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## ANALYSIS

# Behavioral economics for environmental policy

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## ABSTRACT

The predictions of widely prescribed global and country level environmental policies at present are based mainly on mainstream economic models, which treat individual actors to be ‘unboundedly rational’ in their decision making. In recent years, however, behavioral and experimental economists have found that the individual actors in many circumstances act within a ‘bounded rationality’ framework, suggesting that predictions based on the ‘unbounded rationality’ models would be less valid. While some of mainstream economists have already started adopting the bounded rationality-based models in their academic discourse, many environmental economists seem to be reluctant to use these alternative models of rationality in their research and policy prescriptions. This paper highlights the implications of using bounded rationality models in environmental research in general and policymaking in particular.

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## 1. Introduction

The ‘unbounded rationality’ assumption of mainstream economics continues to dominate the analytical foundation of normative environmental economics and policies dealing with how to allocate non-market environmental resources efficiently among competing uses (see Gowdy, 2007). This assumption is strongly omnipresent in all stretches of normative environmental economics such as Pigouvian negative externality analysis, Coasian property rights approach for pollution control, cost-benefit analysis of environmental changes, common property resource management, and sustainable development and intergenerational equity issues. In recent years, however, the unbounded rationality assumption of mainstream economics is being rigorously questioned by a group of behavioral and experimental economists who

found that in both laboratory and field experiments the behavior of individuals, in many circumstances, reflects ‘bounds’ on their rationality (Kahneman, 2003). These economists who belong to ‘bounded rationality school’<sup>1</sup> identified several serious ‘behavioral anomalies’ that cause systematic deviation in the individual behavior in a neoclassical sense. The individual preferences reflected in terms of behavioral anomalies are largely in compliance with the broader notion that individuals in many cases do adopt multiple objectives such

<sup>1</sup> It should be noted that the modern psychological economists are criticized for using too much of psychology in economics and therefore, their approach is found to deviate much from the fundamental principle of ‘bounded rationality school’ headed by Herbert Simon, which argues that only that part of psychology which could help us explain the ‘rationality’ of individuals alone is desired in economics (see Selten, 1998). To avoid confusion, we use ‘bounded rationality school’ in a broader sense to cover all economists who use substantial inputs from psychology in economics.

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as, 'satisficing'<sup>2</sup> (Simon, 1986)—including 'maximising'. This being the case, the bounded rationality school argues that the conventional selfish-maximizing rationality assumption is at odds in relation to empirically observed human behavior (Gowdy, 2004). Therefore, the question posed by Michael Lovell to mainstream economists namely, 'Should the facts be allowed to spoil a good story?' (cited in Conlisk, 1996) is concurrently relevant for the environmental economists as well, who are categorically using conventional rationality model in their policy prescriptions. The research findings from the bounded rationality school provide some new insights into the analytical foundation of modern environmental economics and policy prescriptions based on it. It should be noted that some of the environmental and ecological economists have already taken initiative to use alternative models of rationality in their analyses related to environmental policy (e.g. Gowdy, in press; Gowdy, 2007; Gowdy and Erickson, 2005; Howarth, in press; Howarth, 2006; Howarth, 2003; van den Bergh et al., 2000). Here, we make an additional contribution by highlighting – in a consolidated fashion – how some of the specific behavioral anomalies could potentially affect the overall environmental policies based on conventional environmental economics.

## 2. Endowment effect

One of the anomalies found to occur in the preference pattern – both in laboratory and field experiments – is supposedly caused by the 'endowment effect' which refers to a phenomenon in which the disutility of 'loss' of a commodity that has already become an endowment of an individual is considered to be greater than the utility of acquiring the same commodity *ex-ante*. More precisely, the marginal utility of acquiring a commodity is convex while the marginal disutility of giving up the same commodity is concave, as demonstrated by Knetsch (1989) using indifference curve analysis. Endowment effect matters for environmental policy. Using large-scale evidence on existence of endowment effect in the laboratory experiments for varieties of private and public goods, Kahneman et al. (1990) argue that the widely used Coase theoretic prescriptions in environmental decision making may not always achieve the expected Pareto-optimal efficiency. Let us explain its policy implications with appropriate examples. In a polluter–polluter market set-up, for example, the tradable permit system for controlling pollution relies on the endowment of property rights and as suggested by the endowment

effect, the exchange of permits in a market structure even with negligible transaction cost may not be as smooth as predicted by the Coase theorem. This is because, the permit holder who is under the influence of endowment effect will not be willing to trade it with other potential buyers of the permit at the existing, efficient market price; rather, she may demand a higher price for the trade in permits to take place. This would generate two different outcomes in a perfectly competitive market: in case the permit is not sold, then the potential buyers will have to control pollution at a higher cost which reduces 'producer surplus'; and, in case the permit is sold at a higher price, the producer surplus taken away from the buyers reduces efficiency in a different way. In a 'polluter–victim' context, if the 'right to clean environment' is with the victims then existence of endowment effect will either result in higher level of monetary compensation or higher level of pollution control cost – both to be incurred by the polluter; if the same right is with the polluter, then the endowment effect will result in a situation where the victims will have to either pay a higher level of monetary payment to the polluter or bear an increased level of damage cost. Therefore, under the Coasian framework the existence of endowment effect makes the policy outcomes as sub-optimal in nature. This implies that any environmental policy associated with property rights may not always achieve Pareto-optimal outcomes if the issues related to endowment effect are not properly taken into account.

## 3. Disparities in preferences

The bounded rationality school provides new useful insights into eliciting individuals' preferences and interpreting the economic values resulting from these preferences, which are used in social-cost/benefit analysis (CBA). In the conventional CBA, the benefits and costs are measured either in terms of 'compensating variation (surplus)' or in terms of 'equivalent variation (surplus)' (Bateman and Turner, 1993). These variation (surplus) measures are expressed either in the form of 'willingness to pay' (WTP) or in the form of 'willingness to accept' (WTA) compensation, depending on the 'reference status' of the environment that the individuals face. Theoretically, it has been demonstrated that the WTP value for a small improvement in the environment and WTA compensation for allowing the same level of reduction in the environment should differ only if income and substitution effects prevail (Willig, 1976; Hanemann, 1991). However, a substantial number of empirical studies reported a larger disparity between the WTP and WTA values—usually, the latter being greater than the former (see Horowitz and McConnell, 2003). Apart from the positive income effect (Willig, 1976) and lack of substitution effect (Hanemann, 1991), the mainstream economists have attributed this disparity to various other theoretical and empirical aspects such as, commitment cost arising from uncertainty, irreversibility and limited learning opportunities (Kling et al., 2003; Zhao and Kling, 2001), positive transaction cost of exchange (see Venkatachalam, 2004), lack of experience of individuals in the market processes (List, 2003; Shogren et al., 1994) and improper administration of contingent valuation surveys (Carson et al., 2001). However, the bounded rationality school found that even if one controls for all the above factors,

<sup>2</sup> Some authors argue that satisficing is nothing but either a cost-minimising or a cost-effective strategy adopted by the individuals (see Schwartz, 2002). However, this argument may be simply refuted on the ground that an individual who is not capable of maximizing the benefits cannot be in an ideal position to minimise the cost as well. Williamson (2000) argues that individuals have bounds on cost-minimisation strategy because of cognitive limitations to predict unforeseen events such as opportunistic behavior (which is a maximizing strategy) of other agents while making contracts, which make the *ex-post* transaction cost high. It should be noted that 'satisficing' is still considered to be nebulous by many mainstream economists.

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