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Benefit-Cost Analysis of Government Regulation

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This booklet is one in a series designed to enhance the understanding of the private enterprise system and the key forces affecting it. The series will provide a forum for considering vital current issues in public policy and for communicating these views to a wide audience in the business, government, and academic communities. Publications will include papers and speeches, conference proceedings, and other research results of the Center for the Study of American Business.

Benefit-Cost Analysis of Government Regulation

by Murray L. Weidenbaum

DISCUSSIONS OF GOVERNMENT regulation of product hazards, such as toxic substances, frequently conclude that decision makers would be aided by the results of benefit-cost studies and related economic analyses.¹ This article tries to explain the role of such quantitative analyses in the regulatory process.

The motive for incorporating benefit-cost analysis into public decision making is to lead to a more efficient allocation of government resources by subjecting the public sector to the same type of quantitative constraints as those in the private sector. In making an investment decision, for example, business executives compare the costs to be incurred with the expected revenues. If the costs exceed the revenues, the investment usually is not considered worthwhile. If revenues exceed costs, further consideration usually is given the proposal, although capital constraints require another determination of the most financially attractive investments.

The government agency decision maker, however, does not face the same type of economic constraints. If the costs and other dis-

At the time of this printing, Dr. Weidenbaum was nominated Chairman of the U.S. Council of Economic Advisers. He was Director of the Center for the Study of American Business at Washington University in St. Louis when this article was written. Reprinted with permission from TOXIC SUBSTANCES JOURNAL, Volume 2, Number 2, Autumn 1980, pp. 91-102.

advantages to society of an agency action exceed the benefits and other advantages, that situation may not have an immediate adverse impact on the agency. However, such an action would have an immediate impact on a private business if one of its executives made an error. Such analytical information rarely exists in the public sector, so that, more often than not, the governmental decision maker is not aware that he or she is approving a regulation that is economically inefficient. The aim of requiring agencies to perform benefit-cost analysis is to make the government's decision-making process more effective, and to eliminate regulatory actions that, on balance, generate more costs than benefits. This result is not assured by benefit-cost analysis, since political and other important, but subjective, considerations may dominate. This may result in actions that are not economically efficient, but are desired on grounds of equity or income distribution. Yet benefit-cost analysis may provide valuable information for government decision makers.

The Economic Rationale

It may be useful to consider the economic rationale for making benefit-cost analyses of government actions. Economists have long been interested in identifying policies that promote economic welfare, specifically by improving the efficiency with which a society uses its resources.²

Benefits are measured in terms of the increased production of goods and services. Costs are computed in terms of the foregone benefits that would have been obtained by using those resources in some other activity. The underlying aim of benefit-cost analysis is to maximize the value of the social income, usually measured by the gross national product (GNP). For many years, certain federal agencies (such as the Corps of Engineers and the Bureau of Reclamation) have used benefit-cost analysis to evaluate prospective projects.

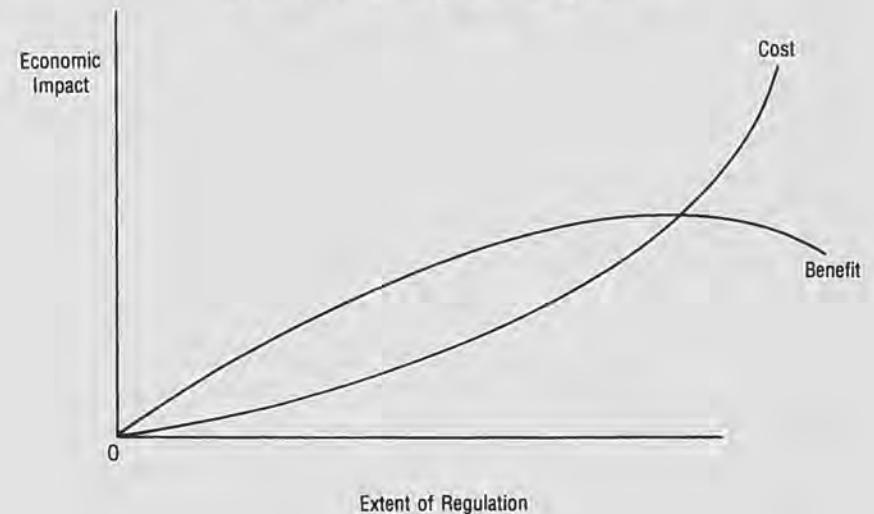
Despite important operational difficulties, including that of choosing an appropriate discount rate, which would correspond to a realistic estimate of the social cost of capital, these analyses have helped to improve the allocation of government resources. They have served as a partial screening device to eliminate uneconomical projects—those for which prospective gains are clearly less than

estimated costs. The analyses also have provided some basis for ranking and comparing projects and choosing among alternatives. Perhaps the overriding value of benefit-cost analysis has been to demonstrate the importance of making relatively objective economic evaluations of political actions and to narrow the area in which subjective factors dominate. Thus, if economically inefficient programs are approved, at least government decision makers know the price being paid for those actions.³

Applying Analysis to Regulation

Figure 1 shows the basic relationship of costs and benefits that tends to hold for most regulatory programs. Typically, the initial regulatory effort—such as cleaning up the worst effects of pollution in a river—may well generate benefits greater than costs. But the resources required to achieve additional cleanup become disproportionately high, and at some point the added benefits may be substantially less than the added costs. For example, a study of the impact of environmental controls on the fruit and vegetable processing industry revealed that it costs less to eliminate the first 85 percent of the pollution than the next 10 percent.⁴ In beet sugar plants, it costs more than \$1 a pound to reduce bio-

Figure 1
Benefit-Cost Analysis of Regulation



logical oxygen demand (BOD)—a measure of the oxygen required to decompose organic wastes—up to a level where 30 percent of pollution is eliminated. But it costs an additional \$20 for a one-pound reduction at the 65 percent control level and an additional \$60 for a one-pound reduction when over 95 percent control is achieved.⁵

Another comparison is equally telling. The pulp and paper industry spent \$3 billion between 1970 and 1978 complying with federal clean-water standards, and achieved a 95 percent reduction in pollution. But to reach the new reduction goal proposed by the Environmental Protection Agency (EPA)—98 percent by 1984—would cost \$4.8 billion more, a 160 percent increase in costs to achieve a 3 percent improvement in water quality. Thus, it is important to look beyond the relationship of the costs and the benefits of a proposed governmental undertaking to the additional (marginal) benefits and costs resulting from each extension of or addition to the governmental activities.

If regulatory activity goes unchecked, the result could be an excess of costs over benefits. Thus, benefit-cost analyses should be viewed as a tool for identifying the optimum amount of regulation, rather than as a means of debating the pros and cons of regulation in general. To an economist, “overregulation” is not an emotional term; it is merely shorthand for the regulatory activities in which the costs to the public are greater than the benefits.

When there is more than one alternative for attaining a regulatory goal, benefit-cost analysis can be used to compare the various methods and to help select the most attractive. Consider the following hypothetical example: Suppose a government agency wishes to control the amount of pollutants a factory is spilling into a river. Assume technology allows for two means of reducing the pollution, System A and System B, of which System B is costlier, but more effective (see Table 1).

Table 1
Applying Benefit-Cost Analysis

System	Total Annual Cost	Total Annual Benefits	Benefit-Cost Ratio
A	\$14,000	\$17,500	1.25
B	26,000	34,000	1.38

System B has greater benefits per dollar spent than System A (i.e., a benefit-cost ratio of 1.38 compared with 1.25). Although System B has a larger annual cost than System A, System B will yield the greater benefit to society. In the creation of government policy, however, such simple cases are rarely encountered.

If a business decision in the private sector places an external burden on its neighbors, such as pollution, the firm does not include such a cost in its accounting, since it does not bear the burden. Public sector decision makers, however, must, or at least ought to, consider all the effects of such a decision. Because their vantage point is the entire nation, government regulators—unlike their private sector counterparts—should attempt to include all costs and benefits, including those external to the government.

The agencies should do so because most regulatory actions have indirect effects on the economy. For example, requiring safety belts in automobiles has a direct impact on the cost of automobiles and on sales in the safety belt industry. It also influences the severity of auto accidents and has a ripple effect on the suppliers of the safety belt industry and their suppliers, and so on. If a regulatory decision is to be good, these indirect effects, as well as the direct impacts, must be taken into account.

Quantification

The benefits and costs attributable to regulation are measured by the difference between the benefits and costs that occur in the presence of regulation and those that would prevail in its absence. Although the idea may seem straightforward, its application can be complex. Determining what would occur in the absence of regulation—which establishes a reference point for the calculations—may involve a considerable amount of judgment.

Table 2 shows how the incremental costs (the expenses that would not have been made in the absence of regulation) were computed in one study of water pollution control. Apparently the bulk of the costs would have been undertaken voluntarily.

Sometimes the indirect effects of regulation may be as important as the direct. Consider, for example, the question of mandatory standards to ensure the production of less hazardous consumer products. From time to time, suggestions have been made to require more protection in helmets and other recreational equipment

Table 2
Calculation of Incremental Cost of Regulation

<i>Steps</i>	<i>Example</i>
Company identifies an action taken to comply with a specific regulation.	Installation of waste-water pretreatment system to remove 99 percent of pollutants in compliance with Title 40 of the <i>Code of Federal Regulations</i> , Chapter I, Part 128.
Would action have been taken otherwise?	Pretreatment system without Title 40 would have been designed to remove 95 percent of pollutants.
What was the cost of the action?	\$1,200,000 (from fixed-asset ledger data).
How much would the action that would have been taken in the absence of regulation have cost?	\$800,000 (the cost of installing a 95 percent system).
What was the incremental cost?	$\$1,200,000 - \$800,000 = \$400,000.$

Source: *Regulation*, July/August, 1979, p. 21.

used in playing football. Those using the safer helmets would be expected to receive the benefit of fewer or less severe injuries. However, such a safety standard could impose substantial costs on lower-income youngsters. Perhaps of greater concern, the standards might even contribute to more injuries since the price increases might result in more people playing football without any protective equipment at all. That example illustrates another basic thrust of benefit-cost analysis—to examine the proposed government action not only from the viewpoint of the impact on the business firm but also from the vantage point of the effects on the consumer.

A large, but difficult to measure, type of regulatory cost is a grouping that economists refer to as dead-weight losses. Regulation often limits the range of permissible prices, practices, or processes. Those legal restrictions may inhibit the most productive use of resources. The loss of the higher output that would result in the absence of the regulatory activity—those dead-weight losses—arises from an inefficient combination of factors. For example, the total efficiency of the economy is reduced when regulated surface transportation rates make it necessary for freight to be moved by rail rather than hauled at a lower cost by truck.⁶ That is so because

more resources are being used to achieve the same objective.

When political judgment suggests that it is not feasible to put a dollar sign on the benefits, a benefit-cost analysis still can be helpful by ranking the cost-effectiveness of alternatives. By using this method, which was originally developed for military programs, estimates are made of the costs of different ways to accomplish an objective. Cost-effectiveness analyses permit policymakers to identify least-cost solutions. In this more limited approach, the analyst assumes that the objective is worth accomplishing. In the regulatory field, this approach may be particularly useful in dealing with programs to reduce personal hazards. Instead of dealing with such an imponderable question as the cost of a human life, the emphasis shifts to identifying regulatory approaches that would maximize the number of lives saved after use of certain resources (such as people or capital), or minimize pain. Rather than a cold systems approach, such attempts at objective analysis show true compassion for our fellow human beings by making the most effective use of the limited resources available to society.⁷

Discounting

A regulatory action has an impact not only in the present but also in the future. It is necessary, therefore, to place a lower value on future costs and benefits than on present costs and benefits. The basic notion here is that a given benefit is worth more today than tomorrow, and a given cost is less burdensome if borne tomorrow than today. (This is a restatement of the economic principle that a dollar received today is worth more than a dollar received tomorrow, because today's dollar could be invested and earn a return.) For this reason, future benefits and costs have less weight than today's benefits and costs.

This practice is important in evaluating regulatory actions. If the costs and benefits of two actions appear equal, and most of the benefits of one action occur after five years, while the benefits of the other action occur immediately, then the latter is the preferred alternative. Discounting of the future thus implies that the timing of any proposed action's costs and benefits is an important consideration in its evaluation.

Assuming we are able to quantify the costs and benefits in a given program, it is then necessary to discount correctly the ben-

efits and costs expected in the future. The discount rate (r) can be crucial, as is seen in the highly simplified, two-period example shown in Table 3.

Table 3
The Role of Interest Rates

Plan	Benefit Period 1	Benefit Period 2	Cost Period 1	Discounted Benefit in Period 1	
				$r = 10\%$	$r = 5\%$
A	\$200	0	\$100	\$200	\$200
B	0	\$215	\$100	\$195	\$205

If all costs accrue in period 1 and the discount rate is 10 percent, then plan A is superior to plan B. However, if the correct discount rate is 5 percent, not 10 percent, then plan B is preferable. The appropriate discount rate is obviously very important in benefit-cost analysis. Such decisions can be biased, however, if Congress or a government agency designates an unrealistically low interest rate, which frequently has been the case in federal expenditure programs. Such an action tends to underestimate the costs of initial capital outlays and overestimate the extent of future benefits.

Uses and Limitations of Benefit-Cost Analysis

Reliable measures of costs and benefits are not easily achieved or always possible. Should the loss of a forest be measured by the value of the timber eliminated? What of the beauty destroyed? What of the area's value as a wildlife habitat? In view of such questions, it is unlikely that agency decision makers will be faced with simple choices.

However, the difficulties involved in estimating the benefits or costs of regulatory actions need not serve as a deterrent to pursuing the analysis. Merely identifying some of the important and often overlooked impacts may be useful in the decision-making process. Examples on the cost side include the beneficial drugs that are not available because of regulatory obstacles, the freight not carried because empty trucks are not permitted to carry back-hauls, and the television stations that are not broadcasting because they were not licensed. On the benefit side, examples include a

more productive work force that results from a lower rate of accidents on the job, savings in medical care because of safer products, and a healthier environment that results from compliance with governmental regulations.

At times the imperfections of benefit-cost analysis may seem substantial. Nevertheless, this analysis can add some objectivity to the government's decision-making process. While benefit-cost analysis is capable only of showing the effectiveness of an action, the subsequent decisions of elected officials and their appointees might be envisioned as representing society's evaluations of the equity effects of that action. Economists can provide benefit-cost analyses and studies of the distribution of those benefits and costs, leaving the final decision to society's representatives. Presumably, those individuals are better able to make political decisions on the impacts of the actions they contemplate. Despite its shortcomings, benefit-cost analysis is a neutral concept, giving equal weight to a dollar of benefits and to a dollar of costs.

Not all the criticism of benefit-cost analysis may be valid. The idea of attempting to quantify the effects of regulation outrages some persons. They forget the objectives that economists have in developing such measurements. The goal is not to eliminate all regulation. As economists of all political persuasions have testified before a variety of congressional committees, it is not a question of being for or against government regulation of business. A substantial degree of intervention in private activities is to be expected in a complex, modern society.

Critics who are offended by the notion of subjecting regulation to a benefit-cost test may unwittingly be exposing the weakness of their position: they must be convinced that some of their pet rules would flunk the test. After all, showing that a regulatory activity generates an excess of benefits is a strong justification for continuing it.

Despite talk of cold systems approaches, economists are deeply concerned about people as well as dollar signs. The painful knowledge that resources available to safeguard human lives are limited causes economists to become concerned when they see wasteful use of those resources because of regulation.

General Motors, for example, calculates that society spends \$700 million a year to reduce carbon monoxide auto emissions to 15 grams per mile, thus prolonging 30,000 lives an average of one

year, at a cost of \$23,000 for each life. To meet the 1981 standard of 3.4 grams per mile, the company estimates that it will cost \$100 million in addition, and prolong 20 lives by one year at an estimated cost of \$25 million for each life. Human lives are precious, which is why it is so sad to note another use of that money. It has been estimated that the installation of special cardiac-care units in ambulances could prevent 24,000 premature deaths each year, at an average cost of approximately \$200 for each year of life.⁸ Thus spending the \$100 million for the special ambulances conceivably could save 500,000 lives a year.

Part of the problem in setting regulatory policy is that at times the benefits are more visible than the costs—not necessarily greater, but more evident. If the required scrubber for electric utilities results in cleaner air, we see the benefits. The costs are merely part of the higher electric bill we pay. Thus, the cost of regulation takes on the characteristics of a hidden sales tax that is paid by the consumer.

A by-product of benefit-cost analyses is the identification of less costly ways to achieve society's regulatory objectives. For example, detailed estimates of industrial compliance with federal regulations, produced by Arthur Andersen & Company for the Business Roundtable, revealed the types of regulations that tend to generate especially high costs.⁹ Such information may help government policymakers select less costly approaches. (See Table 4.)

In the final analysis, however, the political factors in regulatory decision making cannot be ignored. Many social regulations involve a transfer of economic resources from a large number of people to a small group of beneficiaries. The Occupational Safety and Health Act's (OSHA) coke-oven standard, for example, protects fewer than 30,000 workers, but is paid for by everyone who buys a product containing steel. So long as regulators avoid concentrating the costs on a small group that could organize political counterpressures, costly regulations can be promulgated easily.¹⁰

Despite the limitations, there is a useful role for formal economic analyses of regulatory impacts in providing, at least, an ancillary guide to policymakers. As a federal court stated in striking down OSHA's proposed benzene regulation: "Although the agency does not have to conduct an elaborate cost-benefit analysis, . . . it does have to determine whether the benefits expected from the standards bear a reasonable relationship to the costs imposed by the

Table 4

Attributes of Regulations with High Incremental Cost

<i>Type of Regulation</i>	<i>Characteristics</i>
Continuous Monitoring	Requires evidence of compliance by means of round-the-clock monitoring devices or continuous maintenance of comprehensive records of actions taken and results achieved.
Forcing New Technology	Requirement to meet a level of compliance not achievable with available technology, often effected through legislation specifying a stringent deadline.
Capital Intensity	Requires the purchase of new equipment or modification of existing equipment.
Recurring Costs	Requires actions that lead to continuing costs of operation or maintenance.
Retrofitting	Requires modification of existing facilities, not just application to new facilities.
Specified Compliance Action	Requires a specified method of compliance without flexibility to recognize differing circumstances for application of alternative techniques to achieve the desired objective.
Inadequate Risk Assessment	Requires compliance with a stringent standard even though the risks have not been adequately assessed.
Changing Requirements	Requires adaptation to rules that are frequently changed or are subject to delay in being defined; capital-spending plans are made without knowledge of requirements to be met.

Source: Arthur Andersen & Company.

standard."¹¹ That court's common-sense approach might be the direction to which the public policy debates on regulation could profitably shift.

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