

COULD SOCIOECONOMIC METABOLISM BE MOLDED BY TRANSACTION COSTS?

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Abstract

Two key issues that shape the economic development and growth of a country are the independence and effectiveness of the judicial system and the level of bureaucracy. The theory of transaction costs, developed, among others, by Douglass C. North, explores both. Increasing the independence and effectiveness of the judicial system reduces corruption and protects private property and economic freedom while reducing bureaucracy is absolutely necessary to increase a country's competitiveness by lowering the cost and increasing the speed of transactions. This paper introduces the transaction costs approach, the concept of 'socioeconomic/societal metabolism' and takes advantage of the Multi-Scale Integrated Analysis of Societal and Ecosystem Metabolism (MuSIASEM) to examine how the 'socioeconomic/societal metabolism' could be impacted.

Keywords: socioeconomic metabolism, MuSIASEM, socioeconomy, transaction costs.

Clasificare JEL: B52, O10, Q57

1. Brief introduction to the transaction costs approach

Douglass C. North [1] advances the idea that a functional society ('an ideal political model') would be based on four elements: (i) the *institutional matrix* as a set of organizations together with a set of rights and privileges; (ii) in both political and economic markets, *exchange relationships* have a stable structure; (iii) the *set of political rules and enforcement* protects organizations and exchange relationships; (iv) some mixture of *norm internalization and coercive enforcement* that induces conformity. In this worldview, the transaction costs are defined as "the costs of measuring what is being exchanged and of enforcing agreements".

Specifically, in any economy, the main sources for transaction costs are also fourfold: (1) the process of measuring the multiple valuable dimensions of a good or service in order to define property rights more precisely and to reduce the costs of exchange; (2) securing protection of individual property rights requires third party enforcement and/or individual resources; (3) resources needed for integrating the dispersed knowledge of a society; and last but not least, (4) the enforcement of agreements which includes the costs of monitoring and metering exchanges and developing effective punishment for violations [2]. Some examples include: warranties, guarantees, trademarks, the resources devoted to sorting and grading, time and motion studies, the bonding of agents, arbitration, mediation, and of course the entire system of judicial process [3].

Marinescu [4] provides an extensive and useful list of the literature on empirical measurement of transaction costs ([5]-[11]) and some more recent work on modeling transaction costs at sectoral level ([12]-[18]).

Under this framework, two key issues that shape the economic development and growth of a country (see below a few words on Romania’s example) are the level of production and transaction costs which are intrinsically interconnected with the independence and effectiveness of the judicial system (and, implicitly, with the intensity of corruption) and the level of bureaucracy. Increasing the independence and effectiveness of the judicial system reduces corruption and protects private property and economic freedom, while, reducing bureaucracy is absolutely necessary to increase a country's competitiveness by lowering the cost (for all four components listed above) and increasing the speed of transactions.

Strengthening the rule of law is vital to any country's development and for its economic growth. For example, according to the Index of Economic Freedom 2016 calculated by The Heritage Foundation and published in collaboration with The Wall Street Journal, Romania ranks 29th out of the 44 countries included in Europe, being classified as a moderately free economy. Unfortunately, compared to 2015, the country fell two positions, from 27 to 29, in the regional rankings, suggesting the need to accelerate efforts in this area [19]. The reform against corruption is another essential element for the progress of a country. Ziarul Financiar reported in its 11 February 2016 edition the estimates made by Oxford Economics: “Romania’s GDP growth is projected to slow to about 3% per year in 2017-2019. However, the ongoing anti-corruption reforms, if continued, could increase the potential growth over 3.5%” [20].

The next section will explore the conceptual area of ‘socioeconomic/societal metabolism’ and how, given the structure of levels, compartments and sectors in the Multi-Scale Integrated Analysis of Societal and Ecosystem Metabolism (MuSIASEM) approach, it could be impacted by various types of transaction costs.

2. The connection transaction costs—socioeconomic metabolism

More than forty-five years ago, in his book *The entropy law and the economic process*, Nicholas Georgescu-Roegen [21] introduced the idea of a ‘minimal’ bioeconomic program as absolutely necessary for the long-term (harmonious) survival of humans on Earth. In the new paradigm, economic systems are considered as viable entities (socioeconomies) with an exosomatic metabolism (which can be analyzed using a model based on Georgescu-Roegen’s flow-fund model).

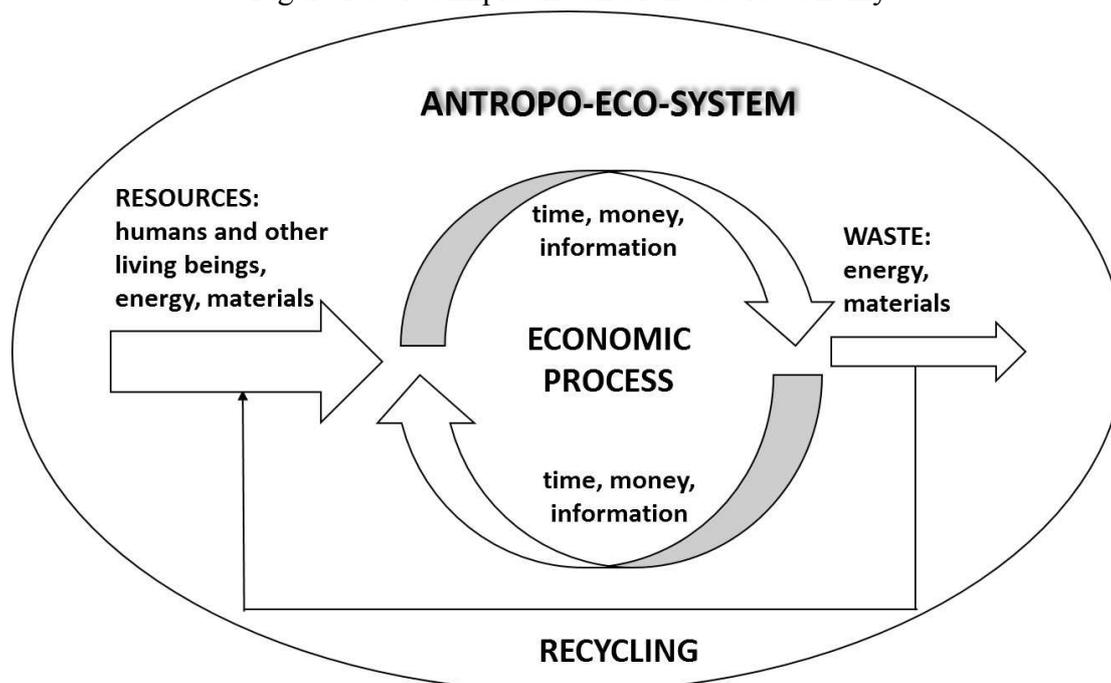
Very slowly (it took decades) but pressed by the approaching environmental crisis, the research environment absorbed this idea. In 1995, Herman Daly [22] was describing the conceptual changes that would be required in the study of economics under the new paradigm. The most fundamental change would be represented by the opening of the ‘circular flow diagram’. Achieving sustainability in development inextricably imposes that the economic process be represented as an open diagram of the socioeconomy (Figure 1) containing the continuum ‘economy embedded in the environment (antropo-eco-system)’ with the implicit reciprocal interactions (read one-way flows of humans and other living beings and circular, diminishing, flows through consumption and recycling of materials and energy).

Ravera et al. [24] describe the concept of *societal metabolism* as “a notion used to characterize processes of appropriation, transformation and exchange of materials and energy between society and the ecological system embedded in society ([25]-[29]).”

Blackstock et al. [30] emphasize that the concept of *social metabolism* “draws attention to how energy, material, money and ideas are utilized by society, drawing on natural capital and generating material, waste and social outputs”.

Scheidel et al. [31] go one step further and explain how a society’s specificity is captured by the *societal metabolism approach* “which looks at socio-ecological systems by analyzing the processes of material and energy transformation required to sustain a given identity and to perform structural and functional activities ([32]-[33]).”

Figure No. 1. Simple sketch of the socioeconomy



Source: Adaptation after [23], Figure 6.3, p. 149

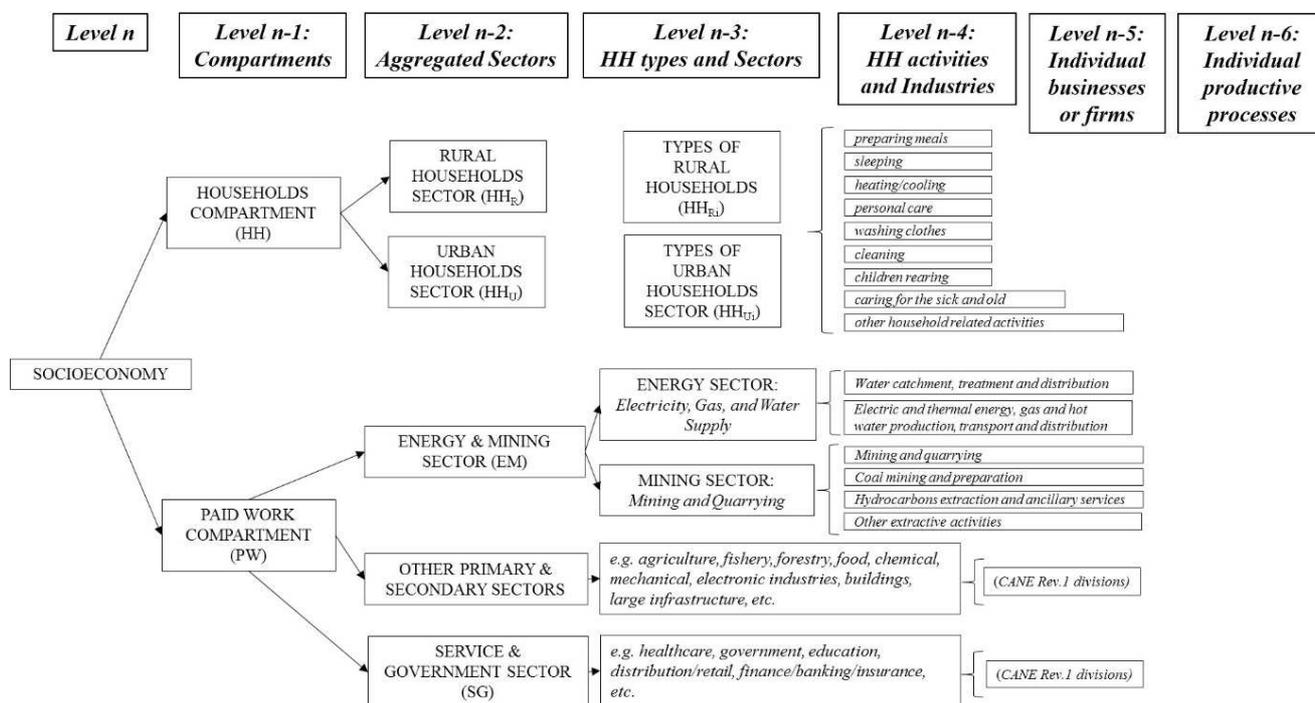
The concept of socioeconomic systems as metabolic systems prompted Georgescu-Roegen to envision the ‘flow-fund’ model of the production process, where the ‘funds’ are elements whose identity remains unchanged during the economic process (they define the system in the model) and ‘flows’ that are produced or consumed during the economic process (they define the interactions of the system in the model). Flows are, among other, money, energy and materials flows; in a digitally organized world, it is mandatory to consider information flows also. The social/societal metabolism is molded, in time, by the changing institutional/cultural matrix and can be analyzed using the Multi-Scale Integrated Analysis of Societal and Ecosystem Metabolism (MuSIASEM) approach based on Georgescu-Roegen’s flow-fund model.

MuSIASEM was devised to ‘explore tradeoffs and synergies between different development goals (across disciplines and scales) and to check the semantic of the narratives associated with the choice of these indicators with the relevant social actors’ [34]. In the MuSIASEM model the *flow of exosomatic energy* represents in a sketchy way the use of energy by humans outside of their body (in the socioeconomy) and which corresponds to the exosomatic metabolism, differently from the *flow of endosomatic energy* which corresponds to the endosomatic metabolism associated with the processing of energy and matter inside the human body [35]. Accordingly, in the bioeconomic approach “poverty could be regarded as a reduction of the socioeconomic metabolism due to reduced exosomatic energy consumption and to an increased amount of time spent to provide basic necessities or other goods” [36].

For example, if a person lives in a poor country with a disorganized and excessive paperwork system where in order to obtain the proof of existence for a piece of private property to be either inherited or purchased means, initially, to spend hours waiting in line at various government-related offices in different parts of a city only to submit a written request, and then to wait for more days or weeks to get the official answer. There also might be the alternative, in order to save some time, to pay a bribe to an ‘intermediary’ and get faster the information/document through corrupt functionaries. In both cases, resources (human energy, time and money) have to be wasted in this process: the person needs to take free time from work (in which case his/her productivity drops) and accept a wage reduction or use some vacation days (in which case other sectors of the economy might be impacted). Additionally, in the same economic system mentioned above, it is possible that

private property is not accurately protected by law. For example, if a person that hosts another person asks the guest to leave the property and that one refuses, and the only alternative (by law) for the host is to go to court and ask for a judge to give an order so the police can evict the guest, this is again a case of waste of resources (human energy, time and money).

Figure No. 2. Levels 1 to 7 in the MuSIASEM socioeconomic approach



A possible split by MuSIASEM levels down to the level of individual households, respectively businesses or firms and their associated individual activities or processes is presented in Figure 2.

Table No. 1. Intensive Variables MuSIASEM level n to level n-2

Intensive Variable	Name	Explanation	Influenced by transaction costs YES/NO
EMR _{SA}	Exosomatic Metabolic Rate Societal Average	Energy consumed at the level of the whole society	YES
EMR _{HH} , EMR _{PW} (EMR _{EM} , EMR _{PS} , EMR _{SG})	Exosomatic Metabolic Rate for Compartments (Aggregated Sectors): households and paid work (energy and mining, other primary and secondary sectors, service and government)	Energy consumed per hour of activity at the level of each compartment or aggregate sector	YES
ELP _{SA}	Economic Labor Productivity Societal Average	Value-added per hour at the level of the whole society	YES
ELP _{PW} (ELP _{EM} , ELP _{PS} , ELP _{SG})	Economic Labor Productivity for Compartments (Aggregated Sectors): households and paid work (energy and mining, other primary and secondary sectors, service and government)	Value-added produced per hour of activity at the level of each compartment or aggregate sector	YES
EI _{SA}	Energy Intensity Societal Average	Energy consumed per unit of value-added produced at the level of the whole society	YES

Intensive Variable	Name	Explanation	Influenced by transaction costs YES/NO
EI_{PW} (EI_{EM} , EI_{PS} , EI_{SG})	Energy Intensity for Compartments (Aggregated Sectors): households and paid work (energy and mining, other primary and secondary sectors, service and government)	Energy consumed per unit of value-added produced at the level of each compartment or aggregate sector	YES
EE_{SA}	Energy Efficiency Societal Average	Measures economic productivity in energetic terms at the level of the whole society	YES
EE_{PW} (EE_{EM} , EE_{PS} , EE_{SG})	Energy Efficiency for Compartments (Aggregated Sectors): households and paid work (energy and mining, other primary and secondary sectors, service and government)	Measures economic productivity in energetic terms at the level of each compartment or aggregate sector	YES

Source: Adaptation of table in [37] p. 6-7

Previously were provided a couple of very simplistic examples suggesting how the change of the individual time use pattern caused by various transaction costs alters both the *endosomatic metabolism* of the person considered (private person, business owner or employee), due to the need for additional human energy, and the *exosomatic metabolism* of the particular industries (segments of the economy) impacted, meaning the socioeconomic metabolism. In this way, for the aggregated levels n (whole economy), $n-1$ (compartments) and $n-2$ (aggregated sectors), the intensive MuSIASEM variables exosomatic metabolic rate, economic labor productivity, energy intensity, energy efficiency, do depend on the level of transaction costs (Table 1). Once the analysis reaches the level of households and economic sectors (*level n-3*) and gets more detailed for lower levels, those intensive MuSIASEM variables might or might not be influenced by transaction costs depending on individual characteristics.

3. Some concluding remarks

This paper introduces two apparently disconnected conceptual areas, those of transaction costs and ‘socioeconomic/societal metabolism’. The bridge is built using Nicholas Georgescu-Roegen’s bioeconomic approach. The Multi-Scale Integrated Analysis of Societal and Ecosystem Metabolism (MuSIASEM) approach provides a method to investigate how the macroeconomic exosomatic (socioeconomic/societal) metabolism could be impacted by various types of transaction costs at various levels.

Reducing corruption and protecting private property and economic freedom, while, reducing bureaucracy are the only ways to reduce the cost and increase the speed of transactions. Given that for levels lower than $n-3$ (household types and economic sectors), intensive MuSIASEM variables might or might not be influenced by transaction costs depending on their specificities, comparative case studies of socioeconomies more or less functional could provide a multitude of additional examples and insights. Deepening this discussion could open a new line of research since designing a strategy for sustainable development should necessarily assess that impact under different scenarios.

4. Acknowledgement

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