

The complementary relationship between institutional and complexity economics: The example of deep mechanistic explanations

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Abstract: Analyzing economic systems from an evolutionary-institutional or a complexity perspective are two complementary approaches to economic inquiry. Three arguments in favor of this hypothesis are discussed: (i) eminent institutional economists have considered the economy as what today could be considered a complex system; (ii) complexity economists lack meta-theoretical foundations which could be provided by institutionalist theory; (iii) institutional economists could benefit from using methods of complexity economics.

In this context I argue that scholars considering the economy to be complex should seek to explain it by discovering social mechanisms instead of focusing on prediction. For the discrimination between alternative explanations, scholars should refer to the deepness of an explanation, rather than to Occam’s razor.

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Economics is undergoing a crisis: the general public becomes more and more skeptical of economic experts, student movements criticizing the current state of teaching economics gain ever more attention, and even within the scientific community criticism on the current state of affairs is growing (Earl et al, 2016). One reason for the failure of economics is its failure to consider its object of inquiry as a complex system. Many other, more successful sciences such as physics or biology have accepted what could be called the *complexity challenge*. They have recognized that their subjects of inquiry are parts of complex systems, and even complex systems themselves. They have reacted to this recognition with new theories and methods that ensure their continuing success. Large parts of economics have missed this development.

There are, of course, exceptions: a growing community of interdisciplinary scholars now tries to push the – admittedly very heterogeneous – research program of *complexity economics*. And even several decades earlier, a couple of great thinkers have anticipated the complexity challenge in the social sciences. These scholars include a number of evolutionary institutionalists:

Thorstein Veblen and Gunnar Myrdal, beyond doubt pioneers of the institutionalist school, stressed the complexity of social systems, just without using the buzzword ‘complexity’. Therefore, the emergence of the research program of complexity economics should be good news for institutionalists. Yet, there are only few thematic and personal overlaps among the two research communities.

Much this has to do with different personal and disciplinary backgrounds of the researchers, a lack of an explicit meta-theory on the side of complexity economics, and a very different set of methods. Here I argue that overcoming these obstacles would be fruitful. I illustrate the complementary relationship between institutionalist and complexity economics by focusing on one particular

epistemological concept: *mechanismic explanations*. The structure of the argument is the following: In the first section I substantiate the claim that many eminent institutionalists anticipated the complexity challenge and considered the economy as what would today be called a complex system. There is thus a very basic ontological affinity between institutionalists and complexity economists.

The second section focuses on one particular concept on which a closer collaboration between institutionalists and complexity economists would be beneficial: in order to make further progress in the understanding of complex economic systems, scientists must seek *mechanism-based* (or *mechanismic*) explanations.

Sections three and four examine two challenges arising in the context of mechanismic explanations: firstly, one requires a meta-theoretical means to discriminate among competing mechanismic explanations for the same observed phenomenon. Complexity economists can benefit from the concept of the *depthness of an explanation* that comes from the philosophical framework of systemism underlying much of institutionalist theory (section 3).

Secondly, conjecturing mechanisms operating in the real world and studying them empirically requires particular methods. Institutionalists can benefit from the toolbox of complexity economists to overcome this challenge (section 4).

I close this essay with some remarks on the concept of a “mechanism” (section 5) and a short summary (section 6).

The complexity challenge and its anticipation by eminent institutionalists

What are the essential properties of complex systems? First note that the concept of a *system* is to be understood broadly: every entity is considered either a system or a part of one (Bunge, 2004).

Together with the concept of a *mechanism* (which will be discussed below), systems are the constitutional ingredients to the philosophical framework of *systemism* underlying much of institutionalist theory (Gräbner & Kapeller, 2015). Roughly speaking, the essential properties of *complex* social systems are (i) the fact that they consist of many different parts that are potentially heterogeneous and adaptive, (ii) a non-trivial set of relations among the parts that represent their direct interdependence, and (iii) a layered ontology, i.e. the existence of *emergent properties* that may feed back on the elements on lower ontological levels. These characteristics usually *imply* properties such as the existence of non-ergodicity (or path dependence) and disequilibrium. While the concept of complexity has not been mentioned by eminent institutionalists (at least in its contemporary meaning), they have developed a very similar conception of the economic system:

Thostein Veblen, for example, one of the founding fathers of evolutionary institutionalism, combined a psychologically and anthropologically rich conception of individual agency with a reflected view on the emerging meso and macro aspects of the economy, in particular its institutions, and their effect on individuals. He thus mastered the layered ontology with the corresponding upward and downward effects central to systemist thinking and social complexity (c.f. Gräbner & Kapeller, 2017). To give another example, Gunnar Myrdal, another great institutionalist thinker, further developed Veblen's concept of *cumulative causation* and stressed positive feedback loops within the economy. His notion of *circular cumulative causation* verbally expressed the ideas of path dependency and non-ergodicity of economic systems, central in the complexity approach today.¹ There is thus a basic ontological affinity between institutionalism and complexity economics that indicates potential gains of cross-fertilization among the two paradigms. In the next section I focus on one meta-theoretical implication of socio-economic complexity to

illustrate this point: the need to adopt a way of explanation giving credit to the complexity of the real world.

Epistemological implications of the complexity challenge: the need for mechanism-based explanations

Every model has a purpose, and this purpose affects its design, its presentation, and the way its quality gets assessed (Mäki, 2009). In conventional economic theory, universal predictive power is often said to be an important quality indicator for models.² In the context of complex systems, this quality indicator is, however, inadequate: complex systems are often non-ergodic and show chaotic dynamics. This renders point-prediction (in particular in the long run) often impossible and makes it a poor indicator for the quality of the model.

Rather, the default option should be a focus on identifying the *mechanisms* that have caused the status quo, i.e. to seek mechanism-based or *mechanismic* explanations (c.f. Bunge, 2004). Mechanismic explanations go beyond a purely descriptive analysis that provides a very detailed exposition of the particular events leading from one situation to another. Instead of being focused on particular case studies, mechanism-based explanations are theories of medium-range: mechanisms do not constitute universal laws, but do have a certain generality (Hedström & Swedberg, 2005).

There are many reasons why scientists studying complex economic systems in general, and institutionalists and complexity economists in particular should focus on mechanism-based explanations. Let me emphasize three of them:

- 1) Mechanismic explanations are the natural mode of explanation if one is working within a

systemist framework: as indicated above, systemism is ontologically built upon the twin concept of systems and mechanisms. Every system is a potential carrier for mechanisms. Studying mechanisms thus helps us to understand something very fundamental about our object of inquiry. It is therefore a scientifically very attractive endeavor.

- 2) Studying mechanisms helps to generalize results obtained from one point of time and space to another without making the positivist mistake of chasing universal economic laws. As all systems are carriers of particular mechanisms and some mechanisms operate in more than one system, identifying a set of mechanisms in one system helps us to understand other systems as well: mechanisms that are causing persistent poverty in Mexico may also operate in Panama. Thus, studying mechanisms goes beyond the study of certain case studies. However, since there is no *a priori* reason that mechanisms operate similarly in isolation and in conjunction with other mechanisms (Page, 2012), this constitutes only an (important) first step: mechanisms may interfere with each other and interaction effects among them may play an important role. Taking a complexity approach to the search for mechanisms naturally lets one acknowledge the dependence of mechanisms on their socio-cultural environment and motivates the development of a toolbox of mechanisms which serves as a vantage point for the study of every new situation.
- 3) Understanding and identifying mechanisms is essential for policy design. Without knowledge of the respective mechanisms, it is impossible to know, for example, whether a poverty reduction program that has been very successful in Mexico will also work in Panama: because the set of mechanisms (and the socio-economic environment) in Panama differs from that in Mexico, the same program may have different effects. Only if one

focuses on the mechanisms underlying the success of the program in Mexico, one may check whether these mechanisms will have a similar effect in Panama as well (Deaton, 2010; Grüne-Yannoff, 2016).

It is striking that – beyond having anticipated the complexity challenge itself – eminent institutionalists have also practiced (implicitly or explicitly) the search for mechanistic explanations:

Gunnar Myrdal, for example, identified several fairly general mechanisms, such as backwash and spread effects (Myrdal, 1973) or circular cumulative causation (Myrdal, 1944; Berger & Elsner, 2007). Thorstein Veblen started theorizing about the instrumental-ceremonial dichotomy of institutions (Veblen, [1899]2009) and institutionalists continued to study the corresponding mechanisms of institutional change (Bush, 1987; Elsner, 2005). All these mechanisms are (essentially or accidentally) associated with very different economic systems.

There are also two challenges that are associated with the search for mechanistic explanations, a theoretical and a methodological one. The theoretical challenge concerns the way one discriminates between competing mechanism-based explanations. The methodological challenge concerns the problem of actually identifying potential mechanisms operating in the real world.

The theoretical challenge can be addressed by using the meta-theoretical concept of *deep explanations*, which can be derived from the kind of systemism underlying much of institutionalism (Gräbner & Kapeller, 2015). Here, complexity economists can benefit from the sound philosophical foundation of institutionalism. The methodological challenge can be addressed by using methods from complexity economics. Here, institutionalists can benefit from the rich set of

methods available in complexity economics. The way the two challenges can be addressed thus illustrates the complementary relationship between institutionalism and complexity economics.

The concept of deep explanations

Let us first consider the theoretical challenge: within an instrumentalist approach³ to theorizing the dubious concept of Occam's razor is usually put forward as the standard measure to distinguish between similar explanations: according to the razor, if two theories explain the same phenomenon equally well, the simpler one is to be preferred. But there are two fundamental problems: Firstly, it is very difficult to measure the simplicity of a particular explanation (see already Bunge, 1961). Secondly, it is by far not clear when two theories explain the same phenomena equally well.⁴ These challenges can be overcome if we replace Occam's razor with the concept of the *deepness* of an explanation. According to this concept, not simpler theories should be preferred, but deeper theories. One theory is deeper than another if it explains observed phenomena with recourse to more of the underlying mechanisms. Consider the following example: why does a rise in real per-capita income lead to increased per capita consumption expenditure? This is a central question if one wishes to understand the sustainability of growth rates. A conventional approach would use utility-maximizing agents whose preferences feature the property of local non-satiation and value some goods more than others. In the context of increasing real income agents will substitute inferior for superior goods and in the equilibrium the economy continues to grow. A more complicated, but much more convincing approach would be to consider the needs and wants of humans as they have evolved over time:

Witt (2010) explains that needs and wants can be either physiologically determined and thus homeostatic (e.g. for the need to collect food and shelter), or they can be non-physiological and

non-homeostatic (e.g. for the want for group conformity or status seeking). Because of limited cognitive resources human beings have the ability of social cognitive learning which in turn allows commodities to have characteristics that are symbolic and socially constructed. Some symbolic properties are capable to serve the individual need for social status. As a consequence, the demand for these (often rather expensive) goods rises. This explanation is certainly much more convincing than the standard approach which simply assumes preferences and the capacity to maximize one's utility, rather than identify the mechanisms underlying these preferences. While Occam's razor would be unable to seriously distinguish the two explanations, the concept of the deepness of explanations rightfully favors the evolutionary explanation offered by Witt (2010).⁵

The concept thus provides a natural motivation to dig deeper into problems and to constantly question prevalent explanations. It also challenges misleading assumptions that are made for convenience only, e.g. the maximization hypothesis or strong rationality assumption common in economics. Researchers striving for deep explanations are motivated to question such assumptions and to explore their underlying empirical plausibility – and to search for alternatives if at some point such empirical plausibility cannot be found (see Elsner (2012) for a related argument in the context of theories of institutional change).

Note that the kind of meta-theoretical concepts discussed so far structure scientific inquiry and facilitate the mutual references between different studies. Complexity Economics currently lacks such concepts because it lacks adequate (meta-)theoretical foundations. Therefore, complexity economists could benefit tremendously from considering institutionalist theory.

How to identify and communicate mechanisms: computational models

The second challenge with respect to mechanism-based explanations concerns the adequate method to identify social mechanisms. Since mechanisms are not directly observable, they need to be conjectured (Bunge, 2014, p. 186). Conjecturing mechanisms is, however, a tough problem. In this context, institutionalists can benefit from using methods of complexity economics that facilitate the conjecturing of mechanisms. Of particular interest (though certainly not the only useful method) in this context are agent-based models which allow a very direct representation of the layered ontology and its upward and downward effects (see Gräbner (2016) for a more complete discussion). But the most important feature of computational models is their ability to encode hypothetical mechanisms in an analytically very exact way. By comparing the behavior of the model with what we know about reality, and by gradually refining the model, one can have a very clear, structured and effective way to conjecture mechanisms and to provide ever deeper explanations.⁶ In the best case, they are then combined with graphical methods from statistics to validate the conjectured mechanism with the data available (see e.g. Moneta & Russo, 2014).⁷ Since I have discussed the usefulness of computational models for institutionalist research already elsewhere (Gräbner, 2016), I want to keep the argument short. But I want to emphasize another – in addition to their usefulness for developing mechanism-based explanations – advantage of computational models: they are usually written in algorithms rather than equations. Algorithms are more similar to our natural language and are very flexible formalization devices. Therefore, they are useful in formalizing very different approaches to understand a particular system and to compare them. They can thus serve a mutual language bridging different schools of thought and thus supporting a productive pluralism within economics.

Some remarks on the concept of “mechanisms”

The concept of a social mechanisms is potentially ambiguous: Cowen (2005), for example, argues that neoclassical economics is very successful in providing mechanistic explanations by showing how the market mechanism brings about a certain result.

But it is very misleading to characterize the market as one particular mechanism (see already von Mises (1949)) Institutionalists have argued for long that markets are embedded in institutions and can function in very different ways, i.e. can represent very different mechanisms.⁷

To avoid ambiguity, it seems plausible define a mechanism as a “process (or sequence of states, or pathway) in a concrete system” (Bunge, 2004, p. 186). This definition also stresses the relation, but also distinctiveness of systems and mechanisms: while a systems represents a *being*, a mechanisms represents a *change* in a being (c.f. Bunge, 2004).

Conclusion

This essay illustrated the complementary relationship between evolutionary-institutional and complexity economics using the example of deep mechanistic explanations.

I have shown that eminent institutionalists have anticipated this “complexity challenge” and that - despite a lack of current collaboration - there exists a fundamental ontological affinity between complexity and institutionalist economists. On that basis, both research communities have much to offer to each other: complexity scholars could benefit tremendously from institutionalist (meta-)theory. The lack of such prevents complexity economics from being an even more productive and successful paradigm. I illustrated this via the example of mechanistic explanations, a mode of explanation that is particularly well suited for complex social systems and should be the default

mode of explanation for institutionalists and complexity economists. I also presented the concept of *deep explanations* as an attractive alternative to Occam's razor. Such kind of meta-theoretical tools are currently missing in complexity economics. On the other hand, institutionalist economists can benefit from the set of sophisticated methods of complexity scholars. In particular, computational models can be helpful in conjecturing mechanisms, relating different explanations to each other, and assessing the empirical validity of a theory. Thus, the positive relationship between institutionalist and complexity economics is mutual and closer collaboration would be for the good of both scientific communities.

Endnotes

¹ Bunge (1999, 2012) provides a more extensive list of institutionalist economists who (implicitly) have worked in a systemist way.

² This might sound surprising given the poor predictive performance of many mainstream models. This lack of predictive capacity is usually ‘explained’ by the violation of particular *ceteris paribus* assumptions.

³ ‘Instrumentalism’ here refers to the particular positivist epistemology. It does not refer to the institutionalist approach to theorizing and policy making as outlined in Hayden (2006, chapter 3).

⁴ This is particularly the case if two explanations come from different, potentially incommensurable paradigms (Kuhn, 1962). As economics should currently be considered a multi-paradigmatic science (see already Elsner, 1986), this is a probable coincidence.

⁵ Since both models essentially provide the same predictions on sustainable growth rates, the standard model is certainly simpler than the one by Witt. Defenders of Occam’s razor could then argue that Witt’s theory explains the observed facts *better* than the standard one and thus should be preferred. But in this they would lack a concept giving substance to this judgment of ‘better’.

⁶ This process should be embedded into an adequate epistemological framework to make clear how the explanatory power of the model increases. I suggested such a framework in Gräbner (2017), but there are, of course, other useful alternatives. The most important thing is that the epistemological framework is made explicit in the modeling exercise.

⁷ Moneta & Russo (2014) discuss the concept of *evidential pluralism* which specifies the circumstances under which one can make informed statements about causal mechanisms in reality. They argue that both background knowledge on the mechanisms at work and statistical evidence is needed. Computational models are useful in supplying the mechanistic information in a form

that can then be tested statistically very directly.

⁷ Hodgson (2015) makes a nice proposal by defining a market as organized and institutionalized recurrent exchange (p. 139).

References

- Berger, Sebastian, and Wolfram Elsner “European Contributions to Evolutionary Institutional Economics: The Cases of ‘Cumulative Circular Causation’ (CCC) and ‘Open Systems Approach’ (OSA).” *Journal of Economic Issues* 41, 2 (2007): 1-43.
- Bunge, Mario A. “The Weight of Simplicity in the Construction and Assaying of Scientific Theories.” *Philosophy of Science* 28, 2 (1961): 120-149.
- Bunge, Mario A. *Social Science under Debate*. Toronto, Canada: University of Toronto Press, 1999.
- Bunge, Mario A. *Evaluating Philosophies*. Dordrecht, Netherlands: Springer, 2012.
- Bunge, Mario A. “How Does It Work: The Search for Explanatory Mechanisms.” *Philosophy of the Social Sciences* 34, 2 (2004): 182-210.
- Bush, Paul D. “The Theory of Institutional Change.” *Journal of Economic Issues* 21, 3 (1987): 1075-1116.
- Cowen, Tyler “Do economists use social mechanisms to explain?” In *Social Mechanisms. An Analytical Approach to Social Theory*, edited by Peter Hedström and Richard Swedberg, 125-146. Cambridge, UK et al.: Cambridge University Press, 2005.
- Deaton, Angus “Instruments, Randomization, and Learning about Development” *Journal of Economic Literature* 48, 2 (2010): 424-455.
- Elsner, Wolfram. *Ökonomische Institutionenanalyse - Paradigmatische Entwicklung der ökonomischen Theorie und der Sinn eines Rückgriffs auf die ökonomische Klassik am Beispiel der Institutionenanalyse („Property Rights“)*. Berlin, DE: Dunker & Humblot, 1986.
- Elsner, Wolfram. “The Theory of Institutional Change Revisited: The Institutional Dichotomy, Its Dynamic, and Its Policy Implications in a More Formal Analysis.” *Journal of Economic Issues* 46, 1 (2012): 1-43.

- Gräbner, Claudius. "Agent-based computational models- a formal heuristic for institutionalist pattern modelling?" *Journal of Institutional Economics* 1, 12 (2016): 241-261.
- Gräbner, Claudius. "Dealing adequately with the political element in formal modeling." In *A Cyprus Symposium: Theory and Method of Evolutionary Political Economy*, edited by Hardy Hanappi, Savvas Katsikides, and Manuel Scholz-Wäckerle. London, UK and New York, NY: Routledge, forthcoming 2017.
- Gräbner, Claudius, and Jakob Kapeller. "New Perspectives on Institutional Pattern Modeling: Systemism, Complexity, and Agent-Based Modeling." *Journal of Economic Issues* 49, 2 (2015): 433-440.
- Gräbner, Claudius, and Jakob Kapeller. "The micro-macro link in heterodox economics." In *The Handbook of Heterodox Economics*, edited by Lynne Chester, Carlo D'Ipolity and Tae-Hee Jo. London: Routledge, forthcoming 2017.
- Grüne-Yanoff, Till "Why Behavioural Policy Needs Mechanistic Evidence." *Economics & Philosophy* 32, 3 (2016): 463-483.
- Hayden, Gregory F. *Policymaking for a good society*. New York, NY: Springer, 2006.
- Hedström, Peter and Richard Swedberg. "Social mechanisms: an introductory essay". In *Social Mechanisms. In An Analytical Approach to Social Theory*, edited by Peter Hedström and Richard Swedberg, 1-31. Cambridge, UK et al.: Cambridge University Press, 2005.
- Hodgson, Geoffrey M. *Economics in the shadows of Darwin and Marx*. Cheltenham, UK, and Northampton, MA: Edward Elgar, 2006.
- Hodgson, Geoffrey M. *Conceptualizing Capitalism. Institutions, Evolution, Future*. Chicago, IL, and London, UK: University of Chicago Press, 2015.

- Kuhn, Thomas. *The Structure of Scientific Revolutions*. Chicago, IL: University of Chicago Press, 1962.
- Mäki, Uskali “Models and truth: The functional decomposition approach” In: *EPSA Epistemology and Methodology of Science: Launch of the European Philosophy of Science Association*, edited by Mauricio Suarez, Mauro Dorato and Miklós Redei, 177-187. Dordrecht: Springer, 2009.
- von Mises, Ludwig. *Human Action. A Treatise on Economics*. London, UK: William Hodge, 1949.
- Moneta, Alessio and Federica Russo. “Causal models and evidential pluralism in econometrics.” *Journal of Economic Methodology* 21, 1 (2014): 54-76.
- Myrdal, Gunnar. *An American Dilemma. The Negro Problem and Modern Democracy*. New York, NY; London, UK: Harper & Brothers Publishers, 1944.
- Myrdal, Gunnar “Equity and growth.” *World Development* 1, 11 (1973): 43-47.
- Page, Scott E. “Aggregation in agent-based models of economies” *The Knowledge Engineering Review* 27, 2 (2012): 151-162.
- Veblen, Thorstein *The Theory of the Leisure Class*. Oxford, UK; New York, NY: Oxford University Press, 2009[1899].
- Witt, Ulrich “Symbolic consumption and the social construction of product characteristics.” *Structural Change and Economic Dynamics* 21 (2010): 17-25.