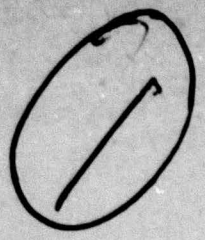

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WHAT CAN MANAGERIAL ECONOMICS CONTRIBUTE TO ECONOMIC THEORY?

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As background for this discussion, let us review the customary distinction between economic problems, on the one hand, and management problems, on the other. The distinction is really between problems of choice at different levels. Traditionally, economic problems have related to the allocation of resources among broad uses, taking efficiency within firms for granted, while managerial problems have pertained to resource use within individual firms (or other organizations).

The line of demarcation is a blurred one, of course. For one thing, it is hard to define a firm precisely in view of the diversity of organizational structures, and for another, the whole subject of inputs, including behavioral inputs, is a problem that is necessarily of concern to economists. If one learns more about the behavior of individuals or firms, it may affect hypotheses about resource allocation among broad uses. Certain branches of physics have a somewhat analogous relationship. Theories about the behavior of large masses and the spectra emanating from the stars influenced our understanding of the atom; and there was in turn a feedback from the study of the atom upon our understanding of the orbits of and emanations from various celestial bodies.

Thus the dividing line between these two subjects is not clear cut. Both deal with problems of choosing among alternative ways of using resources -- above the level of the firm in one case and within the firm in the other. Both involve calculations for economizing. Let us turn now to a more specific aspect of their relationship -- the potential feedbacks from management economics to economic theory.(1)

I. OUR BUSINESS BEHAVIORAL INPUTS

One part of economic theory to which managerial economics may contribute comprises the inputs concerning business behavior. In much of our theorizing we have fallen into the lazy habit of making convenient but naive assumptions about individual, business, and government behavior. There are at least two good reasons for re-examining these behavioral assumptions.

One reason is that examining assumptions underlying theories may lead us to new and promising hypotheses to be tested. One does not put a monkey in front of a typewriter, have him grind out hypotheses at random, and then proceed to test them. As Bob Newhart has reminded us, this procedure, with good luck, results in propositions like: "To be or not to be; that is the gesinderplatz." In devising theories worth checking, one looks at the real world and asks, "What hypotheses are plausible? What abstractions will still fit reality well enough to yield a useful theory?" Thus in screening hypotheses initially, we do appraise them in terms of the realism of their assumptions.

Another reason for re-examining behavioral assumptions is that we continue to appraise theories, long after any initial screening, partly by the reality of their assumptions. Some have argued that the test of a theory is its ability to make useful predictions, not the realism of its assumptions. This point appears to be valid for theories yielding predictions that can be checked, such as econometric models of cyclical fluctuations. Unfortunately, some important economic models yield insights on the basis of which we predict outcomes, but outcomes not subject to adequate empirical check. An example is the theory that a private enterprise economy tends (or does not

tend) toward Paretian optimality. How does one test such an hypothesis? By seeing if subsidiary implications are consistent with the facts? But that is precisely analogous to testing for the accuracy of assumptions! In the end we are forced to appraise some theories according to the accuracy of side implications and of assumptions.

Let us examine the business behavioral inputs to economic theory, then, and see how managerial economics may affect those inputs. The usual assumption about business behavior has been that firms seek to maximize profits. This may be all right for some purposes. It seems to be valid in some rather unrealistic circumstances -- namely, if there is no risk or uncertainty (including uncertainty about distant time-streams of costs and receipts); if all production is carried on by purely competitive firms; or if the management of each firm, however sheltered from competition, is interested solely in profits. If there is vigorous competition and certainty, it would appear that the forces of natural selection insure that surviving firms behave as if they are trying to maximize profits.(2) At best, however, one must be cautious in generalizing about natural selection. Where there is a diversity of organizational forms, it is not really clear what types of behavior can survive.(3)

In any event, the main conditions for natural selection of profit-maximizing firms do not prevail. Pure competition does not exist in much of the economy. There is production by government and production contracted for by government, often by means of some form of cost-plus contract.

Many activities are carried on by non-profit corporations or other public authorities. Public utilities and a few other industries are deliberately sheltered from competition. Moreover, in the real world there is dynamic change and disequilibrium, not equilibrium. Thus there is a great deal of leeway for the management of various organizations to seek goals other than profit-maximization.

Do they have other goals? There is ample evidence that they do -- that firms are concerned about shares of the market, about "satisficing" rather than maximizing. Especially when management is separated from ownership, a multiplicity of goals develop.

Much more important, though, management could hardly pursue profit-maximization, even if it wanted to do so. For maximum profits is not even a meaningful concept in a realistic environment. We are so bemused by static theory that we keep forgetting how ambiguous this concept is in a world of change and uncertainty. To take the most obvious ambiguity, consider uncertainty about the final outcomes of alternative courses of action. If alternative A could yield anything from a million-dollar profit to a half-million-dollar loss, while alternative B would almost certainly produce a $250,000 profit, what is the profit-maximizing course of action? Equally obvious is the ambiguity caused by elements of gaming. If the best policy for one firm depends on how other firms react, what course of action constitutes profit-maximization? Still more pervasive are the effects of the uncertainties that harass decision-makers at all

levels of the firm and at every step of the way -- uncertainties about everything from the impacts of an advertising campaign to the effectiveness of a new sweeping compound. There is an infinity of alternatives to be considered, and even the costs of acquiring information about them are uncertain.

What do firms do in the face of these unknowns? How do they behave? Clearly they suboptimize -- breaking out many decisions to be made separately from others, delegating decisions, adopting crude rules of thumb, sometimes taking blind stabs. Furthermore it is doubtful that the surviving firms can appropriately be described as profit-maximizers. For some of the effects of such an environment on the survival of firms see Sidney Winter's paper, "Economic Natural Selection and the Theory of the Firm," which is being presented at one of the sessions of the Econometric Society.(3)

In this situation, how does managerial economics contribute or show promise of contributing to economic theory? One way is simply by emphasizing the extent to which our behavioral inputs are inadequate -- the extent to which firms pursue goals other than profits and have to cope with uncertainties.(4) The mere fact that firms have been making use of operations research and management economics suggests how elusive the path to profits is. Either those firms were operating inefficiently in the past or they are operating inefficiently when they purchase operations research.

More significantly, many management analyses have apparently paid off. Certain petroleum companies pay regularly for linear programming solutions to problems of blending and production scheduling. The blending of animal feeds is another well-known application. One manufacturer of

electrical equipment markets a line-balance computer to allocate power output among plants. Gas and milk companies apparently believe that more sophisticated solutions to their "traveling servicemen" problems will increase profits. Managerial economics has contributed to the more efficient use of drag lines in strip-mining, to more economical beneficiation of ores, and to more efficient mining operations of other sorts. Simulation of plants such as metal-working shops is apparently paying its way in connection with shop modifications.(5)

Thus such studies have been underlining the facts that businesses have criterion problems, that they often use rough rules of thumb, that they must cope with the lack of information and the presence of vast uncertainties -- that, in short, our business behavioral inputs have been oversimplified. Such studies emphasize that the assumption of profit-maximizing behavior is at most a first approximation and that we should not be content to stop with first approximations. They emphasize that we should explore the formulation of a more general and more complex theory of the firm. As one step, we might postulate utility-maximizing business units, as Alchian and Kessel have proposed.(6) In just the right circumstances, these units necessarily become profit-maximizing (or loss-minimizing) organizations. (In fact, Alchian and Kessel suggest that one might test for monopolistic power by looking for the thickest carpets, the highest percentage of beautiful secretaries, and other evidence of non-profit-maximizing behavior.)

To subsequent steps -- the development of <u>improved</u> behavioral inputs wherever utility-maximizing firms are not necessarily profit-maximizers -- managerial economics may contribute in a more positive fashion. By forcing

us to observe business practices more closely, it may show us more about how firms really operate. And better behavioral inputs may in turn yield better theories, for example, hypotheses that explain more satisfactorily how prices move in recessions such as those of the 1950's.

Studies of business and government operations, often reported on in publications like Management Science and Operations Research, are beginning to hold out the promise of such improved behavioral inputs, sometimes explicitly but more often implicitly. For examples, see the references in H. A. Simon's article in the American Economic Review last year and the papers from the 1955 Social Science Research Council Conference held at the Carnegie Institute of Technology.(7) Analyses of the behavior of oligopolies may make game theory and bargaining theory in economics more useful than they have been to date. Studies of information-gathering and data-processing may shed light on murky aspects of large firms' decision-making processes. At a more conventional level, management research is increasing our knowledge of cost and production functions. Research on firms' inventory policies, equipment replacement, and sequential decision-making may produce significant impacts on dynamic theories, such as models of inventory cycles and inflationary processes. Analyses of advertising programs and research and development policies may influence hypotheses about changes in the production function. Studies of firms' decision processes and research-and-development strategies may modify theories about business behavior in the face of uncertainty. Interest in management science and familiarity with concrete situations may shift the emphasis in welfare economics from defining the conditions for optimality to searching for "improvements" -- that is, for courses of action that are better than

other specified policies even though it cannot be proved that they lead toward an over-all optimum optimorum.

A different sort of study of "management" behavior that deserves mention is Anthony Downs' inquiry into the economics of political parties.(8) Political parties are non-government agencies that seek utility but not profits, being similar in some ways to non-profit corporations. Downs' study helps show the two-way relationship between economic theory and management economics: it indicates how economics can contribute to the analysis of an organization's practices and suggests how better understanding of these practices may contribute to a theory of organizational behavior.

All of these potential contributions would come about through the provision of more appropriate behavioral inputs. In some instances, managerial economics may bring firms' behavior more nearly into line with present inputs. In others, it may reveal more clearly the sectors of the economy in which we need better behavioral assumptions. And, finally, it may help us devise improved inputs regarding those sectors.

II. GOVERNMENT UNITS' BEHAVIOR

Another group of organizations that can be regarded as utility-maximizers but not profit-maximizers are government agencies -- various units of government at Federal, State, and local levels. Whether the study of their behavior is economics or managerial economics is not at all clear. Analyses of specific governmental operations or problems of choice are extremely similar to analyses of business operations and

management problems. If we can reach generalizations about governmental behavior, however, they would constitute an economic theory of government expenditure.

Government is now a significant sector of the economy. We live in a mixed economy, and economics should be concerned with the performance of mixed economies and with ways to improve their performance. As noted earlier, we know far too little regarding the behavior of business firms, and we would be still more at sea if it were not for our partial understanding of "natural selection." When we turn to government, we do not have even that aid, because we understand even less about the process of natural selection in government. Perhaps the time has come to develop a theory of government behavior to supplement the theory of the firm. The research of several economists -- among them Ronald Coase, James Buchanan, and C. E. Lindblom -- bears on the development of such a theory.(9) Because of the importance of the subject, a great deal more work on it is warranted.

The economics of the governmental unit could be important in connection with several types of policy decisions. First, it would be pertinent to deciding whether an activity should be conducted by private firms or public agencies. Existing theory tells us that numerous activities will be conducted inefficiently if left to private firms, because of, say, imperfect competition or external economies and diseconomies. There is often a tendency -- perhaps because we have no economic theory of government behavior -- to assign such activities, without much question, to a government agency. We apparently simply assume that a public agency automatically behaves in the public interest. As

George Stigler has pointed out, this is like the decision of the Emperor who was to judge the performance of two singers and awarded the prize to the second after hearing the first.

Next, the economics of governmental units might help show what methods, techniques, or "systems" should be used to carry out certain activities assigned to the public sphere. The analogy to management science is clear, but the choices, for example, in or among modes of transportation, have always been regarded as problems of economics.

Another type of policy decision on which a theory of government behavior would have a bearing is the choice of the institutional framework in which a governmental activity is conducted. Often the costs and rewards confronting an agency pull it irresistibly toward wrong decisions from the nation's standpoint. With a better understanding of organizational behavior, we might be able to devise institutional arrangements such that an agency's costs and rewards (including the costs of offending certain groups and the rewards from pleasing other bargainers) would more nearly coincide with the costs and rewards to the nation.

What does management economics have to do with developing an economic theory of government behavior? It may have a great deal to do with it. Management economics is concerned with the internal or management problems of governmental units as well as those of business firms, and studying management problems inside government is almost a sine qua non of developing an economic theory of government behavior. Operations analysis for a governmental unit reveals much more vividly than armchair speculation the criterion problems that beset government officials.

Analyses of managerial problems in defense planning, in resource development, and in local activities such as urban transportation systems or the operations of port authorities suggest how complex the decisions are and how little we know about government units' behavior. At the same time many of these analyses of governmental operations have pointed the way to greater efficiency. Eventually the cumulative effect of such studies may provide improved insights into governmental behavior and therefore improved behavioral inputs in economics.

III. MANAGERIAL ECONOMICS AND NORMATIVE ECONOMICS

Finally, management economics should be able to contribute in another way toward the achievement of the aim of normative economics. Speaking somewhat loosely, we can say that the objective of normative economics is the maximization of the value of output in a national (or regional or world) economy. As noted before, management research can contribute if it can increase the efficiency of business and governmental units. This contribution would take the form of improvements, not in economic theories, but rather in production functions. Here we refer to managerial economics that pays off, such as the recent research on a barge company's scheduling policies[10] or, for a governmental unit, the studies of traffic for the Port of New York Authority.[11] A type of analysis that is quite promising for both firms and government is Allais' application of statistical techniques to prospecting for minerals.[12]

To view successful managerial analysis as being itself a feedback to economics may conflict with traditional definitions of economics. Yet, as pointed out before, the dividing line between economic and management

problems is a hazy one, and the concern of economists about productivity in the narrow sense goes a long way back. All means of increasing productivity are of interest in economics.

Does this line of argument "prove too much?" Does it expand the province of economics unreasonably so as to include, for instance, analysis of the consumer and improvement of his efficiency -- say by helping him to be well-informed and to choose "rationally?" Does it expand the domain of economics to include the analysis and promotion of technical progress -- tasks normally left to psychologists, scientists, and engineers?

Perhaps the line of argument does lead in that direction, but it is hard to see much force in objections to this. To achieve the results that are really desired, we should draw the boundaries between disciplines more pragmatically, less arbitrarily. The relevant questions are: (1) What <u>is</u> important for increasing the value of output? (2) Can trained economists and their kit of tools be useful? (3) Can management economics be helpful? Whatever tools, disciplines, and activities can increase the value of output should be used. To us, results that expand national output seem like economics. But it doesn't really matter whether some result is called management science or a feedback to economics. What would matter would be the failure to use all of the tools or skills that can increase total output. Failure to use part of them because of arbitrary boundaries would be, to say the least, a sterile sort of traditionalism.

Footnotes:

(1) Professor H. A. Simon also has addressed himself to this question, as well as to the possibility of other impacts on economic theory, in his article, "Theories of Decision-Making in Economics," American Economic Review, June, 1959, pp. 253-283.

(2) Armen A. Alchian, "Uncertainty, Evolution, and Economic Theory," Journal of Political Economy, June, 1950, pp. 211-221.

(3) Sidney G. Winter, Jr., "Economic Natural Selection and the Theory of the Firm," a paper being presented at the meetings of the Econometric Society, December, 1960.

(4) Charles Hitch, "Uncertainties in Operations Research," Operations Research, July-August, 1960, pp. 437-445.

(5) For some of the applications, see D. G. Malcolm, "Bibliography on the Use of Simulation in Management Analysis," Operations Research, March-April, 1960, pp. 169-177. For more examples of other types of operations analysis, see the reference at the end of Robert Dorfman's article, "Operations Research," American Economic Review, September, 1960, pp. 575-623.

(6) A. A. Alchian and R. A. Kessel, "Competition, Monopoly, and the Pursuit of Money," to appear in the forthcoming volume of papers presented at the Universities-National Bureau of Economic Research Conference on Labor Economics in April, 1960.

(7) Simon, op. cit.; and M. J. Bowman, ed., Expectations, Uncertainty, and Business Behavior, Social Science Research Council, New York, 1958.

(8) Anthony Downs, An Economic Theory of Democracy, Harper and Brothers, New York, 1957.

(9) R. H. Coase, "The Federal Communications Commission," Journal of Law and Economics, October, 1959, pp. 1-40; J. M. Buchanan, "Politics, Policy, and the Pigovian Margins," (unpublished); C. E. Lindblom, Bargaining: The Hidden Hand in the Government, The RAND Corporation, RM-1434-RC, Santa Monica, California, 1955.

(10) George G. O'Brien and Roger R. Crane, "The Scheduling of a Barge Line," Operations Research, September-October, 1959, pp. 561-570.

(11) Leslie C. Edie, "Review of Port of New York Authority Study," Operations Research, March-April, 1960, pp. 263-277.

(12) M. Allais, "Method of Appraising Economic Prospects of Mining Exploration Over Large Territories: Algerian Sahara Case Study," Management Science, July, 1957, pp. 285-347.