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## ANALYSIS

# Environmental economics and ecological economics: Where they can converge?

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## ABSTRACT

Environmental economics and ecological economics share the common objective of understanding the human–economy–environment interaction in order to redirect the economies towards sustainability. In pursuing this objective, these two perspectives utilise different types of analytical framework and are opposed to each other on many of the fundamental theoretical and methodological issues. While the environmental economics has progressed within a narrowly, but sharply, focused neoclassical analytical approach, the ecological economics has expanded by adopting a ‘diversified approach’, which led to widen the gap between the two. This article makes an attempt to highlight the divergence between these two perspectives on different issues and identifies certain research avenues that would potentially bring convergence between these two perspectives.

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## 1. Introduction

The environmental economics has gradually become a full-fledged sub-discipline of economics after Pigou (1920) who dealt extensively with the analysis of ‘negative externality’ within the neoclassical framework to correct the ‘market failure’ (Verhoef, 1999). This Pigouvian neoclassical tradition still continues to dominate the analytical foundation of all stretches of environmental economics (Cropper and Oates, 1992) such as, Coasian solution (Coase, 1960); ‘second-best solution’ in the area of pollution control (Baumol and Oates, 1988); non-market valuation within micro cost-benefit analysis (Smith, 1993); sustainable development (Pearce and Turner, 1990) and environmental accounting (Ahmed et al., 1989) within macroeconomics of environment (Munasinghe, 2002), making this subject as an ‘economically holistic’ as well as a powerful branch of modern normative welfare economics. Though the Pigouvian neoclassical tradition embracing methodological individualism, un-

bounded rationality assumption and efficiency as a criterion for resource allocation had strengthened the analytical foundation of modern environmental economics, this sub-discipline has its own weakness as well. While its strength lies in its analytical rigour and its ability to provide concrete, first-hand solutions to some of the major environmental problems, its weakness is that it adopts a narrow approach which has prevented us from thinking about the ‘larger features’ (Lazear, 2000) of the environmental and ecological issues. On the other hand, the ecological economics (see Costanza et al., 1997a) emerged in the late 1980s to ‘capitalise’ this weakness by making effort to incorporate those ‘larger features’ in the analysis of human–economy–environment interaction. The ‘distinguished’ analytical approaches used in the ecological economics (see van den Bergh, 2001; Turner et al., 1997; Sahu and Nayak, 1994) in the past have enriched our understanding of the importance of ecological dynamisms in the economic processes. But at the same time, the progress in ecological

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economics during the past one and half decades leads us to ask the following questions: Have the ecological economists succeeded in their objective of ‘capitalising’ the weakness of environmental economists, despite heavy opportunity cost incurred by them? Have the environmental economists responded adequately to the challenges provided by the ecological economists? Has the gap between these two perspectives converged? What common lessons that the environmental and ecological economists can learn from the recent developments in mainstream economics, especially from the behavioral economics so as to narrow down the gap? This present article makes an attempt to investigate these questions rigorously.

### 1.1. On the theoretical and methodological approach

At the outset, the environmental economics and the ecological economics differ on the basic theoretical framework that they utilise to analyse the underlying objective of understanding the human–economy–environment dynamism. While the former extends the basic premises of neoclassical economics namely, methodological individualism, rationality, marginalism, efficiency criterion and general equilibrium models to analyse the environmental issues, the latter adopts ‘diversified’ approaches such as energy/entropy analysis and ecological modeling (see Proops and Safonov, 2004). More precisely, environmental economics assumes that environmental issues form part of overall economic issues and therefore, these issues could be well analyzed by extending the existing neoclassical economic tools and principles without altering the fundamental structure of them. At the micro level, for example, the environmental economists extend the ‘tractable’ models of neoclassical economics such as random utility model (Domencich and McFadden, 1975) or household production function approach (Becker, 1965) to understand how both marketed and environmental goods are being combined by the individuals and the households to produce ‘economic’ welfare. Various standard non-market valuation techniques are based on the ‘weak complementarity’ principle suggesting that the marginal utility derived from environmental goods becomes positive *only* if marketed goods are combined with the non-market environmental goods. The major task of an environmental economist here is to employ the standard utility models to analyse how the individuals combine the market and non-market commodities to produce economic welfare, and how this welfare changes in relation to change in the combination of the goods. This implies that the existing neoclassical micro models are capable of dealing with any number of ‘sub-sets’, including the environment sub-set. At macro level also, the macroeconomists take a similar kind of position. For example, Solow (1974) showed how environmental scarcity could be incorporated within the neoclassical growth models without disturbing the ‘tractability’ of the models. Similarly, the micro-based macro models developed by Hotelling (1931) and Hartwick (1977) demonstrated how the ‘individual rationality’ based models can be used to understand the long term relationship between the resource use behavior of the economic agents guided by market forces and its impact on the sustainability of resource use. In recent years, specific efforts were made to incorporate the environ-

ment into the neoclassical IS-LM models at the theoretical level (e.g. Heyes, 2000) without altering the fundamental structure. All these suggest that the existing neoclassical economics, in one way or other, could respond adequately to the emerging concerns about the environmental issues as along as the neoclassical tools and principles are understood and used appropriately (see Solow, 1997).

Ecological economics, on the other hand, challenges the entire ‘tractability’ postulation of neoclassical models in dealing with natural resource and environmental scarcity, even though some of the ecological economists themselves are moving closer to using the neoclassical models in their analyses (see Gowdy and Erickson, 2004). The ecological economists treat the entire economic system as a dissipative structure or a sub-system of global ecosystem (see Gowdy and O’Hara, 1997; Sollner, 1997) which is more complex than understood by the environmental economists. It is argued that with a meager level of understanding of the environmental system, the existing neoclassical models are capable of addressing only a very few environmental issues but are inadequate to incorporate variety of other issues. This is because, the neoclassical models: (a) ignore the natural limits to growth; (b) neglect the important interdependency between economy and environment; and (c) downplay the role of time (Sollner, 1997). Therefore, the ecological economists prescribe not a single approach but a variety of them in order to ‘broaden’ the neoclassical models to accommodate the larger ecological issues. They rely mainly on the ‘methodological pluralism’ (Norgaard, 1985) in which important conceptual frameworks such as macroeconomic scale, ecological footprint, long-term sustainability and ecological complexity are constantly used to analyse the environment–economy interaction. Some ecological economists adopt alternative approaches such as institutional approach to analyse this interaction (e.g. Soderbaum, 2000). The insistence on the multiplicity of approaches calls for shifting the focus from the ‘abstract model building’ of the neoclassical economics towards constructing plural models that would accommodate the ‘real’ issues. Some of the ecological economists even go to that extent to argue that the present ‘narrow’ environmental economics approach needs to be replaced with a ‘transdisciplinary’ approach ‘that takes the integration of disciplines a stage further, where not only does one transcend the boundaries of the discipline in seeking understanding, but actually generates new concepts and mental structures which subsume and extend the approaches of even an interdisciplinary approach’ (Proops, 1999:1232).

The above discussion suggests that the theoretical and methodological approaches used between the two perspectives have not yet converged adequately. There are obvious reasons for this. It should be noted that environmental economists strongly believe in Adam Smith’s ‘specialisation’ through ‘division of labour’ which helps them to gain ‘comparative advantage’ in using the neoclassical economic tools to environmental problems in a more rigorous way. The specialisation sometimes is expected to set the agenda for experts in other disciplines as well. For example, environmental economists argue that the environmental standard-setting by scientists and policy makers should be based purely on the ‘economic criterion’ namely, the optimal level of pollution determined by the marginal costs and marginal benefits of controlling pollution. This kind of strong view is supported by

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