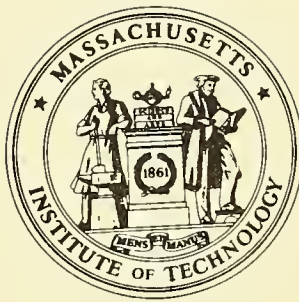


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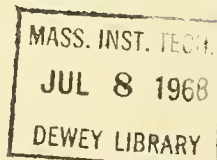
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SETTING: SOME METHODOLOGICAL CONSIDERATIONS

by

Matthew Edel



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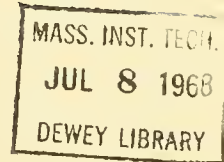
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The views expressed in this paper are the author's sole responsibility and do not represent those of the Department of Economics nor of the Massachusetts Institute of Technology.

ECONOMIC ANALYSIS IN AN ANTHROPOLOGICAL SETTING

Some Methodological Considerations

by Matthew Edel*

The debate over the role of economic theory in social science, and over the place of an economy in society, is an old one. The issues agitated the economics profession in the early part of this century, as the marginal utility school confronted the institutionalists in the United States, and the historical school in Germany. Since the Kinght-Herskovitz exchange (1941), however, anthropologists have been among the principal debaters. Burling (1962), LeClair (1962) and others have upheld the definition of economics as the study of "economizing" behavior, the allocation of scarce means to multiple objectives. On the other hand Polanyi (1957), Dalton (1961) and their followers have rejected the applicability of this notion of economizing to non-market society and have espoused a definition of economics as the study of the material means to man's existence, dealing with their production, distribution and consumption. Recent contributions by Belshaw (1965), Nash (1966), Cook (1966), Cancian (1966) and Vayda (1967), aimed at resolving the debate, appear only to have left it in the realm of what Cook calls "split-level dialogue," despite their noteworthy contributions to the instruments available to the two camps.

This paper attempts to clarify some of the issues in the substantive-formalist debate through a more explicit presentation of the nature of economic analysis, and through some concrete suggestions for its use in the treatment of anthropological problems. It is the author's opinion that both sides in the controversy have interpreted the nature of economic theory too narrowly. The proper question is not whether economizing behavior is the principal trait of all societies or

only some of them, but rather what the range of problems is in any specific society to which the analysis of this behavior may fruitfully be applied, and in what form the analysis is applicable. There are almost certainly no societies for which this analysis could never be appropriate; it should also be obvious that even in western marketized society, economic analysis cannot describe everything.

I

Economics, like most academic fields, encompasses a wide range of subjects. The discipline draws its name from the Greek word for management of a household; it was also applied to management of a state or its finances. In common discourse, economic activities are taken as the production, distribution and consumption of goods and services. Smith (1776) defined economics as the enquiry into the causes of the wealth of nations. However, at the core of economic science as it is taught today, there is a body of technique so formalized in its nature as to allow the definition, "economics is the study of interrelated quantities," (Hart, 1965). This body of technique is called economic analysis; the use of these tools is the subject of the first course in the curriculum of graduate economics departments and it is the study whose relevance to anthropological questions will be espoused in this paper. Economic analysis has been described in operational terms by Samuelson (1947, p. 7):

In every problem of economic theory certain variables (quantities, prices, etc.) are designated as unknowns, in whose determination we are interested. Their values emerge as a solution of a specified set of relationships imposed upon the unknowns by assumption or hypothesis. These functional relationships hold as of a given environment and milieu.

Problems in economic analysis can be set up in two ways. Either the problem can be one of the allocation of limited resources to competing ends (the economic problem as defined by Robbins, 1952) or the problem can be the determination of whether certain targets, which are fixed, can be attained given the means at hand (the form of analysis used by Tinbergen, 1956). Mathematically, the two problems are similar; in recent work in linear programming they have been shown to be the same. However, in their implications for psychological views of

man, they may be separated. In what follows, the traditional problem in which ends are competing will be presented first, at some length. In this treatment, the approach of economic analysis will be illustrated. The second formulation of the problem, with fixed targets, will be presented with less detail.

In analyzing the allocation problem, an economic analyst takes as given data three categories of information, each of which is conceptually viewed as a mathematically defined quantity or function. These are

1. A pattern of "wants and preferences." These are the things that the actors in the economic process desire to get or to maximize.
2. A set of technical production or exchange possibilities.
3. An inventory of available resources (and, save in the case of a one-man "Crusoe" economy, information on their ownership).

These will be considered in turn.

1. The pattern of preferences: In treating a problem of "economizing," the economist takes as given a set of desires on the part of the men in the economic system. Most economists are content to take these as coming from outside the system, or, sometimes, as "sovereign." The "neoclassical" school of laissez-faire economists put a positive ethical valuation on these wants, taken as independent for each individual, and argued that an economic system "should" satisfy them as efficiently as possible. But this interpretation is not vital to economic analysis; the wants may be seen as things people will try to satisfy, whether this be good or bad, and analysis can study the results of their attempts. These wants or preferences may be much more complicated than a simple desire to maximize profit, although most problems involving businesses can be based on this simple assumption.

Where the maximand is more than simply profit, and where there are several different items which are valued, the wants and preferences of an individual, at a given time and place, may be described by a series of "indifference curves." These are contours ~~presenting~~ representing different combinations of goods; each contour line connects bundles of goods, the possession of any of which would leave the individual feeling equivalently well off. Thus in Figure I, the individual is indifferent

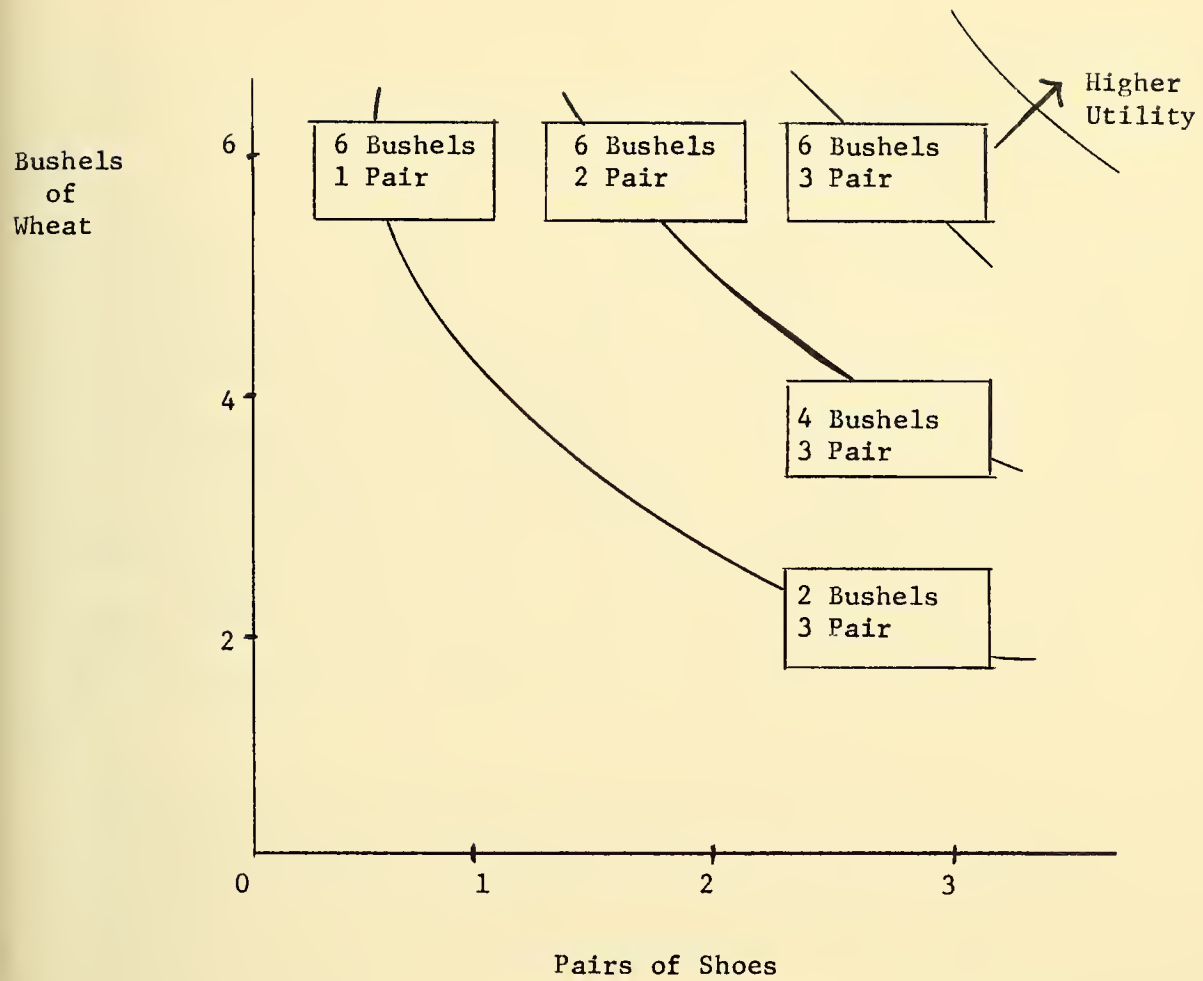


Figure I: An Indifference Map

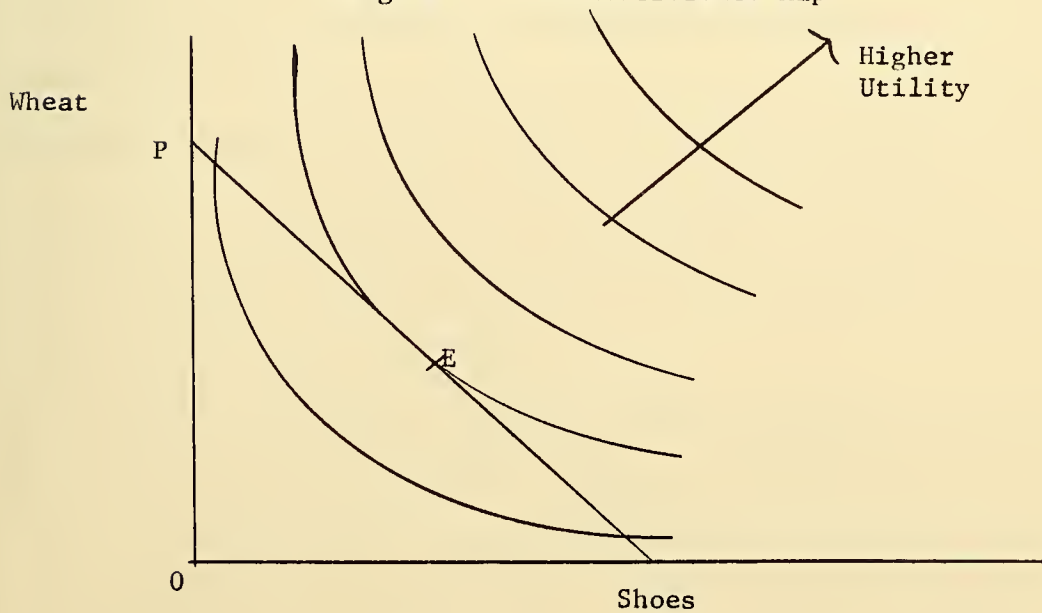


Figure II: Individual Equilibrium

between six bushels of wheat and one pair of shoes, on the one hand, and two bushels plus three pair of shoes on the other. On the other hand with more of both shoes and wheat, he is better off; that is, with six bushels and two pair, or, equally, with four bushels and three pair, he enjoys a higher psychic income. The individual with this preference pattern becomes still better off as he attains a point further from the origin, increasing his holding of both goods. These curves are given numerical values, called utility following Bentham's usage. This can be seen as a third dimension, and the indifference curves as iso-utility contours connecting points of equal height. However, utility is now more often taken as an ordinal index; an indifference curve further to the right indicates a position in which the individual is better off, but one can't say by how much he is better off.

Figure I gives the individual's pattern of preferences between only two goods or wants. Any individual will no doubt have a far higher number of wants; a larger number of goods could make him feel well off. Thus a complete map of an individual's preferences would require many dimensions; instead of being graphed, it could more easily be presented as a mathematical function. The utility function, furthermore, need not only include tangible goods, Leisure, time spent in ritual, the well-being of other people, prestige, or power over others all may enter the utility function. While economists do not normally treat such cases (save for that in which leisure is treated as a wanted good), conceptually there is no reason why they should not be included.

The economist, as stated above, must take the preference function as given in his problems. The anthropologist, however, is concerned with the explanation of why values are held--and the indifference curve is a means of presenting the different strengths of competing values. Whether values are explained in historical or in functional terms, they cannot be explained by economic analysis. Thus a division of labor is required between economic analysis and anthropological (or psychological) analysis. Thus, given a pattern of conspicuous consumption,

such as the meso-american fiesta system, economic analysis can be used to indicate the shape of the preference map involved in such a pattern, and to indicate its economic consequences (when it is combined with the resources and techniques available). But, it cannot be used to decide between alternative theories of how the preference system developed: whether it was Mayan in origin (Vogt, 1964) or whether it was introduced by the Spanish priests (Harris, 1964).

Some knowledge of social structure may also be required for proper specification of the maximand or utility function in economic analysis. A classic example of this is found in discussions of peasant family farms. Economists who viewed the peasant as maximizing "profit," a hypothetical quantity from which the estimated market value of their unpaid family labor was deducted, fell into error. This was a misapplication of theories drawn from the behavior of the capitalists, described by Ricardo (1817). The hypothesis that the peasant family seeks to maximize an income including elements of both profit and labor incomes, proposed by Chayanov (1966) has proven more accurate in predicting behavior. Chayanov has at times been claimed as a believer in the inapplicability of economic theory to peasant behavior; in fact his work, recently published in English for the first time, does the opposite. His proper specification of the utility function, and other recent efforts along the same line (Sen, 1966; Dean, 1966; Georgescu-Roegen, 1960) have made economic theory applicable to economics of peasant society.

2. The technology of a society is also taken by the economist as given. He conceives of it as the available set of means for transforming resources into those goods which are valued by the individuals' preference systems. Thus, for example, a number of hours of labor, seeds, bags of fertilizer, acres of soil, and inches of rain are combined to produce corn according to one technique. As there are several different combinations of goods in an individual's preference system that may yield indifferent amounts of utility, there may be possibilities of utilizing different combinations of inputs (resources) to get the same valued goods as outputs. Just as the consumer may trade off two bushels of wheat for one pair of

shoes and be at the same level of well-being as before the trade, a farmer may be able to substitute more fertilizer for some of his weeding time and get the same amount of corn at the harvest. For a man with access to a market, there are other possibilities for trade-offs. He may spend his time making sandals for himself; or work for wages and buy them; or grow corn and barter it for them.

The economists's notion of an individual's being in equilibrium is that he can no longer improve his lot by making any further available trade-off, either through substituting the consumption of one good for another (given his preference pattern), or through trading on the market (where his preferences interact with those of other people) or through a process of production (where he trades with nature, in effect). For example, in Figure II, imagine the individual starting out with only wheat, with the number of bushels on hand putting him at point P. He is confronted with the market opportunity to trade-off wheat for shoes by barter at a constant rate, which can get him to any point on the straight line PE. He will in this circumstance, attain his highest possible level of utility by bartering enough wheat to arrive at point E. At that point he is in equilibrium. An economy in turn is in equilibrium when all of the component individuals are.

In the sphere of technology, the economist usually considers production possibilities as if they were given to him by an engineer. Anthropologists' accounts of technological processes, the original subjects for economic anthropologists, could be used as well. But they would have to be combined with preference functions to describe economic processes. What is more, in dealing with anthropological problems, a further modification might be introduced. If a ritual has a function in agricultural production, time spent on it must be included in the requirements for this production. A more important modification is required in limiting the number of applicable techniques. The economist generally assumes that all methods ever invented fall within the possible use of a given producer. Transferring them from some other place may have a cost--that of hiring a technician

or ordering a blueprint. Thus, traditional agriculture is traditional only because this small investment in bringing techniques to the peasants by means of an extension service has not been made. If techniques were introduced, the peasants would, it is assumed, use those which raised their incomes (Schultz, 1964). The anthropologist, however, has been concerned with the diffusion of techniques between societies, and takes a less mechanical view of the matter. He may show that some techniques are not accepted in a given society because they are in some sense in conflict with other elements of a culture. Such techniques, the economist would say, enter both into the production process and into the preference function. These interconnections, which may be explained by the anthropologist, can be accepted as 'given' data for economic analysis. Although they complicate economic analysis, they do not make it impossible.

3. The resources available for production have already been considered, implicitly, in the discussion of individual equilibrium. This is perhaps the simplest set of data employed in analysis, but even here there are complications. As ecological studies of Swedish agriculture show, land is not an unchanging element. In addition, the land, water, minerals, wood and so on that can be used are subject to patterns of ownership. This is something that the economist takes for granted, and does not subject to much attention. This neglect has led to serious trouble in the use of economic analysis for evaluative or "welfare" studies of economically advanced societies. The traditional definition of optimum welfare took property ownership as given. The study of nature and causes of property ownership would seem to be part of the description of a society required before economic analysis can be carried out, because, obviously, the total resources in a geographical area may be different from those available to a particular producer in that area. Such a prior study is often omitted in economics; anthropologists have the conceptual tools to repair this deficiency.

Labor, which is also included as a resource, has its own peculiarities.

Since labor refers to the working time of people, it cannot, in any culture, be measured as simply as a stock of copper. However, if the various forms of leisure, ritual and governmental activities which may be alternative uses of time to work are included as "goods" in the preference function, with each produced by a production process using labor time as an input, then total time available to each age, sex and skill group may be taken as a resource.¹

4. Solution of the model. Once the maximand, or preference function, the production function and the resource availabilities are given, the economist has a system or "model" which can be solved mathematically (at least conceptually). Let us take a simple case, involving no interpersonal differences in tastes or property ownership, but rather assuming the society has a combined stock of resources and a combined preference function. The model would consist of a preference function:

$$\text{Utility} = f_1(\text{food}, \text{rituals})$$

two production functions:

$$\text{food} = \phi(T, M_1, W_1)$$

$$\text{rituals} = \theta(M_2, W_2)$$

and an inventory of resources:

T = ayre-years of land available for the given year.

M = total number of manhours available, with M_1 the number used in agriculture, and $M_2 = M - M_1$ the number used in rituals.

W = total number of woman-hours available, with W_1 and W_2 similarly defined.

If these functions, here presented in a general form, are specified more exactly, then it is possible to solve for the optimal amounts of male and female labor to allocate to rituals and to food production, respectively. The conditions for maximization of utility in this, as in any problem, are those of elementary calculus (for example, that the first derivative of utility with respect to all

variables equal zero).²

In practice, rituals and food production may not really be competing uses of time for most groups, since work is a full-time activity in a growing season and rituals are concentrated at other times. But the analysis of choice presented in this model has other applications.

One could use a formulation like this in anthropology to answer a problem like this: From other aspects of culture we might make the hypothesis that one group is much more concerned with ritual and less with food than in some comparable group. The hypothesis would then be that the value of B is much higher than that of A in the preference function of the people being considered, as compared with other groups (or, ignoring the comparison, in some absolute numerical sense). From observation of rituals the values of F and G could be obtained; while those of C, D and E could be estimated by the standard economic techniques for estimating an agricultural production function. (See Klein, 1962). The total endowments of labor and the observed allocation of labor between ritual and agriculture would provide all of the remaining data required to compute the values of A and B from the two equations of the solution, and it could be determined whether B was indeed as high as expected.

A concrete example of such a procedure would be a test of the claim made several times in the Reichel-Dolmatoff (1961) study of Aritama, Colombia, that "the prestige value of clothes is taught to all children from infancy and represents the basic incentive for work." Operationally, this could be translated into the statement that in the relevant range, at least, the preference function of an Aritama resident puts a much higher value on clothing than would the function which guides a peasant somewhere else. This should be a testable hypothesis. Budget studies in other under-developed areas show the proportion of income spent on clothing is typically 12% and ranges up to 18% (Houthakker, 1957). The two figures which may be computed from budgets in Reichel-Dolmatoff's account are not inordinately high by this standard. One family, in the poor barrio of town,

spent 153.70 pesos on clothing in a year, out of a cash expenditure of 524 pesos and a total income, including presumed income in kind of about 725 pesos; a more well-to-do family spends 330,80 pesos on clothing, out of a cash income of 3685.36 pesos. This would cast some doubt on the importance of clothing, alone, as a motivating force for work at the current levels of income in Aritama.

The authors do, however, present some information which would indicate there is a more complex preference pattern at work, in which clothing is only one of several goods entering (others being land, food and conspicuous leisure), all of which are valued, in part, because they have to demonstrate that "they were not wild Indians as the government seemed to think." In maximizing prestige, each individual is presented as an economic man: "Every individual has to know just how far he can go in his efforts; just how much prestige he can afford to lose in one sphere if he is to acquire it in another" (p. 260). However, since the observations of what the economic opportunities are that confront the villagers remain in a fragmentary form, scattered throughout the book, it is hard to tell exactly what goes into this expanded economizing process. Thus, although I believe that the authors have conceptualized the problem in a form appropriate to the use of economic analysis, such an analysis is impossible because they lacked the economic tools to undertake it, and thus did not gather their data in a proper manner, for this end.

If data from a number of communities or cultures is available, it may also be possible to determine whether differences between them with respect to some measurable economic variable are statistically attributable only to differences in resources, or whether differences in technique and in cultural preferences must also be considered to account for the variation. This technique has been applied to the adoption of cooperatives by Jamaican fishing villages (Edel, 1967), the sources of entrepreneurship in Nigeria (Harris, 1967), and to community investment by Colombian peasants (Edel, 1968).

Even if specific hypotheses about the preference function are not made, it may be possible to determine some aspects of preferences by computing the costs actually suffered by a group in achieving some end, such as the amount of additional food that could be produced if some ritual were foregone. For this, of course, data must be adequate.

II

The problems considered to this point have been those of maximization of utility as defined by preference functions. However, a second formulation of the problem must also be considered. It is often said of primitive peoples (and even of Western peoples) that they do not maximize in the sense of making conscious attempts to weigh alternatives, but rather operate according to fixed patterns of activity, which they expect to yield certain minimal results. Only if the old patterns fail to provide normal satisfactions is change considered. Some care must be taken with the assumption of fixed targets in order to assure whether preferences are truly rigid. It is possible that the observed actions of a group (even if these are repeated unchanged over many years or even generations) may result from a compromise among competing ends, as represented by a curved preference function, rather than from absolute preferences (Schultz, 1964). But assuming that fixed targets are involved, as long as the activities being considered involve the relation of some means (a production method and a stock of resources) to a given end (a customary consumption level, if not a system of preferences), then the problem is still one that can be treated by economic analysis.

Let us assume a set of fixed targets required for the survival of a society in its present form. These may include a certain amount of food per year; a certain amount of time available for warfare; a certain amount for the raising of children into the culture; a certain surplus to be distributed at rituals, and so on. The economist can compare these targets with the production conditions to determine the minimum resources that would be needed to achieve them, and thus

to sustain the culture. By projecting targets into the future, and applying a similar method, he may determine whether the society is likely to come under economic pressure in the future. The sort of response it will make to pressure, and the original targets, however, cannot be explained by economic analysis.

To use another grain and rituals example, suppose a person requires 200 pounds of grain a year to keep him well-fed, and the culture demands that he spend 165 days a year in rituals. The economist must try to solve for the amount of land, that, given the available agricultural technique, is needed per-capita for 200 pounds of grain to be produced in less than 200 working days. If the land available is limited in quantity, it would be possible to solve for the maximum amount of population growth that would be possible before pressure on either diets or the ritual calendar were encountered.

A model of this form is used by Cancian (1965) in his study of the religious "cargo system" in Zinacantan. Cancian takes as fixed (inelastic) the supply of these ceremonial posts in Zinacantan, and computes, as alternative estimates, the age at which men will hold their first office if everyone in Zinacantan is to participate, and the percentage of men who will be left out if the first office is held by the age of 35 by all who will participate. The average age of first cargo holding is shown to rise from 41.2 years (1950) to 45.8 years (predicted for 1980 on the basis of expected increase in population); while, under the alternative model, the percentage bypassed increases from 30.7% to 47.3%. Cancian speculates that this will undermine the effectiveness of the cargo system in fulfilling the function of providing cohesiveness and a focus for identity in Zinacanteco society.

More complex models may, of course, also be constructed; in a formal sense different time periods can be connected by the solution for the amount that must be left aside from immediate consumption and invested if the resources in a future period are to attain a certain target level; or the overall level of employment in an economy at which consumption will equal production can be solved for, and

compared with the desired target of full employment. This is the method used in simple Keynesian models of Western societies. Another variant is a model that views the economy as a closed circuit, without targets, but with observed parameters assumed constant. Thus, if it were observed that the number of days of agricultural labor were a cultural constant, and other resources were given, the production function could be used to determine total food production. If a given level of consumption was found to be culturally established as normal, use of this parameter would allow a solution for the amount of production which remained as a "surplus" for distribution in a potlatch system, or for other uses. Any discussion of surpluses requires use of such parameters and functions. There has been a fairly full discussion of the normal consumption (subsistence level) parameter, but not as much of the other parameters used in the problem. (See Pearson, 1957; Harris, 1959; Dalton, 1960; Wharton, 1963.)

In all of these problems, as in those in which it is assumed that individuals act to maximize consumption or some sort of utility or psychic income, economic analysis has been shown to be a system for casting information in a framework amenable to the manipulation of mathematical functions and values. In every society, some sort of fitting together of physical means of subsistence, and means for the provision of other wants, with the ends of subsistence and satisfaction must take place. Therefore, it is safe to conclude that there is in every society at least some aspect that can be analyzed in the framework of economic analysis. It may be, although this is less well established, that this fitting together takes the form of maximization of some utility function in all societies; and it may even be that an aspect of such maximization permeates all human behavior. However, the three elements (preference function, resources, technological possibilities) which are brought together in economic analysis must be stimulated before such an analysis takes place. Therefore, an economic analysis cannot be a complete description of any social system, even when it can be employed in the analysis

of all parts of that system.

Two elements are missing from the economic analysis, which leave it incomplete as a description of a social system. The first is the historical background of the functions. Except through the formal linkage of an investment model, which only explains the history of the capital component of resource endowments, economic analysis is entirely anachronic. In the terminology of Lefebvere, it is part of the study of "horizontal complexity," but not of "vertical complexity." (Lefebvere, 1953; cited in Sartre, 1963.) Culture history, encompassing both diffusion or invention of technology, and the origins of the patterns of ownership and the values system which gives rise to the preference function must be one additional study.

And even within the single time period with which economic analysis is concerned, the economic process that it studies may not be the only system relating the values, technology and ownership (if not the existence) of resources. Different values may in some way fit together to form a psychologically compatible pattern, or they may be incompatible, even if the extreme patterning posited by Benedict (1934) does not hold, social organization may be by a technological process; and this organization may in turn be compatible only with some value systems. Thus, an additional theory is needed to cover these interrelations. At its simplest, it may be a behavioral psychological theory. But attempts that have been made to theorize on a more abstract level as to the nature of systems which are internally consistent have led to interesting enough findings to warrant further study, if not the mathematical codification that has been possible of the economic relationship. These include principally the work of the functionalist school in examining what Goodenough (1963) refers to as "the systematic relationship of custom to custom," as distinct from "the utilitarian relationship of custom to need." This latter is amenable to economic analysis; the former is not, though it may have an inner logic which can be discovered by anthropological analysis. Certain sectors of it, notably kinship systems and grammars do have their inner logic

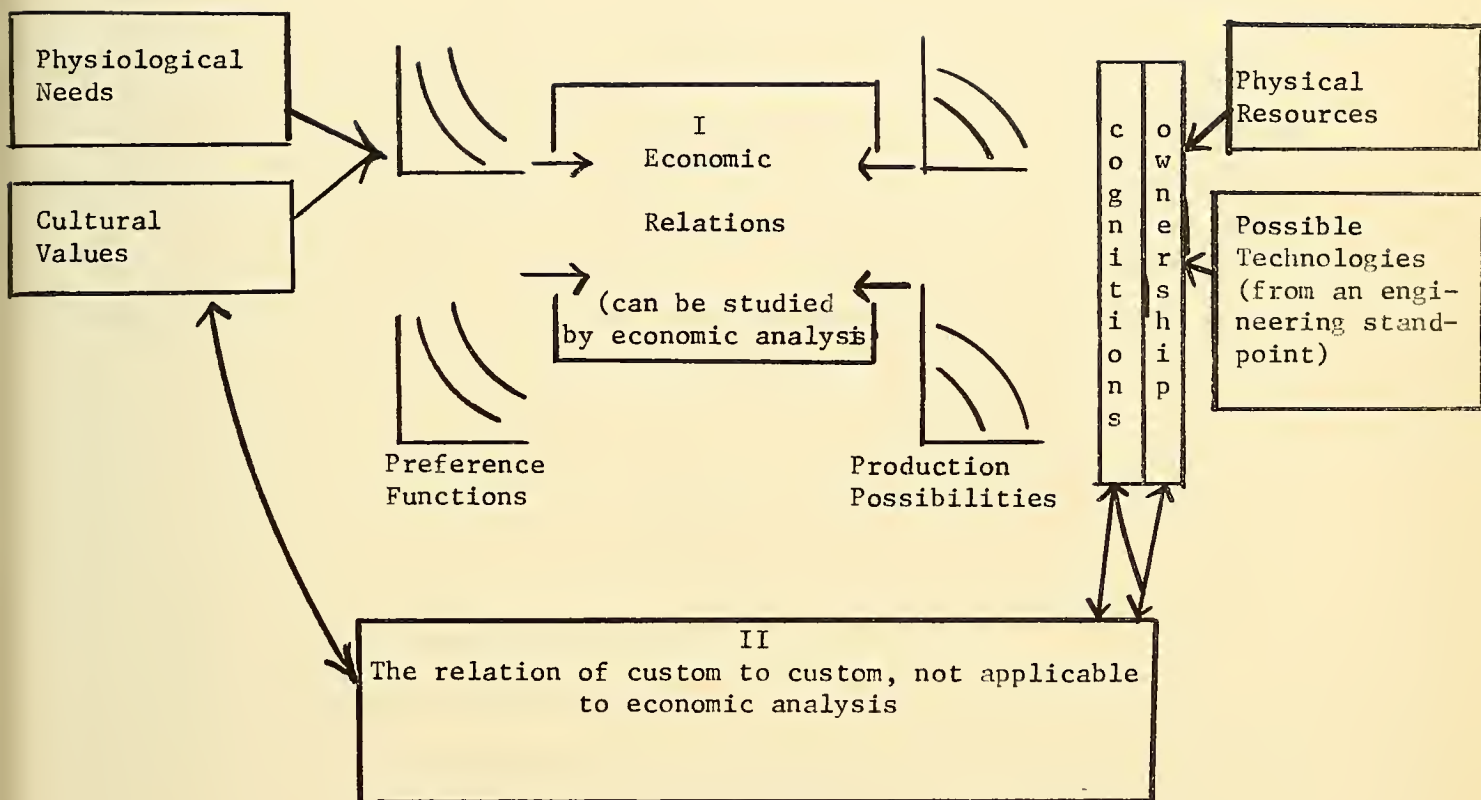
which has already been treated at some length. Problems of psychological compatibility between values and results (Festinger, 1957) or between language and cultural preferences (Whorf, 1956) among others, also warrant attention.

How all of these different aspects of a combined social science may be fitted together is hard to say. There may be some value to Levy-Strauss' (1953) division of relationships into economic, kinship and cybernetic, in terms of a division of labor between techniques of analysis. A very tentative schema of the relation of economic analysis to the other analyses of relationships within a single time period is given in Figure III. A schema which would contain historical depth would obviously be more complex and could not be represented in two dimensions.

III

The schema as presented, and the description of economic analysis given above, allow a new perspective on the debate over the definition of economies and the economy. In this controversy, as indicated above, two principal definitions were presented. The first being that economics is the study of the material means to man's existence: dealing with their production, distribution, and consumption. The second, that economics is the study of "economizing" behavior: the allocation of scarce means to multiple objectives. Other definitions suggested have been (for economic anthropology) that it study in primitive societies what economists study in western societies, and (for any economics) that it was simply what economists do.

A simple statement that "economic anthropology treats in primitive societies what economists study in ours" is too broad to do much good, particularly since some economists have begun speculating in psychological causation. (Hagen, 1962.) However, the account of economic analysis as the core of economics should suggest a related definition of what might be termed anthropological economics as treating the economic process in societies, with reference to the social milieu in



Set of relation I forms an economic (Walrasian) general equilibrium system. Set of relations II forms what one might term an anthropological equilibrium system, involving Malinowskian interrelationships or perhaps a Benedictian pattern.

FIGURE III: ECONOMIC AND OTHER RELATIONSHIPS

which it is fitted. The economy, or at any rate the area of activity to be treated by economic analysis, may be defined heuristically. If economic analysis improves our understanding of an area of behavior, then we may say it is included in the economic process to a significant degree.⁴

This statement might seem to leave open the implication that has been found in Burling's position in the debate, namely that as larger and larger areas of human behavior turn out to involve some sort of maximizing behavior, economics may swallow the other social sciences. The considerations given above, in showing that the "givens" for economic analysis have a historical dimension and other relationships to each other that economic analysis cannot treat, would seem to me to preclude such a possibility. From a substantive viewpoint, also, it would be possible to enumerate several possible levels, any of which could be termed "the economy," if that proved useful. These domains, which are partially overlapping, might include:

1. Acts involving subsistence goods.
2. Acts involving all material goods.
3. Activities commensurable with subsistence goods in the culture studied.
4. Activities commensurable with each other and some material goods but not with subsistence goods in the culture studied, as in African cultures with a separate "economy" in which cattle, brides or prestige goods circulate.
5. Activities commensurable with subsistence goods in modern or capitalist cultures.
6. Any activities involving maximizing behavior.

In a given society, economic analysis may be applicable to all, some or none of these substantively defined "economies." Considering "the economy," those domains in which economic analysis improves understanding of activity to a significant degree, would have the advantage of demarcating areas of study for a possible division of labor. Such a division is itself, of course, supported by economic analysis. Economists' techniques have a cost: they take time to learn; they also yield a certain return in understanding. Economic analysis would in-

dicade that the cost should be born when the return will be great enough to make it worthwhile. Whether it is or is not in a particular case may be difficult to determine; however, by making a few techniques of economic analysis more cheaply available to the anthropologist, more applications can be brought into the range where costs are justifiable. Perhaps, more anthropologists will be able to gather data in a form amenable to the drawing of some economic conclusions (as through the taking of samples from which consumption or production functions can be computed). This would also make anthropologists, who in most cases do the first scouting of non-industrial societies for the social sciences, more able to determine in which cases a full-time practitioner of economic analysis would be able to perform a useful role.

Footnotes

* The author is assistant professor of economics at Massachusetts Institute of Technology. A preliminary version of this paper was presented in a seminar conducted by Professor S.W. Mintz at Yale University. Discussions with A. Perey, J.R. Harris and M. Rothschild also aided in the formulation of several points.

1. Even this is an oversimplification in that nutrition and other factors influence the ability to work.
2. Additional conditions involve second derivatives or convexity of functions. An example can be constructed, if simplifications are made through the use of an additive utility function and production function for rituals. Normally, we assume utility functions to be curved, and the production function for rituals in most cultures would, no doubt, require fixed proportions of male and female participation. The food production function is of the exponential Cobb-Douglas form used in many models.

Here let Utility = $U = aF^c - bR$ (utility function)
 where $F = \text{Food} = T^c M_1^d W_1^e$ (production function for food)
 $R = \text{Rituals} = gW_2 + hM_2$ (production function for rituals)
 and $T = \text{available land/year}$
 $M = M_1 + M_2 = \text{available number of man-days}$
 $W = W_1 + W_2 = \text{available number of woman-days}.$

The equations may be combined into a new function:

$$U = aT^c M_1^d W_1^e + bg(W - W_1) + bh(M - M_1)$$

which when differentiated gives (setting derivatives = 0):

$$\frac{dU}{dM} = daT^c M_1^{d-1} W_1^e - bh = 0$$

$$\frac{dU}{dW_1} = aeT^c M_1^d W_1^{e-1} - bg = 0$$

the solution of this would give

$$M_1 = \frac{dg}{eh} W_1 \quad W_1^d + e-1 = \frac{bg}{ea} \left(\frac{eh}{dg} \right)^d T^{-c}$$

which gives the allocation of labor to farming; production of food, and of rituals, can then also be computed.

3. Sartre (1963), opts for a three-level approach: phenomenological description, analytico-regressive movement, and synthetic-progressive movement. Economic analysis, which he would probably relegate to the first of these levels, would seem to be relevant in all three.
4. This is a slightly different position from Nash's view (1966, p. 5) that "the institutional cluster where the strategy of economizing is the dominant mode of choice is the economy," in that even if society does not consciously optimize, but the limitations of scarcity and techniques combined with some customary wants work through an evolutionary process to create an equilibrium allocation of resources, so that economic analysis is useful, the sector might be termed an economy.

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