</td>
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<td>Beneficiaries</td>
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<td>Cofinanciers</td>
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<td>Bank</td>
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1. For components with social goals, outcomes will be expressed in terms of reaching target groups, etc.
2. By how much does the variable need to fall for the project component to be unsatisfactory?
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Annex A SARs and PCRs Covered by Practice Review
Chapter 1: Rationale for the Review

I. Background

1. The Bank's approach to the economic analysis of projects has been under attack in recent years. Criticism has come from both within the Bank and outside. Within the Bank, OED has raised serious questions about the quality of the Bank's analysis. Based on audits of completed projects—and impact analyses of projects five years after completion—OED has pointed to (a) a gap in economic rate of return (ERR) estimates between project appraisal and completion; (b) unrealistic analysis of risk and uncertainty; and (c) a failure of many projects to sustain satisfactory benefit flows during execution. Outside the Bank, concerns have been expressed about the decline in methodological rigor, particularly in the application of the Little and Mirrlees/Squire and van der Tak approach to the economic analysis of projects.

2. These two sources of criticism have little in common, other than their broad concern with actual practice at the Bank. OED questions the Bank's judgment about the likelihood of various assumptions being borne out. Its most frequent criticism is overoptimism and failure to take account of downside risk. Since OED deals with projects that have already been implemented, its focus is on past practice—the early 1980s and before—the heyday of the influence of Ian Little and James Mirrlees, who are among the Bank's most vocal academic critics. Little and Mirrlees, by contrast, focus on current Bank practice. Their concern is that it departs sharply from the theoretical ideal that they developed and that the Bank embraced in the late 1970s and early 1980s.

3. It is against this background that the review underlying this Report has taken place. The fundamental objective is to assess the Bank's approach to the economic analysis of projects with a view to making proposals for cost-effective ways to improve it. The immediate objective is to provide substantive recommendations for OD 10.40—the Economic Evaluation of Investment Operations. The OD is to replace OMS 2.21, which was issued in 1980. The OMS dealt primarily with issues of methodology. Questions of processing, implementation, and staff incentives were addressed—albeit in a quite limited fashion. These, however, have emerged as key issues in recent years.

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9/ The review has spanned several years. It has involved staff members and managers throughout the Bank, including close cooperation with OED. Inputs and comments have been received from: Messrs./Mmes. Acharya, Aiyer, Al-Khafaji, Ayub, Banum, Belli, Blackwood, Cercone, Churchill, Cochrane, Colaco, de Weille, Devanjian, Dowsett-Coirolo, Duane, Estache, Fleig, Ganguly, Ghosh, Goldman, Grawe, Guerrero, Gutierrez, Halpern, Hammer, Harris, Isenman, Jechoutek, Johansen, Khaas, Kjellstrom, Kutzin, Landell-Mills, Linn, Maniatis, Mitra, Morin, Munasinghe, Nankani, Ody, Olivares, Otoo, Over, Parthasarathi, Pereira da Silva, Phillips, Picciotto, Schirmer, Schulz, Segal, Siraj, Squire, Staab, Ueno, van der Tak, Wellenius, and Yusuf.

4. The Report is organized as follows: The remainder of this chapter provides more detail on the OED and Little and Mirrlees critiques. Chapter 2 summarizes the intellectual and institutional history of the Bank's approach to the economic analysis of projects, and more recent discussions within the Bank. Chapter 3 summarizes the results of the methodology that emerged from the internal debates. Chapter 4 looks at current practice with respect to the economic analysis of investment operations—both in the sectors for which ERRs are calculated and in the other sectors. Chapter 5 pulls together the Report's findings and summarizes its recommendations.

II. The OED Critique

5. The ERR gap refers to differences in the project ERR—as forecast at appraisal and at project completion. The gap grew from virtually nothing for projects completed in 1974-75 to 8-9 percentage points for projects completed in the late 1980s and early 1990s. However, approval dates are a better gauge than completion dates for evaluating appraisal methodology. Based on the dates the projects were approved by the Board, the period of the gap identified by OED is 1972-82. The gap was first discussed by the Board during the Annual Review of Project Performance Results for 1987. Executive Directors at that time asked for a detailed analysis of reasons for the gap, and whether the gap was likely to continue or even grow further. Based on its follow-up analysis,11 Operations staff reported the following findings:

- project implementation delays accounted for about a third of the gap, and not achieving projected annual benefits for the remainder; cost overruns were not a major factor;
- the gap was greatest in agriculture and rural development, reflecting mostly shortcomings in project design and over-optimism about grain prices and farmers' productivity improvements;
- the gap was greatest in East Africa, in part reflecting the total failure of projects in Tanzania;
- the widening of the ERR gap over time reflected primarily increases in appraisal ERRs, and only to a small extent to lower completion ERRs; and
- the average real rate of return on Bank investment projects—including the failures—still exceeded 15 percent.12

More recently, OED's reports have focused on appraisal optimism as a cause of the gap.


12/ This measure, of course, only covers those projects for which ERRs are calculated. Meanwhile, the average ERR on completion has fallen to 14 percent for projects reviewed in 1987-90.
6. OED has also voiced concerns about the Bank’s risk analysis. Its audit reports have consistently found that the Bank’s sensitivity analysis is unrealistic, that it systematically fails to alert decisionmakers to the possibility of unsatisfactory outcomes. The Board has been receptive to these concerns. The Report of the 1989 Joint Audit Committee Informal Subcommittee on Project Performance Audit Reports recommended that “the Bank should review its risk analysis practices in SARs to improve the quality (accuracy) of the analysis and make it more useful for decisionmakers.” In this case, Management replied:

“While the guidelines envisage a broad spectrum of sensitivity and risk analysis designed to accommodate project design questions on a case-by-case basis and to inform decisionmaking, actual practice is different. There has been a long-standing tendency for sensitivity analysis to be mechanical in its application. In some cases, the orders of magnitude of the posited variations from the base case are too small to alert decisionmakers to possible unsatisfactory outcomes. Switching values are rarely calculated for the important individual benefit and cost items in the NPV computations. Rather, it is more common to assume a limited range of variation in a few variables or in the entire cost and benefit streams and to show the effect of the posited changes on the NPV/ERR. This foregoes much of the richness of the analysis foreseen in the guidelines, and the stimulus for thinking about project design that could result. Full risk analysis, involving the generation of a frequency distribution of possible NPVs, is almost never done. Still, it is important not to overstate the impact of shortcomings in project risk analysis. By all accounts, the major problem with the economic analysis of projects is not the inadequacy of the risk analysis per se, but the neglect of relevant downside probabilities in the calculation of expected NPVs/ERRs. This has imparted an upward bias to appraisal estimates of NPVs and ERRs. The resulting ‘appraisal optimism’ is reflected in the large gap between appraisal ERRs and project-completion ERRs that recent OED reports have demonstrated.”

7. Finally, there is the issue of sustainability. Here, OED has been concerned about the fact that, in a significant number of cases, ERRs calculated at completion are not sustained into the post-completion phase of project operation. OED’s initial study reviewed 31 projects, all of which had satisfactory ERRs at completion. However, five years later, a review of their ERRs led to a determination that 13 were sustainable; 8 were marginal; and 10 were unsustainable. Principal causes of unsustainability were: institutional inadequacies; inadequate cost recovery or recurrent cost financing; failure of the private sector to adopt technological packages; and policy failures. This study, and follow-up work at OED, sparked a lively debate within the Bank about sustainability. How is sustainability accounted for in the ERR? Is it an end in itself? What is the methodology for evaluating it? These unresolved issues notwithstanding, the debate about sustainability has focused attention within the Bank—both at the Board

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14/ See, for example, S. Shahid Hussain, “Sensitivity Analysis for Key Commodities,” memorandum filed with OPN 2.02, February 18, 1987.

and among staff—on institutional and financial design issues. More recently, environmental sustainability has also received considerable attention. It is a primary focus of this year’s evaluation report.16

III. The Little and Mirrlees Critique

8. Ian Little and James Mirrlees presented their paper “Project Appraisal and Planning Twenty Years On,”17 at the 1990 World Bank Annual Conference on Development Economics (ABCDE Conference). This paper reviewed the methodology of social cost benefit analysis that their work18 had pioneered twenty years previously. It also discussed Bank practice. Little and Mirrlees concluded:

“Social cost-benefit analysis is not as widely, as well, or as effectively practiced as its expected net value might lead one to hope and expect. We have covered, or at least touched on, many aspects of its theory, practice, and effects. We have claimed that much in the rules we collected and prescribed in 1969 and 1974 has survived analytical scrutiny, that these procedures are capable of being used effectively, and that many important aspects of them have been neglected by project evaluators. We have found that the extent to which they are used and have real influence is not great, even in the World Bank. We have examined some of the data appearing to show considerable randomness in the evaluations performed within the World Bank. We went on to consider the bearing of the very considerable uncertainty that has been shown to attend project appraisal upon the value of the appraisal activity itself. We argue that the value is indeed probably diminished by that uncertainty but is nevertheless very large. Good project appraisal is done by people with their own incentives, within organizations that wittingly or not set these incentives. Both environments of project appraisal, the intellectual and the political-organizational, are keys to the quality of selection overall. This needs to be most seriously considered by those who manage and create these environments.”

9. Little and Mirrlees—and the OED findings—have struck a resonant chord with Bank staff. Indeed, in commenting on the Little and Mirrlees paper, Lyn Squire said:19

“Ian Little and Jim Mirrlees have done an excellent job in putting on paper what I suspect many World Bank staff have already acknowledged at least privately. That is: although the Little-Mirrlees approach to project analysis remains theoretically intact, the World Bank’s commitment to its application has clearly declined.


“Some may question the extent to which the World Bank ever adopted the approach in practice; others may claim that we are doing a much better job than Little and Mirrlees give us credit for. But for the purposes of my comments I would like to accept their assessment as broadly accurate and ask what we can do to improve matters.

“The starting point is the experience of the mid- and late-1970s, when the World Bank was seriously trying to implement the approach. At that time much was made of the idea that it was important not to reduce cost-benefit analysis to a set of cookbook rules. Instead, it was argued, one should set out the broad approach and then rely on the analyst to mold it to the specific circumstances of each project. *To be successful this approach to implementation requires two ingredients: enough well-qualified analysts to conduct the appraisals and an environment that encourages such effort. The World Bank had the first but not the second.*” [Emphasis added.]

**IV. OED vs. Little and Mirrlees**

10. It is clear from the above that OED and Little and Mirrlees are raising quite different points. Little and Mirrlees are concerned that the Bank is not implementing the analytic system that they developed. OED is saying that there is a large gap between project ERRs estimated at appraisal and at completion. Indeed, the gap emerged, and widened, during the period in which the Bank was introducing and trying to implement the Little and Mirrlees approach.
Chapter 2: Institutional History of Project Economic Analysis at the Bank

1. During the 1960s, the Bank’s economic analysis of projects entailed several more or less routine adjustments to financial cash flows of project entities—mainly deductions of import duties and taxes from project costs. Economic and financial analyses were not clearly separated, and economic costs and benefits were often confused with financial costs and benefits. Over time, however, a World Bank approach emerged. The first formal statement of the basic principles was issued in 1971. This reflected the current state of practice at the Bank, which used world prices for valuing key tradeables in the project’s cost and benefit streams. The Bank’s approach to the economic analysis of projects evolved rapidly during the 1970s. It paralleled developments outside the Bank, following Little and Mirrlees’ seminal work. Inside the Bank, it included the work of Lyn Squire and Herman van der Tak. This thinking was reflected in OMS 2.21. This chapter summarizes the main features of Little and Mirrlees; Squire and van der Tak; the evolution of the Bank’s guidelines between 1970 and 1980; and the more recent Bank debates covering the 1989-92 period.

I. Little and Mirrlees

2. What Little and Mirrlees espoused in 1969 was not totally new. They argued that a valid assessment of a project’s worth to an economy often required the use of values different from those used in financial appraisals. They said that economic appraisals should use economic prices, and that this typically involved shadow prices reflecting underlying scarcity values. The particular shadow prices recommended were world prices, representing a country’s actual trading opportunities. The resulting streams of annual costs and benefits would then be discounted to translate all future values into present values; the streams of future costs and benefits would be summed into single figures; and the single cost figure would be subtracted from the benefit figure. If there were a surplus, the project had a favorable present social value, and was deemed worth doing. In many respects, this was broadly in line with the approach that the Bank was taking at the time.

3. What was new in Little and Mirrlees was the notion that all prices used in project calculations should be world prices. Little and Mirrlees rejected the procedure followed at the time by the Bank, inter alia, whereby partial use was made of international values, e.g., applying them only to major inputs and outputs that were traded. Rather, Little and Mirrlees argued in favor of valuing all inputs at world prices, even nontraded inputs that normally cannot be imported (i.e., electricity, construction, and local transport). Nor would a single economy-wide conversion factor be adequate for transforming domestic

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prices into border prices. Rather border prices for nontradeables would be built up individually from world prices for tradeable inputs, shadow prices for labor and capital, and — where available — input-output data.

4. Little and Mirrlees also allowed for different weights for costs and benefits accruing to different groups. In their 1969 work, they allowed consumption benefits and investment benefits and for benefits to the private vs. the public sector — to be valued differently. This established the basis for a wedge between the consumption rate of interest and the investment rate of interest, and complicated the concept of the opportunity cost of capital. They also articulated the idea of risk neutrality of governments with respect to the variance of expected returns for small projects. In their 1974 work, they allowed for benefits accruing to different consumers to be valued differently.

II. Squire and van der Tak

5. Squire and van der Tak built on the work of Little and Mirrlees. They concentrated on three interrelated issues. First, they focused on the observation that the desired level of investment in an economy may not be forthcoming with exclusive reliance on the macroeconomic instruments of monetary and fiscal policy. Financial markets may be distorted, driving a wedge between rates of interest on financial savings and physical investments. In such circumstances, the consumption rate of interest is a downward biased estimate of the opportunity cost of capital. Second, because of deadweight losses from taxes, simple estimates of returns to public sector projects that are net drains on the budget and biased upward. Third, if the government also has concerns about equity, these would need to be systematically incorporated into the analysis.

6. Noting that the standard tools of macroeconomic policy may not be able to circumvent these problems, Squire and van der Tak argued that other instruments, including the selection of projects, may need to be used. They recounted the general switch in focus on these issues as follows:

"Theorists and practitioners therefore turned their attention to the derivation and estimation of shadow prices that recognized a suboptimal rate of investment. But, once there was a recognition of the constraints on the government's ability to secure the desired distribution of income between investment and consumption, it was but a short step to the realization that the separation of the growth and equity objectives may not be justified: that is, the government's ability to redistribute income in general may be limited. On this basis it was concluded that project analysts should investigate the impact of projects not only on the distribution of income between consumption and investment but also on the distribution of income between the rich and the poor. Shadow prices that include both these distributional aspects are here described as 'social prices.'"  

21/ Manual of Industrial Projects, op. cit.
22/ Project Appraisal and Planning, op. cit.
23/ Squire and van der Tak, op. cit., page 6.
7. Much of their book is devoted to an explication of these issues. It outlines the thinking behind the various corrections that would need to be made to observed price and interest rate variables for project analysis to systematically incorporate the government's growth and equity objectives. It provides the derivation of formulas for the various shadow prices and the accounting rate of interest. The latter is perhaps the most difficult concept in the entire methodology. Defined as the rate of fall in the numeraire—which in Squire and van der Tak is uncommitted public income measured in convertible foreign exchange—it is complicated by the fact that the distortion to public income is forecast to change over time. Hence the change itself also needs to be discounted.

III. From OPM 2.21 to OMS 2.21

8. The guidelines that were issued in 1971—OPM 2.21, Economic Tests of Project Acceptability—were pre-Little and Mirrlees. The guidelines that were issued in 1980—OMS 2.21, Economic Analysis of Projects—were post-Squire and van der Tak. The differences between the two sets of guidelines are large. They reflect the major evolution in the Bank's approach to the economic analysis that took place during the 1970s. Given their relevance to the task of producing the OD, salient features are described below.

A. OPM 2.21

9. The OPM began with a general statement about evaluating projects as elements in larger systems:

   "An economically attractive project is one that represents a high-priority use of resources at a country's present stage of development. A judgment of this question requires a combination of macroeconomic and project perspectives based on several considerations. The following points will usually be relevant.

(a) Does the project come from a sector in which the country needs additional investment? The Bank must rely on its knowledge of the country's economy and on sector studies to satisfy itself that the sector deserves Bank support.

(b) Does the project fit in well with the most urgent needs of its sector, i.e., does it reflect sensible subsector allocations and does it represent the lowest-cost method of achieving sector objectives? Sector 'needs' will most frequently be expressed in terms of (i) needed additional outputs and/or (ii) opportunities for cost-reductions which the project will produce. Occasionally other economic objectives may deserve explicit recognition, such as diversification, better income distribution among regions or groups, or the creation of new or improved institutions for carrying on sector activities.

(c) Is the project or program well-scaled, i.e., is it too big, too small, or about right?

(d) Is the proposed timing about right? Premature investment always means the commitment of resources before they have attained as high a priority as they deserve and a failure to take advantage of other opportunities of greater immediate profitability. Alternatively,
high returns can sometimes reflect little more than failure to have made timely investments in the past, leading to high and rising present costs.

(e) Is the project well-designed? Are the standards used appropriate or do they require excessive costs?

(f) If the project did not go forward, what other opportunities exist for using resources in the same country? This reflects the basic point that the economic merit of any project can be judged only by comparing it with other practical opportunities for using resources.

10. The OPM extensively discussed treatment of shadow prices, but ultimately the recommendations were soft:

“‘Shadow’ prices are values assumed for important cost or benefit elements when market prices are seriously distorted and do not reflect real scarcities in the economy. However, because of differing concepts as to what shadow prices should represent, plus difficulties in their measurement, the Bank has made rather limited use of them in its project work. In the future, shadow prices should be used in the following cases:

(a) If a country’s foreign exchange rate appears clearly to overvalue the currency, a shadow rate should be used for valuing all imported inputs (capital and operating) used by the project and all benefits that are valued in foreign exchange, i.e., import-substitutions or export earnings. Since the use of shadow exchange rates in Bank reports can have repercussions on the Bank’s external relationships, it is important to present and explain such calculations as prudently as possible; one way of doing so is to present the calculations in the form of a ‘sensitivity test’ of the project to different values of its foreign exchange content.

(b) If there is considerable chronic unemployment in a country it is reasonable to price unskilled labor at something below its actual wage if the project would employ labor of roughly the same grade or skill as those who are unemployed. Only if the labor in question has a high chance of remaining totally unemployed for several years is it acceptable to use a shadow price of zero when making economic calculations. In almost all cases a shadow price of, e.g., 50 percent or 75 percent of actual wage rates will be appropriate. Skilled labor, if given a shadow price, should almost always be given a shadow price above its actual rate.

(c) The use of a shadow price for capital is so common in Bank work that its presence is often not realized. The use of the opportunity cost of capital as a standard of comparison, instead of a project’s actual borrowing rate, amounts to giving capital a ‘shadow rate.’

“There is clearly an element of judgment as to whether or not shadow prices deserve to be used at all, what particular values are reasonable ones, and whether they should be assumed to hold for the project’s whole life. Since the ‘shadow’ or true economic prices of foreign exchange, labor, and capital involve basic resource values in an economy, project analysts should discuss
the use of shadow prices with the Area Department to ensure consistency in the use of shadow prices among different projects in a given country.”

11. In discussing the opportunity cost of capital, the OPM stated:

“In most countries the OCC will fall within a range of approximately 8 to 14 percent. When projects can show internal economic returns of 14 percent or higher it is not necessary to estimate the OCC for comparison purposes; at rates below 14 percent specific reference to the OCC should normally be made. There may occasionally be countries whose OCC falls outside the range cited, or sectors for which the normal country rate may not be appropriate; such cases would represent exceptions calling for special justification.”

12. The OPM also discussed other issues. It introduced the concepts of with project and without project, sunk costs, and consumers’ surplus. With respect to risk and uncertainty, it used the “best estimate” concept for the ERR. Building on this, the OPM introduced the idea of sensitivity and probability analyses.

B. OMS 2.21

13. The introductory overview to OMS 2.21 discusses scarcity, tradeoffs, benefits and costs, economic vs. financial analysis, and use of shadow prices. It next introduces “basic approaches.” Here it departs totally from OPM 2.21. It introduces the distinction between efficiency vs. social prices. It argues:

“Any economic analysis of projects, whether in efficiency or in social prices, rests fundamentally on value judgments regarding what is or is not good for the country concerned. While the responsibility for the judgments used in any Bank appraisal naturally belongs to the Bank, it is important to ensure that such judgments are consistent with government preferences to the extent that the latter can be determined. The underlying value judgments should preferably be made explicit and the effects of alternative judgments on the justification of the project discussed.”

14. The section identifying costs and benefits is similar to OPM 2.21. But the OMS section on valuing costs and benefits departs quite dramatically from OPM 2.21. The OMS stops short of making the use of multiple shadow prices mandatory. But it makes clear that such an approach is preferable and more accurate. According to the OMS:

“The traditional practice in the Bank has been to express costs and benefits in terms of domestic prices, converting the foreign values of traded inputs and outputs to domestic values by using a ‘shadow exchange rate.’ This shadow exchange rate is intended to adjust the relative prices of traded and non-traded goods which are typically distorted by various types of trade interventions, such as import and export duties and quantitative restrictions, as well as by other measures such as sales taxes. However, current practice is increasingly using border values directly for accounting purposes; this involves the reverse process of converting domestic values of non-traded inputs and outputs to border values by using ‘conversion factors’ which remove the distortions in their relative prices.

“While in principle the two approaches can be defined so as to be equivalent, the approach using shadow exchange rates has tended to be less reliable in the Bank’s practice. The use of an
economy-wide shadow exchange rate to convert foreign values of traded goods to domestic values does not by itself remove the distortions in relative prices of the particular non-traded goods involved in a project; additional adjustments are necessary for that purpose. The approach using conversion factors is preferable as it focuses directly on these specific adjustments.

"In practice, of course, it is not feasible to differentiate conversion factors between all non-traded commodities. Shortcuts that provide a reasonable approximation are needed. In essence, all the shortcuts involve some degree of averaging for a group of non-traded items and, therefore, some degree of error if the average conversion factor, rather than a specific factor, is applied to a particular non-traded good. For example, separate conversion factors might be estimated for broad groups of items such as construction, transportation, or consumption. The consumption conversion factor may be further differentiated by income groups, or by rural and urban areas. By contrast, the traditional approach does not use any differential conversion factors and simply applies one ‘standard’ conversion factor to all non-traded items, which is inversely proportional to the shadow exchange rate. The use of specific conversion factors is encouraged in cases in which greater accuracy of conversion is required."

15. There are many other innovations in OMS 2.21. An important one deals with uncertainty and the ERR concept. In place of the “best estimate” concept used in OPM 2.21, the OMS introduces the “expected value” concept—making explicit the idea that the disutility of risk can be ignored since the covariances among the assumed-to-be large number of small investment operations will tend to be mutually offsetting. It also introduces switching values into the sensitivity analysis. Vis-a-vis the opportunity cost of capital, the appropriate cutoff rate for the investment criterion becomes the accounting rate of interest in OMS 2.21, defined à la Little and Mirrlees and Squire and van der Tak. On implementation, OMS 2.21 indicates that the Regions will maintain satisfactory sets of shadow price parameters for countries with significant lending programs. The OMS takes a cautious approach to the implementation of the social analysis, i.e., the use of distributional weights for adding up costs and benefits. It suggests that:

"Only if ... shortcuts in the social analysis do not give an unambiguous answer regarding the social justification of the project, taking account of its impact on income distribution and savings, would it be necessary to make a more elaborate, detailed investigation of the distribution of project benefits. The additional work involved in such cases would be essential to establish the justification of the project."

IV. Implementation

16. In terms of actual practice, the 1970s are often regarded as the halcyon days of project economic analysis. Little and Mirrlees indicate that “shadow pricing in the World Bank reached its apogee around 1981.” But how good were “the good old days?” The following picture emerges from file searches and staff interviews: Multiple conversion factors were not used in project analysis during the 1970s. However, the issue received considerable management attention. There was an implementation program, and clearly the issue was being closely watched. Estimates in memoranda written at the time put the
incremental cost of developing multiple conversion factors at about four staffweeks and one staffweek thereafter to maintain them. Prevalence increased following the introduction in 1980 of CPN 2.03, “Conversion Factors and Shadow Exchange Rates.” However, even then, they were clearly not so prevalent as to cover all countries. Indeed, suggesting that implementation was not universal, the files contain a few examples of studies that calculated multiple conversion factors, which had been circulated on a best-practice basis.25

V. More Recent Bank Debates

17. Prompted by the OED Annual Reports, the Bank began a series of reviews of the framework for the economic analysis of projects starting in 1989—carried out both internally, by PRE,26 and externally, COD.27 There was also a Workshop on Economic Analysis of Projects jointly sponsored by OED, OPS, and PRE in late June, 1990, shortly after the ABCDE Conference at which the Little and Mirrlees paper was discussed. This section summarizes the reviews and the results of the Workshop.

A. The Reviews

18. The reviews focused on the Bank’s approach to economic and social cost-benefit analysis. According to the guidelines, this is based on economic or shadow prices for valuing inputs and outputs; social weights—taking fiscal effects and income distribution into account—for summing up the calculated economic costs and benefits; and the opportunity cost of capital for discounting the future stream of net benefits into a single net present value.

1. Theory and Methodology

19. The reviews reaffirmed the underlying theory and methodology espoused in the guidelines. They suggested that the theory and methodology were “capable of addressing the majority of concerns that arise in project evaluation.” They also strongly affirmed the value of cost-benefit analysis. However, based on the extensive literature that has developed over the past 20 years and the increasing prominence of certain issues such as the environment, poverty, and women in development, some of the reviews pointed to the need for rethinking in a few areas. But most cautioned against requiring refinements that do not matter in practice and that may require extensive staff resources. Mitra, for example, emphasized the need for “distilling the essential core of existing methods in a way that preserves the integrity of the basic approach in routine applications,” while Beier stressed the importance of supplementing the guidelines with specific “how to” directions and concerted training and encouragement of staff.

2. Practice at the Bank

25/ See, for example, H. Ghanem and M. Walton, “Indonesia—The Use of Shadow Prices,” August 1984.


20. The reviews focused much of their critical attention on actual practice within the Bank. The broad conclusion was that the current application of shadow prices and economic cost benefit analysis is at best not systematic and perhaps totally ad hoc. Beier reported that the “country specific data required for routine economic analysis is not systematically available to project officers.” Mitra observed that it is “far from being the case that the existing methodology is being systematically applied in project work.” Based on a small sample, he found that “shadow pricing in project appraisal on the basis of any common methodology had virtually ceased in recent years.”

3. Social Weights

21. The reviews considered the implementation of the social weights described in the guidelines. These comprise two main adjustments applied to project economic cost and benefit flows: poverty weights, which depend on the distribution of income across households; and income weights, which reflect differences in the social value of income accruing to the public and private sectors. In practice, neither concept has ever been operationalized. Beier recalled an early pilot effort within the Bank to test the methodology, an exercise which resulted in inconclusive results, “at least partly because the application of the ideas was inconsistent and difficult.” Supporting the application of social weights in principle, he said they allow us “to quantify our judgments—in favor of the poor, in favor of women, or of public income—rather than adding unquantifiable brief statements to SARs as a form of special pleading for marginal projects.”

22. The concept of the income weights (i.e., public vs. private) derives from differences in the social value of additional expenditures on consumption versus investment. The important role of the private sector notwithstanding, in most of the literature and in the reviews, public sector income and costs are presumed to command a higher weight than private sector income and costs. This is based on the presumptions that (a) investment is typically “inadequate” in borrowing countries; (b) the public sector is more likely to invest; and (c) taxes are distortionary. While the reviews reported broad agreement that tax-related distortions may be large, they said that in practice at the Bank no distinction is made in project analysis between public and private incomes. Most of the reviews supported the idea that the fiscal effects—including indirect effects such as changes in tax payments by recipient of income—of all projects should be included in appraisal reports. Newbery suggested that the “project selection process could be more closely integrated with the country investment review at which the financial position of the whole government program is examined.”

4. Opportunity Cost of Capital

23. Some of the reviews raised questions about the shadow interest rate, which is supposed to be used to discount expected future costs and benefits. Beier and Newbery addressed what they describe as current Bank practice of using a common cutoff rate of 10 percent for all countries. Leaving to one side the provision of OMS 2.21 to develop the accounting rate of interest on a country-by-country basis along with country-specific shadow prices, they questioned the 10 percent cutoff in the context of some IDA-only countries. Stating that in those countries the constraint is not funds, but prospects and absorptive capacity, they concluded that there is a need for a lower accounting rate of interest. Newbery stressed, however, the fact that the real interest rate on long-term bonds in international financial markets should be the floor for the opportunity cost of capital for all countries.

5. Risk
24. The reviews treated risk in three ways. First, they addressed the question of valuing risk. Referring to the guidelines, they noted that the investment criterion rests solely on the expected net present value (NPV) of a project, with a few exceptions. They further noted that, even for these exceptions, the size of the required corrections—in terms of percentage points on the expected rate of return—was small, and that state-of-the-art research was underway within the Bank on this topic. Second, they noted that, in practice at the Bank, risk analysis was typically perfunctory, with basic switching values not even calculated routinely in sensitivity analysis, despite explicit instructions in the guidelines to that effect. Third, they focused on the evidence of the widening gap between expected economic rates of return measured at appraisal and at project completion. The problems with the Bank’s risk analysis notwithstanding, they indicated that, by all accounts, the major problem with the economic analysis of projects was not the inadequacy of the risk analysis per se, but a neglect of relevant downside probabilities in the calculation of expected NPVs/ERRs. They said that an important contributing factor has been a tendency to assume that things will go more or less according to plan, which has imparted an upward bias to appraisal estimates of NPVs and ERRs.

B. The 1990 Workshop

25. The Workshop built on these reviews and staff presentations. The discussion focused on the current guidelines and their implementation; possible revisions to the guidelines; and the need for a client focus in the Bank’s approach to the economic analysis of projects. During the Workshop, participants expressed major concerns that the quality of the Bank’s project economic analysis was eroding. In turn, they attributed this to a lack of management attention to the results of, and inadequate budgetary resources for, project economic analysis. They said that this threatened the Bank’s ability to maintain its position as the world’s premier project lending institution.

1. The Guidelines and their Implementation

26. Participants voiced several concerns with the guidelines and their implementation. First, some felt that the guidelines in their present form were not easily applied in an operational context. It was noted that the guidelines had been developed under the assumption that sufficient resources would be available to adapt the economic analysis of projects to country and sector conditions on a case-by-case basis; but, as that assumption had not been borne out, the guidelines had proved too abstract for practitioners. Shortcuts thus proliferated on an ad hoc basis. Second, on a related note, participants argued that, although the guidelines are clear that economic analysis should be used from the earliest phases of project development—as a tool of project design and for evaluating alternatives—little specific methodological advice was provided as to the kind or complexity of the economic analysis that would be appropriate during the upstream stages of project development. This contributed to delays in the application of the economic analysis until late in the project cycle. Citing perceived pressures to lend and to stay within budget for project preparation, participants said that this often meant that it was too late to materially affect project design or to stop a bad project. Third, many repeated the finding of the reviews, that shadow prices and conversion factors, which even the simplest economic analysis described in the guidelines would require, are not consistently calculated across countries—or when calculated are not applied uniformly across sectors within a country. More broadly, they felt that incentives for quality economic analysis of projects were insufficient.

27. Participants said that these factors combined to compromise the integrity of the Bank’s system for economic analysis of projects. They said that, since the guidelines are not followed consistently, there is no objective standard for project economic analysis. Echoing sentiments expressed in the
Little/Mirrlees review, some participants commented that this is complicated by the fact that, since the
reorganization, no single unit within the Bank is charged with ensuring that appraisals meet a common
standard of acceptability. Others, however, warning against the dangers of central controls, suggested
that one way to strike the balance between the need for quality control and the desirability of a
decentralized system was for central staff to review a sample of projects after they were approved by the
Board. Some participants suggested that a peer review system would also help to ensure quality standards
were met.

2. Proposed Revisions to the Guidelines

28. The discussion also covered several specific areas, where it was felt that the guidelines themselves
were in need of refinement, revision or, in some cases, development from scratch. In many cases, the
discussion mirrored the points made in the reviews. The broad thrust of the Workshop and follow-up
discussions in each area is summarized below:

(a) **Poverty.** The treatment of poverty described in the guidelines relies on distributional
weights in evaluating project costs and benefits. While this aspect of the guidelines has
never been systematically implemented, it has not been replaced by an alternative
approach. The 1990 WDR made it timely for the Bank either to begin to apply the
existing guidelines or to codify a new approach to treating poverty in project evaluations.

(b) **Risk.** The guidelines are explicit that the investment criterion is based on the expected
NPV, except in a few special cases. These include projects that are large relative to
GDP, have a concentrated impact on a particular group, especially the poor, and/or for
which underlying income is volatile. However, the guidelines do not provide a workable
alternative to the expected NPV criterion for determining project acceptability in such
cases. They should be amended to provide specific guidance on how to incorporate risk
into the analysis.

(c) **Sustainability.** OED has introduced sustainability as a separate indicator of project
success. However, no consensus has emerged within the Bank either about its precise
operational meaning or on criteria for assessing it. For concreteness, the sustainability
question could be focused on the necessary institutional, economic, and financial
conditions for project success. For project design, this would involve putting in place
a policy and institutional framework governing the key actors in both the public and
private sectors, designed to facilitate the correction of the distortions identified in project
economic analysis. It would also entail the analysis of the broader fiscal and balance of
payments implications of projects—including those associated with maintenance and other
recurrent costs after project completion—with a view towards anticipating future problems
arising from the country’s budgetary and foreign exchange situation.

(d) **Environment.** The guidelines provide no guidance beyond the advice that, if external
costs “are significant and measurable, they should be counted as economic costs.”
Clearly, a practicable methodology needs to be developed.

(e) **Social Sectors.** The guidelines say little about the economic analysis of projects in the
social sectors. They acknowledge that, “while it may be possible to use quantitative
criteria in such sectors more often than is customary, both conceptual and statistical
difficulties limit their application." In practice, projects vary in the degree of quantification they incorporate—even in assessing cost effectiveness. They likewise vary in the rigor of their underlying analytic approach. The broad issue of quantified economic analysis of the social sectors thus merits review, particularly as these sectors increase in importance.

3. Client Focus

29. Many participants pointed to the importance of providing a sound and user-friendly methodology for our clients. They stressed that sector investment loans would offer an expanded forum for this issue, and that economic cost-benefit analysis should be part of the dialogue in public investment reviews. Most participants agreed with the importance of maintaining a client focus in this exercise—as in all Bank work—but many stressed the importance of revisiting the guidelines and their implementation first. They said the dissemination process would be more effective if built on a firm methodological and practical foundation.
Chapter 3: Methodology

1. This chapter addresses six topics: (a) social weights; (b) discount rate; (c) risk; (d) sustainability; (e) incorporating experience and country factors into economic analysis; and (f) methodology for upstream economic evaluation. The discussion focuses on the central issues for each topic. It summarizes the comments received from the Econ Advisory Group on an issues paper circulated in January 1991 and from comments received more recently on a draft of the current paper.

I. Social Weights

2. The social weights described in the guidelines comprise two main adjustments applied to project economic cost and benefit flows: fiscal weights, which reflect differences in the social value of income accruing to the public and private sectors; and poverty weights, which depend on the distribution of income across households. In practice, neither concept has ever been fully operationalized within the Bank.

A. Fiscal Weights

3. The concept of the income weights (i.e., public vs. private) derives from differences in the discounted social value of additional expenditures on consumption versus investment. The important role of the private sector notwithstanding, in most of the literature, public sector income and costs are presumed to command a higher value than private sector income and costs. This is based on the presumption that (a) investment is typically "inadequate" in borrowing countries; (b) the public sector is more likely to invest; and (c) taxes are distortionary. Accordingly, ceteris paribus, projects that result in a fiscal deficit that needs to be financed are of lower economic value than projects with the same NPV that impart a fiscal surplus or are neutral.

Issue: Should the Bank resurrect the idea of differently valuing public and private income in evaluating net project benefits? Is the gain of introducing such a complication likely to be worth the cost?

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29/ Comments were received and are gratefully acknowledged from: Messrs./Mmes. Blackwood, Dowsett-Coirolo, Estache, Ganguly, Ghosh, Goldman, Halpern, Jechoutek, Khorns, Morin, Nankani, Ody, Otoo, Parthasarathi, Picciotto, Schulz, Segal, Siraj, Staab, Ueno, Wellenius, Yusuf.
4. **Comments**: Of all the issues discussed, this was the most controversial. Many argued that the case for a premium on public income no longer was valid—if indeed it had ever been. Some said that fiscal weights are a tenth order refinement and that the Bank's scarce resources would be better spent on cleaning up implementation of the basics. Others, however, stressed the need for factoring into project costs the deadweight losses from the tax increases necessitated by some projects. Most respondents supported the proposal that the fiscal implications should be clearly laid out in project documents.

**B. Poverty Weights**

5. The concept of poverty weights bundles efficiency and equity considerations into a single concept. There is broad consensus about the impracticality of using poverty weights, there are also widespread concerns about the subjectivity of poverty weights. Many also question the appropriateness of Bank support for projects that may have an economic rate of return (ERR) < the discount rate. Nevertheless, undertaking such investments may be desirable if the weights reflect society's utility function and the costs of redistribution are large. Although such projects may appear to be economically inefficient, they may be preferable to financing efficient projects elsewhere and incurring large transactions costs to transfer the project benefits to the poor.

**Issue**: Should the Bank formally drop the poverty weights? What (if anything) should be adopted in their place?

6. Assuming that we drop the poverty weights, if the "test" discount rate (see below) is correctly calculated, all projects with ERR greater than or equal to it will be financed by the Bank or by others. So in principle it does not matter whether the Bank finances a poverty-related project or someone else finances it. However, this conclusion ignores the critical role that the Bank can play in defining and developing projects and in particular those with a poverty focus. Accordingly, the proposal is that only projects with ERR > test rate be accepted, but that, consistent with the "Assistance Strategies to Reduce Poverty," projects should be selected in the context of the overall country poverty reduction strategy. The Bank would thus pay special efforts to identify projects that both meet the economic test and enhance the position of the poor. Note that a corollary of this proposal is that the Bank will not lend for "resource poor areas," except for economically viable projects or for projects in the social sectors.

**Issue**: Is such an approach acceptable?

7. **Comments**: There was a consensus about the desirability of the outright elimination of the poverty weights. Most respondents argued that: (a) Poverty weights conceal more than they reveal; and (b) their purpose in making project evaluations consistent notwithstanding, they are open to arbitrariness and misuse. As an alternative, there was broad support for trying to measure in some way the distributional impact of project benefits. Some noted that this was not a well-developed area and suggested a pilot effort for selected projects, with a view to developing a monitoring methodology.

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Postscript

8. This issue was widely debated in the preparation of OD 4.15, Poverty Reduction and the Poverty Reduction Handbook, and in the Board seminar on the OD and Handbook. OD 4.15 is explicit that "Bank-financed poverty reduction projects must pass the same economic tests that apply to other projects. Bank-supported investments must have a satisfactory economic return or—in projects where the calculation of an economic rate of return is not practicable—be the least cost way of achieving project benefits." The thrust of the poverty reduction strategy is thus the reorientation of economic and sector work towards helping to identify project proposals that both have high returns and help the poor.

II. Discount Rate

9. The discount rate provides the link between different time periods and allows all costs and benefits to be expressed in present value terms. It is also the rate that when used as a cut-off for project selection just exhausts the available supply of funds. According to OMS 2.21, the appropriate discount rate is the consumption rate of interest (CRI), which in equilibrium is also equal to the country's opportunity cost of capital or investment rate of interest. There are two principal issues vis-à-vis the discount rate. The first is whether the 10-12 percent standard that is used in the Bank makes sense for all countries. The second is whether the marginal economic rate of return on capital is the appropriate cut-off rate or whether a social rate of return—reflecting possible different weights for private and public income and possibly for benefits accruing to different classes of consumers—is more appropriate. This relates to the use of social weights discussed above.

A. Should the test rate for the investment criterion be 10-12 percent for all countries?

10. The 10-12 percent Bank standard is not based on OMS 2.21, which does, however, mention "range estimates" of 5 to 15 percent. Rather, its use reflects a "reasonable ballpark number for making judgments." Indeed, according to OPN 3.05, Rates of Return in Bank's Project Work, December 23, 1982, "for a project to be acceptable for Bank financing, it should have a minimum ERR of 10 percent, which is taken as the notional value of the opportunity cost of capital." (Emphasis added.)

11. A particular question has arisen in the context of some IDA-only countries, where donor financing is available for much of the public investment program—and cannot be used for financial or other investments abroad. For some of these countries, it has been argued, the portfolio of project possibilities is so small relative to the availability of funds, that the IDA borrowing rate is the effective marginal cost of funds. However, in most IDA countries, the factor proportions reflect very low capital endowments,


32/ See OMS 2.21, para. 54.

suggesting that if anything the test rate should be higher than 10-12 percent. Moreover, IDA resources are predicated on their being used in the same way as IBRD resources, and to use a below-market test rate is to raise questions about the appropriate size of the IDA allocation.

**Issue:** Should 10-12 percent apply to all countries?

12. **Comments:** Many respondents expressed the view that the OCC should be determined on a country-specific basis, reflecting resource availability relative to investment opportunities. Some respondents agreed in principle but said that this would be operationally difficult to implement. Others pointed to specific problems in deriving the OCC from market data in the face of debt overhangs and uncertainty about debt reduction.

**Issue:** Should the Bank soften the investment criterion for opportunity-poor countries with large donor financing? Should this be coupled with a review of such countries’ IDA allocations in terms of their ability to utilize IDA funding?

13. **Comments:** There was little support for the idea of soft discount rates for selected countries. Most respondents questioned the concept of “opportunity-poor” countries. They said that weak implementation capacity has reduced the effective rate of return in some countries; what is needed is thus improvement in institutions there, rather than a lowering of the test OCC. They argued that the poorest countries are that way because of their ultra-capital-scarcity, and ventured that the OCC should be higher than the standard for such countries. Some pointed to the staffweek costs of trying to calculate the appropriate OCC. They argued that we should bow to the inevitable and accept a standardized rate. Many, however, supported the idea of individual country OCCs. Some respondents indicated that a country’s IDA allocation may need to be reduced, if the analysis suggested a dearth of investment opportunities relative to resource availability.

**B. Economic vs. Social Rate of Return**

14. The question of the economic vs. the social rate of return is relevant when social weights—either poverty or income—are considered. Assuming that poverty weights are rejected on other grounds, the only question is the role of the fiscal/investment premium. In the presence of the fiscal/investment premium, the accounting rate of interest (ARI) is the test discount rate. It incorporates the fiscal/investment premium, resulting in a situation in which the ARI > CRI and in which the marginal product of capital (q) > ARI.

**Issue:** As the analogue of the income weights, should not the Bank incorporate the fiscal/investment premium into the test discount rate if the principle of income weights is maintained? Is this feasible?

15. **Comments:** Since the fiscal weights were to be dropped, this question becomes moot.
III. Risk and Uncertainty

16. Acknowledging the fact that project documents typically present the analysis in terms of ERRs, the Bank’s guidelines on risk and sensitivity analysis\(^{24}\) indicate that under normal circumstances, the basic economic criterion for the acceptability of a project is its expected net present value (NPV). OMS 2.21 is also explicit that risk-reducing project components need to be justified by a positive impact on the expected NPV/ERR. The underlying thinking is that—except in the special cases discussed below—the existence of many (small) projects in a country’s (large) investment portfolio reduces the country’s vulnerability to the risks of any one project and makes it approximately risk neutral. Nevertheless, since the alternative possible costs and benefits of a project, weighted by their respective probabilities, comprise the expected NPV, the probabilities of good and bad results are clearly relevant to the analysis. Under this approach, the importance of “downside risk” to the investment decision is measured in terms of its impact on the expected NPV/ERR.

**Issue:** Is the expected NPV approach still appropriate as the Bank standard?

17. **Comments:** There was general reaffirmation of the appropriateness of the expected NPV as the conceptual standard. At the same time, however, it was noted that we should be more honest about the limitations of our analysis, noting that the expected value calculations are conducted over a very limited sample of probabilities.

18. As noted, the current guidelines indicate that the expected value criterion need not be valid in all cases. Three examples are cited—large projects, volatile country income, and concentrated impact on a small group within a country. In the case of a large project, the guidelines indicate that a project with a lower but more certain NPV might be preferred. Even so, they suggest that “the error introduced by the use of the expected value is likely to be very small.” For the cases of volatile country income and concentrated impact, the guidelines suggest that the solution lies in using “appropriate weights” for benefits and costs. For the volatile income case, this involves the use of different weights at different national income levels; for the concentrated impact case, it involves the use of “appropriate distributional weights.” Since these have never been used and are likely to be excluded from the OD, this raises the question of how to treat them.

**Issues:** For the exceptions to the expected NPV/ERR criterion—such as large, lumpy projects, variable country income, and concentrated impact—what specific guidance should be provided on how to incorporate risk into the analysis—and how to adapt the Bank’s investment criterion? Under what circumstances is full risk analysis warranted?

19. **Comments:** Few respondents addressed this issue. Those who did tended to be supportive of the notion that elaborate risk analysis is seldom warranted and only when important variables are mutually interdependent. No one addressed the issue of how to adapt the investment criterion in the face of large/concentrated impact projects. Rather the focus was on making the risks clear in project documents.

\(^{24}\) See OMS 2.21, “Economic Analysis of Projects,” pp. 13-14; and OPN 2.02, “Risk and Sensitivity Analysis in the Economic Analysis of Projects.”
so that the borrower and the Board can make informed decisions. More recently, SASVP-sponsored research notes that two possible approaches—certainty-equivalent analysis and risk adjusted interest rates—can be used to incorporate a measure of the disutility of risk into the analysis.

20. Although expected NPV is the standard investment criterion, the guidelines envisage a broad spectrum of sensitivity and risk analysis designed to accommodate project design questions on a case-by-case basis and to inform decision-making. Nevertheless, actual practice mostly amounts to mechanical sensitivity analysis. Switching values are rarely calculated for the important individual benefit and cost items in the NPV computations. Rather, it is more common to assume a limited range of variation in a few variables or in the entire cost and benefit streams and to show the effect of the posited changes on the NPV/ERR. Still, it is important not to overstate the impact of shortcomings of project risk analysis. By all accounts, the major problem is not the inadequacy of the risk analysis per se, but the neglect of relevant downside probabilities in the calculation of expected NPVs/ERRs. An apparent tendency to assume that things will go more or less according to plan has imparted an upward bias to appraisal estimates of NPVs and ERRs. The resulting "appraisal optimism" is reflected in a large gap between appraisal ERRs. Analysis by the Africa Technical Department found that frequent causes of agricultural project failure were adverse macroeconomic developments and management/institutional weaknesses, i.e., non-technical issues that had not been adequately factored into the ex ante expected NPV/ERR calculations.

Issue: How should non-technical—i.e., macroeconomic and institutional—risks be factored into the expected NPV calculation?

21. Comments: The general consensus was that these issues were central to project design and evaluation and needed to be factored into the analysis explicitly.

IV. Sustainability

22. According to OED, the sustainability of projects is "broadly defined as their ability to maintain an adequate level of net benefits after the investment phase is completed." However, no consensus has emerged within the Bank about the precise operational meaning of or on criteria for assessing sustainability—or indeed of the usefulness of the concept. For concreteness, the sustainability question can be focussed on the necessary economic, financial, environmental, and institutional conditions for project success. For project design, this would involve putting in place a policy and institutional framework governing the key actors in both the public and private sectors, designed to facilitate the correction of the distortions identified in project economic analysis. It would also entail the analysis of the broader fiscal and balance of payments implications of projects—including those associated with maintenance and other recurrent costs after project completion— with a view towards anticipating future


problems arising from the country’s budgetary and foreign exchange situation. The following observations are relevant:

(a) **Economic sustainability** is not an end in itself. The expected net present value (NPV) measures the value of the project, including its likely survival time horizon. If $\text{NPV} > 0$, the project is worthwhile. The time frame over which the project produces its net benefits is irrelevant. According to Little and Mirrlees, “Whether a project is sustainable (forever?—or just a long time?) has nothing to do with whether it is desirable. If unsustainability were really regarded as a reason for rejecting a project, there would be no mining, and no industry. The world would be a very primitive place.”

(b) **Financial sustainability** largely refers to the project’s operational sustainability. Will it have the wherewithal for spare parts, etc.—either because of appropriate cost recovery policies or because the provision of recurrent funds is assured? Cost recovery aspects are included in the financial analysis. Neither aspect is directly covered in the NPV analysis, although clearly the expected NPV will be affected by the project’s assumptions about the sustainability of necessary financing.

(c) **Environmental sustainability.** In principle, environmental costs and benefits can be measured and incorporated into the measure of the ERR although, in practice, there are many practical difficulties. Most of these revolve around pricing resources for which there are no markets. Some environmentalists argue that we should use a lower discount rate for future environmental costs and benefits, which they feel are not sufficiently taken into account in standard cost-benefit analysis. However, if there is a consensus that cost-benefit analysis incorrectly values certain natural resources, then their projected future price may need to be raised. The discount rate should not be reduced.

(d) **Institutional sustainability.** This can be incorporated in the ERR analysis—as long as specific account is taken of the probability of institutional failure, etc.

**Issue:** How should financial and institutional sustainability be treated? Should they be included as part of the risk analysis, with their expected values used as the basis for the expected NPV calculations?

23. **Comments:** Most respondents agreed that sustainability per se was not a separate success criterion, but rather a characteristic of some benefits and assumptions that may be essential for project success. The issue is thus appropriately handled by treating institutional and financial sustainability explicitly in project design and analysis. In evaluating the expected returns of the project, therefore

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in institutional capacity and financial sustainability need to be assessed. If the sensitivity analysis reveals that some actions are key to project success, they need to be reflected in the project's legal agreements.

V. Experience and Country Factors

24. The treatment of financial and institutional sustainability notwithstanding, the lessons learned from completed and ongoing operations—in the sector, in the country, and with the implementing institution—at all stages of the project cycle need to be reflected in the assumption. This will require the use of more realistic, historically-based parameters and implementation schedules. OD 9.00, *The Processing of Investment Lending*, indicates that at the IEPS review meeting, the task manager and others should identify ongoing and completed operations with lessons learned that are relevant for the project, as well as special studies prepared by OED and other Bank units to be considered in project design.\(^{40}\) Annexes C and D of OD 9.00 respectively indicate the need for explicit recognition in the Executive Project Summary and Memorandum of the President. Incorporating the lessons learned should result in more realistic cost and benefit estimates. However, specific mechanisms for quantifying the lessons of experience will be needed.

*Issue:* How should the Bank ensure that implementation assumptions are based on past experience? Who should provide the information? How should it be quantified?

25. *Comments:* There was broad support for the provision of OD 9.00 that indicates that the IEPS meeting should focus on the lessons of experience, derived from previous projects, OED reports, and other sources. However, respondents expressed concern about how to implement the requirement—and to quantify it. Several respondents raised the possibility of using the OED database. They suggested two measures: (1) the unsatisfactory ratio—the ratio of unsatisfactory projects to total rated projects; and (2) the “divergence indicator”—i.e., the difference between the appraisal ERR and the project completion ERR as a percentage of the appraisal ERR.

VI. Upstream Criteria

26. OD 9.00 stipulates that the IEPS review meeting should establish the approach to be followed in the risk and economic analysis.

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\(^{40}\) See OD 13.60, *Dissemination and Utilization of the Findings of the Operations Evaluation Department.*
Issue: Is this sufficient? Can something more specific be required than the indication of the benefits and risks and the way they will be measured? What is the proper standard of economic proof at the IEPS stage? At the FEPS stage?

27. Comments: Notwithstanding the views expressed by workshop participants, respondents overwhelmingly rejected the idea of a specific economic test at the IEPS stage. They stressed that, at that stage of project processing, the economic analysis of the project should be concerned with issues of design and with identification of the costs and benefits. They added that lack of specific data will generally limit early quantitative economic analysis. On the other hand, respondents were very supportive of the strengthening of the role of the IEPS and the FEPS Review meeting envisaged in OD 9.00. They welcomed the tightening of the guidelines for the IEPS and the specific mention in the OD that the IEPS meeting inter alia: (1) clarify the rationale for Bank involvement in terms of the project's economic and strategic objectives and the Bank's comparative advantage; and (2) establish the major sources of project risks and the approach to be followed in the economic analysis in quantifying the project's risks and expected benefits.

28. Respondents also stressed the importance of the lead economist, particularly at the IEPS stage. Some argued that lead economist review at the upstream end of project preparation, preferably before a project enters the lending program, would help to "weed out the chaff before too many staff resources were sunk." Some said that a specific role for the lead economist would also widen the coverage of project economic issues beyond the narrow confines of ERR calculations, to which they are often restricted these days, to the entire spectrum of economics. This is important in view of the large share of the investment lending program that is not subject to an ERR test.

41/ See para. 26, Chapter 2.
Chapter 4: Review of Practice

1. This chapter reports on a review of 181 projects approved by the Board in FY91. This represents nearly 74 percent of the number of operations and 70 percent of the value of operations approved in the year. (Box 4.1.) The remaining operations were SALs, SECALs, debt reduction, emergency, or technical assistance. Of the 181 projects reviewed, half were subject to an ERR test and half were not. Those operations subject to an ERR test are discussed first.

<table>
<thead>
<tr>
<th>Project Type</th>
<th>Number</th>
<th>Share of Total (percentages)</th>
<th>Amount (millions of US$)</th>
<th>Share of Total (percentages)</th>
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</thead>
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<td>37.4</td>
<td>9,117.6</td>
<td>40.2</td>
</tr>
<tr>
<td>Investment Projects without ERRs</td>
<td>89</td>
<td>36.2</td>
<td>6,775.8</td>
<td>29.9</td>
</tr>
<tr>
<td>(Total)</td>
<td>(181)</td>
<td>(73.6)</td>
<td>(15,893.4)</td>
<td>(70.1)</td>
</tr>
<tr>
<td>Other operations without ERRs</td>
<td>65</td>
<td>26.4</td>
<td>6,792.1</td>
<td>29.9</td>
</tr>
<tr>
<td>of which:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Structural Adjustment</td>
<td>(23)</td>
<td>(35.4)</td>
<td>(2,496.9)</td>
<td>(36.8)</td>
</tr>
<tr>
<td>Sectoral Adjustment</td>
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<td>(33.8)</td>
<td>(3,074.5)</td>
<td>(45.3)</td>
</tr>
<tr>
<td>Debt Reduction</td>
<td>(2)</td>
<td>(3.1)</td>
<td>(215.0)</td>
<td>(3.2)</td>
</tr>
<tr>
<td>Technical Assistance</td>
<td>(13)</td>
<td>(20.0)</td>
<td>(377.7)</td>
<td>(5.6)</td>
</tr>
<tr>
<td>Emergency</td>
<td>(5)</td>
<td>(7.7)</td>
<td>(628.0)</td>
<td>(9.2)</td>
</tr>
<tr>
<td>Total</td>
<td>246</td>
<td>100.0</td>
<td>22,685.5</td>
<td>100.0</td>
</tr>
</tbody>
</table>

 Includes two supplemental loans amounting to US$116.4M. Excludes one hybrid, Kenya Export Development, amounting to US$100.0M.

 Includes seven supplemental loans amounting to US$73.9M.

 Includes eight supplemental loans amounting to US$142.3M.
I. Projects Subject to an ERR Test

2. This section reports on a review of 92 FY91 projects that were subject to an ERR test. The focus of the review was the section(s) of the SAR dealing specifically with the economic analysis per se, although inevitably this led to a broader review of the SAR. The list of projects reviewed is contained in Annex Box A1. The projects were reviewed by a consultant (a retired Bank staff member). COD’s Economic Advisor reviewed both the consultant’s findings and the 92 SARs. The review covered eight broad issues:

- transparency and soundness of the basic economic evaluation;
- evidence of optimism or realism, including with respect to treatment of assumptions about macroeconomic policy, borrower commitment, and institutional/implementation capacity;
- appropriateness/usefulness of sensitivity/risk analysis;
- environmental impact;
- distributional/poverty-reduction impact;
- fiscal analysis;
- fungibility analysis; and
- economic criteria used in sector investment loans.

The findings are summarized below. For each topic, there is a box listing “good practice” examples. To compare appraisal methodology with evaluation methodology used at completion, we also looked at a sample of PCRs completed in FY91, broadly conforming to the country and sectoral coverage of the 92 project review.

A. Transparency and Soundness of Basic Evaluation

3. This part of the review addressed three questions:

- Is a coherent economic story provided?
- Is there a clear discussion of the price and quantity assumptions? (Are financial versus economic prices discussed?)
- Are alternative courses of action (including the without-project case) considered and compared?

The economic story is important for establishing the plausibility of project benefits. The economic clarity and coherence of the story thus becomes more important, the more indirect or ambiguous the project’s benefit function. For example, for an investment in replacement equipment, for which the price and quantity of project output are pretty much known, the story line can be simpler than for an agricultural investment in which the private sector needs to respond to price signals and other factors in order for benefits to materialize. However, in all cases, the basic project’s price and quantity assumptions and the reasons for those assumptions need to be spelled out. Also essential is a clear delineation of what would happen without the project or with an alternative investment.
4. **Results.** The FY91 cohort of SARs was judged against these criteria. Fifty-one SARs were rated good or better, and 27 were rated marginal or acceptable. The remaining 14 SARs were rated poor. SARs in the latter category provide little more than the estimated ERR, leaving the reader in the dark about how it was derived. By contrast, the best SARs provide a clear statement of what is assumed and why, and a summary of the without-project case. Good-practice examples are highlighted in Box 4.2.

**Box 4.2: GOOD PRACTICE: ECONOMIC COST-BENEFIT ANALYSIS**

- Bangladesh: Third Inland Water Transport
- China: Irrigated Agricultural Development
- Ecuador: Lower Guayas Flood Control
- India: Gas Flaring Reduction
- Indonesia: Provincial Irrigated Agriculture Development
- Nigeria: National Water Rehabilitation
- Yemen: Fourth Fisheries Development

5. **Conversion Factors and Country Parameters.** In all the China projects, disaggregated conversion factors were used. In some other countries—mostly in South Asia, but in a few African and East Asian countries as well—shadow prices were used for the wage rate for unskilled workers and foreign exchange. However, all is not totally well. Variations in treatment across projects in the same country suggest that the project economist is pretty much on his/her own in deciding whether to use shadow prices and/or conversion factors, and which ones to use. In addition, there is a widespread misuse of the “shadow exchange rate” concept, as it is supposed to be used in economic cost-benefit analysis. In some cases, where a correction for the exchange rate is provided, it is solely in respect to a divergence between the official and parallel market rate, leaving import duties and export taxes/subsidies unadjusted for. Similarly, in many cases, the SAR indicates that because the official exchange rate is appropriately valued, no conversion factors are needed. But, in such cases, there is still a need to correct relative prices of nontraded goods and services for distortions to the exchange rate caused by import tariffs and export subsidies. For four countries, different parameter values for the country’s opportunity cost of capital were used in different projects.

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42/ In each of the examples cited in Box 4.2, conversion factors have also been used to translate prices for non-traded goods and services into border prices. See paragraph 5.

43/ Only four country departments routinely circulate memoranda containing conversion factors.
B. **Optimism vs. Realism**

6. Earlier chapters discuss the tendency for ERRs to be overly optimistic. One important reason cited there, and elsewhere,\(^{44}\) is the neglect of macroeconomic and implementation risks in estimating *expected* project benefits. The review confirms that project assumptions about government implementation capacity, macroeconomic performance, availability of local cost financing, and other key operational variables\(^{45}\) are not factored into the calculations. Although some SARs refer to the macroeconomic environment as being important for determining the project outcome, *the variables are not explicitly taken into account in calculating ERRs.*

7. **Upward Bias in ERR Estimates.** The neglect of these downside risks, which are frequently cited in the SAR’s risk section and sometimes considered in the sensitivity analysis (see below), imparts an upward bias to the ERR estimate, which is supposed to be the *expected* value—that is, the *statistical mean* of possible project outcomes. By itself, this neglect is a key reason for the so-called ERR gap—that is, the difference between the ERR at appraisal and at project completion. With the appraisal ERR based on “Everything Goes According to Plan”\(^{46}\) and the completion ERR based on the colder reality of project implementation, that there is a gap is not surprising. Nor is it surprising that it widened during a period of macroeconomic decline.

C. **Sensitivity/Risk Analysis**

8. The Board’s Joint Audit Committee (JAC) has repeatedly complained that the Bank’s sensitivity/risk analysis is not realistic. To research this issue, the review asked the following questions:

- Is any sensitivity/risk analysis presented?
- How meaningful is it? Does the sensitivity/risk analysis address issues raised in the project risk section of the SAR? Does it identify key variables to watch during implementation, variations in which have an important impact on the ERR?

Of the 92 projects in the review sample, 24 present no sensitivity/risk analysis at all. Of the remaining 68 projects, 49 often do not test any of the risks mentioned in the SAR’s “project risk” section; and of these, 31 SARs present cosmetic analysis only—that is, they consider 10 percent increases/decreases in total costs/benefits. Only 19 SARs use sensitivity analysis to test the effect of one or more of the risks identified in the SAR’s “project risk” section (Annex Box A2). Only 24 present switching values—that is, the values for key variables that turn the project from viable to nonviable (Annex Box A3). Based on the SARs, sensitivity/risk analysis is *not* being used to designate variables for close monitoring during implementation and supervision.

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\(^{45}\) Based on the information provided in the SARs, it is not possible to determine if the time frame for project completion and benefits is consistent with the disbursement schedule.

9. Several SARs, however, present quite thoughtful sensitivity/risk analysis (Box 4.3). The Zimbabwe project, for example, provides a complete sensitivity analysis with switching values for key variables, including traffic growth, for which the likely load growth for 12 major commodities was analyzed. The Turkey project’s sensitivity analysis covers macroeconomic variables such as GDP growth and the exchange rate. The Indonesia project is noteworthy for its consideration of the sensitivity of the project outcome to the availability of recurrent O&M expenditures for completed subprojects. The Djibouti project conducts risk analysis over normal distributions of benefits and costs, and calculates an expected ERR. The Uganda SAR contains a full risk analysis over the project’s main technical risks; the SAR does not report the resulting expected ERR.

**BOX 4.3: GOOD PRACTICE: SENSITIVITY/RISK ANALYSIS**

- **Djibouti:** Second Urban Development
- **Indonesia:** Provincial Irrigated Agriculture Development
- **Turkey:** TEK Restructuring
- **Uganda:** Third Power
- **Zimbabwe:** Railways II

D. Environmental Analysis

10. According to OD 4.01, *Environmental Assessment*, the analysis is to include “a systematic comparison of the proposed investment design, site, technology, and operational alternatives in terms of their potential environmental impacts.... For each of the alternatives, the environmental costs and benefits should be quantified to the extent possible, and economic values should be attached where feasible.” Annex D of the OD discusses the appraisal mission’s role in reviewing the Environmental Assessment (EA). It indicates that the appraisal mission inter alia determines that the EA’s recommendations are properly addressed in project design and economic analysis. On this basis, the review considered the following questions:

- Is there an environmental assessment for the project? If so, how are its findings reflected in the economic analysis?
- Are environmental externalities discussed/incorporated into the economic analysis?

11. Of the 92 projects in the sample, 25 had Environmental Assessments (Annex Box A4). Of the 25, only three refer to environmental issues in the economic analysis; in each case, the reference is to the benefits of flood control. Box 4.4 references two projects which presented thoughtful economic analysis of environmental costs and benefits. The Ecuador SAR provides quantified estimates of the
benefits of flood control. The Mauritius SAR provides estimates of the value of tourist receipts and health benefits that are projected to flow from the government’s environmental investment program, which the project supports.

**BOX 4.4: GOOD PRACTICE: ECONOMIC ANALYSIS OF ENVIRONMENTAL EFFECTS**

- Ecuador: Lower Guayas Flood Control
- Mauritius: Environmental Monitoring and Development

**E. Poverty Reduction Impact**

12. The review checked whether the projects applied social weights and/or otherwise analyzed the distributional impact of project costs and benefits. No SARs discussed social weights. Income distribution effects were discussed in 35 SARs. The treatment varies from specific quantified analysis to general statements about broad project impact. Box 4.5 cites examples of thoughtful analysis. The China and Bangladesh SARs provide the per capita income level of poor farmers in the project area and estimate the impact on their incomes through the farm income model. The Ecuador project cites studies which show that half of the project beneficiaries have incomes below the poverty line. The Pakistan SAR notes that the targeting of investments for maximal poverty relief has been a determining factor in the project’s locational choices; it provides an annex relating project characteristics to the characteristics of poverty in Pakistan.

**BOX 4.5: GOOD PRACTICE: ANALYSIS OF INCOME DISTRIBUTIONAL EFFECTS**

- Bangladesh: National Minor Irrigation Development
- China: Mid-Yangtze and Henan Agricultural Development
- Ecuador: Municipal Development and Urban Infrastructure
- Pakistan: Rural Water Supply and Sanitation

**F. Fiscal Impact**

13. Earlier chapters discuss the methodological approach to the economic analysis of projects that was developed during the 1970s. One aspect of that analysis was a premium on public sector income. In today’s paradigm, this translates into a concern with the deadweight loss from taxes. Two issues were researched:

- Are the fiscal costs of the program considered?
• Is there a discussion of the deadweight losses associated with any incremental tax burden caused by the project?

Nine SARs explicitly consider the fiscal implications of the project (Annex Box A5). These discussions tend to be brief and delinked from the ERR analysis. Most often, the discussion is an isolated paragraph that reports on net budgetary transfers. One exception is the Mauritius project cited in Box 4.6. Its SAR specifically links the discussion of the project’s financial implications for the government budget to project sustainability. No SARs consider the deadweight-loss costs of incremental taxes needed to pay for the project, or the obverse.

**BOX 4.6: GOOD PRACTICE: ANALYSIS OF FISCAL IMPACT**

- **Mauritius: Agricultural Management and Services**

**G. Fungibility**

14. Since money is fungible, if the Bank finances a project that would be done anyway, the de facto impact is to finance the marginal project. For the Bank’s development impact to be positive under such conditions, the returns on the marginal project would have to be satisfactory. To investigate how SARs approach this issue, the review asked:

- Does the SAR make clear that the project would not be done or would be done differently without the Bank—so that in effect it is the marginal project?
- If the project would be done anyway, what is the status of the dialogue on the public expenditure program? Are there public sector projects/expenditures that we think are inefficient either in the sector or more broadly? Are the policy undertakings, etc. sufficient to warrant the project, given the quality of the public expenditure program?

15. On the first point, many SARs were vague, discussing why the project is consistent with the IBRD or IDA country strategy but not making clear what was the particular value added of the Bank. More thoughtful discussions indicated how the project would (1) provide an entry point into the sectoral policy dialogue; (2) support institutional-building, policy changes, or a shift in the composition and thrust of sector investment program; or (3) develop a project concept for replication on a wider scale (Box 4.7). The Zaire project is a pilot, for possible replication with donor and other support. The China project is larger than a pilot, but it is also to provide a basis for replication. The Indonesia project is “being used to encourage the Government to give priority to completion of on-going schemes rather than investments in new schemes, or existing schemes that require rehabilitation.” The Zimbabwe project references Bank

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48/ This area warrants more work in the context of development effectiveness. How do we measure the gains from policy, institution-building, etc., and the Bank’s role therein?
sector work, which helped the Government to map out a coherent framework for the restructuring of the railways. It notes that continued Bank involvement, as a catalyst for change, “is essential to ensure successful implementation of the proposed restructuring, and for mobilizing donor assistance.” No SARs addressed the appropriateness of the sectoral, or overall, public expenditure program.

**Box 4.7: Good Practice: Discussion of Value-Added of Bank Support for the Projects**

- **China:** Mid-Yangtze Agricultural Development
- **Indonesia:** Provincial Irrigated Agriculture Development
- **Zaire:** Pilot Feeder Roads
- **Zimbabwe:** Railways II

**H. Wholesale Criteria**

16. Of the 92 projects, 20 are wholesale operations, which include agreed criteria to be used by the borrower in subproject selection. The specificity of the agreed criteria varies considerably. In some cases the economic criterion is buried in the document and not easy to find. Once found, it may be difficult to interpret. In one SAR, agreement with the Bank on subproject selection criteria is a condition of loan effectiveness, so the criteria are not spelled out in the SAR. In another, the eligibility criteria are specified not in ERR terms, but with respect to specific kinds of eligible expenditures. The SARs cited in Box 4.8 provide annexes with detailed descriptions of the criteria to be used in evaluating subprojects. The Argentina, Mexico, and China SARs discuss the use of sensitivity analysis in subproject selection. The Argentina and Mexico Water Supply SARs also stress the need to closely follow during implementation the variables to which the ERR is sensitive. Five other SARs discuss sensitivity analysis for subprojects already appraised. Twelve SARs do not include any discussion of sensitivity analysis.

**I. Evaluation at Project Completion**

17. To get a picture of evaluation on project completion—as a basis for comparison with appraisal methodology—the review looked at project completion reports (PCRs) in countries/sectors broadly conforming with the country/sector coverage of the review. The PCRs reviewed are listed in Annex A8. In general terms, the evaluation standards used in the PCRs were consistent with appraisal practices described above.
BOX 4.8: GOOD PRACTICE: ARTICULATION OF ECONOMIC CRITERIA FOR APPRAISING SUBPROJECTS

- Argentina: Water Supply and Sewerage Sector
- China: Jingsu Provincial Transport
- Colombia: Municipal Development
- Indonesia: East Java and Bali Urban Development
- Mexico: Water Supply and Sanitation Sector
- Mexico: Decentralization and Regional Development for the Disadvantaged States
- Morocco: Port Sector

II. Evaluation in Other Investment Lending Operations

18. Some 89 investment operations, accounting for nearly 30 percent of the amount of total new lending commitments in FY91, were not subject to an ERR test. The SARs for these operations were reviewed for the evaluation and benefit standards used in the appraisal. Over half of these projects were in the social sectors. In turn, these were evenly divided between education and population/health/nutrition (PHN). (Box 4.9.) Another 25 percent of the projects were wholesale loans, most of which were financial intermediary loans (FILs). Most of the remaining operations supported research and extension projects in the agriculture sector. In some of the latter, evaluation issues were addressed, and there were attempts to quantify benefits and ERRs based on proxy variables and experience elsewhere. However, institutional and macroeconomic risks received virtually no attention. With a few notable exceptions, SARs for social sector projects did not focus on evaluation issues. Consequently, implicit macroeconomic and implementation assumptions were not addressed, and risks were not evaluated.

A. Social Sectors

1. Education

19. Of the 26 FY91 education sector projects reviewed (Box A.9), about a quarter specified success criteria. The Trinidad and Tobago project (Box 4.10), for example, specified one and a half times the graduates of training centers would have found employment compared to nongraduates, and that they would earn 20 percent more than nongraduates. About half of the SARs specified detailed performance indicators for evaluating performance during implementation. When performance indicators were indicated, they were heavily weighted to inputs, not project outputs. About two-thirds of the projects included specific provision for midterm reviews. One-third of the SARs provided for educational outcome testing, but more for overall educational administration purposes than as a criterion of project performance. An exception was the Nigeria Project, in which student achievement is a success criterion; the project provides for student testing during the third and fifth year of the project.
Box 4.9: FY91 Investment Projects Without ERRs

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<th>Project Type</th>
<th>Number</th>
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<th>Amount (millions of US$)</th>
<th>Share of Total (percentages)</th>
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</thead>
<tbody>
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<td>Social Sector</td>
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<tr>
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<tr>
<td>Education</td>
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<td>(50.0)</td>
<td>(2,251.7)</td>
<td>(59.7)</td>
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<tr>
<td>Pop./Health/Nutr.</td>
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<td>(50.0)</td>
<td>(1,520.4)</td>
<td>(40.3)</td>
</tr>
<tr>
<td>Agriculture</td>
<td>8</td>
<td>9.0</td>
<td>219.1</td>
<td>3.2</td>
</tr>
<tr>
<td>Environmental</td>
<td>3</td>
<td>3.4</td>
<td>325.1</td>
<td>4.8</td>
</tr>
<tr>
<td>Wholesale</td>
<td>22</td>
<td>24.7</td>
<td>2,281.1</td>
<td>33.7</td>
</tr>
<tr>
<td>of which:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Financial Inter.</td>
<td>(17)</td>
<td>(77.3)</td>
<td>(1,894.6)</td>
<td>(83.1)</td>
</tr>
<tr>
<td>Sector Inv.</td>
<td>(5)</td>
<td>(22.7)</td>
<td>(386.5)</td>
<td>(16.9)</td>
</tr>
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<td>Supplements</td>
<td>2</td>
<td>2.2</td>
<td>116.4</td>
<td>1.7</td>
</tr>
<tr>
<td>Other</td>
<td>2</td>
<td>2.2</td>
<td>62.0</td>
<td>0.9</td>
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<tr>
<td>Total</td>
<td>89</td>
<td>100.0</td>
<td>6,775.8</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Box 4.10: Good Practice: Education Project Design

- Brazil: Innovations in Basic Education
- Nigeria: Primary Education
- Trinidad and Tobago: Education and Training for Youth Employment

20. No SARs attempted to demonstrate the cost-effectiveness of the particular pattern of activities supported, nor did any indicate alternatives not utilized. However, the Brazil project included provision to assess the costs of alternative preschool support models which might influence future program design. About forty percent of the SARs presented cost tables generated with the Bank's COSTAB program, which provides for standardized treatment of costs, normally in considerable detail. The rest generally had less detailed cost tables.
2. PHN

21. There were 26 investment operations in the PHN sector in FY91. Four of these were social funds. Of the remaining 22 projects, half identified specific indicators for monitoring during implementation. The other 11 did not rely on indicators. They called for progress reports and other qualitative vehicles as a basis for monitoring. In some cases, these projects were collections of smaller items, for which specific indicators of performance were not useful. In no case was the cost-effectiveness of the intervention discussed.

B. Agriculture

22. The FY91 cohort included eight agricultural operations for research, extension, and/or services for which ERRs were not presented. Although there was no formal rate of return analyses in any of these SARs, two effectively used quantified benefits as partial project justification (Box 4.11).

BOX 4.11: GOOD PRACTICE: ECONOMIC ANALYSIS OF EXTENSION PROJECTS

- Bolivia: Agricultural Technology Development
- Kenya: Second National Agricultural Extension

The Kenya project specified assumptions about the impact of the extension on production and within these assumptions presented a detailed economic analysis estimating the ERR at between 15 and 28 percent. A similar approach was used in the Bolivia project, which derived an annual incremental value of production attributable to the project. Two other SARs made some references to quantitative benefits, while the SARs for four operations made no attempt to quantify economic benefits either by estimating an ERR or by proxy analysis. All implied there would be increased rural incomes as a result of the projects, and cited various noneconomic benefits. Two research operations included provision for ex-post studies to estimate the ERR to the research programs (Box 4.12). The Ghana project devoted an annex to methodologies for selecting research priorities, and a set of weighted criteria presented on the basis of which the three initial research programs—for pineapple, plantain, and soybeans—were chosen. None of the projects included any sensitivity test. The closest approach was the aforementioned Kenya project, which provided a range of possible economic rates of return based on various assumptions about effectiveness.

23. Although these agriculture operations did not quantify economic benefits or compute economic rates of return, they included relatively detailed tabulations of costs. All included cost tables using the Bank's COSTAB program. Although the SARs described the project costs in the main body of the text

or in appendices, characteristically the cost tables themselves were not explained in accompanying text. All the SARs had a section describing the main project risks. None, however, discussed the risks associated with possible cost increases.

C. Environment

24. There were three environmental projects. (Box A.12.) The core of one operation was the preparation of communal land management plans. According to the SAR, no attempt was made to estimate economic returns, "because measurement of benefits to natural resources management is difficult at the farm level, but even more difficult at the community level." Hence, "any attempt to estimate an economic rate of return to the proposed project would be spurious." Another operation dealt with dam safety. The SAR asserts that "conventional cost-benefit analysis is not appropriate for evaluating this project, and the justification for the project rests on the fact that dam safety assurance is a regulatory function of government..." Most of the project cost was for remedial works on dams, but the SAR did not discuss how the technology for the remedial works was chosen, nor did it include a least-cost justification. The third environmental project addressed industrial pollution. The main benefits of this project were derived from the reduction in environmental degradation caused by industrial sources and the project’s replicability throughout the country.

D. Wholesale Projects

25. In the case of wholesale projects, the Bank appraises the local institution, which in turn appraises the subprojects according to selection criteria agreed with the Bank. In most of the twenty-two wholesale projects under review there were clear and well-established criteria for subproject selection. Most FILs required a financial rate of return (FRR); some of the SECIL components involved agreed ERR criteria.

1. SECILs

26. Most of the five sector investment operations were mixed operations, combining TA, some financing of infrastructure, and some financing of subprojects. (Box A.13.) Two of the five operations provide for monitoring with performance indicators. These included indicators such as increasing utilization rates for classrooms and increasing student-teacher ratios in the China project and use of new water supply sources and hand washing in the India project. Most SECILs had clear appraisal criteria for subprojects. The China project requires ERRs for road subprojects. The India project states that the ERR has been about 15 percent in similar projects where attempts have been made to calculate the value of women's time.
### Box 4.13: Good Practice: Performance Indicators in SECILs

- China: Medium-Sized Cities Development
- India: Maharashtra Rural Water Supply and Environmental Sanitation

### 2. Financial Intermediary Operations

27. Most of the 17 financial intermediary operations (FILs) rely exclusively on a FRR test. (Box A.14.) But eight FY91 FILs (Box 4.14) also stipulate an ERR test. These projects typically establish a minimum ERR ranging from 12-15 percent. One project requires a “satisfactory” ERR for each subproject, but no minimum is specified. Four projects did not specify a minimum FRR or ERR. In 9 of the 17 SARs, there is a discussion of distortions in the financial sector, which the operation will help to address. Of the remaining eight SARs, five discuss the policy framework for the financial sector, noting recent changes which the operations build on, while three SARs discuss neither distortions nor remedies.

### Box 4.14: Good Practice: ERR Test for FILs

- Brazil: Private Sector Finance
- Central African Republic: Enterprise Rehabilitation and Development
- China: Rural Industrial Technology (Spark)
- China: Shanghai Industrial Development
- Cyprus: Industrial Restructuring
- Philippines: Industrial Restructuring
- Philippines: Rural Finance
- Turkey: Private Investment Credit
Chapter 5: Findings and Recommendations

I. Major Findings

A. Guidelines vs. Practice

1. There is a large gap between the guidelines on the economic analysis of projects, as embodied in OMS 2.21 and associated OPNs, and current practice.

- The guidelines suggest that individual shadow prices should be calculated for important nontraded project inputs and outputs. In practice, very few projects rely on such calculations. Some projects make no corrections to financial prices. Only four country departments routinely circulate memoranda to project staff containing conversion factors. Of these, only one contains multiple conversion factors.

- In evaluating project costs and benefits, separate weights for public and private income and for different segments of the income distribution are never used.

- The elegant theoretical structure underlying the concept of the accounting rate of interest in OMS 2.21 notwithstanding, an OCC of 10-12 percent is typically assumed.

B. Risk and Sensitivity Analysis

2. Sensitivity analysis typically consists of costs ± 10 percent and benefits ± 10 percent. Switching values are seldom calculated. The analysis is rarely anchored to the risks identified elsewhere in the SAR. Accordingly, it sheds little light on the key concern: Will the project survive the kinds of shocks identified in the project analysis as important, given the lessons of experience.

C. Unrealistic Project Forecasts

3. Historically, project failures have tended to be associated with policy, institutional, and financial problems. But the likelihood of such problems is typically not factored into the economic evaluation. Contrary to OMS 2.21, the ERR presented in the typical SAR is not the expected ERR. Rather, it tends to be the EGAP—i.e., the Everything Goes According to Plan—ERR.

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See Beier, op. cit.
D. Benefit Standards for Projects Not Subject to ERR Test

4. In the social sectors, there are no guidelines governing benefit standards. In practice, benefit standards for evaluating such projects are ad hoc, and many projects do not set clear success criteria. About 50 percent of social sector operations identify indicators to be monitored during implementation; the others do not.

E. Role of Lead Economists

5. Since the Reorganization in 1987, investment lending has been increasingly integrated into country assistance strategies. However, the integration is by no means complete, and there is a particular problem on the economic side. This is perhaps most evident in the role of the lead economist, which in many country departments is exclusively focused on macroeconomic issues. With few exceptions, lead economists have little involvement with the economics of investment projects. This has several unfortunate side-effects, which are partially mitigated in departments where the country team concept has taken root. First, the links between ESW and projects are not always well-forged.\(^{51}\) Second, the tough questions that the lead economists would raise, go unasked. For investment operations, these questions would help to clarify the economic strategy of the project proposal, sharpen the project concept, and through this process improve project identification. Third, the desired coordination between country economists and project economists often fails to occur. This is costly for project design. It is also costly for country strategy formulation.

II. Recommendations

6. Clearly, the guidelines need to be overhauled. In some cases, they should be moved closer to current practice. In others, current practice needs to be sharpened. The following recommendations are proposed for incorporation in OD 10.40, Economic Evaluation of Investment Operations\(^{52}\):

- **Shadow Prices**: Emphasize that cost effectiveness in the context of country circumstances should determine the appropriate degree of attention to shadow prices. Where distortions are widespread and an important part of the policy dialogue, clearly shadow prices will be an important aid to the economic evaluation of public investments, whether supported by the Bank or not. In many countries, the use of standard conversion factors to correct for tariffs and other distortions will suffice for most project purposes.

- **Social Weights**: Eliminate the provision in the guidelines for the inclusion of different public and private sector income (fiscal) weights and distributional (poverty) weights in the calculation of the expected rate of return. The project documents to indicate the fiscal and distributional implications of the project.

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\(^{51}\) One-third of SARs reviewed made no reference to ESW and were not follow-on projects.

• **Opportunity Cost of Capital**: Simplify the concept of the opportunity cost of capital (OCC), by dropping the discussion of the accounting rate of interest, in line with the recommendation to eliminate the fiscal weights. In principle, the OCC should be determined on a country-specific basis; in practice, calculating country-specific OCCs is not straightforward. Pending experimentation with the estimation of country-specific OCCs, the 10-12 percent Bank standard should continue to be used. Deviations should be fully justified in the CSP, based on an assessment of available resources relative to investment opportunities in the country.

• **Role of Lead Economist**: The lead economist should be responsible for advising the Country Department Director on (1) the quality of the economic analysis in his/her department’s investment operations, (2) whether individual shadow prices or standard conversion factors are generally needed, and (3) on the appropriate treatment of the country OCC.

• **Financial vs. Economic Analysis**: Emphasize the importance of financial analysis as underpinning the economic analysis. While recognizing the separate spheres of financial and economic analyses, it is important to consider financial aspects explicitly in the economic analysis, particularly as they bear on the implementation and operational sustainability of project benefits. This is critical in terms of (1) cost recovery when parastatals are involved; (2) recurrent financing when budgetary support is required; and (3) financial profitability when private sector beneficiaries are involved.

• **Institutional Assessment**: Make explicit the implementation and institutional sustainability assumptions underlying the economic analysis, integrating the findings of institutional development specialists and staff with other skills in assessing the likely performance of project-related institutions.

• **Environment**: Include environmental costs and benefits in the economic analysis, discounting them by the country OCC.

• **Expected NPV/ERR**: Retain the expected NPV/ERR as the primary investment criterion. Acknowledging the limitations of any probability analysis relied on to calculate the expected NPV/ERR, the project documents to indicate the variables for which different probabilities have been taken into account in the calculations.

• **Social Sector and Agriculture Extension and Research Projects**: Require a clear statement of the success criteria used for evaluating the project and an indication of how success will be measured. To facilitate the evaluation, benefits should be quantified. Cost effectiveness of the proposed design in meeting the project’s objectives should be established.

• **Forecast Realism**: As a benchmark, assess the project outcome assuming the continuation of recent country/sector performance levels that influence project success—such as for institutional and financial implementation capacity as well as the macroeconomic policy environment. If the projected outcome differs from this, state clearly what policy/behavioral changes are assumed, the justification for the assumption, and how likely the assumed policy/behavioral changes will be sustained.
• **Sensitivity Analysis:** Consider the impact on the project outcome of variables that are subject to change. Test for sensitivity to macroeconomic, institutional, behavioral, financial, and environmental variables, noting that sensitivity analysis does not reflect the probability of these occurrences.

• **Risk Analysis:** The project documents should make clear the sources and magnitude of the risks associated with the project and, regardless of whether the project is subject to an ERR test, assess the cumulative probability of an unsatisfactory outcome.

• **Legal Covenants:** Include key actions, as determined in the sensitivity analysis, in the legal agreements.

• **Indicators:** During appraisal, the project’s success criteria need to be established and—based inter alia on the sensitivity analysis—key monitoring variables selected. In turn, the indicators should provide the basis for rating the project’s expected development impact during supervision and, more important, for signalling the emergence of serious problems and triggering remedial action.

• **Completion:** On completion, projects to be rated as satisfactory or not according to the evaluation criteria established at appraisal (as amended during implementation). Among unsatisfactory projects, there would be a distinction between those projects where the eventual cause of failure had been anticipated at appraisal, and other projects where the cause of project failure had not been so anticipated.

7. There is also a need for follow-up work to test the operational feasibility of: calculating (and including as a project cost) the deadweight losses from revenue measures to finance the project; calculating country-specific OCCs; quantifying the impact of policy and institutional reforms; and evaluating large project risks (including the country-specific disutility of risk) in the context of the overall public investment program.53

8. Finally, the Bank should adapt the ECON Framework shown in Box 2 (page vi), as a vehicle for making transparent (1) the macroeconomic, institutional, technical, and financial assumptions underlying the project analysis; (2) important deviations in project assumptions from past experience; (3) required actions by the government, borrower, etc.; and (4) how the required actions look in light of the borrower’s past record of compliance. This will require work to distill from the Bank’s vast amount of project experience easily accessible and usable sector and country parameters for use in project analysis.

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## Annex A

### Box A1. FY91 Projects with ERRs

<table>
<thead>
<tr>
<th>Africa</th>
<th>Benin: Power Rehabilitation</th>
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<tbody>
<tr>
<td></td>
<td>Botswana: Tuli Block Roads</td>
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<tr>
<td></td>
<td>Burkina Faso: Public Works</td>
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<td></td>
<td>Burundi: Energy Rehabilitation</td>
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<td></td>
<td>Comoros: Road Maintenance</td>
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<td></td>
<td>Congo: Agriculture Extension and Adaptation</td>
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<td></td>
<td>Djibouti: Urban Development II</td>
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<tr>
<td></td>
<td>Equatorial Guinea: Crop Diversification</td>
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<td></td>
<td>Ghana: Agriculture Diversification</td>
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<td>Ghana: Transport Rehabilitation II</td>
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<td>Madagascar: Livestock</td>
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<td>Malawi: Fisheries Development</td>
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<td>Mauritius: Agriculture Services</td>
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<td>Mauritius: Infrastructure Environment</td>
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<td>Mozambique: Agriculture Rehabilitation and Development</td>
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<td></td>
<td>Niger: Public Works</td>
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<td></td>
<td>Nigeria: OSL Condensate</td>
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<td>Nigeria: Water Rehabilitation</td>
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<td>Rwanda: Second Communications</td>
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<td>Senegal: Transport Sector</td>
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<td></td>
<td>Togo: Power Rehabilitation</td>
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<td>Uganda: Livestock</td>
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<tr>
<td></td>
<td>Uganda: Power III</td>
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<td></td>
<td>Uganda: Urban I</td>
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<td></td>
<td>Zaire: Pilot Feeder Roads</td>
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<td>Zimbabwe: Railways II</td>
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<table>
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<tr>
<th>South Asia</th>
<th>Bangladesh: Agriculture Support</th>
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<tbody>
<tr>
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<td>Bangladesh: Inland Water</td>
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<td>Bangladesh: LPG Distribution</td>
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<td>Bangladesh: National Minor Irrigation</td>
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<td>Bangladesh: Shallow Tubewell</td>
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<td>India: Agriculture Development</td>
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<td>Region</td>
<td>Projects</td>
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<tr>
<td>----------</td>
<td>--------------------------------------------------------------------------</td>
</tr>
</tbody>
</table>
| South Asia | Sri Lanka: Telecommunications II  
Sri Lanka: Third Roads  
Sri Lanka: Irrigation Rehabilitation |
| East Asia | China: Henan Agriculture Development  
China: Irrigation Agriculture Intensification  
China: Jiangsu Provincial  
China: Liaoning Urban  
China: Mid-Yangtze Agriculture  
China: Rural Credit IV  
Indonesia: East Java/Bali Urban  
Indonesia: Fertilizer Restructuring  
Indonesia: Power Transmission  
Indonesia: Provincial Irrigated Agriculture  
Indonesia: Sulawesi/Irian Jaya  
Indonesia: Third Jabotabek  
Indonesia: Yogyakarta Upland  
Korea: Housing  
Lao PDR: Highway Improvement  
Papua New Guinea: Special Interventions  
Philippines: Communal Irrigation II  
Vanuatu: Housing |
| MENA     | Egypt: Gas Investment  
Jordan: Dead Sea Industrial Export  
Morocco: Port Sector  
Morocco: Rural Electrification II  
Yemen: Fisheries IV  
Yemen: Multi-Mode Transport |
| ECA      | Hungary: Telecommunication II  
Poland: Heat Supply  
Poland: Telecommunication I  
Turkey: State and Provincial Roads  
Turkey: Tek Restructuring  
Yugoslavia: Kolubara "B" Thermal |
| LAC      | Argentina: Provincial Development  
Argentina: Water Supply II  
Bolivia: Water Supply  
Brazil: Hydrocarbon  
Chile: Valparaiso Water II  
Colombia: Municipal Development  
Colombia: Rural Development Investment  
Dominican Republic: Highway Maintenance V  
Ecuador: Guayas Flood Control  
Ecuador: Municipal Development I  
Jamaica: Road Planning  
Mexico: Decentralization and Regional Development for the Disadvantaged States  
Mexico: Water Supply |
### Box A2. Sensitivity Analysis Considers Identified Project Risks

Two risks tested:

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<thead>
<tr>
<th>Region</th>
<th>Project Description</th>
</tr>
</thead>
</table>
| Africa | Mauritius: Environmental Monitoring and Development  
         | Zimbabwe: Second Railways |
| MENA   | Egypt: Gas Investment  
         | Jordan: Dead Sea Industrial Exports |
| LAC    | Brazil: Hydrocarbon Transport and Processing |

One risk tested:

<table>
<thead>
<tr>
<th>Region</th>
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</thead>
</table>
| Africa | Burundi: Energy Sector Rehabilitation  
         | Congo: National Agricultural Extension and Adaptive Research  
         | Ghana: Second Transport Rehabilitation  
         | Nigeria: OSO Condensate Field Development  
         | Rwanda: Second Communications  
         | Tanzania: Railways Restructuring  
         | Uganda: Livestock Services  
         | Uganda: Third Power |
| South Asia | Bangladesh: LPG Transport and Distribution  
              | India: Second Petrochemicals  
              | Pakistan: Second SCARP Transition  
              | Sri Lanka: Second Telecommunications |
| East Asia | China: Irrigated Agriculture Intensification  
              | Indonesia: Fertilizer Restructuring |
# Annex A

## Box A3. Switching Values Provided

<table>
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</tr>
</thead>
<tbody>
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<td></td>
</tr>
<tr>
<td>Equatorial Guinea: Crop Diversification and Agricultural Services</td>
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<tr>
<td>Ghana: Agricultural Diversification</td>
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<tr>
<td>Malawi: Fisheries Development</td>
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<tr>
<td>Mozambique: Agricultural Rehabilitation and Development</td>
<td></td>
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<tr>
<td>Nigeria: OSO Condensate Field Development</td>
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</tr>
<tr>
<td>Tanzania: Petroleum Sector Rehabilitation</td>
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<td>Tanzania: Railways Restructuring</td>
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<td>Zimbabwe: Second Railways</td>
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<td>South Asia</td>
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<td>Bangladesh: Agricultural Support Services</td>
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<td>Bangladesh: Shallow Tubewell and Low Lift Pump Irrigation</td>
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<td>India: Agricultural Development—Tamil Nadu</td>
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<td>Sri Lanka: National Irrigation Rehabilitation</td>
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<td>East Asia</td>
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<td>China: Mid-Yangtze Agricultural Development</td>
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<td>Indonesia: Fertilizer Restructuring</td>
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<td>Indonesia: Yogyakarta Upland Area Development</td>
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<td>Philippines: Second Communal Irrigation Development</td>
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<td>MENA</td>
<td></td>
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<td>Jordan: Dead Sea Industrial Exports</td>
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<tr>
<td>LAC</td>
<td></td>
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<tr>
<td>Ecuador: Lower Guayas Flood Control</td>
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<td>Ecuador: Municipal Development and Urban Infrastructure</td>
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### Box A4. FY91 Projects with ERRs and Environmental Assessments

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</table>
| Africa    | Benin: Power Rehabilitation  
            Botswana: Tuli Block Roads  
            Comoros: Highway Maintenance  
            Djibouti: Urban II  
            Ghana: Agriculture Diversification  
            Ghana: Transport Rehabilitation II  
            Madagascar: Livestock  
            Nigeria: OSO Condensate  
            Tanzania: Railways  
            Zaire: Pilot Feeder Roads  
            Zimbabwe: Railways II |
| South Asia| Bangladesh: Inland Water Transport III  
            India: Private Power |
| East Asia | Indonesia: East Java/Bali Urban  
            Indonesia: Fertilizer Restructuring  
            Indonesia: Power Transmission  
            Indonesia: Provincial Irrigated Agriculture  
            Indonesia: Sulawesi-Irian Jaya Urban  
            Papua New Guinea: Special Interventions  
            Philippines: Communal Irrigation  
            Vanuatu: Housing |
| MENA      | Morocco: Rural Electrification II |
| LAC       | Colombia: Rural Development Investment  
            Ecuador: Lower Guayas Flood Control  
            Mexico: Decentralization and Regional Development for the Disadvantaged States |
### Box A5. FY91 Projects with Poverty Analysis

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<th>Comoros: Road Maintenance</th>
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<tbody>
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<td></td>
<td>Djibouti: Urban Development II</td>
</tr>
<tr>
<td></td>
<td>Equatorial Guinea: Crop Diversification</td>
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<tr>
<td></td>
<td>Ghana: Transport Rehabilitation II</td>
</tr>
<tr>
<td></td>
<td>Mozambique: Agriculture Rehabilitation and Development</td>
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<tr>
<td></td>
<td>Niger: Public Works</td>
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<tr>
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<td>Nigeria: Water Rehabilitation</td>
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<td>Uganda: Livestock</td>
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<td></td>
<td>Uganda: Urban I</td>
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<td>Zaire: Pilot Feeder Roads</td>
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<td>South Asia</td>
<td>Bangladesh: Agriculture Support</td>
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<td></td>
<td>Bangladesh: Inland Water III</td>
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<td></td>
<td>Bangladesh: National Minor Irrigation</td>
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<td></td>
<td>Bangladesh: Shallow Tubewell</td>
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<td>Nepal: Urban Water</td>
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<td>Pakistan: On-Farm Water III</td>
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<td>Pakistan: Rural Water</td>
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<td>Pakistan: SCARP Transition II</td>
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<td>East Asia</td>
<td>China: Henan Agriculture Development</td>
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<td>China: Irrigation Agriculture Intensification</td>
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<td>Indonesia: East Java/Bali Urban</td>
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<td>Indonesia: Provincial Irrigated Agriculture</td>
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<td>Indonesia: Sulawesi/Irian Jaya</td>
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<td>Indonesia: Third Jabotabek</td>
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<tr>
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<td>Philippines: Communal Irrigation II</td>
</tr>
<tr>
<td>LAC</td>
<td>Argentina: Provincial Development</td>
</tr>
<tr>
<td></td>
<td>Argentina: Water Supply II</td>
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<td>Bolivia: Water Supply</td>
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<td>Chile: Valparaiso Water II</td>
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<td>Ecuador: Guayas Flood Control</td>
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<td>Ecuador: Municipal Development I</td>
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<td>Mexico: Water Supply</td>
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<tr>
<td></td>
<td>Mexico: Decentralization and Regional Development for the Disadvantaged States</td>
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</table>
**BOX A6. FY91 PROJECTS WITH FISCAL ANALYSIS**

<table>
<thead>
<tr>
<th>Region</th>
<th>Country</th>
<th>Project Description</th>
</tr>
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<tbody>
<tr>
<td>Africa</td>
<td>Congo</td>
<td>Agriculture Extension and Adaptation</td>
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<td>Kenya</td>
<td>Forest Development</td>
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<td>Madagascar</td>
<td>Livestock</td>
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<td></td>
<td>Mauritius</td>
<td>Agricultural Management and Services</td>
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<tr>
<td></td>
<td>Rwanda</td>
<td>Second Communication</td>
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<td>South Asia</td>
<td>Bangladesh</td>
<td>Agriculture Support</td>
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<td></td>
<td>Sri Lanka</td>
<td>Telecommunications II</td>
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<tr>
<td>LAC</td>
<td>Argentina</td>
<td>Provincial Development</td>
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<td>Ecuador</td>
<td>Lower Guayas Flood Control</td>
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### Box A7. FY91 Wholesale Projects with ERRs

<table>
<thead>
<tr>
<th>Region</th>
<th>Projects</th>
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<tbody>
<tr>
<td>Africa</td>
<td>Burkina Faso: Public Works</td>
</tr>
<tr>
<td></td>
<td>Burundi: Energy Rehabilitation</td>
</tr>
<tr>
<td></td>
<td>Niger: Public Works</td>
</tr>
<tr>
<td></td>
<td>Nigeria: Water Rehabilitation</td>
</tr>
<tr>
<td>South Asia</td>
<td>Sri Lanka: Irrigation Rehabilitation</td>
</tr>
<tr>
<td>East Asia</td>
<td>China: Jiangsu Provincial</td>
</tr>
<tr>
<td></td>
<td>Indonesia: East Java/Bali Urban</td>
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<td></td>
<td>Indonesia: Provincial Irrigated Agriculture</td>
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<tr>
<td></td>
<td>Korea: Housing</td>
</tr>
<tr>
<td></td>
<td>Papua New Guinea: Special Interventions</td>
</tr>
<tr>
<td>MENA</td>
<td>Morocco: Port Sector</td>
</tr>
<tr>
<td>ECA</td>
<td>Turkey: State and Provincial Roads</td>
</tr>
<tr>
<td>LAC</td>
<td>Argentina: Provincial Development</td>
</tr>
<tr>
<td></td>
<td>Argentina: Water Supply II</td>
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<td></td>
<td>Colombia: Municipal Development</td>
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<tr>
<td></td>
<td>Colombia: Rural Development Investment</td>
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<tr>
<td></td>
<td>Ecuador: Municipal Development I</td>
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<tr>
<td></td>
<td>Jamaica: Road Planning</td>
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<tr>
<td></td>
<td>Mexico: Decentralization and Regional Development for the Disadvantaged States</td>
</tr>
<tr>
<td></td>
<td>Mexico: Water Supply</td>
</tr>
</tbody>
</table>
Box A8. FY91 PCRs Reviewed

| Africa          | Benin: Fourth Highway Project and Third Feeder Roads  
|                 | Cote d’Ivoire: First Power                          
|                 | Djibouti: Geothermal Exploration                    
|                 | Djibouti: Highway Maintenance                        
|                 | Ghana: Railway Rehabilitation                       
|                 | Kenya: Fisheries                                     
|                 | Nigeria: Kaduna Water Supply                         
|                 | Rwanda: First Telecommunications                      
|                 | Senegal: Forestry                                    
|                 | Sudan: Third Power                                   
|                 | Tanzania: Songo Songo Petroleum Exploration Project  
|                 | and Second Songo Songo Petroleum Exploration        
| South Asia      | Bangladesh: Greater Khulna Power Distribution        
|                 | India: Gujarat Irrigation II                         
|                 | India: Inland Fisheries                              
|                 | India: Cashewnut                                     
|                 | Nepal: Mahakali Irrigation (Stage 1)                 
|                 | Sri Lanka: Sixth Power                               
| East Asia       | China: Rural Credit                                  
|                 | Indonesia: Highway Betterment                         
|                 | Indonesia: Yogyakarta Rural Development              
|                 | Malaysia: Kedah Valleys Agricultural Development      
|                 | Thailand: Provincial Power Distribution               
|                 | Thailand: Second Provincial Roads                    
| MENA            | Egypt: Fish Farming Development                      
|                 | Tunisia: Third Ports                                  
| ECA             | Cyprus: Third Highway                                
| LAC             | Brazil: Multistate Water Supply and Sewerage         
|                 | Brazil: Parana Market Towns Improvement              
|                 | Mexico: Integrated Rural Development - PIDER III     |
### Annex A. FY91 Education Projects

<table>
<thead>
<tr>
<th>Region</th>
<th>Projects</th>
</tr>
</thead>
</table>
| **Africa** | Burkina Faso: Fourth Education  
Ghana: Community Secondary Schools Construction  
Mozambique: Second Education  
Nigeria: Primary Education  
Rwanda: First Education Sector  
Togo: Technical Education and Vocational Training  
Zaire: Education Sector Rehabilitation |
| **South Asia** | India: Second Technician Education                                           |
| **East Asia** | China: Key Studies Development  
Indonesia: Second Higher Education Development  
Korea: Third Technology Advancement  
Korea: Vocational Education  
Papua New Guinea: Public Sector Training  
Philippines: Second Elementary Education |
| **MENA** | Algeria: Science and Technology University Development  
Morocco: Rural Basic Education Development  
Tunisia: Employment and Training Fund  
Yemen: Secondary Teacher Training |
| **ECA** | Hungary: Human Resources  
Poland: Employment Promotion and Services |
| **LAC** | Brazil: Innovations in Basic Education  
Brazil: Science Research and Training  
Dominican Republic: Primary Education Development  
Haiti: Fifth Education  
Trinidad and Tobago: Education and Training for Youth Employment  
Mexico: Third Technical Training |
### BOX A10. FY91 PHN PROJECTS

<table>
<thead>
<tr>
<th>Region</th>
<th>Country/Project/Program</th>
</tr>
</thead>
<tbody>
<tr>
<td>Africa</td>
<td>Ghana: Second Health and Population</td>
</tr>
<tr>
<td></td>
<td>Madagascar: Health Sector Improvement</td>
</tr>
<tr>
<td></td>
<td>Malawi: Population, Health and Nutrition Sector Credit</td>
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<tr>
<td></td>
<td>Mali: Second Health, Population and Rural Water Supply</td>
</tr>
<tr>
<td></td>
<td>Nigeria: Health System Fund</td>
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<td>Nigeria: National Population</td>
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<td>Rwanda: First Population</td>
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<td></td>
<td>Senegal: Human Resources Development</td>
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<td></td>
<td>Zaire: Social Sector</td>
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<td>Zambia: Social Recovery</td>
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<tr>
<td></td>
<td>Zimbabwe: Second Family Health</td>
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<tr>
<td>South Asia</td>
<td>Bangladesh: Fourth Population and Health</td>
</tr>
<tr>
<td></td>
<td>India: Integrated Child Development Services</td>
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<tr>
<td></td>
<td>Pakistan: Family Health</td>
</tr>
<tr>
<td></td>
<td>Sri Lanka: Poverty Alleviation</td>
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<td>East Asia</td>
<td>Indonesia: Fifth Population</td>
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<td>Korea: Health Technology</td>
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<td>MENA</td>
<td>Algeria: Pilot Public Health Management</td>
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<td>Egypt: Social Fund</td>
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<tr>
<td></td>
<td>Tunisia: Hospital Restructuring Support</td>
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<td>Tunisia: Population and Family Health</td>
</tr>
<tr>
<td>LAC</td>
<td>El Salvador: Social Sector Rehabilitation</td>
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<td></td>
<td>Haiti: Economic and Social Fund</td>
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<td>Honduras: Social Investment Fund</td>
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<td>Mexico: Basic Health Care</td>
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<td>Venezuela: Social Development</td>
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### Box A11. FY91 Agriculture Extension, Research, and/or Services

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<tr>
<th>Region</th>
<th>Description</th>
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<tr>
<td>Africa</td>
<td>Benin: Agricultural Services Restructuring</td>
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<tr>
<td></td>
<td>Ghana: National Agricultural Research</td>
</tr>
<tr>
<td></td>
<td>Kenya: Second National Agricultural Extension</td>
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<td>Mali: Agricultural Services</td>
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<td>Nigeria: National Agricultural Research</td>
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<tr>
<td>LAC</td>
<td>Argentina: Agricultural Services and Institutional Development</td>
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<td>Bolivia: Agricultural Technology Development</td>
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<tr>
<td></td>
<td>St. Kitts and Nevis: Agricultural Development Support</td>
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BOX A12: FY91 ENVIRONMENTAL PROJECTS

- *Burkina Faso: Environmental Management*
- *India: Dam Safety*
- *India: Industrial Pollution Control*
<table>
<thead>
<tr>
<th>Region</th>
<th>Project Description</th>
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<tr>
<td>Africa</td>
<td>Cote d'Ivoire: Women in Development Pilot Support</td>
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<td>Sao Tome and Principe: Second Multi-Sector</td>
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<tr>
<td>South Asia</td>
<td>India: Maharashtra Rural Water Supply and Environmental Sanitation</td>
</tr>
<tr>
<td>East Asia</td>
<td>China: Medium-Sized Cities Development</td>
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<td>ECA</td>
<td>Turkey: Technology Development</td>
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### Box A14. FILS

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<tr>
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<td>Central African Republic</td>
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<td>Lesotho</td>
<td>Industrial and Agroindustries Development</td>
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<td>Malawi</td>
<td>Financial Sector and Enterprise Development</td>
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<td>Pakistan</td>
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<td>Sri Lanka</td>
<td>Fourth Small and Medium Industries</td>
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<td>East Asia</td>
<td>China</td>
<td>Rural Industrial Technology (Spark)</td>
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<td></td>
<td>China</td>
<td>Shanghai Industrial Development</td>
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<td>Indonesia</td>
<td>Second BRI/Kupedes Small Credit</td>
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<td>Philippines</td>
<td>Cottage Enterprise Finance</td>
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<td>Philippines</td>
<td>Rural Finance</td>
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<td>ECA</td>
<td>Cyprus</td>
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<td>Mexico</td>
<td>Mining Sector Restructuring</td>
</tr>
</tbody>
</table>
OD 10.40: Economic Evaluation of Investment Operations

Terms of Reference

Background

1. The main text of OD 10.40, Economic Evaluation for Investment Operations will cover generic methodological and procedural issues. It will lay out the broad approach to the Bank's appraisal/evaluation methodology. The scope of the OD will be the economic analysis of all investment operations—not just those subject to a rate of return test. It will cover evaluation over the project cycle—from identification to completion.

2. The OD will de-emphasize the theory of the accounting rate of interest, disaggregated shadow pricing, and distributional weights that was developed during the 1970s. Instead, it will stress the importance of realistic analysis of an operation's net economic impact—making explicit the behavioral, institutional, macroeconomic, and financial assumptions that underlie the analysis and subjecting the derived project outcomes to sensitivity analysis with respect to these assumptions. The project assumptions will need to be anchored to past experience, with deviations convincingly justified.

3. For projects for which an economic rate of return (ERR) can be calculated, the OD will make clear that the expected ERR must exceed the country's opportunity cost of capital (OCC). (Normally 10-12 percent is taken for the minimum OCC; country deviations from the norm will need to be fully justified in the CSP, based on an assessment of available resources relative to investment opportunities in the country.) In evaluating an operation, special attention needs to be paid to indirect and secondary costs and benefits, particularly of policy reforms and institution-building. However, a net positive indirect and secondary impact can not be used to justify a low return investment component. Similarly, in line with OD 4.15, the promotion of poverty reduction and other social goals can not be used to justify a component for which the ERR < OCC. Rather, these goals should influence the composition of the ESW program, which in turn can focus on identifying investment opportunities that both have high returns and promote social objectives.

4. For projects for which economic rates of return are not calculated, establishing the appropriateness of Bank support is less straightforward. Interventions in the social sectors, for example, tend to have two kinds of effects. Some benefits can be quantified by indirect means and valued using a monetary numeraire, such as the wages associated with more productive work. In such cases, it will be useful to use the returns on the investment, as captured partially and indirectly by the monetary numeraire, as a minimal indication of the relative value of the operation and as a basis for comparing with other possible investments. Other benefits—such as better quality of life—are more subjective, and there is not a consensus on an appropriate metric. These benefits would be indicated and quantified as appropriate. If the achievement of these benefits is an essential part of the justification of the project, the documents would have to establish that the proposed approach is the cost effective solution—or can dominate the cost effective solution, if reasonable values are placed on the benefits. The main text of the OD will stress the importance of the project documents' making clear the project's objectives and the criteria on which the appraisal is (and the evaluation at project completion will be) based. The documents will also need
to make clear how success will be measured. Sectoral annexes (see below) will cover the sector-specific conventions with respect to the measurement of costs and benefits.

5. For all projects, the text of the OD will emphasize the importance of a common methodological approach to evaluation throughout the project cycle, noting that at some stages the analysis is necessarily more back-of-the-envelope than at other stages. The most thorough analysis is done at appraisal and completion. At identification, the analysis is less refined, but critical for determining the project's inclusion in the lending program. During implementation the analysis will be based on the monitoring of proxy indicators—chosen during project preparation on the basis of the sensitivity analysis—which will allow the evolution of both costs and benefits critical to project success to be tracked during supervision, as a basis for possible remedial measures. (This will be important for helping to end the unfortunate syndrome whereby projects are rated as satisfactory throughout supervision only to be paid on completion.)

6. The text of the OD will also outline responsibilities for project economic analysis. It will make clear that accountability for project economic analysis—and its implications for project selection and continued Bank support during implementation is vested in Regional Management. It will call for more effective support to task managers in securing appropriate skills, inputs about and analysis of country economic variables, and methodological guidance—including through an enhanced role for country economists, lead economists, and chief economists in the economic evaluation of investment operations.

7. Other issues to be covered include: criteria for sector investment loans; value-added of operations in light of fungibility of Bank financial support; treatment of environmental costs and benefits; risk analysis for large projects; fiscal and sustainability analysis; and the links between ESW and investment lending.

Sectoral Annexes

8. The OD will also contain brief (1-2 pages) sectoral annexes. Annexes will be included for: agriculture, education, energy, family planning, health, housing, nutrition, power, telecommunications, transport, urban, and water.

9. The annexes will indicate the special sectoral issues in evaluation, the recommended scope for the analysis, and the degree of quantification required. In general they will cover the following:

a. **Background.** States the objectives of projects in the sector. Indicates how projects address these objectives through policy and institutional reforms and investments, noting the relative importance of the three ingredients—and noting whether the policy and institution-building tend to have repercussions beyond the investments being supported by the projects.

b. **Success Criteria.** Indicates how success in meeting project objectives is to be judged. Makes clear what the standards for Bank support are, in terms of the outcome and the presentation of the results of the appraisal. Makes clear what will be criteria for determining at project completion whether the project should be rated satisfactory or unsatisfactory.

c. **Costs.** Indicates special features in the evaluation of project costs. Possible issues include valuing environmental effects; importance of recurrent cost financing; and the role of cost-effectiveness/least-cost analysis.
d. **Benefits.** Indicates special features in the evaluation of project benefits. Some benefits can be quantified and valued in money terms more easily than others. Different sectors have addressed this issue in different ways. For each sector, indicates how benefits are to be measured.

e. **Sensitivity Analysis.** Reflecting the lessons of experience, indicates the key variables—and pitfalls—that affect project success in the sector. For example, how will shortfalls from the assumed availability of local financing, overall growth (as a proxy for demand), and implementation capacity affect the project outcome? Indicates magnitude of variations in assumptions to be considered.

f. **Proxy Indicators.** Based on the evaluation at appraisal, the criteria for evaluating the project on completion, and the sensitivity analysis, indicates which variables should be tracked during implementation to provide advance warning of deterioration in project quality, for possible remedial action. Indicators should contain cost and benefit proxies, as well as a weighting algorithm, so that the net impact on the value of the project can be determined. Provides basis for “development impact” rating on Form 590.
OD 10.40: Economic Evaluation of Investment Operations

Introduction

1. Purpose

- Summarize Bank procedures and guidelines for the economic analysis of Bank-supported investment operations.

- Update OMS 2.21, Economic Analysis of Projects.

- Clarify the economic analysis linkages across all stages of the project cycle from identification through appraisal, implementation, completion, and impact evaluation.

- Make economic analysis more useful and cost effective for project selection, design, implementation, and supervision, and for assessing performance.

- Make approach more transparent for clients and co-financiers.

2. Background

- Bank’s approach has evolved over time. Start with 1971, OPN 2.21: Economic Tests of Project Acceptability.

- During the 1970s, there are major refinements in the approach to economic and social cost-benefit analysis. Little-Mirrlees/Squire-van der Tak approach is embodied in OMS 2.21, issued in 1980.

- During the 1980s, the Bank’s attention shifts to macroeconomic issues and SALs; project economic issues narrowly focus on economic rate of return (ERR) calculations.

3. Forward Perspective

- Timely to revisit economics of projects as Bank renews emphasis on quality of investment lending and sectoral issues.

- But approach of the 1990s needs to integrate the project orientation of the 1970s with the programmatic orientation of the 1980s.

- Projects need to reflect macroeconomic and sectoral context—especially since the policy environment is critical for project success.

- Approach also needs to broaden the role of economic analysis of projects beyond the calculation of ERRs.
• Needs to address evaluation of project's policy and institutional components.

• Needs to address the areas of special emphasis.

Bank Policy

4. Investment Criteria

• Benefits exceed costs; best among alternative designs.

• Measuring costs may be complicated by environmental and social effects.

• Benefits investments in some sectors may be difficult to value in monetary terms.

• Bank may displace other financiers; leaving unclear the net impact on country prospects; hence the fungibility test (see below).

5. ERR Test

• Appropriate decision variable is net present value (NPV). But ERR is used to present the results. Bank policy is: the expected NPV is greater than zero. This translates into: the expected ERR must exceed the opportunity cost of capital (OCC).

• Applies to all projects for which costs and benefits can be quantified—and valued in terms of a monetary numeraire—with a reasonable degree of confidence. That is, most projects in agriculture, industry, energy, and infrastructure, inter alia.

6. Criteria for Other Investment Operations

• Specify project success criteria and how success will be measured.

• Establish that the project meets least-cost condition for achieving the desired benefits.

• Indicate how benefits will be measured and monitored during implementation.

• Indicate how progress will be evaluated on completion. What constitutes satisfactory performance?

7. Fungibility Test

• Establish whether the project is the “marginal” project.

53/ Note problem using ERRs to compare mutually exclusive projects.
• If the project is one that would be done anyway, (1) discuss public expenditure program and the marginal expenditures (in effect) financed by the project; and (2) establish that Bank involvement serves other policy and institutional purposes. Provide broad measure of the order of magnitude of the benefits associated with the policy and institutional gains.

8. **Criteria for Sector Investment Operations**

• For wholesale operations, the criteria must be formulated in conformity with above—typically either ERR > OCC or cost effectiveness test—but with local institutions appraising subprojects.

• Assess the capacity of the institutional mechanism to appraise and supervise subprojects.

• Assess the policy package.

9. **Evaluation Throughout the Project Cycle**

• Same basic approach to evaluation is used for identification; appraisal; implementation/supervision; project completion and performance audit report; and impact evaluation.

• At some stages—such as identification—back-of-envelope calculations will suffice; at others—such as appraisal—more in-depth evaluations is necessary; but some basic framework is used.

• ECON Framework for Evaluation over the Project Cycle (see Box 2, page vi) is attached to Executive Project Summary (from IEPS to FEPS) and to Memorandum of the President.

**Analyzing Costs and Benefits of Physical Investments**

10. **Prices**

• Costs and benefits are measured in economic prices; that is, prices that reflect the scarcity value from the viewpoint of the economy as a whole.

• Border prices are used for tradeable goods. (For projections, Bank commodity price and MUV forecasts are used.)

• For traded goods, this is straightforward: f.o.b. for exports; c.i.f. for imports.

• For non-traded goods, shadow prices or conversion factors may be needed to convert domestic prices into border price equivalents. (See below.)

• Where project-related increase in production will be large, take into account impact on prices.

• Key project assumptions should be explicit.
11. **Quantities**

- Forecast is based on clearly identified market factors.
- These are specifically related to the macroeconomic forecast.
- Based on plausible assumptions about financial profitability and sustainability (financial, institutional, and environmental).
- Key assumptions to be explicit.

12. **Costs**

- Cost stream includes all costs incurred to construct, operate, and maintain the project’s facilities throughout its useful life.
- Implementation schedule is based on the standard disbursement profile.
- Consistency with the institutional assessment.

13. **Environmental Costs and Benefits**

- Quantify where possible.
- Use the same discount rate for environmental “goods” and “bads,” as for other benefits and costs.
- Use the rule of caution, if project-associated environmental losses are likely to be irreversible.
- Switching values: determine rate of increase in value of the environmental good necessary to make project nonviable/viable.

14. **Opportunity Cost of Capital (OCC)**

- The opportunity cost of capital should be based on an assessment of the supply of available resources relative to investment opportunities in the country. Traditionally the Bank has used 10-12 percent.
- The OCC analysis should be discussed in the CSP, in the context of the macroeconomic forecast, particularly vis-a-vis the postulated availability of foreign financing and ICOR.
- In no case, should the OCC be less than the real interest rate on long-term bonds in international markets, as a measure of a readily available alternative investment vehicle for the country.
Analyzing Policy and Institutional Reforms

15. Policy

- Analyze the policy changes included in the project.
- Provide order-of-magnitude estimates of the likely impact on economic and social variables.
- Assess the sustainability of the policy changes.

16. Institutions

- Analyze the institutional changes included in the project.
- Provide order-of-magnitude estimates of likely impact of institutional reforms.
- Assess the sustainability of the institutional changes.

Analyzing Underlying Assumptions

17. Macroeconomic

- Indicate the extent to which project benefits depend on the current stance of macroeconomic policy. (Do exchange rate, trade policy, etc., affect financial profitability or budget position so that assumed private sector, or budgetary response may not materialize?)
- How likely is it that the macro policy stance will be maintained?

18. Institutional

- Analyze the assumptions about sustainability of project implementing and other institutions that underlie the analysis.
- Are these reasonable, based on past country/sector performance?

19. Financial

- Indicate assumptions about financial profitability and cost recovery that underlie benefit estimates? Are they realistic?
- To what extent is project success is dependent on availability of recurrent financing? Are project assumptions realistic?
20. **Social**

- What behavioral assumptions underlie the analysis? Are they realistic?
- To what extent is project success dependent on adequate human resources being available, or community participation?

21. **Environmental**

- Do project outcomes depend on the continuation of present environmental conditions and/or trends? Is this likely?
- Do national economic policies adversely affect the environment and/or the natural resource base?

**Sensitivity/Risk Analysis**

22. **Objective**

- Provide a measure of robustness of project NPV/ERR to possible variations in critical assumptions.
- Test project design against variations in parameter assumptions to see if it should be modified.

23. **Sensitivity Analysis**

- Test impact of changes in assumed values of key variables that have high probability of occurrence, based on experience with similar projects in the country/sector/agency.
- Test sensitivity of macro, institutional, financial, social, and environmental as well as technical variables.

24. **Switching Values**

- Determine values of the key variables for which the project’s NPV turns negative.
- Indicate cumulative probability of NPV < 0.
- Also use to analyze projects not subject to ERR test.

25. **Implications for Implementation**

- Identify key variables correlated with successful outcome—such as product prices, construction costs, exchange rate—to monitor during supervision.
• Establish trigger points for key variables to determine whether more in-depth reassessment of ERRs during implementation is necessary.

• In all cases, reassessment of ERR is recommended for mid-term review.

26. Large Projects

• More detailed analysis of the sources and magnitude of risks associated with the project, and the cumulative probability of unsatisfactory outcomes.

• Provide indication of certainty-equivalent ERR, based on alternative values for the country’s disutility of risk.

Analyzing Impact

27. Budget Impact

• What is the impact of the project on the (local and central government) fiscal position?

• How will additional budgetary resources be raised?

• What about deadweight-losses from taxes or other financing measures?

28. Distributional Impact

• Identification of beneficiaries by income level.

• Indication of (i) share of poor among project beneficiaries and (ii) share of benefits going to the poor.

• Analysis of the mechanism, if any, for targeting benefits to the poor.

Procedures and Responsibilities

Project Cycle

29. Identification

• Ideas come from economic and sector work.

• Back-of-the-envelope assessment of economic rationale for the project. Why should the country make this investment? Does it relax a critical constraint?

• Address the fungibility test. Why should the Bank be involved?
30. **Appraisal**
- In-depth assessment of project costs and benefits, etc.
- Establishes criteria for evaluation at completion.
- Provides transparent analyses that can be replicated at completion, with parameters prevailing at that time.
- Identify indicators for tracking value of the project during supervision.

31. **Implementation/Supervision**
- Track indicators identified in sensitivity analysis.
- If triggers (see para. 25) are activated, remedial action to be taken.

32. **Completion**
- Starting with the appraisal analysis, re-estimates ERR, based on actual values for completion costs and reevaluation of benefit flows.
- Satisfactory rating based on criteria established at appraisal.
- If project is rated unsatisfactory, the SAR’s risk analysis to be scrutinized. If it adequately analyzed the risk, then it is rated unsatisfactory with mitigating circumstances. Otherwise, it is rated unsatisfactory.

**Responsibilities**

33. **Regional Management**
- Overall responsibility is vested in the Region.
- Principal line responsibility for quality of economic analysis is with country department director.
- In turn, sponsoring division chief is responsible.

34. **Chief Economist**
- Ensures consistency across the Region in the treatment of the opportunity cost of capital, conversion factors and distortions, project economic analysis.
- Advises RVP on economic aspects of investment operations, including overall economic thrust of investment operations and consistency with CSP.
35. **Lead Economist**

- Ensures availability of country parameters and consistency of use across projects.
- Advises the country department director and the Regional chief economist on economic aspects of investment operations, including the overall economic thrust of investment operations and, at the IEPS stage of project processing, the consistency of project proposal with CSP.
- Advises project/sector economist in evaluating economic impact of project proposals.

36. **Project/Sector Economist**

- Responsible for project economic analysis in project cycle and reports.
- Integrates analysis of specialists in other fields.
- Advises project task manager on economic issues.

37. **Economist Peer Reviewer**

- Provides written comments on economic analysis for FEPS and yellow cover review meetings.
- Advises project economist on project economic issues.

38. **COD Economic Adviser**

- Keeps guidelines up-to-date in light of institutional priorities and lessons of experience.
- Maintains information network across Regions, OSP sector departments, DEC, and OED and IFC on project economic issues.
- On request, provides advice to task managers on project economic issues.
- Disseminates Bankwide, best-practice examples for staff use.

**Monitoring Bank Effort**

39. **Development Effectiveness**

- Annual Report (for Bank Management) by OSP on status, contributions, and findings of economic analysis of investment operations in SARs and PCRs.
- Builds on inputs from the Regions.
Documentation for the Board

40. **SAR**

- Summarizes results of evaluation.
- Tells clear economic story.
- Makes assumptions explicit.
- Spells out methodology used.

41. **MOP**

- Explains rationale for Bank involvement in terms of specific value-added contributed by the Bank.
- Summarizes expected project benefits, in terms of the $\text{ERR} > \text{OCC}$ or other measure of success, to show why the project is better than alternatives.
- Assesses economic impact of project's institution-building features and policy reforms.
- Summarizes project risks and results of sensitivity analysis.
- Provides switching values of key variables and cumulative probability of unsuccessful outcome.
- Indicates implications of risk/sensitivity analysis for variables to be tracked during implementation.
- ECON Framework (see Box 2, page vi) is included as an annex.

**Sectoral Annexes [1-2 pages each]**

42. Annexes for the following sectors to identify sector-specific success criteria; benefit measures; costs; variables for sensitivity analysis; and proxy indicators to be used for tracking and reevaluation during implementation:

- Agriculture
- Education
- Energy
- Health
- Housing
- Industry
- Nutrition
- Population and Family Planning
- Power
- Telecommunications
- Transport
- Urban
- Water