Cost-Benefit Analysis
Concepts and Practice
FOURTH EDITION

Chapter One

Introduction to Cost-Benefit Analysis

TABLE 1-1 Value of Different Classes of CBA

| Value | Class of Analysis | | | |
	Ex Ante	In Medias Res	Ex Post	Ex Ante/Ex Post or Ex Ante/In Medias Res Comparison
Resource allocation decision for this project.	Yes—helps to select best project or make "go" versus "no-go" decisions, if accurate.	If low sunk costs, can still shift resources. If high sunk costs, usually recommends continuation.	Too late—the project is over.	Same as *in medias res* or *ex post* analysis.
Learning about actual value of specific project.	Poor estimate—high uncertainty about future benefits and costs.	Better—reduced uncertainty.	Excellent—although some errors may remain. May have to wait long for study.	Same as *in medias res* or *ex post* analysis.

Table 1-1 (continued) Value of Different Classes of CBA

Contributing to learning about actual value of similar projects.	Unlikely to add much.	Good—contribution increases as performed later. Need to adjust for uniqueness.	Very useful—although may be some errors and need to adjust for uniqueness. May have to wait long for project completion.	Same as *in medias res* or *ex post* analysis.
Learning about omission, forecasting, measurement and evaluation errors in CBA.	No	No	No	Yes, provides information about these errors and about the accuracy of CBA for similar projects.

TABLE 1-2 The Major Steps in CBA

1. Specify the set of alternative projects.
2. Decide whose benefits and costs count (standing).
3. Identify the impact categories, catalogue them, and select measurement indicators.
4. Predict the impacts quantitatively over the life of the project.
5. Monetize (attach dollar values to) all impacts.
6. Discount benefits and costs to obtain present values.
7. Compute the net present value of each alternative.
8. Perform sensitivity analysis.
9. Make a recommendation.

TABLE 1-3 Coquihalla Highway CBA (1986 $ Million)

	No Tolls		With Tolls	
	A Global Perspective	**B** Provincial Perspective	**C** Global Perspective	**D** Provincial Perspective
Project Benefits:				
Time and Operating Cost Savings	389.8	292.3	290.4	217.8
Horizon Value of Highway	53.3	53.3	53.3	53.3
Safety Benefits (Lives)	36.0	27.0	25.2	18.9
Alternative Routes Benefits	14.6	10.9	9.4	7.1
Toll Revenues	—	—	—	37.4
New Users	0.8	0.6	0.3	0.2
Total Benefits	494.5	384.1	378.6	334.7
Project Costs:				
Construction	338.1	338.1	338.1	338.1
Maintenance	7.6	7.6	7.6	7.6
Toll Collection	—	—	8.4	8.4
Toll Booth Construction	—	—	0.3	0.3
Total Costs	345.7	345.7	354.4	354.4
Net Social Benefits	148.8	38.4	24.2	–19.7

Source: Adapted from Anthony Boardman, Aidan Vining, and W. G. Waters II, "Costs and Benefits through Bureaucratic Lenses: Example of a Highway Project," *Journal of Policy Analysis and Management,* 12(3) 1993, 532–555, Table 1, p. 537.

EXHIBIT 1-1

A BALLAD OF ECOLOGICAL AWARENESS

The cost of building dams is always underestimated,
There's erosion of the delta that the river has created,
There's fertile soil below the dam that's likely to be looted,
And the tangled mat of forest that has got to be uprooted.

There's the breaking up of cultures with old haunts' and habits' loss,
There's the education programme that just doesn't come across,
And the wasted fruits of progress that are seldom much enjoyed
By expelled subsistence farmers who are urban unemployed.

There's disappointing yield of fish, beyond the first explosion;
There's silting up, and drawing down, and watershed erosion.
Above the dam the water's lost by sheer evaporation;
Below, the river scours, and suffers dangerous alteration.

For engineers, however good, are likely to be guilty
Of quietly forgetting that a river can be silty,
While the irrigation people too are frequently forgetting
That water poured upon the land is likely to be wetting.

Then the water in the lake, and what the lake releases,
Is crawling with infected snails and water-borne diseases.
There's a hideous locust breeding ground when water level's low,
And a million ecologic facts we really do not know.

There are benefits, of course, which may be countable, but which
Have a tendency to fall into the pockets of the rich,
While the costs are apt to fall upon the shoulders of the poor.
So cost-benefit analysis is nearly always sure
To justify the building of a solid concrete fact,
While the Ecologic Truth is left behind in the Abstract.

—KENNETH E. BOULDING

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Figure 1-1 CBA Seeks More Efficient Resource Allocation
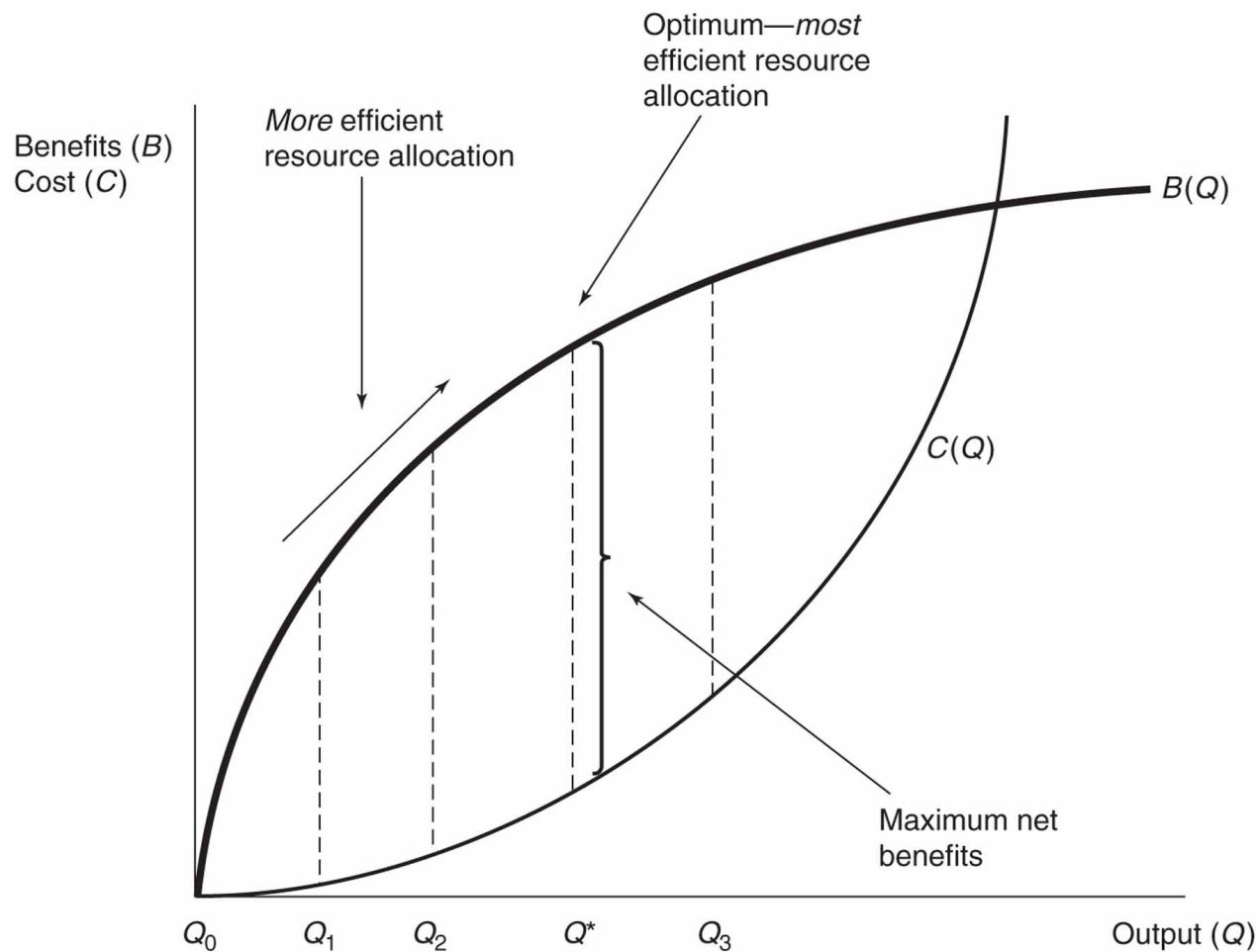
TABLE 1-4 Coquihalla Highway from a Provincial Guardian's Perspective
(1986 $ Million)

	No Tolls	*With Tolls*
Revenues ("Benefits"):		
Toll revenues from British Columbia residents	0	112.1
Toll revenues from non–British Columbia residents	0	37.4
	0	149.5
Expenditures ("Costs"):		
Construction	338.1	338.1
Maintenance	7.6	7.6
Toll collection	—	8.4
Toll booth construction	—	0.3
	345.7	354.4
Net Revenue-Expenditure "Benefits"	345.7	204.9

Source: Adapted from Anthony Boardman, Aidan Vining, and W. G. Waters II, "Costs and Benefits through Bureaucratic Lenses: Example of a Highway Project," *Journal of Policy Analysis and Management* 12(3) 1993, 532–555, Table 2, p. 539.

TABLE 1-5 Coquihalla Highway from a Provincial Spender's Perspective (1986 $ Million)

	No Tolls	*With Tolls*
Constituency "Benefits":		
Project Costs (from CBA)	345.7	354.4
Project Benefits (from CBA)	384.1	334.7
	729.8	689.1
Constituency "Costs":		
Toll Revenues from British Columbia Residents	—	112.1
Net Constituency "Benefits"	729.8	577.0

Source: Adapted from Anthony Boardman, Aidan Vining, and W. G. Waters II, "Costs and Benefits through Bureaucratic Lenses: Example of a Highway Project," *Journal of Policy Analysis and Management* 12(3) 1993, 532–555, Table 3, p. 542.