Ecological Economics 153 (2018) 195–203

Contents lists available at ScienceDirect

Ecological Economics

journal homepage: www.elsevier.com/locate/ecolecon

Analysis

Searching for a Scientific Paradigm in Ecological Economics: The History of Ecological Economic Thought, 1880s–1930s

Marco P.V. Franco*

Centro de Desenvolvimento e Planejamento Regional, Faculdade de Ciências Econômicas, Universidade Federal de Minas Gerais, Avenida Presidente Antônio Carlos 6627, Belo Horizonte 31270-901, Brazil

ARTICLE INFO

JEL Classification:
B10
B41
Q57

Keywords:
Ecological economics
Ecological economic thought
Social energetics
Scientific paradigm
Scientific metaparadigm

ABSTRACT

This paper addresses the history of ecological economic thought (EET) in the period between the 1880s and 1930s, with the aim to contribute to a better understanding of the early history of modern ecological economics, as well as to the current position of the discipline in relation to its values, goals, methods and contents. EET is defined as the ideas concerning the interlinkages between ecology and economics and described through the analysis of the flows and stocks of energy and matter, including their economic implications for the processes of social provisioning and cultural development. The diversity of EET is analyzed in terms of dissimilar positions mainly concerning energy as a determinant of cultural development and the normative aspects involving resource distribution, social ideals and policy-making. Social energetics is identified as a foundation of EET. These definitions are then used to argue for the formation of a scientific metaparadigm, falling short of a full-scale Kuhnian scientific paradigm. In addition, insights are drawn concerning paradigm formation in modern ecological economics and how this paradigm formation is related to the on-going debate among ecological economists on the benefits and limits of the adoption of a broad methodological pluralism.

1. Introduction

The history of ecological economic thought (EET) concerns the historical development of the interlinkages between economics and ecology, described through the analysis of the flows and stocks of energy and matter and their economic implications for the processes of social provisioning and cultural development. Energy in the form of solar radiation is absorbed and fixed by plants, hence, the role of agriculture in human ecology studies, including energy accounting, gradually climbing the trophic ladder all the way up to humans and other animals, providing subsistence to all. On the other hand, the flows and transformations of renewable and exhaustible materials (which also encompass embodied energy, e.g. fuels) are analyzed regarding their scarcity and potential for satisfying human needs. Thus, a strong sense of embeddedness of the economic system in the biophysical universe is present throughout the history of EET, with the immediate consequence that all economic reasoning must be solidly anchored in the natural sciences.

A biophysical approach to economic science serves as a common thread in the history of EET, representing the views of otherwise very dissimilar thinkers. This assumption also makes the history of EET quite distinct[1] and different from the more profuse literature on the history of environmental economic thought, in which appear works such as Kula (1998), Pearce (2002), Sandmo (2015) and Brown et al. (2016). The latter focuses on the history of ideas regarding environmental restrictions and boundaries to the economic process, analyzing phenomena in a cause-effect relationship with market prices and in terms of market failures, efficient allocation, and a demand-oriented concept of marginal utility. This approach, as observed by Martinez-Alier (1987), is related to the Aristotelian meaning of chrematistics – the art of exchange through the use of money, with prices as market entities without a direct link to physical goods – in stark contrast with a more

* Escola de Governo Professor Paulo Neves de Carvalho, Fundação João Pinheiro, Alameda das Acácias 70, Belo Horizonte 31275-150, Brazil.
E-mail address: marco.franco@fjp.mg.gov.br.

[1] The literature on the history of EET is still relatively scarce, especially the more comprehensive accounts such as Martinez-Alier's (1987), which provides a historical outline upon which this paper has drawn many insights.

https://doi.org/10.1016/j.ecolecon.2018.07.022
Received 11 March 2018; Received in revised form 25 June 2018; Accepted 27 July 2018

materialistic view of economic processes as flows and stocks of energy and matter, subject to entropic laws and sources of livelihood. Thus, energy accounting of human societies and studies regarding the scarcity of natural resources for concrete production processes can be treated as a distinct history of ideas, acting as the main line of investigation to refer to the history of EET. As put by Christensen (1989), one could then split the history of economic thought, when in connection with environmental issues, into biophysical and allocative approaches.[2] Only the biophysical approach will be addressed here.

Moving beyond the dichotomy presented by the biophysical and allocative approaches, other frameworks might also be considered to address environmental questions in the history of economic thought, such as the evolutionary approach of American classical institutionalists. They focused on the evolutionary character of natural and social processes, the dynamic role of institutions and the disconnection between monetary systems and the actual technical requirements of production, and influenced prominent ecological economists working in the mid-twentieth century, including Nicholas Georgescu-Roegen (1906–1994), Kenneth E. Boulding (1910–1993) and K. William Kapp (1910–1976). A historical account of an evolutionary approach to EET would be quite different from the one offered in this paper. Focus would be shifted from the analysis of the flows of energy and matter in the economy to the evolutionary character of economic processes. Nevertheless, the definition of EET given above relates to the biophysical approach, which does not preclude the observation that evolutionary processes are an important topic of such a framework, either in terms of human organization and behavior or Darwinian natural selection.

In addition to the biophysical approach to economic processes presented above, another key aspect of EET concerns its implications for both descriptive and normative assessments of social systems. The reality of the natural world, subject to the entropy law, has direct effects over human organizations and their provisioning processes, including the issue of the short- and long-term ideals of society (thus comprising the intergenerational dimension) and the policies which would lead to such ideals. These effects are of great relevance to EET, among them nature as a source of value, moral aspects regarding natural resource distribution, evolutionary and technological transformations, and how biophysical endowments and restrictions act upon the development of specific cultures. These questions, as will be shown below, have been addressed by means of a quite diverse assortment of worldviews, ideologies and theories.

Over the last thirty years, the links between ecology and economics have been the main object of study of ecological economics, a discipline[3] which focuses on the human economy both as a social system and as subject to a biophysical reality. Core values such as the criticality of environmental problems, the embeddedness of the economy in nature and the awareness of the complexity of social and natural phenomena have led to the attempt to bring together social and natural sciences in an effort to better understand the relationship between human society and nature (Røpke, 2005). Economic processes either are or effectuate natural processes, comprised ultimately of biological, physical and chemical transformations. General systems theory and the laws of thermodynamics can therefore provide crucial insights into the study of ecology and economics through the observance of biophysical constraints on a finite planet and the role of flows and stocks of energy and matter in the life-supporting metabolic processes on Earth (Boulding, 1966; Daly, 1968; Georgescu-Roegen, 1971).

Such formulation corresponds to a modern ecological view of economic processes, developed and strengthened from the 1960s up to the 1980s, a period which has been referred to as the "early history of modern ecological economics" (Røpke, 2004, p. 294), and that culminated with the institutionalization of the International Society for Ecological Economics (ISEE) in 1988. Nevertheless, the history of ideas concerning the interconnections between ecology and economics stretches back at least as far as the second half of the nineteenth century, when social energetics[4] and natural resource (fertile lands, materials, fuels, etc.) scarcity studies were systematically produced.[5] An analysis of the development of ecological economic ideas further back in time, explored between the 1880s and the 1930s, could contribute to a better understanding of the early history of modern ecological economics, as well as to the current position of the discipline in relation to its values, goals, methods and contents. The relevance of a historical account focused on the diversity of EET is increased by its potential to inform or provide a historical perspective on the on-going debate among ecological economists on the benefits and limits of the adoption of a broad methodological pluralism (Baumgärtner et al., 2008; Costanza, 1989; Gowdy and Erickson, 2005; Lo, 2014; Norgaard, 1989; Özkaynak et al., 2012; Røpke, 2005; Söderbaum, 1999; Spash, 2012; Tacconi, 1998). This is defined by Norgaard (1989, p. 51) as a methodological stance in which participants would act as: "(1) being conscious of their own methodologies; (2) being conscious of the advantages and disadvantages of the methodologies used by others; and (3) being tolerant of the use of different methodologies used by others".

The debate on methodological pluralism has been accompanied by attempts to assess whether the discipline of ecological economics entails or should entail a scientific paradigm, with diverging conclusions (Anderson and M'Gonigle, 2012; Illge and Schwarze, 2009; Klaassen and Opschoor, 1991; Söderbaum, 2015; Turner et al., 1997). The acceptance of disparate views on the relations between ecology and economics within the scope of the discipline was initially seen as the best alternative to deal with impending global environmental issues such as climate change, biodiversity loss, chemical pollution, atmospheric aerosol loading, ocean acidification, and others (Costanza, 1989; Norgaard, 1989). However, more recent works (Lo, 2014; Spash, 2012) questioned such an approach, arguing that ecological economics has paid a price for its broad pluralism, as it lacks internal coherence and scientific relevance. The acceptance of neoclassical economic thought as part of EET (and, therefore, not only as part of the allocative approach of environmental economic thought) is particularly contentious. Many ecological economists have posed the question of what would be a research programme for ecological economics that could ensure it is both relevant and influential on the decision-making process (Baumgärtner et al., 2008; Özkaynak et al., 2012; Spash, 2012; Tacconi,

[2] Despite the characterization of social sciences (and the allocative approach of neoclassical economics in particular) as suffering from "physics envy" (Mirowski, 1989), as they try to emulate the determinism and mathematical formalism of the hard sciences, it seems that modern thermodynamics has not enjoyed the same treatment as analytical mechanics (Christensen, 1987). To Martinez-Alier (1987), by the end of the nineteenth century, the emerging neoclassical economics was at the same time becoming closer to a formal physical analysis and farther away from an ecological physical analysis.

[3] Ecological economics is characterized throughout the text as a "discipline" or "school" without a more rigorous methodological analysis. A thorough evaluation of ecological economics as a discipline, field, movement, and school of thought remains a worthwhile endeavor for future philosophical studies on ecological economics.

[4] The term energetics was coined by William Rankine (1820–1872) in 1855 with the same meaning as the later widespread concept of thermodynamics. Thus, social energetics refers to thermodynamic principles as applied to a social system, i.e. the flows and stocks of energy that shape and condition the functioning of human societies. However, the laws governing the many different forms in which energy is transformed or exchanged – the laws of energetics – are broader in scope than the laws of thermodynamics. In addition, studies using social energetics might adopt different assumptions regarding the dynamics of energy transformations, as well as different methodologies in their attempt to better understand such dynamics. This paper omits these particularities and refers to these studies as a group.

[5] A non-exhaustive compilation of such studies can be found in Martinez-Alier (1986).