



Methodological and Ideological Options

The unfinished journey of ecological economics

Robert L. Nadeau

Emeritus George Mason University, 1400 University Drive, Fairfax, VA 22030, United States



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ABSTRACT

The goal of the economists and ecologists who laid the conceptual foundations for ecological economics in the 1960s and 1970s was to create a scientifically informed discipline that could serve as the basis for coordinating economic activities in environmentally responsible ways. The aim of this article is to make a convincing case that the history of neoclassical economic theory provides a coherent basis for understanding why ecological economists must finish the journey begun by these economists and ecologists.

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1. Introduction

The ideas of economists and practical philosophers, both when they are right and when they are wrong, are more powerful than is commonly understood. Indeed, the world is ruled by little else. Practical men, who believe themselves to be quite exempt from any intellectual influence, are usually the slaves of dead economists.

[John Kenneth Galbraith]

In textbooks on mainstream economic theory, virtually nothing is said about the ideas of the dead economists that rule the world and several studies have shown that the history of this theory has “all but vanished” in both undergraduate and graduate programs (Colander, 2007). A coded explanation of why this is the case is contained in two claims frequently made or clearly implied in the textbooks studied by students in these programs. The first is that the nineteenth century creators of neoclassical economic theory disclosed and described the previously hidden dynamics of free market systems and transformed the study of economics into a rigorously mathematical scientific discipline. The second is that extensions and refinements of this mathematical formalism by subsequent generations of mainstream economists fully disclosed and described these dynamics. The clear suggestion here is that the ideas of the dead economists who rule the world are irrelevant because the mechanisms of market systems are fully revealed in the mathematical formalism used by mainstream economists.

The economists and ecologists who laid the conceptual foundations for the discipline of ecological economics challenged the validity of assumptions about the dynamics of market systems in neoclassical economic theory in an effort to create an environmentally responsible economic theory (Martinez-Alier, 2002; O'Connor, 2000; Giampietro, 2001). Numerous attempts have been made to explain why ecological economics did not finish the journey begun by the founders of this

discipline and is now listed in the *Journal of Economic Literature* under the heading “Environmental Economics.” The list of the usual suspects includes an overemphasis on methodological pluralism, a precarious and confused epistemology, a failure to properly define ontological assumptions, and a lack of scientific rigor (Spash, 2012, p. 37).

The aim of this discussion is to make a convincing case that the history of the ideas of the dead economists that rule the world provides a coherent basis for understanding why these problems exist and how they can be resolved. This history reveals that the mathematical formalism used by neoclassical economists is predicated on assumptions about economic reality that massively frustrate or effectively undermine efforts to implement scientifically viable and equitable economic solutions for environmental problems. Equally important for the purposes of this discussion, this history is replete with compelling reasons why ecological economics must become a radical discipline committed to completing the journey begun by its founders.

At this point, allow me to stress that the intent of this discussion is not to launch an ill-mannered attack on the intellectual or moral integrity of mainstream economists. If environmental sinks were inexhaustible, environmental resources unlimited, and the environmental impacts of economic activities relatively benign, the usefulness of neoclassical economic theory could be regarded as sufficient justification for its widespread application. However, this theory can no longer be viewed as useful in even strictly pragmatic or utilitarian terms because it fails to meet what must now be viewed as the fundamental criterion for the usefulness of any economic theory—the extent to which the theory can serve as the basis for coordinating economic activities in environmentally responsible ways and preserve and protect the capacity of the biosphere to sustain the richness and diversity of life on planet Earth.

2. Origins of Neoclassical Economic Theory

There are no mentions in textbooks on neoclassical economic theory of a very salient and vitally important fact disclosed and described in

E-mail address: rnadeau@gmu.edu.

great detail by Philip Morowski: Neoclassical economic theory was created by substituting economic constructs derived from classical economics for physical variables in the equations of a badly conceived and soon-to-be outmoded theory in mid-nineteenth century physics (Mirowski, 1988, 1989). The theory in mid-nineteenth century physics was developed from the 1840s to the 1860s in response to the inability of classical physics to account for the phenomena of heat, light and electricity. In 1847 Hermann-Ludwig Ferdinand von Helmholtz, one of the best known and most widely respected physicists at this time, posited the existence of a vague and ill-defined energy that could unify these phenomena. This served as a catalyst for a movement called “energetics” in which physicists attempted to explain very diverse physical phenomena in terms of a unified and protean field of amorphous energy that fills all space.

The theories developed by these physicists were not subject to proof in repeatable experiments under controlled conditions because they did not specify the actual character of the field of energy or provide a means of measuring and quantifying phenomena associated with this field. The amorphous character of energy in these theories obliged the physicists to appeal to the law of the conservation of energy which states that the sum of kinetic and potential energy is conserved. This appeal was necessary because it was the only means of asserting that the vaguely defined field of energy somehow remains the “same” as it undergoes changes and transformations.

The strategy used by the creators of neoclassical economics (Stanley Jevons, Leon Walras, Francis Ysidro Edgeworth, and Vilfredo Pareto) was remarkably simple – they wrote down the equations from the theory in physics that finally emerged in the energetics movement and substituted economic variables for the physical variables. Utility was substituted for energy, the sum of utility for potential energy, and expenditure for kinetic energy. The forces associated with utility-energy were represented as prices and spatial coordinates described quantities of goods (Mirowski, 1988, p. 310).

The economists claimed that market systems are closed because the physical system described in the equations borrowed from the theory in physics was closed. Physicists in the mid-nineteenth century used the term “closed system” to describe a system in which no outside forces enter and nothing can change the internal dynamics that result in observable behavior or properties. These physicists also assumed that these dynamics will inexorably move closed systems toward states of equilibrium where energy is distributed in the most statistically probable way and change tends not occur because forces, influences and reactions cancel each other out.

Based on this nineteenth century scientific understanding of closed physical systems, the economists made the following claims about market systems: 1) market systems are closed and exist in a domain of reality separate and distinct from the external environment; 2) a field of utility-energy operates within closed market systems and forces associated with this field manifest as the dynamics of these systems; 3) these dynamics govern decisions made by economic actors and sustain closed market systems in states of equilibrium if they are not interfered with by external or exogenous agencies like government.

The economists claimed that the sum of utility is conserved because the sum of energy in the equations borrowed from the theory in physics was conserved. In the formalism that resulted from the substitution of economic variables for physical variables, forces associated with the field of utility-energy govern decisions made by economic actors and determine the real value or right price of goods and commodities. The prices paid by the actors generate capital which circulates in this field as an abstract embodiment of value in a closed loop from production to consumption with no inlets or outlets.

Since the sum of utility in the “immaterial” field of utility-energy is conserved, the economists claimed that production is a physical neutral process that does not alter the sum of utility. In an effort to justify this idea, they appealed to a very strange interpretation of the law of the conservation of matter, or the idea that matter cannot be created or

destroyed. If matter, said the economists, is immutable, the production of goods and commodities cannot alter or change the basic stuff out of which they are made. They then argued that the immutable stuff out of which goods or commodities are made cannot be changed by production and any value associated with consumption must reside in the minds of economic actors (Mirowski, 1989, pp. 290–291, 399).

Walras and Jevons included an additive utility function which signified that the utility of a good is solely the function of the quantity of the good consumed. The problem that these economists were attempting to resolve is that utility in the differential calculus borrowed from the theory in physics becomes progressively smaller. In an effort to explain why this is the case, the economists claimed that the utility experienced by an economic actor in the consumption of increasing larger amounts of a particular good gradually diminishes (Walras, 1960; Jevons, 1970).

What is important to realize here is that the economists made these claims not because they had anything to do with the actual character of economic reality. They were obliged to make them in an effort to justify the idea that the mathematical formalism borrowed from the theory in physics disclosed and described the previously hidden dynamics of market systems. This formalism also obliged the economists to assume that forces associated with these dynamics act casually and deterministically on atomized economic actors to sustain market systems in states of equilibrium. In an effort to justify this assumption, the economists claimed that economic actors are supremely rational human beings with prodigious knowledge of all the complex variables involved in maximizing their utility.

This view of economic actors is not as strange as it may seem when one carefully examines the mathematical formalism borrowed from the theory in physics. In this formalism, the prodigious knowledge of the actors during the process of making economic decisions that maximize their utility is embedded in and a property of the field of utility-energy in which these decisions are made. This clearly implies that these decisions are solely determined by forces associated with the dynamics of closed market systems in the field of utility-energy.

This is not, as some might suppose, an esoteric intellectual problem with no real world consequences for the following reasons: It explains why there is no basis in the mathematical formalism used by mainstream economists for even recognizing, much less dealing with, the fact that economic decisions in the real world are often informed by and even predicated on moral values, ethical standards, and concerns about equity and fairness. It explains why mainstream economists have routinely dismissed or ignored the work of ecological economists who appeal to concerns about equity and fairness to justify the implementation of economic programs and public policies. And it also explains why the claim that the rigorously mathematical theories used by mainstream economists are value-free is bogus and only serves to disguise the fact that these theories sanction and perpetuate economic inequality, mitigate against equitable distribution of scarce environmental resources, and enhance the wealth, power and influence of financial elites (Piketty, 2014).

A number of well-known mathematicians and physicists told the creators of neoclassical economic theory that the economic constructs were utterly different from the physical variables and that it was not possible to assume that the constructs were in any sense comparable to the variables (Mirowski, 1988, pp. 11–43; Ingrao and Israel, 1990, pp. 139–173). However, the economists refused or, more probably, failed to comprehend, how devastating this criticism was and proceeded to claim that they had transformed the study of economics into a rigorously mathematical scientific discipline like physics.

As it turned out, the origins of neoclassical economic theory in mid-nineteenth century physics were forgotten, subsequent generations of mainstream economists disguised the axiomatic assumptions about the dynamics of market systems under an increasingly more elaborate maze of mathematical formalism, and the claim that the theory is scientific was almost universally accepted (Nadeau, 2003, 2008). Meanwhile,

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