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Behavioral economics and climate change policy☆

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ABSTRACT

The policy recommendations of most economists are based on the *rational actor* model. The emphasis is on achieving efficient allocation by insuring that property rights are completely assigned and that market failures are corrected. This paper takes the position that so-called behavioral "anomalies" are central to human decision-making and, therefore, should be the starting point for effective economic policies. This contention is supported by game theory experiments involving humans and closely related primates. This research suggests that the standard economic approach to climate change policy, with its focus on narrowly rational, self-regarding responses to monetary incentives, is seriously flawed.

1. Introduction

Behavioral research has fundamentally changed the field of economics by putting it on a firm experimental basis (Camerer et al., 2004; Gintis, 2007). The axioms of consumer choice, the starting point of traditional economic theory, have been recast as testable hypotheses, and these assumptions have come up short as defendable scientific characterizations of human behavior. It is no longer tenable for economists to claim that the self-regarding, rational actor[1] model offers a satisfactory description of human decision-making. Nor do humans consistently act "as if" they obey the laws of rational choice theory, as the evidence discussed below shows. The implications for economic policy are enormous but have just begun to be explored.

In its early days behavioral economics concentrated on revealing various shortcomings of the standard model of economic choice. Recently the field has moved from merely reacting against the rational actor model to identifying behavioral

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[1] The fact that the field of economics is changing so rapidly means that terms that were once good descriptions of basic concepts are no longer adequate. I use the term "rational actor" to describe to kind of behavior also attributed to *Homo economicus* or economic man. Other terms for the traditional economic model include "rational choice theory", "the canonical model" (Henrich et al., 2001), or the "axioms of consumer choice". Gintis (2000) uses the term "rational agent" but in a way so as to include a much wider array of human behaviors than the once standard economic model. I use the term "Walrasian" to describe the general equilibrium system of traditional economics with its key assumptions of self-regarding rational actors and competitive equilibrium.

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regularities that might form the basis for a new, more realistic model of human decision-making. Experiments such as the Ultimatum Game and the Public Goods Game have established a number of regularities in human behavior such as loss aversion, habituation, pure altruism, altruistic punishment, and hyperbolic discounting of the future. These behavioral patterns have been confirmed by neurological experiments showing how behavior is reflected in brain activity.

A shortcoming of much of the behavioral economics literature is that it still considers violations of the rational actor model to be "anomalies." "Irrational" human behavior is frequently explained by a kind of tug-of-war between the "rational" part of the brain, the cerebral cortex, and some other more primitive "emotional" part of the brain—"The overriding of deliberation by the influence of visceral factors . . ." as Loewenstein (2004, 691) puts it. The implication is that humans try to act rationally, but they are sometimes dragged down by their "animal" instincts. The vast majority of evolutionary biologists and neurobiologists reject this view.[2] The emerging view of cognition is that the human brain is a unified, highly evolved system with complementary, rather than conflicting, components (Glimcher et al., 2005). Furthermore, it is the "anomalies" (the deviations from the rational actor model) that make humans almost unique in the animal kingdom in their degree of cultural complexity. Ironically, the rational actor model seems to be most appropriate for animals with limited cognitive ability and perhaps humans making the simplest kinds of choices. For the most important decisions humans make, culture, institutions, and give-and-take interactions are critical and should be central to any behavioral model.

This paper argues that the neuroscience of choice can take behavioral economics a step further to offer a unified[3] model of decision making that can lay the foundations for a science-based policy framework for critical issues involving cross-cultural cooperation and inter-generational transfers. Global climate change is used as an example of how sustainability policies might be informed by contemporary theories of human choice.

2. New insights into human behavior

Experimental results from behavioral economics, evolutionary game theory and neuroscience have firmly established that human choice is a social, not self-regarding, phenomenon. Two broad principles have emerge from the literature (1) human decision-making cannot be accurately predicted without reference to social context, and (2) regular patterns of decision-making, including responses to rewards and punishments, can be predicted both within particular cultures and across cultures.

One of the most important contributions to behavioral economics was the Ultimatum Game[4] (UG) formulated 25 years ago by Güth et al. (1982). Like the Prisoner's Dilemma game before it, the UG helped revolutionize the way economists think about economic decision-making. Results from this game as well as from a variety of other game theoretic experiments showed that, in a variety of settings and under a variety of assumptions, other-regarding motives are a better predictor of behavior than those embodied in *Homo economicus*. Humans regularly exhibit a culturally conditioned sense of fairness, and they are willing to enforce cultural norms even at economic cost to themselves. Cross-cultural UG experiments also show that cultural norms vary and that they dramatically affect the average amount offered in the game and the rates of rejection (Henrich et al., 2001). A striking result of numerous UG experiments is that the model of rational economic man is not supported in any culture studied (Henrich et al., 2001).

Also relevant to the study of human decision-making is a growing body of evidence from (non-human) animal experiments. These experiments show two important things. First, social animals, such as primates, also have a sense of fairness and a tendency to cooperate, even at a cost to themselves. Second, "lower" animals do appear to behave in accordance with the rational actor model. They are self-regarding in evaluating payoffs, they are not susceptible to the sunk cost effect, and they apparently evaluate payoffs according to expected utility theory.

2.1. The behavior of social animals

Melis et al. (2006) played a cooperation game with chimpanzees at the Ngamba Island Chimpanzee Sanctuary in Uganda. A feeding platform with two metal rings was placed outside a testing room cage with a rope threaded through the rings

[2] Referring to the idea of economists that "irrational" behavior is the product of ancient emotional systems within the brain, Glimcher et al. (2005, p. 252) write, "What we cannot stress strongly enough is that the vast majority of evolutionary biologists and neurobiologists reject this view. There are probably two principle reasons that biologists reject this dualist view of the nervous system; one neurobiological and one behavioral. First there is no neurobiological evidence that emotional and non-emotional systems are fully distinct in the architecture of the human brain. Second there is no evidence that rational and irrational behaviors are the products of two distinct brain systems, one of which is uniquely rational and one of which is uniquely irrational."

[3] Some readers of this paper objected to the notion of a "unified model" of human behavior. I use the term only to mean that the various kinds of models used by economists, sociologists, anthropologists, decision scientists, and so on should not be flatly contradictory as they are now. This does not contradict, for example, Norgaard's (1989 and 2006) notion of "methodological pluralism," but it does mean weeding out, using the scientific method where possible, theories of behavior falsified by empirical evidence.

[4] In the Ultimatum Game a leader offers one of two participants a certain sum of money and instructs that participant to share it with the second player. The second player can either accept the offer or reject it (in which case neither player gets anything). If the players behave according to model of *Homo economicus*, the first player should offer the minimum amount and the second player should accept any positive offer. Results from the game show, however, that the majority of proposers in Western countries offer between 40 and 50 precent of the total and that offers under 30 percent of the total are usually rejected because they are not "fair" (Nowak et al., 2000). These results have held up even when the game is played with substantial amounts of real money (Gowdy et al., 2003).