

Empiricism and Rationalism in Economic Theories of Value

Over the past forty years, logical positivism has been the dominant expression of the methodology of empiricism in the social sciences. Throughout the entire period it has been subjected to sustained and increasingly damaging criticism. While most of the criticism originated in philosophy journals and books, where questions of metaphysics and epistemology are generally debated, it was only a matter of time before the critiques of logical positivism (and empiricism generally) found their way into the literature of the social sciences, where empiricism in the form of logical positivism has been dominant over all other methodologies for nearly three decades. A recent work by Professors Martin Hollis and Edward Nell has succeeded brilliantly in applying these critiques of positivism to the methodological foundations of neoclassical economics.¹

Positivist empiricism has insisted that all cognitively meaningful statements are either analytic statements which are conventionally agreed upon rules of discourse that have absolutely no factual content, or synthetic statements which are factual and derive solely from the human sensory apparatus acting as a passive receptor for the brute, atomistic, metaphysically given “facts” of experience. In this view, the sciences are distinguished only by their subject matter and never by their methodology; value judgments have no place in scientific discourse; hypotheses are guesses that some previously observed spatial and temporal contiguities among atomistic “facts” are projectable into the future; a hypothesis becomes a causal law when it is “well enough” confirmed empirically; and the only test of a theory is the success of its predictions.²

The basic problem for positivism, as for all types of empiricism, is its failure to solve the riddle of induction. In the realm of economic theory this difficulty can most easily be seen by posing the question: what are the metaphysically given, brute, atomistic facts of experience, and where do they fit into neoclassical theory? Certainly neither the “firm” nor the “household” is such a “fact,” as any economics instructor can testify if she/he has tried to explain to students how the incredible variety of living arrangements and modes of profit-seeking all qualify to be treated indifferently as households or firms with (for purposes of economic theorizing) identical economic behavior.

Prices and quantities purchased or sold might seem to constitute these atomistic facts. But price is not an atomistic fact. It is a social convention of considerable complexity, the understanding of which requires an understanding of the nature of monetary exchange, laws of contract, and other social phenomena which are themselves complex nonatomistic institutions and processes. The same is true of sales or purchases. There simply are not atomic economic facts which a passive human sensory apparatus could merely record in order to inspect their spatial and temporal contiguity.

Even if there were such facts, the positivist or empiricist methodology cannot, by its very nature, furnish a criterion which would tell us which observed contiguities are accidental and which are projectable or causal in nature. Any such criterion, in order for it to be cognitively meaningful, would have to be either analytic, and hence devoid of any factual significance, or synthetic, and hence the direct result of sensory perception of atomic facts. No positivist has ever argued that such criteria are directly experienced.

Finally, empirical testing is no simple, automatic affair. Theories must result in testable predictions. The theory must define its terms, include criteria for applying these terms, specify *ceteris paribus* clauses, and provide rules for interpreting and/or adjusting the phenomena of observations. The failure of a prediction can indicate problems at any one of these steps. Theories are conditional and predict consequences only if certain conditions are fulfilled. In most of the

social sciences it is frequently difficult, if not impossible, to independently ascertain whether or not these conditions are fulfilled. Most generally, failure of predictions is taken as evidence that the conditions were not fulfilled and not disconfirmation of a hypothesis. With a subject matter as complex as that studied in the social sciences, empiricism has found no answer to this circularity.

If one accepts the critique, then one must conclude with Hollis and Nell that “the case is . . . strictly against Positivism Theorizing in economics imports a circularity which positivists must regard as vicious. This is not to say, however, that neo-classical economists can, if they are convinced by the case, simply drop positivism and otherwise proceed as usual.”³ The present writer agrees with Hollis and Nell. It is the contention of this paper that most neoclassical economists, despite their protestations to the contrary, espouse theories that seem to implicitly rest upon rationalistic rather than empiricist methodology; that once this rationalist basis is seen, the criteria for sound theories furnished by a rationalist methodology show neoclassical economic theory to be of little value; and, finally, that the same criteria show Marxist economic theory to be decidedly superior to neoclassical theory.

Before proceeding to this task it is necessary to make a few comments about rationalism as a scientific methodology. This necessity arises because in English-speaking intellectual circles, rationalism has a long history of being very unfairly maligned. Rationalism is not the assertion that scientific theories intended to explain phenomena external to the theorist can be simply conjured up in an armchair or an ivory tower and that the adequacy or inadequacy of such theories can be determined independently of any empirical experience or evidence. It is, rather, based on a recognition of two facts. First, scientific explanation must rest on certain first principles which can be known, but which cannot themselves be scientifically proven. Without such first principles we can explain *a* by *b*, *b* by *c*, *c* by *d*, and so forth in an infinite regression in which nothing is explained. Second, the first principle of empiricism, that there are simple, atomistic facts of experience which are immediately known to any observer and which form the bases of inductive generalizations, has proved untenable. Experience is not made of discrete atomistic facts. It is a continuous interconnected process in which the subject selects and isolates “facts.” The selection process is always based upon previously held ideas, values and emotions. It is particularly true in the social sciences that what constitutes a fact is rarely independent of the theory which the fact is intended to confirm or disconfirm.⁴ Furthermore, even if such atomic facts did exist empiricism has never advanced an adequate explanation of the process of moving from facts to projectable generalizations.

Rationalism therefore seeks first principles which can provide a more servicable foundation for sciences. It finds this foundation in true definitions. Empiricism has always insisted that definitions are either lexical or stipulative. Lexical definitions merely report common usage and are alphabetically listed in any dictionary. One never asks whether or not a lexical definition adequately connects a word in the language or thought process to its existential referent; one merely asks if the lexicographer accurately recorded the most dominant or characteristic ways in which the word is actually used. Stipulative definitions are arbitrary assertions about how an individual intends to use a word. Again, empiricists never question the adequacy of stimulative definitions, since they are arbitrary and their acceptance is a mere matter of convention. Rationalists, however, argue that some lexical and some stipulative definitions are true definitions while some of each are not.

The belief in true definitions is based upon the belief that the “things” that make up the component parts of experience have features which are essential and features which are nonessential or accidental. Essential features of a thing are those features which the thing must have if it is to be the kind of thing it is. Nonessential or accidental features are those features which could be otherwise and the thing would continue to be the kind of thing that it is.

The key concept in the preceding paragraph is that there are “kinds of things” that are represented by, or understood by virtue of concepts. The essence of a thing is the properties the thing must have if the concept of that “kind of thing” is to apply to it. The essence of a concept is all of those predicates which must be applicable to a thing if the thing is a true existential referent of the concept. The first principle of rationalism is that things do have essences and that true definitions are those which adequately reflect the essence of the things under consideration. Rationalism has been concerned, traditionally, with attempts to expand our knowledge by using axiomatic systems which work out the implications of what are believed to be true definitions. The principle of true definitions is the rationalists' replacement for the metaphysically given, atomistic, sensory “facts” of the empiricists. The rationalists' belief that classes of phenomena have essences permits them to avoid the empiricists' insoluble problem of induction.

The importance of empirical observation in rationalist methodology cannot be denied, however. This is so because all true definitions are not such as to command our belief or our assent with equal force. Some essential features of a thing are so obviously essential to that thing remaining the kind of thing that it is that we cannot possibly conceive of the continuation of the thing without these features. A true definition of such a thing must contain predicates of which these features are the essential referents. Such a definition is known a priori to be true because it cannot be conceived or imagined to be false. Furthermore, such a definition is a synthetic statement; i.e., it has empirical content.⁵ Thus the rationalist escapes the empiricist's difficulties which arise from the insistence that all a priori statements are analytic and have no empirical content. A part of the Marxist' labor theory of value, which is discussed below, is based on a definition of production which can be known a priori to be true, and hence can support - conclusions which can be known to be true a priori. There are, however, true definitions which do not have the power to command our a priori assent. Empirical research is necessary to construct such definitions, and empirical testing of the deduced implications of these definitions is also necessary if such definitions are to forcefully command our assent. Another part of the Marxist labor theory of value, also discussed below, is based on definitions which Marx regarded as true definitions, but the truth of these definitions must be established a posteriori by an appeal to empirical research.

An important point must be added to the preceding paragraph to obviate a traditional empiricist objection to rationalist methodology. To say that a priori synthetic statements are possible is not to say that these ideas exist innately in the minds of newborn babies, and no experience is necessary for the person to become conscious of them. One can believe that only through experience can one begin to understand definitions and even insist that experience of certain particulars forms a necessary prelude to grasping a priori synthetic statements. The important point is that the objects experienced by themselves do not give us any basis for generalizing about the essence of all objects of that kind. A priori synthetic statements are possible because on the basis of certain experiences, the human knowing mechanism grasps some essences of experiential reality which it cannot conceive being otherwise for the general type of object or situation being experienced or conceived. When this happens we have projectable generalizations which are both a priori, in that they can be projected into situations and circumstances of which we have had no experience, and yet we cannot conceive of them being false, and synthetic, in that they refer to real elements of experience.

Thus the rationalist methodology asserts that some true definitions can be known a priori, while others must be established a posteriori. The a priori truths can be known with certainty, while claims of truth for definitions which can only be known a posteriori will command our assent only to the degree that convincing empirical evidence can be given in support of them. This distinction provides us with criteria for evaluating competing theories which are based on the rationalist methodology and which purport to explain the same or similar sets of phenomena.

First, true definitions which are known to be true a priori are always more powerful in commanding our assent than definitions the truth of which can only be established a posteriori. Where the two competing theories rest on a posteriori true definitions, then we must assess the adequacy of the evidence supporting the rival claims to have truly defined the phenomena in question.

The two most important economic theories purporting to explain capitalism are the Marxist and neoclassical theories. Each attempts to explain capital, profits, wages, employment levels, prices, and other phenomena of capitalism. It is the contention of this writer that Marxism and neoclassicism (at least in its more logically consistent versions) are based either explicitly or implicitly on rationalist methodology, despite the frequent claim that neoclassicism is based upon logical positivism. It will be argued that by the criteria of the rationalist methodology, Marxism can be shown to be clearly superior to neoclassicism.⁶ In this paper only value theories will be subjected to a comparison. But because nearly all economists accept the assertion that value theory is the core of any general economic theory, this seems to be a reasonable test of the two competing theories.

Neoclassical economists for over forty years have accepted Lionel Robbins' definition of their subject matter: "Economics is the science which studies human behavior as a relationship between ends and scarce means which have alternative uses."⁷ Although it is called a social science, distinctions among individuals are almost never found in neoclassical economics. There is rarely a mention of social class, race, social power, sub-ordination, superordination or any of the other categories that might describe real social relations among people. Robbins, in fact, begins by making statements about the behavior of a lone Robinson Crusoe, which he believes can be generalized to describe the behavior of all individuals in any society.⁸ The theme that all individuals in a "free enterprise" economy are essentially the same pervades neoclassical textbooks. The best-selling intermediate level text of the last twenty years is Richard H. Leftwich's *The Price System and Resource Allocation*.⁹ Leftwich sets the theme of his book on page 2: "We are the participating members of a substantially free enterprise economy. We consume its milk and honey, its automobiles and entertainment. We own and operate its farms, its filling stations, its factories and its gold mines. We own and command its capital and labor."¹⁰ The "we" in this passage is never differentiated in any way throughout the book.

The single most important feature of all persons in this view is the capacity for making rational choices. It is no exaggeration to say that the neoclassicists' real definition of a human being (whether isolated or in a social context) is that of a rational maker of choices. Leftwich states that "in economics we build a theory of consumer behavior on the postulate of consumer rationality."¹¹ Another best-selling text asserts that "the postulate of rationality is the customary point of departure in the theory."¹²

The rationality of persons is defined as the making of choices and taking of actions which maximize the individual's utility or satisfaction.¹³ Individuals are supposed to get utility or satisfaction only from consuming commodities. A person is assumed to have only two ways of securing the commodities from which to get the satisfaction: a person can exchange his assets (presumably money) for commodities, or he can take part in the production process as a means of acquiring assets (again, presumably money). Neoclassical theory is accordingly divided into two branches, consumption theory and production theory. The former explains how consumers spend their money so as to maximize their utility; the latter explains how they use the "factors of production" which they own to maximize their monetary returns from the sale of the commodities produced (there is never a discussion of who owns what factors of production, how the patterns of

owner-ship came about, or what social, economic, and political significance can be attached to different patterns of ownership).

These two branches of the theory are, in fact, frequently reduced to a common explanation of utility maximization through exchange. In a widely used advanced text the theory begins by giving each individual an initial endowment, i.e., “a combination of goods that provides a starting point for optimizing choice.”¹⁴ He or she can then acquire desired goods by exchanging for them directly with other economic agents or by producing. A business firm is defined as “a grouping of one or more individuals specialized to productive activities (transformations of commodity combinations effected through dealing with nature rather than through exchange with other economic agents).”¹⁵ Thus consumption theory is concerned with exchanges among persons, while “production is 'exchange' with nature.”¹⁶

From this foundation, the entire elaborate, esoteric structure of neo-classical economics is constructed. Consumption theory and production theory both form the basis for a series of logical deductions which culminate in the conclusions of Paretian welfare economics. This writer has argued elsewhere that Paretian welfare economics is the most sophisticated Conservative rationale for the status quo yet constructed.¹⁷

It is not difficult to destroy any claim that neoclassicism is based upon positivist empiricism. One merely has to ask upon what atomistic facts of sensory data is the theory based. The notion that individuals are rational maximizing agents is surely not based upon such facts. The idea of rationality is very complex and its meaning has been widely debated. To this writer's knowledge, no neoclassical economist has ever argued that rationality is an atomistic fact given directly in experience. Maximizing behavior is an equally complex notion which no theorist has ever claimed to be immediately known through sensory experience. In fact, what most neoclassical economists claim to be the brute atomistic facts are prices and quantities bought and sold. They assert that a projectable relationship exists between prices and quantities people wish to buy and sell. The theory of rational maximizing behavior, they argue, is not itself a product of empirical observation. It is, rather, an axiomatic system in which logical deduction culminates in statements about the ways in which buyers and sellers will respond to prices and price changes. It is asserted that the observed behavior of buyers and sellers will involve projectable contingencies which can be explained by the assumption that people behave as if they are rational maximizers. The theory should be accepted or rejected, in their view, according to whether or not the “atomistic” facts of buying and selling are observed to conform to the theory's predictions.¹⁸

Accepting the theory on these terms it proves to be unsatisfactory. Empirical tests of the theory are usually attempts to construct multiple correlations where the empiricist has a time series of numbers representing prices, quantities, and some other data which he assumes represent the most important variables among the *ceteris paribus* conditions. From a perusal of the various attempts to estimate demand curves, one conclusion is immediate: neoclassical economists do not have a theory or any consistent theories about what the important *ceteris paribus* variables are or how they affect quantities bought and sold. Most such empirical studies represent many, many hours of computer time as the theorists continually manipulate the equations and alter the data until the computer just happens to yield an appropriately high multiple correlation coefficient. At that point the theorist attempts to give an ad hoc “explanation” or justification for the particular form of his equation that yielded this result. None of these “explanations” ever make their way into the economic theory text-books, where prices and quantities remain the only two variables for which the theory supposedly gives a systematic relationship.

But the empirical tests of neoclassical price theory have an even greater flaw. Most generally such tests are called estimates of demand equations. Implicit in the setting up of such equations is the assumption that all of the *ceteris paribus* variables considered represent conditions for which

a change in any one of them will “shift” the demand curve. When the theorist has isolated these effects, then price changes that are presumed to be independent of these other variables are assumed to be the results of “shifts” of the supply curve. The pairs of prices and quantities thus considered are supposed to constitute points on a demand curve. Each price and quantity pair are merely assumed to represent an equilibrium point where the demand curve crosses a supply curve. And if the relation between price and quantity has a positive sign, everything is merely reversed. The study becomes an estimate of the supply curve, where the *ceteris paribus* variables are assumed to “shift” the supply curve and where price changes are assumed to reflect “shifts” in the demand curve.

It is extremely complex to attempt to construct simultaneously both a demand equation and a supply equation that are independent of each other (as the theory requires). If such could be done, it would not be necessary to assume that each price and quantity represented an equilibrium where supply equaled demand. It would then be possible to assert that some points represented disequilibria. But each point would still have to be on either a supply curve or a demand curve.

The overwhelming weakness of any of these approaches is the fact that empirical observation simply can never tell us whether an observed price and quantity is on either a supply curve or a demand curve, much less whether they represent a point in common on both a supply curve and a demand curve. This fact is utterly devastating of the whole claim that neoclassical consumption and production theory are based upon empiricist methodology.

The problem is that the theory of rational maximization, upon which supply and demand theory are based, is a theory about mental states that are not observable. The theorems about demand and supply, which are deducible from the theory of rational maximization, are theorems about mental states. They tell us how much people would desire to buy and sell at different prices. There is simply no directly observable indication of whether either buyer or seller is satisfied with any given exchange.

Because an actual exchange is both a purchase and a sale of identical magnitudes, there is no way of empirically differentiating whether it lies on a demand curve but not on a supply curve, on a supply curve but not on a demand curve, or not on either curve.

In most empirical studies of either supply curves or demand curves, it is simply assumed on a priori grounds alone that the observed point is an equilibrium point that lies on both curves. And even if it were possible to construct separate and independent equations for empirical studies of supply and demand, it would still have to be assumed on a priori grounds alone that each point lies on either the supply curve or the demand curve. Introspection and common sense tell us that there are innumerable exchanges in which the quantity exchange differs from that which either the buyer or the seller would like to exchange at the existing price. Neoclassical economists must, on a priori grounds alone, simply assume all such situations away. Logical positivism and empiricism indeed!

The only role which the neoclassical theory of consumer choice generally has in this morass of empirical confusion is to give an a priori answer to the question of whether observed pairs of prices and quantities lie on a supply curve or a demand curve. If a positive correlation exists, then the theory tells us that the points are probably on a supply curve, though not necessarily, because the theory shows that under certain conditions supply curves can be backward-bending. If a negative correlation exists, then the theory tells us that the points are probably on a demand curve, though not necessarily, because once again the theory shows that under certain conditions demand curves may be upward-sloping.

Thus the theory gives equivocal support for empirical predictions, the testing of which is impossible without the a priori assumption of several axioms of the theory. Particularly restrictive

is the necessity of assuming that empirical observations of prices and quantities lie on supply curves or demand curves or (more generally) at the point of intersection of supply curves and demand curves. The theory must be assumed to be true in order to interpret, the data which, when interpreted, are supposed to provide empirical confirmation of the theory. A more empty and tautological theory would be hard to find.

Why then do neoclassical economists cling to the theory so tenaciously? The answer, in this writer's opinion, is that the empiricism of the neoclassicists is a ruse. The most important conclusions of the theory of the rational consumer are not those which underlie empirical predictions about buying and selling behavior at all. The most important conclusions are those which underlie the conclusions of Paretian welfare economics.

The theory, when viewed from the standpoint of its most essential actual use in the hands of neoclassical economists, is a rationalist theory designed to support normative conclusions. It posits, as a true definition of an economic agent, a calculating, rational person who always maximizes utility either through exchanges with other persons or through exchanges with nature. From this supposedly true definition is constructed, in nearly every textbook on neoclassical price theory, not empirical tests of buying and selling, but rather the norm of Pareto optimality.

The norm of Pareto optimality is the core concept of welfare economics. The usual exposition of this norm begins with a sharp dichotomy—the theory of the consumer and the theory of the firm. Each isolated, maximizing consumer is constrained by a fixed budget. Constrained utility maximization results in commodities being chosen in such proportions that the individual's marginal rate of psychological substitution between any pair will be equal to the ratio of their prices. This means that relative prices accurately reflect the psychic or utility evaluations (at the margin) for every commodity for every consumer—because in a competitive economy, every consumer is faced with the same prices. And because prices reflect the relative evaluations of every consumer considered individually, they must, in a capitalist economy where the consumer is “sovereign,” perfectly reflect the relative social values of commodities.

Next, an individual business firm with a “continuous twice differentiable” production function is confronted by given prices in a competitive market. A mathematical or geometrical analysis of constrained profit maximization shows each firm choosing a point on its production function where (1) the price of any factor (including labor) is equal to the value of its marginal product; (2) the marginal rate of substitution between any pair of factors is equal to the ratio of their prices; and (3) the marginal rate of transformation between any two outputs is equal to the ratio of their respective prices.

The first of these conditions of profit maximization is equivalent to the neoclassical marginal productivity theory of distribution. It assures us that each factor of production (and, by implication, each human being) receives in income exactly that which it contributes, an ideal which has long served as a bourgeois ideal of distributive justice. The third of the above conditions of profit maximization assures us that the prices of commodities accurately reflect the marginal opportunity costs of society foregoing some of any commodity in order to get more of another commodity.

In the competitive world of the neoclassical apologist, every consumer and every firm faces the same set of prices as every other. This means that in equilibrium the mental evaluation of any pair of commodities by any consumer is a perfect reflection of the technologically determined opportunity cost of producing those commodities. No reallocation of resources through changes in consumption, exchange or production could unambiguously augment the value of the commodities being produced and exchanged. This is Pareto optimality—the fundamental norm of bourgeois economics.

If what has been argued to this point is accepted, then one must agree that neoclassical economics should be evaluated not by the epistemological canons of empiricism, but rather by the criteria of rationalist epistemology. The foundation of this theory is its representation of the essence of human beings as being characterized by given preference orderings (each preference ordering displaying several necessary features such that it can be represented by a single-valued, differentiable utility function that is quasiconcave) and as continuously maximizing utility through acts of exchange. And it is this purportedly true definition that must be evaluated.

First, we must obviously reject the possibility that this definition can be known to be true a priori. Because most of us can easily imagine a human being who is an economic agent whose preference ordering does not conform to the neoclassical definition, and who frequently acts out of habit, conditioning, caprice, or other motives in such a manner that he may not maximize his utility; the neoclassical definition obviously need not be accepted in order for most of us to continue to perceive and conceptualize human beings as we do. Therefore, this definition must be subjected to empirical testing to see if, in fact, all humans are so characterized.

The obvious answer is no; at least some humans do not display the necessary characteristics. The neoclassicist must retreat. He will probably answer this criticism by admitting that neoclassical economics does not describe all people at all times (although welfare economics and the various policy conclusions in virtually every field of applied economics that rest on welfare economics assume that the theory applies universally in a market, capitalist economy). He will assert that the theory is applicable when people do, in fact, behave rationally. But this answer takes us no further, because neoclassical economics furnishes us with no independent criteria for determining who is rational and who is not. It can only be asserted that people are rational if they behave in the manner which the theory of rational decision-making predicts that they would behave, and non-rational if they behave differently. There is absolutely no way of ascertaining whether some “nonrational” people happen to behave as if they were rational, or some “rational” people happen to behave as if they were non-rational. There needs to be some criterion, independent of the theory, which enables us to identify “rational” human beings in order to see whether they in fact behave as the neoclassical theory predicts they should behave.

The word “rational” could be replaced by any other adjective. We could assert that the theory predicts the behavior of sad people, or mean people, or deranged people, and as long as we defined sad, mean, or deranged as simply behaving as the theory predicts each of these adjectives would be on the same footing as “rational.” The theory is thus circular, and we are incapable of adducing any evidence that the neoclassical definition of economic man is a true definition. The theory must be rejected when judged by the criteria of rationalism.

Marxist economics, unlike neoclassical economics, does not look toward the forces motivating individual behavior. Rather, it begins with the recognition that human beings, unlike many species of animals, generally do not exist in environments that are immediately usable to satisfy needs. Production, seen as human effort expended to transform the environment, is a universal necessity for continued human existence. We cannot even refer to ongoing social entities, institutions, or behavioral patterns unless we assume that such people and institutions are a part of an economic system that successfully produces and reproduces the material requisites of its own continued existence.

Human production consists of a series of activities. But when we examine particular economic activities, such as “production,” “consumption,” or “exchange,” we find that they are not isolated “atomic facts.” These activities are interconnected in two separate ways. First, each activity by any economic agent presupposes that other activities by other economic agents as its absolutely necessary practical prerequisites. Second, any conceptual description, of these activities presupposes a complex set of systematic relationships. Any activity can only be

described in terms of these relationships. For example, production must be for immediate use or for exchange; a seller implies a buyer with different needs and intentions; money implies individual command over resources; command over re-sources implies certain political or power relationships, etc.

A conceptual understanding of the definitions of economic terms therefore involves logical interdependence among the terms. And when the terms involve true definitions, the logical deductions that grow out of this logical interdependence give us real knowledge of the real practical inter-connections of economic processes.

The labor theory of value begins with the proposition that material production requires material inputs as well as human effort. Experience is such that we cannot conceive that this has not always been the case, and unless we resort to mysticism or supernaturalism we cannot conceive a situation in the future in which this will not hold true. But material inputs are only rarely given in nature in such a form that they are immediately usable in the production process. Natural resources require human labor to transform them into usable material inputs in the production process. Human labor, in turn, requires previously produced output as a means of subsistence if it is to be expanded over any considerable period. It is thus clear that in some minimal sense we cannot conceive of ongoing productive activities in which certain basic interrelationships do not exist. These inter-relationships provide the a priori synthetic basis of the labor theory of value.

We shall now outline a brief model in which some of the implications of this are spelled out. We begin with only those generalizations which are known to characterize virtually all human production: humans require previously produced goods to sustain themselves; they use material inputs in the production process, and human labor must be more or less continuously expended to insure an adequate flow of material inputs into the production process; they use tools in the production process, and as these tools are used up, new ones must be produced to replace them.

Let X be the products necessary to sustain labor; Y will represent the tools used in production; and Z will be the material inputs. We know that X , Y , and Z are each used directly or indirectly in the others' production. That is,

$$X_1 \text{ and } Y_1 \text{ and } Z_1 \rightarrow X$$

$$X_2 \text{ and } Y_2 \text{ and } Z_2 \rightarrow Y$$

$$X_3 \text{ and } Y_3 \text{ and } Z_3 \rightarrow Z$$

The subscript 1 denotes the production process for X ; 2 denotes Y ; and 3 denotes Z . From this it follows, a priori, that the production process cannot continue for very long if the total output of each type of product is not sufficient to provide each of the three production processes with a sufficient quantity of that product to meet the input needs of those processes. We can conclude that the system will not be practicable or workable unless the following condition is generally satisfied:

$$X_1 + Y_1 + Z_1 \leq X$$

$$X_2 + Y_2 + Z_2 \leq Y$$

$$X_3 + Y_3 + Z_3 \leq Z$$

Thus we have a simple model that gives us conclusions that must hold true if a productive system is to be self-sustaining. This writer would assert that the above conclusion contains synthetic statements applicable to empirical reality and can be known to be true a priori because we simply cannot conceive how a productive system could be self-sustaining if this condition were not met.

To bring the analysis closer to the labor theory of value, however, we must specify the social-economic institution by which the output of each process is allocated as inputs to the various production processes. Vile can, for example, define a free market— a. money exchange economy in which each sector sells its output to the other sectors and buys its inputs from the other sectors. If we so define an economy and assume that the output of each sector is exactly exhausted by its uses as inputs in all of the sectors, then it is easy to show that these interrelationships produce a unique vector of prices which must obtain if the outputs are to be satisfactorily allocated as inputs. Under these assumptions the following equations determine the prices at which a satisfactory or workable allocation is possible:

$$X_1 P_X + Y_1 P_Y + Z_1 P_Z = X P_X$$

$$X_2 P_X + Y_2 P_Y + Z_2 P_Z = Y P_Y$$

$$X_3 P_X + Y_3 P_Y + Z_3 P_Z = Z P_Z$$

If more is produced than is required for productive inputs, then the system has a surplus and the prices are not determinate until we know how the surplus is distributed.

Here it becomes necessary to bring in the features of capitalism that Marx believed were its most essential defining features: capitalism exists when in a money exchange, market economy the majority of direct producers (workers) have been stripped of any control over the resources and tools with which they produce; in such a situation, labor power itself becomes a commodity which the worker must sell if he is to sustain himself and his family; the owners of the means of production (capitalists) receive some or all of the surplus as profits; the profits are distributed among capitalists in proportion to the value of the capital which they control (i.e., competition creates pressures which tend to equalize rates of profit).

With these circumstances, the surplus will be divided between workers and capitalists. In his very important book *Production of Commodities by Means of Commodities*,¹⁹ Piero Sraffa assumed that workers and capitalists share the surplus. Assume that “A” is a consumption good, “C” is a capital good (and that capital goods wear out after one period of production), and “L” is labor, then Sraffa's price equations are

$$P_a = L_a W + C_a P_c (1 + R)$$

$$P_c = L_c W + C_c P_c (1 + R),$$

where W and R are the unknown wage and profit rates. If we know the technical conditions of production, then we have two equations and four unknowns.²⁰ We can reduce the unknowns to three by taking either price as the numeraire. Thus Sraffa concluded that in his model the number of unknowns “exceeds the number of equations by one and the system can move with one degree of freedom; and if one of the variables is fixed the others will be fixed too.”²¹

Sraffa's approach is to assume that the division of the surplus between wages and profits is determined by some complex combination of social, political, and economic forces. Most of his book is devoted to exploring the effects on the structure of relative prices of changes in the distribution of the surplus between wages and profits.

To this point, the price theory outlined above rests entirely on logical deductions from definitions which seem to this writer by their very nature to reflect necessary conditions for pricing in a competitive capitalist economy. But Marx's labor theory of value goes one very important step beyond Sraffa. Marx asserts that wages are commodity prices which are determined by the necessary costs of producing the bundle of commodities necessary for a socially defined subsistence for a worker and his family.²² This makes the wage level determinate, i.e., wages contain none of the surplus and the Sraffa system therefore becomes determinate.

Limitations of space prevent the writer from showing how the above definitions and assumptions are sufficient to deduce all of the propositions of Marx's labor theory of value. A careful step-by-step deduction of the conclusions of Marx's value theory from these definitions and assumptions is contained in Alfredo Medio, "Profits and Surplus-Value: Appearance in Capitalist Production."²³ Medio's discussion is the best and most concise statement of the current level of development of Marx's value theory.

The most important point, in the context of the argument of this paper, is that the neoclassical and Marxist value theories are the only theories of prices which contain two very important features: first, they are logically consistent and fully determinate theories of value (as opposed, for example, to those of Sraffa or the institutionalist economists); second, these value theories are consistent, fully integrated parts of larger social philosophies (as opposed to Sraffa, but not, perhaps, to the institutionalists).

If the arguments of this paper are accepted, then both neoclassical and Marxist value theories are based on rationalist methodology. Within the context of rationalism, it was shown that neoclassical price theory does not rest on a priori true definitions. Furthermore, we found that the theory was subject to a circularity, which made it virtually impossible to formulate empirical tests of the adequacy of the neoclassical definitions that could only claim to be true a posteriori. Therefore, neoclassical price theory appears to be an elaborate deductive edifice based upon definitions which cannot be said to be true either a priori or a posteriori and which appear to function solely as a deductive, intellectual foundation for the normative conclusions of Paretian welfare economics.

Marxist value theory, however, to the extent that it rests on the same foundations of Sraffa's theory of prices, *is* based, in this writer's opinion, on true definitions which can be known a priori and which are synthetic, even though they are conditional. To make the Sraffa theory fully determinate, however, it is necessary to add Marx's claim that the wage, or the value of labor power, is determined by the socially defined subsistence of labor. The truth of this assertion cannot be determined a priori. Evidence for this assertion would require that Marxists devise some reasonable method of determining the socially defined subsistence independently of any knowledge of actual wage rates. To date they have made only minimal attempts to do this. The efforts of the U. S. government to define a "modest but adequate" budget for an urban family of four would seem to give a preliminary indication that the Marxist assumption is at least reasonable. But much work remains to be done before this tenet of Marxist value theory could be said to be supported by strong empirical evidence.

If this attempt to adduce empirical evidence for Marx's theory of wages should fail, this writer believes that Sraffa's model provides the only reasonable approach to a theory of prices. And Sraffa's theory is neither determinate nor a part of a larger, more complete social theory. On the bicentennial anniversary of the publication of Adam Smith's *Wealth of Nations*, we must note that despite endless esoteric elaborations of value and price theory during the last one hundred years, most of the substantial improvements in Smith's analyses were made by Ricardo and Marx. The real advances in establishing a scientific foundation for price theory have been astonishingly meager over the last century, even though Sraffa's contribution to our understanding of some of the logical problems involved has definitely been of great significance.

1. Martin Hollis and Edward Nell, *Rational Economic Man; A Philosophical Critique of Neo-Classical Economics* (Cambridge: Cambridge University Press, 1975), pp. 1-266. This work has a bibliography that lists many of the more significant philosophical critiques of positivism and empiricism, generally.
2. *Ibid.*, p. 10.

3. *Ibid.*, pp. 112-13.
4. *Ibid.*, pp. 95-113.
5. *Ibid.*, pp. 140-62.
6. For a forceful argument that neoclassicism cannot ultimately rest on logical positivism, see Hollis and Nell, chs. 1-8.
7. Lionel Robbins, *The Nature and Significance of Economic Science* (London: Macmillan, 1932), p. 15.
8. *Ibid.*, p. 12.
9. Richard H. Leftwich, *The Price System and Resource Allocation* (Hinsdale, Ill., Dryden Press, 1970), pp. 1-392. (First published in 1955.)
10. *Ibid.*, p. 2.
11. *Ibid.*, p. 7.
12. James M Henderson and Richard E Quant, *Microeconomic Theory* (New York McGraw-Hill, 1971), p 6
13. *Ibid.*; also Leftwich, chs. 4 and 5.
14. J. Hirshleifer, *Investment, Interest and Capital* (Englewood Cliffs, N.J.: Prentice-Hall, 1970), p. 2.
15. *Ibid.*, p. 12.
16. *Ibid.*
17. E. K. Hunt, "A Radical Critique of Welfare Economics," in Edward Nell (ed.), *Value, Distribution and Growth: Essays in the Revival of Political Economy* [Cambridge: Cambridge University Press, forthcoming].
18. See Milton Friedman, *Essays in Positive Economics* (Chicago: University of Chicago Press, 1966), pp. 4-14.
19. Piero Sraffa, *Production of Commodities by Means of Commodities* (Cambridge: Cambridge University Press, 1963), pp. 1-95.
20. These equations are simplified versions of Sraffa's equations, *ibid.*, p. 11.
21. *Ibid.*
22. Karl Marx, *Capital* (Moscow: Foreign Language Publishing House, 1961), I, 167-76.
23. Alfredo Medio, "Profits and Surplus-Value: Appearance and Reality in Capitalist Production," in E K. Hunt and Jesse G. Schwartz (eds), *A Critique of Economic Theory* (Middlesex, England. Penguin Books, 1972), pp. 312-46.