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Cost-Benefit Analysis in World Bank Projects

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Abbreviations

CBA	Cost-benefit analysis
ERR	Economic rate of return
ICR	Implementation Completion and Results Report
IDA	International Development Association
IEG	Independent Evaluation Group
NPV	Net present value
OP	Operational Policy
PAD	Project appraisal document

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Foreword

This report has been prepared in the context of a major global effort in the past eight years to better measure results in development assistance. The agenda for this effort was articulated and refined in a series of international conferences, beginning with the International Conference on Financing for Development in Monterrey in 2002 and continuing through the Accra Agenda for Action in 2008. Cost-benefit analysis entails measuring results, valuing results, and comparing results with costs, and hence is highly relevant to the results agenda. Cost-benefit analysis can provide a comprehensive picture of the net impact of projects and help direct funds to where their development effectiveness is highest.

The key documents from the international conferences cited above rarely mention cost-benefit analysis. This situation is mirrored at the World Bank, where cost-benefit analysis is rarely mentioned in recent policy documents and where its application has been declining for the past three decades. The purpose of this report is to develop a better understanding of why this trend is occurring and whether the policies and practice of cost-benefit analysis require revision.

Vinod Thomas
Director-General, Evaluation

Executive Summary

Cost-benefit analysis used to be one of the World Bank's signature issues. It helped establish the World Bank's reputation as a knowledge bank and served to demonstrate its commitment to measuring results and ensuring accountability to taxpayers. Cost-benefit analysis was the Bank's answer to the results agenda long before that term became popular. This report takes stock of what has happened to cost-benefit analysis at the Bank, based on analysis of four decades of project data, project appraisal documents and Implementation Completion and Results Reports from recent fiscal years, and interviews with current staff at the Bank.

The percentage of Bank projects that are justified by cost-benefit analysis has been declining for several decades, owing to a decline in adherence to standards and to difficulty in applying cost-benefit analysis. Where cost-benefit analysis is applied to justify projects, the analysis is excellent in some cases, but in many cases there is a lack of attention to fundamental analytical issues such as the public sector rationale and comparison of the chosen project against alternatives. Cost-benefit analysis of completed projects is hampered by the failure to collect relevant data, particularly for low-performing projects. The Bank's use of cost-benefit analysis for decisions is limited because the analysis is usually prepared after the decision to proceed with the project has been made.

This study draws two broad conclusions. First, the Bank needs to revisit its policy for cost-benefit analysis in a way that recognizes the legitimate difficulties in quantifying benefits while preserving a high degree of rigor in justifying projects. Second, the Bank needs to ensure that cost-benefit analysis is done with quality, rigor, and objectivity: poor data and analysis misinform, and do not improve, results. Reforms are required to project-appraisal procedures to ensure objectivity, improve both the analysis and the use of evidence at appraisal, and ensure effective use of cost-benefit analysis in decision making.

Current Bank policy states that cost-benefit analysis should be done for all projects at appraisal—the single exception is for projects for which benefits cannot be measured in monetary terms, in which case a cost-effectiveness analysis should be performed. The requirement to conduct cost-benefit analysis stems from the mandate in the Articles of Agreement that the Bank should strive to increase the standard of living in member countries. When a country borrows—and repays—funds for projects in which benefits fall short of costs, the standard of living of the country declines.

Using the presence of an economic rate of return estimate as an indicator of whether cost-benefit analysis was performed, this evaluation finds that the percentage of projects with such analysis dropped from 70 percent to 25 percent between the early 1970s and the early 2000s. Further examination of project documents reveals that the presence of an economic rate of return is a reliable indicator of the presence of cost-benefit analysis. A little more than half of this decline was due to an increase in projects in sectors at the Bank that tend not to apply a cost-benefit analysis to their projects. About half of the sectors apply cost-benefit screening to many of their projects; the other half, the growing half, rarely do. In addition to this shift away from sectors that apply cost-benefit analysis, there has been a general decline in all sectors in the application of such analysis. In addition, most of the improvement in project performance ratings that has occurred at the Bank in the past 20 years has been in the five sectors that tend to apply cost-benefit analysis.

World Bank policy notwithstanding, many appraisal documents for new projects in recent years do not include cost-benefit analysis. How is this omission explained? How are

the projects justified? Of the 93 investment projects that closed in 2008 without reporting cost-benefit information (either at appraisal or at closing), 60 provided no explanation or asserted that efficiency considerations were not applicable. Eighteen projects cited inadequate data. Nineteen projects provided some relevant information, but the information tended to be in the form of positive anecdotes; no attempt was made to address potential selection bias. Twenty-four project documents invoked cost-effectiveness as the standard by which the projects were to be judged, but of these, none actually applied cost-effectiveness analysis, which entails a comparison between specific alternatives on the basis of cost. One project claimed such an analysis had been done but did not show the results in the document.

Photo by Alfredo Srur, courtesy of the World Bank Photo Library.

Of projects that do provide cost-benefit analysis, there are several examples of excellent analysis, but often a lack of transparency. The most important data, the quantitative cost and benefit flows, are rarely provided in a straightforward manner, such as a simple table. Such a table, along with a discussion of the main assumptions or empirical evidence that lies behind the numbers, could be provided. As pointed out in a World Bank report 20 years ago, ex ante project analysis at the Bank is usually based on the assumption that everything will go as planned. This imparts an upward bias to the cost-benefit estimates because disruptions frequently occur along the way. An alternative—more in line with Bank policy to present the expected economic return—would be to assume that new projects would achieve the average cost-benefit results measured in previous similar projects, unless relevant revisions had been made to the project design.

The weak points in economic analysis of Bank projects are fundamental issues such as the public sector rationale, comparison against alternatives, and measurement of benefits against a without-project counterfactual. Project justification rarely includes a discussion of whether the project is producing a public good. If alternatives are considered, they tend to be minor ones, such as alternative funding mechanisms, rather than truly alternative projects. Counterfactual analysis tends to be good for projects in sectors such as transport, in which this analysis is hardwired into standard spreadsheets. Impact evaluations, which are designed to address the counterfactual issue and thus are a natural complement to cost-benefit analysis, have rarely been used in the past, though their use is now growing in some sectors. Cost-benefit analyses sometimes do not use shadow prices or other technical adjustments to capture social benefits and costs.

Projects that have identifiable beneficiaries, such as agricultural and community-based development projects, could provide better poverty analysis (at least after the project). This often requires a special baseline household survey. Lack of baseline data is a key weakness undermining ex post cost-benefit analysis in many projects. Overall, the economic analysis in appraisal documents in 2007–08 was found to be acceptable or good in 54 percent of the cases. This compares with 70 percent found by a rating exercise using the same methodology in the 1990s.

This report also examines whether there is evidence of bias in the economic rates of return that are reported. It finds that the "everything goes according to plan" scenario is still the working assumption underlying cost-benefit analysis at appraisal. The report also finds that the likelihood that the economic rate of return is recalculated at the close of projects is lower for projects with low outcome ratings. Moreover, interviews with staff indicate that cost-benefit analysis is conducted after the decision to go ahead with the projects, which puts the analysis under considerable pressure to reach conclusions consistent with the decisions already taken.

The lack of attention to cost-benefit information is surprising, given the positive story that emerges on trends in the reported rates of return in the declining subset of projects that apply this approach: reported economic rates of return have doubled in 20 years, from a median of 12 percent in the late 1980s to 24 percent in 2008. If reflective of the larger group of projects, this could signal a large rise in the effectiveness of these development projects.

Some discount this rise, believing that it indicates nothing more than an *increase* since 1987 in the upward bias in the measurement of economic returns. The available evidence does not confirm this belief, but it cannot be dismissed because the evidence is thin.

Another possible explanation for the large rise in returns is growth-oriented reforms. Reforms—comprising both a retreat of antimarket approaches to projects and improvements

in investments and institutional support in the economic environment—could account for some of the rise in economic returns for this subset of projects. A review of project documents from the prereform 1970s and 1980s suggests that project execution was frequently frustrated by high transaction costs or unavailability of imported spare parts and was hampered by unresponsive state entities. Examination of 47 countries where the available data permit the impact of such factors to be tested reveals that 43 had higher economic returns in projects after reforms.

External factors could also be responsible. Economic conditions facing countries have improved in Bank client countries, and project returns correlate with growth rates. But much of the improvement in growth occurred rather late in the 1987–2008 period, and thus is not sufficient to account for the sustained rise in returns during the entire period.

A review of economic analysis at the World Bank 20 years ago (World Bank 1992b) found many of the same shortcomings documented here. Yet that report's recommendations did not go far enough in confronting underlying causes: a decision-making process under which decisions are made before cost-benefit evidence is provided, and that provides few institutional checks to counteract the influence of advocacy for projects that undermines rigor in project appraisal, including cost-benefit analysis.

The Bank needs reforms to ensure objectivity and address conflicts of interest in ex ante project analysis. It needs to use cost-benefit analysis evidence to improve decisions in a context where decisions are increasingly driven by borrowing countries.

The policy for cost-benefit analysis needs to be defined in a way that recognizes legitimate difficulties in quantifying benefits in some types of projects while preserving a high degree of rigor in justifying projects. This report closes with suggestions on how the Bank can address these institutional issues.

Management Response

Chairperson's Summary: Committee on Development Effectiveness (CODE)

Chapter 1

EVALUATION HIGHLIGHTS

- The Articles of Agreement that founded the World Bank established the principle that Bank projects should aim to increase welfare in member countries.
- Bank policy has traditionally mandated that cost-benefit analysis be used to determine whether Bank projects increase welfare. Operations with a positive net present value increase welfare because discounted benefits exceed costs.
- Bank policy requires a net present value calculation for all projects except those for which benefits cannot be measured in monetary terms.

Photo by Dominic Sansoni, courtesy of the World Bank Photo Library.

World Bank Policy

This evaluation is grounded in World Bank policy on cost-benefit analysis, which in turn is grounded in the Articles of Agreement that established the International Bank for Reconstruction and Development in 1944. The Articles state that "the purposes of the Bank are: (i) To assist in the reconstruction and development of territories of members by facilitating the investment of capital for productive purposes . . . (iii) . . . thereby assisting in raising productivity, the standard of living and conditions of labor in their territories" (World Bank 1944).

The Articles state that the fundamental goal of World Bank operations is to raise productivity, incomes, or welfare ("standard of living") and wages, employment, or working conditions ("conditions of labor") in the territories of member countries. Cost-benefit analysis is the technique the Bank has used, since the early 1970s, to gauge for itself, and to verify for stakeholders outside the Bank and the Bank's Board of Directors, that its operations are indeed having a net positive effect on the standard of living in member countries. *Cost-benefit analysis* is defined as any quantitative analysis performed to establish whether the present value of benefits of a given project exceeds the present value of costs. Such analysis usually also produces both a net present value (NPV) calculation and an economic rate of return (ERR) calculation.

Increasing the welfare of poorer countries is the fundamental objective underlying Bank policy on cost-benefit analysis. That policy directs the Bank to help borrowing counties select the highest-NPV project and to do nothing if the best alternative entails a negative NPV. When a country borrows at commercial interest rates and the (properly measured) NPV is negative, the country as a whole is becoming poorer as a result of the project. That is why the policy against negative NPV projects is particularly important.

In the case of International Development Association (IDA) credits, which contain a large grant element, a negative NPV does not necessarily mean that the receiving country is poorer; nevertheless, such a project wastes taxpayer funds from donor countries because better alternatives are not pursued. Whenever a country fails to pursue the alternative with the highest NPV, global resources are wasted.

Bank policy also serves as a safeguard against project choices being captured by narrow political or sectional interests. Efficiency considerations always compete with other motives in project selection, and the policy is designed to give efficiency the upper hand in this competition. Borrowers have expressed their appreciation of the Bank's role as an honest broker (World Bank 1992a, annex B, p. 14).[1]

The current version of the Bank's policy on cost-benefit analysis is Operational Policy (OP) 10.04, "Economic Evaluation of Investment Operations," written in September 1994 (see appendix D).[2] Three parts of this policy deserve special comment. The first part is the rule to guide decisions to approve investment operations. Bank policy requires choosing the investment that maximizes the NPV of benefits from a list of alternatives and not investing if the NPV is negative. The clear policy against investments with negative NPVs is rooted in the desire to avoid lowering national welfare in member countries.

The second part of Bank policy establishes the scope of cost-benefit analysis. It states that the positive NPV test should apply to all Bank investment operations, with a single exception: "If the project is expected to generate benefits that cannot be measured in monetary terms, the analysis (a) clearly defines and justifies the project objectives, reviewing broader sector or economy-wide programs to ensure that the objectives have been appropriately chosen, and (b) shows that the project represents the least-cost way of attaining the stated objectives." Hence, the positive NPV criterion should apply to all operations except those for which benefits cannot be measured in monetary terms. In that case, the operation must be established as the least-cost way of attaining the stated objective. Redistributive programs are, therefore, not at odds with this part of Bank policy if they are achieved in a cost-effective manner.

The third part of Bank policy is guidance on what constitutes good cost-benefit analysis. The policy stipulates what must be analyzed to establish that an operation will achieve or has

achieved a positive NPV. These criteria are covered in detail in chapter 4 of this report. In summary, they stipulate that:

- The main goal of the ex ante project analysis is to estimate the discounted expected present value of its benefits, net of costs, because this is the basic criterion for a project's acceptability. This places a premium on accurate and unbiased estimates.
- Benefits and costs should be measured against the situation without the project.
- All projects should be compared against alternatives, including the alternative of doing nothing.
- Analysis should consider the sources, magnitude, and effects of the risks associated with a project by taking into account the possible range in the values of the basic variables and assessing the robustness of the project outcomes with respect to changes in these values.
- The economic analysis should examine the consistency with the Bank's poverty-reduction strategy.
- The economic evaluation of Bank-financed projects should take into account any domestic or cross-border externalities.

A mandate to adhere to basic principles of transparency and accuracy in the assumptions and estimates is also part of Bank policy. The analysis should be clear, accurate, and sufficiently complete to support informed decisions.

The points mentioned in this chapter constitute the basic evaluative principles against which this evaluation will be conducted.

Photo by Ray Witlin, courtesy of the World Bank Photo Library.

Chapter 2

EVALUATION HIGHLIGHTS

- Since the early 1970s, the use of cost-benefit analysis in Bank projects, specifically the calculation of ERRs, has declined both at the time of project appraisal and at project closure.
- There is a strong difference across sectors in the use of cost-benefit analysis.
- A shift in composition toward sectors not using cost-benefit analysis accounts for 23 percentage points of the overall 37 percentage point decline.
- The decline is also evident in sectors that traditionally use cost-benefit analysis, which account for 15 percentage points of the 37 percentage point decline.

Photo by Arne Hoel, courtesy of the World Bank Photo Library.

The Decline in Cost-Benefit Practice

World Bank policy (OP 10.04) is stated in a manner that offers little scope for exemption from a net-benefit test: "For every investment project, Bank staff conduct economic analysis to determine whether the project creates more net benefits to the economy than other mutually exclusive options" (World Bank 1994).

In light of this policy, it is potentially significant that the use of cost-benefit analysis appears to be declining, at least as indicated by the percentage of investment operations that contain an estimate of the ERR in the initial project document.[1] This percentage declined from a high of more than 70 percent during the early 1970s to approximately 30 percent in the early 2000s (figure 2.1).[2]

The data for initial ERRs in figure 2.1 run only through 2001. This is because information from the beginning of a project, such as the initial ERR, gets recorded in the Bank's internal database only after the project has closed, which happens on average seven years after projects open.

End-of-project ERRs also show evidence of a decline in cost-benefit practice. Estimates for such ex post ERRs, calculated upon project closing,[3] found in the final project report,[4] are available in the Bank internal database through 2008. Figure 2.2 reports the proportion of final project documents that contain an ex post estimated ERR, displayed by the year of project closing. It shows similar evidence of a long-term decline in calculation of ERRs. (There has, however, been a slight increase in the proportion of projects with final ERRs in recent years.)

The data on the proportion of projects with ERRs in figures 2.1 and 2.2 provide convenient summaries of broad trends but are less-than-ideal indicators of some aspects of cost-benefit analysis. Strictly speaking, Bank policy mandates calculations of NPVs, not ERRs, and it permits cost-effectiveness calculations in special circumstances, making ERR coverage an imperfect indicator of adherence to World

FIGURE 2.1 Percentage of Bank Investment Projects with Estimates of the ERR in the Appraisal Document, by Year of Project Approval

Source: World Bank data.
Note: ERR = economic rate of return.

FIGURE 2.2 Percentage of Bank Investment Projects with Estimates of the ERR in the Final Completion Report, by Year of Project Closing

Source: World Bank data.
Note: ERR = economic rate of return.

Bank policy.[5] As argued later in this report, neither of these issues is empirically significant. In particular, projects with a cost-benefit analysis and an NPV calculation almost always report an ERR. Second, the mere presence of an ERR calculation says nothing about the quality of the analysis behind it or the accuracy of the data. Both of these issues will be examined later in this report. A final issue is the extent to which project expenditures are covered. Rarely do the reported ERRs cover 100 percent of project expenditures; the ERR coverage data are silent on what proportion of a project's expenditures were covered by a cost-benefit assessment. Nonetheless, lessons can be learned from further examination of the coverage data.

Sectoral Differences in the Calculation of ERRs

To what degree does the decline in the use of cost-benefit analysis come from a change in the composition of the projects that are being financed or from other factors? The practice of calculating ERRs varies sharply by sector. Table 2.1 shows data for major sectors at the Bank. (Table A.1 provides data for all 17 sectors.) The last column on the right of the table shows a sharp divide: 5 of the 11 sectors tend to produce the vast majority of the ERR estimates; the remaining 6 sectors produce virtually none. The five sectors that tend to calculate ERRs are Agriculture and Rural Development; Energy and Mining; Transport; Urban Development; and Water. The six sectors that do not tend to calculate ERRs are Education; Environment; Finance and Private Sector Development; Health, Nutrition, and Population; Public Sector Governance; and Social Protection. For convenience, these will be called "high-CBA sectors" and "low-CBA sectors," respectively.

Table 2.1 shows the long-term shift in World Bank activity away from the five sectors that tend to apply cost-benefit analysis. Comparing two five-year periods, 1975–79 and 2003–07, reveals that the proportion of project closings in these five sectors covered 74 percent of all operations in 1975–79 but only 46 percent in 2003–07.

The decline in ERR practice is not solely attributable to the shift away from high-CBA sectors. Figure 2.3 shows that the percentage of projects with ERR calculations at entry has declined even in the high-CBA sectors, from approximately

TABLE 2.1 Trends in Sector Composition and Proportion of Projects Reporting ERRs, by Sector

Sector	Number of projects 1975–79	Number of projects 2003–07	Percentage of projects 1975–79	Percentage of projects 2003–07	Percentage reporting ERRs at entry 1970–2008
Agriculture and Rural Development	165	190	27	16	48
Education	50	133	8	11	1
Energy and Mining	96	83	16	7	43
Environment	0	82	0	7	8
Financial and Private Sector Development	60	97	10	8	4
Health, Nutrition, and Population	4	109	1	9	1
Public Sector Governance	7	78	1	7	1
Social Protection	0	80	0	7	3
Transport	162	121	27	10	58
Urban Development	9	73	2	6	32
Water	22	71	4	6	37
Other	35	45	6	4	13
Total	610	1,162	100	100	

Source: World Bank data.
Note: ERR = economic rate of return. The "Other" category includes all sectors with less than 5 percent of operations in 2003–07. Financial sector operations are included in the Financial and Private Sector Development category.

TABLE 2.2 The Shift from High-CBA Sectors to Low-CBA Sectors at the World Bank

	High-CBA sectors	Low-CBA sectors	All sectors	Percentage in high-CBA sectors
Number of project closings				
1975	56	9	65	86
2007	85	109	194	44
Number of projects reporting rates of return at entry (by year of project closing)				
1975	44	0	44	
2007	52	7	59	
Percentage of projects reporting rates of return at entry				
1975	79	0	68	
2007	61	6	30	

Source: World Bank data.
Note: CBA = cost-benefit analysis.

90 percent in the early 1970s to just over 50 percent in the 2000s.

The decline in the percentage of projects reporting ERRs is thus a result of two broad trends: a shift away from the high-CBA sectors and a decline in cost-benefit analysis even within such sectors.

Table 2.2 shows the data when World Bank projects are grouped into two broad sectors: high CBA and low CBA. It shows that the percentage of projects in the high-CBA sectors declined from 86 percent to 44 percent between 1975 and 2007 (for example, 86 percent of projects that closed in 1975 had reported ERRs at entry). Over the same period, the percentage of projects that reported ERRs at entry declined even within the high-CBA sectors, from 79 percent to 61 percent.

FIGURE 2.3 Percentage of Investment Projects in the Five High-CBA Sectors with ERRs in the Appraisal Report, by Year of Project Closing

Source: World Bank data.
Note: CBA = cost-benefit analysis; ERR = economic rate of return.

Table 2.3 shows the results of a mathematical decomposition designed to calculate the part of the overall decrease that is due to declines within sectors versus shifts between sectors. The full decline in the percentage of projects reporting ERRs at entry between 1975 and 2007 was 37 percentage points. Of this, 15 percentage points were attributable to the decline in calculation of ERRs within the high-CBA sectors, and 23 percentage points were due to a decline in the percentage of World Bank operations in the high-CBA sectors. The very small rise in the percentage of low-CBA-sector operations that produced ERRs (from 0 percent to 6 percent) slightly offsets the contribution of these terms (contributing a positive 1 percentage point).[6]

The evidence confirms a major change in composition of World Bank projects away from high-CBA sectors. Further evidence shows that this shift was first evident in approvals

TABLE 2.3 Sources of the Decline in ERR Reporting

Total change in ERR reporting (percentage points)	**–37**
From change within high-CBA sectors	–15
From change within low-CBA sectors	1
From shift away from projects in high-CBA sectors	–23

Source: World Bank data.
Note: CBA = cost-benefit analysis; ERR = economic rate of return.

FIGURE 2.4 Shift toward Low-CBA Sectors

Source: World Bank data.
Note: CBA = cost-benefit analysis.

after 1988 and that it reached a low in 2001 before staging a modest recovery. Figure 2.4 shows the evolution over the years in the fraction of projects in high-CBA sectors.

Summary

The prevalence of cost-benefit analysis, as indicated by percentages of projects that contain ERR estimates, has declined over the years. Of a total decline of 37 percentage points in the share of projects with ERRs at entry, 15 percentage points came from a decline in ERR calculation within high-CBA sectors, which habitually report ERRs, and 23 percentage points came from a shift in operations from high-CBA to low-CBA sectors. The shift away from high-CBA sectors started after 1988 and reached a low in 2001. Since 2001, the percentage of operations in high-CBA sectors has risen slightly.

Chapter 3

Photo by Yosef Hadar, courtesy of the World Bank Photo Library.

EVALUATION HIGHLIGHTS

- Of 166 investment projects that closed in 2008, 93 reported no ERRs.
- A common reason for failing to report ERRs is the belief that calculating an ERR is not applicable.
- Many of the reasons given for the lack of ERRs stem from basic problems with projects, rather than with cost-benefit methodology.
- The belief that benefits are not quantifiable is the most legitimate—but also the most easily abused—reason for not presenting cost-benefit analysis.
- Of 24 projects that claimed justification through cost-effectiveness analysis, only one appeared to use the technique correctly.

The Scope for Cost-Benefit Analysis

World Bank policy and practice regarding cost-benefit analysis have been diverging for many years. World Bank policy mandates an NPV calculation for all investment projects and a cost-effectiveness analysis for projects that are "expected to generate benefits that cannot be measured in monetary terms." In practice, however, World Bank documents increasingly lack ERR estimates either at the beginning or the end of projects. What fraction of the nonreporting projects present cost-effectiveness analysis?[1] What fraction present cost-benefit analysis in a form other than an ERR? Of those projects with neither kind of analysis, what reasons are offered for the omission?

Of the 195 projects that closed in fiscal 2008 with project documents available at the time of writing, 29 were development policy operations (which rarely perform cost-benefit assessments) and 166 were investment operations. Of the 166 investment operations, 50 reported ERRs at both the start and the close of the project, 93 reported neither, and 23 reported one or the other alone (see table 3.1).

This chapter focuses on the projects with no ERR reporting. These projects are broken down by sector in the column of table 3.2 that is headed "None." Five sectors—Agriculture and Rural Development; Education; Environment; Health, Nutrition, and Population; and Public Sector Governance—had eight or more such projects.

Why did some projects not present cost-benefit information? The usual reason given is that cost-benefit analysis is not applicable for certain kinds of projects. This raises two issues. First, what is meant by nonapplicability? What are the criteria by which it is judged? What kinds of projects *do* qualify as cost-benefit-analysis-cannot-be-applied? Second, if cost-benefit analysis is not done for a project, how does the Bank know that benefits exceed costs? Are alternative justifications provided?

This chapter focuses on the following question: What, if any, are the underlying reasons given when cost-benefit analysis is not applied to projects, and are the reasons technical limitations with cost-benefit analysis or limitations with the projects? As a first step, the chapter reviews what project Implementation Completion and Results Reports (ICRs) say about the issue.

Reasons for Nonreporting of ERRs

The ICRs contain a section on efficiency that is supposed to summarize the cost-benefit estimates. In the projects with no ERRs, a review of the efficiency section identifies some of the issues (see also box 3.1). In several ICRs, nonapplicability is stated with little additional explanation:[2]

- "It is not possible to calculate quantitative measures of efficiency for the sub-projects."
- "An economic and financial analysis was not undertaken given the institutional nature of the outputs."
- "[The project's annual outputs were] not countable because it was a social welfare–related, adult, nonformal education project for poor people."
- "The [project] did not include the implementation of civil works. Therefore, conventional quantitative economic analysis, which is normally carried out for investment projects, does not apply."

In other cases, the response simply states that there was no analysis; for example, "An ERR was not carried out for the project," or "No economic analysis was undertaken during project preparation."

TABLE 3.1 Number of Projects Reporting ERRs at the Beginning or at the Close of Projects, Fiscal 2008

		ERR at closing?		
		Yes	No	Total
ERR at beginning?	Yes	50	9	59
	No	14	93	107
	Total	64	102	166

Source: World Bank data.
Note: ERR = economic rate of return.

Still other project documents identify lack of prior data collection or analysis as the reason for no cost-benefit analysis:

- "No economic analysis of the project or any of its components or activities was attempted during appraisal, and no economic analysis was done as part of the [implementation completion report] since there was not an adequate baseline available."
- "Economic and financial analyses were not provided at appraisal, and data were insufficient to carry out such analysis at completion."
- "Appraisal documents did not include a cost-benefit or a cost-efficiency analysis. Consequently, it is not possible to assess if project outcomes were produced in accordance with efficiency benchmarks set at appraisal."

One project document cites a lack of data but goes on to assert that the data would not be meaningful even if collected:

> As in most of the social development projects, it is difficult to provide an overall project economic and financial analysis because of the difficulty of quantifying the benefits in the absence of the necessary data. Even if the data regarding the unit costs were available, the relevance of comparison is not that meaningful due to the diversity of micro-project types and the local conditions where they are implemented.

A few documents refer to lack of time and competing priorities. For example, "In the end, individual rates of return for projects were not calculated, partly because of the competing demands that (the project) faced."

Some projects state that the benefits are not quantifiable. The unquantifiable thesis is asserted most often for four kinds of projects: education, health, technical assistance, and environment. For example, "A formal cost/benefit analysis was not done at appraisal because the project financed only technical assistance activities," or "Cost-benefit analysis is not applicable to the education and health investments since benefits are not fully quantifiable."

The last quote raises the issue of the appropriate standard for accuracy. By using the qualifier "fully" to modify

TABLE 3.2 Reporting of Economic Rates of Return, Fiscal 2008, by Sector

		ERR reporting			
Sector	Total projects	None	Complete	Start only	End only
Agriculture and Rural Development	30	9	13	4	4
Economic Policy	2	2	0	0	0
Education	14	11	0	2	1
Energy and Mining	14	3	7	0	4
Environment	11	11	0	0	0
Financial and Private Sector Development	10	6	0	2	2
Health, Nutrition, and Population	19	17	2	0	0
Poverty Reduction	0	0	0	0	0
Public Sector Governance	10	9	1	0	0
Social Development	2	2	0	0	0
Social Protection	7	6	0	1	0
Transport	27	5	21	0	1
Urban Development	7	5	1	0	1
Water	13	7	5	0	1
Total	166	93	50	9	14
Percentage	100	56	30	5	8

Source: World Bank data.
Note: ERR = economic rate of return.

BOX 3.1 The Costs and Benefits of Cost-Benefit Analysis

Consider the costs and benefits of spending time on analyzing costs and benefits. The costs include the analyst's time and the expenses associated with collecting data—a survey reported later in this report indicates the median cost is currently $16,000. The benefits are a reduced chance of wasting money and a greater chance of selecting a better project. The following general points may be made about this issue:

- Costs tend to rise at a constant rate as more time is spent on the analysis (except for the one-time costs of data collection).
- The benefits of spending additional time on cost-benefit analysis tend to be high at first and to decline once the basic issues have become clear. This is partly because one of the main benefits of cost-benefit analysis—namely, requiring people to articulate the benefits they expect and to compare these benefits with costs—are achieved within the first days of work.
- The benefits of performing a cost-benefit analysis, in terms of avoiding mistakes or choosing a better project, can reach 10 percent of project costs. With loans on the order of $10–$100 million, potential benefits may be $1–$10 million.
- In the end, the limiting factor to doing a more accurate, and thus better, cost-benefit analysis is usually the unavailability of accurate data. If one is not prepared to incur additional data-collection costs, there will be a point beyond which additional time spent on cost-benefit analysis will not produce significant benefits.
- The benefit of cost-benefit analysis is low if the conclusions reached will not affect funding decisions.

Putting these points together:

- It is almost certainly valuable to do some cost-benefit analysis. Neither extreme—doing no cost-benefit analysis or spending many months on a cost-benefit analysis—is likely to be the best answer.
- Beyond a certain point, the cost-benefit analysis cannot be made much better if accurate data are not available.

If the Bank places little weight on cost-benefit results for decisions, staff will have little incentive to invest effort in it. Mandating that staff conduct cost-benefit analysis while giving it little weight in decisions imposes costs with few benefits.

quantifiable, is the suggestion that benefits should not be quantified unless that can be done with high accuracy? But what is the standard? Does "fully" mean 100 percent accurate or something less?

In other documents, the fact that project activities are not known in advance is the reason for the lack of cost-benefit estimates: "Given the demand-driven nature of the [project] and the difficulty to predict in advance the types of loans that would be financed, the PAD [project appraisal document] did not attempt to predict an . . . ERR . . . for the overall project."

Other project documents attribute the lack of cost-benefit analysis to the emergency nature of the assistance, which required quick disbursement: "The project was an emergency response operation, and no economic or financial analysis was undertaken during appraisal."

On the basis of this review, it is possible to enumerate the major reasons for lack of cost-benefit analysis that are cited in the documents (see table 3.3). Many projects simply leave the efficiency section blank or assert "not applicable," with no further explanation. Of those that provide reasons, the reasons include unquantifiable benefits, lack of adequate data collected at inception or during implementation, inadequate analysis in the project appraisal document (PAD), or too little time.

Of the projects without cost-benefit information, 60 assert that the efficiency issue was not applicable to the project, either by leaving the space blank or by writing "not applicable." At least 20 documents claim that the benefits of the project were not quantifiable (the language is hard to classify in some cases).

Nineteen projects, including some that claim that the benefits were not quantifiable, nevertheless do provide information relevant to whether benefits exceeded costs. Most of the information provided by these projects portrays the project in a positive light; there is no effort to demonstrate that the results cited are representative. A few projects, however, offer extensive information. Some projects appear to have sufficient information to estimate an ERR, but they do not present the calculation.

TABLE 3.3 Reasons Offered in Project Completion Documents for Lack of Cost-Benefit Estimates, Projects That Closed in Fiscal 2008 (N = 93)	
Reason	**No. of times cited**
No information given or "not applicable" asserted	60
Inadequate data	18
Relevant information provided but no final cost-benefit analysis	19
Emergency programs	3
Analysis promised in PAD not done	4
Revolving funds	3
Lack of analysis in PAD cited	3
Cost-effectiveness analysis invoked	24
Cost-effectiveness analysis performed	1

Source: Author's estimates using World Bank project documents.
Note: PAD = project appraisal document. Some project documents cite more than one reason.

A significant fraction of the project documents is apologetic about the lack of information on efficiency. Nineteen documents cite lack of prior data collection as the key problem; four mention that studies or analyses promised at appraisal were not carried out; three mention inadequate analysis in appraisal documents; and three maintain that such information cannot be provided because their projects deal with emergencies.

Cost-Effectiveness Analysis as an Alternative to Cost-Benefit Analysis

Cost-effectiveness analysis is the form of analysis most often mentioned as an alternative to cost-benefit analysis. Twenty-four projects invoke cost-effectiveness as the method of justification, either by checking the cost-effectiveness tab in the PAD or by asserting in the ICR that efficiency considerations would be addressed by cost-effectiveness analysis. Interestingly, of the 24 projects, only 1 offers what appears to be a real cost-effectiveness analysis.

A classic cost-effectiveness analysis starts by stating a specific goal, such as reducing the incidence of a disease in a town by 50 percent in four years, presents data on the expected cost of two or more methods of achieving this goal, and then selects the least-cost alternative. The 24 projects that invoke cost-effectiveness analysis, however, do not mention a specific alternative to the project chosen. Second, project documents usually examine the costs of doing the project rather than those of achieving a meaningful goal such as disease reduction.

Several projects claim to have achieved cost-effectiveness on the grounds that the expenditures of some components of the project were less than anticipated at appraisal. One project considers itself cost-effective because costs are lower than those of the previous version of the project. Other project documents assert cost-effectiveness on the grounds that the procurement was competitive. Still others assert cost-effectiveness on the grounds that costs were kept "within international norms" or "comparable to costs of other similar projects in the region." One project claims that costs were low compared with the potential growth of fisheries in the region, implicitly invoking a cost-benefit standard in an analysis that was claimed to focus on cost-effectiveness. None of these projects presents what is normally understood to be a cost-effectiveness analysis.

Analysis of Reasons for Not Applying Cost-Benefit Analysis

Of all the reasons offered above, "unquantifiable benefits" is arguably the most legitimate and most easily abused justification for not applying CBA. The fact that current practice gives project managers broad scope to claim unquantifiable benefits raises the risk that projects with negative NPVs are being funded. Some project documents treat this analysis as an all-or-nothing proposition—benefits are either quantifiable or not—whereas it is often a matter of degree.

Assigning monetary value to benefits always entails some measurement error. What is needed is policy that spells out which benefit streams entail sufficient difficulty in valuation that a cost-effectiveness analysis is warranted. It is also possible to calculate how large the unquantified benefits would have to be to justify the costs of the project. This review found no projects providing this information. If such a calculation were standardized (for example, nonquantified benefits per beneficiary), reasonable standards and case law could be developed.

Also valuable would be outside information that establishes a plausible case for the project in the absence of quantification. Some projects do this. For example, a recent ICR for

an education loan in Georgia, although not presenting data to quantify benefits in monetary terms, does provide some data to help the reader judge the plausibility that the benefits exceeded the $26 million investment.

A second underlying issue is the treatment of project components that, when considered in isolation or in the short run, may have a low NPV. For example, some components are necessary complements to the main intervention but do not have independent value. Administrative expenditures and monitoring and evaluation would fall under this heading, as might capacity building and institutional strengthening. If a component is necessary for the achievement of the benefit flows, it should be included as a cost in the cost-benefit calculation. Many projects do not do this; often such items are treated as stand-alone components.

Also in this category are interventions that are necessary, but not sufficient, to achieve results and interventions that are really a gamble (that is, they may achieve large benefits, but the probability of success is small). An example of the former might be improving record keeping in a land registry: by itself, it probably will not increase productive rural investment, but if several other factors are in place, it may have a positive result. Strictly speaking, it is incorrect to claim that a cost-benefit analysis is not applicable for such components. The right calculation, if the intervention will not yield results over a specific horizon, is that the net benefit is negative for that time horizon. Probabilities can be assigned to uncertain outcomes. Project managers may believe that the net benefit will be positive over a long time horizon, but that could be argued by using the available evidence rather than by asserting nonapplicability of efficiency considerations.

Photo by Ami Vitale, courtesy of the World Bank Photo Library.

The fact that benefits may occur over long time horizons in and of itself does not make cost-benefit assessments inapplicable. Cost-benefit assessments routinely deal with benefit flows that occur over many years: literacy programs for children are an example. The income-earning years for a child may start decades after primary schooling, but because both plausible reasoning and solid evidence establish that benefits will eventually materialize, there is no problem in applying a cost-benefit calculation with a long time horizon.

Lack of data is a major reason for lack of cost-benefit estimates both at the start and the end of projects. This is because of the shortage of rigorous quantitative evaluations of closed projects (which could be providing a wealth of information to guide cost-benefit analysis for new projects), failure to collect data during project implementation, and failure to record and use data that are available from previous projects. The simplest area in which individual projects fall short is failure to collect baseline data. Previous Independent Evaluation Group (IEG) evaluations, such as the 2009 *Annual Review on Development Effectiveness* and the evaluation on health, nutrition, and population (IEG 2009), have documented the low level of baseline data collection in World Bank projects.[3]

In other cases, the country or the sector specialists could organize data collection in an aggregate form rather than for each individual project. It is more efficient, for example, to organize supplements to the national household income survey than to conduct project-by-project, ad hoc surveys. Similarly, background research on measures such as expected yields or the average relation between gross domestic project growth and traffic growth require basic research or national or international data-collection efforts. The Development Economics Research Group at the Bank could be asked to assume responsibility for organizing such research.

Not knowing the activities to be financed in advance of the project poses another important obstacle to cost-benefit analysis. Budget-support programs by definition do not disclose the ultimate destination of the funds; the same is true of many kinds of community-based development projects. The latter commit to a process whereby the use of the money will be decided later, by recipients. This poses a problem not only for cost-benefit analysis but also for any kind of ex ante analysis.

Emergency-assistance projects are another class of projects that tend not to have cost-benefit assessments. The reason, presumably, is that the cost-benefit effort is believed to take too long. At issue here are the time and cost required to perform a reasonable cost-benefit assessment (see box 3.2). The learning curve in performing cost-benefit assessments is

BOX 3.2 Who Should Perform the Cost-Benefit Analysis?

Deciding who should perform cost-benefit analysis for a new projects presents a dilemma because two desirable attributes, familiarity and objectivity, are unlikely to be found in the same group. Those who are most familiar with the project are usually those who are promoting it; they may not be sufficiently objective to conduct an unbiased assessment of costs and benefits.

Some propose that borrowing countries should carry out the cost-benefit analyses for their projects. Objectivity would still be critical because project promotion exists both in client countries and in the Bank. One variant of this proposal would be to entrust the cost-benefit analysis to an independent agency within the borrowing country, if such an agency exists and functions effectively. Consultants hired by project promoters are not necessarily the answer, as they may have an interest in securing the next consulting contract.

One question is whether objectivity can ever be ensured if the analysis is entrusted to a single group. The analogy with legal systems may be helpful. The task of eliciting an objective verdict does not rest on the assumption that either the prosecution or the defense will be objective. The truth is expected to emerge in the debate between the two.

The accountability system in development agencies is typically built around the assumption that those close to the project will provide objective information. Some agencies are overseen by independent groups, such as the World Bank, but these groups usually do not assess and rate projects until after they have closed. An independent voice to check the cost-benefit analysis and the quality of monitoring and evaluation plans before a decision is made to proceed with the project could strengthen accountability.

usually quite steep: high increments to learning early on and lower increments as the analysis becomes more detailed. For this reason, a rapid-assessment cost-benefit analysis would seem to be the right approach in emergency conditions.

Uncertain Future for Cost-Benefit Analysis in Bank Projects

The Bank is currently undertaking a major reform of its procedures for appraising projects (investment lending reform), with the goal of simplifying approval requirements for low-risk projects and devoting more staff time to high-risk projects. A key question is what role cost-benefit analysis will have in the new procedures (see box 3.2). The investment lending reform concept note in January 2009 does not mention cost-benefit analysis (World Bank 2009).

Positive results alone, however, are not sufficient to justify projects: what counts is the value of those results compared with the costs, and the concept note does not indicate whether this more relevant assessment will take place. A "risky project" could be defined as one with a high probability of achieving a negative NPV, and the determination of which projects so qualify could be made on an objective empirical basis by measuring and documenting the NPV of past projects.

Instead, it appears that the determination of riskiness will depend on the subjective ratings of staff. In addition, the main remedy for dealing with risky projects appears to be to devote more staff time and resources to such projects. A less costly alternative would be to require that such projects pass pilot testing before being introduced on a broader scale.

Observations on the Scope of Cost-Benefit Analysis

On the basis of this review of closed projects, the following observations can be made about the scope of cost-benefit analysis. First, the scope is greater than currently practiced, if for no other reason than the existence of projects with ERRs at the beginning but not the end, or vice versa. If these gaps were filled, the coverage of cost-benefit analysis would rise by approximately 5 percentage points.

Second, inadequate data emerges as a major reason for not conducting cost-benefit analysis. If adequate data were available, the percentage of projects with cost-benefit analysis at closing would rise substantially. Over time, accumulating evidence would allow greater accuracy and coverage of costs and benefits at appraisal.

Currently, cost-benefit analysis is performed extensively or not at all. This all-or-nothing approach is worth reexamining. If the task were instead to present relevant information to help the reader assess whether benefits exceed costs, several projects could present information short of a full-fledged analysis. Defined in this way, the scope for cost-benefit analysis would be substantially higher than it is at present.

When emergency operations for war-torn areas or natural-disaster relief entail reconstruction of structures such as bridges that were previously heavily used, the case for positive net benefits is not difficult to make. The Bank could pursue rapid cost-benefit assessments for emergency operations as a safeguard against the possibility that decisions concerning expenditures will be captured by narrow political interests during a moment of crisis.

Projects such as community-development operations, where expenditures are committed before specific investments are identified, pose a number of accountability issues. In such cases, cost-benefit analysis can be done after the fact, at least for a representative sample of investments. The results can be used to inform new project proposals.

Any project that is implemented in specific communities or regions of a country but not in others (as are many community-investment projects) can conduct income-and-expenditure surveys before and after the project for affected regions and unaffected regions and thus provide evidence both for poverty analysis and for cost-benefit analysis. A variety of options that differ in terms of both analytical rigor and expense can be chosen for such surveys. The World Bank has funded and promoted a number of these surveys at the national level, but this evaluation found few examples where such surveys are used for project-level cost-benefit analysis.

There appears to be scope for innovation in cost-benefit analysis, and this would probably raise the scope for cost-benefit analysis. Rapid appraisal and greater use of household surveys have already been mentioned. Another example could be credit programs that on-lend funds at known interest rates to recipients who then make further investments. If repayment rates were close to 100 percent, as they often are, it could be inferred that recipients are likely investing the funds in activities for which returns are at least as high as the interest rates charged by the financial institutions.

This analysis could be used to ensure that economic returns were at least above a minimum threshold for microcredit and other on-lending operations. Further, there is probably greater scope for application of cost-benefit analysis to social projects. Jimenez and Patrinos (2008) discuss the application of cost-benefit analysis to education projects, and Hammer (1997) discusses its application to health projects.

A general issue is the degree to which development assistance has changed to render cost-benefit analysis more difficult or less applicable than it once was. Mentioned often in this connection is the increase in policy-reform and institutional-reform projects, including budget support, health and education projects, community-based development projects, and greater country ownership in project choices.

Policy and institutional reform presents a mixed picture. It is difficult to place a value on strengthening the effectiveness of public resource management. But there are well-known methods of estimating the benefits of more efficient pricing in the electricity sector or of increased competition in the trucking sector.

Education and health also present a mixed picture. Raising the educational attainment of children is a benefit that can be estimated and valued; it is harder to place a value on curriculum reform. Reducing the incidence of disease can be valued, but improving administrative records at health centers is more difficult to value.

Community-based development programs can be evaluated after the fact if not before the fact. The impact of such programs on poverty reduction and a cost-benefit analysis of such programs as poverty-reduction tools can be assessed with household-income-and-expenditure surveys, particularly if the programs are implemented in some areas of the country but not in others.

Greater country ownership does not necessarily change the need for or scope of cost-benefit analysis, whether performed by the Bank or the borrower. Given their direct interest in allocating funds efficiently, borrowing countries are not necessarily less interested in cost-benefit analysis than the Bank is. And even if this were the case, it would not preclude the Bank from performing its own due diligence for the borrower's information, for its own records, and for the benefit of other clients contemplating similar investments.

Chapter 4

Photo by Edwin Huffman, courtesy of the World Bank Photo Library.

EVALUATION HIGHLIGHTS

- The information in the economic analysis section of appraisal reports is often of high quality, but it is usually incomplete.
- Appraisal reports rarely discuss the public sector rationale for projects and the extent to which a project provides a public good.
- ERRs at appraisal assume everything will proceed as planned, which rarely happens. Downside risks are frequently not factored into the calculations.
- There is little evidence of a prior systematic effort to compare alternatives to a chosen project.
- Poverty analysis could be improved; the constraining factor appears to be lack of data.

Evaluating the Quality of Cost-Benefit Analysis

The criteria used to evaluate the analytical quality of cost-benefit analysis are derived from World Bank policy as outlined in chapter 1. For ease of analysis, this policy may be divided into six components: expected values, measurement of benefits and costs against a counterfactual, alternatives, risk, poverty reduction, and externalities.

1. ***Expected values:*** Because the expected NPV is the main criterion to be applied in decisions, analysis in appraisal documents should strive to estimate and present the expected outcome rather than a best-case scenario.
2. ***Measurement of benefits and costs against a counterfactual:*** Benefits and costs should be measured as the change compared with what would have been the case without the project.
3. ***Alternatives:*** All projects should be compared against alternatives, including the alternative of doing nothing.
4. ***Risk:*** Analysis should consider the sources, magnitude, and effects of the risks associated with a project by taking into account the possible range in the values of the basic variables and assessing the robustness of project outcomes with respect to changes in these values.
5. ***Poverty reduction:*** The economic analysis should examine the degree to which the project is consistent with the Bank's poverty-reduction strategy.
6. ***Externalities:*** The economic evaluation of Bank-financed projects should take into account any domestic or cross-border externalities.

Many of the conclusions in this chapter draw on Belli and Guerrero (2009), a separate review and rating of the economic analysis presented in staff appraisal reports for projects in calendar years 2007 and 2008 exceeding $100 million in commitments.[1] The chapter rates the analysis against the six priorities set out in Bank policy. The chapter closes by reporting the conclusions of Belli and Guerrero (2009), who rated the analytical quality in appraisal reports from 2007–08 using the same criteria they applied in the mid-1990s to projects in 1996–97.

The overall conclusion is that what is reported in the economic analysis section of Bank project appraisal reports is frequently of high quality; the weakness is in what is omitted. Rarely does project analysis cover all six items in the policy, and project justifications frequently omit crucial items such as comparison of alternatives, measurement of benefits against counterfactuals, and transparency about data and assumptions used. A similar review conducted in the mid-1990s found a lower proportion of poor analysis but also a lower proportion of good and excellent analysis.

Expected Values

In 1992, an important World Bank report assessing economic analysis in Bank project appraisal reports concluded that "no Staff Appraisal Reports report truly *expected* economic rates of return . . . , 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" (World Bank 1992b, p. ii). This report cited another report that concluded that analysis was instead based on an assumption of "everything goes according to plan," dubbed "EGAP analysis" (Beier 1990).

There is little evidence that this situation has changed. Analysis of the economic sections of project completion reports for calendar years 2007 and 2008 reveals that downside risks to implementation identified in the institutional-risk section of reports are rarely factored into the NPV calculation. Further, there is little evidence from these completion reports or from the separate survey with Bank staff conducted for this report of systematic collection and use of data from previous projects on items such as delays due to procurement problems, poor administration, or cost overruns.

In other words, there is no evidence that the Bank systematically factors lessons from past cost-benefit analysis into new rounds of cost-benefit analysis. To be sure, this probably happens to some degree, but if it does, it is dependent on the person doing the analysis. No systematic effort is made to collect and record information and to factor it into future assessments to enforce discipline and quality control across all cost-benefit analyses.

Counterfactual

Bank policy requires that "both benefits and costs are defined as incremental compared to the situation without the

project" and that the project is also compared with the alternative of "not doing it at all." There exist both analytical and empirical tools to assist in this assessment, but the evidence is that these are used only sparingly in the ex ante analysis performed for projects.

Analysis can help determine what would likely occur without the project. For public goods such as a national system for registering property, the situation without the project is plausibly no investment. Similar reasoning can be applied to investments with high positive externalities. For such investments, there is a case based on the analytics that the without-project situation would be low investment.

Belli and Guerrero (2009) find that the extent to which a project provides a public good is rarely discussed, and hence is rarely used to support an assessment of what would happen without the project. Furthermore, the way project appraisal reports treat the public sector rationale for projects in general is an issue in itself, apart from its use as helpful information to assess the without-project scenario.[2] Although it is no doubt true that some projects regard the public rationale as obvious and not requiring discussion, what is telling is that "none of the projects that produced private goods provided a justification for public involvement" (Belli and Guerrero 2009, p. 14). Indeed, Bank appraisal reports rarely ground the case for doing projects in first principles. Instead, they generally justify Bank involvement on the basis of long-time involvement in the sector or of accumulated experience.

When a project provides private goods or services, there is always the possibility that private suppliers would have provided the goods anyway, and hence that the difference between with- and without-project benefit streams would be small. Determining and estimating what would have happened without the project in these cases is usually difficult to establish analytically. In such cases, empirical techniques such as impact evaluation can be a useful input to cost-benefit assessments, but there is little evidence of their incorporation into cost-benefit analysis.

Alternatives

Comparison with alternatives is one of the core features of the analysis recommended by Bank policy. Ideally, project appraisal reports would present the alternatives considered before decisions were taken, and the rationale for the decision would be apparent from the NPV estimates associated with each alternative. Instead, the appraisal reports present a single alternative—that of the project chosen. There is little evidence that a systematic effort to compare and choose from alternatives is a major part of decision making at the Bank. Nevertheless, when projects are rated against

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BOX 4.1 Cost-Benefit Analysis and the Results Agenda

The managing–for-results agenda in recent years has been dominated by discussions about measuring results, using logical frameworks to frame monitoring and evaluation efforts, and using impact evaluation to measure results in a more accurate and rigorous way. These efforts complement each other and also complement cost-benefit analysis. Yet in practice they are often treated separately, leading to unnecessary fragmentation.

It is easy to find cost-benefit analyses that do not mention or use impact evaluation results, despite the fact that measurement of benefits against the counterfactual is integral to cost-benefit assessment. Similarly, it is easy to find impact evaluation studies that do not embed their results in a cost-benefit analysis.

For example, suppose that an intervention is designed to raise rice yields. The value of the increase in yields would be part of the benefit flow in the cost-benefit analysis, and the analyst typically would make an informed estimate of what yields would have been in the absence of the intervention and then compute the value of the change in yields. An impact evaluation would provide a scientifically rigorous estimate of the change in yields and should replace the informed guess. This is how impact evaluations can greatly improve cost-benefit assessments. But note also that an impact evaluation alone (one that went no further than providing an estimate of the change in yields) would be unhelpful for decision makers deciding whether to continue the project. They need to know the value of the increase in yields, and how it compares to costs. In short, they need a cost-benefit framework: the information from impact evaluations and the cost-benefit framework together provide a complete picture.

Crucial to the success of any project is having good answers to basic questions. What is the problem being addressed? Will project activities lead to the desired outcomes? If the change desired is so beneficial, why hasn't it been made already? What is the economic rationale—public good, externality, information asymmetries, redistribution, or distortions in other markets? It is sometimes said that such questions are more important than the cost-benefit calculation. This may be the case, but that is not a reason to omit cost-benefit assessment. Project analysis should contain both features.

Furthermore, the process of constructing a cost-benefit analysis has value by itself. It clarifies the indicators and data required to determine whether benefits are being achieved at the required levels. This can focus and simplify monitoring, indicator development, and indicator target setting, thereby sharpening the monitoring and evaluation effort.

Instead of profiting from the ways these analyses complement each other, staff interviews revealed that the parts are often undertaken by different groups at different times. Individuals writing the results framework usually work separately from the economist or consultant performing the cost-benefit analysis and also those determining the indicators to use for project monitoring.

the less stringent criterion of whether there was some evidence of consideration of meaningful alternatives, about 50 percent pass this test (see box 4.1).

In the other cases, the reports focus not on alternative projects or project designs but on less important choices, such as alternative lending instruments. In other words, the alternatives considered do not raise fundamental issues of the choice and justification for the project.

In some sectors, Transport being the prime example, consideration of alternatives is hardwired into the spreadsheets used for economic analysis. For example, alternatives are incorporated directly into the highway development and maintenance model and the roads economic decision model. Indeed, 24 of 28 Transport projects were assessed to have an acceptable discussion of alternatives. Outside of the Transport and Energy sectors, by contrast, only 18 of 58 projects were judged to have an adequate or a good consideration of alternatives. Discussion of alternatives is especially low in the Health, Nutrition, and Population; Social Protection; Social Development; and Public Sector Governance sectors.

Risk

Bank policy on risk analysis focuses on identification of key variables on which the economic impact of the project hinges. Ideally, managers will use this information to set priorities and to focus their monitoring efforts. A risk analysis entails identifying key variables, performing a sensitivity analysis of those key variables, and calculating switching values (that is, critical values below which the NPV would be negative).

Apart from its role in flagging sensitive variables and parameters, risk analysis is not expected to calculate the variability in returns and feed that information into decision making. Bank policy states that variability of a project's expected NPV around its mean should not carry weight in decisions. But the policy also says that risk analysis should

be used to increase the expected return and to reduce the risk of failure. Risk analysis should also be used to prioritize what variables to monitor during implementation.

Belli and Guerrero (2009) conclude that when project documents are assessed against these criteria, risk analysis emerges as one of the weakest areas. The typical analysis of risk conducts sensitivity analysis by simply varying aggregate costs and benefits by some percentage. Every document has a section identifying major risks, but the sensitivity analysis rarely assesses the sensitivity to these specific risks. Less than 10 percent of the projects perform Monte Carlo analysis, which can be readily done with a spreadsheet.

Poverty Reduction

In some projects it is possible to forecast beneficiaries and identify them by income group to gauge the impact of the project in raising incomes of poor individuals. Agriculture technical assistance projects, some education projects, and some community-based development projects are examples.

The appraisal documents identify beneficiaries by income in only 14 percent of projects. An additional 26 percent of the documents identify project beneficiaries and make some use of income data. Forty-seven percent of the documents contain only general discussions of who would benefit, and 6 percent of projects do not discuss beneficiaries.

Externalities

Nearly every appraisal document discusses the project's environmental impact and mitigating measures. The major issue here is a lack of clarity about whether environmental externalities have been factored into the economic costs and benefits. In 13 percent of the documents, it is clear that environmental costs and benefits are estimated and included in the economic analysis; in a further 34 percent, environmental impacts are quantified but there is no evidence of inclusion. In 47 percent of projects, environmental costs are discussed in isolation.

Other Criteria

Further technical shortcomings in World Bank cost-benefit work are not listed in OP 10.04 but are nevertheless potentially important. When there are distortions to market prices, the cost-benefit analysis should use shadow prices to measure the real value or costs of goods and services. Previous reviews of the Bank's economic cost-benefit analysis found that the use of shadow prices, recommended by Little and Mirrlees (1974) and Squire and Van der Tak (1975), has not often been applied (Little and Mirrlees 1990). World Bank (1992b) and Belli and Guerrero (2009) confirm this finding.

To compare current standards of analysis with those of previous years, note that Belli and Guerrero (2009) found the economic analysis in appraisal documents to be acceptable or good in 54 percent of the cases. An average of the three similar reviews in the 1990s found economic analysis to be acceptable or good in 70 percent of the appraisal documents, indicating that analytical quality appears to have declined. At the same time, the percentage of very poor analysis has declined: this lowest rating was given to 7 percent of projects in the 1990s and to only 1 percent in recent projects. Hence, there is a modest compression toward the middle. With respect to sector, the best performance was in Water (81 percent good or acceptable), followed by Agriculture and Rural Development (67 percent). In contrast, only 20 percent to 40 percent of the appraisal documents in the Urban Development; Education; and Health, Nutrition, and Population sectors were rated good or acceptable.

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Chapter 5

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EVALUATION HIGHLIGHTS

- The gap between ERRs at appraisal and at closing has narrowed, but this is likely a by-product of two unrelated forces rather than an indication of improved forecasting ability.
- Projects with lower outcome ratings are less likely than projects with higher ratings to have the ERRs recalculated at closing.
- Few projects report negative ERRs at closing.
- Growth forecasts from Country Assistance Strategy reports are reasonably accurate but usually miss negative growth.
- Sustainability of benefits is rarely checked after a project has ended, which likely imparts a positive bias to reported ERRs.

Accuracy in Cost-Benefit Calculations

This chapter assesses whether there is any evidence of bias in the reporting of cost-benefit results at the end of projects, focusing primarily on the ERRs. To what extent do the reported results provide what corporate accountants call a "true and fair view" of the economic impact of the project?

The first indicator of possible bias is based on a comparison of the ERRs at project entry with those at project closing: Are the rates at closing higher or lower than the original rates? The Bank's Board of Directors first discussed the ERR gap in 1987 (World Bank 1988a). A 1989 report by IEG concluded that two-thirds of the gap was due to actual benefits falling short of expectations, and that one-third was due to project implementation delays (IEG 1989). Further reports from the Independent Evaluation Group cited unrealistic forecasts in appraisal estimates as a continuing problem (World Bank 1992b).

Interestingly, the ERR gap has virtually disappeared in recent years. Figure 5.1 shows median ERRs at appraisal and closing since 1972, along with lines indicating the five-year moving average of each data series. The moving averages had become essentially the same by the middle of the first decade of this century. The figure also shows that most of the closing of the gap was due to the ERRs at closing catching up with those at entry, a trend that will be analyzed later in this report.

FIGURE 5.1 Convergence of Before-Project and After-Project ERRs

Source: World Bank data.
Note: ERR = economic rate of return. Figures expressed in percentages.

Closer analysis suggests that the closing of the ERR gap is likely a by-product of unrelated forces driving the two time series. Regarding the median ERRs at entry, constantly increasing forces such as population and traffic density are likely responsible for the steady positive trend over time. For example, examination of the way in which benefits are calculated in the Highway Development and Maintenance-4 model for the Transport sector reveals that forecasted benefits will rise automatically with increases in traffic density. The ex post ERRs reflect actual project outcomes, and hence exhibit greater fluctuation in the time series, driven in part by the forces discussed in chapter 7.

Previous World Bank reports have cited several manifestations of an optimism bias at appraisal. A report solicited by World Bank President Lewis Preston cited a finding that only 22 percent of financial covenants in loan agreements were in compliance, suggesting that the language of the loan covenants was chronically optimistic. Based in part on a workshop convened to solicit the views of borrowers, that report concluded:

> In the eyes of Borrowers and co-lenders as well as staff, the emphasis on timely loan approval (described in some assistance agencies as the "approval culture") and the often active Bank role in preparation, may connote a promotional—rather than objective—approach to appraisal. Borrowers allege that loans feature conditions thought to be conducive to approval by management and the Board, even when these may complicate projects so as to jeopardize successful implementation (World Bank 1992a, p. iii).

Furthermore, it has long been noted that projects frequently underestimate the time required for implementation: the average length of projects is seven years, but the average estimated length at appraisal is five years (World Bank 1992a, p. 9).

It is rare to find reports that analyze and quantify bias in project analysis at appraisal and especially rare to find reports that compare this across institutions. One exception is a study examining forecasted rates of return for road projects in China. The ERRs were estimated at two points in time: when the projects were first under consideration; and again many months later just before implementation. Typically, the ERRs become more realistic and lower on the eve of implementation. Figure 5.2 shows a summary of the results. There was, on average, a positive bias in all three cases, whether projects were funded by the Chinese government, the Asian Development Bank, or the World Bank. The eve-of-implementation ERRs were 2.5 percentage points lower than the earlier ERRs for domestic-funded roads, 3 percentage points lower for Asian Development Bank–funded roads, and 5.5 percentage points lower for World Bank–funded roads.

Previous reports have been critical of the analysis and treatment of risks in Bank appraisal documents, claiming that downside risks are usually ignored, leading to an upward bias in the ERRs reported at appraisal. The 1992 review of economic analysis in Bank projects concluded that "project assumptions about government implementation capacity, macroeconomic performance, availability of local cost financing, and other key operational variables are *not* factored into the [ERR] calculations. Although some Staff Appraisal Reports refer to the macroeconomic environment as being important for determining the project outcome, *the variables are not explicitly taken into account in calculating ERRs*" (emphasis in the original) (World Bank 1992b, p. 29). Belli and Guerrero (2009) reach a similar conclusion: risks identified in the risk section of the appraisal reports are not factored into the cost-benefit calculations in other parts of the reports.

In some projects, ERRs are calculated at appraisal but not again at closing. The possibility of recalculation bias can be examined by asking whether projects that received low ratings by the IEG were less likely to have their ERRs recalculated than were projects that received favorable ratings.

Figure 5.3 shows the probability of recalculation of ERRs for projects in the high-CBA sectors (sectors that frequently calculate ERRs for their projects) since 1993. The ERRs of unsatisfactory projects were much less likely to be recalculated at closing than those of satisfactory projects, suggesting that recalculation bias is indeed present. Figure 5.4

FIGURE 5.2 Forecasting Bias in Predicted ERRs—Road Projects

Source: Asian Development Bank.
Note: ERR = economic rate of return. Figures given are percentage point differences in the ERRs calculated for feasibility studies performed long before project commencement and the ERRs presented just before projects commenced.

FIGURE 5.3 Probability of Recalculation of ERRs at Closing—High-CBA Sectors, 1993–2007

Source: World Bank data.
Note: CBA = cost-benefit analysis; ERR = economic rate of return.

FIGURE 5.4 Probability of Recalculation of ERRs at Closing—Low-CBA Sectors, 1993–2007

Source: World Bank data.
Note: CBA = cost-benefit analysis; ERR = economic rate of return.

FIGURE 5.5 Probability of Calculating a Final ERR When an Initial ERR Was Calculated, All World Bank Projects, 1972–2008

Source: World Bank data.
Note: ERR = economic rate of return. "High-rated projects" are those that obtained a satisfactory rating by the Independent Evaluation Group.

shows the same evidence for low-CBA sectors. For projects in low-CBA sectors, the probability of ERR recalculation at closing for highly unsatisfactory projects was virtually zero.

Another area of interest is whether such recalculation bias has changed over time. As shown in figure 5.5, among projects for which an ERR was calculated at appraisal, the probability that an ERR would be calculated after the project closed has always been lower for the lower-performing projects. (In this case, a "lower-performing project" is defined as one that received an unsatisfactory rating by the IEG.) The recalculation probability has been declining for both classes of projects. However, the difference between the two recalculation probabilities, one possible measure of the degree of bias, was higher after 1987, when it averaged 0.24, than before, when it averaged 0.18.[1] This is one piece of evidence suggesting a small rise in the bias over time.

There is also the possibility of upward bias in median returns due to nonmeasurement (at both appraisal and closing) of ERRs for projects that do in reality have a negative return. This bias is a possible problem because many projects do not report cost-benefit estimates. It is also the case that the ERRs reported at closing are rarely negative. Of 1,299 projects that have closed since 1990 and report an estimate of the ERR at closing, only 24 report negative returns and 16 of these are exactly –5 percent. Only 4 are lower than –5 percent. Some implementation completion reports contain data suggesting negative returns, but the full calculation is not provided. An upward bias caused by nonreporting of low-return projects is a potentially serious issue.

A further possible source of bias in ERRs for which evidence can be obtained concerns the growth forecasts in Country Assistance Strategy reports. For example, ERRs for roads contain forecasts of traffic growth, which are usually assumed to be some fixed multiple of overall forecasted economic growth. If the growth forecasts are biased in a positive direction, then any ERR based on them will also have a positive bias.

When checked, this emerges as a minor source of bias. The growth forecasts in 59 recent Country Assistance Strategy documents were examined and compared with the growth outcomes in reality. In 51 cases, both forecasted and actual growth was positive. In these 51 cases, the average forecast was 5.2 percent and the reality was 5.0 percent, suggesting a very small positive bias.

The weakness in forecasting, however, is that negative growth is rarely predicted. In a further seven cases, the forecast was positive and the reality negative. In these cases, the average forecast was 4.3 percent and the reality was –4.6 percent. One case was the opposite, with a negative forecast (–5 percent growth) and a positive real outcome (1 percent). Combining all 59 cases, the average forecast was 5 percent and the average outcome was 3.8 percent. This suggests that there is a small positive bias in appraisal ERRs

BOX 5.1 The Problem of Fragile Estimates

The conclusions of cost-benefit analysis are sensitive to parameter assumptions. Should this lead one to avoid such analysis or to improve oversight and standards?

Consider, for comparison, the example and history of corporate accounting. If one thinks cost-benefit analyses are easily manipulated, what about profit-and-loss statements of firms? The difference is that with corporate accounts, nations have developed their own Generally Accepted Accounting Principles, and international bodies such as the International Accounting Standards Board have developed and refined International Financial Reporting Standards. Many nations have now adopted these standards, and the world is well on the path toward a single, globally accepted set of accounting rules to discipline corporate accounts. An entire profession with accreditation standards exists to prepare corporate accounts.

But this is evidently not enough. In addition to the accounting rules are the auditors, whose job is to independently verify the accounts. Auditors have their own Generally Accepted Auditing Standards, and the International Federation of Accountants has developed International Standards of Auditing to move toward international standards and harmonized procedures.

Nevertheless, recent events have shown that even this superstructure of accounting standards is not sufficient when conflicts of interest exist. Arthur Andersen is no longer in business after the Enron affair, and a court-appointed examiner has found that Ernst & Young were aware of but did not question Lehman Brothers' use and nondisclosure of an accounting procedure that understated their leverage.[a]

The point is that when problems with corporate accounts arise, the customary response is to tighten accountability standards. Fragility in corporate accounting is rarely used to argue for dispensing with corporate accounts.

a. See http://lehmanreport.jenner.com/VOLUME%201.pdf, p. 8.

stemming from the fact that forecasts rarely predict negative growth (see box 5.1).[2]

A final possible source of positive bias in ERRs is over-estimation of long-term benefits. The typical ERR includes benefit flows that last 25–30 years, yet the sustainability of such flows is rarely verified after the first 7–10 years. ERR calculations virtually always assume that benefit flows in later years either remain at a constant high levels or continue growing. Yet, IEG studies with information on sustainability of benefits often find that benefit levels fall short of what was anticipated at appraisal (World Bank 1990; IEG 2002). The practice in ERR estimation of assuming constant high benefit levels for many years has not been supported empirically due to the lack of comprehensive studies on the sustainability of benefits.

This chapter has reviewed eight areas of possible evidence for bias in calculation of ERRs. One of these areas, the closing of the ERR gap, is probably a by-product of two unconnected trends; the other seven areas do suggest a positive bias. On balance, this evidence, especially the nonreporting of negative outcomes, raises the likelihood of a positive bias in ERR reporting.

Chapter 6

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EVALUATION HIGHLIGHTS

- Interviews with Bank staff reveal that cost-benefit analysis is usually prepared after major decisions are made and thus has little influence on those decisions.
- Cost-benefit analysis is often delegated to consultants.
- Senior staff show little interest in cost-benefit results and a great deal of interest in safeguards, procurement, and financial management.

Use of Cost-Benefit Analysis for Decision Making

The main purpose of cost-benefit analysis is to improve decision making—to enable those responsible for decisions to choose projects with higher net benefits over those with lower net benefits and thereby maximize the effectiveness of development assistance. Using cost-benefit information for decision making would reassure donors that the Bank is using their money to the maximum effect.

This chapter examines whether the Bank's decision making allows for effective use of cost-benefit analysis. The conclusions are based on interviews with 51 Bank project leaders (task team leaders), chosen randomly from all projects that closed in fiscal 2006–07 and 2008–09.[1] In 74 percent of cases, the sampled task team leaders were not economists by background, although the fiscal 2008–09 subsample had more economists (31 percent) than did the 2006–07 sample (21 percent).

Photo by Curt Carnemark, courtesy of the World Bank Photo Library.

The most significant finding is that project leaders report that cost-benefit analysis is usually conducted *after* the decision has been reached to pursue a project. Of the 51 project leaders, only 5 reported that cost-benefit analysis is given significant weight at the project identification stage. Eighteen of the leaders reported that cost-benefit analysis is given significant weight at the preparation stage.

When asked whether a cost-benefit analysis had ever been the key criterion in deciding to fund a project, project leaders overwhelmingly (82 percent) said it had not. The decision about funding a project occurs well before cost-benefit analysis is done; in those cases where cost-benefit analysis is already available, it is used as a design tool at best—that is, to evaluate components or subcomponents of a project that should be added or dropped on the basis of their economic viability.

Moreover, the cost-benefit analysis is not usually conducted by senior staff. Forty-one project leaders report that an outside consultant was hired for the task; only 10 leaders did the analysis themselves. Project leaders also reported that country directors or sector directors rarely comment on, or show any interest in, cost-benefit analysis.

One important question is the degree to which the information in cost-benefit analysis is affected by the fact that decisions often precede it. When asked whether, in their experience, cost-benefit results had ever been altered at the request of a key decision maker, 14 project leaders said yes and 34 said no.

Does devoting time to the cost-benefit analysis enhance career prospects? Most task team leaders agreed that contributing to the cost-benefit analysis of a project did not result in a better performance evaluation (55 percent) or a better chance of promotion (92 percent).

Thirty-eight percent of task team leaders reported that contributing to the cost-benefit analysis of a project was not significant at all in recognition or approval by their peers,

and 42 percent noted that it was only partly significant. Fifty percent responded that contribution to a cost-benefit analysis was only partly significant in approval by supervisors. Some task team leaders added that superiors who are economists give greater consideration to the quality of the cost-benefit analysis than noneconomists do.

Time and money spent on cost-benefit analysis vary considerably. It is normally performed by a project economist, who might be a staff member or a consultant. He or she is allotted, as median values, 18 days and a budget of approximately $16,000. These values are slightly higher in the subsamples of the projects ending in fiscal 2006 and 2007 (18 days and $18,125) than in those of projects starting in fiscal 2008 and 2009 (15 days and $14,375). Task team leaders from the Public Sector Governance sector reported that they allot only two days to cost-benefit analysis—the lowest value in the sample. Team leaders from the Transport sector allot about 20 days, the highest value in the sample.

In their interviews, some task team leaders expressed a desire to see the Bank devote more resources to the training of staff and to the dissemination of methodologies in an effort to overcome some of the sector-specific challenges to use of cost-benefit analysis as a decision-making tool. As a case in point, they noted the heavy resources invested to implement the guidelines on safeguards, procurement, and financial management. These areas, they asserted, tend to absorb most of the task team leaders' time and are also the areas where they expect the Bank's senior staff and management to focus most when evaluating a project. Thus, in project design, task team leaders focus heavily on the accurate implementation of the above guidelines, typically devoting little or no time to cost-benefit analysis. As one team leader put it, "Management wants cost-benefit analysis for paperwork, and staff complies as it is easier for them to go with the flow."

What role does the cost-benefit analysis play in project approval? Eighty percent of the task team leaders concurred that when preparing a project proposal, it is sufficient to have a cost-benefit analysis, alluding to the need to "tick a box" in the template of the required documents for the project to be successfully appraised. Many team leaders considered cost-benefit analysis to be just an "input into the discussion," a "factor in the conversation," or a "parameter" that might attract attention if it challenged the viability of a project. Even in such a case, however, the project may still go forward. A small majority of task team leaders (58 percent) think that the existence of a cost-benefit analysis helps project approval.

Bank staff do not unanimously support basing project decisions on cost-benefit analysis, making staff opposition part of the reason for poor adherence to Bank policy, but most staff support cost-benefit assessment. When asked about the usefulness of cost-benefit analysis, most task team leaders (82 percent) responded that it does enable objective performance assessment, although team leaders from the Public Sector Governance; Health, Nutrition, and Population; and Education sectors pointed out a lack of relevant data. Respondents underscored the potential of cost-benefit analysis to reveal factors crucial to better performance (77 percent). They also pointed to its potential usefulness in diagnosing and modifying an underperforming project midway through implementation (47 percent), though admittedly they have yet to see this happen.

Finally, task team leaders overwhelmingly agreed that cost-benefit analysis should be used to accurately estimate economic returns at closing (82 percent), and that lessons from such analysis should be used to amend future projects (88 percent). In fact, many of them noted that cost-benefit analysis is done after project completion precisely for this purpose, typically in the context of ICRs.

The overall picture that emerges is that the quality and accuracy of cost-benefit analysis are hindered by the decision-making structure and incentives at the Bank. Cost-benefit information is available too late in the decision-making process at appraisal, and the incentive of staff or consultants to conduct careful cost-benefit analysis is affected by the fact that important decisions have already been made when they do their analysis. Project leaders report that there are few positive incentives for devoting time and energy to cost-benefit analysis and that senior management rarely takes notice of such analysis. There is also a potential conflict of interest from the fact that the Bank often places responsibility for cost-benefit assessment in the hands of the same staff members who are responsible for guiding the project through Board approval.

Chapter 7

EVALUATION HIGHLIGHTS

- The median ERRs reported for Bank projects at closing have doubled over the past 20 years.
- An increasing positive bias in measuring returns may explain the rise, though this is difficult to verify.
- The trend in project outcome ratings has been on a similar upward path.
- The rise in outcome ratings has occurred mostly in the five sectors that routinely produce cost-benefit analyses.
- The years since 1987 have been characterized by a shift toward greater market orientation in economic policy. The rise in ERRs correlates empirically with market orientation and with economic growth rates.
- Eighty-three percent of the variation in ERRs between 1974 and 2007 is empirically associated with the rise in market orientation and higher economic growth.

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The Rise in Rates of Return

The World Bank has kept data on the ERRs achieved by its projects for many years, but statements by Bank officials, major policy documents, and formal reviews of performance rarely mention rates of return. This lack of attention is both telling and surprising, given that Bank data show that the median ERR on the subset of projects that conduct cost-benefit analysis has approximately doubled since 1987.

This chapter presents tentative findings on the causes of this rise in median returns. One hypothesis is that the median ERR from the sample of projects for which the ERR is calculated is an upward-biased estimate of the median ERR from all projects, and that this bias has been rising in recent years—specifically, that since 1987 the percentage of low-return projects that fail to report ERRs has gradually risen, causing the median ERR among the remaining projects to drift upward. Although there is little direct evidence to support this idea, there is little evidence that rules it out. Note that most of the evidence given in chapter 5 regarding bias concerned the *level* of bias at all time periods, not the *change* in the bias. The one piece of evidence that is about the change in bias over time—the difference in recalculation probabilities in figure 5.5—does suggest a slight increase after 1987, but the difference does not increase steadily in a manner that suggests an obvious correlation with the rise in returns.[1]

FIGURE 7.1 Median ERRs, All World Bank Projects, 1972–2008 (percent)

Source: World Bank data.
Note: ERR = economic rate of return.

This chapter first reviews data by sector to examine the plausibility of trends at the sector level. It then compares ERR data with indicators of overall project performance, both by sector and in the aggregate. It asks whether the changes in median returns by sector are positively associated with changes in performance ratings over time. After a discussion on returns and performance ratings being associated with each other, there is an examination of what is driving the increase in median returns.

Trends in ERRs

Median ERR—All Bank projects

Figure 7.1 shows the median ERRs of all Bank projects for which ERRs have been calculated. These rates of return were calculated at project closing; consequently, they are the best information available on the actual returns achieved by Bank projects. The median rate of return among all projects that closed in a given year has risen from a low of approximately 12 percent in 1987–88 to a high of about 24 percent in 2005–07—a doubling in approximately 20 years.

These are not small differences, as illustrated by the hypothetical example of an agriculture project that appears in box 7.1. In this example, real incomes of a poor family increase by a factor of 5 after 20 years with a 24 percent rate of return, but by a factor of just 2 after 20 years with a 12 percent rate of return. Thus, a doubling of the ERR is associated with more than a doubling of the underlying growth in real agricultural incomes.

Median ERRs by sector

Clearly the rise in median ERRs is large. Is it plausible, and can it be corroborated by other performance measures? Disaggregating the data by sector shows that the rise in median returns occurred in each of the five high-CBA sectors. In three of these there has been a steadily rising profile over time. In the other two sectors—Agriculture and Rural Development, and Energy and Mining—median ERRs exhibited a V pattern, with a bottom in 1987, rather than a steady increase over time.

Figure 7.2 shows median ERRs for projects in the Agriculture and Rural Development sector. The small circles in the figure represent the median return of all investment projects that closed in the indicated year; the line shows the average trend over time. The downward trend during the 1970s and 1980s was broken in 1987, when a positive trend set in. That trend has continued to the present. The year in which the trend changed was determined by a statistical procedure that selects the break in trend that best summarizes the data.

Figure 7.3 shows similar evidence for the Energy and Mining sector. In this sector, too, a change in the trend from negative to positive started in 1987.

Median ERRs in the Transport sector, by contrast, exhibit a steadily rising trend (figure 7.4).

The same gradual rise in the median rates of return is apparent in the Water and the Urban Development sectors combined (figure 7.5). These two sectors are not displayed separately because of small samples. The trends in

FIGURE 7.2 Median ERRs in the Agriculture and Rural Development Sector (percent)

Source: World Bank data.
Note: ERR = economic rate of return.

BOX 7.1 The Difference between a 12 Percent and a 24 Percent ERR—Example from Agriculture

The difference between a 12 and 24 percent ERR is evident from the following simplified example of an agriculture project. The project delivers technical assistance to families with incomes near the poverty line, with the objective of raising their incomes to enable them to escape from poverty. The table below compares two projects. Both projects deliver technical assistance to a family that begins with an income of $2 per day, or $730 per year.

Suppose that the technical assistance costs $2,000 per family. The 24 percent ERR project requires income growth on the order of 8.9 percent per year, while the 12 percent ERR project requires income growth of just 3.7 percent.

	12% ERR	24% ERR
Base income (poverty line times two)	$730	$730
Income growth due to project	3.7%	8.9%
Cost of project per family	$2,000	$2,000
Family income after 5 years	$844	$1,027
Family income after 10 years	$1,012	$1,572
Family income after 20 years	$1,456	$3,689

The full effects of the differing ERRs and the differences in underlying growth are increasingly apparent with the passage of time. After 10 years, the 12 percent ERR project would raise family income by $282, from $730 to $1,012; the 24 percent ERR project would raise family income by almost three times as much, by $842. After 20 years, the 12 percent ERR project would raise family income to $1,456; but the 24 percent ERR project would move the family to near middle-class status, with an annual income of $3,689. Therefore, the differences in income can be truly significant over 20–30 years.

Source: Author's calculations.
Note: ERR = economic rate of return.

FIGURE 7.3 Median ERRs in the Energy and Mining Sector (percent)

Source: World Bank data.
Note: ERR = economic rate of return.

FIGURE 7.5 Median ERRs in the Water and the Urban Development Sectors (percent)

Source: World Bank data.
Note: ERR = economic rate of return.

each sector are similar, and a single graph provides a fair representation of trends in both sectors.

The median rates of return in the remaining low-CBA sectors show no significant positive trend over time (figure 7.6).

In summary, the rise in median ERRs can be isolated to five sectors. In two of these sectors, median returns exhibit a V pattern centered on 1987. Before 1987, positive trends in the Transport, Water, and Urban Development sectors were offset by negative trends in Agriculture and Rural Development and in Energy and Mining, resulting in zero overall increase in Bank-wide economic returns. After 1987, positive trends in all five sectors combined to drive a significant increase in Bank-wide economic returns.

The low-CBA sectors show no positive trend over time in median ERRS (figure 7.6), but they do show a mean return of approximately 20 percent, indicating that such projects

FIGURE 7.4 Median ERRs in the Transport Sector (percent)

Source: World Bank data.
Note: ERR = economic rate of return.

FIGURE 7.6 Median ERRs in All Other Sectors Combined (percent)

Source: World Bank data.
Note: ERR = economic rate of return.

can have high returns. On average, low-CBA sectors are not low-ERR sectors. If the median ERRs shown are unbiased, the fact that ERRs in low-CBA sectors are not statistically significantly different from those in the high-CBA sectors, suggests that the shift in the proportion of projects toward low-CBA sectors did not have an important effect on overall median economic returns. (Note, however, that the sample of projects behind figure 7.6 is small.)

Trends in IEG Performance Ratings

The foregoing review indicates nothing obviously implausible about the trends over time in ERRs by sector. Is the rise in median returns by sector consistent with other non-ERR performance data? The most commonly used non-ERR performance data are the outcome ratings produced by the IEG. These ratings have been applied to the great majority of projects since 1973. The rating system was binary (satisfactory/unsatisfactory) until the early 1990s, when the IEG adopted the current six-point scale (highly satisfactory, satisfactory, moderately satisfactory, moderately unsatisfactory, unsatisfactory, and highly unsatisfactory). The six rating categories were first widely applied by IEG evaluators in 1993.

As a cautionary note, the performance ratings and the ERRs contain common information, because the returns are observed by the evaluator doing the rating, so some positive association would be expected. Nonetheless, the empirical overlap between them is not huge. Table B.1 shows numerous projects with low performance ratings and high economic returns, and vice versa. Overall, the simple correlation between ERRs and ratings is approximately 40 percent.[2]

Using 1993 as the starting year for a comparison of the trends in ratings reveals a pattern broadly similar to the positive trends in median economic rates of return. Table 7.1 shows estimates of the average trends in project ratings by sector.

The trends in IEG performance ratings are positive and significant for each of the same five sectors in which the trends in ERRs are positive. These five sectors are also the only ones in which the estimated trend is positive and statistically significant at the 5 percent level. Thus, the same five sectors—Agriculture and Rural Development, Energy and Mining, Transport, Urban Development, and Water—exhibit positive trends in both performance measures. Trends in project ratings since 1992 broadly corroborate the positive trends in median ERRs across sectors

The average performance ratings (scale of 1–6) of the five high-CBA sectors are plotted over time in figure 7.7, which shows the strong increase in performance ratings between 1994 and 2008.

The average performance ratings of the low-CBA sectors are plotted over time in figure 7.8. There is no evident trend toward improvement. As was apparent from the data in table 7.1, the lack of a positive trend does not occur because trends in some sectors were declining while others were improving. None of the five low-cost-benefit analysis sectors individually exhibited positive and statistically significant trends over time.

In conclusion, both the ERR data and the performance-rating data show an increase in project performance since 1993 that is concentrated in the same five sectors.

Possible Explanations for the Rise in ERRs

What explains the increase in median ERRs? The major explanations to be examined empirically are a rise in the

TABLE 7.1 Trends in IEG Project Performance Ratings by Sector, 1993–2008

Sector	Time trend	Standard error	T-ratio	Number of projects
Agriculture and Rural Development	0.053	0.011	4.89	692
Education	–0.01	0.014	–0.68	357
Energy and Mining	0.036	0.015	2.36	421
Environment	0.036	0.027	1.32	172
Financial and Private Sector Development	0.021	0.031	0.69	221
Health, Nutrition, and Population	–0.025	0.019	–1.29	269
Public Sector Governance	0.038	0.022	1.74	192
Transport	0.041	0.011	3.62	410
Urban Development	0.058	0.020	2.87	206
Water	0.074	0.021	3.46	190

Source: Author's calculations using World Bank data. Reported results are regressions of performance ratings (scale of 1–6) in each sector on a time trend.
Note: IEG = Independent Evaluation Group.

FIGURE 7.7 Average IEG Performance Ratings—High-CBA Sectors—and Trend over Time

Source: World Bank data.
Note: CBA = cost-benefit analysis; IEG = Independent Evaluation Group. These are average ratings measured on a scale of 1–6, where highly unsatisfactory is assigned a 1, unsatisfactory a 2, and so forth. A rating of 4 corresponds to moderately satisfactory.

FIGURE 7.8 Average IEG Performance Ratings—Low-CBA Sectors—and Trend over Time

Source: World Bank data.
Note: CBA = cost-benefit analysis; IEG = Independent Evaluation Group. These are average ratings measured on a scale of 1–6, where highly unsatisfactory is assigned a 1, unsatisfactory a 2, and so forth. A rating of 4 corresponds to moderately satisfactory.

upward bias in returns, improvement in overall economic conditions as measured by growth, and a rise in the degree of market orientation of the economic regime.

Positive bias

The possibility that an increasing positive bias might explain the rise in returns was discussed at the beginning of the chapter. An empirical proxy for this rise is the *difference* in ERR recalculation probabilities between low- and high-rated projects. The recalculation probabilities used in the calculation of the difference are those shown in figure 5.5.

Improvement in growth

An improvement in overall economic conditions in partner countries is the second possible explanation for the rise in project returns. To test for this, the rate of gross domestic product growth prevailing during project implementation was calculated for all Bank projects and then averaged over all projects in the year they closed.[3] The resulting growth rates were calculated separately for IDA and non-IDA countries.

On the basis of the evidence in figure 7.9, if growth raised returns after 1987, its effects were most strongly felt late in the 1987–2007 period, starting in 2001 for non-IDA countries and somewhat earlier for IDA countries. The ERRs in figure 7.1 show a long-term increase starting in 1987; there is no obviously similar increase in growth. The increase in growth since 1987 has been slightly higher for IDA countries than for non-IDA countries, which, holding constant other things, should cause a higher increase in rates of return for IDA counties.

The absolute level of returns and the rise in returns since 1987 are almost identical for IDA and non-IDA countries (figure 7.10). This casts doubt on any explanation for the rise in returns based on characteristics associated with IDA status, such as level of income.

Market-oriented and institutional reform

Project completion reports and project performance audit reports from the years 1979, 1984, and 1989 were reviewed and compared with those from 2007–08 to better understand other factors that could influence economic returns.[4] Compared with projects from 2007–08, projects in the earlier periods contained more examples of administration by state enterprises and efforts to create, through projects, private sector outcomes that the market was not creating. Examples of problems that may have lowered ERRs include the following:

- One credit project reported large cost increases experienced by borrowers because of delays in obtaining import licenses and unanticipated increases in customs duties on imported equipment.
- An agriculture project aimed to stimulate what was considered to be disappointingly low private investment in livestock. After a few years' effort, this did not occur to the extent anticipated. The project then established a

FIGURE 7.9 Average Economic Growth Rates during World Bank Project Implementation

Source: World Bank data.
Note: IDA = International Development Association. Figures are the average annual growth rates that obtained during implementation of all projects that closed in the year shown. The timing thus parallels that of the ERR calculations.

FIGURE 7.10 Median ERRs in Bank Projects, IDA and Non-IDA Countries

Source: World Bank data.
Note: ERR = economic rate of return; IDA = International Development Association.

government-majority-owned development company to help accomplish the task. The private sector response continued to disappoint. Owners of small herds were unwilling to organize themselves into cooperatives as desired by the government and envisaged by the project. Further, private financial coinvestment in the development company was less than anticipated. The project switched to full government financing of the development company. By the end of the project, production in the formerly private livestock ranches controlled by the development company was not significantly higher than it had been before the project started.

- Another agriculture program reported low returns stemming from higher costs of vehicles and higher deterioration of equipment than had been anticipated at appraisal. The higher costs resulted from delays in obtaining import permits and from poor investment in maintenance by users. One factor behind poor maintenance was that the vehicles were collectively owned by the project rather than by the farmers. Farmers did not have strong incentives to maintain the vehicles they were using.

These examples illustrate four interconnected themes that can influence economic returns. The livestock project illustrates a naïve expectation that private investors would respond even if the incentives were not there; it also illustrates a failure to take private incentives seriously in project design. The examples generally illustrate the extensive reliance on public enterprises to implement projects. They also illustrate the effect of import quotas or licensing on the level and uncertainty of costs of production. In 1997, IEG summarized the environment under which agriculture projects were implemented as follows:

> Throughout the 1970s, most developing countries followed growth strategies that emphasized public production and direct controls on credit, foreign exchange and prices. Development programs relied heavily on Public Enterprises. Overvalued exchange rates, high tariffs, and quantitative restrictions prevailed. Prices received by producers of export crops were often less than half their world market value (Meerman 1997, p. 1).

To test for the influence of such factors on economic returns in projects, a simple indicator was developed to capture the broad orientation of economic policy in each country. The validity of this indicator rests on two facts. First, for a significant number of countries, the fact that market-oriented reforms occurred is widely known and noncontroversial. Second, for many such countries, the date of reform is also widely known and uncontroversial. The purpose of using nothing more than these two facts in measuring the indicator is to ensure that the validity of the test does not hinge on controversial measures of the degree of market orientation.

A list of countries was selected in which these two facts hold true (market-oriented reforms are widely acknowledged to

have taken place and there is a reasonable consensus around a specific date) and tests were conducted using only those countries. Information on the presence and timing of market-oriented reform was drawn largely from a World Bank publication (World Bank 1996) that documents and describes the economic history in all developing countries. The publication is from 1996, which guarantees that the judgments about the reform status of any particular country could not have been influenced by knowledge of economic growth after 1996 in that country or by the performance of any project in that country that closed after 1996. Countries were assigned reform status and a year in which reforms commenced in cases where the evidence was judged to be clear. Post-Soviet and Eastern European transition countries were not assigned reform status until the first year in which high inflation was stabilized in the 1990s or the cessation of a major war.[5] Bolivia was assigned reform status after 1985, the year in which hyperinflation was stabilized.

Other ostensible reform economies—Chad, Côte d'Ivoire, Ethiopia, and Lebanon—were excluded from the tests if there was a major ongoing civil war or other conflict. El Salvador's reforms began in 1989, but it was not assigned full reform status until after 1992, the year in which the peace accords were signed. The full list of countries and the reform date assigned are presented in table C.1. For convenience, this indicator will be referred to as the "reform indicator" or the indicator for "market orientation," even though in a few cases, such as El Salvador, reform is considered to be in effect only after reform and civil peace were achieved. It is also worth stressing that the reforms typically include both market-oriented policies and supporting regulatory institutions.

The impact of economic reforms on project rates of return was first tested on a county-by-country basis: did returns rise in countries after reforms occurred? To conserve space, a shorter list of the results for the first 20 countries is shown in table 7.2 (in alphabetical order). Table C.2 contains results for all 47 countries.

Nineteen of the 20 countries shown in table 7.2 are shown to have had higher average ERRs for projects conducted after reforms. Of those 19 countries, the increase was found to be statistically significant in 9 countries, and in the single country where returns were lower after reform—Bolivia—the decline was not statistically significant. Some countries

TABLE 7.2 Tests of the Impact of Economic Reforms on Project Economic Returns in 20 Selected Countries

Country	Year of reform	Mean rate of return for projects completed			Statistically significant difference?
		Before reform	After reform	Difference	
Algeria	1994	19	23	4	No
Argentina	1991	12	25	13	Yes
Bangladesh	1991	21	36	16	Yes
Benin	1989	41	33	–9	No
Bolivia	1985	9	30	21	Yes
Brazil	1990	19	46	28	Yes
Bulgaria	1997	24	49	24	Yes
Burkina Faso	1994	21	39	19	No
Cape Verde	1992	14	41	27	No
Chile	1976	15	30	15	Yes
Colombia	1990	15	36	21	Yes
Costa Rica	1982	17	65	48	Yes
El Salvador	1992	14	19	6	No
Gambia, The	1985	18	23	5	No
Ghana	1983	21	34	13	Yes
Guatemala	1994	28	27	–1	No
Guyana	1988	4	18	14	No
Honduras	1992	15	24	9	No
Hungary	1990	35	20	–15	No
India	1991	18	24	6	No

Source: IEG.
Note: See table C.2 for the full list of 47 countries.

simply do not have sufficient projects with ERRs reported to draw strong conclusions.

The full results (see table C.2) indicate that of the 47 countries identified as pursuing market-oriented reforms (and possessing sufficient projects with economic return data), 43 have had higher mean economic returns after reform. Four (Benin, Hungary, Lesotho, and the Russian Federation) exhibit lower returns, but in all such cases the sample sizes are small or the differences are trivial and thus not statistically significant Among the 19 countries with sufficient data on which to draw statistically significant conclusions, all showed higher returns after reform (see the final column in table C.2). When all country results were pooled, mean returns rose by 14 percentage points after reform (from 17 percent to 31 percent), and the rise is statistically significant. Therefore, this country-by-country evidence supports the idea that the shift to market orientation was a factor explaining higher mean returns.[6]

Did returns also rise in nonreforming countries? Clearly for these countries there is no date of reform. Nevertheless, a range of years was used, and the conclusion is similar, regardless of the year selected. As an example, if 1991 is chosen to make the comparison, the mean returns were 17 percent before this date and 22 percent after. These data generally suggest that mean returns were higher in the nonreform group, but by *less* than in the reform group. The difference-in-difference estimator in the case shown would ascribe an impact of 4.6 percentage points to liberalization ((27.5 – 17.4) – (22 – 16.5))—lower than the before-after estimate of 10 percentage points but still statistically significant.

A further test is to determine the influence of the explanations against each other in a regression framework. Does market orientation account for the rise in returns even after controlling for economic growth and measurement bias? To conduct this test it was determined, for each World Bank project, the extent to which the project was executed under market-oriented reform conditions. Projects that spanned the reform year were assigned a fraction corresponding to the percentage of the life of the project that was executed under reform conditions. Then, for each year between 1974 and 2007, the fraction of all World Bank projects that closed in that year and were implemented under reform conditions was calculated. The result is the data time series shown in figure 7.11.

FIGURE 7.11 Percentage of Projects Completed in Countries That Implemented Market-Oriented Policy Changes, 1974–2007

Source: World Bank data.

This series increases strongly after 1987 and levels off at approximately 80 percent after the year 2000.[7] The impact of this variable on project economic returns was tested in a regression framework against the impact of economic growth and the bias indicator derived from the data in figure 5.5. The results of the test indicate (table 7.3) that projects conducted in market-oriented environments, which typically have both appropriate policies and supporting regulatory institutions, had economic returns that were 10 percentage points higher than projects conducted in environments that were not market oriented. Projects conducted during

TABLE 7.3 Correlation between the Rise in Economic Returns in Projects and the Rise in Market Orientation and Growth in Client Countries, 1974–2007

Variable	Impact	Standard error	T-ratio
Economic growth	1.5	0.52	2.9
Market orientation	10.0	1.4	7.7
Bias	3.1	3.9	0.8
R^2 = 86 percent	N = 33		

Source: Author's calculations using World Bank data.
Note: The dependent variable is the median economic rate of return (ERR) reported at the termination of projects among all projects closing in a given year. The estimated impact of 1.5 associated with economic growth suggests that a rise in growth of 1 percentage point was associated with a rise in ERRs of 1.5 percentage points. The estimated impact of 10.0 suggests that a shift to market-oriented policies was associated with a rise in economic returns of 10.0 percentage points. The bias variable is not significant.

FIGURE 7.12 Median Economic Returns in Projects Correlate with Average Economic Growth, Controlling for Reform Condition

Source: Author's calculations using World Bank data.
Note: ERR = economic rate of return.

FIGURE 7.13 Median Economic Returns in Projects Correlate Strongly with the Fraction Executed under Economic Reform Conditions, Controlling for Growth

Source: Author's calculations using World Bank data.
Note: ERR = economic rate of return.

periods of faster economic growth also had higher returns, with each percentage point increase in economic growth associated with a 1.5 percentage point rise in the ERR. The bias indicator is not statistically significant. Together, these three variables account for 86 percent of the variation in ERRs between 1974 and 2007.

Furthermore, focusing specifically on the explanation for the *rise* in returns between 1987 and 2007, the rise in market orientation, rather than rising growth, accounts for most of the increase in returns, since the rise in the reform variable was larger than the rise in growth during the period 1987–2007.[8]

The core evidence in the regression is summarized in figures 7.12 and 7.13. Economic returns in Bank projects correlate positively with the economic growth prevailing during project implementation, even after controlling for reform (figure 7.12), but the positive association between economic reform and project returns is strong, even after controlling for the impact of economic growth (figure 7.13).

If it is correct that market-oriented reforms explain the rise in returns, one might expect to see little impact of reforms on ex ante returns (which are forecasts and do not use actual observed results) compared with ex post returns (which use some data from actual results). The evidence does indeed show little association between reform status and ex ante economic returns. In the period after 1987, mean economic returns at the beginning of projects were virtually the same for reform countries and nonreform countries: 28 percent and 27 percent, respectively. Hence, the impact of reforms shows up in the ex post returns, not in the ex ante returns, as one would expect. This supports the idea that improved performance was driving higher returns.

Summary

Median ERRs of World Bank projects have approximately doubled in the past 20 years. Project performance ratings from IEG also rose over approximately the same period and in the same sectors. Further, most of the performance ratings increases are in the sectors that compute ERRs. A possible interpretation of this result is that sectors that have a habit of quantifying results tend to learn to improve their projects over time.

This chapter also reports the results of tests performed to help determine whether and to what degree three factors help explain the rise in median returns: a changing bias in measurement, overall economic conditions (as measured by country growth), and market-orientated approaches to project design and economic policies. The last two factors help explain the rise in project returns, accounting for 86 percent of the increase in returns. Statistical tests suggest that the quantitative impact of market orientation is larger than that of growth: the shift to market orientation that occurred in the late 1980s and 1990s is associated with a 10 percentage point increase in economic returns of projects.

Chapter 8

Photo by Masaru Goto, courtesy of the World Bank Photo Library

Conclusions

The World Bank has long required cost-benefit analysis in its investment projects, but this review finds that Bank policy is not consistently implemented. The use of cost-benefit analysis has declined, even in sectors where it is typically applied. Moreover, numerous shortcomings exist where it is applied, including upward bias, poor compliance with Bank analytical standards, and limited use of cost-benefit results for learning or decision making.

Findings of a 1992 Report

A major review of cost-benefit analysis at the World Bank 20 years ago found many of the same shortcomings documented in this report (World Bank 1992b). That earlier report made numerous recommendations to change Bank practice (see box 8.1), noting problems such as lack of interest by higher management, low morale stemming from the belief that better evidence would not alter decisions, poor incentives, and lack of staff skills. It noted:

> 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.

The report stopped short of proposing institutional changes, recommending instead:

- Improved monitoring of portfolio quality
- Providing institutional support for project economists
- Involving the chief and lead economists.

Bank response to the recommendations

Although the report's recommendation arguably contributed to the establishment of the Quality Assurance Group and may also have improved some quality dimensions, the evidence in this report suggests that these recommendations either were not effectively implemented or did not solve the problems of biased analysis, poor compliance with cost-benefit policy, and failure to factor learning from cost-benefit results into decisions on new projects. The Quality Assurance Group's quality-at-entry ratings are performed after projects have been approved by the Board and therefore have no effect on approval decisions. Furthermore, the small sample of projects reviewed by the Quality Assurance Group does not provide sufficient evidence on which to draw conclusions about quality by sector. As for the other two recommendations, it is difficult to say when they would be satisfactorily implemented.

The earlier report did not address two important institutional issues. The first issue, confirmed in the present study, is that management decisions to go ahead with projects are typically made before cost-benefit information is available. That sequence is likely to place pressure on any subsequent analysis to conform to previous decisions. The second issue is the conflict of interest that may arise when cost-benefit analysis is conducted, directed, or commissioned by project managers with a professional interest in the outcome. The managers also select which aspects of the analysis to report in project documents. Two further issues identified in the present study are the general lack of interest by senior management and, in some cases, active staff opposition to the use of cost-benefit analysis for decision making.

Key Principles

Moving forward, the World Bank needs to align practice with policy in the area of cost-benefit analysis. To this end, the evidence in this report points to the need to change key practices at the Bank. IEG also suggests that policy needs to be revised, but in specific ways so as not to attenuate the clarity and strength of current policy.

BOX 8.1 Recommendations of a 1992 Review of Cost-Benefit Analysis in the World Bank

An in-depth 1992 review of cost-benefit analysis concluded the following:

"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 . . . 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 project economic impact, based on the lessons of experience with the country, the sector and the borrower.
- 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.
- 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 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 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."

Source: World Bank (1992b).

Whatever reforms are adopted should strive to respect key principles of evidence—transparency and unbiased analysis—before decisions:

- Cost-benefit estimates should be available and used *before* decisions are made to go ahead with projects. The estimates should influence decisions and be seen to influence decisions. This is critical, as the Bank should not fund projects with a negative NPV and needs clear procedures in appraisal and supervision to address this risk.
- The cost-benefit analysis should be summarized, preferably in a single table, in each PAD and ICR. The table and corresponding text should present the benefit and cost flows over time and the evidence or assumptions behind values for the benefit flows. The spreadsheets prepared during the appraisal analysis should be saved for review during project implementation and final evaluation.
- Cost-benefit estimates should follow high technical standards, use the best empirical evidence available, and represent the expected or most likely outcome.
- Responsibility for funding, conducting, and directing the cost-benefit analysis should not lie primarily with those who ha ve vested interests in the outcome.

The findings of this report point more specifically to the need for reforms in the following four areas at the Bank.

Bank policy

The Bank policy requires some revision. It is important, however, that any revision not undo the basic strengths of current policy. Current policy has a fundamental rationale; namely, to determine whether net benefits are positive in fulfillment of the Bank's mandate to improve welfare, as set forth in the Articles of Agreement. The wide application of cost-benefit analysis also serves as a safeguard against the possibility that narrow political and sectional interests will capture project selection. Other than quantitative cost-benefit analysis, no methodology can answer the basic question of whether benefits exceed costs. Furthermore, the technical aspects of Bank policy are basically sound. Any revision to Bank policy should not diminish this basic strength and clarity.

At the same time, it is clear that Bank staff have difficulty implementing the policy. This report has found that noncompliance with Bank policy is a function of several factors, including lack of incentives, shortage of or failure to collect appropriate data, and lack of technical knowledge. None of these has anything to do with shortcomings in Bank policy. Part of the gap between policy and practice stems from legitimate difficulty in implementing the policy in a limited number of cases.

The scope for cost-benefit analysis

The aspect of Bank policy that is most objectionable to staff is the expectation that either cost-benefit analysis or cost-effectiveness analysis can be applied to 100 percent of interventions. The Bank policy cited at the beginning of this report applies to investment operations, not to policy loans, but some investment operations have policy components where similar problems in applying traditional quantitative cost-benefit analysis arise. Technical assistance operations are also often not amenable to traditional cost-benefit analysis.

The Bank needs to define the scope for cost-benefit analysis in a way that recognizes the legitimate difficulties in quantifying benefits while it preserves a high degree of rigor in justifying projects. Policy on which projects can seek justification through a cost-effectiveness, rather than a cost-benefit, standard should be carefully defined and limited in scope, given that cost-effective projects may still have negative NPVs. Alternative standards for justifying projects may be required where traditional cost-benefit analysis cannot be applied, but these standards should be made explicit. Given improvements in technical methods and data collection in recent years, there is likely to be scope for innovation.

Comprehensive analysis

Cost-benefit analysis is not a stand-alone activity; it is part of a larger effort to appraise and evaluate projects. The crucial issue is not simply whether a cost-benefit analysis is done but whether the reasoning motivating the project is analytically sound and supported by credible evidence.

Current Bank policy does not contradict this point; however, it does not affirm it. There are separate guidance documents for conducting cost-benefit analysis, developing results frameworks, defining development objectives, and performing monitoring and evaluation. There is no formal policy on impact evaluation. This fragmentation in the guidance documents is paralleled by fragmentation in the project appraisal process. Staff interviews revealed that groups frequently do not communicate with one another when performing the different aspects of appraisal. The re-

Photo by Ray Witlin, courtesy of the World Bank Photo Library.

vision to Bank policy should recognize the mutually reinforcing nature of appraisal activities and strive to make appraisal become a single, complete, and integrated analytical exercise.

It is important to emphasize that comprehensive analysis need not be time-consuming. The optimal amount of time to devote to cost-benefit analysis can range from hours to months. Sometimes the required information is readily available; sometimes it is worth the additional time and expense to collect better information. It all depends on the nature of the project and the constraints to improved information. Moreover, efficiencies can be achieved by engaging groups such as the Bank's Development Economics Group to perform the background research and required household surveys and to establish acceptable ranges for key parameters.

Objectivity in decision making

Objectivity of the cost-benefit estimates is paramount for effective learning and decision making and for improving results. Current Bank policy is silent on procedures to ensure objectivity; it does not address who should perform cost-benefit analysis and under what circumstances. There is a potential conflict of interest when those responsible for cost-benefit analysis at appraisal are also responsible for shepherding a project through Board approval.

Any policy adopted needs to confront the related issues of objectivity and client ownership. The Bank's clients propose and implement projects, but both the Bank and its clients have an interest in ensuring objectivity. The issues in ensuring objectivity apply whether appraisal is done by the borrowing country or with the assistance of the Bank. The three basic options for reinforcing objectivity are (i) an auditing model, where the project task team performs the analysis but the conclusions are subject to independent and random audits, (ii) a model in which the analytical work is separated from that of the project task teams, and (iii) a model in which different groups are explicitly given adversarial roles in promoting or criticizing projects, as in legal proceedings.[1]

Empirical evidence can also be used to promote objectivity. Audited or verified records of cost-benefit results achieved from previous projects can be used to reinforce realism in appraisals of new ones. One specific aspect of Bank practice requiring review is the finding, based on staff interviews, that results from cost-benefit analysis at appraisal are frequently lost when the cost-benefit analysis at closing is prepared. Furthermore, the cost-benefit analyses for completed projects are rarely used as evidence in cost-benefit analyses for new, similar projects.

Disclosure and transparency are further methods to reinforce objectivity. Currently, it is impossible to replicate the cost-benefit analysis on the basis of the information in the PADs and ICRs. Disclosing the spreadsheet used could help

Photo by Alejandro Lipszyc, courtesy of the World Bank Photo Library.

resolve this problem, particularly if the data were disclosed in a way that highlighted key assumptions and parameters of the cost-benefit exercise.

It is crucial that the analysis and key evidence be available before key decisions are made and that they be used to influence those decisions. Current Bank practice often seems to be the opposite: decisions constrain the analysis. Bank operational policy currently has no safeguards in place to prevent this.

Ensuring objectivity and getting the right information available at the right time in the decision process are interconnected issues. Cost-benefit analysis needs to be performed earlier than is it is under current practice so that the results can be reviewed before substantial resources and time are committed to a project. Bank project teams already produce a concept note for each project early in the decision-making process. To ensure serious discussions early in the project cycle, before a cost-benefit analysis can be developed, the Bank could clarify the required content of these notes, ensuring that it sets out the public sector rationale for the project and briefly describes how the project addresses the stated rationale. This would focus attention on the broader economics of the project and not just on the cost-benefit analysis. The concept note would also include the proposed method of evaluation (cost-benefit analysis, cost-effectiveness analysis, or other methods). Costs and benefits would have to be clearly described, even if they could not all be quantified. The note would also include a description of the data required for analysis before Board approval, including any need to collect new data.

Summary

This report suggests a number of complementary steps to enhance the usefulness of cost-benefit analysis in the Bank: revising Bank policy on use of cost-benefit analysis to clarify applicability and methods; better integrating the various types of analysis (for example, cost-benefit analysis, monitoring and evaluation frameworks, impact evaluation) undertaken as part of project appraisal; clarifying the required content and process for review of project concept notes; and considering institutional alternatives to ensure the objectivity and transparency of cost-benefit analysis.

Cost-benefit analysis can be a powerful tool when appropriately applied. Taken together, these steps could considerably enhance the overall results focus of Bank lending.

APPENDIX A

World Bank Projects by Sector Board

Table A.1 shows the number and percentage of all investment projects at the World Bank classified by Sector Board for two five-year periods: 1975–79 and 2003–07. Some sectors have relatively few projects: Economic Policy; Gender and Development; Private Sector Development; and Social Development. The Global Information/Communications Technology Sector Board has few projects for the period 2003–07. The Financial Sector has been renamed and subsumed into the Financial and Private Sector Development Sector. The 11-sector classification used in table 2.1 of the text was obtained by grouping the small sectors into "Other" and combining the Financial Sector with the Financial and Private Sector Development Sector.

TABLE A.1 World Bank Projects by Sector Board, 1975–79 and 2003–07

	1975–79		2003–07	
Sector Board	Number	Percentage	Number	Percentage
Agriculture and Rural Development	165	27.0	190	16.4
Economic Policy	1	0.2	12	1.0
Education	50	8.2	133	11.4
Energy and Mining	96	15.7	83	7.1
Environment	0	0.0	82	7.1
Financial	60	9.8	0	0.0
Financial and Private Sector Development	0	0.0	97	8.3
Gender and Development	0	0.0	1	0.1
Global Information/Communications Technology	33	5.4	10	0.9
Health, Nutrition, and Population	4	0.7	109	9.4
Private Sector Development	1	0.2	0	0.0
Public Sector Governance	7	1.1	78	6.7
Social Development	0	0.0	22	1.9
Social Protection	0	0.0	80	6.9
Transport	162	26.6	121	10.4
Urban Development	9	1.5	73	6.3
Water	22	3.6	71	6.1
Total	610	100.0	1,162	100.0

Source: World Bank data.

APPENDIX B

Relation between IEG Project Ratings and Economic Rates of Return

TABLE B.1 Relation between IEG Project Ratings and Economic Rates of Return, 1987–2008

IEG final rating	ERR of project						Total number of projects
	10 percent or lower	Between 10 and 14 percent	Between 14 and 19 percent	Between 19 and 25 percent	Between 25 and 35 percent	Higher than 35 percent	
Highly unsatisfactory	9	3	0	0	1	1	14
Unsatisfactory	154	39	22	16	11	13	255
Moderately unsatisfactory	18	12	10	8	8	7	63
Moderately satisfactory	40	51	29	48	35	44	247
Satisfactory	63	130	180	182	162	153	870
Highly satisfactory	1	11	11	15	17	31	86
Total	285	246	252	269	234	249	1,535

Source: World Bank data.
Note: ERR = economic rate of return; IEG = Independent Evaluation Group.

APPENDIX C

Market-Oriented and Institutional Reform Dates

Table C.1 shows the reform dates used in the analysis of chapter 7. Table C.2 shows the results of tests of the impact of market-oriented and institutional reform on average economic rates of return in each country.

TABLE C.1 Countries and Reform Dates Assigned (in chronological order)

Country	Reform date assigned	Country	Reform date assigned
Indonesia	Before 1975	Estonia	1992
Malaysia	Before 1975	Honduras	1992
Botswana	Before 1975	Latvia	1992
Chile	1976	Mozambique	1992
China	1978	Paraguay	1992
Belize	1981	Uganda	1992
Costa Rica	1982	Mauritania	1992
Mauritius	1982	Lebanon	1992
Ghana	1983	Guinea-Bissau	1993
Thailand	1983	Kazakhstan	1993
Bolivia	1985	Lithuania	1993
Gambia, The	1985	Madagascar	1993
Lao People's Democratic Republic	1986	Moldova	1993
Tanzania	1986	Nicaragua	1993
Tunisia	1986	Slovenia	1993
Guyana	1988	Burkina Faso	1994
Mexico	1988	Cambodia	1994
Benin	1989	Georgia	1994
Jordan	1989	Guatemala	1994
Sri Lanka	1989	Kyrgyz Republic	1994
Vietnam	1989	Mali	1994
Brazil	1990	Senegal	1994
Colombia	1990	Slovak Republic	1994
Hungary	1990	Côte d'Ivoire	1994
Mongolia	1990	Algeria	1994
Peru	1990	Armenia	1995
Philippines	1990	Azerbaijan	1995
Poland	1990	Jamaica	1995
Argentina	1991	Kenya	1995
Bangladesh	1991	Romania	1995
Czech Republic	1991	Russian Federation	1995
India	1991	Tajikistan	1995
Nepal	1991	Ukraine	1995
Ethiopia	1991	Uruguay	1995
Albania	1992	Chad	1995
Cape Verde	1992	Lesotho	1996
El Salvador	1992	Bulgaria	1997

Source: Author's calculations based on World Bank data (1996).

TABLE C.2 Before–After Tests of Impact of Market-Oriented Reforms on Economic Returns

Country	Year of reform	Average rate of return (%) for projects			Number of projects		Statistically significant change?
		Before	After	Change	Before	After	
Algeria	1994	19	23	4	14	1	No
Argentina	1991	12	25	13	13	8	Yes
Bangladesh	1991	21	36	16	53	16	Yes
Benin	1989	42	33	–10	15	3	No
Bolivia	1985	15	30	15	16	8	Yes
Brazil	1990	18	46	28	88	25	Yes
Bulgaria	1997	24	49	24	2	2	Yes
Burkina Faso	1994	21	39	19	18	3	No
Cape Verde	1992	14	41	27	1	1	No
Chile	1976	15	30	15	3	13	Yes
Colombia	1990	15	36	21	54	6	Yes
Costa Rica	1982	16	65	48	14	2	Yes
El Salvador	1992	17	19	2	6	2	No
Gambia, The	1985	18	23	5	8	1	No
Ghana	1983	14	34	20	18	22	Yes
Guatemala	1994	24	27	3	10	2	No
Guyana	1988	10	18	7	6	2	No
Honduras	1992	15	24	9	21	3	No
Hungary	1990	35	20	–15	11	5	No
India	1991	20	24	4	160	41	No
Jamaica	1995	13	21	8	19	2	Yes
Jordan	1989	17	25	9	22	8	Yes
Kenya	1995	14	30	17	42	3	Yes
Lao People's Democratic Republic	1986	5	27	22	5	11	Yes
Lesotho	1996	11	12	0	6	1	No
Madagascar	1993	13	36	24	26	5	No
Mali	1994	18	43	25	24	3	Yes
Mauritania	1992	6	18	12	7	2	No
Mauritius	1982	9	27	18	6	4	No
Mexico	1988	19	33	14	40	15	No
Mozambique	1992	9	37	29	1	3	No
Nepal	1991	13	40	27	28	6	Yes
Nicaragua	1993	13	43	30	8	4	No
Paraguay	1992	23	20	–4	10	2	No
Peru	1990	16	35	19	16	5	Yes
Philippines	1990	18	37	18	51	18	No
Romania	1995	13	39	26	31	6	Yes
Russian Federation	1995	75	43	–32	4	2	No
Senegal	1994	18	43	25	30	5	No
Slovenia	1993	7	28	20	2	1	No
Sri Lanka	1989	15	30	15	26	8	Yes
Tanzania	1986	7	21	14	35	9	Yes
Thailand	1983	18	22	4	43	25	No
Tunisia	1986	21	25	4	38	12	No
Uganda	1992	15	40	25	16	6	No
Uruguay	1995	16	27	11	15	4	No
Vietnam	1989	8	34	26	1	14	No
All countries		17	31	14	1,083	350	Yes

Source: Author's calculations.
Note: A project was coded "Before reform" if part of the implementation occurred before the reform date. A project was coded "After reform" only if all of the implementation occurred after the reform date.

APPENDIX D

Operational Procedure (OP) 10.04—Economic Evaluation of Investment Operations

These policies were prepared for use by World Bank staff and are not necessarily a complete treatment of the subject.

OP 10.04
September 1994

Note: OP 10.04 replaces the version dated April 1994. Please retain the April 1994 BP 10.04. OP and BP 10.04 are complemented by OP/BP10.00, Investment Lending: Identification to Board Presentation. OP and BP 10.04 replace the Operational Memorandum Treatment of Environmental Externalities in the Evaluation of Investment Projects, 10/4/93, and draw on the following documents: OMS 2.20, Project Appraisal; OMS 2.21, Economic Analysis of Projects; OPN 2.01, Investment Criteria in Economic Analysis of Projects; OPN 2.02, Risk and Sensitivity Analysis in the Economic Analysis of Projects; OPN 2.04, Economic Analysis of Projects with Foreign Participation; OPN 2.05, Foreign Exchange Effects and Project Justification; OPN 2.06, Use of the Investment Premium and Distribution Weights in Project Analysis; OPN 2.07, Reporting and Monitoring Poverty Alleviation Work in the Bank; and OPN 2.09, Presentation of Project Justification and Economic Analysis in Staff Appraisal Reports. Additional guidance on project economic evaluation is provided in Handbook on Economic Analysis of Investment Operations. Questions may be addressed to opmanual@worldbank.org.

1. The Bank[1] evaluates investment projects to ensure that they promote the development goals of the borrower country. For every investment project, Bank staff conduct economic analysis to determine whether the project creates more net benefits to the economy than other mutually exclusive options for the use of the resources in question.[2]

Criterion for Acceptability

2. The basic criterion for a project's acceptability involves the discounted expected present value of its benefits, net of costs. Both benefits and costs are defined as incremental compared to the situation without the project. To be acceptable on economic grounds, a project must meet two conditions: (a) the expected present value of the project's net benefits must not be negative; and (b) the expected present value of the project's net benefits must be higher than or equal to the expected net present value of mutually exclusive project alternatives.[3]

Alternatives

3. Consideration of alternatives is one of the most important features of proper project analysis throughout the project cycle. To ensure that the project maximizes expected net present value, subject to financial, institutional, and other constraints, the Bank and the borrower explore alternative, mutually exclusive, designs. The project design is compared with other designs involving differences in such important aspects as choice of beneficiaries, types of outputs and services, production technology, location, starting date, and sequencing of components. The project is also compared with the alternative of not doing it at all.

Nonmonetary Benefits

4. If the project is expected to generate benefits that cannot be measured in monetary terms, the analysis (a) clearly defines and justifies the project objectives, reviewing broader sectoral or economywide programs to ensure that the objectives have been appropriately chosen, and (b) shows that the project represents the least-cost way of attaining the stated objectives.

Sustainability

5. To obtain a reasonable assurance that the project's benefits will materialize as expected and will be sustained throughout the life of the project, the Bank assesses the robustness of the project with respect to economic, financial, institutional, and environmental risks. Bank staff check, among other things, (a) whether the legal and institutional framework either is in place or will be developed during implementation to ensure that the project functions as designed, and (b) whether critical private and institutional stakeholders have or will have the incentives to implement the project successfully. Assessing sustainability includes evaluating the project's

Photo by Curt Carnemark, courtesy of the World Bank Photo Library.

financial impact on the implementing/sponsoring institution and estimating the direct effect on public finances of the project's capital outlays and recurrent costs.

Risk

6. The economic analysis of projects is necessarily based on uncertain future events and inexact data and, therefore, inevitably involves probability judgments. Accordingly, the Bank's economic evaluation considers the sources, magnitude, and effects of the risks associated with the project by taking into account the possible range in the values of the basic variables and assessing the robustness of the project's outcome with respect to changes in these values. The analysis estimates the switching values of key variables (i.e., the value that each variable must assume to reduce the net present value of the project to zero) and the sensitivity of the project's net present value to changes in those variables (e.g., delays in implementation, cost overruns, and other variables that can be controlled to some extent). The main purpose of this analysis is to identify the scope for improving project design, increase the project's expected value, and reduce the risk of failure.

Poverty

7. The economic analysis examines the project's consistency with the Bank's poverty reduction strategy.[4] If the project is to be included in the Program of Targeted Interventions, the analysis considers mechanisms for targeting the poor.

Externalities

8. A project may have domestic, cross-border, or global externalities.[5] A large proportion of such externalities are environmental. The economic evaluation of Bank-financed projects takes into account any domestic and cross-border externalities. A project's global externalities—normally identified in the Bank's sector work or in the environmental assessment process—are considered in the economic analysis when (a) payments related to the project are made under an international agreement, or (b) projects or project components are financed by the Global Environment Facility.[6] Otherwise, global externalities are fully assessed (to the extent tools are available) as part of the environment assessment process[7] and taken into account in project design and selection.[8]

Endnotes

Chapter 1

1. For example, a major conference of World Bank borrowers in 1992 concluded that borrowers "want reduced Bank involvement in preparation and design, but the same insistence on rigorous analysis that the Bank used to expect, since only in that way will they develop the capability for independent project development" (World Bank 1992b, annex B, p. 14).

2. Other multilateral donors, such as the Asian Development Bank and the Inter-American Development Bank, and multilateral institutions such as the European Union provide instructions and guidelines for conducting cost-benefit analysis, as does the World Bank. It is difficult to judge precisely from the Web sites what the de jure and de facto policies are in terms of applying and using cost-benefit analysis. The donor agency that has the most rigorous accountability standards and uses cost-benefit analysis most extensively is the Millennium Challenge Corporation, which makes its policy of requiring a cost-benefit analysis clear on its Web site and also has a policy of conducting rigorous impact evaluations and applying this information to improve future cost-benefit analyses. The corporation's investment committee requires that ex ante cost-benefit evidence be presented to it before it makes funding decisions, and it has rejected projects on cost-benefit grounds. Three countries that are known for using cost-benefit information in domestic policy decisions are China, Chile, and South Korea.

Chapter 2

1. The elements outlined in the chapter on Bank policy define what a complete cost-benefit analysis would entail according to Bank policy. Although this evaluation assesses the degree to which Bank policy is followed in its entirety as outlined in that chapter, the current evaluation also assesses the extent to which Bank project analysis contains *any* cost-benefit analysis, complete or not. For this latter exercise, "cost-benefit analysis" is defined as any quantitative analysis to establish whether B > C, where B and C are the present value of benefits and costs, respectively. The presence of such analysis is indicated by the reporting of an NPV or an ERR calculation in the Bank's project database. Bank staff sometimes use the term "cost-benefit analysis" to refer to elaborate analysis that employs shadow prices, or that follows techniques outlined by Squire and van der Tak (1975). The application of such techniques is not, however, the defining characteristic of cost-benefit analysis as the term is used in this evaluation.

2. A World Bank internal document claims that 44 percent of appraisal reports for investment operations between 2008 and 2010 contain an ERR forecast covering all components, and that 10 percent contain a forecast for some components. IEG has not vetted these data because these projects are not completed, but if confirmed they would indicate a rise in the proportion of new projects with ERR forecasts.

3. The ERRs at closing are called estimates, rather than forecasts, even though they do involve some forecasting. A typical ERR is based on benefit flows lasting 20 or 30 years, so ERRs calculated just after projects terminate (an average of 7 years after commencement) still contain a large degree of forecasting.

4. The main document at the inception of projects was previously known as the staff appraisal report but is now the project appraisal document (PAD). The major document at project termination was previously known as the Project Completion Report but is now the Implementation Completion and Results Report (ICR). The data on ERRs in this report are taken from the World Bank's own project database, which records project information at completion.

5. A related study by IEG reports results of a search of Bank project documents for words frequently associated with cost-benefit analysis, such as "net present value" or "discount rate," and typically finds that less than 50 percent of the documents contain such terms. This supports the general impression of the low use of cost-benefit analysis in Bank projects. In contrast, 90 percent of Bank project documents contain the term "environmental analysis."

6. The decomposition is chosen to ensure that the parts exactly sum to the total. The contribution of the change within the high-CBA sectors is computed as (0.79–0.61)*.86, the contribution of the change within the low-CBA sectors is computed as (0.06–0.0)*(1–0.86), and the contribution from the shift away from projects in the high-CBA sectors is computed as (0.44–0.86)*(0.61–0.06).

Chapter 3

1. The term "cost-benefit analysis" refers specifically to a cash-flow analysis in which the major benefit and cost flows are quantified over time. The results of cost-benefit analysis are typically summarized by the presentation of an ERR or

an NPV calculation. More generally, the terms "cost-benefit analysis" or "cost-benefit assessment" refer to any attempt to estimate benefits in monetary terms so that they can be compared with costs. "Cost-effectiveness analysis" entails comparing the costs of alternative methods of achieving a given goal.

2. Quotes taken from Implementation Completion and Results Reports for projects that closed in fiscal 2008.

3. In private correspondence, Bank management has claimed that new projects (covering fiscal 2008 through the second quarter of fiscal 2010) have both a higher rate of baseline data collection and presentation of ex ante ERRs (54 percent) than those cited here. IEG does not review and record project data until after project closure, and thus has not independently validated the methodology or the findings.

Chapter 4

1. The $100 million threshold was chosen to ensure that the monetary value of good analysis would not be in doubt for the sample of projects examined.

2. The relative neglect of the public rationale for projects is stressed in Devarajan, Squire, and Suthiwart-Narueput (1997).

Chapter 5

1. A test of difference in means yields a *t*-ratio of 2.0, which is on the borderline of statistical significance at the 5 percent level. It is unlikely that the presence of an ERR is an important cause of low ratings because it has a minor weight in the IEG's project-rating criteria.

2. Some evidence suggests that the World Bank's Unified Survey forecasts (from 1991–97) do not exhibit upward bias. This is not inconsistent with the points made here (see Verbeek 1999).

Chapter 6

1. This chapter draws on the results of a survey written by Domenico Lombardi.

Chapter 7

1. Four pieces of information suggest a constant, rather than increasing, bias over time. Looking at the Agriculture sector, in which data are available for long periods, it is evident that the empirical probability of recalculating ERRs at closing has remained fairly constant over time, at slightly under 80 percent. The review of the analytical quality of the Bank's economic analysis conducted for this report finds that quality was roughly the same in 2007–08 as it had been 10 years earlier—again, no indication of a significant change in standards over time. Probably more important, the structural issues that underpin bias—the facts that decision making precedes analysis and that project leaders are entrusted with funding the cost-benefit analysis—remain in force. Finally, the finding in this report that downside risks are systematically ignored in ex ante economic analysis of projects was also reported 20 years ago, again suggesting that the practice has continued over time.

2. The expectation is that the IEG ratings and the ERRs would be positively, but not perfectly, correlated. IEG ratings take into account efficiency, effectiveness, and relevance, whereas the ERRs measure one of these.

3. Specifically, the rate of real economic growth prevailing in the country during the execution of the project was calculated for each World Bank project that reported an ERR at closing. Mean growth (unweighted) across all projects closing in a given year was then calculated. Figure 7.9 depicts the centered three-year average of these growth rates for IDA and non-IDA countries separately. Mean economic growth weighted by project commitments (in U.S. dollars) was also calculated and shows a similar pattern over time.

4. A 10 percent random sample of projects that closed in 1979 and 1984 was examined for this purpose.

5. Notable countries so affected include Bulgaria, Romania, the Russian Federation, and Ukraine. Bulgaria achieved its inflation stabilization in 1997; Romania, Russia, and Ukraine in 1995. The reform years for Armenia (1995), Azerbaijan (1995), and Georgia (1994) were delayed not only because of hyperinflation conditions in the immediate transition period but also because of war and civil unrest.

6. Isham and Kaufmann (1999), using World Bank economic return data from the period 1974–1990, showed that ERRs were higher for projects undertaken in less distorted economic policy environments. World Bank ERRs were inversely associated with the premium on the exchange rate in the black market and international trade restrictions. Given that their data did not extend beyond 1990, these authors could not have known or analyzed the subsequent rise in returns, but their finding that ERRs rose in countries for which the black market premium fell below 30 percent is consistent with the evidence shown here.

7. Several checks have been conducted on these data: varying the date of reform one or two years and dropping countries in which the evidence could be construed to be equivocal. These checks cause minor changes to the data but do not alter the major fact of a large rise in the reform percentage of projects after 1987. The conclusions derived from the regression results are not materially altered by these changes.

8. The product of the change in growth between 1988 and 2007 and its estimated coefficient is 3.75; the same calculation for economic liberalization is 6.70. Hence the economic liberalization variable accounts for approximately 70 percent of the rise in economic returns. There may be further causality from liberalization to growth, which this calculation implicitly ignores, but allowing for this in the analysis would only strengthen the estimated impact of liberalization.

Chapter 8

1. It may be helpful to recall that the independent-auditor model has failed to prevent misleading reporting in several important cases in the private sector. On March 11, 2010, a court-appointed examiner's report investigating the Lehman Brothers' bankruptcy found that "Lehman's auditors, Ernst & Young, were aware of but did not question Lehman's use and nondisclosure of the Repo 105 accounting transactions." This accounting procedure made Lehman's leverage appear lower than was really the case. See http://lehmanreport.jenner.com/VOLUME%201.pdf, p. 8.

Appendix D

1. "Bank" includes International Bank for Reconstruction and Development and IDA, and "loans" includes IDA credits and IDA grants.
2. All flows are measured in terms of opportunity costs and benefits, using "shadow prices," and after adjustments for inflation.
3. Although it has long been the Bank's policy to calculate the expected net present value, standard practice has been to calculate the expected internal rate of economic return, that is, the rate of discount that results in a zero expected net present value for the project. The expected rate of return is not fully satisfactory (e.g., when comparing mutually exclusive project alternatives); however, it is widely understood and may continue to be used for the purpose of presenting the results of analysis.
4. See OP 1.00, *Poverty Reduction*.
5. "Cross-border externalities" are effects on neighboring countries (e.g., effects produced by the construction of a dam on a river). "Global externalities" affect the entire world (i.e., emissions of greenhouse gases or ozone-depleting substances, pollution of international waters, or impacts on biodiversity).
6. See OD 9.01, *Procedures for Investment Operations under the Global Environment Facility* (to be reissued as OP/BP 10.20).
7. See OP/BP 4.01, *Environmental Assessment*.
8. The Bank's Environment Department provides guidance on analyzing, ranking, and physically quantifying environmental externalities—whether domestic, cross-border, or global—and on taking them into account in project design and selection.

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