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Evaluating Alternative Expenditure Programs

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ONE problem of choice that falls, at least partly, into the domain of public finance is the allocation of government resources among broad activities and the determination, therefore, of the scale of its various activities. In order for us to get the most out of the nation's resources, we should devote fewer millions to an activity if some of its output is worth less than the cost—and spend still more millions on it if extra output would yield greater value than the other things the money could buy. This way of looking at the problem is not universally accepted. Some persons apparently believe that the scale of activities should be determined in the light of cost alone. They name some figure and say: "That's all we'll pay, and that's that." Others apparently believe that activities should be planned on the basis of need alone. In determining the scale of defense outlays, for example, defense leaders are often asked to reveal what they "really need." Some simply say that the task of determining budget size has to be done one way or the other:

"In general, there are two ways in which the problem of balancing defense needs against fiscal requirements can be approached. One way is to ascertain essential defense needs and then see if the funds can be made available to meet them. The other is to predetermine, as a matter of fiscal policy, a dollar limit for defense expenditures; and thereupon refuse to satisfy any defense needs that cannot be compressed within that limit."¹

The truth is, however, that one cannot properly plan expenditures

Note: Parts of this paper are also presented, though in somewhat different form, in Chapter 4 of a book entitled *The Economics of Defense in the Nuclear Age*, by Charles Hitch and Roland McKean, published in 1960 by Harvard University Press.

In various parts of the paper, I am indebted to David Novick of The RAND Corporation, especially for access to unpublished materials.

For other discussions of some of these points and of related topics, see Arthur Smithies, *The Budgetary Process in the United States*, McGraw-Hill, 1955, especially pp. 229-77, and Jesse Burkhead, *Government Budgeting*, Wiley, 1956, pp. 110-81.

¹ *Airpower*, Report of the Subcommittee on the Air Force of the Committee on Armed Services, U.S. Senate, 84th Congress, U.S. Government Printing Office, 1957, p. 9.

on the basis of either cost alone or needs alone. There is no budget size or cost that is correct regardless of the payoff, and there is no need that should be met regardless of cost. One has to make judgments about *both* costs and gains. What we should like, therefore, in evaluating alternative expenditures, are estimates of both costs and gains. Or, where estimates cannot be in terms of a common denominator, we should like at least relevant clues to both costs and gains so that more informed judgments about them can be made.

1. *How Much for Programs vs. How Much for Objects?*

In order to derive meaningful clues to the gains as well as the costs of broad governmental activities, we probably have to think in terms of "programs"—that is, combinations of activities that produce distinguishable products. A program is the counterpart of an "industry" in the private sector of the economy—and is just as ambiguous, as hard to define, and probably as useful a concept—as an industry.

There is one important difference, however. In the private sector of the economy, markets reveal prices for industry outputs, even if they are intermediate products. In the governmental sector, there are no markets for most outputs, and the significance of the products, especially intermediate outputs, becomes especially hard to judge. To facilitate judgments about their value, therefore, programs should be aggregations of activities yielding outputs that can be at least subjectively appraised. In general, we should move toward thinking in terms of programs that perform tasks and yield end-products (speaking rather loosely) rather than actions that yield objects or intermediate products.²

For example, consider the attempt to derive clues to the gains and costs of defense programs. (Since defense accounts for a large proportion of government expenditures, I shall use defense activities to illustrate many points.) We can think in terms of activities that perform tasks or missions, or we can think in terms of objects. Certain activities of the Air Force, Army, and Navy produce retaliatory striking power or deterrence and might be grouped together as a *program*. In providing deterrence, the Services use *objects* such as missiles, manpower, food, and transportation.

² I use this terminology largely because *The Budget of the United States Government* distinguishes between "programs" and "objects."

Several points about programs and objects should be noted. First, decisions about the size of programs and those about the things to be bought are interdependent. One would not make one of these decisions in complete ignorance of the other. If the desired striking power is increased, different types of equipment may become the most efficient means, and if some new type of equipment appears (e.g., more accurate ballistic missiles), a different level of striking power may become the proper choice. But to some extent these choices have to be made separately—by different people or at different times. In making one choice we must try to make reasonable assumptions about the other.

Second, as suggested previously, just what one means by a “program” is not unambiguous. The line of demarcation between programs and objects is not clearcut. Is the Military Air Transport Service (MATS) a program or simply an activity supporting, say, the Tactical Air program? Or is the latter merely something to be purchased for a program that might be called “deterrence and fighting of limited wars”? Even such tasks as providing deterrent striking power and forces for limited war have interrelationships. Neither is solely a supporting activity of the other, yet each can influence the credibility and effectiveness of the other. It may seem that one is driven to regard every defense item and activity as an object purchased for and contributing to *one* program—national security. Such an aggregation, however, would be too broad; we have no conception of units of “national security” that are being purchased.

Despite these complexities, officials do find it helpful to think in terms of programs, and there is hope of developing still more useful categories. Complications and difficulties abound, and yet for some such programs we can make judgments about (or even develop quantitative clues to) their value as well as their cost. To be sure, attention should also be given to the detailed objects of expenditure. The way government agencies use materials and manpower deserves hard scrutiny—even at the highest levels. If Congress can, through the review of expenditures, perceive better ways to combine objects or discover wasteful purchases that can be eliminated, it should certainly insist upon the increased efficiency. But objects of expenditure do get a goodly share of attention at the Congressional level. The annual hearings on appropriations are to a considerable extent about such matters as maintenance costs, the utilization of

surplus butter and cheese by the Services, travel costs, and the location of flag officers' quarters. Here, however, I wish to stress that the broader problem, the selection of the scale of programs, also deserves careful attention. At whatever degree of efficiency can be achieved, the question remains: Should the nation buy larger or smaller programs? Are the last increments to existing programs worth their cost? Would further increments to particular programs be worth more than their cost?

To these questions, we cannot provide definitive quantitative answers, of course. No analysis can yield solutions to the problem of choosing program sizes that would necessarily be valid for all congressmen and voters. There is no use, as I see it, in trying to find optimal solutions to *this* problem by means of elaborate linear programming models and sophisticated computational techniques. Each person's answer depends upon how much value he attaches to the outputs of various governmental programs. It depends upon his attitude toward risks and uncertainty—that is, upon whether he is inclined to gamble or to hedge. It depends upon his valuation of “spillover effects” on other programs and impacts that cannot be made commensurable (in any *generally* valid way) with the main effects of the programs. Nonetheless, we can devise budgetary exhibits and analyses that facilitate weighing the gains and costs of alternative program sizes.

In the following sections, I turn first to exhibits of costs and then to the possibilities of appraising gains. Most of the time, I shall use the defense budget and defense activities to illustrate these possibilities. It might be noted too that I am regarding certain changes, such as more extensive crossing of departmental lines, as being politically feasible. Such reforms could be achieved either by organizational changes or by the preparation of special exhibits separate from the main budget documents.

2. Breakdowns of Cost in Recent Budgets

Since 1949, budgetary presentations have been improved. Proposed obligational authority and expenditures³ have been collected into

³ In the United States budget, “obligational authority” is total authority to make commitments during the designated fiscal year, whether the cash is to be expended in that year or later on; and “expenditures” are the estimated disbursements during the fiscal year, whether the obligations were incurred in that year or previously. I shall refer mostly to obligational authority here, believing that it approximates future costs more closely than would the scheduled disbursements.

one document and put into somewhat more meaningful categories than had previously been used. These recent presentations probably make possible more informed judgments about expenditure levels than could be made in earlier years. Nonetheless, the current document falls far short of being an effective program budget. Perhaps the best way to bring this out is to discuss briefly a few sample exhibits from a recent budget.

A. THE BROAD FUNCTIONAL BUDGET

There is, first, the functional budget in which activities are put into extremely broad programs like labor and welfare, commerce and housing, and international affairs and finance.⁴ (Defense outlays are collected into one huge program called "major national security.") To appreciate the cost and significance of such programs is almost impossible. Few persons have any subjective "feel" for the worth of the outputs from these categories. And there is little hope of ever devising quantitative measures that would shed much light on the worth of such conglomerations. To try to sort out less inclusive programs would seem to be a more promising approach.

B. THE CURRENT "PERFORMANCE" BUDGETS

The present budget does classify expenditures into less inclusive categories that have often been called programs.⁵ There are fairly detailed exhibits in terms of both programs and objects. In the Defense Department Section, however, the classification of expenditures by program turns out to be a classification by organization unit (Army, Navy and Air Force) and account title,⁶ though the exhibit for each account title is accompanied by a few paragraphs purporting to describe "program and performance." Consider the summary presentation of the Air Force budget that appeared (until the Budget for 1960) at the front of the section. (In order to conserve space, Table 1 omits proposed expenditures and shows only proposed new authorizations.)

Note the nature of these "programs." Few of the items on this

⁴ *Budget of the United States Government for the Fiscal Year Ending June 30, 1958*, Table 2, "Summary of Net Budget Expenditures by Function and Agency," U.S. Government Printing Office, 1957, p. A5.

⁵ In the Budget for fiscal-year 1960, these categories are labeled "appropriation groups," and the amounts for the Army, Navy, and Air Force are combined into totals for the Defense Department instead of being shown separately. The points presented here, however, still apply.

⁶ The "account titles" are the major "programs" listed in Table 1.

EVALUATING EXPENDITURE PROGRAMS

TABLE 1
Budget Authorizations and Expenditures (Air Force)
by Organization Unit and Account Title

DEPARTMENT OF THE AIR FORCE	NEW AUTHORIZATIONS (millions of dollars)		
	1956 <i>Actual</i>	1957 <i>Estimate</i>	1958 <i>Estimate</i>
Aircraft and related procurement	\$6,287	\$6,849	\$6,200
Procurement other than aircraft	350	1,140	1,225
Research and development	593	712	661
Operation and maintenance	3,597	3,743	4,225
Military personnel	3,709	3,690	3,840
Reserve personnel	44	59	57
Air National Guard	192	259	263
Military construction	739	1,228	-
Miscellaneous:			
Contingencies	-	-	-
Preparation for sale or salvage of military property (indefinite, special account)	6	10	10
Total, Department of the Air Force	\$15,517	\$17,690	\$16,481

SOURCE: *The Budget of the United States Government for the Fiscal Year Ending June 30, 1958*, p. 488.

list are even remotely like end-product missions, and the dollar amounts are not the costs of achieving capabilities in such missions. Instead, the items are collections of objects used in a variety of Air Force missions; and the dollar figures are the sums of selected costs from all of them. For instance, "military personnel" covers officers and men for the Strategic Air Command, tactical air capability, and all other activities. How does one choose the amount that should be spent on categories like across-the-board procurement or military personnel?

As might be expected, the further breakdown of these items helps little in appraising program levels. Consider, for instance, the breakdown of expenditures for military personnel into activity-categories—shown in Table 2. These so-called "activities"—e.g., pay and allowances, clothing, subsistence in kind, and travel—are really species of objects, and are just as remote from tasks or functions as is "military personnel."

It was mentioned at the outset that current budgetary exhibits include breakdowns of expenditure both by programs (so-called) and by objects. In order to make clear what these objects are and why they do not convey useful information about end-product

EVALUATING EXPENDITURE PROGRAMS

TABLE 2
Obligations for Air Force Military Personnel,
by Activities

	OBLIGATIONS (millions of dollars)		
	1956 Actual	1957 Estimate	1958 Estimate
Program by Activities:			
1. Pay and allowances	3,284	3,250	3,332
2. Individual clothing	75	74	70
3. Subsistence in kind	150	159	161
4. Movements, permanent change of station	204	210	227
5. Other costs	5	5	51
Total obligations	\$3,718	\$3,698	\$3,840 ^a
Financing:			
Comparative transfers from (-) other accounts	-9	-8	-
Appropriation	3,709	3,690	3,840

SOURCE: *The Budget of the United States Government for the Fiscal Year Ending June 30, 1958*, p. 548.

^a Totals may not add because of rounding.

TABLE 3
Obligations for Air Force Military Personnel,
by Objects

	OBLIGATIONS (millions of dollars)		
	1956 Actual	1957 Estimate	1958 Estimate
1 Personnel services: military	\$3,372	\$3,337	\$3,410
2 Travel	106	111	120
3 Transportation of things	66	66	72
5 Rents and utility services	-	^a	6
7 Other contractual services	19	19	21
8 Supplies and materials	150	159	161
10 Lands and structures	-	-	^a
11 Grants, subsidies, and contributions	^a	^a	^a
12 Pensions, annuities, and insurance claims	4	5	4
14 Interest	1	1	^a
15 Taxes and assessments	-	-	46
Total obligations	\$3,718	\$3,698	\$3,840
Comparative transfers from (-) other accounts	-9	-8	-
Appropriation	3,709	3,690	3,840

SOURCE: *The Budget of the United States Government for the Fiscal Year Ending June 30, 1958*, p. 549.

^a Less than \$500,000.

programs, Table 3 presents a sample breakdown of authorizations by objects—the one for Air Force military personnel.

The amounts proposed for these object classes (e.g., personnel services, transportation of things, supplies and materials) may aid officials in locating inefficiencies; though systematic analysis would be necessary before anyone could be reasonably sure where inefficiency existed. Such a list of amounts can scarcely assist anyone, however, in weighing alternative program levels.

3. *Improving the Breakdown of Costs*

The first step toward getting more useful exhibits is to put budget figures into categories that more nearly correspond to end-product functions. Officials can make more perceptive judgments about the importance to the nation of these functions than they can make about the worth of categories like those listed above. Moreover, as will be indicated later, there is hope of devising useful quantitative clues to the importance of end-product missions. Thus, for these programs, there would be both rough estimates of the costs and a chance of gauging the gains.

Let us follow through the Defense Department illustration, keeping in mind that the aim would be, for any part of government, to think in terms of more meaningful programs. In the Defense Department, activities that contribute to an end-product program are seldom confined to one branch of the service. Naval operations and the Army's role in active defense contribute to strategic deterrence. All three departments—Navy, Army, and Air Force—contribute to limited-war capability. Hence, a budget designed to show the approximate cost of "end-product programs"⁷ would have to cross departmental lines.

In Exhibit 1, there are essentially three broad programs—(1) deterrence or fighting of all-out war, (2) deterrence or fighting of limited war, and (3) research and development. Each of these would be divided into component missions. Many of the latter would be interdependent to a considerable degree (the broad programs to a lesser degree), and the incremental costs of one would depend in part upon the sizes of the others. Some parts, such as a submarine force or a transport fleet, would contribute to both the nuclear

⁷ As stressed previously, I use the term loosely. At best, no aggregation of defense activities yields an output that is unambiguously an independent end-product, and some "programs" will inevitably comprise left-overs or aggregations for which no clear-cut end-product can be defined, let alone measured.

EVALUATING EXPENDITURE PROGRAMS

EXHIBIT 1

Pro Forma National Security Budget

<i>Programs and Subprograms</i>	<i>Proposed Force Composition (No. Military Units, Where Applicable)</i>										<i>Expenditures Implied by Proposed Programs</i>									
	'60	'61	...	'64	'65	'60	'61	...	'64	'65	'60	'61	...	'64	'65					
Deterrence or Fighting of All-Out War																				
Nuclear striking force (AF, Navy)																				
B-47																				
B-52																				
Atlas																				
Polaris																				
etc.																				
Active defense (Army, Navy, AF)																				
Early warning																				
Interceptors																				
F-102																				
etc.																				
Local defense																				
Nike																				
Bomarc																				
etc.																				
Passive defense (OCDM, FCDA)																				
Dispersal																				
Shelters, evacuation																				
Recuperation planning																				
Deterrence or Fighting of Limited Wars																				
Ground forces (Army, Marine)																				
Sea power (Navy)																				
Tactical air (AF, Navy)																				
Transport (AF, Navy)																				
Air																				
Sea																				
Military aid to other countries (mutual security)																				
Reserves for mobilization																				
Military units (AF, Army, Navy)																				
Defense production (OCDM)																				
Research and development (AEC, AF, Army, Navy, etc.)																				
Exploratory																				
Weapon systems																				
General Administration																				
Miscellaneous																				

deterrent capability and the limited-war mission. For this reason (as well as others), the costing of programs would necessarily be approximate.

In principle, one always wishes to know the incremental cost of whatever policy or program he is considering. In the budgetary exhibits suggested here, the costs of programs and program-increments would be rough approximations. Joint costs might be allocated among programs according to crude rules of thumb, or sometimes assigned to one program with recognition that others were being aided (or hindered, as the case might be). Some items used jointly, such as top administration, could be considered as separate aggregates (called, for the sake of convenience, "programs").

The particular aggregations in Exhibit 1 simply represent one set of possibilities. There may be other aggregations that would be equally or more useful. Additional meaningful programs might be formulated from the activities in the "all other" or "miscellaneous" category. I believe that Exhibit 1 does indicate, however, the direction in which our budgetary exhibits should be evolving.⁸

4. Indicators of Performance in Recent Budgets

Budgetary presentations today do attempt to describe the product that is being purchased. Since 1949, when the Services were instructed to submit "performance budgets," they have classified proposed outlays into programs or appropriation-categories such as those previously discussed, and they have tried to indicate the output or performance that would be purchased. The indicators are not very revealing, however, chiefly because the categories into which outlays are grouped are remote from end-product programs. As an example, consider the paragraphs on the performance of the "military personnel" category—the one that also served in Tables 2 and 3 to illustrate other points:⁹

⁸ The use of the exhibits just suggested would call for, or be aided by, a number of changes in current estimation procedures—for example, increased emphasis on the use of statistical cost factors and a shortened budget cycle, increased attention to costs during the formulation of proposed programs (i.e., prior to their translation into budgets), and an improved system of accrual accounting and costing of programs. Some of these reforms are discussed in Smithies, *op. cit.*, pp. 237–65, and in David Novick's *Weapon-System Cost Methodology*, Report R-287, The RAND Corporation, February 1, 1956.

⁹ This passage, including the title at the beginning and the numbers at the end, is an excerpt from *The Budget of the United States Government for the Fiscal Year Ending June 30, 1958*, pp. 548–49.

Program and Performance

1. *Pay and allowances.* Provision is made for pay, separation travel, and other allowances of military personnel, including aviation cadets and cadets at the United States Air Force Academy. Also included are personnel of the Reserve components while on active duty for purposes other than undergoing training such as duty under section 265 or 8033 of title 10, United States Code. The 1958 estimate includes the cost of enacted legislation for increased pay and allowances for doctors and dentists.

Provision is made for amounts otherwise available as quarters allowances to be paid (1) to the revolving fund for "Acquisition, rehabilitation, and rental of Wherry Act housing," in cases where such housing is assigned as public quarters, and (2) as mortgage payments on Capehart housing.

The revised 1957 estimate provides for an end strength of 15,300 below the number previously approved and a reduction of 5,957 man-years.

2. *Individual clothing.* Provision is made for the payment of authorized monetary clothing allowances, including initial uniform allowance, maintenance allowance and special supplemental allowances, to enlisted personnel and aviation cadets for individual clothing requirements.

3. *Subsistence in kind.* Provision is made for the procurement of subsistence supplies for issue as rations to enlisted personnel, including emergency and operational rations.

4. *Movements, permanent change of station.* Provision is made for permanent change of station movements of individuals and groups of military personnel and their dependents, including dislocation allowance, storage of household goods in commercial facilities, movements to and from overseas by Military Sea Transportation Service, and for transportation of household effects and personal automobiles. . . .

The number of military personnel provided for by type is shown in the tables on page 348.

The only parts of the above passage that convey much are the numbers at the end; and they, since personnel are ingredients rather than end-products, are not very informative. Sometimes descriptions of performance are a good deal worse, constituting merely colorful

EVALUATING EXPENDITURE PROGRAMS

Type:	Average Number		
	1956 Actual	1957 Estimate	1958 Estimate
Officers	142,127	142,273	142,655
Enlisted personnel	792,275	769,296	775,599
Aviation cadets	3,502	2,776	2,381
Air Force Academy cadets	270	518	776
Total	938,174	914,863	921,411

Type:	Fiscal Year End Number		
	1956 Actual	1957 Estimate	1958 Estimate
Officers	142,093	142,500	143,500
Enlisted personnel	764,609	774,890	778,265
Aviation cadets	2,993	2,800	2,475
Air Force Academy cadets	263	510	760
Total	909,958	920,700	925,000

pleas for a program. It is not surprising that some officials prefer a budget in terms of objects to be purchased. With the latter one can at least try to say something about the internal efficiency of programs. The advantages of a program budget are considerably reduced if the indicators of performance are uninformative.

5. *Improving the Indicators of Performance*

If activities are grouped into more appropriate aggregates, however, it seems likely that better subjective appraisals of output can be made and also that better indicators of performance can be provided.

A. PROGRAMS FOR WHICH DOLLAR GAINS CAN BE ESTIMATED

There are a number of government activities for which gains in terms of dollars can be estimated.¹⁰ Wherever reasonable estimates of this type are feasible, gains and costs of increments to programs

¹⁰ Results of surveying the Federal Budget for possible programs of this sort are summarized in the writer's *Efficiency in Government Through Systems Analysis, with Emphasis on Water Resource Development*, Wiley, 1958, pp. 279-309.

can be directly compared. There will still be serious difficulties in reaching decisions because of such things as interdependencies among programs, uncertainties and variability of outcomes, and "spillover effects" that are not commensurable with the other costs and gains. But estimates of predicted outcomes (plus perhaps some clues to variability, interdependencies, and spillovers) can lighten the burden of weighing these various considerations and lead to better-informed decision-making.

The possibilities of estimating dollar gains from increments to certain governmental tasks have been illustrated in several studies.¹¹ William A. Vogely has tried some promising techniques and lines of reasoning for measuring the gains from the land, minerals, and grazing programs in the Bureau of Land Management.¹² The estimates strongly suggested, for example, that increments to the grazing program at the present time would have an extremely low rate of return.¹³

B. PROGRAMS FOR WHICH GAINS IN MEANINGFUL PHYSICAL TERMS CAN BE ESTIMATED

In most government programs, however, the dollar gains cannot be measured. Once again consider defense activities as an example. It is obviously impossible to put a generally valid price tag on the output. The gains from program increments cannot therefore be expressed in the same units as the costs, and the two cannot be compared in terms of a common denominator. But there is hope of describing the product meaningfully, and some ways of describing it are more meaningful than others. Similarly, no researcher can measure the ultimate worth of a new car to a particular consumer. But there is hope of describing this product, and what the car will do is a more meaningful description to the consumer than the car's chemical composition.

Changes in Force Structure

As a first approximation, force structures for each category in Exhibit 1—numbers of B-52 wings, Atlas squadrons, army and naval

¹¹ For example, *ibid.*, pp. 253-78, where an attempt was made to estimate the prospective gains from increments (positive or negative) to forest-service activities, and William A. Vogely, *A Case Study in the Measurement of Government Output*, Report RM-1934-RC, The RAND Corporation, July 9, 1957.

¹² *Ibid.*, pp. 29-49, 63-84, 98-114.

¹³ *Ibid.*, pp. 108-109.

units of various types—are closer to end-products than numbers of personnel. To some extent, the quantity of wings and divisions in each category suggests what is being purchased. This information is constantly used at present by officials in the Services and in the Defense Department, and by our legislators in various Congressional hearings. Numbers of wings and divisions, however, do not reveal enough about capabilities. For one thing, force structure *per se* does not tell anything about the enemy's position or about his probable reaction to changes in our force structure. Yet what our forces buy for us is clearly relative to the enemy's capability and his reaction to our decision. Can he easily counter our move? What deterrent capability (or ability to fight local wars) will we end up with? Will our action yield a better basis for finding mutually advantageous weapon limitations?

For another thing, force structure *per se* may not tell much about the kind of capability that it provides. An augmentation of our forces may increase our capability to strike first, but not our ability to strike second. If so, it may produce negative deterrence. Or, additional divisions may increase our ability to fight World War III but not our strength in more likely kinds of conflicts. If so, they may produce small gains.

Changes in Designated Capabilities

Fortunately, it is often possible to indicate more meaningfully what program increments will buy. Quantitative analyses can be made comparing alternative ways of carrying out broad missions such as the strategic deterrence mission. Such analyses usually seek to answer questions like: What combination of means yields the greatest deterrent capability for a given budget? Capability might be measured by the destruction that could be inflicted on potential enemies in selected contingencies, even if we received the first strike. Similar analyses can be devised to answer a different type of question: What capabilities are yielded by different program levels? What changes in capability result from program increments or decrements? The analyses would by no means point to the preferred program levels—but they would give highly relevant indicators of performance.¹⁴ Analysis can also provide revealing indicators of another gain from portions of the strategic deterrence mission—namely,

¹⁴ The quantitative nature of these problems is indicated by Albert Wohlstetter in "The Delicate Balance of Terror," *Foreign Affairs*, January 1959, especially pp. 213-7.

the contribution of retaliatory capability, active defenses, passive defenses, and recuperation planning to the chance of survival in the event of enemy attack. Analysis can give a rough yet informative picture of, say, people and stocks that would survive a plausible enemy attack.

In addition, analysis of this sort might be able to reveal what different program-levels could accomplish in the limited-war mission (another of the broad programs listed in Exhibit 1). Calculations might give clues to the scale and kinds of local aggressions that could be "handled" with alternative programs for limited-war capability. The results would constitute quantitative clues to what we could do in various plausible contingencies. Obviously the outcomes of such conflicts could not be projected with precision. Nonetheless, such clues to our capability would probably be more revealing than numbers of divisions, tactical air units, and so on.

These indicators of gain would not embrace all possible effects of program changes. There would be "spillover effects" on other programs. For instance, a change in strategic deterrence capability would have some influence on our prospects regarding limited conflicts. There would also be other impacts not reflected in the suggested indicators of performance—impacts on our relations with neutral or friendly nations, on the basis for trying to reach mutually advantageous agreements with enemy nations, and so on. Nonetheless, such indicators of gain would help sort out the *major* implications of alternative program-levels, facilitating the task of weighing the costs and gains of program increments or decrements.

As for the research-and-development program, there is probably no good way of indicating the performance that would be purchased with alternative program-levels. Estimating the results of research is even more uncertain than measuring the consequences of, say, future programs for limited war. We can try to estimate the potential gains *if* certain break-throughs or developments can be accomplished, and such estimates are valuable clues in shaping research and development programs. Even though estimates of potential payoff are helpful, however, tremendous uncertainties must be recognized. Hence, while the output of research and development is of great significance to future capabilities, that output is highly uncertain in both form and magnitude, and there is no way to show what a particular year's program will bring.

It is partly for this reason that it seems to be appropriate to break

out research and development as a separate program. In a sense it is a supporting activity. But we do not know to what extent it will turn out to support strategic deterrence and to what extent it will support other missions. Moreover, because the program's objective is to explore rather than to carry out a well-defined task, research and development should be managed differently from operational missions. It is best, therefore, to regard research and development as a separate program—but no over-all indicator of performance in these activities (or in Administration and Miscellaneous!) can be provided.

Where meaningful indicators were feasible, they would have to be separate exhibits, not just a few numbers in another column of Table 4. But they would be introduced *along with* the breakdown of costs by broad missions. In the case of defense programs, the breakdown of costs, the indicators of performance, and the underlying analyses might all have to bear a military classification. These tools, nonetheless, could be valuable to military planners, to officials in the Defense Department and the Budget Bureau, and to congressional leaders.

For many other governmental activities, too, meaningful measures of gain from program-increments can probably be devised. As an illustration, I have talked mainly about defense, gains from which are typically regarded as being particularly difficult to assess. What I hope this discussion suggests is that, in many governmental operations, there is hope of measuring more meaningfully what we are buying. We can often do better than to measure the number of manhours used, the number of post offices built, or the number of trees planted. We can often devise measurements that get at least somewhat closer to what we really *want* to buy—and get close sometimes to the *value* of what we want to buy.

COMMENT

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The combative discussant always looks forward to reading the paper prepared for comment. There is the search for errors of analysis or interpretation with which to confound the author. A careful reading may disclose a passage that suggests an inadequate

historical perspective. A phrase may be lifted out of context and employed for purposes of harassment. We might call this the Art of Discussantmanship.

Unhappily, Mr. McKean's paper is a disappointment in this regard. The traditional devices of the combative discussant are not available; the search for error has been unavailing; the major conclusions and most of the subpoints are unassailable. McKean is surely right in pointing out that a further analysis of costs and gains is desirable for government expenditure programs, that the national defense budget is particularly inadequate in its cost/gain aspects, that the first step in improvement is a better definition of programs within the Department of Defense, that there will always be difficulty in measuring dollar gains for defense, but that at least the major implications of program levels can be quantified, and that there are some expenditure areas, such as research and development, that are particularly difficult.

These conclusions suggest comments that will be directed here to three points. The first will consist of a rapid review of the whole range of efforts in the last ten years to improve the quality of budgetary decisions in governments in the United States. The second, an examination of some specific measurement problems, to indicate answers to the question: Where do we go from here? And the third, a brief restatement of the goals of traditional budget-making.

1. Recent Progress in Budget Measurement

The last ten years have brought a rather large number of developments in the practice and more recently in the theory of budgeting. The first of these, in point of time, is the introduction of performance budgeting by a rather large number of cities, and a few states and other units of government. In some cases, as in Richmond, Virginia and the state of Maryland, the performance units selected for measurement are simply broad programs, resting on existing organizational structure. In other cases, as in Los Angeles, there has been a serious effort to provide a firm cost-accounting support for budget justifications, with careful and detailed measurement of work units and activities. And in dozens of other jurisdictions there has been a thorough reclassification of expenditures, conducted in the name of performance or program budgeting. Unfortunately, no one has surveyed and analyzed all or even a major portion of these efforts.

Two significant developments have taken place in the national government. The first can also be described as the performance or program approach. The Department of Defense has taken the lead here but in that Department the heightened tempo of organizational change, changes in definitions of programs, projects and sub-projects, and the reassignment of budgetary responsibilities make it impossible for the outsider to appraise the results. The insiders are apparently too busy accommodating to change to be able to analyze the state of improvement, if any.

The development of performance budgeting in the national government has produced the cost-type budget statement whose applications are being continuously extended. This classification, utilized by both the military and other agencies, is a careful analysis of program costs. It does not attempt to measure gains in dollar terms other than those revealed by savings in costs for a government output level as authorized.

The second development at the national government level is the expanded use of an old technique developed by the Navy—the stock and industrial fund, or the “public enterprise fund,” as it is commonly called. This has been useful from an administrative standpoint in segregating some kinds of activities that are notoriously difficult to budget.

Apart from reforms within government agencies, a significant development in budgetary theory and practice has come by way of the work of the RAND Corporation. The major effort has been directed to the military, with efforts to measure costs, objectives, alternative production possibilities for achieving these objectives, and performance. The major conceptual advance has been on the gain side of the cost/gain ratio. McKean's paper is an outgrowth of this, and shares, with the other work of RAND, a concern for both the conceptual apparatus and the arduous task of measurement.

The public finances of water resources have also been subject to particular examination, as a part of the theory of public expenditures. Major theoretical and measurement contributions have been made in the work of Krutilla and Eckstein on multiple purpose river development, of Eckstein on benefits and costs, and of McKean on water resource project analysis. Finally, there is the more purely conceptual work of Samuelson and Musgrave which contribute substantially to a more sharpened analysis of the activities of the public sector.

All of this adds up to a considerable amount of effort devoted to thinking about government activity, to the measurement of government activity, to improvements in budgetary technique. It is sometimes instructive, when contemplating a major shift in professional and practitioner concern such as this represents, to ask, "How come?" Why is it that the theory and practice of public expenditures, so long neglected, suddenly comes to the center of attention? The answer may be obvious. It may be that the sheer growth in the public sector has caught the attention of economists with their traditional concern for resource allocation and efficiency. But I suspect there is a bit more to it. Efficiency and economy have been around a long time, as have government cost accounting and work measurement. It may be that this heightened concern with the analysis of government programs is a simple out-growth of strong pressures from the private sector to protect that sector from what are thought to be the threats of big and uncontrolled government. The professional concern with measurement may be a manifestation of the same concerns as the recent taxpayers' revolts in state capitals, and the current popular identification of inflation with any increase in government expenditure.

However, it should hastily be added that the practice of economy and efficiency must not be regarded as evil. Improvement in the effectiveness of government programs is a laudable objective even if its by-product is the protection of the affluent taxpayer. But surely there is a bit of irony in a situation where efficiency and economy in government will contribute to the expenditure of tax-released dollars on prestige symbols such as larger automobiles, that will in turn force larger public outlays for such programs as highways and parking facilities. I am inclined to agree with Galbraith that we need additional resources in the public sector. We might do better to worry more about how to increase the dollars in this sector than to worry about the effective employment of the dollars already there. Efficiency in the interest of retrenchment is one thing; efficiency in the interest of an improved quantity and quality of government services quite another.

2. Where Do We Go From Here?

As we turn to more technical considerations, it may be appropriate to say a few words at the outset about the cost aspects of the cost/gain ratio. For a great many public programs the measurement

of cost poses no particular problem. The attribution of government staff costs to programs or activities would appear to be as difficult but no more difficult than the attribution of overheads to product costs in industry. In most instances, this can probably be handled best by simply neglecting it, that is, by measuring program costs with an appropriate break-out of fixed and variable and by the treatment of departmental overheads as a separate program or activity whose end product is not subject to measurement.

Far more serious is the case of joint costs in government, as, for example, in water resource programs. A multiple purpose dam and reservoir produces a number of water derivatives such as flood control, hydro power, and water supply. In these circumstances in the private sector Alfred Marshall told us that price is a function of demand. But for a public project, demand cannot be measured directly and we must resort to a synthetic attribution of joint costs in terms of alternative costs for specific water programs. This is conceptually unsatisfactory, but it is not easy to see any way out.¹ Unfortunately, substantial elements of joint costs in government programs are a pervasive phenomenon, as in the public works departments of municipalities.

There is a further range of cost problems that may be mentioned but not elaborated. These arise in comparisons of government activities with private activities. Here an effort is made to answer the question, as with hydro power development: how do public sector costs compare with private sector costs for an identical project? Even an approximation to the answer requires careful analysis of interest costs, depreciation, allowance for risk and uncertainty, and taxes. These issues have been thoroughly explored in recent literature, but it could hardly be said that all controversy is settled.²

Nevertheless, and although the measurement of government program costs is not always easy, the problems are at least translucent. The gains side is more obscure but also more intriguing, because we are dealing here with a fine tangle of economic measurements, political processes, administrative procedures, and value judgments.

Starting at the definitional level, our concern is with the allocation

¹ Eckstein has recently stressed the arbitrary nature of joint cost allocation for resource projects but points out that there is no resulting distortion in public investment patterns as long as the cost allocation does not affect project justification. See Otto Eckstein, *Water-Resource Development*, Harvard University Press, 1958, pp. 259-72.

² See Eckstein, pp. 81-109; John V. Krutilla and Otto Eckstein, *Multiple Purpose River Development*, Baltimore, 1958, pp. 78-130; Roland N. McKean, *Efficiency in Government Through Systems Analysis*, Wiley, 1958, pp. 103-82.

branch, to follow the Musgrave terminology.³ Considerations affecting stabilization and distribution may be laid to one side, although the latter must be reintroduced later, together with the distinction between gains from the satisfaction of social wants and gains from the satisfaction of merit wants. Gains may be described as falling in three general categories, in accordance with the language of cost-benefit analysis. Direct or primary benefit is the immediate value of the output of government goods and services to the program beneficiaries. Indirect or secondary benefits are those "stemming from or induced by" the program, such as profits from additional economic activity that would not otherwise have been undertaken. This category is imprecise since it is never very clear as to how many rounds of activity should be embraced as indirect. Intangibles are all noneconomic or nonefficiency values, including the political, cultural, and social. Third party or spillover gains or benefits may arise in either the secondary or intangibles category but are separate from primary benefits.

With these categories as reference points, let us now attempt to divide measurement problems into three broad classes. The first are the cases where not even primary gains can be measured with precision, let alone indirect and intangible gains. The second class embraces cases where primary gains can be measured with some accuracy, but where secondary and intangible gains, not susceptible to measurement, may be more significant than the measurable gains. The third class consists of the cases where nonprimary gains do not predominate and where some rather precise measurements of gains and costs are possible on an incremental basis.

The first group, where there are the greatest difficulties in the measurement of even primary gains, includes two of the largest government programs—national defense and public education. As McKean says of defense, "It is obviously impossible to put a generally valid price tag on the output." Hoffman, of the RAND staff, in his AEA paper last December, concluded that the most that could be done was further exploration of alternative ways of achieving stated objectives.⁴ But the objectives, as Hoffman said, must be established by higher criteria, that is, by nonefficiency considerations. It may be laboring the obvious to emphasize that

³ Richard A. Musgrave, *The Theory of Public Finance*, McGraw-Hill, 1959, pp. 6-17.

⁴ Fred S. Hoffman, *The Economic Analysis of Defense: Choice without Markets*, RAND, Santa Monica, 1958.

concepts of consumer well-being, or alternative private cost have no applicability in this area.

Now it may well be, as some have suggested, that the value of national defense is infinite, and if so, we have no cause for concern; all resources except those for subsistence living must be channeled into defense. But even at a less philosophically absurd position it is most evident that we cannot even measure whether we are better defended this year than last. If the objectives themselves cannot be quantified, nor progress in achieving objectives, the contributions of the economic analyst will not be very significant. It can only be hoped that the political process will come to our rescue.

The measurement of gains from public education is almost as formidable as the measurement of national defense. But here, at least, we can describe the categories of gains. Education brings substantial primary, tangible benefits in terms of the increased earnings of those educated. But we cannot estimate the value of these either for particular individuals or for a whole society. If decisions about educational expenditure were made solely by households, it seems likely that the total volume of education would fall short of its potential social contribution. Neither is it possible to attach monetary values to the components of an educational system—to the life adjustment courses and the math courses. Then, of course, there are the third-party, tangible but nonmeasurable benefits, such as accrue to the employers of graduates of a vocational high school, and the intangibles, such as the value of an informed and cultured citizenry. Since the primary benefits cannot be measured, there is no way of knowing whether they are more important than the tangible and intangible third-party benefits.

Government programs of this first class—where all significant gains cannot be measured—are not likely to be undervalued because of this fact. Legislators and administrators are not waiting for measurements of gains from national defense and education. Decisions about the totals of such programs are not likely to be improved by additional measurements. The preferences of strong interest groups are well revealed in these areas and will continue to dominate public decision-making.

The second class of problems covers a rather large group of government programs for which some measurements are possible, but where the task is that of making sure that that which is measured is meaningful. Consider the case of an urban renewal program that

includes slum clearance, the construction of new housing units, widened streets, and the provision of public parks. Many of the gains from such a program can be added up in dollar terms—increases in property values, and in economic activity in and adjacent to the area. But such intangibles as the reduction of crime and disease rates and the improvement in urban esthetics cannot be put into the summation.

When this kind of problem is encountered in cost-benefit analysis for water resource projects it is customary to measure that which can be measured and describe that which cannot as a part of project justification. No doubt this is the best that can be done, but, in consequence, projects tend to be justified in terms of the measurable and the project values that are nonmeasurable are relatively neglected. This is the case with recreation, whose benefits are now valued in federal water-resource project-justification at an arbitrary \$1.60 per visitor day. This figure reflects average daily expenditures of public park visitors for admission and parking fees, outlays for food and beverages, and other concessions within the park area. Even if this were an adequate measure of average visitor benefits, which it is not because the admission fee is a subsidized price, the \$1.60 figure would omit such tangible but nonmeasurable gains as the long-run improvement in the health and productivity of a society with adequate recreation facilities. In consequence of this valuation technique, reservoir-based recreation facilities are not now highly developed and at the moment we have an Army-Interior land-acquisition policy that is not only restrictive in its present scope, but also destructive of recreation values that might be developed in the future.

Another kind of measurement difficulty, again from the field of water resources, arises with hydro power values. The next several decades will undoubtedly bring multipurpose projects to a number of eastern river valleys. Hydroelectric power will be one of the project purposes. Prevailing practice requires that this power be valued, for purposes of project justification, at its most efficient use. This means hydro for peaking purposes, and if these values are to be realized in project operation, the power must be sold to large, integrated private companies with substantial peaking requirements. The preference customers—public bodies and cooperatives—are seldom in a position to utilize substantial amounts of peaking power; their needs are for base power. As a result, a *prima facie* case can be made in terms of economic efficiency for modifying existing preference policy,

shunting the public bodies and cooperatives to one side and selling the power to private distributors. But the efficient solution is, in this case, a single-faceted kind of efficiency that neglects the values of a long-range power-marketing arrangement embracing both private and public distributors, an arrangement that can be sustained only by the continued application of the preference clause. It can be demonstrated, I am convinced, that our mixed system of public and private power gives rise to a kind of competition that checks monopoly, supplements traditional rate regulation, and produces significant long-run gains in terms of lower retail rates and wider markets for electric power. To preserve these long-run efficiencies it will be necessary to continue to provide governmental support that will have the unfortunate appearance of a subsidy to the inefficient.

These examples—urban renewal, recreation, public hydro power—illustrate that in some areas decisions about alternative government expenditures cannot be based solely on the things that can be measured. Very often the nonmeasurables have a societal significance that exceeds the significance of the measurable values. In other cases the efficiency values that can be measured reflect short-range expediencies. There are “higher criteria” in areas of public expenditures other than national defense. The general point is that not all values in our society center on the private market and on the preferences of the sovereign consumer.

The third class of government programs is made up of those where measurable gains are significant indicators of performance and where additional quantification is likely to be productive of results useful for decision-making. Vogely of the RAND Corporation has provided an excellent case study of this type in his examination of the Bureau of Land Management of the Interior Department.⁵ McKean has suggested additional cost/gain measurements, on an incremental basis, for the Forest Service and for other resource management programs.⁶ Techniques of this type are now rather widely applied to decisions about highway expenditures at the state and even the local level.

Unfortunately, the dollar volume of all programs of this type is not large. For the national government, defense outlays, veterans' benefits, welfare expenditures and agricultural price supports, to

⁵ William A. Vogely, *A Case Study in the Measurement of Government Output*, RAND, Santa Monica, 1958.

⁶ *Op.cit.*, pp. 247-309.

name major areas only, must be excluded. For state and local governments it would be necessary to exclude welfare, education, and police protection, although the costs and gains of many aspects of institutional care and public works construction and operation could be measured with reasonable accuracy. There is work to be done here by both economists outside government and by the budget practitioner.

There is a final point affecting all types of measurement problems in government expenditures. This can best be elaborated in terms of the Musgrave framework that conceptualizes a separation between the allocations branch for public goods, and the distribution branch where considerations affecting income by size class must be dealt with.

Musgrave has recognized that in the real world these branches are not, in fact, separated, and that decision-making about government programs must necessarily embrace both branches simultaneously. Let us look at some aspects of this interrelationship by examining budget-making as a political process.

There are a great many public goods that are demanded not by individuals, acting in their capacities as consuming householders, but by individuals acting in their capacities as representative of producer groups. Government programs for almost all aspects of resource development—navigation, flood control, and reclamation, and programs for farmers, and for highways and airports fall in this category. The public goods that are demanded here are not for the satisfaction of the nonrevealed preference of consumers, but for the satisfaction of the strongly-revealed preferences of producer groups.⁷ What is it these producer groups want? Their demands are in fact for a larger share of the national income. The employees and stockholders of an electronics firm are very likely to have a greater preference for national defense expenditures than the employees and stockholders of a diaper manufacturing concern. A steel company that operates a fleet of ore boats will have a greater preference for navigation improvement than will a railroad. The demands of producer groups for government goods are, of course, distributional demands, but not of the kind that can be taken care of by an income tax directed at the distribution of income by size class. Economic power considerations are at stake here.

⁷ A similar point has been made by Julius Margolis, "A Comment on the Pure Theory of Public Expenditures," *Review of Economics and Statistics*, November 1955, pp. 347-9.

It would be possible to conceptualize a model to deal with these cases. For example, intermediate goods to be provided by government, such as a resource development program, could be isolated and maximizing equations elaborated. Principles could be devised for the compensation of the losers by the producer groups that gain. And as Musgrave has proposed, goods to satisfy social wants could be distinguished from goods to satisfy merit wants, with a dividing line between the two described in terms of the exclusion principle.⁸ But models drawn along these lines would have no relation to reality. Once an activity is within the public sector, decisions about expenditures combine program and distributional considerations.

This is the reality of interest group pressures with which the administrator and legislator must deal continuously. The economist who attempts to measure program gains in terms of consumer preference is not talking about the same world as the administrator or legislator who must look continuously to the relative distribution of economic power among producer groups. The public decision-maker does not proceed on the assumption that social goods are consumed equally by all. His assumption is quite the opposite—namely, that all government programs have distributional consequences; the political process is an assessment and balancing of the relatives of economic power.

3. *The Traditional Role of Budget-Making*

In government budgeting our zeal for quantification and the emphasis that we attach to it may well cut us off from communication with the political decision-maker, particularly if we insist that efficiency and economy, as measured by market techniques, is the primary consideration.

An expanded role for the economist in the measurement of alternative government expenditures must be found within the existing framework of budgetary processes and procedures. I would submit that the traditional budgetary process, as practiced in governments in this country with strong executive leadership patterns, where implemented by competent central budget staff and where legislative

⁸ If the exclusion principle means simply that the enjoyment of government goods by A does not limit B's enjoyment, there is little difficulty with the concept. But if it means that government goods must be provided equally for all or consumed in equal amounts by all, the principle is an uncertain basis for classifying government activities. It is hard to find a government program, even national defense, that does not discriminate among beneficiaries in accordance with income, occupation, geographical location, or personal tastes and habits. See Musgrave, *op.cit.*, pp. 9-17, 37-41, 133-5.

review procedures are reasonably adequate does, in fact, contribute a great deal to the maximization of gains over costs. Further, it provides a mechanism for equating, insofar as possible, efficiency values with political values, and tangibles with intangibles. McKean says that procedure is no substitute for analysis. True, but traditional budgetary procedure in government embraces a good deal more analysis than is revealed in budget documents. Cost/gain considerations are very often examined with great care, often explicitly, and always implicitly.

In well-staffed and well-organized central budget offices, efficiency considerations are the continuous responsibility of the budget examiner. In most budget procedures proposed increases in appropriations are examined with particular care. New programs are subject to special scrutiny and changes above last year's appropriation to special justification. This, of course, is incremental budgeting as an assessment of marginal costs. Marginal gains, unfortunately, are not always examined with the same circumspection, but very often this is not the fault of the budget examiner, revealing a lack of understanding of effective resource allocation. Rather, the general dimensions of the program under review and the area or groups to be benefited have been specified in basic legislative enactment, and the examiner is not in a position to propose a revision in the authorizing legislation. This kind of incremental budgeting is practiced very widely. In fact, it may so dominate the work of a central budget office that total justification, that is, the re-examination of the whole program of an agency, may be neglected.

Traditional budget procedure also imposes a kind of efficiency by way of ceiling requirements. It is common practice in many governments for the chief executive or the budget officer to initiate the budget cycle with an announced ceiling within which agencies and departments must submit their requests. This technique forces on the agencies a re-examination of inputs and outcomes and serves as a kind of disciplinary ingredient that secures more effective resource allocation.

Finally, traditional budget examination is based very heavily on ordinary, run-of-the-mill measurements and comparisons. The Veterans Administration engages continuously, aided and abetted by the Bureau of the Budget, in the comparison of costs among field offices and among hospitals. Strong state budget offices, as in New York State, undertake comparative cost studies of institutional care

as a basis for budget decisions about operating expenses, and as a basis for selecting hospitals that shall remain open or be closed.

The budget examiner can achieve certain kinds of efficiencies. In addition, a well-articulated budget procedure will unite considerations affecting the kinds of efficiencies that may be subject to economic measurement with considerations based on other kinds of values to be maximized.

A central budget office does not necessarily conduct a better budget examination than a departmental budget office, but it conducts a different kind of examination. The department budget officer is close to program operation and program needs. The central budget office, if it is competent, has a perspective on many programs, on their interrelations, on the total program of the chief executive, and on the probable reception to the program by the legislature.

Similarly, legislative review is a different kind of budget examination than review by administration officials. The Congress, for example, is very much interested in costs and gains. But, as noted, it is also interested in the relative welfare of interest groups, the welfare of states and congressional districts, and the welfare of Democrats and Republicans. This is both the accommodation of conflict and the building of consent. All of this makes budgetary decision-making imprecise, which is simply another way of saying that budget-making is a political process well adapted to a pluralistic society.

Budget procedures and organization in the Commonwealth countries and in governments in the United States are a product of Anglo-Saxon patterns of executive leadership in administration. The executive budget system in the United States government is an outgrowth of the evolution of the Presidency since the turn of the century. In his institutional capacity the President is the general manager of administrative agencies and departments, the head of a state, and the leader of a political party. The Office of the Presidency thus becomes our most significant national political institution in the broadest sense of the word political. The budget of the United States government is a major instrumentality both expressing and contributing to the strength of the Presidential office.

The measurement of the economic costs and economic gains of government programs can be a significant part of budgetary decision-making. But it cannot and will not be the predominant concern. Budgeting is far more than a device for the allocation of public resources.