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STRUCTURE AND BEHAVIOR IN CLASSICAL AND NEO-CLASSICAL THEORY

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Adolph Lowe preserved and developed the great classical tradition at a time when most economists had abandoned it. This essay will explore some of the basic conflicts and contrasts between the structural approach of the classics and Marx and the behavioralism of the neo-classicals, and will try to indicate the methodological contribution of Lowe to the classical approach.

The Social Context of Economic Behavior

We shall argue that the analysis of behavior and its likely determinants is not relevant to the understanding of the most fundamental economic aspect of social organization. Economic "behavior" in this context means either a particular person's normal patterns of economic response and action in various typical circumstances, or the normal patterns of economic response and action of a typical person in various circumstances. Such behavior may be considerd purely externally, as publicly verifiable actions or words, or it may be considered from the internal side as well, taking into account the intentions and motivations of the agent.[1] But in whichever way "behavior" is taken, it is always understood both that the relevant acts relate to some agent, and that they are performed in certain normal or typical situations, in response to certain recognizable economic stimuli. (Faced with some set of prices, households will buy a certain set of consumer goods.)

Economic behavior takes place in a definite social context (by which we do not mean simply the "market"). This means that the agent must know how to perform all the oridinary social routines, must have learned to speak the language, to recognize the relevant stimuli, and to act as expected in his normal roles. To say that economic behavior always takes place in a social context, is to imply that a social context exists in which such behavior is possible. The agents have been trained, are currently being supported, and their roles are tied together in a network of duties, expectations and mutual inter-dependencies. The study of society must include the study of this network, of how it came into existence, of what it does, and of how both it and the agents who occupy the places in it are maintained. Some knowledge of at least part of the network of social relationships necessarily comes before any understanding of the causes of behavior.

The basic economic question in the analysis of society is, how can the society maintain itself materially? Just as the text of the play is given from the point of view of the director and producer, so the economist must take a particular social context for granted when asking this question. And just as the producer can calculate what he must make to break even without reference to anyone's likely behavior, so the economist can

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calculate what society must do in order to maintain and reproduce itself, without making reference to motivations, expectations, plans or normal responses. No judgement can be made as to whether a society will survive, i.e. succeed in paying its way, unless it is first known what it needs to accomplish in order to do so.[2]

In most contemporary economics the initial questions concern what some kind of agent, usually a "household" or a "firm", would normally do, acting under the influence of some assumed rational motivation, when presented with various stimuli. Given the behavioral assumptions, reaction patterns to such hypothetical stimuli are constructed, and from these sets market functions are aggregated. Equilibrium market positions are then determined by solving the market equations on the hypothesis that behavior will be adjusted until the markets are cleared. This approach is supposed to lead to a general equilibrium theory in which the full economic interdependence of the society can be vividly displayed in a manner capable of improving the understanding and control of economic forces. Such a general theory, of course, involves not only the markets for "final" goods, but also includes the markets for "factors of production." It is with the behavioral approach to the determination of a general equilibrium of both final and factor markets that we shall be concerned when discussing behavioral economics.

Such a procedure begins by taking a kind of agent and a social context as given and assumes them to persist. But the prior question is: what conditions must be met for the social context (and, a fortiori, for any behavior which depends on this context) to continue to exist? Further, what limitations does this put on the possibilities of behavior? The answers to these questions are independent of all specific behavioral assumptions, since they are questions about what institutions require in order to continue to operate, and not about how persons are likely or inclined to act in various social contexts.

To appreciate the full force of this argument we must first examine briefly the nature of models, and then contrast those models which attempt to represent behavior with those that represent social structure.[3]

In the sense in which we shall use the term, a "model" can be said to have two aspects, or to be composed of two kinds of elements. On the one hand, there is the purely formal part, and on the other there is the interpretation which clothes the formal skeleton with meaning. The formal part of a model consists of an algorithm in some formal calculus. Two algorithms commonly used in economics are, first, maximizing a function of many variables in the differential calculus (usually subject to some constraints), and secondly, determining the existence of a solution to a set of linear equations, namely that the rank of the augmented matrix equal the rank of the coefficient matrix. Each of these formal models is purely abstract and must be given an interpretation; it must be applied to a subject matter. This requires making its variables and relations represent certain concepts. Thus one variable will stand for 'price', another for 'quantity demanded', and so on. By this route the maximization algorithm, for example, can be made the basis of the model of demand theory, in one interpretation, and supply theory in another.[4] The formal side of the model thus provides the method for the determination of the unknowns in terms of the given conditions, while the substantive interpretation applies this method to the problem at hand.

When behavior is the object of study the existence, the characteristics and the positions of those whose behavior it is must be taken as given. It is here, in connecting behavioral functions to agents as they are assumed to exist, that the "subjectivity" of the approach lies. It has rightly been pointed out, in answer to the charge of subjectivity, that the variables of behavioral models in economics refer to publicly observable acts

than which hardly anything could be more objective. The theory of demand has choices and market prices as its variables; both are observable, open and publicly verifiable; the theory of supply refers to inputs, prices, and outputs, all likewise public and observable. But this misses the point, which is that none of these are observable except in connection with some actual agent; but actual or observable agents are rarely similar to the ideal types postulated by the model. The real charge of "subjectivity" lies here, in the fact that acts, however public they may be, are always someone's acts, i.e. they belong to a subject. A theory of behavior must therefore always predicate its behavioral functions of some agents or kind of agents. Thus all attention is concentrated on the way agents with assumed knowledge, abilities and desires affect one another's actions, and the question of what these agents are and how they and their characteristics are brought into being and maintained is neglected.

The difficulty that we shall examine arises from the fact that because the neo-classical approach is behavioral there is a necessary connection between the kind of behavior which neo-classical theory studies and the characteristics assumed to hold of the agents. That is, the patterns of behavior in question consist of a series of choices made under the influence of the desire to maximize private gain (utility or profit) in response to a variety of hypothetical economic situations. This means that economic behavior is assumed to take the form of rational responses to clearly perceived stimuli. But the crucial aspect of this basic assumption concerns not rationality, but the form of behavior. By saying that a pattern of behavior has the stimulus-response form we mean nothing more than that when an agent perceives that he is faced with an external stimulus he performs some particular and pre-determined act in response to it.[5] The advantage of assuming stimulus-response behavioral patterns lies in their easy translation into the calculus, since the stimuli can be treated as the set of arguments of the function and the response as its value for those arguments. But this advantage is bought at the price of certain rigidities, which we shall indicate now and whose implications we shall discuss later.

For one thing it is normal to assume that both stimuli and responses may occur in any order. If time enters into the analysis at all, it enters as a separate variable to which there corresponds a definite pattern of response, or which leads to a shift in the pattern of responses to other variables. In addition, the time needed to bring forth and complete a particular response to a particular stimulus is normally defined as part of that response, and is both independent of what went before or will come after, and of any other variables in the system (unless some specific dependence is explicitly shown, of course). Finally, the behavioral responses of other agents are assumed to be either independent of the behavior of any given agent, or to function as stimuli to which he responds in some definite way.

A second problem arises from the fact that it is customary in neo-classical writing to represent the stimulus-response patterns by functions of real variables, implying that the behavioral patterns are capable of continuous variation. (It is admitted, of course, that this is unrealistic).

A third and widely discussed problem concerns the characteristically subjective aspects of behavior: perceptions, knowledge, motivation, learning, and the like. In actual people and even more, in actual institutional (and therefore political) situations, these are highly complex, and more often than not, fraught with contraditions. Information is ambiguous, perceptions are uncertain and expectations volatile, while motivations (and the loyalty of subordinates) may be undercut by rivalry or self-destructive impulses, and the whole may be undergoing continuous transformation through learning. Under such conditions no equilibrium patterns or behavior could possibly be defined. So assumptions are made to rule all of this out of court, with the result that the model takes on an artificial and unrealistic air. The 'behavior' it purportedly describes is simply not

recognizable. Where do we find such paragons of clarity in purpose, accuracy of perception, completeness of knowledge, unity of aim? Not among our giant corporations, still less among small businesses, as the study of industrial organization will readily attest. And which of us would like to claim such attributes for our own household, or that of anyone we know? Of course, the apologia is that actual behavior need not be so; all that is necessary is that the world be as if it were so, the test being that the model can predict well.[6] But the most common neo-Classical models don't predict well; indeed, neither the simple textbook models nor the advanced general equilibrium models ever predict at all. They are much too abstract to be applied. But reducing the level of abstraction - restoring realism to the concept of behavior - creates the problem that equilibrium positions can no longer be derived. The approach is caught on the horns of a dilemma. More of this later.

These three sets of characteristics give rise to certain fundamental distortions in the view taken of the agents of the system, distortions which have economic significance. First, the assumption that behavior can be continuously varied without reference to the order in which acts are performed overlooks the important fact that, in reality, the adoption of a pattern of social behavior gives rise to expectations among others and to commitments. To change a pattern of action requires time and energy; for one must free oneself of the commitments, and undo the expectations. The time needed to make the adjustment will depend on the nature of the change, the acts that went before and the new acts, and the effect on the agent's relations with others. The economic significance of this lies in the fact that both time and energy have costs. Secondly, the time required to complete a response, once begun (e.g., the time a firm takes to produce) is, like the time needed to adjust, of central importance to the nature of an agent, since during that time he must be supported. Neo-classical neglect of an explicit analysis of the relation of activities to time, therefore, produces a greatly distorted picture. Thirdly, the behavior of others is more than a variable to which agents respond, for the commitments others make may affect a given agent's bargaining position with respect to them. In a zero-sum game each party's bargaining power depends in part on the others' commitments, and this point is generally overlooked. Fourthly, agents are supposed to possess abilities, information, motivation and other attributes of a very high calibre, without any indication how they acquire or maintain them, in spite of the fact that on the face of it, such characteristics must be expensive to produce and keep up.

Finally, certain basic ideas in the neo-classical approach compound the difficulties which the above considerations raise. The fact that equilibrium is thought of as balancing of desires against efforts and/or the alternative uses of "scarce resources" tends to direct attention away from the fact that there can be no equilibrium unless the institutions of the system can be maintained. As a result of this misdirection of attention every effort is made to present a range of potential choices as large as possible, in order that no conceivable satisfaction will be overlooked, whereas, choices are in fact, limited by the requirements of maintenance. Secondly, since the real problem is conceived to be the allocation of goods among the competing desires, the methods by which goods are actually produced and then brought to market and traded are given relatively short shift. Production is often treated as a kind of "exchange with Nature", and its actual specifics are completely ignored. When money is introduced, it frequently figures simply as an object of desire, and the same kind of analysis, with some important modifications, is applied to it. In pure theory, little or no attempt is made to analyze the institutional differences between barter and monetary exchange. (But Cf. Nell, 1968). Finally, because of the emphasis on actions undertaken in response to stimuli the neo-classical concept of competition implicitly assumes tht in perfectly competitive conditions all agents possess the same degree of economic power. Social class is of no significance. This approach therefore concentrates its attention on the question of the allocation of resources and misses the specifics of the production of a surplus and the significance of economic power in determining its distribution.

Structural Models

If a behavioral model can be said to show what an agent does under various conditions, then a structural model can be said to show what an institution is, regardless of conditions. A structural model shows how actions in accordance with some set of rules work out, how various practices and procedures fit together. In a sense a structural model can be regarded as the blueprint of a process.

There are of course, different kinds of structural models. For example, a recipe directs how to make something; a blueprint shows how the various parts fit together and sometimes, how it functions. Both of these are structural models in the sense of representing something upon which the existence of the object depends, in the one case its origin, in the other its structure or purpose. But we shall not be concerned here with either recipes or blueprints. The kind of structural model relevant here might be called "homeostatic" for it shows what must be done if the existence of some set of institutions is to be preserved.

A structural model, therefore, is based on a very different approach to society from the one we have just considered. Its whole aim is to examine the very features of social life that the behavioral model takes for granted, and to determine under precisely what conditions, and with what consequences, it is appropriate to take these matters for granted.

Instead of describing the behavior of agents, a structural model shows the rules governing behavior, the methods and procedures of production, the legal and property relationships.[7] What is shown is not tangible, perceptible, or "objective" in the same way. But this does not imply that these rules are any the less real or objective. The intangibility of structure does not imply its subjectivity. The duties of, e.g. the American President are not a matter of subjective preference. A proposition stating them is not a 'value judgment' or an 'expression of feeling'. It is a proposition stating a fact, although one of a different kind than those the natural sciences examine.

A structural model determines actions that must be taken to reproduce the system, i.e. given the initial position and how it is changed by the processes of the economy, it shows what must be done to restore the initial position. The "equilibrium condition" is therefore that this position should be exactly restored. Since the model does not ascribe actions to agents, there is no attempt to predict what will actually happen; the model merely shows what has to be done if reproduction is to take place. There is no balancing of contending forces here; the calculation shows the necessary conditions for the maintenance of society, given the maxims and rules governing and defining the courses of action available in the system.

The neo-classical theory of price is a good example of a behavioral model in economics but perhaps structural models in economics are not so well known.

It is true that classical theorists thought in structural terms, but since they neither elaborated their theories mathematically nor confined themselves entirely to structural analysis, their actual works may not be the best example to start with. Instead we shall take as our example an input-output system with the following characteristics. At least as much is produced of every good per period of production as is consumed in the process of production; every industry is distinguishable from every other industry either by the product it produces or by the process of production it employs; goods are used in each other's production, and some good or goods figure directly or indirectly in the production of every good; goods that support labor are counted among the means of production. (The implicit assumption is that every firm in an industry uses the same technique of production, but, of course, such an assumption is not necessary). Mathematically, this

can be represented by an input-output matrix. At the end of a period each product is concentrated in the hands of its producer, but each producer needs the products of other industries in order to continue production. Exchange ratios can be computed which will permit replacement and reproduction when total output exactly equals total input, or, if there exists a surplus, when the method for disposing of the surplus has been given.[8]

Thus, for example, the surplus may be divided between wages and profits, with all workers receiving a common wage, and all units of capital receiving profit in the same ratio to their value. Such a model presupposes not only capitalist property institutions but also a sufficiently developed system of markets for competitive pressures to establish the common wage and uniform rate of profit. It is therefore historically specific.

Such a structural model attempts to answer questions roughly analogous to the questions dealt with by the neo-classical behavioral model of general equilibrium.[9] In what follows when we speak of structural models in economics the model just described is chiefly what we have in mind, and in a later section we will set it forth more fully. Now, however, let us compare this model with the behavioral analysis of the neo-classical approach, and in the process, see if we cannot bring out the significance of Lowe's instrumental analysis.

A Comparison of Behavioral and Structural Models

The differences between the behavioral and the structural approaches to the analysis of the economic aspects of society are important for an understanding the role played by assumptions about motivation, competition and equilibrium in the construction of economic models.

First, a behavioral model describes how an agent acts under various assumed conditions. For example, a Marshallian utility function is predicated in a behavioral world predicated on which may or may not describe a particular consumer. A consumer cannot acquire such a function, either through purchase or by inheritance. But an agent could adopt a method of production such as is represented in input-output studies. Unlike behavioral models, structural models are predicated on social relationships into which agents can enter, such as positions of ownership, or jobs. The terms of a behavioral model describe the behavior or will of agents, given their social positions, whereas the terms of a structural model are possible objects of an agent's will.

Secondly, the application of a behavioral model to concrete circumstances requires an enumeration of the particular agents to whom the behavioral functions are to apply. The prediction of behavior is necessarily the prediction of someone's behavior, hence the persons must be specified even if only in the most abstract terms. By contrast a structural model need never specify particular agents, times, or places. It makes reference only to the rules, methods and procedures employed by actual institutions; there is, indeed, a sense in which it is they who refer to the model and not the other way around. The model is, so to speak, inherent in the institutions; it shows what they are trying to achieve.

Thirdly, the consequences of falsity are very different for the two kinds of model. If it is shown that in a given context a behavioral model (known to be applicable to that context) is false, i.e. gives wrong predictions, then all that follows is that the postulated behavior pattern is not true of the agent or agents in question. No doubt is thereby cast upon their existence or continued existence. But if it is shown that a structural model is false relative to the institutions which it supposedly represents, e.g. that their continuous existence can be achieved only with other values of the unknowns than those calculated, or perhaps through reliance on a different set of factors, then it is implied that the

actually existing institutions were not correctly represented by the model, or, to put it another way, the model in fact shows a different set of institutions from those actually present. The applicability of a behavioral model must be decided prior to and independently of the determination of the truth or falsity of the predication of the behavior patterns. But in the case of structural models the question of applicability and the question of truth are one and the same.

Fourthly, a behavioral model implies a definite set of actions which will occur if the model is truly predictive of the agents. (The set of actions need not, of course, be unique; multiple equilibria are possible). A structural model, however, implies a definite set of results which must be achieved if the social context is to be preserved; but the set of actions which will bring these results about under particular circumstances is not specified. Hence, there is always room for a behavioral model to decide this further question in the context of any structural model.

It is at this point that we can see Lowe's contribution to the classical approach. His innovation is to treat "maximizing" instrumentally rather than behaviorally. Instead of treating maximizing as a description of what rational agents will do, he treats such a model, suitably embedded in a structural contest (which he describes as a classical model of production), as a representation of what they should do. The traditional approach postulates motivation and tries to predict what will happen, on the assumption that agents behave "rationally." Lowe postulates a goal and then inquires what would have to be done to achieve that goal. Thus the failure of a maximizing model to accord with experience, when interpreted in Lowe's schema, leads to criticism, not of the model, but of the agents. The model shows that they could have done better.

Finally, the meaning of the equilibrium conditions in the two cases is altogether different.[10] In a behavioral model the equilibrium condition implies the balancing of two kinds of forces impinging on an agent's decisions to act. This is generally put in terms of some kind of balancing of desire and effort, or of benefits with costs. In any case, the basis of the equilibrium is to be found in the motivations of the agents of the system. By contrast, the equilibrium condition of a structural model makes no reference at all to agents or to their motives, and consists purely and simply in the condition that a certain pattern of material allocation be restored, enabling the system to reproduce itself. The equilibrium condition, in short, is that existence be preserved. In the one case, therefore, the equilibrium condition determines the existence of the system, in the other case it presupposes it.

This leads us to the basic connection between these aspects of the distinction between behavioral and structural models. All stem from the fact that what a behavioral model predicts about its subject does not explain that subjects' continued existence, but on the contrary, presupposes it: whereas what a structural model tells us about its subject is precisely what its continued existence depends on. For all the purposes of the model the agents of a behavioral model are assumed to be self perpetuating; the question of how they continue to exist is never raised. Yet this is exactly this question which a structural model is designed to answer. The question of the continued existence of an agent or a set of agents simply can not be assumed away in any economic model, for the conditions of continued existence set the limits of behavior.

It follows that the behavioral concept of equilibrium is deficient in an important way. For it is possible to conceive of a case where desires and efforts are in a neat balance in each market (taken individually, and assuming other things to be equal) yet the "equilibrium" prices might not be such as to permit reproduction. This is not quite the same as the familiar argument for a general rather than a partial equilibrium system, since even a general equilibrium system is based on the assumed ability of the consumers and firms to maintain themselves. For nowhere in the neo-Classical system are there

any equations which show precisely what is required to support the institutions whose behavior is so elaborately determined.

There is good reason for this. The agents whose support must be shown are "households" and "firms." But two of the objects for which there are supply and demand functions, showing offers to buy and sell at various prices, are labor and capital. The support of working-class households at least is obviously the same thing as the support of labor, and the maintenance of a firm is clearly impossible unless its capital is kept intact, which means keeping intact not only its plant and equipment, but also the circulating fund out of which it pays wages, salaries and other running costs. Failure to keep the firm's capital intact means a loss of its competitive position and ultimately results in bankruptcy.[11]

"Capital" means the holding of productive inputs in a certain legal relationship; and "labor" is the exercise of the ability to work, hired for a given period of time. Capital therefore is embodied in a collection of goods, and labor, since it must be supported for a definite time, and will have to be paid in a particular allocation of goods. Thus the demonstration that the agents of the system can be supported requires the determination of an allocation of the commodities produced. There is no reason a priori, to suppose that the exchange necessary to accomplish this reproductive allocation would be made at the rates determined in a behavioral model.

Moreover both capital and labor earn returns, and according to widely accepted principles, in a competitive system equal capitals and equivalent labor earn equal returns regardless of the industry in which they are employed. But the rate of profit on capital cannot be determined unless one can measure the amount of the capital; yet until one knows the prices of the individual goods comprising the capital one cannot know the amount. Prices and the profit rate must therefore be determined together. The same argument applies to the relationship of the quantity of labor and the wage rate. But if prices, the rate of profit, and the wage rate are all determined by the conditions that must be met if households and firms are to support themselves then there is very little left for the neo-classical behavioral model to do. Further, if the behavioral model has a different equilibrium solution, the system will fail to reproduce itself. The behavioral model therefore cannot determine equilibrium by itself.

Recent Discussions on Method

Recently (Garegnani, 1975; Eatwell, 1980, Milgate, 1982) attention has been directed to a purported shift in the notion of equilibrium in economic theory. The early works of the marginalists drew on essentially the same concept of long-run equilibrium that had been used by the Classical and Marx. This was a position characterized not only by market-clearing, but even more basically by a uniform rate of profit on capital, together with a uniform wage rate and uniform prices for the different instances of each commodity, (making allowance for special circumstances).

But as marginalist thinking developed, it became evident that capital theory was more difficult than had previously been supposed, and leading neo-Classical thinkers, led by Hicks, began to espouse a notion of temporary equilibrium, characterized only by market-clearing, so allowing each kind of capital good (and each kind of labor) to earn quasi-rents according to market conditions, regardless of the ratio of such earnings to the good's supply price. No uniform rate of profit was required; nor for that matter did wages in different industries have to be uniform. The problems of capital theory were eliminated by giving up the central idea of capital as a fund of value seeking the highest rate of return available among the investment opportunities in the various industries.

So, according to this line of interpretation, in its initial phase the Marginalist

Revolution had seen a shift in theory, but had preserved a continuity in method. Theoretical analysis, for both Classical and neo-classical economists, basically consisted in comparing alternative long-run equilibrium positions, defined for different values of key parameters. But with the advent of neo-Walrasian general equilibrium theory there came a shift in method as well, to escape the problems posed by capital theory. The older long-run approach was dropped in favor of temporary equilibrium; and the long-run itself was redefined as a succession of temporary equilibria moving through time.

Clearly, the rate of profit is crucial to capital theory. If it is not uniform, then there will be constant pressure on capital to migrate from low to high rate areas. This may be prevented by many different kinds of barriers, but the barriers themselves will be subject to erosion from the pressure of capital.

Interestingly, this is a structural, not a behavioral argument. It does not depend on whether the agents managing capital are, for example, family firms, small businesses, banks, or giant corporations. All that matters is that capital, for whatever reason, must seek out the highest rate of return. If this is taken as an institutional fact about capital, then the tendency to uniformity in the rate of profit follows at once, quite apart from any behavioral considerations.

But things are not so simple for neo-Classical theory. Movements of capital must be specified functionally, in response to clearly defined stimuli. All the problems inherent in the relationship between capital as a fund and capital goods arise at once. But they arise precisely because capital must be treated in a behavioral fashion, in terms of supply and demand functions which describe the actions of agents or sets of agents. Yet just because the theory concerns supply and demand in response to various market signals, it is not very worried about valuation 'puzzles'; as a first approximation it is content to treat capital as 'jelly' and get on with the job. It does not seem likely that the change was motivated by concern over inability to deal with issues in capital theory.

In other words, contrary to the view expressed in recent discussions, the Marginalist Revolution was not simply a change in theory while maintaining adherence to a common method. It was a change from one kind of analysis - Classical structural analysis - to an altogether different kind - neo-Classical behavioral theory. But in the early phases it was still thought desirable to be able to obtain equilibrium results similar to those generated by Classical theory. Hence the neo-Classical theory of long-run equilibrium was developed, with its special assumptions designed to eliminate uncertainties, motivational conflicts, human failures and subjective influences generally. So, as a result stable neo-Classical equilibrium prices could be calculated with all the definiteness and certainty which attach to Classical 'natural prices'. But, as we have seen, the assumptions required for this rendered the concept of behavior involved inapplicable for all practical purposes. Nor is equilibrium, in the long-run or Classical sense, very important for neo-Classical purposes, which are to predict the behavioral responses to market stimuli. It doesn't really matter whether the market signals, or the responses, are equilibrium ones or not. Given the stimulus the response can be calculated; given a sequence of stimuli, a sequence of responses can be derived, with later market stimuli being the consequences of earlier responses. So the shift to Temporary Equilibrium analysis, with its notion of intertemporal paths, and more recently, the further shift to Disequilibrium Theory can be seen as attempts to relax the assumptions, giving up the traditional notion of equilibrium in the process, so as to base the approach on a more plausible and more readily applicable concept of behavior. Yet the earlier objections still apply; the behavior has not been properly related to its structural context.

The Emphasis on Production

We must now consider a possible charge derived from Bohm-Bawerk and others, that a structural approach places a misguided emphasis on the supply side of the market, so that, coupled with a total exclusion of demand and a general misunderstanding of the role of competition, it must inevitably lead to a variety of confusions and errors; the famous "transformation problem" is the most prominent of these. While we cannot deal in any detail with the various critics who have taken this line, we will now review the reasoning which can be advanced to justify the singular emphasis on the role of production and distribution in the structural approach, classical and Marxian economics, and now in Lowe and Sraffa.

Marx, for example, confined his economic analysis to the discussion of "commodities", whose essential property is that they are produced by labor. In this, of course, he echoed the Ricardian emphasis on the productivity of labor as the principal cause of value in exchange. But he stands in striking contrast to more modern writers. Even in his own day this emphasis on production and its inter-relatedness as the basis of exchange value was regarded as suspect by many. Indeed, Bohm-Bawerk regarded this as the fundamental error in the Marxian system; in his opinion Marx

> ...acts as one who urgently desiring to bring a white ball out of an urn takes care to secure this result by putting in white balls only. That is to say he limits from the outset the field of his search for the substance of the exchange value to "commodities", and in doing so he forms a conception of "goods" (though he does not clearly define it), and limits it to products of labor as aginst gifts of nature. (Bohm-Bawerk)

To Bohm-Bawerk it seemed ridiculous to insist that objects in exchange are simply products of labor. Soil, wood, water power, minerals, etc., are not products at all. Other things which can be bought and sold, such as deeds, rights licenses, bonds and shares, are neither products nor gifts of nature. Moreover, products of labor have other properties in common, besides that of "emboyding labor"--why are these not regarded as equally important in determining exchange value?

> ...Is not the property of being scarce in proportion to demand also common to all exchangeable goods? Or that they are the subjects of demand and supply? Or that they are appropriated? Or that they are natural products made from raw materials taken from nature ...Why then... may not the principle of value reside in any one of these common properties as well as in the property of being products of labor? (Bohm-Bawerk-p. 75)

To understand the reasons behind the apparently disproportionate emphasis on production, it is necessary to bear in mind that on the whole, classical economists did not conceive of equilibrium as a balancing of market forces. Rather, they concerned themselves with discovering the conditions that would have to be met if the institutions of society were to be enabled to work in a regular and normal fashion. For this to be the case those employed needed various amounts of goods to sustain them while working and the institutions required regular replacements of materials and instruments, as well as repairs to buildings, etc. They thus examined structural rather than behavioral issues. To put it another way, the regular and normal patterns of social activity require finance, in the form of food and clothing to sustain life and tools and materials with which to perform jobs. No sooner are the jobs done than many of these must be replaced once again, if the pattern is to be repeated. Only if there is a surplus of the necessaries and conveniences of life above the requirements of replacement can such activities as art,

music, religion and literature be supported, for those who engage in these activities produce nothing which can support life, however well they may interpret it. For the classical economists then, the economic problem initially centered around reproduction; they were concerned with how the system could maintain itself intact, and with how much extra activity it could support in addition to producing enough to replace its current consumption.

Since the normal working of society requires above all, that it maintain itself, and since this means using up goods while producing them, it is not at all surprising that classical economists should have put production in the center of the stage. When they came to consider the determinants of exchange value it seemed natural, therefore to begin from the fact that at the end of production a producer has in his hands the whole of his product, while reproduction requires that he have on hand the products of other producers both to support himself and his workers and for use as tools and materials. Exchange therefore seemed to be implicit in the concept of continuous production and reproduction.

Both Ricardo and Marx regarded labor as the basic determinant of value, although both qualified this doctrine by pointing to the fact that when a surplus exists it will be distributed among the social classes through the same procedures that effected exchanges; and changes in distribution would, consequently, affect exchange-value. This qualification is not such a great deviation from the original doctrine as it might first seem, since the effect which a change in distribution has on the price of a good depends on the ratio of wage costs to total costs of production. The causes of price changes are still to be found wholly in the objective conditions of production; no considerations of subjective utility, scarcity, effort or opportunities foregone enter into the calculations at any stage.[12]

These considerations may explain why, in general, classical economists gave prominence to the circumstances of production in framing their explanations of exchange value. But one may still ask whether Ricardo and Marx were justified in basing their account of exchange value wholly upon production and distribution. The answer to this depends, first, upon an evaluation of the alternatives; secondly, upon the relation between distribution and exchange; and thirdly, upon the view which is taken of consumption.

If the explanation of values in exchange, and of changes in these values is not to be based on the objective circumstances of their production, the principal alternative basis would seem to be subjective factors, the relative scarcity of goods, and the objective circumstances of consumption.

But the latter cannot be very important by itself; it is difficult to see how the way a good is destroyed could have anything to do with its value, unless the good were consumed in producing another good. But then we are back to considering production again. In other words, since producing one good implies consuming other goods in the process, a consideration of production automatically takes a great part of consumption into account.

Natural scarcities are, of course, not irrelevant to an analysis of exchange value, but in a classical system they do not affect prices. The effect of such scarcities is to be found in the phenomenon of differential rents and since rent does not enter into rice, such scarcity can be neglected when considering value.[13]

The principal alternative explanation of value which remains is therefore the subjective one; ie. value in exchange arises from the balancing of desires against estimates of the cost, in trouble and effort of fulfilling them. But while an explanation

of such a form may be appropriate to a discussion of market prices it has no place in a discussion of "natural prices", since these are defined to be the exchange ratios that will permit reproduction, and there is no necessary connection between such prices and planned or actual behavior in the market. For since the object of the classical analysis is to show how society maintains itself, the subjective estimates of those who currently fill the positions in society are of relatively little relevance.

As we have seen, a structural analysis considers the logical relations of given institutions, through examining the extent and nature of their mutual dependence. The interdependence is not revealed in what is done in the market place, but is found in the structure of the possibilities of action. Before one can choose to buy or sell anything the goods must be brought into existence, and since doing this entails using up other goods, dependencies are created which are independent of what happens to those goods in the market place on any particular occasion. Structural questions are, in the first place, engineering ones: Is there enough material to go around, and if so, what exchanges will allocate it? Secondly, they come to involve legal matters: If there is a surplus, who has the right to claim how much of it? It is of no importance to such an inquiry whether the market will actually settle on the prices determined by such considerations, though of course, if such prices are not realized there will be structural repercussions. The important point is that subjective considerations are directly relevant only to a market analysis, never to a structural one.

Another important difference between the classical approach, particularly as developed by Marx, and most contemporary economic thought lies in the treatment of distribution which modern economists treat as a special case of the value problem. The wage is treated as the price of labor, and the rate of interest as the price of capital. When the wage and the rate of interest are equal to the marginal products of labor and capital respectively it is believed that the payments to factors are in equilibrium. The amount supplied of each factor depends on the disutility of offering it compared to the price it receives; the amount demanded depends on the productivity of an extra unit compared to the cost of employing it. Thus equilibrium is established by the interaction of these functions, given the state of the market for final products.

Marx would have thought this preposterous apologetics masquerading in scientific terminology. In the Ricardian tradition distribution depends only on relative market power. When labor is in short supply the wage will rise; otherwise it will tend to approximate the cost of production of labor, namely, enough to cover the necessaries and normal, customary conveniences of family life. Under these circumstances it does not make sense to speak of "factors being rewarded in proportion to their productive contributions."

A further reason for rejecting the neo-classical view of distribution lies in its treatment of "capital" as a factor of production, measurable independently of and prior to the determination of prices. Such a view of capital obliterates the essential distinction between fixed and circulating, constant and variable, productive and commodity capital. Even more important, it suggests that a change in the wage, or in the rate of profit, will lead to changes in the amount of the corresponding factor employed rather than to an inverse movement in the other distribution variable. It thus directs attention away both from Ricardo's discovery that changes in the wage will lead different prices to move in different directions, and from the accompanying difficulty of finding a way of measuring the quantity of capital when prices are changing.

Finally, the third consideration which serves to justify the emphasis on production is to be found in the nature of consumption. One basic doctrine of the only real alternative to classical economics is that consumption depends on a comparison of the marginal utility of a good with the cost of acquiring it. This notion is not well supported

by empirical findings, and, in addition, there are a number of purely conceptual difficulties in it. These center around the fact that if society is to continue, consumers must maintain their own existence and replace themselves. They do this through their consumption, and they receive the income out of which they consume from their employment by capital or as a result of owning capital. A person's employment depends on his possession of certain qualifications and characteristics; but a person's qualifications and characteristics in turn depend on his current and past consumption. The maintenance of a labor force with a certain distribution of skills, therefore, requires that the population engage in a definite pattern of consumption. Of course not all consumption affects the skills of the population, but the point deserves to be stressed, since the connection between consumption and work is significant in capital theory.

If the ability to work is produced through consumption, and if the wage paid to labor is just sufficient to bring up a family in which the children will have an education equivalent to that of their parents, then a change in methods of production which requires a work force with different skills will require a general change in patterns of consumption, i.e. a change in productive techniques will bring about a change in "consumer tastes". Moreover this can be expected to apply not only as regards basic consumption but in the consumption of luxuries as well. For example, if new methods of production and work organization require a work force with a higher proportion of literacy, this can be expected to lead to changes in consumer tastes for all kinds of goods.

These considerations, incidentally, allow us to dispose of one objection to Marx which has frequently been advanced. It has been charged that his explanation of exchange value is circular since he reduces various quantities of different grades of skilled labor to a single quantity of uniform unskilled labor by relying on market valuations, the very things he uses labor to explain. This objection is unfounded since as we have just seen, Marx maintains that labor power is produced by consumption; hence he measures different grades of labor by their market valuation. There is no circularity; all that is necessary is that all cost of production equations be solved simultaneously. This may lead to some complexity, but it will never lead to circularity. (Cf. Nell, 1983).

We said earlier that the justification of the emphasis on production and distribution in explaining exchange value depends on the view taken of the alternatives, of the relation between distribution and exchange, and of the nature of consumption. Subjective considertions cannot be used to explain structural questions. Distribution cannot legitimately be treated as a special case of exchange, nor can it be explained adequately by a model which supposes that "amounts of factors" are offered and taken in response to market stimuli. Finally, it must be recognized that consumption produces men and women as well as satisfaction and utility; when account is taken of this it is clear that patterns of consumption cannot be separated from the conditions of production in the way required by neo-classical theory. There may still be difficulties in the classical approach, but it cannot be ruled out of court because of its emphasis on production. On the contrary, that must be regarded as a strength. Nor can the approach be charged with neglecting maximization, for as Lowe has shown, maximizing can be integrated with the structural approach of the classical tradition by treating it instrumentally.

The Proper Relationship Between Structure and Behavior

The emphasis on production may be justified, and it may be correct to proceed by first calculating what must be done in order to reproduce the economic system as it currently is. But we still want to know what will, or at least is likely, to happen. In other words, it is still necessary to examine behavior. Here Lowe has provided an admirable example. In the Path of Economic Growth he first calculates the structural

requirements, and then proceeds to determine, through what he calls 'force' analysis, what pattern of behavior is needed to achieve such reproduction. Then given a change in some key parameter, in his case, the growth rate of population, he calculates what behavior by the appropriate agents would be required to move to the new set of structural requirements. So far, it seems, we have only learned what should happen, if such-and-such goals are to be achieved. But this is not so. Given the structural requirements and the derived behavior patterns needed to realize them (subject to some contraints), like minimizing time or expense), certain predictions follow. If the behavior indicated is undertaken, e.g. in moving from a lower to a higher rate of growth, then certain events will happen, in a certain sequence, along the way, e.g. unemployment will emerge, along with idle capacity, followed by changes in the relative sizes of the sectors. Moreover, it can also be shown that certain other events might or might not happen, such as overbuilding or underbuilding of capacity. In other words, the analysis does generate both definite predictions and an indication of possibilities, even though at no point is it specifically based on stimulus-response functions. Lowe's approach therefore embeds the analysis of behavior in a Classically based study of structural requirements, and makes it possible both for us to study behavior critically, and to consider predictions of the course of events when behavioral patterns are undertaken.

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Footnotes

1. The word "behavior" is used by many different disciplines in a number of different ways, and is here used without prejudice to any philosophical or psychological thesis.

2. Lowe, in fact, begins from a discussion of "Robinson Crusoe", an isolated individual. But he restricts the economic analyses to material provisioning, arguing that the approach of the "logic of choice" misrepresents both choice and the (merely historical) role of scarcity, while preventing a services analysis of what he calls the "technological core of economic activity". C.F. Lowe, 1965, 1977, pp. 8-18.
... Thesis
But the term will be used here in its neo-Classical sense, as designating economic responses to given well-defined stimuli. It should be understood that this is a very limited concept of social action. The claim for the independence and priority of structure would not hold, for example, for a broader concept of self-reflexive social action. But, of course, models of such action could not result in a determinate equilibrium of the kind required in neo-Classical economic theory.

3. The distinction between structural and behavioral approaches is similar to that drawn by Lowe between 'structure' and 'force' analysis, although he treates both as examples of instrumental analysis, whereas the discussion here does not. Cf Lowe, (1965).

4. 'Assigning meanings' is all very well, but, notoriously, calling something an X doesn't make it an X. If we say, this variable represents 'price', does it? Is that all there is to it? The argument is too complex to get into, but at the very least, the formal aspects of the variable must be compatible with the formal aspects of the concept being represented. For further discussion cf. Hollis and Nell, (1975), Chs. 5 and 9, esp. pp. 102-3 and 190-92.

5. A contrasting form of behavior might be dubbed the "rule-interpretive form", where agents are assumed to be guided by some set of rules which they must interpret to fit the changing circumstances in which they act. These forms may or may not be compatible; we do not wish to take sides in a philosophical dispute, for our only interest here lies in the prima facie contrast between them. In the stimulus-response case both the stimuli and the various responses are perfectly clearly defined in advance, whereas in the rule-interpretative case only the rules of the game and the basic objectives are clear. The interpretation of the changing circumstances and the operations by which to deal with them and achieve the objective both remain to be defined; and will be defined only in the actual course of action.

6. For a detailed and rigorous critique of this contention, see Hollis and Nell; (1975), Chs. 1-4.

7. A simple but effective test: In a structural model the production functions show the inputs required to produce a product, whoever does it. In a behavioral model they show the inputs required by a firm, given its particular circumstances. The latter but not the former can be used to examine market behavior.

8. The price equation is: $p = (1+r)Ap + wL$, where p is the price vector, A the square non-negative matrix of input coefficients, L the vector of labor requirements, and w and r the wage and rate of profits. Circulating capital is assumed, though the extension to fixed capital is simple. The Perro-Frobenius theorems guarantee the existence of unique, positive solutions under plausible conditions. Cf. Sraffa, 1960, and Pasinetti, 1975.

9. To see the contrast starkly, compare two constructions the Sraffian w - r curve, and a neo-Classical p - q long-run supply curve. The first is a set of calculations showing the pairs of wage and profit rates that go together when the assumptions are fulfilled. Given one, the other follows. It doesn't matter which, for none of the assumptions concern behavior. Nor are the agents of the system even specified. By contrast, the supply curve shows the supplies which firms will offer in response to perceived market signals, where their response is determined by maximizing. Prices are the parametric variable. If quantities are taken as the stimulus, a different (and short-run) theory must result. The assumptions concern firms'; perceptions, knowledge, mobility, etc., and when they are changed, the patterns of behavior change, and what results are market imperfection theories.

10. The Classical and Marxian long-run position is simply the calculation of what is required for the system's reproduction with a given distribution. Whether this is realized or not is a separate question, involving effective demand, monetary matters and mark-up policies. The long-run position is, so to speak, the setting for the short-run analysis. By contrast, a neo-Classical long-run equilibrium is a pattern of regular behavioral responses to market signals, and it must be explained how the system reaches this position, how it gets into equilibrium. Given the extremely strong assumptions required to define the equilibrium, it is hard to see how a system out of equilibrium, say, in which mistakes had been made, or in which uncertainty reigned, could ever get into it. But this problem does not arise in a Classical structural system.

11. There is, of course, a considerable controversy over just what is meant by "the firm" in neo-classical theory. We do not wish to take sides in this rather complicated debate, and we assert only that the maintenance of its caital is a necessary condition for the continued existence of a firm in the long run. Of course a temporary failure to keep capital intact will not lead immediately to ruin and extinction any more than temporary unemployment leads at once to starvation and certain death. But either condition sufficiently prolonged leads step by step, slowly but surely, to these results; and neither condition can be a position of possible equilibrium.

12. It is sometimes argued that the classical economists were able to ignore subjective utility because they assumed "constant costs." This is mistaken; they did not assume "constant costs", as that phrase is commonly understood today, for they did not employ a "production function: in the modern sense; and, they were substantially justified in their neglect of the subjective approach to demand. That approach is not intuitively plausible--no one has ever been able to describe even his or her own indifference curves or preference maps in any precise detail. Nor does it make sense; we value things because of their characteristics, and because of the uses to which we figure to put them. We never rank goods in the abstract. And finally, of course, the orthodox approach does not adequately account for the one well-established empirical finding on demand--the shape of Engel curves. Cf. Hollis and Nell, Rational Economic Man, Cambridge, 1975, Chapter 5.

13. Of course in a Sraffa system, both differential rents and joint production require that demand be taken into account. But the way demand is treated need not rest on any "subjective" considerations at all, that is, it need not involve a behavioral perspective. Demand can be approached from a structural point of view, as deriving from the requirements for the maintenance and reproduction--and/or social advance--of households of various social classes.