

## Book Review

*Cost-Effectiveness Analysis: Methods and Applications*, 2nd Edition

Henry M. Levin and Patrick J. McEwan

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Reviewed by Gordon Cleveland

Individual decision-making is difficult enough; collective decision-making is an order of magnitude more complex and controversial. Consider some typical decisions that face us collectively as a society. What is the best course of treatment for AIDS? How much of our scarce health-care dollars for all ailments should be allocated to medical treatment, to prevention programs, to research? For children in primary school, is it better to reduce class sizes, to hire teaching assistants to work with teachers, or to increase special education resources?

Issues like these are controversial partly because the effects of different treatments are not well known, partly because the relative costs of different courses of action are not well known, partly because individuals have special interests and diverse biases which tilt them towards different alternatives. Cost-effectiveness analysis, and its cousins — cost-benefit analysis, cost-utility analysis, and cost analysis (all of which are discussed in this book) — attempt to make the process of collective decision-making more rational, less political, and more transparent.

*Cost-Effectiveness Analysis: Methods and Applications* by Henry Levin and Patrick McEwan is the second edition of a book that has gone through 17 printings since its origins in 1983. It clearly fills an important niche, and this edition has lots of improvements that will ensure its continuing popularity. In particular, there has been a substantial increase and improvement in the real-world examples used, and fuller discussion of cost-benefit, cost-utility, and cost analysis, each of which now gets chapter-length treatment. The book is designed to be introductory rather than comprehensive, and it is directed towards an audience interested in the analysis of issues in education. As the authors write: "The purpose of this volume is to provide a diverse audience — evaluators, educational administrators, and graduate students — with a systematic introduction to the use of cost analysis in educational evaluation" (p. 3). Virtually all of the specific examples used to illustrate the

use of cost-effectiveness analysis are from the educational field. Readers of the *Canadian Journal of Nursing Research* who are primarily interested in health-care issues might also wish to look at Drummond, O'Brien, Stoddart, and Torrance (1997) or Johannesson (1996), to which the authors refer.

Cost-effectiveness analysis is a technique for evaluating which of several alternative policies or treatments should be adopted to solve a collective problem we face as a society. The technique emphasizes both the measurement of benefits (i.e., "effectiveness") and the measurement of the costs of the treatment. As such, it is especially valuable for those charged with doing evaluation research, which, sadly, is often conducted with little regard for the full costs of alternative courses of action. Typically, cost-effectiveness analysis will assess both the effects and the costs of several possible solutions to a problem and will rank them in order of the dollar cost per unit of desired effect. Policy-makers will presumably be attracted to the solution that delivers the most "bang for the buck" — that is, the one with the lowest costs per unit of effect.

An example, provided by the authors, may be helpful. Four alternatives have frequently been put forward as possible educational reforms: a longer school day, computer-assisted instruction, cross-age tutoring in schools, and reduced class sizes. After the best available version of each of these reforms has been identified quite precisely, the costs and effectiveness of each are judged. Effectiveness is measured using a standard reading test and mathematics test. The costs of all the resources used in each intervention are tallied and effects on test scores are measured. This produces a CE (cost-effectiveness) ratio for each of the four possible interventions; the CE ratio is the number of dollars it would take to raise the average student's test scores in (a) reading, and (b) mathematics by one unit (one standard deviation). On both reading and mathematics, peer tutoring is found to be the most effective per dollar spent, with other alternatives being ranked differently according to whether reading or mathematics is taken to be the correct measure of effectiveness.

As the authors note, cost-effectiveness analysis is not a universal tool, good for all situations. In fact, its limitations are rather stringent. Used in the wrong situation, it will deliver poor results. In order for it to be fully applicable, the following three conditions must be met. First, the "benefit" of the interventions must be unidimensional. There cannot be two or three combined benefits, with one intervention delivering more of one benefit and another alternative delivering more of another.

So, if a medical procedure produces both improved longevity and decreased pain, cost-effectiveness analysis is not really appropriate (it cannot weigh up the trade-off between these two benefits). Second, the "benefit" must be common across treatments (it cannot be improved longevity for one and decreased pain for another). Third, the decision to do *something* must already have been made (e.g., to adopt one of the treatments that are currently being assessed). In other words, cost-effectiveness analysis cannot tell us whether it is worth spending public money improving AIDS treatments (i.e., whether the benefits of available treatments are greater than the costs); it can only rank alternative treatments to determine which of several alternative treatments delivers the best results per dollar spent.

When these conditions are not met, cost-benefit analysis should really be the preferred assessment method. Unfortunately, the authors are not very enamoured of cost-benefit analysis. Or, to be fair, perhaps they reflect the perceived feelings of their audience when they complain that cost-benefit analysis is really relevant only when the benefits can be easily measured in dollars (e.g., when things like improved incomes or decreased public social assistance payments are the main benefits of a policy being assessed). In truth, cost-benefit analysis can, when used creatively, cast a much broader net than this (see, for instance, the assessment of the costs and benefits of universal early-childhood education programs in Cleveland and Krashinsky, 1998).

Part of the problem is that cost-benefit analysis, especially the analysis of the benefit side, requires mastery of a fair number of technical details which are rooted in an understanding of microeconomic theory and its application to a particular situation. This is not an easy subject to present in only one chapter to an audience of non-economists. Levin and McEwan do a pretty good job, all considered, but it remains true that their discussion of cost-benefit analysis is fairly cursory. Further, their discussion of the measurement of benefits in the context of cost-effectiveness analysis is weaker than their discussion of costs. This is partly explained by the characteristics of their chosen audience. They explicitly direct themselves to educational evaluators who may have a pretty good general idea about benefits and how to measure them but have heretofore paid too little attention to costs.

For those looking for an introduction to cost-effectiveness analysis, and for those wishing to teach a course in evaluation research, this paperback text with its associated questions and exercises could be the ideal solution. It is marvellously clear and well-written and covers its chosen subject well.

### References

- Cleveland, G., & Krashinsky, M. (1998). *The benefits and costs of good child care: The economic rationale for public investment in young children*. Toronto: Childcare Resource and Research Unit, University of Toronto.
- Drummond, M.F., O'Brien, B., Stoddart, G.L., & Torrance, G.W. (1997). *Methods for the economic evaluation of health care programmes* (2nd ed). Oxford: Oxford University Press.
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