

Austrians and the use of models

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Austrians have traditionally been reluctant to adopt mathematical methods. Mostly for good reasons. In fact, the way economics is presently practiced and taught at most universities, namely using general-equilibrium models and econometric techniques, gives ample reasons to reject the mathematical method.¹ However and in spite of that, the use of models generally lies at the core of all human inquiry. Scholars of all disciplines use models to organize their thoughts, to communicate with others, and to isolate essential aspects from the objects of investigation. In fact, strictly speaking, even any verbal statement about the world is a model, as it necessarily represents a complexity reduction with regard to the observed reality, which is the definition of a model. Also Mises when he introduces the concept of imaginary constructions appeals to models, which are not mathematical, but share the idea of modeling. Hence, also from an Austrian perspective, nothing is wrong with the use of models in general. The point and the difficulty lies in choosing the right model, the right modeling strategy, and the right degree of abstraction and specificity. Certainly, a thorough *understanding* in the Mengerian sense is necessary to develop adequate models.

The debate about finding the right type of formalization is not new. It was already present in the days of Carl Menger. There are indications that Menger himself was not fundamentally opposed to the use of mathematical models in economics (Antonelli, 1953, p.272, as translated in Gloria-Palermo (2013)). Yet, on the other hand, he was well aware that the models used by his contemporaries, which were based on functional calculus, were hopelessly unsuited to deliver a meaningful description of the world (Antonelli, 1953, pp.279, as translated in Gloria-Palermo (2013)). This inadequacy of the functional models is well explained by Mayer ([1932] 1994). Mayer argues that the cognitive value of functional price theories is very limited, as the functions usually state relations between magnitudes that are theoretically quite distinct while the Mengerian

¹This has been widely discussed in the Austrian literature. See e.g. Rothbard (1957) and Mises ([1949] 2008, pp.347).

approach, in contrast, considers the formation of prices in the context in which they arise. The latter approach therefore is more coherent and less prone to error. In Menger's ([1883] 1985, p.43) own words this approach can be framed as follows:

The goal of scholarly research is not only the cognition, but also the understanding of phenomena. We have gained cognition of a phenomenon when we have attained a mental image of it. We understand it when we have recognized the reason for its existence and for its characteristic quality (the reason for its being and for its being like it is).

One might well say that this statement captures much of the Austrian essence. It makes clear that the economy is conceptualized as a process that is bound in time and that is driven by certain essential features. This certainly stands in opposition to the concept of equilibrium and to how models based on differential calculus are designed. In fact, equilibrium models are entirely silent about how equilibrium is established. The processes that create the tendency toward equilibrium simply remain outside the scope of the models (see Blaug, 2003). And this is how much of the economic perspective is lost.

However, there is a relatively young school in economics that has developed a methodological standard that is in many aspects compatible with the Austrian view. This school is called evolutionary economics, or complexity economics, and it largely uses the techniques of agent-based modeling. One should compare the quote of Menger given above with what Dosi and Winter (2002, p.146), who are two of the main figures in evolutionary economics, state:

Evolutionary theories share the methodological imperative of “dynamics first”! That is, the explanation of why something exists, or why a variable takes the value it does, ought to rest on a process account of how it became what it is.

With regard to methodology there is, hence, much common ground between Austrian and evolutionary economics. Judging from the quotes it should even be possible to reconcile those two approaches which, indeed, has been postulated by a wide range of authors (e.g. Lavoie et al., 1990; Vaughn, 1999; Koppl, 2006; Gloria-Palermo, 2013). The problem with evolutionary economics as such, however, is that methodology alone does not help to craft sensible models. Instead, it is indispensable to supplement

evolutionary models with economic insight, since only economics (as a well understood term) prevents such models from being arbitrary. Therefore, if combined with Austrian economics agent-based models may actually deliver a meaningful description of the world.

To make the point more clear a comparison between the agent-based models and Austrian economics may be helpful. One of the main characteristics Austrian economics is certainly the use of the praxeological method, which identifies the formal implications of human actions in general and which ties economic analysis to the premises that are logically implied in the concept of action. Notably, however, an agent-based computer simulation is nothing more than a sequence of actions and, thus, these actions almost automatically follow the laws of praxeology. For instance, just as in Austrian economics, an action of a simulated agent is necessarily an exchange of one state against another and also, since computer programs operate sequentially, he can only carry out one action at the time. Moreover, anything that a simulated economic agent does is necessarily embedded in a means-ends context. All of this finds a correspondence in *Human Action* (Mises, [1949] 2008, pp.92, pp.97). Another central theme in Austrian economics is the information problem, i.e. the explanation of why certain coordination results occur despite the fact that the information about how to achieve this coordination is nowhere concentrated (Hayek, 1945). This, again, is almost automatically represented within agent-based models since, by definition, they describe the decentralized actions of agents and the patterns that emerge from these actions without central planning.

A suggestion about how Austrian economics and agent-based modeling can be unified has recently been made by the author of this essay (Hagedorn, 2014). The proposed model comprises a population of agents that operate within an accounting scheme and a framework for the description of capital structures. The results of these models, which take the form of impulse-response curves, illustrate how the capital structure always adapts to the preferences of the consumers and how saving leads to capital accumulation and growth. Moreover, the models are designed so that they can be extended as to cover almost any other economic aspect of interest.

Surely, there are already models of Austrian economics, most notably the ones by Garrison (2001) and Fillieule (2007) and they have provoked much fruitful discussion. However, the problem with those models is that they are static in nature and that they take an aggregate perspective. In other words, they lack what modern economists call

microfoundations. In today's academic debate it is yet indispensable to build models (at least formally) from a bottom-up perspective. For, otherwise, they are just considered "state of the art" by the majority of professional economists. In fact, one of the reasons why Austrian economics is under-represented in academic curricula and public debates lies in the absence of a modeling framework that is acceptable to the mainstream. In addition, as noted by Hülsmann (2001), while the Garrison-Fillieule approach is extremely helpful in communicating Austrian ideas with students and the interested public, it yet is not entirely faithful to the Austrian methodology. There may even be the danger that the Garrison-Fillieule models, by using mainstream methods, are mainstreaming the Austrians more than they Austrianize the mainstream. Here, the agent-based models may provide a solution. Only first Austrian principles are needed to build those models and, therefore, they emphasize the essentialist character of the Austrian approach. Furthermore, they describe economic insights based on processes which are bound in time and are driven by human action alone. These models may thus help to better frame the Austrian ingenuity.

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