Benefit-Cost Analysis

“A systematic framework for economic appraisal of proposed public and private projects from a public interest point of view”


Who can benefit from this approach?

• the analyst
  - a simple framework for applying a standard methodology
  - a check on the internal consistency of the analysis

• the decision-maker
  - uniformity of approach to analysis
  - check on internal consistency
  - transparency of project data and assumptions

What is the standard methodology?

Decision

Undertake the Project

Scarc Resources Allocated to the Project

Value of Project Output

Project Benefit = $X

If X > Y, recommend the project

Do not Undertake the Project

Scarc Resources Allocated to Alternative Uses

Value of Output from Resources in Alternative Uses

Project Opportunity Cost = $Y

What do we mean by the public interest?

A private or public sector project has implications for:

• Government revenue – taxes and charges
• Government expenditure – provision of services
• Employment
• The economy
• The environment.

These need to be assessed before project approval

“With” and “without” the project are hypothetical states; “with and without” is not the same as “before and after”.

While the analyst might “recommend” the project, it is up to the decision-maker to decide. Benefit-cost analysis is intended to supplement the decision-making process, not to supplant it.
What sort of systematic framework is proposed?

A spreadsheet divided into five inter-related sections:

- the variables section: containing all the relevant data;
- the project analysis: valuing the project at market prices;
- the private analysis: calculating the value of the project to the private proponent;
- the efficiency analysis: calculating the value of the project to the economy;
- the referent group analysis: calculating the public interest value of the project.

The remaining sections of the spreadsheet calculate project net present value (NPV) or internal rate of return (IRR) from the following perspectives:

- Project analysis: all benefits and costs evaluated at market prices
- Private analysis: benefits and costs to the private equity holder
- Efficiency analysis: all benefits and costs evaluated at efficiency prices
- Referent group analysis: benefits and costs to the referent group

Why do we appraise the project from these four different viewpoints?

- The different viewpoints are related in such a way that each part of the analysis contributes to the other three parts;
- The relationships between the four parts of the analysis provide a check on the internal consistency of the appraisal as a whole;
- We often ask questions that require us to adopt different viewpoints:
  - How does this project look from the equity holders' point of view?
  - How would it look without the gearing provided by debt finance?
  - Is it an efficient use of scarce resources?
  - Does it provide an overall net benefit to the referent group?
  - If so, how is that net benefit distributed?

What do we mean by efficiency prices?

Efficiency prices are prices that measure the marginal value of project output or the marginal cost of project inputs from the viewpoint of the economy as a whole. They are often referred to as shadow-prices.

Why do we shadow-price?

Any input or output the market fails to cost or value correctly. This could include:

- otherwise unemployed labour
- pollution
- foreign exchange rates

Why do shadow-prices differ from market prices?

Private markets may be:

- uncompetitive e.g. monopoly power
- distorted e.g. taxes and regulations
- absent e.g. market for clean air

Why use shadow-prices in the efficiency and referent group analysis?

To measure the public interest in the project.
What is the referent group?
It is the group of individuals from whose viewpoint the project is to be appraised.

Who is normally included in the referent group?
All residents of the state, including the government.

Who is often not included in the referent group?
- foreign entities
- residents of other states

How does it all fit together? It’s as easy as BCA!

Check: \[ A + C = (A + B + C) - B \]

Recall Figure 1.3:

- \( A \): Referent Group (market prices)
- \( B \): Non-Referent Group (market prices)
- \( C \): Referent Group (non-market prices)
- \( A + B \): Project (market prices)
- \( A + B + C \): Efficiency

Example of benefit-cost analysis using the spreadsheet framework:

Suppose that a foreign company proposes to invest $100 in a project which will produce 10 gadgets a year for a period of 5 years. The gadgets will sell for $10 each. To produce the gadgets the firm will have to hire 20 units of labor per year at a wage of $3 per unit. The project is located in an area of high unemployment and the opportunity cost of labor is estimated to be $2 per unit. The firm will pay tax at a rate of 25% on its operating profit (defined here as its total revenue less its labor costs). There are no other costs or allowances, such as depreciation allowances, and the project has no effect on the market price of any input or output.

Calculate the project NPV and IRR (where appropriate) using the spreadsheet framework.