

Book review

Cost-Benefit Analysis: a Practical Guide, 2nd edn

Michael Snell. Thomas Telford, London, UK, 2011,
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Cost-benefit analysis seeks to measure the net social benefit of a development project. It thus attempts to select those projects for which there is a high surplus of social benefit over cost. Cost-benefit analysis is seldom used in isolation as a decision-making tool. The technique is basically economic in nature but other techniques such as environmental impact assessment or risk assessment can be used alongside cost-benefit analysis. Criteria that do not seem to be economic in nature and whose value may not appear to be readily expressible in monetary terms can be brought into a cost-benefit framework using techniques such as contingency valuation or hedonic pricing. This is the main thrust of this text book. I found Snell's second edition of *Cost-Benefit Analysis: a Practical Guide* to be well written, comprehensive, and accessible to a non-economist or mathematician.

The book is divided into six chapters and eleven appendices. Following an introduction, chapter 1 covers the basic principles of cost-benefit analysis and makes a distinction between financial, economic and social cost-benefit analyses. The main stages of a cost-benefit analysis are outlined including the various stages in which it can be applied during the life cycle of an engineering project. chapter 2 explains the techniques for quantifying and valuing benefits and costs. Valuation of non-marketable benefits and costs is also discussed, including the principles and practical applications of shadow pricing.

In making investment decisions, it is essential that future costs and benefits are discounted to their present value. The net present value method calculates the present values of expected future cash inflows and outflows to ascertain whether the total present value of cash inflows is greater than the present value of cash outflows. This is covered in chapter 3. Where the discount rate is the cost of capital, the decision rule is to accept a project if the net present value is positive. The principles governing the choice of discount rate are discussed also in this chapter. This distinction between real and nominal interest rates and discount rates is given. chapter 4 describes the applications of cost-benefit analysis to a number of sectors including agriculture, healthcare projects and programmes, water supply, sanitation and public health, education, flood and coastal protection, environment and recreation.

Engineering and construction projects are very capital intensive in nature. As a consequence, it is essential that the results of a cost-benefit analysis are communicated with clarity and transparency to those who ultimately

have to make the investment decision. All the assumptions made in the analysis and the limitations must be clear. Some general indications on how to present a cost-benefit analysis are given in chapter 5 and a useful checklist on the key aspects that need to be considered when carrying out and preparing a cost-benefit analysis report is provided in chapter 6.

Approximately half of the book is devoted to appendices. appendix A covers briefly the principles of analysing and managing uncertainty and risk in engineering projects. Decision-making rules under uncertainty including the maxi-min rule and the maxi-max regret rule are outlined briefly. The full probabilistic analysis method based on Monte Carlo simulation is described. Appendix B compares and contrasts the domestic pricing and foreign exchange numéraires. The techniques for estimating economic prices including contingent valuation, travel costs methods and hedonic pricing are discussed in appendix C. Techniques that can be used to take account of the distribution of benefits likely to arise from a project to various stakeholders is given in appendix D. Appendix E amplifies material given earlier on the choice of discount rate including its adjustment to take account of risk. The appraisal of many engineering projects involves consideration of a number of attributes. These may be monetary, non-monetary, economic or environmental. Multi-criteria decision analysis allows such factors to be taken into account in a comprehensive and consistent manner. Multi-criteria decision analysis techniques are covered briefly in appendix F. Appendix G outlines the effects method which is an alternative to cost-benefit analysis. It is very rarely used because of its complexity, but in principle it seeks to assess the effect of a project on the whole economy. Model answers to readers' worked examples are given in appendix H. Appendix I provides a comprehensive example to show how a cost-benefit analysis can be undertaken and how the report might be presented for an irrigation scheme. Discount factors and an extensive bibliography are given in Appendices J and K, respectively.

Overall, I enjoyed reading the book. It is a good textbook, succinct and informative. It is rigorous and covers difficult concepts in a manner that is relatively straight forward to understand for the non-subject specialist. It is for this reason that I have recommended it as one of the essential textbooks for postgraduate students on the project appraisal and finance module on the MSc Construction Project Management at Edinburgh Napier University. Postgraduate engineering students, practising civil engineers, academics and researchers will all find the book equally useful. At the time of writing this review, the special offer price of £21.75 to my mind represents excellent value for money. I thoroughly commend the textbook.

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