

THEORIES OF BEHAVIOR AND PUBLIC POLICY

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Introduction

The past forty years has witnessed an increasing preoccupation among members of the economics profession with economic policy. In the United States, this trend began with the Great Depression of the 1930's and was given considerable impetus by the Keynesian revolution, which followed the publication of the *General Theory*. Keynes offered a highly simplified and aggregative theory of economic behavior, consisting of a few variables, which lent itself to policy applications. Kuznets' work in national income accounting made it possible to «operationalize» the theory. For the first time it appeared that rational economic policy would be within the grasp of decentralized free enterprise economies.

The above developments in economics coincided with a changing climate of opinion from laissez faire to interventionism as the Depression became more prolonged. The two developments, Keynesian theory, which offered the promise of rational economic policy within the framework of existing economic and political structures and the general acceptance of the idea of a need for greater government intervention in economic activity, propelled the discipline of economics to new heights of popularity. As time passed, political discussions shifted from concern with whether or not the government *should* intervene in economic activity to *how much* the government should intervene.

During the first thirty years, namely about 1936-1966, attention focused on macroeconomic policy, and neoclassical theory (since renamed microeconomic theory) seemed to remain dormant with respect to government policy.¹ During the latter part of the 1960's the interest of government expanded to include what might be called microeconomic problems, such as poverty, structural unemployment, pollution, discrimination, etc. This new orientation gave rise to microeconomic research which put that field at least on a par with macroeconomic theory, regarding «relevance» for solving real world problems.

The expansion of government policy interest to include problems of a microeconomic nature represented an important shift in policy orientation from general economic policy to specific economic policy, resulting in much greater degree of

government intervention and control of economic activity. Again, the economics profession was the handmaiden in that new development, and the «policy implications» sections of journal articles in «applied microeconomic theory» became a standard part of that literature.

The past ten years have witnessed a growing impatience with the inability of macroeconomic policy to live up to its expectations. «Automatic stabilizers» and «tune tuning» discussions of the earlier years gave way to considerations of «conflict of goals» (price stability, full employment, growth, and external equilibrium), and the recognition of «trade-offs» between goals (Phillips curve analysis). More recently «stagflation» discussions question whether or not trade-offs are even feasible. All this has been accompanied by a reevaluation of the macroeconomic theory underlying policy. One example of such reevaluation is a shifting emphasis towards the microeconomic foundations of macroeconomic theory, which were either ignored or taken for granted by earlier Keynesians. Another example of the current reevaluation is the attention being focused on the structural aspects of the economic system which allegedly contribute to its «poor performance,» namely, microeconomic factors, such as price and wage determination, and which are said to undermine the effectiveness of macroeconomic policy. So we have come full circle in the span of forty years. Disillusion with neoclassical economics gave rise to the general acceptance of Keynesian theory and the failure of macroeconomic theory and policy to live up to expectations has resulted in a new emphasis on microeconomic foundations.²

The experience of the past forty years outlined above, and the resulting disappointments, are not unique in the history of economics : periods of great expectations regarding the prospects for progress are followed by disillusion, which, in time, give way to renewed optimism. In other words, we observe in the history of economics alternating periods of faith and skepticism, as we do in political and social history. In this sense, economics has been a less cumulatively progressive science than some of the physical sciences.

My purpose is to examine some of those factors which cause economics to be less than a cumulatively progressive science. The obstacles confronting economics are formidable; if they were otherwise, they would have been surmounted long ago. I shall argue that they continue to exist partly because of historical tradition and partly because the alternative approaches have offered so little in the way of improvement over «orthodox» methodology.

The Tradition of Economics and Its Critics

The early development of economics was influenced by utilitarian philosophy, which can be characterized as having been atomistic, rationalistic, and materialistic. These three characteristics of utilitarianism together constituted a paradigm of individual and social behavior which was adopted by classical economists. Although later writers, such as Pareto, attempted to purge neoclassical economics of the

ethical aspects of utilitarian influence, the utilitarian paradigm remained so that economic science is essentially atomistic, rationalistic, and materialistic.³

The three general characteristics of the paradigm of economic science delimit the scope and methodology of economics, as well as method. Regarding methodology and method, there is a correspondence between economics and rational mechanics, implying that the procedures of the physical sciences are appropriate for the investigation of human behavior. Or to put it differently, the subject matter of economics is *conceptually* similar to natural phenomena, reflecting the unity of all science, both social and natural.⁴

The orthodox view of the methodological unity of all science has not remained unchallenged. Among the most articulate critics were Marx, the German historical economists, and the American Institutionalists. The views expressed by these critics of orthodox methodology were varied and complex, and I shall not attempt even a detailed outline. Instead, I shall focus on some of these issues which will serve to contrast the orthodox methodology with those of its critics.

To begin, there is the issue of atomism. The problem associated with atomism occurred at two levels. The first level was intradisciplinary, where the social was assumed to be merely the aggregation of individual elements. This allowed many forms of aggregation, but permitted only impersonal interaction of the elements rather than interpersonal interaction characteristic of human behavior.⁵ The second level was interdisciplinary, the argument being that the interdependency of social phenomena was such that it did not lend itself to the analysis of parts-as in the case with specialized disciplines. In general, the critics of atomism stressed the interdependence of social phenomena, which led to a «holistic» or «organistic» view of social behavior in contrast to the atomistic character of economics.⁶ For the critics, there could be at most economic aspects of social behavior, but not a separate discipline of economics which ignored political, cultural, etc., factors.⁷ Finally, atomism, whether at the intradisciplinary or interdisciplinary level, resulted in a static-mechanistic conception of individual and social behavior rather than a dynamic conception where change over time is an ever present part of the process.

The second characteristic of the economic paradigm mentioned above—rationalism—was also a matter of controversy. First, there was the criticism of the means-end criterion of rationality. The critics argued that no individual in the social system could anticipate the consequences of his actions because of the limited information he possessed. Consequently there would always be an «unpredictable» or «uncertain» aspect to human behavior not present in physical sciences.⁸ Secondly, in an environment of economic and social change, it was impossible for any individual to forecast the future; yet decisions were made with expectations about future states.⁹ Also, the time paths were not constrained for the system as a whole as in the case of mechanical dynamics because of «free will» (ability to alter institutions for example) characteristics of human societies.¹⁰ Finally, there

was a second aspect of rational behavior which was stressed by Veblen. Veblen went so far as to argue that much of what constitutes economic behavior is culturally determined, the result of habit, custom, tradition, etc.¹¹ Here the degree of rational behavior in concrete economic behavior was questioned.

In general, the critics of orthodox methodology called attention to two facets of rational behavior—those related to the problem of uncertainty resulting from incomplete or imperfect information, or similarly that resulting from a changing environment, and those related to cultural influence. The utilitarians acknowledge the existence of the latter (habit, custom, tradition), but thought that «education» would diminish its importance.¹² The former represented a serious problem for orthodox theory, which has received attention in recent years.

The materialistic characteristic of the economic paradigm is related to the problem of scope in general and welfare considerations in particular. The secular orientations of the utilitarians caused them to stress the material well-being (as well as political freedom) of individuals and the concern for material well-being is manifested in the classical growth orientations.¹³ The Germans, who were influenced by the idealistic philosophy viewed «development» not only as a material problem but also as a cultural one.¹⁴ The American institutionalists also recognized the necessity for a correspondence between technology and culture and saw «frictions» resulting from lags in the latter, as did Marx.

In summary, both Marx, the German historical economists, and the American Institutionalists called attention, in different ways, to the distinction between the social and natural phenomena.¹⁵ The result was an attempt by each to develop methods suitable for social science in contradistinction to those of the natural sciences. Marx borrowed his dialectical approach from Hegel, the Germans stressed the procedures of history, and the Institutionalists ranged from cultural anthropology to pragmatism. None of these critics succeeded in the sense of altering orthodox scope, methodology and method. Nevertheless, the problems they called attention to remain today and deserve reexamination.¹⁶

Theories of Behavior

The rationalistic tradition, as reflected in the physical sciences, implied the existence of a rough correspondence between our thought processes and the physical universe. In other words, theories derived from a logical process (reason) would accurately represent the physical universe: as if to say God created the universe through reason and reason would unlock the secrets of the universe for mankind.¹⁷ The achievements of the physical sciences lent great weight to this view.¹⁸

In view of the early achievements in the physical sciences, it is not surprising that economists would adopt the procedures of those sciences. The rationalistic orientations of the classical economists was reflected in their assumptions about the behavior of economic man. The *concept* of «economic man» was nothing other

than a conceptualization of the observer's own thought process (reason) extended to the actor. Hence as Pareto was to point out later, the concept of «economic man,» was more like that of a scientist working in a laboratory than a real flesh and blood man who lived in an environment of uncertainty, ignorance, custom, tradition, and possessed with prejudice, hatred, love, envy etc.¹⁹ For the utilitarians real flesh and blood man was a pathological creature at variance with their ideal of rational man. The utilitarians were reformers, and one can understand their tendency to dismiss behavior which did not conform to their program of reform as being due to ignorance.²⁰ But why does the concept persist today? The appeal of «economic man» is that it fits very well the static equilibrium framework of economic analysis borrowed from mechanics.²¹ His behavior is limited to specific and limited goals, such as utility or profit maximization, subject to certain constraints, the appropriate means being clearly defined. Constrained maximization problems derive from the physical sciences.²² Such behavior is timeless, in the sense that «time» does not alter «background conditions.»

Uncertainty and Learning

From what we know at present, physical phenomena do not make choices, to say nothing of changing their choices over time, instead their behavior is constrained by «laws,» so that, in general, they tend to respond to changes in predetermined ways.²³ There are no problems of uncertainty for the phenomena, learning does not exist and physical phenomena are unable to alter or control «background conditions» directly.²⁴ These observations may seem trivial until we realize that the above applies to the conception of economic man, a circumstance which has led Georgescu-Roegen to refer to economics as a «manless» science.²⁵

In concrete reality, almost every decision made by the actor is based on anticipations regarding the outcome (in the future).²⁶ To the extent that actual outcome and expected outcome correspond, then the actors (subjective) perception of the external state(s) of nature (as well as of himself) may be accurate. There is no reason to alter one's perception of the state(s) of nature. For the most part, decisions (choices) are made with varying degrees of ignorance regarding external states of nature (objective factors) and one's own preferences (subjective factors). One would expect some degree of divergence between expectations and outcome. The extent of the divergence determines whether there may occur a change in the pattern of behavior. For instance one might be willing to put up with «small disappointments,» as an inevitable part of decision making under conditions of uncertainty. On the other hand, a «large disappointment» may cause one to reevaluate the basis for his expectations. A revision of expectations may involve a learning process of a mechanical nature, such as simple stimulus-response mechanisms, or may consist of more complex analytical adaptation mechanisms in the choice-learning process. In both cases, the result may be changes in patterns of behavior.

The above process describes not only individual behavior in a unchanging

external state(s) of nature, but in the aggregate the basis for changing external *social* states of nature. Once the problem of a changing states of nature is introduced, decision making under uncertainty becomes even more complex. For even if it were possible to possess perfect information regarding «what is» the current state of nature, it is not possible to know what it will be. In the latter instance one must be able to anticipate all the possible responses of other actors to outcomes of their own *individual* choices made on the basis of expectations in order to know where the social is going. The result is, for the actor, an apparent historical discontinuity for social phenomena, possessing the characteristics of a «random walk» over time. In other words each state of nature is historically unique and possesses concrete individuality.

So much for the social environment in which the individual *actor* must make decisions. Now let us turn to the problem the *observer* is faced with in his investigation of social phenomena in such an environment.

The Historical Uniqueness and Concrete Individuality of Social Phenomena

Perhaps the most perplexing empirical problem for the social sciences is the problem of change and the time lag involved in the recognition of such changes. Change involving social phenomena lends historical uniqueness and concrete individuality to social phenomena which are often absent in the natural sciences. I say often because in the biological sciences, one observes changes in living organisms over time. To the extent that such changes are observed to be repetitious, then «time» is merely a convenient dimension for slicing «change» into discrete units (cell division, for example). Repeated patterns of change over time lend themselves to prediction regarding subsequent states at various time intervals. Departures from predicted time patterns of behavior are in such cases «pathological.» Another type of «change» occurring in the biological sciences does not lend itself to predictions. Two examples may be cited. One example is the case of mutations of viruses which produce «new strains.» A second case is changes occurring in species so gradually and over such long periods of time that they are not practically observable.

The latter two cases are similar to those encountered in economic and social change. In the first case, Keynes called attention to economic change deriving from changes in expectations (which are not anticipated by the observer).²⁷ In the second case, the recorded history of mankind is relatively brief and certainly not long enough to have permitted generalizations of certain kinds regarding social behavior.

The problem of «change» in economic *theory* has been broached by dynamic theories of behavior, which are more analogous to the first case mentioned above, where «time paths» are fairly predictable because of the constraints imposed on the behavior of the variables. «Time» in such cases is merely a convenient label

for designating sequential slices of the process. Such «dynamic» models are really special cases of static models and mechanical rather than historical in nature. They have the advantage and appeal of lending themselves to definitive solutions, and that is why they remain popular in spite of their limitations.

In summary, there are two approaches to dealing with the problem of change. The dynamic-mechanical approach and the historical approach; in the latter approach each «stage» in the process is unique and possesses a concrete individuality. The German historical school stressed the procedures of history to deal with the historical uniqueness problem, but history can only reveal where we have been and perhaps where we are, but it does not follow that it can predict where we will be. Marxian dialectics is no more impressive as a predictive tool than history. Finally, the institutionalist approach, although possessing the merit of «content» did little to solve the problem of what will be. Neither orthodox methodology or those of its critics have been very successful in dealing with the problem of what will be, which is to say that at best they are essentially dealing with historical facts!

The dilemma for social sciences is that, both in theoretical and empirical work, we must assume that some relationships remain constant over time in order to say something about the future when in fact relationships are changing numerically and/or structurally. Unfortunately, we learn of such changes only when the results do not correspond to predicted results. In empirical studies «reestimation» may update our results, but since they derive from historical facts, which only tell us what is (or more often what has been), the problem persists. All that we can hope for from more accurate and more timely data is a better picture of the past and a reduction in recognition time lag so that we can move closer towards what is rather than what has been. Nevertheless, such improvements in data and data collection do little to solve the problem of what will be which derives from other factors discussed earlier.²⁸

Policy and Control

So far the problem of change has been discussed in terms of actors and observers. Let us now turn to government policy. The government is faced with the same problem confronting both actors and observers, but **th**is power to control behavior and responses. When a government undertakes some course of action, it does so, very often, with the expectation that «back-ground conditions» will not change (except those it is acting upon directly). In other words, every action of government presumes an expectations regarding the outcome of its action. To the extent a particular policy «fails,» in the sense the outcome does not correspond to expectations, the response might be rather different from those involving individuals. If disappointment (policy failure) results in learning, then «better» policy may follow. But very often there is simply nothing to learn. The reason is that the responses of individuals to policy are often at variance with those assumed by the policy makers. For instance, if a particular policy results in change

in the pattern of behavior of many individuals, then new background conditions are created to which existing policy does not correspond.²⁹ In other words economic policy involves expected change which itself produces unexpected change. When individuals learn the effect of a particular policy on themselves, they will alter their behavior accordingly. In other words, individuals attempting to maximize utility, profits, or whatever will find ways of mitigating the effects of policy when such policy affects them adversely. In order for a general policy to be effective, it is necessary to anticipate all the possible responses to that policy which would tend to mitigate its expected outcome. Aside from the fact that is almost impossible to anticipate all conceivable responses, the extent of control required, and the complexity of legislation would be mind boggling.

The result of the above is that government policy may be change producing but in a way not anticipated.³⁰ Further attempts to «plug loop-holes» (expost discovery of unanticipated responses) lead to more control, and more change. Of course, a government can constrain behavior totally in order to achieve a correspondence between expected and actual results of policy, at least theoretically, but only at a great cost to human freedom. As mentioned earlier, the postwar experience in the United States has seen a shift in emphasis from general or indirect policy to specific policies in the attempt of government gain control necessary to assume some degree of success. The cost has been greater direct government intervention. Such a trend is not surprising in view of the above discussion.

Economic Structures for Reducing Uncertainty

The problems of uncertainty in individual decision making was broached by both Keynes and Frank Knight. Although Keynes's work on expectational aspects of behavior possessed keen insight regarding the basis for economic instability, he did not go beyond description. Indeed, the state of expectations was taken as «given» when he went on to develop his theory of income and employment equilibrium. Frank Knight's work, *Risk Uncertainty and Profits*, added a new dimension to neoclassical theory, which had the effect of breathing some reality into «economic man.»³¹ Yet in spite of the work of Keynes and Knight on the subject, uncertainty has received a peripheral place in *both* orthodox macroeconomics and microeconomics theory. This circumstance is remarkable, since uncertainty is probably an important source of economic instability.³²

I have argued, that individual decisions are made in an environment of uncertainty regarding outcomes; constant adjustment of expectations to outcomes result in continuously changing «background conditions.» Economic theory and policy are often unable to anticipate changes in «background conditions.» With respect to policy, failure has resulted in greater control. Such controls come into conflict with individual freedom of choice. Is it possible to obtain economic stability with minimal sacrifice of individual freedom? Apparently the answer to this question seems to be no, if one observes the development of the past forty years.

Given that we live in an uncertain world, how have individuals responded to uncertainty? A great deal of human energy has been devoted to reducing uncertainty, and this is reflected in existing structures. A strong incentive for growth of firms is to reduce uncertainty by market dominance. Firms conspire to fix prices and/or output. Trade unions negotiate seniority rules and wage contracts in the *future*, as well as wage escalation clause, for the same reasons. Although such efforts tend to «stabilize» product and labor markets *subjectively* from the point of view of firms and workers, in the aggregate their activities may affect «performance» adversely. In any event, attempts to reduce uncertainty are reflected in the structure of the economy. But the cost of such attempts seems to have been poor performance.

Is it possible to consider other forms of institutions which are consistent with competitive markets and hence less costly in terms of performance. Paradoxically, they do exist in the «mixed» real world. Certain forms of uncertainty have been transformed to calculable risk in the case of insurance. Other forms of uncertainty are transferable to those willing to assume risk in exchange for potential reward (speculators), such as future markets in commodities and currencies. All of these are examples of cases where potential loss due to uncertainty is eliminated or reduced for premium. Is it not possible, at least *theoretically*, to expand the concept of insurable risk to include almost any financial loss confronting any decision making resulting from an uncertain future? If so, could economic theory examine the operation of such a system regarding its potential stability in addition to efficiency? And again, if so, should it not be the roll of government to encourage the widespread development of risk bearing markets to reduce uncertainty, increase efficiency, and economic stability? These are questions which I leave with the reader. In any event, it seems to me that it is worthwhile to at least explore avenues consistent with the Western tradition of individual freedom of choice and which tend to reinforce it, rather than to restrict freedom of choice in an ad-hoc way because of the failure of theory and policy to deal effectively with the problem of uncertainty.

Conclusion

Economic theory and policy are no better than its creators, and therefore reflect the limitation of human capabilities, both as observers and actors, to deal adequately with the problem of change resulting from uncertainty. Some developments in «peripheral» areas of economics such as game theory, duopoly theory, statistical decision theory, etc. derives from the recognition of the lack of correspondence between the orthodox conception of economic man and real world man. Yet the results of these innovations, although lending some realism to behavior, have not been too impressive. The problem of historical uniqueness and concrete individuality has been recognized by the critics of orthodox economics, but the alternatives presented did not solve the problem of prediction. Perhaps the problem

of prediction becomes most obvious in macroeconomic policy deriving from orthodox methodology.

Given the problem discussed in this paper, progress in theory, applied economics and policy will be very slow.³³ Perhaps a revolution in the methodology of the social sciences may change all this some day; in the meantime we should be prepared for future disappointments.³⁴ What is of greatest concern: will the frustration deriving from the failure of theory and policy to live up to expectations bring forth new political and economic structures which will adversely affect individual freedom. What price greater certainty of outcome?

FOOTNOTES AND REFERENCES

1. This is not to say that no government policy at the microeconomic level existed; for example, antitrust legislation and regulation of certain industries existed but their relationship to economic theory was less clear than with macroeconomic policy.

2. Whether all this shifting back and forth will result in some degree of progress, or whether little progress can be expected is the major issue to which I address myself in this paper.

3. Pareto, *Manuale di economia politica* (Milano: Societa Editrice Libreria) pp. 237-273.

4. This view is represented in Carl G. Hempel, «Typological Methods in the Social Sciences,» in *Science, Language, and Human Fights* (American Philosophical Association, Eastern Division, Philadelphia: Univ. of Pennsylvania Press, 1952) pp. 68-86.

5. In economics, impersonal interaction is characteristic of individuals interacting in market structures.

6. On the matter of scope, Marx, the German historical economists, the American-Institutionalists, and Pareto all showed a common view which stressed a wider scope of analysis.

7. Pareto was an exception to this view, since his sociology represented a synthesis of the individual specialized researches. Cf. *Trattato di sociologia generale*, 4 vols. (Firenze: Barbera, 1916); English Translation, *The Mind and Society*, trans. and ed. A. Livingston (4 vols.; New York: Harcourt Brace and Co., 1935).

8. This view is found in Marx; for a detailed discussion see Vincent J. Tarascio, «Marx and Pareto on Science and History,» *Keio Economic Studies*, Vol. 9 (No. 2, 1972), pp. 23-35. For Pareto's views, see: Vincent J. Tarascio, «Pareto: A View of the Present through the Past,» *Journal of Political Economy*, Vol. 84 (Jan. Feb. 1976), pp. 117-119. For an example of the German writers, such as Heinrich Rickert, see: *Über die Grenzen der naturwissenschaftlichen Begriffsbildung* (1st ed. 1902; 2nd ed. 1913; Tübingen: Mohr, 1929); and *Kulturwissenschaft und Naturwissenschaft ein Vortrag* (Tübingen: Mohr, 1926).

9. It was Keynes who popularized this view among economists in his *General Theory*, but the idea was in fact quite old as can be seen in the above footnote, Joseph Bertrand's complaint against Walras' system of general equilibrium was based on the problem of expectations. See: *Correspondence of Leon Walras and Related Papers*, ed. William Jaffe (3 vols., Amsterdam: North-Holland, 1965), letter 590, fn. 3.

10. The philosophical argument of free will was popular among the German historical writers, particularly, Edward Meyer, whose views were attacked by Max Weber. See : Edward Shils and Henry Finch, *Max Weber on the Methodology of the Social Sciences* (Clencoe, 1911. : The Free Press, 1949), pp. 114-115.
11. Thorstein Veblen, *The Instinct of Workmanship and the State of Industrial Arts* (New York : E.W. Hueb sch, 1914), p. 9.
12. Cf. Joseph Schumpeter, *History of Economic Analysis* (New York : Oxford, 1954) p. 133.
13. Regarding the secular orientation of the utilitarian philosophers, I have in mind, Bentham and James Mill.
14. This is so obvious it hardly requires documentation, nevertheless the distinction should be recalled [between the philosophy of history branch and the empiricists, the former being influenced by the idealistic conception of «development.»
15. I have in mind here, in particular, Veblen and the «Veblenites,» Clarence Ayres being the most notable, see : C.E. Ayres, *The Theory of Economic Progress* (Chapel Hill : Univ. of North Carolina Press, 1944).
16. Veblen and Ayres are examples of the former and John R. Commons is an example of the latter.
17. Descartes is perhaps the best example of the rationalistic tradition in the physical sciences and mathematics.
18. The power of «pure reason» or «a priori» theorizing is illustrated in the conception of the «atom» before its actual discovery in nature, and the existence of the planet Neptune by Leverrier and Adams, prior to its actual discovery.
19. Pareto, in *The Mind and Society*, describes the behavior of the latter.
20. Pareto was critical of this aspect of utilitarian philosophy. See : *The Mind and Society*, Vol. III, sec. 1397, note 2, pp. 885-886.
21. The best example is Walras, whose multiequational system of general equilibrium derives from Louis Poinsoit, *Elements de statique* (8th ed. Paris : Bachelier, 1842).
22. There is an interesting analogy between Pareto's system of general equilibrium and his doctoral dissertation, «The Fundamental Principles of the Theory of Elasticity in Solid Bodies, and the Researches Concerning the Integration of the Differential Equations Determining Their Equilibrium.»
23. I realize that these laws may at times be probabilistic rather than deterministic, and therefore subject to various degrees of uncertainty of outcome; this is why I use the term, in general.
24. I have in mind here physical phenomena occurring at speeds less than those of light, i.e. I disregard Brownian movements of particles.
25. Regarding «choice,» the so-called choices of «economic man» are mechanical in nature, somewhat like those of a programmed electronic computer.
26. A rigorous presentation of what follows regarding decisions under uncertainty is presented in Vincent J. Tarascio and James L. Murphy, «Uncertainty, Learning and Dynamic

Utility Theory,' *The Quarterly Review of Economics and Business*, Vol. 12 (Autumn 1972), pp. 19-33.

27. All this could be cast in terms of a stochastic framework, but the problem is not merely one of empirical testing of hypotheses, but also of theoretical import since theorists are susceptible to the same problem—their «intuition» represents a very imperfect picture of reality for the same reason as for those of the actors.

28. Timeliness of data (or information) is not a problem in the American stock market where instantaneous transmission of every transaction is available. Yet with all these data, the consensus among economists is that stock price behavior is a «random walk»—with no discernible relationship between past and present prices. To phrase the problem in terms of my discussion, stock prices are historically unique phenomena possessing a concrete individuality, because the historical background conditions are changing due to a continuous stream of information flows (both internal and external to individual stocks). Admittedly, the stock market possesses a degree of volatility perhaps not usually found in other economic and social phenomena, but the difference seems to be one of degree than kind. Namely, the time rate of adjustment is probably one of degree among various markets.

29. The degree of divergence may be small or large per period of time depending on the recognition lag of actors and their ability to alter behavior quickly. In some cases immediate responses are possible (response to changes in the interest rate in securities markets) in other cases responses are slower (changes in the wages) and may involve lags in adjustment.

30. Here is an example of how stabilization policy may be destabilizing.

31. «Adaptive» economic models, although more realistic, tend to encounter many problems, the not least of which is the need to constrain behavior in order to obtain definitive solutions. See : Richard Day and Theodore Groves, eds., *Adaptive Economic Models* (New York : Academic Press, 1975) for a collection of papers on the subject of adaptive behavior.

32. Frank Knight, *Risk, Uncertainty, and Profit* (New York : Hart, Schaffer and Marx, 1921).

33. I am not suggesting that all economic instability is due to uncertainty, but that uncertainty is a considerable factor in economic instability. This view is consistent with Keynes. What is remarkable is that Keynes who was a speculator in commodity, currency, and stock markets, and who was familiar with the economic function of insurance did not appreciate the value of certain market structures for reducing «uncertainty,» and hence for dealing with the problem of instability.

34. Awareness of the problem of uncertainty and its implication for theory and policy has been slow in developing for the profession *at large*, in spite of Keynes and Frank Knight. In recent years, a substantial literature has been developing, reflecting an increasing interest in the problem in almost every field of economics. Some examples are the «inflationary expectations» literature in monetary theory, dynamic utility theory, international trade under uncertainty, behavior of firms under uncertainty, portfolio theory, etc. Among the most recent contributions is a collection of essays : Jacob Marshak, *Economic Information, Decision, and Prediction* (3 vols, Boston - R. Reidel Publishing Co., 1974), Vol. I *Economics of Decision*; and *Adaptive Economic Models*: cited above.

It is too early to know the consequences of the above literature on economic methodology, and its ability to overcome the problems discussed in this paper.