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McKEAN ON GOVERNMENT EFFICIENCY*

G. S. Tolley

Efficiency in Government Through Systems Analysis is a RAND study published as third of a series sponsored by the Operations Research Society of America. Water resources development is emphasized. The study is unique in its thorough-going operations research approach to allocation for the government sector.¹ The area usually known as benefit-cost analysis is emphasized, while budgeting is considered to a lesser extent.

What is the likely contribution of an operations approach to government efficiency? For analysts helping decision-makers, the study makes the following suggestions: (a) choose a scope of analysis wherein all important project effects can be taken into account (in operations lingo, consider spillover effects); (b) analyze more than one scale of project; (c) present time paths of costs and benefits; (d) present alternative calculations of present values discounted at two or more interest rates; (e) present ranges of project outcome to reflect uncertainty; (f) estimate, and include as an intangible, project effect on the distribution of wealth; (g) abandon the traditional benefit-cost ratio, and instead emphasize a project's internal rate of return as a least objectionable criterion for ranking projects.

* *Efficiency in Government Through Systems Analysis*, by Roland N. McKean. New York: John Wiley & Sons. 1958. Pp. x, 336. \$8.00.

¹ "Systems analysis" and "operations research" appear to connote roughly the same kind of approach. The approach is oriented to the logic of problem-solving instead of to the subject matter per se of a particular traditional field of knowledge. There also seems to be the connotation that quantitative analysis will be used.

Good as most of these recommendations are, they seem striking more because they are well-known than because they are new. The operations approach turns out to be mainly traditional economics with accents on concepts like spillover and suboptimization. Spillover is a new word for external economies and diseconomies. The two case studies do not succeed in showing that there was serious neglect of spillovers. On the other hand ideas related to suboptimization appear — potentially at least — to add more substance. McKean emphasizes that "maximum expected net-benefits for a given water resources budget is an incomplete test, and it should be understood that the term 'criterion' refers to such an incomplete test whenever it pertains to cost-benefit analysis" (page 73). This thought seems important just because economists keep glossing over it. Nonetheless McKean in fact gives maximum expected net benefits the star role in comparison with other types of goals.

Another question that may be asked of the book: How good is the internal rate of return as a number for ranking projects?²

The criterion or ranking problem has to do with maximizing present value when choosing a set of projects. A problem arises because not all projects with a positive present value may be chosen. The existence of a budget restraint, or capital rationing, is assumed.

McKean's argument for ranking projects by their

² By internal rate of return, or simply rate of return, is meant the rate of discount that makes the present value zero.

internal rates of return relies on visualizing reinvestment of net receipts at the marginal internal rate of return.³ He says (page 85) "If net receipts can be reinvested at the marginal internal rate, its use as the discount rate gives the right answer. If net receipts cannot in fact be reinvested at that rate (because of, say, institutional restraints), then that 'internal' rate is not the marginal rate of return, and is [not] relevant."

But there is an institutional restraint precluding internal reinvestment of net receipts from most government expenditures. The restraint is that these benefits do not accrue to government⁴ and so are not available for government reinvestment. In most water resources projects not even the initial investment costs are recovered, so that net benefits must accrue to persons in the private sector.

A ranking device superior to the internal rate of return may be the ratio of present worth to investment cost, when receipts are discounted at a private sector rate.⁵

Suppose an investment is to be made consisting of an initial outlay and resulting in a yearly benefit for a number of years. We assume there is an alternative rate of return r characteristic of the private sector. As illustrated in Chart 1, projects with an equal ratio of present worth to investment cost will vary in internal rate of return depending on longevity of the project. Each curve connects internal rates of return corresponding to a given ratio of present worth to investment cost.⁶ The chart shows

³ Others have recognized the importance of the reinvestment assumption if one uses an internal rate of return. See J. Hirschleifer, "On the Theory of Optimal Investment Decisions," *Journal of Political Economy*, LXVI (August 1958), 329-52; Harold Bierman and Seymour Smidt, "Capital Budgeting and Problem of Reinvesting Cash Proceeds," *Journal of Business*, XXX (October 1957), 276-79; Ezra Solomon, "The Arithmetic of Capital Budgeting Decisions," *Journal of Business*, XXIX (April 1956), 124-29.

⁴ Except as tax revenues may happen to increase as a result of the benefits. At best the increased taxes would represent only a fraction of the benefits.

⁵ This type of ratio was prominent in an earlier unpublished version of the book being reviewed. I have called it the McKean ratio and commented favorably on it. See my "Analytical Techniques in Relation to Watershed Development," *Journal of Farm Economics*, XLI (August 1958), 653-65.

⁶ Let c be investment cost occurring at the present and b the yearly benefit which comes in for n years. Internal rate of return i is then defined by

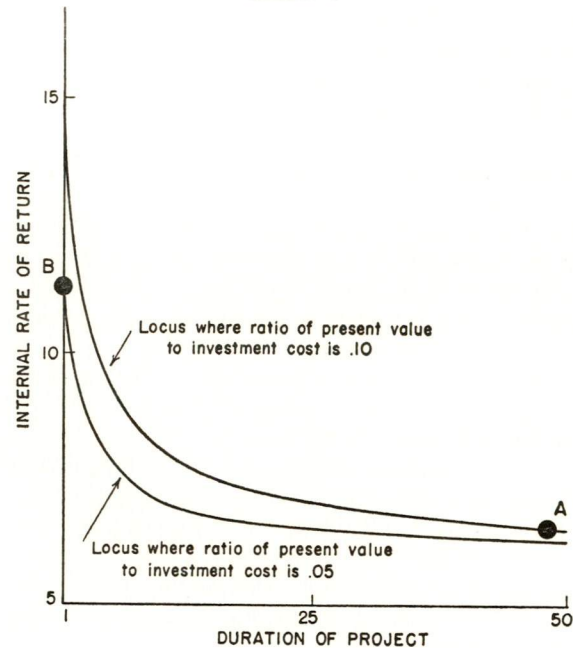
$$-c + \sum \frac{b}{(1+i)^n} = 0.$$

Ratio of present value to investment cost is

$$P = [-c + \sum \frac{b}{(1+i)^n}] \div c.$$

Combining the two expressions gives

CHART 1



how fifty-year Project A has an internal rate of return much less than one-year Project B, even though Project A has twice as much present value per dollar of investment cost. This reflects the situation that an initial investment in one-year Project B, followed by reinvestment of proceeds in the private sector for 49 years, would not result in as great a final value as if the initial investment were made in fifty-year Project A.

We have illustrated how the use of the internal rate can discriminate against long-lived projects. The chart also reveals a tendency, which increases with project longevity, for the internal rate to obscure cardinal relations among present values. Cardinality is desired if decision-makers wish to weigh present value against other goals. At a given great longevity the internal rate maintains the relative rankings of projects, but it brings them close together.

These criticisms of the use of the internal rate may be especially serious since water resources projects are long-lived.

A final question may be asked: Has the efficiency-in-government problem been formulated as usefully

$$P = \frac{\sum \frac{1}{(1+r)^n}}{\sum \frac{1}{(1+i)^n}} - 1.$$

In the chart, i is plotted against n for two values of P , with $r = .06$.

as it might have been? McKean might have done better to concentrate on (1) institutional impediments to efficiency and (2) errors in the data and estimates fed into his general economic framework. This could have the following consequences:

1. There might be further grounds for using a ranking device other than the internal rate of return. Suppose, among a group of government investments being considered, that Project Z is the marginal one in terms of national well-being. Project Z seems unlikely to be marginal in the real decision-making process. If the budget were reduced some superior project would be eliminated. Z will be undertaken anyway, say, because it is in the "right" constituency. Hence the truly marginal internal rate need not be the lowest internal rate.⁷

2. The ranking problem might be linked with the problem of improving estimates used in the benefit-cost analysis. If the problem of improving estimates is ignored, it could be best to use a measure that gives a yes-no answer to whether benefits exceed costs but is otherwise quite insensitive in rank-

ing.⁸ Government analysts have spoken to me critically of highly sensitive rankers. They imply that decision-makers pay attention to rankings but *should not do so*. A benefit-cost measure is to be desired as evidence of effort to show that benefits exceed costs. However, comparisons of projects can be misleading in view of differing reliability of estimates between agencies and even within the same agency.

3. A foremost concern would be with reliability of benefit estimates, with attention to such things as the surveys and analyses of firms' activities on which they are based.

4. Attempts would be made to think of organizational arrangements in which the actors would help lead to socially desired outcomes. An invisible hand hardly works effectively in regard to government resource allocation as administrative and political decision-making now stands. More important to government efficiency than concentrating on technical questions about benefits and costs may be to try to face how to organize agencies and committees in view of lobbies and other political pressures.