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Author(s): Hamid Hosseini

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The Archaic, the Obsolete and the Mythical in Neoclassical Economics:

Problems with the Rationality and Optimizing Assumptions of the Jevons-Marshallian System

By HAMID HOSSEINI*

ABSTRACT. The assumptions of omniscient *rationality* and of *optimizing behavior* of *neoclassical economics* are serious flaws in that theoretical system. By imitating *Newtonian mechanics*, by going back to 18th century *psychology* and *philosophy* and to *Bentham's* rationalism and *hedonism*, and by assuming the ideal world of perfect *competition*, neoclassical economics had to ignore its psychological dimension and thus focus on the behavior of a simple and abstract "*economic man*," who lacks *social*, *ethical* and *political* dimensions, and who is not a creature of habit, hunches, impulses, etc. The *rationality* postulate cannot be tested *empirically* and economic behavior is much too complicated to warrant use of the classical optimization techniques of Newtonian mechanics. *Economics*, dealing with *open systems* and being an *evolutionary science*, once again is not logically consistent with the application of classical Newtonian optimization techniques.

I

Introduction

NEOCLASSICAL ECONOMIC THEORY has been founded on the assumptions that economic agents are omnisciently rational and that they are always optimizing, *i.e.*, maximizing utility and profit and minimizing disutility and cost. This is to say that the standard neoclassical theory, at least implicitly, assumes that economic agents are always fully motivated; it presumes that economic agents should do what they believe right and believe that what they do is right. In this body of thought values and actions are always consistent.

However, the twin assumptions of omniscient rationality and optimizing behavior of economic agents have in recent years witnessed a great deal of criticism. Among these are the celebrated critiques of Harvey Leibenstein, Herbert Simon and George Shackle. Yet, in spite of these strong criticisms, neoclassical eco-

* [Hamid Hosseini, Ph.D., is associate professor of economics, King's College, Wilkes-Barre, PA 18711.]

nomics goes about its business as usual, using the very same tools it has used for a long time.

This is particularly true among those who adhere to the kind of eclecticism that judges theories not on the basis of the realism of their assumptions, but on the basis of how good they are for the purpose at hand. It should not be surprising that Lawrence Boland, a rather staunch neoclassical economist, would, in a dogmatic way, regard any criticism of the neoclassical optimization hypothesis as futile. In speaking of these criticisms he writes:

Some anticlassical economists are very encouraged by these arguments, but I think these arguments are unsuccessful. For anyone opposed to neoclassical theory, a misdirected criticism which by its failure only adds apparent credibility to neoclassical theory will be worse than the absence of criticism. The purpose of this paper is to explain why . . . , no criticism of that hypothesis will ever be successful.¹

Like Herbert Simon and others, and unlike eclecticism, I regard the real world as the most fertile of sources of good research questions calling for scientific inquiry. Thus, my contention in this paper is to show the lack of realism of these two assumptions of neoclassical economics and the type of problems they face. I would argue that in adapting the optimization tools of Newtonian mechanics to economics, neoclassical economics has reduced complex and multi-dimensional economic agents to very simple one-dimensional ones. I want to also argue that the application of these mathematical optimization tools to economics is very problematic.

II

The Roots of the Hypothesis in Newtonian Mechanics

INSPIRED BY GALILEO, Newton discovered the universal law of gravity, which led to the doctrine of scientific determinism. This Newtonian law caused a scientific revolution which became a source of inspiration for the liberal philosophers of the next century, and had the greatest impact on the rise of scientific economics.

It is well established that Smith and many of his Scottish contemporaries were much inspired by Newtonian theories. Smith, who regarded the Newtonian system as “the greatest discovery that ever was made by man,” assumed that the Newtonian system was the model for all scientific theorizing. He applied to social and economic phenomena the idea that the universe, as a perfectly ordered mechanism, operates according to the 18th century understanding of natural laws. Thus, he concluded that the individual pursuit of self-interest in a two-way exchange economy would guarantee social harmony.

The neoclassical tools of today have resulted from the confluence of Smith’s philosophy of society, the abstract and speculative method of Ricardo and the

psychic philosophy of Bentham. (In general, modern economics rests upon 18th century psychology and philosophy). The idea of an abstract “economic man” used today, which was introduced to neoclassical economics by Vilfredo Pareto, especially uses as its building block Bentham’s concepts of hedonism, utilitarianism and rationalism. This omnisciently rational and optimizing economic man is an abstract notion very much rooted in Bentham’s belief that “community is a fiction” and that there is no such thing as a “social” point of view apart from one’s own self-interest. (This belief of Bentham reminds one of two logical fallacies—the fallacy of composition and the fallacy of division).

Thus, in an attempt to find in economic affairs some universal that could play the role that gravity plays in the Newtonian system, the concept of rational and optimizing economic man was discovered. This discovered “universal” is a simple and a one-dimensional individual who only responds to economic self-interest. He is also the vehicle of the process that eventually clears all the markets. It was only because of these simplifying assumptions that the application of classical mathematics to the optimizing behavior of the rational individual became possible. Economists who understand the complexities of the labor market can best understand its distortions if we are to apply the mathematical tools of optimization of Newtonian mechanics to our economic analysis of the labor market.

Thus, neoclassical economics theory gave rise to the “vision of a comprehensive, interdependent market network, involving numerous and *well-informed* buyers and sellers, with prices tending toward uniformity and moving flexibility to provide correct signals for economic decisions.”²

The assumptions of perfect markets and perfect knowledge are necessary if economics is to imitate Newtonian mechanics and become explicit (or at least implicit) assumptions of neoclassical economics. Even Jevons discussed a perfect market and argued that it is perfect “when all traders have *perfect knowledge* of the conditions of supply and demand and the consequent ratio of exchange.”³

Alfred Marshall assumed a perfect market “in which there are many buyers and many sellers all so keenly on the *alert* and *so well acquainted* with one another’s affairs that . . .”⁴ Elsewhere he wrote, “thus we assume that the forces of demand and supply have free play; . . . that is, buyers generally compete freely with buyers, and sellers compete freely with sellers, but though everyone acts for himself, *his knowledge of what others are doing is supposed to be generally sufficient*. . . .”⁵ Marshall, who argued that “knowledge is our most powerful engine of production” also used the assumption of perfect knowledge in his theory of distribution. This is obvious when he argues that “every agent of production, land, machinery, skilled labor, unskilled labor, etc., tends to be applied in production as far as it profitably can be . . . Thus then uses of each

agent of production are governed by general conditions of demand in relation to supply.”⁶

Other giant founders of neoclassical economics have also used the assumptions of perfect markets and perfect knowledge. A. C. Pigou argues that: “hence the markets with which we have here to do all are perfect . . .”⁷ His definition of perfect markets coincides with those of Jevons, which also assumes perfect knowledge of various economic agents. The same kind of assumptions are also obvious in Lord Robbin’s famous essay.⁸

It is interesting that, in spite of the 1930s revolution of imperfect competition (Chamberlin and Joan Robinson), the assumptions of rationality and optimization, which are for the most part consistent with the world of perfect competition, have prevailed in neoclassical theories of utility, profit maximization and general equilibrium analysis. (For example, oligopoly theory has not yet been integrated in general equilibrium analysis). More recently, following the revolution of rational expectations, they have also been applied to macroeconomic theory and policy by the proponents of new classical economics.

III

Are Economic Agents Omnisciently Rational and Optimizing?

ALBERT CAMUS, in his celebrated 1951 work (*L’Homme révolté*), argued that human beings are not smart enough to be rational. Herbert Simon, George Shackle, Harvey Leibenstein and James March have essentially said the same thing. Is this a pessimistic view of history and society? Or, the opposite, can this be verified by the reality of human action and history?

Economic science, or to be more precise neoclassical economics, has tried to be the science of efficiency. In seeking efficiency and in order to use the tools of Newtonian mechanics, neoclassical economics has sought refuge in the ideal world of perfect competition (which also reminds one of another logical fallacy—the fallacy of reification or hypostatization). Thus, instead of explaining what is—which should be the main task of all sciences including the positive theories of economics—neoclassical economics, in spite of its claim to the contrary, has concentrated on what should be. It is to explain the ideal of a perfectly competitive world that the assumptions of rationality and optimization of economic agents have become relevant.

The fact of the matter is that economic agents enter the exchange or any other economic process with more than the motive of economic self-interest. Economic agents—whether workers, entrepreneurs or consumers—also have social, religious, and politico-ideological dimensions. As proponents of social economics have for years argued, economic agents can also be ethical beings. Economic

beings can also have different (and usually less than perfect) degrees of motivation. Their economic behavior is also constrained by the forces of habit, routine and well-entrenched conventions, as well as ignorance. George Shackle and Ludwig Lackmann have long maintained that perfect knowledge is impossible; whereas without it rationality and optimizing behavior become impossible. It should not be surprising that the works of Herbert Simon, March and others have called for the replacement of omniscient rationality with bounded rationality and the replacement of optimizing behavior by 'satisficing' behavior.

IV

The Test of the Hypothesis

ACCORDING TO THE HUTCHINSON-MACHLUP DEBATES of the 1950s, the rationality postulate is the fundamental behavioral law in economics.⁹ And the proponents of falsification have for a long time maintained that disconfirming test instances must be taken seriously. Thus, it is necessary to test the validity of our assumptions. Yet, the omniscient rationality assumption cannot be tested empirically (the same goes for the laws of demand and diminishing returns).

Neoclassical economics might find pure models of rational choice appropriate to guide human action. But these models would prove problematic for predictive behavior and are not possible to test. Neither is it possible to test the related maximizing hypothesis. The optimization hypothesis is based on what should be well-established preferences. For example, we assume that future preferences are exogenous, stable and known with adequate precision to make decisions unambiguous. These assumptions are questionable. When we deal with collective decision-making, individual objectives might be in conflict, or, individual preferences might very often be inconsistent, fuzzy and changing over time. It can also be argued that as human beings, while engaged in decision making, we often ignore our own fully conscious preferences. Instead of maximizing rationally, we often follow rules, traditions, hunches, and advice and actions of others. As a result, these internal conditions (variables) are not themselves directly testable. The point is that, as Bruce Caldwell argues, "the maximization hypothesis is neither directly (since preferences are nonobservable, and introspection and surveys are ruled out as unreliable) nor indirectly testable, in the usual sense of the term."¹⁰

Since the publication of Mark Blaug's *The Methodology of Economics* a few years ago, some have pointed out that the act of falsification in economics faces various obstacles.¹¹ For example, Bruce Caldwell, in his 1984 *Philosophy of Social Science* piece, stated a few of them.¹² These are as follows:

1. "Initial conditions are numerous." Since a true test of an hypothesis occurs if all the exogenous variables are known, and because it's impossible to specify all of the necessary initial conditions (even in some laboratory sciences), falsification becomes problematic.

2. "Some initial conditions are untestable." Two examples in economics are tastes and preferences and the state of information. Economists generally find a way out in the first instance by assuming that preferences are stable and well-ordered, and in the second one by assuming either that information is perfect or uncertainty is the same as risk.

3. "Absence of falsifiable general laws." As stated above, not only the rationality postulate, but also the laws of demand and diminishing returns are not directly testable.

4. "Tests of models are not tests of theories." We can construct a wide variety of models to represent any system of hypotheses. As a result, the empirical falsification of any single model does not imply the falsification of the theory. This makes the falsification of theories more difficult than the falsification of models.

5. "Empirical data may not accurately represent theoretical constructs." Many economists have found problems with aggregating data in economics, or in providing meaningful interpretation of what these are to represent.

V

Economics and Psychology

SOME OF THE AFORE-MENTIONED DISCUSSIONS suggest that economics should be more than the study of the abstract and one-dimensional economic man. It should be the science of man—a complex and multi-dimensional being—and economic analysis should include in its purview the complex dimensions of economic agents. In fact it was Alfred Marshall—the founder of the neoclassical synthesis—that, in the *Principles*, referred to economics as the science of man.

However, as Herbert Simon, George Shackle,¹³ Kenneth Boulding and George Katona have argued, neoclassical economics, in practice, has ignored this point. In the words of Simon, "in its actual development, however, economic science has focused on just one aspect of man's character, his reason, and particularly on the application of that reason to problems of allocation in the face of scarcity."¹⁴ The same point was made by Kenneth Boulding when he wrote, "it is the behavior of commodities not the behavior of men which is the prime focus of interest in economic studies." He further emphasized that the economist "is not really interested in the behavior of men."¹⁵

Economic agents, in their attempts to optimize, are in essence decision makers. And decision making is certainly more than economic. When, in imitating Newtonian mechanics, economics discovered the one-dimensional economic man (universal), in effect the non-economic aspects of people were ignored. This explains why many, if not most, of the investigators of decision-making in economics are drawn from outside economics, instead from psychology, political science and sociology.

One major aspect of the study of humanity ignored by economists is the psychological aspect of economics. Many economists have realized that economics and psychology are related. As George Katona argued, "in order to understand economic processes, psychological considerations and subjective variables must be incorporated in the analysis."¹⁶ This is particularly true because economic agents, as consumers, workers, or producers, are decision-makers. In the words of Katona, "the psychological study of economic process is possible because human decisions, and human behavior in general, are governed by laws, that is, are not arbitrary, unpredictable or indeterminate. Human beings are not marionettes pushed around by external forces and yet the latitude of their choice is subject to scientific analysis. Differences in perceptions, motives, and behavior are measurable and can be related to causal factors."¹⁷

Psychology does not accept the simple economic man used in neoclassical economic analysis. A case in point is Abraham Maslow's theory of hierarchy of needs in which human beings are defined as wanting creatures who strive to satisfy different needs in an order of potency which goes from physiological, to safety, to love, to esteem, and, finally, to self-actualization. Even when psychologists talk about ideal decision making they are aware that it is only an ideal model, and not the real decision-making model (unlike the world of perfect competition in economics which is often confused with the real world). In comparing the ideal and the real models in psychology, Hampton, *et al.*, wrote, "decisions theory tends to depict decision makers as isolated, rational individuals who become fully informed about problems and weigh alternatives dispassionately. Decision-making reality involves a far less computer-like process. Information is incomplete, problems are imperfectly formulated, and social interaction as much as rational calculations may influence the result."¹⁸

Many behavioral psychologists are concerned to see whether or not individuals are maximizers. Many of them, in their debate concerning what they call "the matching law," have raised serious objections about the optimizing theory. In reviewing some of these debates, William Vaughan, Jr. writes, "at the same time, there is some evidence against the maximization thesis. Herranstein and Heyman (1979) have found matching, but not maximization, in a concurrent variable-interreal variable-ratio (conc. VI VR) experiment; Heyman and Luce (1979)

have argued that on conc. VI-VI schedules, matching and maximization do not quite coincide, though their argument is not entirely persuasive (Ruchlin 1979). Finally, Herranstein and Vaughan (1980) have reviewed several experiments which are inconsistent with maximization."¹⁹

VI

Optimization and the Use of Classical Mathematics

A GREAT DEAL of what is done in neoclassical economics is applying various optimization techniques of classical mathematics to the behavior of rational economic agents. This, as was shown earlier, is a kind of mimicry of the physical sciences. But is this imitation really appropriate? Can we, and should we, really apply the optimization tools of mathematics to economics?

One response to this questions was provided by Oscar Morgenstern and John von Neumann in *The Theory of Games and Economic Behavior* in 1944.²⁰ They argued that only in a type of economy represented by the "Robinson Crusoe" model—that is an economy of an isolated single individual or group organized under a single will—can one think of an ordinary maximization problem. If a person participates in a social exchange economy, they argued, this problem is more than simply a maximization problem. If two or more individuals are involved in an exchange process, "then the result for each one will depend in general not merely upon his own actions but on those of the others as well. Thus each participant attempts to maximize a function of which he does not control all variables." This is not really a maximum problem—it is rather a disconcerting mixture of several conflicting maximum problems. They tried to show that this sort of problem is nowhere dealt with in classical mathematics. They maintained that this is no conditional maximum problem, no problem of the calculus of variation, neither is it a problem to be dealt with in functional analysis.

Recently, John Gowdy, following Ernst Mayr and Nicholas Georgescu-Roegen, argued that economics, like biology, is not a mechanistic and physical science, rather it is an evolutionary science, a science of living things.²¹ To him, economists (and biologists) must realize that living (and thus evolutionary) systems possess the characteristics of:

1. Uniqueness and variability. Thus, the study of economics (and biology) is unsuitable for the application of the sort of reductionalism that has been successful in classical mechanics—since there are no absolute phenomena in evolutionary processes. If this is the case, then optimization techniques in economics are also inappropriate.

2. Complexity and organization. In other words, in economics and evolutionary biology, elements in the system should be considered in interaction. Holism, wholeness, and gestalt are a lot more important in evolutionary systems. Again, this makes the above-mentioned reductionalism inappropriate.

3. Indeterminacy. Because evolutionary processes are not absolute, and evolutionary events are relatively unique, indeterminacy here matters more than in mechanics. In economics we also have the indeterminacy from social, and other human constraints.

4. Irreversibility and Irrevocability. While the models of physical sciences are based on reversible concepts, evolutionary systems undergo irrevocable changes. This characteristic makes temporal prediction impossible.

Based on these four characteristics that economics has in common with biology, the use of classical calculus in optimization behavior of rational economic agents seems inappropriate.

Obviously, if economics is to do any imitating, it would be much better off imitating evolutionary biology than Newtonian mechanics. However, it can be argued that economic analysis is even more complex than evolutionary biology, making the application of classical optimization techniques to economics even less appropriate. It can be argued (but it has not yet been proved) that initial conditions (variables) in economics and other social sciences are more numerous than in the physical and biological sciences. Obviously, the proponents think, because of subjectivity of many economic and social variables, more of these variables face the problem of untestability. Economic agents as conscious, social, political, and religious beings, and as creatures of habits, convention, etc., are a great deal more complex, it is held, than the unity of analysis thought to be in mechanics or even biology. To apply the optimization techniques of Newtonian mechanics to economics requires the reduction of a complex, changing and *conscious* being to a one-dimensional and static robot. Emile Grumberg has also argued that economics deals with open systems.²² The fact is that unlike economics, physical and biological sciences deal with what social scientists conceive as being effectively closed systems. It is also a fact that the use of mathematical optimization techniques require closed systems, and that open systems cannot be adequately captured by a closed model.

Thus, as long as we are dealing with open systems, optimization techniques become inapplicable, since no empirically constant relationship describable in equations between economic elements can exist. Effective closure of the system requires endogenizing exogenous variables. This leads to infinite regress, since every exogenous variable is found through other exogenous variables. Thus, the use of optimization techniques, (which are essentially for closed systems)

in open systems, once again, implies the committing of the logical fallacy of reification.

VII

Conclusion

OBVIOUSLY, POINTING TO INADEQUACIES of a theory is not enough. We must go beyond it by proposing an alternative.

In the last few decades two alternatives have been proposed. One alternative emerged as a result of Herbert Simon's discussions of bounded rationality (that all interdependently rational behavior is behavior within constraints) and 'satisficing' behavior, to replace the classical omniscient rationality assumption and the optimization assumption of economic agents. As Simon has argued, a significant number of empirical studies have proven "actual business decision-making to conform reasonably well with the assumptions of bounded rationality but not with the assumption of perfect rationality." He has also argued that satisficing models of firms work better than classical profit maximizing models.²³

Of course, some thirty years after Simon's original papers on the subject, no one claims that we now possess a single, widely accepted, precise theory of choice. Simon and his followers only maintain that the empirical and theoretical efforts of the last few decades have brought us closer to understanding the decision process.²⁴ In spite of the usefulness of the concepts of bounded rationality and satisficing behavior, I don't believe they are able to capture the total picture. For example, it is doubtful that the market of laborers and individual consumers can adequately be explained by these two concepts. It can be argued that human beings as consumers and workers behave a great deal less economically and rationally than do business managers and entrepreneurs. Thus, economic science still must go beyond the concepts of bounded rationality and satisficing.

A second alternative has been proposed by Ronald Heiner in a series of papers beginning with his *American Economic Review* piece of 1983. Heiner is critical of neoclassical economics for not investigating "the consequences of a genuine gap between an agent's decision-making competence and the difficulty of a decision problem (called a C-D gap)."²⁵ What Heiner has done is to outline a general theory for investigating this problem. For example, he argued that recurrent patterns in behavior arise because of decision-making uncertainty due to a C-D gap; so that uncertainty becomes the basic source of predictive behavior. Some argue that Heiner's effort is aiming at a more general theory of human behavior, one that has optimization and rationality of economic agents as special cases.

Heiner's effort is very ambitious. But is his model really that different from the neoclassical optimization that he criticizes? No doubt, his is a very useful analysis. He recognizes the above-mentioned gap, the importance of uncertainty and conscious effort on the part of economic agents. But, overall, it does not appear to vary greatly from the traditional optimization model in the way that leads to the conclusions of restricted variability of behavior he wishes to draw. It is also not clear whether this restricted variability of actions will lead to the greater predictability of behavior that he wishes to see.

Notes

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6. *Ibid.*, p. 521.
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8. Lionel Robbins, *An Essay on the Nature and Significance of Economic Science*, (New York: New York Univ. Press, 1984).
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18. Hampton, D., Summer, C. E., and Webber, R. A., *Organizational Behavior and the Practice of Management*, 3rd ed., (Glennville, IL: Scott, Foresman and Company, 1978), p. 258.
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On Gilding the Written Lily

A PERUSAL of *Line by Line, How to Edit Your Own Writing* by Claire Kehrwald Cook. (Boston: Houghton Mifflin, 1985 p. 162-63) would benefit the writing style of all of us. In a charming passage in which she refers to Dennis E. Barron's *Grammar and Good Taste: Reforming the American Language*. (New Haven: Yale University Press, 1982) she says,

"... Though I would ... argue for literary sensitivity informed by linguistic scholarship, my purpose here is not ideological but pragmatic, I want to alert you to wording that puts you at some risk and that you may therefore wish to avoid, whether or not you agree with the objections advanced. In editing for the Modern Language Association, I suggest alternatives to such wording because the MLA has unusually strong reasons for wanting its language to be above reproach ... Even opponents of traditional standards usually find it tactful to follow the precepts they disparage. Many who don't mind *like* as a conjunctive or *hopefully* in the sense of 'it is hoped' avoid these usages to forestall attack. No one likes to be thought ignorant, and the guardians of the language can be vicious. Baron reports that writers asked to comment on disputed diction have recommended fines, jail sentences and even lynching for those guilty of certain errors. If you would not bow to the vigilantes out of cowardice, you may choose to respect the feelings of the less vindictive cherishers of proprieties. Some writers whom Baron quotes claim to be sickened or disgusted when they find words misused, and it is only civil to spare them distress."

F. C. G.