Rationality and Economic Behavior*

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In the mainstream of modern economic theory rationality is defined as optimization. Individuals (called economic agents in the more rigorous development of the theory) are assumed to maximize their benefits relative to costs. Starting from a given set of assets, each agent trades and exchanges until on optimum position is reached. When all agents have reached their individual optima trading will cease — because no agent will have any incentive to change position — and the system as a whole will have reached an equilibrium. This is the essence of the complex body of mathematical general equilibrium theory that dominates today’s economics.

The theory expresses a fundamental political philosophy. The optimal result stems solely from individual action and reflects individual preferences. There is no need for social action through government. The theory tells us that individual optimizing behavior leads to the best of all possible worlds through the medium of unconstrained markets.

The theory rests on a key assumption: that rational individuals seek to optimize. This behavioral pattern is presented as a self evident proposition. It is not based on empirical evidence, or on a psychological analysis of behavior, or on theory of action. It is founded, instead, on the simple proposition that a rational individual, facing a choice between A and B, will choose the one that provides the greatest net benefits. The logical proof of this proposition assumes the opposite: only an irrational person will make a choice that provides less benefit than an alternative.

It is not possible to either prove or disprove the optimization assumption. Since preferences are internal to the individual any action can be assumed to be optimal, no matter how bizarre it may seen to others. Since the assumption cannot be empirically verified, and is not potentially verifiable, it lies in the area of metaphysics, in the Aristotelian meaning of that term, rather than in the area of verifiable scientific propositions.

Can it not be argued that concepts like rational optimization are scientific in the sense that, even though they cannot be observed or quantified, they fit into a system of analysis that produces observed and quantifiable results? Like gravity, or electromagnetism. Fair enough. But what about phlogiston in chemistry or the missing link in the theory of evolution? Both were key parts of scientific theories and are now rejected because of empirical evidence and recasting of the relevant theories. We need to take a closer look at optimization and its place in the larger theory of which it is a part.

The optimization assumption is not simply the starting point for a chain of logic that ends with a general equilibrium. The argument doubles back on the initial assumption changing and modifying it. For example, preferences must be transitive in order for optimization to generate the demand curves essential to the general equilibrium. Transitivity means that if an individual prefers A to B and B to C, he or she must also prefer A to C. This is a necessary condition for the derivation of individual demand curves, which are then summed to produce a market demand curve.

Let A, B and C be indifference curves in the preference map of an individual. Transitivity means that they do not touch or cross. By rotating the budget line as prices change we can show that the individual’s desire for a good will increase as price falls (usually) or fall as prices rise (usually). We can generate a demand curve for the commodity.

But if preferences are intransitive that cannot be done. If A is preferred to B and B to C, but C is preferred to A, the indifference curves will touch or cross. No demand curve can be generated from the preference map, and it is not possible to sum the individual demand curves to derive a market demand curve. A key piece in the logical chain that connects optimization to a general equilibrium is lacking.

Intransitivity of preferences has been shown by experimental psychologists to be quite common. Even when subjects are shown that it is not rational to prefer C to A when they prefer A to B and B to C, some persist in doing so. Much of this empirical work is ignored by economic theorists, or denigrated as inconsequential.

There are, however, clear conceptual grounds for the existence of intransitive preferences. Consider the following case. Good 1 has three uses,
A, B, C. Good 2 has the same three uses, A, B, C, as does Good 3. Good 1 dominates Good 2 because of use A. Good 2 dominates Good 3 because of use B. But Good 3 dominates Good 1 in use C. In this case preferences are intransitive and the relevant indifference curves cross. The same logic can be applied to the dimensions or characteristics of goods. Different characteristics can also lead to intransitive preferences and destroy the logic by which market demand curves and derived from individual preferences.

The theorist responds that goods have only one use, the creation of utility. But in the real world goods have more than one attribute and more than one use. Differences in utility from a single good are clearly possible. We are left with the uncomfortable conclusion that optimization, as the concept is used in general equilibrium theory, must assume that all goods have only one use each, and each has only one characteristic and one dimension. We are in a metaphysical world in which the logic of the argument is in discord with the world to which it is supposed to apply. Theory tells us that when we deal with real goods, rather than unidimensional and single use hypothetical goods, intransitivity of preferences can be expected.

There is an alternative approach to the construction of demand curves. We can try to show empirically that reductions in price are accompanied by increased purchases (usually), all else remaining equal. And vice versa. From these observations we can construct demand curves that slope downward to the right (usually). There are very serious measurement problems in such a procedure, and not all are soluble using known econometric techniques. Yet this is a legitimate, empirically based approach, used in partial equilibrium analysis of markets. The difficulty is that market demand curves derived empirically may or may not reflect optimizing behavior. It follows that the resultant general equilibrium, if there is one, may or may not be optimal.

We come to an uncomfortable conclusion. Rationality is defined as optimization in order to show that the general equilibrium must be optimal. But that is true only in the limiting case in which all preferences are transitive and all goods have single uses and no more than one characteristic or dimension.

The passage of time creates further difficulty, centering on the problem of price formation. In the Arrow and Hahn version of the theory intermediate non-optimum positions are rejected because they can be shifted to optimum positions only by recontracting, which is rejected as illogical. Why should the party to a transaction who gets the better of a deal recontract to allow the other party to improve his position at the other’s expense? With recontracting eliminated — which is in accord with prevailing commercial practice — Arrow and Hahn fall back on the device of the omniscient auctioneer, who first determines equilibrium prices and then allows trade to be made at those prices. The passage of time is eliminated, and with it the possibility of intermediate non-optimal positions. Arrow and Hahn recognize the limitations of this logic, and admit that the theory lacks a reasonable theory of price formation.

The process of moving to an optimal position over time is highly problematic. Schumpeter wrote of the “heterogony of economic goals”. He meant by this phrase that one who seeks to move from A to B will end up at C, because of unanticipated conditions that divert the path away from B. If B is the desired optimum, the economic actor will come to rest elsewhere.

There are unanticipated consequences of any action. In a complex world of closely interrelated phenomena, it is difficult to anticipate all of the consequences of an action. For example, look at the proposed free trade treaty between the United States and Mexico. We know that the export trade of the United States to Mexico will increase. But this will reduce the share of other nations in Mexico’s imports. They will surely retaliate against this U.S. effort to export unemployment to its competitors in world markets. What form will that retaliation take? What will its consequences be? We just do not know.

Exactly this issue of customs unions led to the theory of the second best. We seek to achieve a particular goal, but the uncertainties and imperfections of the world cause us to end up in a second best position rather than the optimal one. Furthermore — and this is an important corollary to the theory of the second best — we will not be able to determine how far we are from the goal we tried to reach. Nor will we be able to determine whether we are better off than at the beginning.

These general propositions are reinforced by recent analyses of uncertainty in decision-making. Where true uncertainty prevails, that is, where the probability of a future event is unknown, the typical result is indeterminate.

Two concepts have been introduced into contemporary economic theory to deal with uncertainty: expected utility and subjective probability. Decisions are assumed to be made on the basis of expectations, in the one case. While the other, individual estimates of the probability of
outcomes are made. In the case of subjective probabilities, Bayesian methods of decision making can be applied, in which initial estimates of probability are modified as new information is obtained, until the individual is able to make a decision with a satisfactory degree of confidence in the outcome.

Both of these concepts are used to make theoretically indeterminate models into determinate ones by substituting probabilities for uncertainty. They are useful in model building where determinate solutions are desired. But these are theoretic models based on an "as if" assumption. The real world is different: rational decision makers in real world situations know that these devices do not transform uncertainty into risk, but merely make a decision possible. Uncertainty and unforeseen events remain, and second best solutions will be the norm.

Bayesian methods do not solve the problem. Additional information requires the passage of time, which means that the entire situation has changed and new uncertainties have entered the decision space. Bayesian methods work only if the additional information accumulates at a faster rate than the entry of new uncertainties. This is a controversial and unsolved problem in the theory of Bayesian statistical methods.

At this point we bring learning into the picture. Individuals learn from past experience. They must learn, therefore, that in a world in which uncertainty prevails and time passes, and in which unexpected events occur, efforts to optimize do not bring optimal results. Decision makers are continually in second best positions in which they do not know where they are in relation to the optimum. A rational individual will learn from experience that it is not possible to optimize.

How then, can we argue that economic agents are rational optimizers? Sisyphus was condemned by the gods to continually roll a boulder to the top of a hill, only to have it roll down on the other side. But people are not Sisyphus. They learn from experience. If experience tells them that it is not possible to optimize, can we expect them to continue to try? We should expect a rational individual to seek other goals and other patterns of behavior. A rational Sisyphus might start rolling boulders downhill.

Satisficing has been proposed as an alternative to optimizing, particularly for situations in which optimization has come to be questioned. Theoretic analysis of price formation over time, which involves costs, leads to the conclusion that buyers do not optimize: they stop searching for the best price before they find it because further search is costly. Analysis of choice under conditions of uncertainty also leads to non-optimal conclusions, despite the use of expected utility and subjective probabilities. Imperfect rationality, including such things as limited ability to process data instantly or fully, also leads to non-optimal decisions. These investigations on the frontiers of economic theory show a wide variety of non-optimal behavior in a wide variety of circumstances. Satisficing seems to be a descriptive phrase for these actions.

Yet satisficing as a definition of rationality has its own limitations. It implies that one is willing to accept a less-than-optimum solution, at least temporarily. But if one does not know what the optimum position is, or where one stands in relation to it — following the theory of the second best — one does not have a key norm against which to measure one's action. One may (or may not) know one's present position, but that is only half the information necessary for a satisficing decision. Satisficing also suffers from the same methodological problem as optimizing. It is not empirically testable. Any decision can be assumed to be satisfactory, given the circumstances, just as any can be assumed to be an optimal one. There is no way to distinguish between the two by looking at the decision itself.

Finally, like optimizing, satisficing is part of a world view that emphasizes determinate results and economic equilibrium. The results and equilibrium may be different from those obtained by optimizing, but the world-view remains that of a determinate equilibrium. This in itself, is problematic.

One of the key assumptions of optimization theory is that choices are made on the basis of preferences internal to the individual. Preferences are not affected by the decisions or behavior of others. In the theory of consumer choice, for example, buyers are not affected by the actions of other buyers, or sellers, and vice versa. This assumption is necessary because in its absence patterns of consumer demand would become indeterminate. The demand curve would dance about instead of properly standing still. The entire theory of price adjustment and market equilibrium becomes indeterminate if A's preferences depend on B's, and vice versa, or if demand side choices are affected by supply side actions.

John Rae attacked this problem on the demand side with his concept of conspicuous consumption, culminating a century or more of attacks on the consumption patterns of the landed nobility. Thorstein Veblen applied this idea to the rich industrialists and financial giants of the gilded age,
and expanded it to the supply side of the market by analyzing market control by big business. Harvey Liebenstein restated the argument forty years later. John Kenneth Galbraith added a new dimension by arguing that advertising can shift the structure of consumer choices toward benefits to sellers and away from benefits to consumers. All of these writers argued that interrelated preferences lead to non-optimal outcomes for the economy as a whole.

These arguments are reinforced by the research and actions of experts in marketing. They know that actions on the supply side of the market affect the preferences of consumers. For example, in developing a new product a business firm will design the product, give it a name, price it, and plan its advertising campaign as a single unit, knowing that the preferences of consumers will be influenced by the entire package presented to them. And if the initial package does not provide an adequate appeal, from the seller's point of view, it can be modified to provide better results. Sellers know from hard experience that individual preferences are not fully internal to the individual.

A brief summary of my argument to this point is appropriate. I argue, not that individuals are irrational, but that it is incorrect to define rationality as optimization. Optimization is not possible in a world of uncertainty, change and imperfections. Furthermore, the optimization assumption is supplemented by a group of further assumptions about the process of choice that narrow its meaning and application. Choices must be transitive and must be based solely on internalized preferences. Uncertainty must be replaced by subjective estimates of risk, and all actions are instantaneous. This limits optimization to a special case at one extreme of a continuum, at the other end of which all choices are intransitive and based on external influences, time passes, and uncertainty prevails. The special case may be useful in theoretical analysis of some types of choices, but it is not applicable to the general problem of choice by rational individuals.

A general theory of rational action should include the proposition that choices are made in real time, involve a learning process, and must deal with an uncertain future. Today's decisions are made in a sequence of decisions taken in the past and with expectations that others will be made in the future. Continuity of interrelated actions is a feature of the economic actions of individuals.

Continuity over time means that actions are part of a learning process in which today's actions are affected not only by present needs and desires, but also by the results of earlier actions and what the individual has learned from them. As a result, the individual today is a different person from the individual yesterday, and will be a still different person tomorrow. This is particularly true of the individual as consumer, but it also applies to the individual as producer. To put it another way, the individual changes and evolves as a person, both as a consumer and producer, as a result of his or her own behavior. Individual choices are part of a process by which people create themselves.

Furthermore, a rational individual can be expected to direct this process of change and evolution. Rational individuals seek to control their destiny and influence their future. Self-development and self-realization becomes goals of individual behavior in both consumption and production activity, as part of a larger process of individual growth, change, and personal development.

Uncertainty — pure uncertainty in the sense of Frank Knight or J.M. Keynes — is one consequence of this approach to individual behavior. The future is unknown, so the consequences of today's actions must also be unknown. Furthermore, since the effects of today's actions depend in part on their future consequences, there must be uncertainty about benefits and costs. The neat assumption of a given preference map or utility set is invalid, for we can no longer assume that the individual has enough knowledge to rank all the possible consumption bundles or production alternatives. The conventional static theory of choice is a casualty of the view of individual behavior as part of a lifelong self-development of the individual.

Individual self-development always occurs in a social context. Individual change and development involves interaction with other people. Choices, therefore, cannot be made without some consideration of the effect on other individuals, as well as the impact of the actions of others. Mutual interaction of people in a social environment is the framework within which individual actions occur.

We can go a step further. Rational individuals who learn from what they do will come to understand that their behavior, choices, and self-development depend not only on their individual desires within the constraints imposed by social institutions, but also on continuing social interactions with others. Choices made by individuals will reflect this self-conscious regard for others as a counterweight to actions devoted to self-gratification. I will note, in passing, the emphasis given to this proposition by such economists as Adam Smith and Alfred Marshall, both of whom recognized the need for moral constraints and concern for others to check the
disruptive force of individual self-interest.

My point is broader, however, I argue that any individual action embodies not only the need for self-development (which can include but is broader than the pleasure principle and self-interest), but also social goals and social values. This follows from the fact that individual behavior always takes place in a social context, and never in a Robinson Crusoe world. The social context involves social interactions that reflect prevailing values and ethical precepts, which, in turn, affect individual choices.

Finally, individual actions have psychological effects. The lifestyle generated by behavior in both consumption and production lead to self-awareness of one’s individuality and feelings of self-worth. One’s actions and lifestyle also lead to recognition from others of one’s individuality and worth as a person. Status as a person and one’s own conception of oneself are both derived from the lifestyle embodied in individual actions.

Thus, consumption of a specific good can simultaneously allow one to satisfy physical needs, help build one’s self-image, lay claim to a level of status in the social fabric, develop as a person and gain recognition from others. These are the elements that lie beneath the surface of individual choice. They involve continuous interaction between the individual and others in the context of changing social institutions and values. They go far beyond the simplistic assumptions of a determinate utility set and preference map, independent decisions made by discrete individuals, and a stimulus-response psychology. They imply a highly complex rational individual who not only reacts to the existing situation, but actively seeks to change it.

These propositions are part of the research findings and theoretic analyses of behavioral scientists of the past century and more. They have vastly broadened our understanding of human behavior and the foundations of individual action. Yet these ideas have been largely ignored in mainstream economic theory, which clings to behavioral assumptions that were long ago rejected in scholarly study of human action.

This view of human behavior introduces tension and conflict into the analysis. There is tension between the gratification of individual desires and the constraints imposed by social values and institutional structures. There is tension between present gratification and future needs and desires. There is conflict inherent in the interactions among individuals involved in social relationships. There is tension among traditional and ceremonial values, on the one hand, and values associated with a changing technology and institutional structure, on the other. There is tension and conflict between maintenance of things as they are and change to new ideas, values, and institutions. There are tensions arising from the interactions of people in social classes, groups, and vested interests. Instead of economic harmony arising from unconstrained individual choice in a system of perfect markets, we find a world of tension and conflict.

I would like to close, not with a summary, but with three further points. First, the theory of individual behavior sketched here is empirically testable. The economics profession already has at its disposal a variety of survey and other research techniques to provide an empirical foundation for the propositions developed here. We need not start our economic analysis with behavioral assumptions. We can start with empirically validated propositions. Indeed, much of what I have said in this article derives from empirical investigations carried out by researchers in a variety of social science disciplines.

Second, this analysis of the foundations of individual behavior implies an interventionist role for government, in contrast to the laissez-faire implications of the conventional wisdom. For example, if tension and conflict result from individual behavior in a social context, one could project a role for government in mediating or managing those conflicts, as did John R. Commons. Or, like Karl Marx, one might analyze government as supporting the status quo and suppressing the advocates of change. Or, like Clarence E. Ayres and many other institutional economists, one might advocate planned change to accommodate tensions and conflicts.

In another dimension, if behavior is oriented toward self-realization and self-development, government might well move to programs that facilitate achievement of those goals. A more egalitarian distribution of income may be desirable, or an income floor that enables more people to satisfy their need for self-development and self-realization, or restrictions that limit actions whose effect is to keep others from achieving those goals.

Finally, the analysis of individual behavior sketched here broadens economic theory from its present emphasis on resource allocation and price determination to include relationships among individual behavior, institutions, and values. It also implies a strong connection between economics and politics, and a return of economics to political economy. Perhaps economics can once again become a social science, based on real behavioral patterns, and not an exercise in mathematical logic.
Note

* Paper prepared for the Group on Research on Rationality
  in the Social Sciences, Montreal, November 13, 1992.