

# Science



---

Is Economics Necessary?

Author(s): Kenneth E. Boulding

Source: *The Scientific Monthly*, Apr., 1949, Vol. 68, No. 4 (Apr., 1949), pp. 235-240

Published by: American Association for the Advancement of Science

Stable URL: <https://www.jstor.org/stable/19783>

---

JSTOR is a not-for-profit service that helps scholars, researchers, and students discover, use, and build upon a wide range of content in a trusted digital archive. We use information technology and tools to increase productivity and facilitate new forms of scholarship. For more information about JSTOR, please contact [support@jstor.org](mailto:support@jstor.org).

Your use of the JSTOR archive indicates your acceptance of the Terms & Conditions of Use, available at <https://about.jstor.org/terms>



American Association for the Advancement of Science is collaborating with JSTOR to digitize, preserve and extend access to *The Scientific Monthly*

JSTOR

# IS ECONOMICS NECESSARY?

KENNETH E. BOULDING

*A native of Liverpool, England, and a graduate of Oxford (1938), Professor Boulding is on the economics faculty of Iowa State College. His article is from an address presented in the symposium on "Sciences of Society" at the Centennial Celebration of the AAAS, Washington, D. C., September 13-17, 1948.*

BEING an economist, I can hardly be expected to answer "No" to the question that forms the title of this paper. My thesis is, however, that economics is necessary, not merely for the support of economists, but for the development and perhaps even for the survival of science in general and the civilization that supports it. I propose to consider particularly what justification there is for a separate discipline of economics, and what contribution this discipline makes to the general advancement of knowledge.

The social sciences are reputed, at least in popular imagination, to be less "successful" than the physical sciences. The "success" of a science is judged mainly by its ability to predict or to control future events in its field. For the common man, as for the operational philosopher, knowledge is identified with power, and knowing with know-how. By this standard even economics, which has a certain reputation as the most successful of the social sciences, makes a poor showing compared with the prediction of eclipses, the certainties of chemistry, and the miracles of genetics. This, we hasten to explain, is a result of the difficulties of the science, not of the inadequacies of the scientist. We sympathize with the wayward universe of the meteorologist even as we chafe at the waywardness of his predictions, and, if the predictions of the economist are even more wayward, it is because of the complex and unstable nature of the universe with which he deals. Moreover, the social scientist faces a problem which normally does not bother the nonsocial scientist, in that he is himself part of the field of his investigation. If the heavenly bodies were themselves moved by astronomers, or even if they were moved by temperamental angels who guided their behavior by the astronomers' predictions, the astronomers would find themselves in just as bad a fix as the economists. The bacteriologist who must stain his bacteria in order to see them would be in even worse trouble if his bacteria blushed when they were observed. Of course not even the astronomer seems to be exempt from observer trouble in these days of relativity, but in

the case of the social sciences the trouble develops long before we approach the speed of light. Nowhere is the positivistic fiction of a dispassionate, objective observer wholly removed from the field of his observation more absurd than in the social sciences. The difference between the social and the other sciences, however, is merely one of degree, and as the nonsocial sciences run increasingly into observer trouble it may be that not merely the results but the methods also of the social sciences may be of interest to other scientists.

Economics has a certain reputation—not, I think, wholly undeserved—for being the most scientific of the social sciences. It does possess, I think, a larger body of analytical propositions that are widely accepted by competent persons than either sociology or political science. It also exhibits the marks of the history of a true science, in that it exhibits an orderly development toward greater and greater generality. The older theories—i.e., of the classical economists—can easily be formulated as special cases of the more general modern theory. This very internal consistency and success, however, has developed in some economists a certain spiritual pride which has injured the development of social science as a whole, and I think the profession is coming to realize more and more the necessity for trade among the various disciplines if further specialization is to be fruitful. We are reaching out on all sides today toward a unified social science—a regional federation, as it were, which must be accomplished before we can proceed to that great federation of all knowledge that is the ultimate task of the inquiring spirit. All the social sciences have much to learn from one another, and the same might be said of sciences of any kind.

## I

Economics, like any other science, has two closely related parts—the pure science and the empirical science. Pure economics is a branch of logic or of mathematics (in these days there does not seem to be much distinction between them). It attempts to construct systems of hypothetical

propositions, mainly of a qualitative nature (if  $A$  rises,  $B$  falls) relating certain "economic quantities" such as prices, wages, outputs, interest rates, etc. Such a system is called a "model," and the construction of such models is, of course, the characteristic activity of the "pure" part of any science. The nature of the models themselves, however, is determined mainly by the empirical content of the subject matter of the science. Thus, even though the model is an abstraction, not depending for any correspondence with empirical reality for its self-consistency, yet the act of model-building—except perhaps in pure mathematics—is not unrelated to the empirical interests of the model builder, and the usefulness of a model depends on the degree to which it helps in interpreting the complexities of the empirical world. The Keplerian theory of a single planet revolving around a sun is a good example of an "astronomical" model. It has no exact counterpart in reality, at least in our solar system, yet it derives interest and significance from the fact that it helps to interpret (by being capable of extension and generalization) the movements of the actual solar system. Similarly in economics the marginal analysis of the individual economic unit (planet!) or the Walrasian system of equations of general equilibrium of the price system under perfect markets (which corresponds somewhat to the Laplacian system in astronomy) is a "model" which derives interest from the light it throws on the workings of the intolerable complex of social relationships. Models which do not apparently abstract from an empirical universe may be called "non-Euclidian" models from the analogy with non-Euclidian geometry. Thus it would no doubt be possible to construct models of planetary systems assuming different laws of gravitational attraction, of momentum, etc. than those which seem to prevail in our system; indeed, I have no doubt this has been done. Nor are these non-Euclidian models mere idle exercises of an overactive mind; they may turn out to have more than an aesthetic value, as witness the significance of non-Euclidian geometries in modern physics. In economics also there is something to be said for model-building for its own sake, and there is no need whatever to stick to the assumptions of the elementary textbook. Economics is in no way bound to such assumptions as profit maximization; there never has been an economic man even in economics, except as a very first approximation, and by means of the indifference curve analysis economics has increasingly liberated itself from any narrowness of assumption. The *methods* of

economic analysis would apply just as well to a Franciscan economy as to a Benthamite! Nevertheless, the *interests* of the model builder are likely to be determined to a considerable extent by the empirical world in which he lives, and even by the practical problems he faces. It is no accident, for instance, that the depression of the thirties was the scene of a great deal of theoretical activity centering around the problem of unemployment. Similarly, in the elementary theory of the firm, the assumption is made that the firm selects that position of the variables under its control which results in the maximization of some measure of money profits. As a first approximation, this assumption yields useful results. But it is quite possible, and indeed necessary, to go beyond it, and to take account of more complex motivations, such as the desire to be important, or to be well regarded, or to obey the dictates of conscience, or even to be liquid.

It is not generally realized, I think, how far economics has gone in the direction of becoming a generalized theory of choice. Economics begins as an attempt to explain the magnitudes and movements of certain quantities, such as prices, wages, outputs, sales, and so on. Very early in its development it became clear that these quantities cannot be treated as an independent world of their own, for they are thrown up as a result of the whole complex of human choices operating within the strait jacket of a niggardly natural environment. Thus even in Adam Smith we find the explanation of wage differences in terms of what might be called the nonmonetary advantages of the various occupations; and little more than a hundred years later we find Wicksteed illustrating the principles of value theory with reference to the problem of how high a cliff one would dive off to save a mother-in-law, or how much family prayers should be shortened to speed a parting guest to the train—problems that are a long way from what is usually thought of as economic. Nevertheless, it is an inevitable logic that has turned the study of prices into a theory of value, for the price system is simply one reflection of the general problem of "scarcity," and the choice between nuts and apples differs only in its simplicity from the choice between income and leisure, between freedom and security, between love and power, between color and form, or between better and worse. Value, in the sense of what we have to give up of one thing in order to get a unit of another—i.e., as a "transformation ratio"—is a phenomenon we meet in every conceivable branch

of human activity, for wherever there is limitation, wherever there is choice, wherever we cannot have our cake and eat it, there the value phenomenon pops up. The novelist balancing up his chapters, the painter balancing his picture, the general apportioning his troops, the preacher arranging his service, the professor preparing his course, the cook planning a menu, the government formulating a policy, are all of them facing essentially the same "economic" problem as in the apportionment of time or the spending of money. Wherever resources are limited, choice is necessary and value raises its earthy head. It may be, as Wordsworth says, that "High Heaven rejects the lore of nicely calculated less or more" (i.e., economics), but, even if this is the case (and Wordsworth's authority is by no means unimpeachable), it is merely because High Heaven is presumably possessed of unlimited resources. In some fields the "less or more" may be less nicely calculated than in the market place, though one sometimes wonders after studying the exotic behavior of banks, corporations, and labor unions whether these phenomena could not be profitably studied with the techniques of the cultural anthropologist. Custom, habit, tradition, and ritual play an important part in the day-to-day activity of the most solemnly economic and ostensibly money-making institution. On the other hand, the balancing of advantage against disadvantage which is the mark of the "economizing" process is found among the most primitive tribes, the most careless bohemians and the most otherworldly saints. Indeed, it may well be that the saint—who knows what spiritual goods he wants and who goes after them regardless of how many norms of conventional behavior he shatters—is closer to the pattern of economic man than is the frock-coated banker whose watchword is respectability (a thoroughly primitive, anthropological concept) and whose walk of life is hedged about with innumerable barriers of established custom.

Economics is significant, then, not merely because it investigates an important slice of life in the market place, but because the phenomena which emerge in a relatively clear and quantitative form in the market place are also found in virtually all other human activities. Hence, economic life itself, in the narrow sense of that part of human activity that is concerned with buying, selling, producing, and consuming, is a "model" of the whole vast complex of human activity and experience, and the principles which are discovered in a clear and quantitative form in the market may be applied to the understanding of apparently quite

unrelated phenomena in biology, art, religion, morals, politics, and the whole complex structure of human relationships. I do not mean, of course, that economic principles are *sufficient* to the understanding of the complex universe of reality; but they are, I believe, a necessary implement in the inquirer's tool chest.

It is also true, of course, that principles which come to the clearest expression in the study of other subject matters are of great importance in the interpretation of so-called "economic" phenomena. The concept of an ecological system, which was developed first in the biological sciences—i.e., of a system of populations of various things, in which the equilibrium size and the movement of each population are dependent on the size of other populations—is an interpretive principle of the utmost value in the social sciences. Just as a pond develops an equilibrium population of frogs, fishes, bacteria, algae, and the like, all in subtle competitive and cooperative relationships with one another, so society is a great pond, developing equilibrium populations of Baptist churches, post offices, gas stations, families, counties, states, wheat farmers, chickens, and so on, which also exhibit complex cooperative and competitive relations one with another. The concept of mechanical equilibrium, both static and dynamic, has also had an immense impact—indeed, too great an impact—on the social sciences. Wherever we find a potential difference producing a current or flow by overcoming a resistance, we find something like Ohm's law, exhibited in its purest form in the study of electricity, but valuable as an interpretive principle when we study the flow of goods or of resources in response to price differences (economic potential) against the resistance imposed by costs of transport. In the theory of electrical circuits we may find clues to some baffling phenomena connected with the circuit flow of money.

Within the social sciences themselves, concepts which have been developed in anthropology, such as systems of ritualistic and customary behavior, and concepts which have been developed in sociology and social psychology, such as the crisis-adjustment patterns in family relationships, are all applicable to the subject matter of economics.

Indeed, I see the great empire of human knowledge, not as a conglomeration of independent and perhaps even warring kingdoms, each cultivating its own little field of subject matter by its own methods and each living wholly on its own produce, but as a great Republic of the mind, comprised, it is true, of subdivisions such as

Physics, Chemistry, Economics, Botany, and the like, the boundaries of which are, like the boundaries of political states, partly the result of historic accident and partly the result of the lay of the land, but all uniting and cooperating in a common task of producing and exchanging the most precious of all commodities, and, indeed, exchanging not only the results of their labors, but exchanging also the tools which the special requirements of each field have perfected.

## II

I propose to devote the remainder of this article, therefore, to a brief discussion of the contribution which the methods of economics may be able to make to other fields.

Recent developments in economics in the theory of oligopoly have an important bearing on problems of political science. It is perhaps significant that there was no representative from political science in this symposium. In a day when civilization itself is threatened by our inability to solve an essentially political problem (the abolition of war), it is tragic that so little fundamental thinking is being done in political science. Even the World Federalists—the only group who seem to be intellectually active in this field at all—seem to have got little further than the eighteenth century. It may well be that a significant revival in political thought will come out of the economics of oligopoly, where we are concerned essentially with problems of *strategy*—i.e., situations in which the choices of each person or organization involved depend upon their expectations regarding the choices of the others. It may be that the present bankruptcy of the national state, which can provide us with neither security, justice, peace, nor honor, is closely associated with the duopolistic character of international rivalry. There are marked similarities between the power struggles of oligopolistic firms and the power struggles of states: price wars and sales wars exhibit in a simplified form many of the essential problems of that most detestable of sciences, military science. There is no more striking contrast than between the resourcefulness and inventiveness which is shown in dealing with the “war” problem in the business world, with its multitudinous forms of agreement and federation, and the sterility and ritualistic rigidity of the political world.

Economics can also make an important contribution to those sciences in which general equilibria or a great multiplicity of interconnected relationships are characteristic of the subject matter. In

economics, as in astronomy, the experimental method is almost impossible. We cannot simplify our universe, as the chemist or the physicist does, by the artificial creation of conditions in which virtually all factors but the ones we are investigating are excluded. We cannot take a businessman or a household and expose them first to one set of prices and then to another set to see what happens. Our subject matter is presented to us in a manner that is for the most part not within our control; there is no recipe for unscrambling in fact the magnificent *omelette* of social experience. We are always faced with an overwhelming and baffling multiplicity, and because of the very dominance of the problem we have been forced to devise methods for handling it.

These methods fall into three groups. There is first the *ceteris paribus* approach, identified mainly with the name of Marshall, which is in a sense a method of intellectual experiment, involving the isolation of a single problem by the assumption that all variables other than those investigated are held constant. This method has yielded valuable results in a limited sphere, and is a necessary prerequisite to the solution of more difficult problems. Nevertheless, it also has its dangers, especially the danger of overgeneralization from the particular to the general case. Thus the fact that a fall in the wages of carpenters is likely to lead to a rise in the amount of employment offered to them by no means implies that the remedy for general unemployment is general wage reduction. It is easy to fall into fallacies of composition when using this method, but in spite of its dangers it remains a necessary implement in the economist's, and indeed in any scientist's, tool bag.

The second method is one that is familiar in the physical sciences, the method of simultaneous equations. In economics this is associated chiefly with the name of Leon Walras and the Lausanne school. It is based on the proposition that any system of  $n$  variables, each of which can be written as a function of all the others, yields  $n$  of these equations which may be capable of solution to yield values of the variables each of which is consistent with every other. The difficulty of the method is that unless we know a good deal about the form of the assumed functional relationships we cannot be positive that the system has a “real” solution, or that it does not have many real solutions. It may even have solutions that are mathematically correct but economically meaningless, such as negative prices. Consequently, if we except the pioneering work of Leontieff at Harvard, the

method has not been particularly fruitful of results in economics, in spite of its superior elegance and generality.

The third method is that associated with the name of Keynes, now frequently called that of "macroeconomics." This consists essentially in using large aggregates of economic variables as the basic parameters of simplified models, the exact properties of which can be fairly easily determined. In a sense this combines the simplicity and fruitfulness of the Marshallian approach with the generality of the Walrasian. Marshall's method is admirable in discussing the forces that determine the price and output of, say, limburger cheese, but it cannot deal with the problems of the system as a whole. Walras deals with the system as a whole, but at such a level of generality and abstraction that practically nothing can be said about it except that it exists. Keynes, by taking the system as a whole, but ruthlessly lumping it into large aggregates, the relationships of which he explores, effects in a sense a combination of the virtues of both the other methods. The macroeconomic models are simple enough to be handled, and yet cover the whole system. Not that the macroeconomic method is without its own dangers. Aggregates like "the national income," or "the level of employment," or "the price level" are all heterogeneous conglomerations, and there is danger, particularly for the more mathematical and less philosophical users of the technique, of neglecting the *structure* of these aggregates. It is fatally easy to write "Let the National Income be  $Y$  and the Price Level be  $P$ " and straightway to get so deliciously involved in the manipulation of our  $Y$ s and  $P$ s that we forget that they are not simple aggregates but have a complex structure which may well be relevant to the problem in hand. This "fallacy of aggregation" is a common one; it is at the root of most of the fallacies of Marxism, with its assumption of homogeneous classes; of Nationalism, with its assumption of homogeneous nations; and it even accounts for the spectacular lack of prophetic success among the brighter young economists. Nevertheless, for all its dangers, the macroeconomic method has led to a revolution in economic thought, the end of which is by no means visible, and it creates a discipline and habit of mind which might easily create revolutions in other sciences as well. I suspect that the natural scientists are also subject to both the fallacy of composition and the fallacy of aggregation; that they are much too uncritical of their basic taxonomic systems, much too prone to generalize on the basis of particular

experience, and too little sensitive to the abominable interrelatedness of things! It would be a valuable experience for any scientist to familiarize himself thoroughly with what may be called the "macroeconomic paradoxes"—the propositions which are true in individual experience but which are quite untrue for society as a whole. Thus an individual can increase his money stock by "hoarding"—i.e., spending less money than he receives: but the attempt on the part of all individuals to hoard does not result in general "hoarding;" it merely decreases the total volume of money payments. An individual can get rid of money by spending it: a society cannot. For an individual, expenditure and receipts are two very different things: for society they are exactly the same thing, every expenditure being another person's receipt. An individual can "save"—i.e., increase his net worth—by not consuming as much as his income. If everyone tries to do this the result may not be an increase in society's capital but a decline in income and employment. In distribution these paradoxes abound. A trade union may raise the wages of its members: it is very doubtful whether trade unions as a whole can raise wages as a share of the total income. Profits are determined by the level of investment, not by the wage bargain; the more business distributes in dividends, the greater will be the profits out of which dividends can be paid. The macroeconomic world is a Wonderland full of widow's cruses and Danaïd jars, where nothing is what it seems, where things do not add up, where the collective result of individual decisions is something totally different from the sum of these decisions. Moreover, this is the real world: yet it cannot be understood by any generalization from individual experience; it can only be understood through the kind of intellectual discipline which economics provides. Moreover, it is not only in economics that this topsy-turviness prevails. In politics prohibition leads to drunkenness, the quest for national security leads to national destruction, the more literate we make people the less educated they become, and the conquest of nature by the physical sciences leads to ever-increasing misery, fear, and degradation.

### III

I have not attempted in this paper to defend economics by reference to the importance of its subject matter, as that can hardly be a matter of question. Was Marx right in supposing that capitalism has an inherent contradiction in it? What

is the necessary minimum of governmental intervention into economic life? Can inflations and depressions be remedied? How far can the distribution of income be equalized without destroying the roots of economic progress? These and like questions cannot possibly be answered without serious study, and the name of this serious study is economics. One needs no more reminder of its necessity. It is trite, but frighteningly true, to say that the survival of this present civilization depends, not on the further development of natural science, but on the solution of certain serious intellectual problems in the social sciences.

In conclusion, I should like to urge the necessity for the study of economics not only for its conclusions and methods, but also for the state of mind it produces. In the old Cambridge tripos, economics—or, to give it its grander title, political economy—was listed as a Moral Science. For all the attempts of our positivists to dehumanize the sciences of man, a moral science it remains. Its central problem is the problem of value: and value is but a step from virtue. Every science, like every craft, imposes certain of its marks on its practitioners. I would hesitate to suggest, especially to members of the AAAS, that geologists grow like their rocks, chemists like their smells, or even astronomers like their heavens. I cannot forbear, however, from quoting from Professor Robbins, of the London School of Economics: "It is not an exaggeration to say that, at the present day, one

of the main dangers to civilisation arises from the inability of minds trained in the natural sciences to perceive the difference between the economic and the technical." In the lurid twilight of science in which we live, when it has gained the whole world and lost its own soul, when it is everywhere prostituted to special interests, whether of the dairy farmers, the steel industry, or the national state, when the search for truth is subordinated to the lust for power, it is not altogether an accident that it is in the social science departments that the occasional voice crying in the wilderness is most likely to be heard. In a world of technicians, it is the economist who raises the cry that the technically most efficient is not necessarily, or even usually, the socially most efficient; that the best cow is not the one that gives the most milk; the best business is not the one that makes the most profits; the best army is not the one that creates the most havoc; and, above all, that the best training is not the best education. In a day when self-interest, nationalism, totalitarianism, militarism, and a dreadful pride threaten our very existence, economics points always toward the general interest, looks toward a free-trading world society, claims that the business of living even in a complex society can be accomplished with a small minimum of police coercion, urges that plenty is the source of power and war the greatest enemy of plenty, and by its very failures induces that humility for lack of which we perish.

