



“Summary of article by D.H. Judson: The Convergence of Neo-Ricardian and Embodied Energy Theories of Value and Price” in Frontier Issues in Economic Thought, Volume 1: A Survey of Ecological Economics. Island Press: Washington DC, 1995. pp. 15-18

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Ecological economics theories have much in common with classical theories. This can be demonstrated through examining both the roots of energy theorists, which can be found in classical economic thought, and the parallels between energy theorists and the Neo-Ricardians. Some attempts to integrate the equations of neo-Ricardian and energy theories can therefore be made.

Foundations of a Theory of Value

There are three important dimensions to consider when answering the question "what gives a commodity worth or value?":

- 1) The analysis may be at the micro or the macro level. At the root of this dimension is whether the individual or society is made the starting point of economic analysis. Neoclassical economists (the marginal utility perspective) argue that it must be the individual; value is based on individuals exchanging so as to maximize utility. On the other hand, classical economists (with an embodied labor basis for value) argue that society must be the starting point. They see society as reproducing itself over time through the productive activities of its members.
- 2) The analysis of value may be subjective (a human projection onto commodities), or objective (value is inherent in a commodity).
- 3) The analysis may be static or dynamic. Neo-Ricardian economists argue that marginal utility analysis is essentially static, equating the economic process with a mechanical analog. Such an analysis suggests that the economic process cannot affect the environment of matter and energy in any way. Energy based analysis argues that the material universe and hence the economic system is subject to irreversible qualitative change, i.e., to a dynamic evolutionary process. This perspective bases itself on the law of entropy.

The Sraffian Challenge to Marx (A Neo-Ricardian Perspective)

In his book Production of Commodities by Means of Commodities (1960), Pierro Sraffa argued that:

- 1) The exchange value of any particular commodity in relationship to every other commodity is entirely determined by the sociotechnical conditions of production. This was a critique of the

neoclassical theory of value which argued that the forces of demand and supply were crucial in determining the value of a commodity. The major implication of this critique is that the value of a commodity is a function of the costs of production of its various commodity inputs, and not of the exchangers' personal preferences.

2) Given certain technical assumptions, the value of all commodities can be expressed in relation to a standard commodity whose price is equal to unity. This was the neo-Ricardian argument against Marxian theories of value which argued that only labor could create value. Neo-Ricardians do not dispute that labor values can be calculated, but object to the Marxian view that labor should be the only input considered.

Energy Theorizing About Value and Price

Early energy theorists concluded that "value in general rests on the transformation of energy."¹ In comparison, modern ecologists have taken several different approaches to measuring value:

1) Value can be measured as the energy content of a commodity expressed as the amount of energy that can be released from it in combustion or behavior. This view has been criticized since it only recognizes the energy constraints in the system. More specifically, it does not consider the heterogeneous forms of matter (as opposed to energy, which is homogenous), each of which has characteristic properties.

2) Value can be measured as the energy cost of production of a commodity, i.e., the energy used up in its manufacture. This view has been seen as a useful foundational principle for an ecological critique of economic theory.

3) Energy content or input can be considered one of several important factors that determine the value of a commodity. This is seen as the most fruitful integration of ecological and orthodox economics.

Convergence Between the Neo-Ricardian and Embodied Energy Approaches to Economic Valuation

The common threads between neo-Ricardian and energy theorists include:

- 1) the use of input-output analysis as a tool;
- 2) the reliance on cost of production theories to explain exchange value (neo-Ricardians believe that exchange value can be expressed in terms of any "standard commodity," while energy theorists use energy cost of production as a measure);
- 3) the view that economic evolution is an irreversible process; and
- 4) the belief that demand schedules are unimportant as a determinant of value.

Critiques of the Embodied Energy Approach to Value

These embodied energy approaches have been criticized for failing to consider the role of matter in creating value. The crux of this argument is that in the production of commodities some materials are fundamentally non-substitutable.

Another problem with embodied energy approaches to value is their failure to account for the importance of exchange processes in the realization of value. Sraffa (and thereby neo-Ricardian analysis) ignored the problem of exchange processes and their role in the determination of value by assuming that markets cleared and arguing that all outputs are re-introduced into the economy as factor inputs. For goods which did not fit the above assumptions (called "non-basic" or "luxury" goods), Sraffa argued that their value and distribution was determined by some other process. Energy theorists have not dealt with the problem of whether the value of nonessential luxury commodities can be determined by their energy cost of production.

Finally, energy theorists have not yet addressed the relationship between the long run energy value of a commodity and its short-run price.

The Fundamental Theoretical Problem

While economists from the time of the Physiocrats have recognized the inter-connected nature of economic processes, in which one set of outputs become inputs in another process, a fundamental question that arises is whether or not there is a point at which the circle should be broken to establish a first cause of economic value? This question has implications for whether exchange values can be expressed in terms of any standard commodity or a specific input.

The Physiocrats broke the chain, attributing all value to agriculture. The classicists - e.g., Smith, Ricardo, and Marx - argued that labor is the source of all value. The neo-Ricardians claimed that no commodity can be singled out. Now energy theorists are arguing that energy is the common factor in all the inputs of production.

Integrating Neo-Ricardian and Embodied Energy Theories of Value – Theoretical Developments and Recommendations for Empirical Testing

There are several points of convergence between neo-Ricardians and embodied energy theorists. For example, both groups argue that value is inherent in objects. These similarities can be shown through the use of a simple mathematical model. Thus, neo-Ricardian theory might be advanced by integration into the embodied energy framework, where prices can be described in terms of energy costs of production and wages can be described by the energy input. However, energy theorists must still deal with the issue of how prices are derived from values expressed in energy terms. Other theoretical issues to be addressed include basic versus non-basic commodities, the relationship between money, energy and prices, a theory of capital, the role of technological change, and the heterogeneous quality of energy from different sources. Suggestions for empirical work include attempting to compare energy intensities and dollar values of commodities, cross-national testing of energy theory hypotheses, and studies relating energy and international trade.

Notes

1. W. Ostwald, The Modern Theory of Energetics (Monist, 1907), 513, cited by Judson, 266.