



METHODS

Evolutionary policies for sustainable development: adaptive flexibility and risk minimising

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Abstract

An evolutionary perspective on policies to foster sustainable development is presented. It is argued that policies suggested by the traditional economic theory of environmental policy can stimulate unsustainable socio-economic structures and patterns. In addition, they are unable to remove undesired locked-in systems and technologies. Drawing on evolutionary thinking, characterised by diversity, selection, innovation, path-dependence and bounded rationality, an alternative, partly complementary theory of environmental policy is suggested. Specific attention is given to the role of strategies that are aimed at increasing diversity and adaptive flexibility, and at reducing risk.

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1. Introduction

Corresponding with an increasing awareness of global environmental problems and the need for a sustainable development is the realisation that traditional economic approaches may fall short in offering a complete perspective on the relevant issues, problem causes, and solutions. Nevertheless, the current debate about sustainable development is still dominated by neoclassical economic theory. Concepts like sustainable growth (Solow, 1992) and weak sustainability

(Pearce and Atkinson, 1993) emphasise the fundamental role of markets in dealing with environmental problems, and reflect the deterministic and aggregate focus of neoclassical growth theory (Toman et al., 1995). In addition, the standard normative economic theory of environmental policy (Baumol and Oates, 1988) cannot do without the debatable assumptions of individual rationality and the Kaldor–Hicks potential Pareto improvement principle to arrive at conclusions about social optimality of policy instruments. Recently, a significant body of literature has discussed the shortcomings of traditional theories of environmental and resource economics, shedding light on the limitations of various concepts and methodologies. These include monetary valuation, substitution of natural by economic capital, traditional cost-benefit analysis and

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normative policy theory (e.g. Vatn and Bromley, 1994; Victor, 1991; Gutiérrez, 1996; Munda, 1996, 1997; van den Bergh et al., 2000; Gowdy, 2003). Within the mainstream the gap between normative and positive environmental policy theory has been identified (Dietz and Vollebergh, 1999; Oates and Portney, 2003). A possible reason for this gap is that assumptions about behaviour underlying normative policy theory are inconsistent with actual behaviour, which seems to be characterised by bounded rationality—often expressed through habits and imitation—and the formation of interest groups. Nevertheless, traditional theory insufficiently recognises these fundamental problems, which may contribute to persistence of the gap.

Despite these shortcomings, policy making strongly depends on economic advice derived within the neoclassical paradigm (Hall, 1993). This has initiated a tendency to “economise” politics by focusing the attention of decision-makers on efficiency and cost minimising. As the theory and models supporting the policy advice are founded on artificial planning-market systems that resemble closed mechanic systems that do not change over time, they are especially inappropriate to deal with the dynamics of structural and adaptive changes in economic systems. Such changes are either required for, or the result of, sustainable development (Georgescu-Roegen, 1971; Hodgson, 1993). In other words, the “mechanical corset” of neoclassical economics prevents a clear view on changes and adaptations stimulated by environmental policies. This calls for alternative approaches that might be better in coping with complex systems (Funtovicz and Ravetz, 1994).

In the following we argue that a fruitful approach to study policies for sustainable development is offered by evolutionary thinking. Not only does it address the adaptive and structural elements of many economic changes, but also it is consistent with the view that economic behaviour of both firms and consumers is more in accordance with bounded than infinite rationality. Many authors have stressed the universal character of evolutionary phenomena, which has as a corollary that evolution applies equally to economic and biological phenomena (Dennett, 1995). Or better said, the fact that evolution was—somewhat coincidentally—taken more seriously early on in biology does not mean its relevance is restricted to

this field. This is in line with a growing body of literature showing the potential of evolutionary thinking in economics in general (Dosi et al., 1988; Hodgson, 1993; Nelson, 1995). Moreover, a small literature has developed around the idea that evolutionary theories and models can be usefully employed to study sustainable development and environmental policies that foster it (Norgaard, 1994; Clark et al. 1995; Ring, 1997; Allen, 1997; Norton et al. 1998; van den Bergh and Gowdy, 2000; Mulder and van den Bergh, 2001; van den Bergh, 2003a,b; Rammel, 2003). Given the context of sustainable development, the evolutionary perspective outlined in this article will be based on an integration of elements from evolutionary biology, evolutionary economics and technology studies. The analysis of sustainable development as an (set of) evolutionary process(es) allows us to address elementary issues like diversity, risk minimising, path-dependency and lock-in, which are ignored by conventional policy and growth theories in the context of environmental economics.

The structure of this paper is as follows: Section 2 presents a short overview of evolutionary notions in biology, economics and technology studies, highlighting their common background and their potential relevance for sustainable development policies. Section 3 deals with an evolutionary foundation of sustainable development policies, emphasising adaptive flexibility, evolutionary potential, variability, risk minimising, and path-dependence and lock-in. Section 4 presents conclusions.

2. Evolutionary perspectives

2.1. Evolution in biology

Systematic thought about evolution has its starting point in the last century, when Charles Darwin and Alfred Russel Wallace initiated a major transition in the discipline of biology. After an initially hesitant development of theory and empirical methods, biology became the dominant domain of evolutionary thinking after the 1930s. Not surprisingly, it has served as a rich source for possible evolutionary analogies in other fields, notably economics (see Hodgson, 1993; Eldredge, 1997). It is important to realise that economic development and technological

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