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Methodological and Ideological Options

Evolutionary-economic policies for sustainable consumption

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ABSTRACT

Policy prescriptions for sustainable consumption have been dominated by neoclassical economics, which is built around the notions of market equilibrium, utility maximization, and exogenous preferences. There are concerns that neoclassical economics is inadequate to guide policy prescriptions in the presence of evolving preferences and complex dynamics. Evolutionary economics provides a more realistic account of individual behavior underlying economic processes. It offers a framework for studying complex socio-economic interactions and exploring their properties. As a consequence, it may offer a better approach for the analysis of policies aimed at inducing fundamental changes in behaviors, technologies and institutions in the direction of increased sustainability. However, a coherent evolutionary-economic approach to economic policies has been missing so far. In particular, policy criteria for evaluating evolutionary outcomes and processes are ambiguous. The paper discusses the implications of employing the evolutionary-economic approaches to study sustainable consumption and policy from different ethical standpoints.

1. Introduction

Increasing consumption driven by growth in real income in industrial countries has been a source of environmental degradation and stress, placing sustainable consumption high on the political agenda (Jackson and Michaelis, 2003; Jackson et al., 2004; Witt, 2011). Many sustainability policies focus on the improvements in resource productivity and eco-efficiency of processes and products (Mont and Plepys, 2008). However, technological change or improvements in resource productivity alone are unlikely to bring about structural changes in the economy much needed to curb greenhouse emissions (UNEP, 2010). For instance, energy savings from the improvements in energy efficiency have been offset by an increase in output in the past (Sorrell and Dimitropoulos, 2007). In this context, the transition to sustainability is likely to require wider changes in behaviors, technologies, values and worldviews (Beddoe et al., 2008).

Designing sustainability policies requires a theory of consumer behavior which would deal realistically with how individuals respond to novelty (Nelson and Consoli, 2010), how habits and practices emerge and constitute a 'normal way' of life (Shove, 2004), and account for the evolution of wants and socially-constructed desires (Witt, 2011). So far, policy analysis has been dominated by neoclassical economic thinking, which ignores these aspects of consumer behavior. There are concerns that neoclassical economics is inadequate to guide policy prescriptions in the presence of evolving preferences, complex socio-economic interactions and deep uncertainty (e.g.Akerlof and Shiller, 2009; Farmer and Foley, 2009; Gowdy, 2004, 2005; Ostrom, 2008; van den Bergh and Kallis, 2009). It focuses on exogenous preferences and static equilibrium outcomes, and thus ignores preference change and possible long-term effects of implemented policies.

Evolutionary economics offers a good starting point to think about developing an alternative approach for the analysis of policies for sustainable consumption. This is because evolutionary economics provides a more realistic account of individual behavior, social interactions, evolving preferences and habit formation than neoclassical economics (Hodgson, 1988). Yet, before evolutionary economics can offer a sound framework for policy evaluation, it requires further theoretical refinements, especially with respect to its normative underpinnings. Over the last 20 years, evolutionary economists have focused on employing the evolutionary perspective, concepts and formal methodologies for framing economic dynamics (for an overview see Malerba, 2007; Safarzyńska and van den Bergh, 2010a; Texteira and Silva, 2010). As a result, descriptive approaches for economic analysis have been well established in fields such as industry dynamics, diffusion of innovations, and endogenous growth theory (e.g. Malerba et al., 2001; Nelson and Winter, 1982; Silverberg et al., 1988).

Evolutionary economists often emphasize the need for flexible institutional structures that can accommodate and fuel the process of

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evolutionary change (Hodgson, 1984, 1988; Metcalfe, 1998; Witt, 2003). However, guiding structural and behavioral changes in the economy may come at social and environmental costs (van den Bergh and Kallis, 2009). Criteria employed to justify policy objectives and methods of their evaluation are hardly ever discussed in evolutionary-economic papers. In fact, it is not clear which ethical theories match well evolutionary dynamics and how to evaluate individual and social welfare from the evolutionary perspective (Freytag and Reynaud, 2007; van den Bergh and Kallis, 2009; Witt, 2003). Yet, these questions are important if evolutionary economics is to deliver policy lessons. This is because different policy criteria entail (implicitly or explicitly) different views on what is good for the individual and society.

The purpose of this paper is to show that (1) sustainable consumption requires a dynamic framework to study long-term consequences of policies and that evolutionary economics has already offered one; and (2) evolutionary economics can adopt different ethical foundations for policy evaluation. We will discuss the implications of employing different ethical theories to study sustainability policies in evolutionary economics. Different notions of the individual in economic theories determine specific sets of character traits in the ideal case, and thus different aspects of behavior which can be subject to policy interventions, and which are considered desirable. For instance, in neoclassical economics, a rational agent capable of optimizing his choices constitutes such an ideal case. Here, policies focus on identifying the optimal array of social policies and institutions to help individuals optimize their decisions. In the paper, we discuss how individuals are conceptualized in evolutionary economics. We compare policies for sustainable consumption, based on neoclassical and evolutionary models, from different ethical standpoints.

The remainder of this paper is as follows. Section 2 discusses an evolutionary-economic framework. Section 3 provides an overview of ethical theories which can be applied to study sustainability policies. It compares policy prescriptions for sustainable consumption in neoclassical and evolutionary economics from different ethical perspectives. Section 4 concludes.

2. Evolutionary Framework for Policy Analysis

2.1. Evolutionary-economics

Contributions to evolutionary-economics are very diverse (Witt, 2008). In this section, we do not intend to provide an exhaustive account of evolutionary-economic approaches, which has been done somewhere else (e.g. Safarzyńska and van den Bergh, 2010a; Texteira and Silva, 2010; Witt, 2008). Instead, we discuss the main building blocks of evolutionary models such as diversity, innovation, selection, coevolution and group selection.

In evolutionary systems, the interplay of diversity, innovation and selection, at the level of individuals and institutions, determines the direction in which changes in the system are unfolding. Selection encompasses different mechanisms by which elements, technologies or policies are chosen from the variety of available options. It acts so as to limit diversity in the system and may ultimately be a source of lock-in to unsustainable patterns of behaviors or technologies. The process is counterbalanced by innovation mechanisms, which introduce new options to the population.

In evolutionary theories, heterogeneous firms actively search technological landscapes for better solutions or imitate the best frontier technologies (see for a seminal work Nelson and Winter, 1982). As a result, new technologies and products can emerge any time. Whether they diffuse on the market depends on the preferences of consumers. As the majority of environmental characteristics are non-sensory and intangible in nature, environmental innovations can be easily disregarded by consumers in the presence of products which offer more sensory (rewarding) experiences (Buenstorf and Cordes, 2008).

On the other hand, preferences of environmentally conscious consumers can induce firms to innovate towards improving environmental performance of their products (Windrum et al., 2009a, 2009b). Coevolutionary models of demand and supply examine conditions under which the substitution of an incumbent by a new technology can occur and how the evolution of consumers' preferences affects the direction of technological change. Formally, coevolution requires that heterogeneous populations are linked together through mutual adaptation and pressure mechanisms (van den Bergh and Stagl, 2004; Winder et al., 2005). Such approach allows conceptualizing different types of coevolutionary processes between environments and human strategies (Noailly, 2008), different types of industries (Malerba et al., 2005) or demand and supply (Janssen and Jager, 2002; Malerba et al., 1999, 2001, 2008; Oltra and Saint-Jean, 2005; Safarzyńska and van den Bergh, 2010b; Saint-Jean, 2006; Windrum and Birchenhall, 1998, 2005; Windrum et al., 2009a, 2009b). For instance, in Windrum and Birchenhall's (1998) model of demand–supply coevolution, new products can attract consumers, while evolving preferences of consumers affect the direction of product innovations. Windrum et al. (2009a, 2009b) apply this approach to study the substitution of more by less polluting firms.

In coevolutionary systems, feedback mechanisms and increasing returns may be a source of lock-in and path dependency. Lock-in implies that it is difficult to change the direction in which the system is unfolding (Unruh, 2000; van den Bergh et al., 2006). For instance, in Arthur's (1989) model, increasing returns to adoption cause individuals to choose a technology because others have already adopted it. Once the technology becomes dominant, subsequent adoptions will only enforce its leading position. This is often illustrated with the example of lock-in to fossil fuel technologies. However, lock-in does not need to be a permanent state of affairs. Assuming that everyone switches, the change from an inferior state is possible (Arthur, 1994; Foray, 1997). Safarzyńska and van den Bergh (2010b) develop a coevolutionary framework which provides a general and complete account of increasing returns on supply and demand sides, as well as their synergetic interactions. The model is used to study a number of policy instruments aimed at escaping lock-in to a single technology. The analysis reveals that the effectiveness of such policies depends on network topology, i.e. how individuals interact within networks, as well as on the strength of different types of increasing returns (e.g. economies of scale, learning by doing, network or snob effects). Safarzynska (2012) extends this framework by adding the electricity market. She shows that the network effect can prevent diffusion of energy-efficient technologies, rendering the rebound effect.

In evolutionary theorizing, the coevolution of behaviors and institutions has received a lot of attention. It can be modeled using a group selection framework, which describes how selection acting on the level of individual and group contributes to the emergence of higher-level phenomena (Bergstrom, 2002; Henrich, 2004; Sober and Wilson, 1998). Group section has been explored extensively in the models of the evolution of cooperation. The prevailing assumption here is that cooperation (or altruistic behavior) is costly to an individual but beneficial to a group. If selection operates on fitness differences among individuals, cooperation is dominated by defection. However, if selection occurs at the group level, where groups with more cooperators reproduce faster or have higher survival probabilities, cooperation proliferates. Group selection can be applied to study the evolution of different sorts of institutions (van den Bergh and Gowdy, 2009), power relationships along with environmental policies (Safarzyńska and van den Bergh, 2010c), or the coevolution of policies and group beneficial traits such as punishment or resource sharing institutions (Bowles et al., 2003; Safarzynska, 2013).