Analysis

In Search of Substantive Economics: Comparing Today's Two Major Socio-metabolic Approaches to the Economy – MEFA and MuSIASEM

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A B S T R A C T

Ecological economics is largely about the ‘substantive’ (in ‘kind’) study of the economy, as opposed to a purely ‘formal’ economic analysis (in ‘money’). Following Kapp, Polanyi and others, this article argues that substantive economics is interested in the biophysical and politico-institutional structure of the economy rather than in correct prices within a particular axiomatic conformity, as in ‘formal economics’. After outlining the history of the substantive vs. formal dichotomy, we point out that socio-metabolic analyses are ecological economics’ most significant contribution towards substantive economics. The core of this article then compares what could be today’s two best candidates for offering a distinctive foundation to ecological economics as substantive economics: Material and Energy Flows Analyses (MEFA) and Multi-Scale Integrated Analyses of Societal and Ecosystem Metabolism (MuSIASEM). While MEFA is more easily comparative and historical, MuSIASEM is more integrative and comprehensive. Yet we also argue that socio-metabolic analyses represent one of the three pillars of substantive economics and that both MEFA and MuSIASEM are still weak in integrating the politico-institutional structure (second pillar) and a theory of needs (third pillar). If such an integration was done, ecological economics would be in a position to offer a full-fledge, alternative ‘substantive economic theory’.

“Economics must be ‘substantive’ in the sense of taking its departure from man’s actual needs and his dependence upon and interaction with his natural and social environment”

K. William Kapp (1954: 207)

1. Introduction

Ecological economics has been defined as the “science and management of sustainability” (Costanza, 1992) and compared to human ecology (Martín-Alier, 1987). Instead of resorting to a single unit of account – money – ecological economics integrates a variety of such units, especially biophysical ones, and analyses the systemic and dynamic interactions of multiple resources and dimensions.

This integrative line of inquiry implies that (neoclassical) environmental economics – with its monodisciplinary focus on general equilibrium models with external costs – is seen by (heterodox) ecological economists as only relevant to very specific and limited situations; for them, a conventional approach cannot offer a satisfactory understanding of economy – environment interactions (see e.g. Georgescu-Roegen, 1971; Süderbaum, 2013). Regrettably, however, ecological economics has been losing its original, heterodox roots (Gerber and Steppacher, 2012; Spash, 2012, 2013) and is increasingly encroached by purely market-based approaches. Based on an extended discourse analysis of the journal Ecological Economics since its foundation, Plumecocq (2014), for example, found that monetary orientations have strengthened over time in the journal.

In this context, we would like to offer a further clarification as to what makes ecological economics “heterodox”. We argue that ecological economics is largely about the substantive study of economic processes (“in substance”, “in the concrete”) as opposed to the formal approach of neoclassical economics (“in prices”, “in the abstract”). We suggest that ecological economics should assume more consciously the radical implications of the distinction between these two meanings of economics. But what does it imply for ecological economics to be “substantive”? How can it offer a comprehensive “substantive” analysis of the economy? What existing methodological tools are already available, and what can they offer for the study of “substantive economics”?

This article tracks these questions by first outlining some landmarks in the history of the substantive vs. formal dichotomy in economic thought – from Aristotle to the founding fathers of modern ecological economics. We argue that ecological economics as substantive...
economics can be grounded within a long tradition of debates in economics. We then present a brief overview of the main existing approaches to the study of the metabolism of social systems, a set of approaches that we consider essential for the substantive analysis of economic processes, and arguably ecological economics' most significant contribution towards substantive economics.

The central part of this article then compares what could be today's the two best candidates for offering a distinctive foundation to ecological economics as substantive economics: the Material and Energy Flows Analyses (MEFA), to which the "Vienna school of social metabolism" around Marina Fischer-Kowalski fundamentally contributed, and the Multi-Scale Integrated Analysis of Societal and Ecosystem Metabolism (MuSiASEM), developed by the "Barcelona school of societal metabolism" around Mario Giampietro and Kozo Mayumi. This comparison sketches key conceptual differences, strengths, and weaknesses of each approach.

Finally, we briefly outline where to go next. In particular, we argue that metabolic analyses have so far failed to integrate at their core a politico-institutional dimension. Furthermore, a credible theory of needs – incorporated into an institutional-metabolic approach – would be crucial for informing the normative side of substantive ecological economics.

2. Milestones in the History of the Substantive vs. Formal Dichotomy

Whether the study of the economy should be substantive or formal is a fundamental question which runs throughout the history of economic and sociopolitical thought under different names and foci. The debate started perhaps with Aristotle's famous distinction between oikonomia, the wise management of the "household" or community, and chrematistique, the art of making money (Aristotle, 1984 [4th-c. BCE]). For him, whereas oikonomia seeks to address basic needs and the maintenance of the community over time, chrematistics is unnatural and a by-product of personal inclinations and institutions. He added that chrematistics is potentially dangerous because it does not lead to social benefits and real happiness. It goes without saying that ecological economics as substantive economics reclaims the original meaning of the term "economics".

Substantive economic theory could be traced back at least to Physiocracy (the "Government of Nature") in the 18th century. This school reacted against mercantilism which was deemed mistakenly focused on monetary wealth, accumulation of gold, and the balance of school reacted against mercantilism which was deemed mistakenly.

As we will see, Karl Marx also resorted to the physiological analogy, but it is here his influential dichotomy between exchange and use values (and abstract vs. concrete labour) that will retain our attention (Marx, 1981 [1857]). Exchange value is the monetary aspect of value and constitutes the bedrock of a commodity's price. Use value, in contrast, is the concrete way in which a thing meets human needs. Marx thought that supply and demand in terms of exchange values could not form the basis of socialism. Exchange values respond to purchasing power but not to everyone's real needs. He thus envisaged the disappearance of exchange values in a mature socialist system, but never specified how such a substantive non-market economy might be organized.

The conceptual opposition between “substance” and “form” was commonplace in 19th century's European philosophy and social thought. "In fact," writes Berger (2008: 382) "since the substantive-formal distinction runs like a thread through the works of several European economists […] it may be considered a distinct European contribution to institutionalism", that is, to institutional economics. Between the 1880s and the 1890s, a foundational debate took place in the German-speaking world, the “battle over methods” (Methodenstreit), opposing the historical economists of Berlin vs. the marginalists of Vienna. At stake was the pretension of the latter to offer a universal theoretical foundation for the study of the economy. The “substantive” historical school (albeit without using the terms) argued that “formal” market mechanisms and methodological individualism could not explain all economic phenomena and insisted on contextualizing economic life. The Methodenstreit resurfaced later under different forms, as we will see.

Introducing the terms in economics, Max Weber (1964 [1920]) distinguished between “formal” and “substantive rationality”. For him, the former refers to the degree in which activities can be calculated in monetary terms while the latter refers to the degree in which needs are met through economic activity.

Around the same time, Carl Menger – one of the three fathers of marginalism – proposed a related distinction between “formal” and “substantive” approaches to the economy. He wrote in his posthumous and untranslated second edition of the Grundsätze der Volkswirtschaftslehre (Menger, 1923: 22): “the economy has two ‘elemental directions’, one of which is the [formal, maximizing] economizing direction […] while the other is the [substantive, physical] ‘techno-economic’ direction”. Karl Polanyi – influenced by Menger's distinction – noted that after the rise of marginalism and "because of the brilliant and formidable achievements of price theory opened up by Menger, the new economizing or formal meaning of economic[s] became the meaning" while the “meaning of materiality […] lost academic status and was eventually forgotten” (Polanyi, 1971: 24, his emphasis). Needless to say, it is this second meaning which, later on, gave rise to ecological economics as a heterodox school of thought studying the socio-biophysical structure of the economy. In fact, the distinction became one of the key ideas of heterodox economics at large.

After World War II, the formalist vs. substantivist debate prominently took place in economic anthropology. Just like during the Methodenstreit, the formalists emphasized the universal claims of neoclassical economics while the substantivists, like Polanyi, gave priority to the empirical content of material circumstances and disputed that this diversity could be adequately grasped through just one set of concepts (Polanyi, 1957).

K. William Kapp's – arguably the first modern ecological economist
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