

CONTROVERSY

RATIONALITY, LEARNING AND SOCIAL NORMS

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Many real life decision situations involve uncertainty. The uncertainty can be either of the exogenous variety, in that it is resolved randomly by Mother Nature, or of the endogenous variety, in that it is resolved by the actions (or, strategies) chosen by some other players. This distinction is important. The nature of the uncertainty involved will, and ought to, affect the way the decision maker perceives and analyses the decision situation. Indeed, economists do classify decision situations under uncertainty into two categories, namely, single-person decision problems and interactive decision problems. Decision theory is concerned with problems in the former category that only involve exogenous uncertainty, while game theory deals with problems in the latter category that involve endogenous uncertainty (and, possibly, exogenous uncertainty as well). Let me further emphasise this distinction by pointing out that there is, *a priori*, no basis to use results from decision theory (such as Savage's expected utility theorem) to study game-theoretic situations. Those results have been derived under the assumption that the uncertainty is of the exogenous variety.

Two, *a priori* different, kinds of questions can be asked of any decision situation under uncertainty. The *normative* question is what constitutes rational behaviour in such a situation, while the *positive* question is what constitutes human behaviour in such a situation. This distinction is based partly on the view that the human reasoning process may differ to some, lesser or greater, extent from what one may consider to be the perfect (or, ideal) reasoning process.

Economists have spent a great deal of time exploring the normative question. As it currently stands, much of decision theory and game theory is concerned with that question. The positive question as defined above, on the other hand, has in the past received much less attention. However, over the last few years some work has been done to address that question as well. After all, as economists, we should be much more interested in that question. As we are ultimately in the business of understanding the real economic world, and in the business of proposing well founded policies that would improve the lives of us human beings, we do need to understand human behaviour in decision situations under uncertainty. Addressing the normative question is certainly fun and intellectually interesting, but it is irrelevant to understanding the real world unless it can be argued, for example, that the so-called rational behaviour does approximately resemble human behaviour. This does not necessarily mean that the human reasoning process is, or should be, anything

like the perfect reasoning process. It does mean that, for example, the outcomes of these, possibly distinct, reasoning processes are similar.

It is often argued that if the predictions of an economic model based on rational behaviour are not falsified by real life data, then the model in question may be useful in obtaining some understanding of the real economic world and in the formulation of policy. Such a viewpoint provides another justification for studying rational behaviour in order to understand the real economic world. The problem, however, with this methodology is that it is seldom possible to generate falsifiable predictions from economic models. This is partly due to the fact that many ingredients of an economic model are not observable.

Studying rational behaviour is relatively easier in many ways than studying human behaviour. One can sit back in one's office and think as to what ought to constitute rational behaviour in a decision situation. It is much more tricky to figure out what constitutes human behaviour, since one is constrained by objects (the human brain and the human mind) that one knows very little about. Hence the current state of the economics literature.

I want to suggest that economists have yet to answer the normative question defined above. That decision theory and game theory have, in fact, failed to provide us with a theory, or model, of rational behaviour. The basic 'model' of rational behaviour in decision situations involving exogenous uncertainty is due to Savage. What is provided by Savage, however, is actually a representation theorem. It says that if a decision maker is rational, in the sense of satisfying the Savage postulates, the decision maker should choose that act which maximises his expected utility. But the first Savage postulate states that the decision maker has a complete ordering over the set of all acts. Hence, the Savage theory does not describe what constitutes rational behaviour. It simply represents rational behaviour in a particular, rather convenient, manner.

In a similar way, most of game theory evades the normative question by focusing on behaviour consistent with some equilibrium. Although there are a few solution concepts (such as Rationalisability) that are not equilibrium notions, they are however based explicitly on Savage's theory. But the application of Savage's theory to games is, strictly speaking, unwarranted. The endogenous uncertainty that characterises game situations is outside the scope of the Savage theory. As to what constitutes rational behaviour in games therefore remains, and I believe will remain for some time, a deep and open question.

As to the issue of understanding human economic behaviour, I suspect that it may take quite some time to provide satisfactory theories of human decision making in single-person decision problems and in game situations. This is partly due to the fact that we currently know very little about how the human brain and the human mind operate in decision situations under uncertainty.

Decision theory and game theory may have failed to answer the normative question of what constitutes rational behaviour, but they have clarified some of the issues involved, and in the process obtained some understanding on the issue of what might constitute rational behaviour. Furthermore, recent work on bounded rationality, learning and evolution have exposed the extent to which,

and the circumstances under which, human behaviour might be rational. The many applications of decision theory and game theory to the study of real economic problems and phenomena have generated many important and useful insights about the real economic world. Thus, although we certainly have a very long way to go and a lot of work to do, we should be somewhat proud of our achievements.

The three papers in this 'Controversy' are, in the main, concerned with issues that bear upon understanding human economic behaviour in various settings. Roy Radner's essay discusses two themes that are motivated by the need to provide a theory of organisations, namely, bounded rationality and indeterminacy of equilibria. He provides a taxonomy of bounded rationality. In particular, he argues that the Savage paradigm could be extended to deal with some forms of bounded rationality. Tilman Borgers's essay is a critical evaluation of the recent learning and evolution literature. He argues that such models may assist in addressing the issue of when human behaviour does and does not resemble rational behaviour. But that the current motivation of that literature is somewhat misplaced as it tries to mainly address the equilibrium selection problem. The essay by Jon Elster explores the role of social norms and emotions on human behaviour. Economists have recognised that both rational and human behaviour may be influenced by social norms, but have completely omitted the role that human emotions might play in human behaviour. If there is a significant role for emotions, as I would argue that there is in some decision situations, then constructing a unified theory, or model, of human decision making is all the more complex and perhaps unattainable.

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