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Instrument for Evaluating Public Projects

by Dr Hussein Rady, Aachen *

The cost-benefit-analysis represents for the public sector the same as investment projections mean for private enterprise. This method is still in its experimental stage, but it is becoming more and more sophisticated and is already widely used also by national agencies active in the field of development.

Cost-benefit-analysis is a method of assessing all the effects of a given investment that are relevant to the aims, which it is supposed to serve, and to evaluate these effects from the point of view of a national economy as a whole. In other words: Cost-benefit-analysis attempts to compare total costs and total benefits of any given project to find out (1) whether total benefits are larger than total costs and (2) whether the differential, or the ratio between these variables, is larger than that of alternative projects.

This form of analysis transcends the bounds of efficiency tests regarding employed resources from the point of view of a private enterprise — it is to serve also the purpose of striking a balance between desirable and undesirable social effects of a given project (after such effects have been ascertained), which would enable planners to arrive at approximately optimal decisions about planned investments with the highest possible degree of social benefits.

This method is still very much in its experimental stage; but it is becoming gradually more and more sophisticated and is meanwhile used in many areas of practical financial and economic policy. Ostensibly, the need for such an instrument is so crying that, notwithstanding the shortcomings and limits still connected with it, its application to political and administrative decision-making is inexorably spreading, mainly in the United States and among international agencies that are predominantly active in the field of development aid.

The USA as the Method's Country of Origin

Though the theory of this analytical method was built up only in recent years, during which it became of practical value, the history of its doctrine is much older. It is usually said that its basic

theorems were created ¹ by Dupuit (in 1844). However, actual theoretic and empirical foundations for the new method were laid in the United States. Legislation and public administration there were the first prime movers for pioneering work to be done on analysing in advance the probable effects of certain big projects, especially in public flood and irrigation control. The choice between various schemes was then made dependent on more or less precise proof being submitted to the decision-making authorities of the economic benefit and economic harm supposed to be done by the completed projects. Naturally, the primary interest then lay in the presumable economic advantages and disadvantages which could be shown to flow from the work intended and thus be evaluated. After World War II, public sector operation grew very much in volume and invaded larger and larger provinces of economic and social engineering. That is why it was attempted to apply the new method to all forms of public spending, and this again led to a considerable expansion in the theoretical foundations of the analysis, especially through taking in also "social costs" and "social benefits", as well as more or less non-quantifiable "intangibles".

Also in the Federal Republic of Germany, since about 1969, all public sector investments of "considerable financial import" have been subject to cost-benefit-analysis ².

Aid to Decision-Making

It is also in LDCs that much interest is being shown in cost-benefit-analysis as a possible method to determinate a rational choice between differing ways of using capital funds for, and within, the process of economic development.

¹ R. N. McKean, *Efficiency in Government through System Analysis*. New York, 1964, pp. 18.

² H. Schäfer, President of Bundesrechnungshof (Federal Accounting Board) and Federal Commissioner for Administrative Economy, in: *Der Spiegel*, No. 33, 1972, pp. 52.

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That it has taken until our days for serious attempts to be made to run the entire machinery of economic state activities — as far as possible — according to rational and economic principles and to examine it at least carefully from the point of view of efficiency³ is due to the growing scarcity of available investment funds relative to the multitude of existing claims for new investments.

The system of budgeting, as it is used today for selecting projects earmarked for execution, may be described as follows⁴: Individual government departments will state, within their own fields of operations, certain needs, say, for example: At a certain point of time in the future, there will be needed new schools (S), new hospitals (H), new rockets (R), and new hydroelectric power stations (P). The various categories of needs will be defined unambiguously, but the expenditure required to meet all these needs is usually much larger than the scarce financial funds and expert staffs available to the government in question.

That is why priorities have to be established for the various tasks to be tackled so as to deal with, at least, the most pressing types of needs. Decisions about what is important are usually influenced by three major forces:

- ☐ political power;
- ☐ influence of organised vested interests; and
- ☐ random chance behaviour (of the decision-makers).

This means that the process of allocating scarce resources is never made transparent and that neither will the efficiency of individual spending be genuinely tested — because the question whether they are indeed efficient will not even be posed.

Indispensable Scrutiny of Efficiency

In view of the rising proportion of total investments now claimed by public sector spending, it becomes ever more indispensable to subject them to a close scrutiny of their efficiency. The aim is to improve the structure of government spending and/or to rationalise it by making success of individual spending the overriding consideration, thus reforming the allocation of scarce government resources to the multifarious modes of their uses in line with their presumable success. Cost-benefit-analysis is the only effective tool for this purpose of decision-making so far.

³ R. N. McKean, loc. cit., pp. 37 et seq., suggests the following three efficiency tests: (1) After setting-off of costs, will there arise maximum useful benefits?; (2) keeping all costs constant, will there be maximal useful benefits?; and: Keeping useful benefits constant, in which cases will there be the lowest possible costs?

⁴ Cf. O. Eckstein, Public Finance, in: National Tax Journal, Englewood Cliffs, Chicago, 1964, pp. 25.

When a project is subjected to this method of examination, estimated costs and expected benefits accruing to individual members of the polity in question are being compared, and this makes it possible to collect systematically the most important data upon which decisions on the project under study will be based. Project examination will then show clearly whether, and to what extent, affluence and wellbeing of the entire population could be increased by the project in hand. If such cost-benefit-analyses are also made for alternative projects, they enable decision-makers to select the one which will increase the efficiency in favour of society most.

All this means that cost-benefit-analyses are a technique for comparing advantages and disadvantages of individual measures and to choose that which, for serving a fixed objective, appears best. In this respect cost-benefit-analysis represents for the public sector the same as investment projections mean for private enterprise. However, it is not possible to replace political decision-making by cost-benefit-analysis, since governments, apart from achieving economic efficiency, have also other tasks, e.g. to work for an "equitable" and "just" distribution of personal incomes.

Analysis Produces only Data for Decisions

This makes it clear where the boundaries for cost-benefit-analysis are to be drawn. It cannot be its task to stipulate political aims, to produce new ideas for projects, or to make the actual decisions. Its main aim is to seek for rational conditions for making decisions, in respect of set criteria for efficiency. In doing this, it naturally influences, both in advance and retrospectively, all the essential facts and events of which carrying out a given project consists: its objectives, the formulation of alternatives, the mode in which the project is carried through, and the inferences drawn from project results by decision-makers.

In order to test and evaluate costs and benefits of a given project, the method of cost-benefit-analysis, wherever possible, uses the yardsticks of the free market. Even where no market exists, it will simulate one. As an aid to evaluation, it will welcome both the prices of privately-produced supplementary products and market prices of substitutive goods. Wherever it uses, as a framework of reference, so-called "shadow" prices and consumers' usufruct, it may even correct basic weaknesses of existing markets, especially in LDCs⁵.

⁵ Cf., among others: J. Tinbergen, Grundlagen der Entwicklungsplanung (The Fundamentals of Development Planning), Hanover, 1964, pp. 41.

Incidentally, this is the place where it is necessary to emphasise that there does not exist yet a clearly defined and universally accepted method of cost-benefit-analysis, nor can there be one, since cost-benefit-analysis "is a way of thinking"⁶. Sufficiently knowledgeable project analysts are able to use the most varied variables for their calculations, and to arrive at a random multitude of results, provided they are skilled enough to give logical reasons for selecting the basic data they use for calculations.

Cost-benefit-analysis has its theoretical foundation in modern welfare economics. Welfare economics take as their purpose to maximise social (overall economic) welfare. Maximisation of welfare, on the other hand, makes it absolutely imperative to allocate all the resources of a given national economy optimally, which corresponds to the criterion stated by Vilfredo Pareto: social welfare will always increase if and when one or more individuals receive increased benefits without reduction of the benefits of other individuals.

However maximising social welfare is difficult if not impossible because both individual and overall economic benefits are not quantifiable. Therefore, and for pragmatic reasons, the notion of "social welfare" has been replaced by "national income" as an indicator. Costs and benefits are then defined on the basis of this new indicator: costs equal reductions of national income, whilst benefits are increases of such income. When using this expedient, it must never be forgotten that certain intangible elements which go into making up the overall aim, e.g. distribution of personal incomes, will be neglected in this context⁷.

The Method of Setting up an Analysis

The balance left after deducing costs from benefits is the surplus contribution to national income, also known as the criterion of economy. Cost-benefit-analysis worked out this criterion of economy by selecting from a multitude of alternative public-sector projects the one with the largest balance between the present-day value, the future benefits accruing during the lifespan of that project and all its costs.

Defining the analysis thus at once demonstrates the successive steps that must be taken in making a cost-benefit-analysis⁸:

☐ Costs and benefits that enter into the analysis have first to be identified;

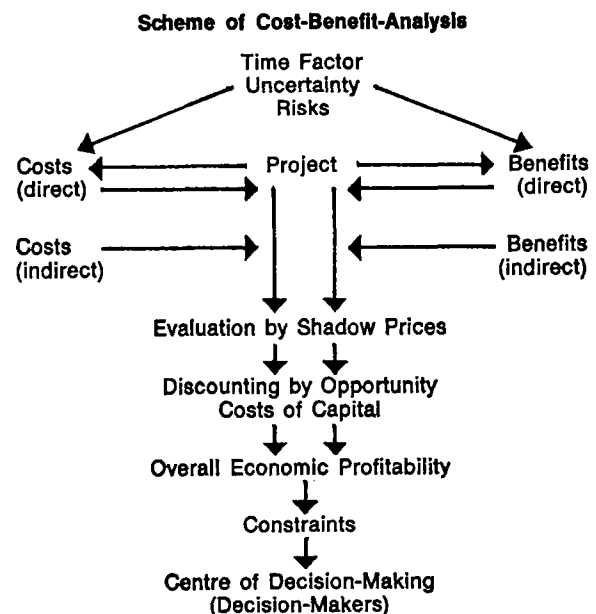
☐ Costs and benefits have to be evaluated;

☐ Pertaining time series must be discounted so as to arrive at their present-day values;

☐ Present-day values of costs and benefits have to be compared.

In addition, certain political-institutional invariables (the so-called constraints) have to be taken care of, but it is not possible to enter them in the above-described network of calculation without difficulty.

The graph shown below is intended to symbolise, in a rough and abstract way, the four fundamental steps by which the method of cost-benefit-analysis — which, in principle, is nothing but an economic evaluation — approaches its aims, and how they deviate from the method of costs and profits evaluation of a private business. The graph shows how, as a first step, costs and benefits of a given project are summarised for a given period of time and evaluated. In the cost-benefit-analysis, not only direct but also indirect costs and benefits are being digested — and that is its major difference from private costs-profits-calculations. For evaluating goods and services in the context of an entire national economy — in contrast to private costs-profits-calculations — the prices assumed are not actual market prices but "shadow prices". After costs and benefits have been listed and evaluated, the costs and benefits which arise at different points in times to come are being compared and discounted on an earlier point in time. Discounting for national economy purposes is not subject to the market rates of interest, but to the "opportunity costs" of capital, whilst the private entrepreneur is tied in his calculations



⁶ Cf. A. R. Prest and R. Turvey, *Cost-Benefit-Analysis: A Survey*, in: *The Economic Journal*, Dec. 1965, pp. 683.

⁷ Conversely social welfare, when measured against the distribution of personal fortunes, will neglect the size of the contribution to national incomes.

⁸ Cf. A. R. Prest and R. Turvey, *Ibid.*, p. 686.

to the rates of interests in the capital and/or money markets.

As far as possible, uncertainties and risks have to be incorporated in the evaluation process. The arrows in the graph are to symbolise the fact that the time factor "uncertainties and risks" is incorporated, through discounting, together with evaluation of costs and benefits, in the calculations, and thus contributes to the determination of the degree of economy under both methods. Comparing alternative projects then permits to choose the one which, subject to the objectives stated, yields most in terms of an increase in social welfare under overall economic assessment methods, or most to profits under private business calculations. How to allocate funds most efficiently can be determined, under such conditions, by using the methods of conventional investment calculation.

Problems of Evaluation

From the explanations given so far, it is clear that the criteria of economy, under the method

of cost-benefit-analysis, cannot take cognizance of other but monetary effects. If it is desired to make a decision about the usefulness or the advantages of a given project mainly in non-monetary terms, cost-benefit-analysis cannot always be a clear guide to such an objective, because it is impossible to state a clear relationship between the economies achieved under the conditions introduced in the calculations and the remaining, non-monetary effects required.

If economic projects are to be judged, the results of a non-monetary, partial analysis are sometimes being used only as supplementary information serving the formation of an overall judgment about a given project⁹. About projects, whose aims are mainly non-economic, it might be assumed logically, from the same premises, that the partial, monetary analysis and its results could be used only as a supplementary, but not a decisive, tool for making decisions on the basis of an overall assessment.

⁹ Cf. H. R a d y, *Rentabilität von Bewässerungsvorhaben* (Profitability of Irrigation Projects), Stuttgart-Hohenheim, 1968, pp. 83.

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