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The Political Economy of Efficiency: Cost-Benefit Analysis, Systems Analysis, and Program Budgeting

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» "The encroachment of economics upon politics is not difficult to understand. Being political in perspective is viewed as bad; having the perspective of the economist is acclaimed as good. As a discipline, economics has done more with its theory, however inadequate, than has political science. Under some conditions economists can give you some idea of what efficiency requires. It is a rare political scientist who would even concern himself with political rationality. Economists claim to know and work to defend their interests in efficiency: political scientists do not even define their sphere of competence. Thus the market place of ideas is rigged at the start."

THERE was a day when the meaning of economic efficiency was reasonably clear.

An objective met up with a technician. Efficiency consisted in meeting the objective at the lowest cost or in obtaining the maximum amount of the objective for a specified amount of resources. Let us call this "pure efficiency." The desirability of trying to

—I am more than ordinarily indebted to the people who have improved this paper through their comments. Win Crowther, John Harsanyi, John Krutilla, Arthur Maas, Arnold Meltsner, Nelson Polsby, William Riker, and Dwight Waldo saved me from errors and contributed insights of their own. The responsibility for what is said is entirely my own.

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achieve certain objectives may depend on the cost of achieving them. In this case the analyst (he has graduated from being a mere technician) alters the objective to suit available resources. Let us call this "mixed efficiency." Both pure and mixed efficiency are limited in the sense that they take for granted the existing structure of the political system and work within its boundaries. Yet the economizer, he who values efficiency most dearly, may discover that the most efficient means for accomplishing his ends cannot be secured without altering the machinery for making decisions. He not only alters means and ends (resources and objectives) simultaneously but makes them dependent on changes in political relationships. While he claims no special interest in or expertise concerning the decision apparatus outside of the market place, the economizer pursues efficiency to the heart of the political system. Let us call this "total efficiency." In this vocabulary, then, concepts of efficiency may be pure or mixed, limited or total.

A major purpose of this paper is to take the newest and recently most popular modes of achieving efficiency—cost-benefit analysis, systems analysis, and program budgeting—and show how much more is involved than mere economizing. *Even at the most modest level of cost-benefit analysis, I will try to show that it becomes difficult to maintain pure notions of efficiency. At a higher level,*

systems analysis is based on a mixed notion of efficiency. And program budgeting at the highest levels leaves pure efficiency far behind its over-reaching grasp into the structure of the political system. Program budgeting, it turns out, is a form of systems analysis, that is, political systems analysis.

These modes of analysis are neither good for nothing nor good for everything, and one cannot speak of them as wholly good or bad. It is much more useful to try to specify some conditions under which they would or would not be helpful for various purposes. While such a list could not be exhaustive at this stage, nor permanent at any stage (because of advances in the art), it provides a basis for thinking about what these techniques can and cannot do. Another major purpose of this paper, therefore, is to describe cost-benefit and systems analysis and program budgeting as techniques for decision-making. I shall place particular stress upon what seems to me the most characteristic feature of all three modes of analysis: the aids to calculation designed to get around the vast areas of uncertainty where quantitative analysis leaves off and judgment begins.

Cost-Benefit Analysis

... One can view cost-benefit analysis as anything from an infallible means of reaching the new Utopia to a waste of resources in attempting to measure the unmeasurable.¹

¹ A. R. Prest and R. Turvey, "Cost-Benefit Analysis: A Survey," *The Economic Journal*, Vol. LXXV, December, 1965, pp. 683-75. I am much indebted to this valuable and discerning survey. I have also relied upon:

Otto Eckstein, "A Survey of the Theory of Public Expenditure Criteria," in *Public Finances: Needs, Sources, and Utilization*, National Bureau of Economic Research (New York, Princeton University Press, 1961), pp. 439-504.

Irving K. Fox and Orris C. Herfindahl, "Attainment of Efficiency in Satisfying Demands for Water Resources," *American Economic Review*, May, 1964, pp. 198-206.

Charles J. Hitch, *On the Choice of Objectives in Systems Studies* (Santa Monica, The RAND Corporation, 1960).

John V. Krutilla, "Is Public Intervention in Water Resources Development Conducive to Economic Efficiency," *Natural Resources Journal*, January, 1966, pp. 60-75.

The purpose of cost-benefit analysis is to secure an efficient allocation of resources produced by the governmental system in its interaction with the private economy. The nature of efficiency depends on the objectives set up for government. In the field of water resources, where most of the work on cost-benefit analysis has been done, the governmental objective is usually postulated to be an increase in national income. In a crude sense, this means that the costs to whomever may incur them should be less than the benefits to whomever may receive them. The time streams of consumption gained and foregone by a project are its benefits and costs.

The aim of cost-benefit analysis is to maximize "the present value of all benefits less that of all costs, subject to specified restraints."² A long view is taken in that costs are estimated not only for the immediate future but also for the life of the project. A wide view is taken in that indirect consequences for others—variously called externalities, side-effects, spillovers, and repercussion effects—are considered. Ideally, all costs and benefits are evaluated. The usual procedure is to estimate the installation costs of the project and spread them over time, thus making them into something like annual costs. To these costs are added an estimate of annual operating costs. The next step involves estimating the average value of the output by considering the likely number of units produced each year and their probable value in the market place of the future. Intangible, "secondary," benefits may then be considered. These time streams of costs and benefits are discounted so as to obtain the present value of costs and benefits. Projects whose benefits are greater than costs may then be approved, or the cost-benefit ratios may, with allowance for relative size, be used to rank projects in order of desirability.

Underlying Economic and Political Assumptions

A straightforward description of cost-benefit analysis cannot do justice to the powerful

John V. Krutilla and Otto Eckstein, *Multiple Purpose River Development* (Baltimore, Johns Hopkins Press, 1958).

Roland N. McKean, *Efficiency in Government Through Systems Analysis with Emphasis on Water Resources Development*, (New York, 1958).

² Prest and Turvey, *ibid.*, p. 686.

assumptions that underlie it or to the many conditions limiting its usefulness. The assumptions involve value judgments that are not always recognized and, when recognized, are not easily handled in practice. The limiting conditions arise partly out of the assumptions and partly out of severe computational difficulties in estimating costs, and especially benefits. Here I can only indicate some major problems.

Cost-benefit analysis is based on superiority in the market place,³ under competitive conditions and full employment, as the measure of value in society. Any imperfection in the market works against the validity of the results. Unless the same degree of monopoly were found throughout the economy, for example, a governmental body that enjoys monopolistic control of prices or outputs would not necessarily make the same investment decisions as under free competition. A similar difficulty occurs where the size of a project is large in comparison to the economy, as in some developing nations. The project itself then affects the constellation of relative prices and production against which its efficiency is measured. The assumption based on the classical full employment model is also important because it gives prices special significance. Where manpower is not being utilized, projects may be justified in part as putting this unused resource to work.

The economic model on which cost-benefit analysis depends for its validity is based on a political theory. The idea is that in a free society the economy is to serve the individual's consistent preferences revealed and rationally pursued in the market place. Governments are not supposed to dictate preferences nor make decisions.

This individualist theory assumes as valid the current distribution of income. Preferences are valued in the market place where votes are based on disposable income. Governmental action to achieve efficiency, therefore, inevitably carries with it consequences for the distribution of income. Projects of

different size and location and composition will transfer income in different amounts to different people. While economists might estimate the redistributive consequences of various projects, they cannot, on efficiency grounds, specify one or another as preferable. How is this serious problem to be handled?

Benefit-cost analysis is a way of trying to promote economic welfare. But whose welfare? No one knows how to deal with interpersonal comparisons of utility. It cannot be assumed that the desirability of rent supplements versus a highway or dam can be measured on a single utility scale. There is no scientific way to compare losses and gains among different people or to say that the marginal loss of a dollar to one man is somehow equal to the gain of a dollar by another. The question of whose utility function is to prevail (the analyst versus the people involved, the upstream gainers versus the downstream losers, the direct beneficiaries versus the taxpayers, the entire nation or a particular region, and so on) is of prime importance in making public policy.

The literature on welfare economics is notably unable to specify an objective welfare function.⁴ Ideally, actions would benefit everyone and harm no one. As an approximation, the welfare economist views as optimal an action that leaves some people better off and none worse off. If this criterion were applied in political life, it would result in a situation like that of the Polish Diet in which anyone who was damaged could veto legislation. To provide a way out of this impasse, Hicks and Kaldor proposed approval of decisions if the total gain in welfare is such that the winners could compensate the losers. But formal machinery for compensation does not ordinarily exist and most modern economists are highly critical of the major politi-

³ In many important areas of policy such as national defense it is not possible to value the product directly in the market place. Since benefits cannot be valued in the same way as costs, it is necessary to resort to a somewhat different type of analysis. Instead of cost-benefit analysis, therefore, the work is usually called cost-effectiveness or cost-utility analysis.

⁴ A. Bergson, "A Reformulation of Certain Aspects of Welfare Economics," *Quarterly Journal of Economics*, February, 1938; N. Kaldor, "Welfare Propositions and Interpersonal Comparisons of Utility," *Economic Journal*, 1939, pp. 549-52; J. R. Hicks, "The Valuation of Social Income," *Economica*, 1940, pp. 105-24; I. M. D. Little, *A Critique of Welfare Economics*, (Oxford, 1950); W. J. Baumol, *Welfare Economics and the Theory of the State* (Cambridge, 1952); T. Scitovsky, "A Note on Welfare Propositions in Economics," *Review of Economic Studies*, 1942, pp. 98-110; J. E. Meade, *The Theory of International Economic Policy*, Vol. II: *Trade and Welfare* (New York, 1954).

cal mechanism for attempting to compensate, namely, log-rolling in Congress on public works projects.⁵ It is a very imperfect mechanism for assuring that losers in one instance become winners in another.

Another way of dealing with income distribution is to accept a criterion laid down by a political body and maximize present benefits less costs subject to this constraint. Or the cost-benefit analyst can present a series of alternatives differing according to the individuals who pay and prices charged. The analyst must not only compute the new inputs and outputs, but also the costs and benefits for each group with whom the public authorities are especially concerned. No wonder this is not often done! Prest and Turvey are uncertain whether such a procedure is actually helpful in practice.⁶

Income redistribution in its most extreme form would result in a complete leveling or equality of incomes. Clearly, this is not what is meant. A more practical meaning might be distributing income to the point where specific groups achieve a certain minimum. It is also possible that the operational meaning of income redistribution may simply be the transfer of some income from some haves to some have nots. Even in the last and most minimal sense of the term it is by no means clear that projects that are inefficient by the usual economic criteria serve to redistribute income in the desired direction. It is possible that some inefficient projects may transfer income from poorer to richer people. Before the claim that certain projects are justified by the effect of distributing income in a specified way can be accepted, an analysis to show that this is what actually happens must be at hand.

Since the distribution of income is at stake, it is not surprising that beneficiaries tend to dominate investment decisions in the political arena and steadfastly refuse to pay for what they receive from government tax revenues. They uniformly resist user charges

based on benefits received. Fox and Herfindahl estimate that of a total initial investment of three billion for the Corps of Engineers in 1962, taxpayers in general would pay close to two-thirds of the costs.⁷ Here, greater use of the facilities by a larger number of beneficiaries getting something for nothing inflates the estimated benefits which justify the project in the first place. There may be a political rationale for these decisions, but it has not been developed.

In addition to redistributing income, public works projects have a multitude of objectives and consequences. Projects may generate economic growth, alleviate poverty among some people, provide aesthetic enjoyment and opportunities for recreation, improve public health, reduce the risks of natural disaster, alter travel patterns, affect church attendance, change educational opportunities, and more. No single welfare criterion can encompass these diverse objectives. How many of them should be considered? Which are susceptible of quantification? The further one pursues this analysis, the more impassable the thicket.

Limitations in the Utility of Cost-Benefit Analysis

One possible conclusion is that at present certain types of cost-benefit analysis are not meaningful. In reviewing the literature on the calculus of costs and benefits in research and development, for example, Prest and Turvey comment on "the uncertainty and unreliability of cost estimates . . . and . . . the extraordinarily complex nature of the benefits. . . ." ⁸

Another conclusion is that one should be cautious in distinguishing the degree to which projects are amenable to cost-benefit analysis.

. . . When there are many diverse types of benefits from a project and/or many different beneficiaries it is difficult to list them all and to avoid double counting. This is one reason why it is so much easier to apply cost-benefit analysis to a limited purpose development, say, than it is to the research and development aspects of some multi-purpose discovery.

⁷ Irving K. Fox and Orris C. Herfindahl, "Attainment of Efficiency in Satisfying Demands for Water Resources," *American Economic Review*, May, 1964, p. 200.

⁸ Prest and Turvey, *Op. Cit.*, p. 727.

⁵ For a different view, see James M. Buchanan and Gordon Tullock, *The Calculus of Consent: Logical Foundations of Constitutional Democracy* (Ann Arbor, University of Michigan Press, 1962).

⁶ Prest and Turvey, *op. cit.*, p. 702. For a contrary view, see Arthur Maas, "Benefit-Cost Analysis: Its Relevance to Public Investment Decisions," Vol. LXXX *The Quarterly Journal of Economics*, May, 1966, pp. 208-226.

such as a new type of plastic material. . . . It is no good expecting those fields in which benefits are widely diffused, and in which there are manifest divergences between accounting and economic costs or benefits, to be as cultivable as others. Nor is it realistic to expect that comparisons between projects in entirely different branches of economic activity are likely to be as meaningful or fruitful as those between projects in the same branch. The technique is more useful in the public-utility area than in the social-services area of government.⁹

If the analysis is to be useful at all, calculations must be simplified.¹⁰ The multiple ramifications of interesting activities can be taken into account only at the cost of introducing fantastic complexities. Prest and Turvey remark of one such attempt, that "This system . . . requires knowledge of all the demand and supply equations in the economy, so is scarcely capable of application by road engineers."¹¹ They suggest omitting consideration where (1) side effects are judged not terribly large or where (2) concern for these effects belongs to another governmental jurisdiction.¹²

If certain costs or benefits are deemed important but cannot be quantified, it is always possible to guess. The increasing use of recreation and aesthetic facilities to justify public works projects in the United States is disapproved by most economists because there can be a vast, but hidden, inflation of these benefits. For example, to attribute the same value to a recreation day on a reservoir located in a desert miles from any substitute source of water as to a day on an artificial lake in the heart of natural lake country is patently wrong. Economists would prefer to see recreation facilities listed in an appendix so that they can be taken into account in some sense, or, alternatively, that the project be presented with and without the recreation facilities, so that a judgment can be made as to whether the additional services are worth the cost.¹³

⁹ *Ibid.*, pp. 729, 731.

¹⁰ David Braybrooke and Charles Lindblom, *A Strategy for Decision* (New York, 1963).

¹¹ Prest and Turvey, *op. cit.*, p. 714.

¹² *Ibid.*, p. 705.

¹³ See Jack L. Knetch, "Economics of Including Recreation as a Purpose of Water Resource Projects," *Journal of Farm Economics*, December, 1964, p. 1155. No one living in Berkeley, where "a view" is part of the cost of housing, could believe that aesthetic values are forever going to remain beyond the ingenuity of the quantifier.

Economists distinguish between risk, where the precise outcome cannot be predicted but a probability distribution can be specified, and uncertainty, where one does not even know the parameters of the outcomes. The cost-benefit analyst must learn to live with uncertainty, for he can never know whether all relevant objectives have been included and what changes may occur in policy and in technology.

It is easy enough to cut the life of the project below its expected economic life. The interest rate can be raised. Assumptions can be made that costs will be higher and benefits lower than expected. All these methods, essentially conservative, are also highly arbitrary. They can be made somewhat more systematic, however, by sensitivity analysis in which length of life, for instance, is varied over a series of runs so that its impact on the project can be appraised.

Lessening uncertainty by hiking the interest or discount rate leads to greater difficulties, for the dominance of "higher" criteria over economic analysis is apparent in the frustrating problem of choosing the correct interest rate at which to discount the time streams of costs and benefits essential to the enterprise. Only an interest rate can establish the relationship between values at different periods of time. Yet people differ in preferences for the present versus the intermediate or long-run value. Moreover, the interest rate should also measure the opportunity cost of private capital that could be used to produce wealth elsewhere in the economy if it had not been used up in the form of tax income spent on the project under consideration. Is the appropriate rate the very low cost the government charges, the cost of a government corporation like TVA that must pay a somewhat higher rate, the going rate of interest for private firms, or an even

There are also costs and benefits, such as the saving and losing of human life, that can be quantified but can only be valued in the market place in a most peculiar (or ghoulish) sense. See Burton Weisbrod, *The Economics of Public Health; Measuring the Economic Impact of Diseases* (Philadelphia, 1961), for creative attempt to place a market value on human life. Few of us would want to make decisions about public health by use of this criterion, not at least if we were the old person whose future social value contribution is less than his cost to the authorities.

higher rate to hedge against an uncertain future? As Otto Eckstein has observed, "... the choice of interest rates must remain a value judgment."¹⁴

If the efficiency of a project is insensitive to interest costs, then these costs can vary widely without mattering much. But Fox and Herfindahl discovered that if Corps of Engineer projects raised their interest (or discount) rate from 2½ to 4, 6, or 8 per cent, then 9, 64, and 80 per cent of their projects, respectively, would have had a benefit-cost ratio of less than unity.¹⁵ This single value choice among many has such large consequences that it alone may be decisive.

The Mixed Results of Cost-Benefit Analysis

Although cost-benefit analysis presumably results in efficiency by adding the most to national income, it is shot through with political and social value choices and surrounded by uncertainties and difficulties of computation. Whether the many noneconomic assumptions and consequences actually result in basically changing the nature of a project remains moot. Clearly, we have come a long way from pure efficiency, to verge upon mixed efficiency.

Economic analysts usually agree that all relevant factors (especially nonmarket factors) cannot be squeezed into a single formula. They therefore suggest that the policy maker, in being given the market costs and benefits of alternatives, is, in effect, presented with the market value he is placing on nonmarket factors. The contribution of the analyst is only one input into the decision, but the analyst may find this limited conception of his role unacceptable to others. Policy makers may not want this kind of input; they may want the answer, or at least an answer that they can defend on the basis of the analyst's legitimized expertise.

The dependence of cost-benefit analysis on a prior political framework does not mean that it is a useless or trivial exercise. Decisions must be made. If quantifiable economic costs and benefits are not everything, neither would a decision-maker wish to ignore them

entirely. The great advantage of cost-benefit analysis, when pursued with integrity, is that some implicit judgments are made explicit and subject to analysis. Yet, for many, the omission of explicit consideration of political factors is a serious deficiency.

The experience of the Soil Conservation Service in lowering certain political costs may prove illuminating. For many years the Service struggled along with eleven major watershed projects involving big dams, great headaches, and little progress. Because the watersheds were confined to a single region, it was exceedingly difficult to generate support in Congress, particularly at appropriations time. The upstream-downstream controversies generated by these projects resulted in less than universal local approval. The SCS found itself in the direct line of fire for determining priorities in use of insufficient funds.

Compare this situation with the breakthrough which occurred when SCS developed the small watershed program. Since each facility is relatively inexpensive, large numbers can be placed throughout the country, markedly increasing political support. Agreement on the local level is facilitated because much less land is flooded and side payments are easier to arrange. A judicious use of cost-benefit analysis, together with ingenious relationships with State governors, places the choice of priorities with the States and yet maintains a reasonable level of consistency by virtue of adherence to national criteria. Errors are easier to correct because the burden of calculation has been drastically reduced and experience may be more easily accumulated with a larger number of small projects.

Consider the situation in which an agency finds it desirable to achieve a geographical spread of projects in order to establish a wider base of support. Assume (with good reason) that cost-benefit criteria will not permit projects to be established in some states because the value of the land or water is too low. One can say that this is just too bad and observe the agency seeking ways around the restriction by playing up benefits, playing down costs, or attacking the whole benefit cost concept as inapplicable. Another approach would be to recognize that federalism—

¹⁴ Otto Eckstein, *op. cit.*, p. 460.

¹⁵ Fox and Herfindahl, *op. cit.*, p. 202.

meaning, realistically, the distribution of indulgences to State units—represents a political value worth promoting to some extent and that gaining nation-wide support is important. From this perspective, a compromise solution would be to except one or two projects in each State or region from meeting the full requirement of the formula, though the projects with the highest benefit-cost ratio would have to be chosen. In return for sacrificing full adherence to the formula in a few instances, one would get enhanced support for it in many others.

Everyone knows, of course, that cost-benefit analysis is not the messiah come to save water resources projects from contamination by the rival forces of ignorance and political corruption. Whenever agencies and their associated interests discover that they cannot do what they want, they may twist prevailing criteria out of shape: Two projects may be joined so that both qualify when one, standing alone, would not. Costs and benefits may be manipulated, or the categories may be so extended that almost any project qualifies. On the other hand, cost-benefit analysis has some "good" political uses that might be stressed more than they have been. The technique gives the responsible official a good reason for turning down projects, with a public-interest explanation the Congressman can use with his constituents and the interest-group leader with his members.

This is not to say that cost-benefit analysis has little utility. Assuming that the method will continue to be improved, and that one accepts the market as the measure of economic value, it can certainly tell decision makers something about what they will be giving up if they follow alternative policies. The use of two analyses, one based on regional and the other on national factors, might result in an appraisal of the economic costs of federalism.

The burden of calculation may be reduced by following cost-benefit analysis for many projects and introducing other values only for a few. To expect, however, that the method itself (which distributes indulgences to some and deprivations to others) would not be subject to manipulation in the political process is to say that we shall be governed by formula and not by men.

Because the cost-benefit formula does not always jibe with political realities—that is, it omits political costs and benefits—we can expect it to be twisted out of shape from time to time. Yet cost-benefit analysis may still be important in getting rid of the worst projects. Avoiding the worst where one can't get the best is no small accomplishment.

Systems Analysis

The good systems analyst is a "chochem," a Yiddish word meaning "wise man", with overtones of "wise guy." His forte is creativity. Although he sometimes relates means to ends and fits ends to match means, he ordinarily eschews such pat processes, preferring instead to relate elements imaginatively into new systems that create their own means and ends. He plays new objectives continuously against cost elements until a creative synthesis has been achieved. He looks down upon those who say that they take objectives as given, knowing full well that the apparent solidity of the objective will dissipate during analysis and that, in any case, most people do not know what they want because they do not know what they can get.

Since no one knows how to teach creativity, daring, and nerve, it is not surprising that no one can define what systems analysis is or how it should be practiced. E. S. Quade, who compiled the RAND Corporation lectures on systems analysis, says it "is still largely a form of art" in which it is not possible to lay down "fixed rules which need only be followed with exactness."¹⁶ He examined systems studies to determine ideas and principles common to the good ones, but discovered that "no universally accepted set of ideas existed. It was even difficult to decide which studies should be called good."¹⁷

Systems analysis is derived from operations research, which came into use during World War II when some scientists discovered that they could use simple quantitative analysis to get the most out of existing military equipment. A reasonably clear objective was given, and ways to cut the cost of achieving it could be developed, using essentially statisti-

¹⁶ E. S. Quade, *Analysis for Military Decisions* (Chicago, 1964), p. 153.

¹⁷ *Ibid.*, p. 149.

cal models. Operations research today is largely identified with specific techniques: linear programming; Monte Carlo (randomizing) methods; gaming and game theory. While there is no hard and fast division between operations research and systems analysis, a rough separation may perhaps be made. The less that is known about objectives, the more they conflict, the larger the number of elements to be considered, the more uncertain the environment, the more likely it is that the work will be called a systems analysis. In systems analysis there is more judgment and intuition and less reliance on quantitative methods than in operations research.

Systems analysis builds models that abstract from reality but represent the crucial relationships. The systems analyst first decides what questions are relevant to his inquiry, selects certain quantifiable factors, cuts down the list of factors to be dealt with by aggregation and by eliminating the (hopefully) less important ones, and then gives them quantitative relationships with one another within the system he has chosen for analysis. But crucial variables may not be quantifiable. If they can be reduced to numbers, there may be no mathematical function that can express the desired relationship. More important, there may be no single criterion for judging results among conflicting objectives. Most important, the original objectives, if any, may not make sense.

It cannot be emphasized too strongly that a (if not the) distinguishing characteristic of systems analysis is that the objectives are either not known or are subject to change. Systems analysis, Quade tells us, "is associated with that class of problems where the difficulties lie in deciding what ought to be done—not simply how to do it — and honors go to people who . . . find out what the problem is" ¹⁸ Charles Hitch, the former Comptroller of the Defense Department, insists that:

. . . learning about objectives is one of the chief objects of this kind of analysis. We must learn to look at objectives as critically and as professionally as we look at our models and our other inputs. We may, of course, begin with tentative objectives, but we must expect to modify or replace them as we learn about the systems we are studying—and related systems. The feedback on objectives may in some cases

be the most important result of our study. We have never undertaken a major system study at RAND in which we are able to define satisfactory objectives at the beginning of the study.¹⁹

Systems analysts recognize many good reasons for their difficulties in defining problems or objectives. Quade reaches the core: "Objectives are not, in fact, agreed upon. The choice, while ostensibly between alternatives, is really between objectives or ends and non-analytic methods must be used for a final reconciliation of views."²⁰ It may be comforting to believe that objectives come to the analyst from on high and can be taken as given, but this easy assumption is all wrong. "For all sorts of good reasons that are not about to change," says Hitch, "official statements of national objectives (or company objectives) tend to be nonexistent or so vague and literary as to be non-operational."²¹ Objectives are not only likely to be "thin and rarified," according to Wohlstetter, but the relevant authorities "are likely to conflict. Among others there will be national differences within an alliance and within the nation, interagency, interservice, and intraservice differences. . . ." ²²

Moreover, even shared objectives often conflict with one another. Deterrence of atomic attack might be best served by letting an enemy know that we would respond with an all-out, indiscriminate attack on his population. Defense of our population against death and destruction might not be well served by this strategy,²³ as the Secretary of Defense recognized when he recommended a city-avoidance strategy that might give an enemy some incentive to spare our cities as well. Not only are objectives large in number and in conflict with one another, they are likely to engender serious repercussion effects. Many objectives, like morale and the stability of alliances, are resistant to quantification. What is worth doing depends on whether it can be done at all, how well, and at what cost. Hence, objectives really cannot be taken as given; they must

¹⁸ Charles J. Hitch, *op. cit.*, p. 19.

¹⁹ E. S. Quade, *op. cit.*, p. 176.

²⁰ Charles J. Hitch, *op. cit.*, pp. 4-5.

²¹ Albert Wohlstetter, "Analysis and Design of Conflict Systems," in E. S. Quade, *op. cit.*, p. 121.

²² See Glenn H. Snyder, *Deterrence and Defense* (Princeton, 1961).

¹⁸ *Ibid.*, p. 7.

be made up by the analyst. "In fact," Wohlstetter declares, "we are always in the process of choosing and modifying both means and ends."²⁴

Future systems analysts are explicitly warned not to let clients determine objectives. A suggestive analogy is drawn with the doctor who would not ignore a patient's "description of his symptoms, but . . . cannot allow the patient's self diagnosis to override his own professional judgment."²⁵ Quade argues that since systems analysis has often resulted in changing the original objectives of the policy-maker, it would be "self-defeating to accept without inquiry" his "view of what the problem is."²⁶

I have stressed the point that the systems analyst is advised to insist on his own formulation of the problem because it shows so closely that we are dealing with a mixed concept of efficiency.

Adjusting objectives to resources in the present or near future is difficult enough without considering future states of affairs which hold tremendous uncertainty. Constants become variables; little can be taken for granted. The rate of technological progress, an opponent's estimate of your reaction to his latest series of moves based on his reaction to yours, whether or not atomic war will occur, what it will be like, whether we shall have warning, whether the system we are working on will cost anything close to current estimates and whether it will be ready within five years of the due date—on most of these matters, there are no objective probabilities to be calculated.

An effective dealing with uncertainty must be a major goal of systems analysis. Systems analysis is characterized by the aids to calculation it uses, not to conquer, but to circumvent and mitigate some of the pervasive effects of uncertainty. Before a seemingly important factor may be omitted, for example, a sensitivity analysis may be run to determine whether its variation significantly affects the outcome. If there is no good basis for calcu-

lating the value of the factor, arbitrary values may be assigned to test for extreme possibilities. Contingency analysis is used to determine how the relative ranking of alternatives holds up under major changes in the environment, say, a new alliance between France and Russia, or alterations in the criteria for judging the alternatives, such as a requirement that a system work well against attacks from space as well as earth. Contingency analysis places a premium on versatility as the analyst seeks a system that will hold up well under various eventualities even though it might be quite as good for any single contingency as an alternative system. Adversary procedures may be used to combat uncertainty. Bending over backwards to provide advantages for low ranking systems and handicaps for high ranking systems is called a *fortiori* analysis. Changing crucial assumptions in order to make the leading alternatives even, so that one can judge whether the assumptions are overly optimistic or pessimistic, is called break-even analysis.²⁷ Since all these methods add greatly to the burden of calculation, they must be used with some discretion.

A variety of insurance schemes may also be used to deal with uncertainty. In appraising what an opponent can do, for instance, one can assume the worst, the best, and sheer inertia. In regard to the development of weapons, insurance requires not one flexible weapon but a variety of alternatives pursued with vigor. As development goes on, uncertainty is reduced. Consequently, basic strategic choice involves determining how worthwhile paying for the additional information is by developing rival weapons systems to the next stage. The greater the uncertainty of the world, the greater the desirability of having the widest selection of alternative weapons to choose from to meet unexpected threats and opportunities. Alchian and Kessel are so wedded to the principle of diversified in-

²⁴ Wohlstetter in Quade, *op. cit.*, p. 122.

²⁵ E. S. Quade, *op. cit.*, p. 157. Quade attempts to soften the blow by saying that businessmen and military officers know more about their business than any one else. But the import of the analogy is clear enough.

²⁶ *Ibid.*, pp. 156-57.

²⁷ Herman Kahn and Irwin Mann., *Techniques of Systems Analysis* (Santa Monica, The RAND Corporation, 1957), believe that "More than any single thing, the skilled use of a *fortiori* and break-even analyses separate the professionals from the amateurs." They think that convincing others that you have a good solution is as important as coming up with one.

vestment that they "strongly recommend this theorem as a basic part of systems analysis."²⁸

As a form of calculation, systems analysis represents a merger of quantitative methods and rules of thumb. First, the analyst attempts to solve the problem before he knows a great deal about it. Then he continuously alters his initial solution to get closer to what he intuitively feels ought to be wanted. Means and ends are continuously played off against one another. New objectives are defined, new assumptions made, new models constructed, until a creative amalgam appears that hopefully defines a second best solution, one that is better than others even if not optimal in any sense. In the famous study of the location of military bases conducted by Albert Wohlstetter and his associates at the RAND Corporation, widely acknowledged as a classic example of systems analysis, Wohlstetter writes:

The base study . . . proceeded by a method of successive approximations. It compared forces for their efficiency in carrying a payload between the bases and targets without opposition either by enemy interceptors or enemy bombers. Then, it introduced obstacles successively: first, enemy defenses; then enemy bombardment of our bombers and other elements needed to retaliate. In essence, then, the alternative systems were tested for their first-strike capability and then they were compared for their second-strike capacity. And the programmed system performed in a drastically different way, depending on the order in which the opposing side struck. In the course of analyzing counter-measures and counter-counter-measures, the enemy bombardment turned out to be a dominant problem. This was true even for a very much improved overseas operating base system. The refueling base system was very much less sensitive to strike order. It is only the fact that strike order made such a difference among systems contemplated that gave the first-strike, second-strike distinction an interest. And it was not known in advance of the analysis that few of the programmed bombers would have survived to encounter the problem of penetrating enemy defenses which had previously been taken as the main obstacle. The analysis, then, not only was affected by the objectives considered, it affected them.²⁹

The advantage of a good systems study is that by running the analysis through in theory on paper certain disadvantages of learning from experience may be avoided.

²⁸ Armen A. Alchian and Reuben A. Kessel, *A Proper Role of Systems Analysis* (Santa Monica, RAND Corporation, 1954), p. 9.

²⁹ Albert Wohlstetter in E. S. Quade, *op. cit.*, pp. 125-26.

If the complexity of the problems encountered proved difficult in cost-benefit analysis, the burdens of calculation are ordinarily much greater in systems analysis. Many aspects of a problem simply must be put aside. Only a few variables can be considered simultaneously. "Otherwise," Roland McKean tells us, "the models would become impossibly cumbersome, and . . . the number of calculations to consider would mount in the thousands."³⁰ Formulas that include everything may appear more satisfactory but those that cannot be reduced "to a single expression are likely to convey no meaning at all. . . ." ³¹ Summing up their experience, Hitch and McKean assert that:

. . . analyses must be piecemeal, since it is impossible for a single analysis to cover all problems of choice simultaneously in a large organization. Thus comparisons of alternative courses of action always pertain to a part of the government's (or corporation's) problem. Other parts of the over-all problem are temporarily put aside, possible decisions about some matters being ignored, specific decisions about others being taken for granted. The resulting analyses are intended to provide assistance in finding optimal, or at least good, solutions to sub-problems: in the jargon of systems and operations research, they are sub-optimizations.³²

Although admitting that much bad work is carried on and that inordinate love of numbers and machines often get in the way of creative work,³³ practitioners of systems analysis believe in their art. "All of them point out how the use of analysis can provide some of the knowledge needed, how it may sometime serve as a substitute for experience, and, most importantly, how it can work to sharpen intuition."³⁴ Systems analysis can increase explicitness about the assumptions made and about exclusions from the analysis. The claim is that systems analysis can be perfected; sheer intuition or unaided judgment can never be perfect.

³⁰ R. N. McKean, "Criteria," in E. S. Quade, *op. cit.*, p. 83.

³¹ E. S. Quade, *op. cit.*, p. 310.

³² Charles J. Hitch and Roland N. McKean, *The Economics of Defense in the Nuclear Age* (Cambridge, Harvard University Press, 1961), p. 161.

³³ See Hitch on "Mechanitis—putting . . . machines to work as a substitute for hard thinking." Charles Hitch, "Economics and Operations Research: A Symposium. II," *Review of Economics and Statistics*, August, 1958, p. 209.

³⁴ E. S. Quade, *op. cit.*, p. 12.

Yet there is also wide agreement that systems analysts "do philosophy,"⁸⁵ that they are advocates of particular policy alternatives. What Schelling calls "the pure role of expert advisor" is not available for the analyst who "must usually formulate the questions themselves for his clients."⁸⁶ Beyond that, Wohlstetter argues that systems analysts can perform the function of integrating diverse values. New systems can sometimes be found that meet diverse objectives.⁸⁷ The politician who gains his objectives by inventing policies that also satisfy others, or the leader of a coalition who searches out areas of maximum agreement, performs a kind of informal systems analysis.

All these men, however, work within the existing political structure. While cost-benefit analysis may contain within it implicit changes in existing governmental policies, it poses no direct challenge to the general decision-making machinery of the political system. Program budgeting is a form of systems analysis that attempts to break out of these confines.

Program Budgeting

It is always important, and perhaps especially so in economics, to avoid being swept off one's feet by the fashions of the moment.⁸⁸

So this new system will identify our national goals with precision . . .⁸⁹

On August 25, 1965, President Johnson announced that he was asking the heads of all Federal agencies to introduce "a very new and revolutionary system" of program budgeting. Staffs of experts set up in each agency would define goals using "modern methods of program analysis." Then the "most effective and the least costly" way to accomplish these goals would be found.⁴⁰

Program budgeting has no standard definition. The general idea is that budgetary decisions should be made by focusing on output categories like governmental goals, objectives,

end products or programs instead of inputs like personnel, equipment, and maintenance. As in cost-benefit analysis, to which it owes a great deal, program budgeting lays stress on estimating the total financial cost of accomplishing objectives. What is variously called cost-effectiveness or cost-utility analysis is employed in order to select "alternative approaches to the achievement of a benefit already determined to be worth achieving."⁴¹

Not everyone would go along with the most far-reaching implications of program budgeting, but the RAND Corporation version, presumably exported from the Defense Department, definitely does include "institutional reorganization to bring relevant administrative functions under the jurisdiction of the authority making the final program decisions." In any event, there would be "information reporting systems and shifts in the power structure to the extent necessary to secure compliance with program decisions by the agencies responsible for their execution."⁴² Sometimes it appears that comprehensiveness—simultaneous and complete examination of all programs and all alternatives to programs every year—is being advocated. Actually, comprehensiveness has been dropped (though not without regret) because "it may be too costly in time, effort, uncertainty, and confusion."⁴³ There exists considerable ambivalence as to whether decisions are implicit in the program categories or merely provide information to improve the judgment of governmental officials.

*Programs are not made in heaven. There is nothing out there that is just waiting to be found. Programs are not natural to the world; they must be imposed on it by men. No one can give instructions for making up programs. There are as many ways to conceive of programs as there are of organizing activity,*⁴⁴ as the comments of the following

⁴¹ Alan Dean, quoted in D. Novick, *ibid.*, p. 311.

⁴² R. N. McKean and N. Anshen in D. Novick, *ibid.*, pp. 286-87. The authors say that this aspect of program budgeting is part of the general view adopted in the book as a whole.

⁴³ Arthur Smithies in *ibid.*, p. 45.

⁴⁴ A look at the classic work by Luther Gulick and Lyndall Urwick, *Papers on the Science of Administration* (New York, Columbia University Press, 1957), reveals considerable similarity between their suggested bases of organization and ways of conceptualizing programs.

⁸⁵ *Ibid.*, p. 5.

⁸⁶ T. C. Schelling, "Economics and Operations Research: A Symposium. V. Comment," *Review of Economics and Statistics*, August, 1958, p. 222.

⁸⁷ Albert Wohlstetter in E. S. Quade, *op. cit.*, p. 122.

⁸⁸ Prest and Turvey, *op. cit.*, p. 684.

⁸⁹ David Novick, Editor, *Program Budgeting* (Cambridge, Harvard University Press, 1965), p. vi.

⁴⁰ *Ibid.*, pp. v-vi.

writers eloquently testify:

It is by no means obvious . . . whether a good program structure should be based on components of specific end objectives (e.g., the accomplishment of certain land reclamation targets), on the principle of cost separation (identifying as a program any activity the costs of which can be readily segregated), on the separation of means and ends (Is education a means or an end in a situation such as skill-retraining courses for workers displaced by automation?), or on some artificially designed pattern that draws from all these and other classification criteria.⁴⁵

Just what categories constitute the most useful programs and program elements is far from obvious . . . If one puts all educational activities into a broad package of educational programs, he cannot simultaneously include school lunch programs or physical education activities in a Health Program, or include defense educational activities (such as the military academies) in the Defense Program. . . . In short, precisely how to achieve a rational and useful structure for a program budget is not yet evident.⁴⁶

In much current discussion it seems to be taken for granted that transportation is a natural program category. But that conclusion is by no means obvious.⁴⁷

A first question one might ask is whether, given their nature, health activities merit a separate, independent status in a program budget. The question arises because these activities often are constituents of, or inputs into, other activities whose purpose or goal orientation is the dominating one. Outlays by the Department of Defense for hospital care, for example, though they assist in maintaining the health of one segment of the population, are undertaken on behalf of national defense, and the latter is their justification.⁴⁸

The difficulties with the program concept are illustrated in the space program. A first glance suggests that space projects are ideally suited for program budgeting because they appear as physical systems designed to accomplish different missions. Actually, there is a remarkable degree of interdependence between different missions and objectives—pride, scientific research, space exploration, military uses, etc.—so that it is impossible to apportion costs on a proper basis. Consider the problem of a rocket developed for one mission and useful for others. To apportion costs to each new mission is purely arbitrary. To allocate the cost to the first mission and

regard the rocket as a free good for all subsequent missions is ludicrous. The only remotely reasonable alternative—making a separate program out of the rocket itself—does violence to the concept of programs as end products. The difficulty is compounded because the facilities that have multiple uses like boosters and tracking networks tend to be very expensive compared to the items that are specific to a particular mission.⁴⁹ Simple concepts of programs evaporate upon inspection.

Political realities lie behind the failure to devise principles for defining programs. As Melvin Anshen puts it, "The central issue is, of course, nothing less than the definition of the ultimate objectives of the Federal government as they are realized through operational decisions." The arrangement of the programs inevitably affects the specific actions taken to implement them. "Set in this framework," Anshen continues, "the designation of a schedule of programs may be described as building a bridge between a matter of political philosophy (what is government for?) and . . . assigning scarce resources among alternative governmental objectives."⁵⁰

Because program budgeting is a form of systems analysis (and uses a form of cost-benefit analysis), the conditions that hinder or facilitate its use have largely been covered in the previous sections. The simpler the problem, the fewer the interdependencies, the greater the ability to measure the consequences of alternatives on a common scale, the more costs and benefits that are valued in the market place, the better the chances of making effective use of programs. Let us take transportation to illustrate some of the conditions in a specific case.

Investments in transportation are highly interdependent with one another (planes versus cars versus trains versus barges, etc.) and with decisions regarding the regional location of industry and the movements of population. In view of the powerful effects of transportation investment on regional employment, income, and competition with other modes of transport, it becomes necessary to take these factors into account. The

⁴⁵ N. Anshen in D. Novick, *op. cit.*, pp. 19-20.

⁴⁶ G. A. Steiner in *ibid.*, p. 356.

⁴⁷ A. Smithies in *ibid.*, p. 41.

⁴⁸ Marvin Frankel in *ibid.*, pp. 219-220. I have forborne citing the author who promises exciting discussion of the objectives of American education and ends up with fascinating program categories like primary, secondary, and tertiary education.

⁴⁹ See the excellent chapter by M. A. Margolis and S. M. Barro, *ibid.*, pp. 120-145.

⁵⁰ *Ibid.*, p. 18.

partial equilibrium model of efficiency in the narrow sense becomes inappropriate and a general equilibrium model of the economy must be used. The combination of aggregative models at the economy-wide level and inter-region and inter-industry models that this approach requires is staggering. It is precisely the limited and partial character of cost-effectiveness analyses, taking so much for granted and eliminating many variables, that make them easy to work with for empirical purposes. Furthermore, designing a large-scale transportation system involves so close a mixture of political and economic considerations that it is not possible to disentangle them. The Interstate Highway Program, for example, involved complex bargaining among Federal, State, and local governments and reconciliation of many conflicting interests. The development of certain "backward" regions, facilitating the movement of defense supplies, redistribution of income, creating countervailing power against certain monopolies, not to mention the political needs of public officials, were all involved. While cost-utility exercises might help with small segments of the problem, J. R. Meyer concludes that, "Given the complexity of the political and economic decisions involved, and the emphasis on designing a geographically consistent system, it probably would be difficult to improve on the congressional process as a means of developing such a program in an orderly and systematic way."⁶¹

On one condition for effective use—reorganization of the Federal government to centralize authority for wide-ranging programs—proponents of program budgeting are markedly ambivalent. The problem is that responsibility for programs is now scattered throughout the whole Federal establishment and decentralized to State and local authorities as well. In the field of health, for example, expenditures are distributed among at least twelve agencies and six departments outside of Health, Education, and Welfare. A far greater number of organizations are concerned with American activities abroad, with natural resources and with education. The multiple jurisdictions and overlapping

responsibilities do violence to the concept of comprehensive and consistent programs. It "causes one to doubt," Marvin Frankel writes, "whether there can exist in the administrative echelons the kind of overall perspective that would seem indispensable if Federal health resources are to be rationally allocated."⁶² To G. A. Steiner it is evident that "The present 'chest of drawers' type of organization cannot for long be compatible with program budgeting."⁶³ W. Z. Hirsch declares that "if we are to have effective program budgeting of natural resources activities, we shall have to provide for new institutional arrangements."⁶⁴ Yet the inevitable resistance to wholesale reorganization would be so great that, if it were deemed essential, it might well doom the enterprise. Hence, the hope is expressed that translation grids or crossover networks could be used to convert program budget decisions back into the usual budget categories in the usual agencies. That is what is done in Defense, but that Department has the advantage of having most of the activities it is concerned with under the Secretary's jurisdiction. Some program analysts believe that this solution will not do.

Recognizing that a conversion scheme is technically feasible, Anshen is aware that there are "deeply frustrating" issues to be resolved. "The heart of the problem is the fact that the program budget in operation should not be a mere statistical game. Great strategic importance will attach to both the definition of program structure and content and the establishment of specific program objectives (including magnitude, timing, and cost)."⁶⁵ The implications of program budgeting, however, go far beyond specific policies.

It will be useful to distinguish between policy politics (which policy will be adopted?), partisan politics (which political party will win office?), and system politics (how will decision structures be set up?). Program budgeting is manifestly concerned with policy politics, and not much with partisan politics, although it could have im-

⁶¹ J. R. Meyer in *ibid.*, p. 170. This paragraph is based on my interpretation of his work.

⁶² M. Frankel, *ibid.*, p. 237.

⁶³ *Ibid.*, p. 348.

⁶⁴ *Ibid.*, p. 280.

⁶⁵ *Ibid.*, pp. 358-59.

portant consequences for issues that divide the nation's parties. *My contention is that the thrust of program budgeting makes it an integral part of system politics.*

As presently conceived, program budgeting contains an extreme centralizing bias. Power is to be centralized in the Presidency (through the Budget Bureau) at the national level, in superdepartments rather than bureaus within the executive branch, and in the Federal government as a whole instead of State or local governments. Note how W. Z. Hirsch assumes the desirability of national dominance when he writes: "These methods of analysis can guide Federal officials in the responsibility of bringing local education decisions into closer harmony with national objectives."⁵⁶ G. A. Steiner observes that comprehensiveness may be affected by unrestricted Federal grants-in-aid to the states because "such a plan would remove a substantial part of Federal expenditures from a program budgeting system of the Federal government."⁵⁷ Should there be reluctance on the part of State and local officials to employ the new tools, Anshen states "that the Federal government may employ familiar incentives to accelerate this progress."⁵⁸ Summing it up, Hirsch says that "It appears doubtful that a natural resources program budget would have much impact without a good deal of centralization."⁵⁹

Within the great Federal organizations designed to encompass the widest ramifications of basic objectives, there would have to be strong executives. Cutting across the subunits of the organization, as is the case in the Department of Defense, the program budget could only be put together by the top executive. A more useful tool for increasing his power to control decisions vis-a-vis his subordinates would be hard to find.⁶⁰

Would large-scale program budgeting benefit the Chief Executive? President Johnson's support of program budgeting could in part stem from his desire to appear frugal and

also be directed at increasing his control of the executive branch by centralizing decisions in the Bureau of the Budget. In the case of foreign affairs, it is not at all clear whether it would be preferable to emphasize country teams, with the budget made by the State Department to encompass activities of the other Federal agencies abroad, or to let Commerce, Agriculture, Defense, and other agencies include their foreign activities in their own budgets. Program budgeting will unleash great struggles of this kind in Washington. An especially intriguing possibility is that the Bureau of the Budget might prefer to let the various agencies compete, with the Bureau coordinating (that is, controlling) these activities through a comprehensive foreign affairs program devised only at the Presidential level.

Yet is it not entirely clear that Presidents would welcome all the implications of program budgeting. It is well and good to talk about long-range planning; it is another thing to tie a President's hands by committing him in advance for five years of expenditures. Looking ahead is fine but not if it means that a President cannot negate the most extensive planning efforts on grounds that seem sufficient to him.⁶¹ He may wish to trade some program budgeting for some political support.

*In any event, that all decisions ought to be made by the most central person in the most centralized body capable of grabbing hold of them is difficult to justify on scientific grounds. We see what has happened. First pure efficiency was converted to mixed efficiency. Then limited efficiency became unlimited. Yet the qualifications of efficiency experts for political systems analysis are not evident.*⁶²

⁵⁶ See William H. Brown and Charles E. Gilbert, *Planning Municipal Investment: A Case Study of Philadelphia* (Philadelphia, University of Pennsylvania Press, 1961), for an excellent discussion of the desire of elected officials to remain free to shift their commitments.

⁶¹ It may be said that I have failed to distinguish sufficiently between planning, programming, and budgeting. Planning is an orientation that looks ahead by extending costs and benefits or units of effectiveness a number of years into the future. Programming is a general procedure of systems analysis employing cost-effectiveness studies. In this view program budgeting is a mere mechanical translation of the results of high

⁵⁶ *Ibid.*, p. 206.

⁵⁷ *Ibid.*, p. 347.

⁵⁸ *Ibid.*, p. 365.

⁵⁹ *Ibid.*, p. 280.

⁶⁰ See my comments to this effect in *The Politics of the Budgetary Process* (Boston, 1964), p. 140. For discussion of some political consequences of program budgeting, see pp. 135-142.

We would be in a much stronger position to predict the consequences of program budgeting if we knew (a) how far toward a genuine program budget the Defense Department has gone and (b) whether the program budget has fulfilled its promise. To the best of my knowledge, not a single study of this important experiment was undertaken (or at least published) before the decision was made to spread it around the land. On the surface, only two of the nine program categories used in the Defense Department appear to be genuine programs in the sense of pointing to end purposes or objectives. Although strategic retaliation and continental defense appear to be distinct programs, it is difficult to separate them conceptually; my guess is that they are, in fact, considered together. The third category—general purpose forces—is presumably designed to deal with (hopefully) limited war anywhere in the world. According to Arthur Smithies, "The threat is not clearly defined and neither are the requirements for meeting it. Clearly this program is of a very different character from the other two and does not lend itself as readily to analysis in terms either of its components or of its specific contribution to defense objectives."⁸³

What about the program called airlift and sealift? These activities support the general purpose forces. Research and development is carried on presumably to serve other defense

level systems studies into convenient storage in the budgetary format. No doubt systems studies could be done without converting the results into the form of a program budget. This approach may have a lot to be said for it and it appears that it is the one that is generally followed in the Department of Defense in its presentations to Congress. But if the systems studies guide decisions as to the allocation of resources, and the studies are maintained according to particular program categories and are further legitimized by being given status in the budget, it seems most unlikely that programming will be separated from budgeting. One is never sure whether too much or too little is being claimed for program budgeting. If all that program budgeting amounts to is a simple translation of previous systems studies into some convenient form of accounting, it hardly seems that this phenomenon is worth so much fuss. If the program categories in the budget system are meaningful, then they must be much more than a mere translation of previously arrived at decisions. In this case, I think that it is not my task to enlighten the proponents of program budgeting, but it is their task to make themselves clear to others.

⁸³ A. Smithies in Novick, *op. cit.*, p. 37.

objectives, and the same is true for the reserve forces.

No doubt the elements that make up the programs comprise the real action focus of the budget, but these may look less elegant when spread into thousands of elements than they do in nine neat rows. When one hears that hundreds of program elements are up for decision at one time,⁸⁴ he is entitled to some skepticism about how much genuine analysis can go into all of them. Part of the argument for program budgeting was that by thinking ahead and working all year around it would be possible to consider changes as they came up and avoid the usual last minute funk. Both Hitch⁸⁵ and Novick⁸⁶ (the RAND Corporation expert on defense budgeting) report, however, that this has not worked out. The services hesitate to submit changes piecemeal, and the Secretary wants to see what he is getting into before he acts. The vaunted five year plans are still in force but their efficacy in determining yearly decisions remains to be established.

One good operational test would be to know whether the Department's systems analysts actually use the figures from the five year plans in their work or whether they go to the services for the real stuff. Another test would be whether or not the later years of the five year projections turn out to have any future significance, or whether the battle is really over the next year that is to be scooped out as part of the budget. From a distance, it appears that the services have to work much harder to justify what they are doing. Since McNamara's office must approve changes in defense programs, and he can insist on documentation, he is in a strong position to improve thinking at the lower levels. The intensity of conflict within the Defense Department may not have changed, but it may be that the disputants are or will in the future be likely to shout at a much more sophisticated level. How much this is due to McNamara himself, to his insistence

⁸⁴ See U.S. House Appropriations Committee Subcommittee on Department of Defense Appropriations for Fiscal 1965, 88th Congress, 2nd Session, IV, p. 133. McNamara asserted that some 652 "subject issues" had been submitted to him for the fiscal 1965 budget.

⁸⁵ Charles Hitch, *Decision Making for Defense* (Berkeley, University of California Press, 1965).

⁸⁶ Novick, *op. cit.*, p. 100.

on quantitative estimates, or to the analytic advantages of a program budget cannot be determined now. It is clear that a program budget, of which he alone is master, has helped impose his will on the Defense Department.

It should also be said that there are many notable differences between decision-making in defense and domestic policy that would render suspect the transmission of procedures from one realm to the other. The greater organizational unity of Defense, the immensely large amounts of money at stake, the extraordinarily greater risks involved, the inability to share more than minimal values with opponents, the vastly different array of interests and perceptions of the proper roles of the participants, are but a few of the factors involved.

The Armed Services and Appropriations Committees in the defense area, for example, are normally most reluctant to substitute their judgment on defense for that of the President and the Secretary of the Department. They do not conceive it to be their role to make day to day defense policy, and they are apparently unwilling to take on the burden of decision. They therefore accept a budget presentation based on cavernous program categories even though these are so arranged that it is impossible to make a decision on the basis of them. If they were to ask for and to receive the discussion of alternative actions contained in the much smaller program elements on which McNamara bases his decisions, they would be in a position to take the Department of Defense away from its Secretary.

There is no reason whatsoever to believe that a similar restraint would be shown by committees that deal with domestic policies. It is at least possible that the peculiar planning, programming, and budgeting system adopted in Defense could not be repeated elsewhere in the Federal establishment.

Political Rationality

Political rationality is the fundamental kind of reason, because it deals with the preservation and improvement of decision structures, and decision structures are the source of all decisions. Unless a decision structure exists, no reasoning and no decisions are possible. . . . There can be no conflict between

political rationality and . . . technical, legal, social, or economic rationality, because the solution of political problems makes possible an attack on any other problem, while a serious political deficiency can prevent or undo all other problem solving. . . . Non-political decisions are reached by considering a problem in its own terms, and by evaluating proposals according to how well they solve the problem. The best available proposal should be accepted regardless of who makes it or who opposes it, and a faulty proposal should be rejected or improved no matter who makes it. Compromise is always irrational; the rational procedure is to determine which proposal is the best, and to accept it. In a political decision, on the other hand, action never is based on the merits of a proposal but always on who makes it and who opposes it. Action should be designed to avoid complete identification with any proposal and any point of view, no matter how good or how popular it might be. The best available proposal should never be accepted just because it is best; it should be deferred, objected to, discussed, until major opposition disappears. Compromise is always a rational procedure, even when the compromise is between a good and a bad proposal.⁶⁷

We are witnessing the beginning of significant advances in the art and science of economizing. Having given up the norm of comprehensiveness, economizers are able to join quantitative analysis with aids to calculation of the kind described by Lindblom in his strategy of disjointed incrementalism.⁶⁸

Various devices are employed to simplify calculations. Important values are omitted entirely; others are left to different authorities to whose care they have been entrusted. Here, sensitivity analysis represents an advance because it provides an empirical basis to justify neglect of some values. Means and ends are hopelessly intertwined.

The real choice is between rival policies that encapsulate somewhat different mixes of means and ends. Analysis proceeds incrementally by successive limited approximations. It is serial and remedial as successive attacks are made on problems. Rather than waiting upon experience in the real world, the analyst tries various moves in his model and runs them through to see if they work. When all else fails, the analyst may try an integrative solution reconciling a variety of values to some degree, though meeting none of them completely. He is always ready to

⁶⁷ Paul Diesing, *Reason in Society* (Urbana, 1962), pp. 198, 203-4, 231-32.

⁶⁸ Braybrooke and Lindblom, *op. cit.* See also Lindblom, *The Intelligence of Democracy* (New York, 1965).

settle for the second or third best, provided only that it is better than the going policy. Constrained by diverse limiting assumptions, weakened by deficiencies in technique, rarely able to provide unambiguous measures, the systems, cost-benefit, and program analysis is nonetheless getting better at calculating in the realm of efficiency. Alas, he is an imperialist at heart.

In the literature discussed above there appears several times the proposition that "the program budget is a neutral tool. It has no politics."⁶⁹ In truth, the program budget is suffused with policy politics, makes up a small part of President Johnson's partisan politics, and tends towards system politics. How could men account for so foolish a statement? It must be that they who make it identify program budgeting with something good and beautiful, and politics with another thing bad and ugly. McKean and Anshen speak of politics in terms of "pressure and expedient adjustments," "haphazard acts . . . unresponsive to a planned analysis of the needs of efficient decision design." From the political structure they expect only "resistance and opposition, corresponding to the familiar human disposition to protect established seats of power and procedures made honorable by the mere facts of existence and custom."⁷⁰ In other places we hear of "vested interests," "wasteful duplication," "special interest groups," and the "Parkinson syndrome."⁷¹

Not so long ago less sophisticated advocates of reform ignored the political realm. Now they denigrate it. And, since there must be a structure for decision, it is smuggled in as a mere adjunct of achieving efficiency. Who is to blame if the economic tail wags the political dog? It seems unfair to blame the evangelical economizer for spreading the gospel of efficiency. If economic efficiency turns out to be the one true religion, maybe it is because its prophets could so easily conquer.

It is hard to find men who take up the cause of political rationality, who plead

the case for political man, and who are primarily concerned with the laws that enable the political machinery to keep working. One is driven to a philosopher like Paul Diesing to find the case for the political:

. . . the political problem is always basic and prior to the others. . . . This means that any suggested course of action must be evaluated first by its effects on the political structure. A course of action which corrects economic or social deficiencies but increases political difficulties must be rejected, while an action which contributes to political improvement is desirable even if it is not entirely sound from an economic or social standpoint.⁷²

There is hardly a political scientist who would claim half as much. The desire to invent decision structures to facilitate the achievement of economic efficiency does not suggest a full appreciation of their proper role by students of politics.

A major task of the political system is to specify goals or objectives. It is impermissible to treat goals as if they were known in advance. "Goals" may well be the product of interaction among key participants rather than some "deus ex machina" or (to use Bentley's term) some "spook" which posits values in advance of our knowledge of them. Certainly, the operational objectives of the Corps of Engineers in the Water Resources field could hardly be described in terms of developing rivers and harbors.

Once the political process becomes a focus of attention, it is evident that the principal participants may not be clear about their goals. What we call goals or objectives may, in large part, be operationally determined by the policies we can agree upon. The mixtures of values found in complex policies may have to be taken in packages, so that policies may determine goals as least as much as general objectives determine policies. In a political situation, then, the need for support assumes central importance. Not simply the economic, but the *political* costs and benefits turn out to be crucial.

A first attempt to specify what is meant by political costs may bring closer an understanding of the range of requirements for

⁶⁹ M. Anshen in D. Novick, *op. cit.*, p. 370.

⁷⁰ *Ibid.*, p. 289.

⁷¹ *Ibid.*, p. 359.

⁷² Paul Diesing, *op. cit.*, p. 228.

political rationality.⁷³ Exchange costs are incurred by a political leader when he needs the support of other people to get a policy adopted. He has to pay for this assistance by using up resources in the form of favors (patronage, logrolling) or coercive moves (threats or acts to veto or remove from office). By supporting a policy and influencing others to do the same, a politician antagonizes some people and may suffer their retaliation. If these hostility costs mount, they may turn into reelection costs — actions that decrease his chances (or those of his friends) of being elected or reelected to office. Election costs, in turn, may become policy costs through inability to command the necessary formal powers to accomplish the desired policy objectives.

In the manner of Neustadt, we may also talk about reputation costs, i.e. not only loss of popularity with segments of the electorate, but also loss of esteem and effectiveness with other participants in the political system and loss or ability to secure policies other than the one immediately under consideration. Those who continually urge a President to go all out—that is, use all his resources on a wide range of issues—rarely stop to consider that the price of success in one area of policy may be defeat in another. If he loses popularity with the electorate, as President Truman did, Congress may destroy almost the whole of his domestic program. If he cracks down on the steel industry, as President Kennedy did, he may find himself constrained to lean over backwards in the future to avoid unremitting hostility from the business community.

A major consequence of incurring exchange and hostility costs may be undesirable power-redistribution effects. The process of getting a policy adopted or implemented may increase the power of various individuals, organizations and social groups, which later will be used against the political leader. The power of some participants may be weakened so that the political leader is unable to enjoy their protection.

The legitimacy of the political system may be threatened by costs that involve the weakening of customary political restraints. Politicians who try to suppress opposition, or who

practice election frauds, may find similar tactics being used against them. The choice of a highly controversial policy may raise the costs of civic discord. Although the people involved may not hate the political leader, the fact that they hate each other may lead to consequences contrary to his desires.

The literature of economics usually treats organizations and institutions as if they were costless entities. The standard procedure is to consider rival alternatives (in consideration of price policy or other criteria), calculate the differences in cost and achievement among them, and show that one is more or less efficient than another. This typical way of thinking is sometimes misspecified. If the costs of pursuing a policy are strictly economic and can be calculated directly in the market place, then the procedure should work well. But if the costs include getting one or another organization to change its policies or procedures, then these costs must also be taken into account.⁷⁴ Perhaps there are legal, psychological, or other impediments that make it either impossible or difficult for the required changes to be made. Or the changes may require great effort and result in incurring a variety of other costs. In considering a range of alternatives, one is measuring not only efficiency but also the cost of change.

Studies based on efficiency criteria are much needed and increasingly useful. My quarrel is not with them as such, at all. I have been concerned that a single value, however important, could triumph over other values without explicit consideration being given these others. I would feel much better if political rationality were being pursued with the same vigor and capability as is economic efficiency. In that case I would

⁷⁴ In the field of defense policy, political factors are taken into account to the extent that the studies concentrate on the design of feasible alternatives. In the choice of overseas basing, for example, the question of feasibility in relation to treaties and friendly or unfriendly relationships with other countries is considered. Thus it seems permissible to take into account political considerations originating outside of the country, where differences of opinions and preferences among nations are to some extent accepted as legitimate, but apparently not differences internal to the American policy.

⁷³ I am indebted to John Harsanyi for suggestions about political rationality.

have fewer qualms about extending efficiency studies into the decision-making apparatus.

My purpose has not been to accuse economizers of doing what comes naturally. Rather, I have sought to emphasize that eco-

nomic rationality, however laudible in its own sphere, ought not to swallow up political rationality — but will do so, if political rationality continues to lack trained and adept defenders.

The Electronic Revolution in the Pentagon

In the five years that I have served in the Department of Defense I have seen my share of computers. I have watched them operating in the underground headquarters of the Strategic Air Command, I have observed them humming to themselves several hundred feet under the surface of the ocean in a Polaris submarine and clicking away on the lower decks of a giant aircraft carrier. Over the last ten years, the number of computers used in Defense Supply operations has increased from three to over five hundred. But I have never seen a computer in the Pentagon itself, although I know they are around somewhere; and I have never taken part in a discussion of Defense policy in which anyone has suggested that we consult a computer.

Before proceeding further let me first attempt to dispose of the popular fallacy that computers are used in the Pentagon to make policy decisions. Computers can provide no substitute for the process of judgment based on experience. But they can make it easier to acquire and marshal the facts that can be subjected to analysis. Any tool that facilitates the collection and organization of data in a complicated and changing fact situation is a significant aid to judgment. Of course, computers are useful in assembling the facts on which to base a decision. So are the typewriters, and adding machines. But no one suggests that we consult a typewriter or an adding machine in reaching a decision. Like computers, they are taken for granted. . . .

There is one way in which the electronic revolution may expand the scope of creative decision making—in the military establishment and elsewhere. It has been suggested that a measure of creativity is the ability to hold a relatively large number of ideas in suspension, allowing them to arrange themselves in a number of different ways. The electronic revolution offers the creative planner and strategist greater scope, as it makes available more data, assembled more rapidly, from a wider geographic range of sources, and more easily combined and recombined. The rest is up to the human mind.

—Adam Yarmolinsky, *The American Scholar* (Spring 1966), p. 272, 274.