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Methods

Finding common ground between ecological economics and post-Keynesian economics

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ABSTRACT

Post-Keynesian economics and ecological economics have in common that they are considered to be 'heterodox' schools of thought. Aside from that, there has not been a strong connection between them. Previous books on post-Keynesian economics contain no chapter on environmental or ecological issues. This neglect has led leading ecological economists to criticize post-Keynesians for succumbing to the same growth paradigm as the neoclassical school.

This paper argues that the two approaches are complementary in the sense that they each have different strong points. Ecological economics has correctly pointed out that the growth of the global economy may not be welfare-improving anymore, whereas post-Keynesians have gained valuable insights into the functioning of the capitalist growth process.

To determine the feasibility of a synthesis between the two schools, the paper compares their approaches to the problems of production, consumption, and economic dynamics as well as the associated policy recommendations. It shows that on a theoretical level the two schools have much in common, but their policy conclusions differ with regard to the desirability of further growth. The paper concludes that a synthesis of both approaches may lead to a better understanding of how a capitalist economy operates in a natural environment with limits to growth and to better-informed policy advice.

1. Introduction

Post-Keynesian economics and ecological economics have in common that they are considered to be 'heterodox' schools of thought[1]. Aside from that, there has not been a strong connection between these two schools of thought. *A New Guide to Post Keynesian Economics* (Holt and Pressman, 2001) contains no chapter on ecological issues or environmental problems. This neglect has led ecological economists like Herman Daly (2007) to criticize post-Keynesians for succumbing to the same 'growth mania' as the neoclassical school.

This paper argues that the two approaches are complementary in the sense that they each have different strong points. Ecological economists have correctly pointed out that the growth of the global economy may not be welfare-improving anymore, whereas post-Keynesians have gained valuable insights into the relationship between growth and important social issues such as unemployment and income distribution. Therefore, combining insights of both approaches may lead to a much better understanding of how a capitalist economy operates in a natural environment with limits to growth[2].

The starting point of many ecological economists is a *normative* question: "Do we want further growth?" They criticize neoclassical resource economics for ignoring the laws of nature, notably the principle of mass balance and the entropy law. According to the former, the mass of output must be equal to the mass of inputs, which implies that the production of material goods requires material inputs. Consequently, ecological economists reject the neoclassical aggregate production function, which allows generously for substitution between material and non-material inputs. The entropy law, as Georgescu-Roegen (1971) pointed out, implies that production is an

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[1] There is some ambiguity concerning the spelling of the term 'post-Keynesian' and its precise definition. In this paper the term is used in a broad sense, encompassing the work of Kaleckian and Sraffian (or neo-Ricardian) authors. The author of this paper prefers to spell 'post-Keynesian' with a hyphen for the simple reason that he was first exposed to post-Keynesian economics through the introductory textbooks by Marc Lavoie, who also uses the spelling with a hyphen, but this is not meant to imply that the hyphen-less spelling (as in 'Journal of Post Keynesian Economics') is incorrect. As pointed out by an anonymous reviewer, 'Post Keynesian' without a hyphen is strictly speaking semantically incorrect, but both spelling variants refer to the same body of heterodox economic thinking.

[2] Recently, a number of authors have realised the potential for combining insights from post-Keynesian economics and ecological economics. Ric Holt et al. (2010) have been working on a book which is going in the same direction and was published in January 2010; the chapter on consumer theory by Marc Lavoie (2005) was already available earlier. Readers of the present paper are, of course, encouraged to read the book by Holt et al. Furthermore, Barker et al. (2006, 2008) and Scrieciu and Stringer (2008) also discuss ecological problems from a post-Keynesian perspective.

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irreversible process. This has led ecological economists to criticize the common neoclassical assumption of 'malleable capital' and recognise the importance of path dependence.

Post-Keynesian economists, by contrast, ask a positive question: "How does growth come about in a capitalist economy?" Therefore, they are not necessarily growth enthusiasts. They agree with ecological economists in much of their criticism against the neoclassical mainstream. Their theory of consumer behaviour, as Lavoie (2005) shows, is in many ways similar. The same is true of their production theory (Christensen, 1989): Having rejected the neoclassical aggregate capital stock in the Capital Controversy, post-Keynesians generally view production as a transformation of inputs into outputs that is mostly characterised by fixed technology coefficients unless a capacity constraint is reached. The importance of dynamic concepts such as path dependence and the irreversibility of decisions, which is emphasised by ecological economists, was also realised by Joan Robinson (1980) and other post-Keynesians.

The aim of this paper is to determine how the theoretical views of both schools can be reconciled and to show how this could contribute to providing actually relevant policy advice. To this end, the paper confronts the theoretical views held by post-Keynesian and ecological economists and the policy recommendations derived from those theories (Section 2), building on contributions of other authors who identified certain similarities in the fields of production theory (Christensen, 2005), consumption theory (Lavoie, 2005), and dynamic theory (Holt, 2005). Finally, conclusions are drawn and future research avenues are suggested in Section 3.

2. Theoretical Foundations of Ecological Economics and Post-Keynesian Economics

2.1. Production Theory

Ecological economists emphasise that a theory of production has to be compatible with the laws of nature (Daly, 2007). That recommendation may seem obvious and trivial, but it has in fact been ignored by many neoclassical economists who base their theory on aggregate production functions. In a highly entertaining special issue of *Ecological Economics* (the journal), Herman Daly (1997) exchanges his views on this matter with Robert M. Solow (1997a) and Joseph E. Stiglitz (1997). He argues that the aggregate production function used by Solow and others 'calls for making a cake with only the cook and his kitchen. We do not need flour, eggs, sugar etc., nor electricity or natural gas, nor even firewood. If we want a bigger cake, the cook simply stirs faster in a bigger oven that somehow heats itself' (Daly, 1997, p. 261).

What Daly expresses so visibly in this metaphor is the fact that much of neoclassical economics is based on a very simple aggregate production function, where output is produced using only labour (the cook's stirring), capital (the oven), and no natural resources. Even if natural resources are included as a third production factor, he argues, the problem is simply swept under the rug, because it does not address his main criticism. The crucial mistake of neoclassical economists, in Daly's view, is that their production functions contradict the first law (conservation of energy) and the second law (the entropy law) of thermodynamics[3].

Ecological economists see production as the transformation of inputs into outputs (Cleveland and Ruth, 1997). Neither energy nor matter is produced or created. The principle of mass balance implies that the production of material output requires material inputs, so the scope of output dematerialisation is limited. It also implies that the production of capital requires material inputs, since even intangible knowledge and ideas have to be stored in brains, books, or some other material storage device. Ecological economists therefore argue that man-made capital cannot replace material because it consists of material[4]. As a result, they believe that the loss of natural capital cannot easily be compensated by the accumulation of man-made capital, as neoclassical economists would have it.

Although post-Keynesians have not yet (to this author's knowledge) dealt with the substitution of man-made capital for natural capital, they would probably be just as sceptical about it as Herman Daly, perhaps even more so. This is because post-Keynesians completely reject the notion of an aggregate capital stock. Harcourt (1972) describes how they developed this view during the famous Cambridge capital controversy. Their main argument was that a unit of capital, unlike a unit of labour, cannot be physically measured. Constructing an aggregate capital stock requires to somehow value the individual capital goods, and this valuation process requires knowledge of the rate of interest. Therefore, the capital–labour ratio, which neoclassical economists use as an indicator of the relative scarcity of labour and capital, cannot be used to explain the distribution of income between wage earners and profit receivers. Instead, post-Keynesians view the rate of interest (or the profit rate) as the outcome of complex social processes. If this is true, the concept of an aggregate capital stock makes no sense, and theories based on the aggregate production function are faulty.

The Cambridge capital controversy dealt a serious blow to the neoclassical production function. Both sides of the controversy finally agreed that aggregate production functions lack a solid theoretical foundation. Yet at the same time, empirical studies appeared to show that 'aggregate production functions apparently work nevertheless' (Fisher, 1971, p. 305). Some authors concluded that aggregate production functions could safely be used for empirical work despite their theoretical shakiness. The studies, however, were never aimed at validating the existence of aggregate production functions; they were aimed at estimating the value of certain parameters characterising their functions, such as the elasticity of output with respect to labour and capital. The regressions generally produced a high R^2 statistic, which was interpreted as evidence that the aggregate production function 'explains' the observed data. This interpretation was soon shown to be faulty (Shaikh, 1974). The reason for the high R^2 statistic is that the most commonly used production functions (the CES function and its special case, the Cobb–Douglas function), can be written as approximations to the accounting identity which follows from the definition of value added: Value added is equal to the sum of wages and profits (Felipe and McCombie, 2001). In this sense, the aggregate production function provides a close approximation to reality, but only because it approximates an accounting identity (which is by definition 'true' and therefore real) and not because it provides a useful model of the actual process of production. More importantly, the results of the estimations have been misinterpreted. Estimating a Cobb–Douglas production function does not produce estimates of output elasticities but of factor shares[5]. The implications of this misinterpretation cast serious doubt on growth accounting and other applied work based on aggregate production functions, as discussed by Felipe and McCombie (2001, 2005a,b, 2006) in a string of papers. They also provide further support to the post-Keynesians' rejection of the aggregate production function.

Having rejected the aggregate capital stock, post-Keynesians argue that the purpose of capital goods such as machines and roads is not to

[3] Baumgärtner (2004) discusses this problem in a less emotional way than Daly, recasting it in a rigorous mathematical formulation familiar to neoclassical resource economists.

[4] It should be noted that the opinions of ecological economists are not perfectly homogeneous. Some reject the substitutability between capital and materials more strongly than others.

[5] Therefore, 'testing' a Cobb–Douglas production function actually means testing whether factor shares are constant. If they happen to be roughly constant, the Cobb–Douglas function provides a 'good fit' to the data, and the regression generates a high R^2. Felipe and McCombie (2006; footnote 15) provide various explanations for the rough constancy of factor shares, for example mark-up pricing.