



**Marcel Boumans.** *How Economists Model the World into Numbers: INEM Advances in Economic Methodology.* London: Routledge, 2004. 207 S. ISBN 978-0-203-32407-3.

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## M. Boumans: How Economists Model the World into Numbers

The recent book by Marcel Boumans from the University of Amsterdam deals with a worthwhile subject, namely the dominance of model-building. See Niehans, Jürg, *A History of Economic Theory. Classic Contributions, 1720-1980*, Baltimore 1990, here pp. 313-317; Solow, Robert M., *How Did Economics Get That Way and What Did it Get?*, in: *Daedalus* 126 (1997), pp. 39-58. Models are conceived as "quantitative representations of our world" (p. 1), which are the "economist's instruments of investigation" and are thus equivalent to the biologist's microscope and the astronomer's telescope (p. 2). Their particular task is measurement, i.e. the mapping of properties of the empirical world into numbers. His concrete area of study is the development of modelling and measuring of business cycles from the 1930s until the present, which he holds as quite typical for the discipline in general (p. 18). Boumans aims at nothing less than the development of a "separate methodology of models" (p. 1). He thus deals with heuristics (p. 17), more specifically with the assessment of the "reliability" of models (p. 1). Obviously, this is an important, but at the same time ambitious task. He proceeds by discussing the contributions of a number of eminent researchers in an almost chronological order, thereby exhibiting a preference for Noble laureates. He begins with Jan Tinbergen, laureate in 1969, and continues with, roughly in order of appearance, Frisch (Noble laureate in 1969 as well), Haavelmo (1989), Koopmans (1975), Simon (1978), von Neumann, Friedman (1976), Klein (1980), Lucas (1995), Kydland, Prescott (both 2004), and Irving Fisher.

Chapter 2 "A New Practice" is entirely devoted to the

work of Jan Tinbergen, who is considered as the founding father of business cycle modelling. Therein, Boumans presents the intellectual biography and, in particular, the seminal econometric work of his compatriot. Reportedly Tinbergen firmly rejected the methods of empirical business cycle research and the theoretical reasoning prevailing at his time. He therefore mainly drew on his earlier studies (and doctorate) in physics under Paul Ehrenfest at the University of Leiden, who was himself heavily influenced by Ludwig Boltzmann and James Clark Maxwell. Thus, he searched for a set of mathematical equations, which would represent the typical characteristics of observed business cycles in a logical and simple manner and without the recourse to external factors. He went through a "trial-and-error process", which Boumans also calls "tuning" or "mathematical shaping". This was followed by the indispensable second step of statistical verification.

The final model in its reduced form consisted of linear difference equations, the parameters of which were estimated by multiple regression analysis and verified by statistical significance tests. His first empirical model from 1936 consisted of 24 equations describing the Dutch economy (p. 22). Later models referred to the US economy for the period of 1919-1932 and to the UK under the Gold Standard. Taken together this constituted indeed "a new approach" and has also been widely acknowledged as such. See Klein, Lawrence R., *The Contribution of Jan Tinbergen to Economic Science*, in: *De Economist* 152 (2004), pp. 155-157; Schumpeter, Joseph A., *History of Economic Analysis*, ed. by Elizabeth Body Schumpeter,

New York 1954, here pp. 1162-1163. For several reasons, the chapter on Tinbergen is the most important part of the book. Firstly, Tinbergen inspired much of the macroeconomic work covered in the later chapters, either as a positive model or as a counter-example. With only a little exaggeration one can therefore say that they deal with the subsequent treatment of his legacy in macroeconomics. Secondly and closely related, the chapter sets the tone and addresses almost all the questions of the following parts of the book. The third reason relates to the author's personal background. Boumans is himself also a trained mathematician and an expert on Tinbergen. See his homepage at <http://www1.fee.uva.nl/pp/mboumans/>.

The following chapter 3 'Autonomy' deals mainly with the successive contributions of Ragnar Frisch, Trygve Haavelmo and Tjalling C. Koopmans, which inspired the macroeconomic 'revolution' at the Cowles Commission. This was also quite heavily influenced by Tinbergen, not least because he had been the mentor of Koopmans. In terms of modelling the Cowles Commission used an explicit probabilistic framework and a system of simultaneous equations. Chapter 4 'Designs of Experiments' then deals with various specific approaches towards constructing and testing macroeconomic models. In detail, Boumans briefly mentions some first attempts at so-called naive model tests of the Cowles Commission models, before turning to the fundamental critique by Milton Friedman's 'Methodology of Positive Economics'. Then Herbert A. Simon's work on complexity is presented, which builds on the work of John von Neumann on automata. Boumans then discusses shortly the Klein-Goldberger model in the Cowles Commission tradition.

Finally, Robert E. Lucas's notion of 'artificial economies' is introduced, i.e. simple models with the representative agent providing the desired microfoundation. In chapter 5 'Measurement' Boumans relies primarily on the dominant representational theory of measurement and draws connections to the use of calibration in economics, mainly with reference to Finn E. Kydland and Edward C. Prescott. Loosely speaking, they conceived of calibration as the choice of model parameters, so that the model displays typical characteristics observed in reality. In the sixth chapter Boumans discusses 'Rigour' as another criterion for the assessment of models. The development of index numbers serves as his case study with Irving Fisher's seminal work identified as 'a good example of how rigour and human experience can work together' (p. 174). In the final 'Conclusions'

Boumans summarises the practices of the economists studied in the course of the book. He characterises them as 'Humboldtian scientists' (p. 176), who try to explore the real world with the help of their instruments.

These instruments in turn cannot be derived in a simple manner from economic theory. Therefore, the favourite alternative sources seem to be hydraulics and mechanics (p. 177). In contrast to physics, however, the lack of experiments under laboratory conditions makes the search for invariance or autonomy built in the econometric models crucial. They are only reliable, if they conform with empirical regularities (p. 180). Boumans himself seems to prefer rather 'simple' models combined with calibration. Thus, he concludes by saying: 'Economists, after a century of mathematical modelling, now prefer very simple mechanisms with the faith that they will be calibrated in the future' (p. 180).

Taken together the book provides a sound reconstruction of certain methodological aspects of business cycles modelling in modern economics. On the one hand, by pursuing a rather specific and original focus it provides important new insights. A particular strength lies in its successive treatment of the contributions of leading practitioners. These are, all in all, combined with insights from interdisciplinary methodological literature in a felicitous manner. On the other hand, some shortcomings follow from this approach. One of the undesirable results is the exclusion of mathematical economics from the discussion. Hence, the question of how this did and should relate to econometric modelling is completely avoided. Finally, Boumans's treatment displays certain deficiencies from a history of thought perspective.

The development of macroeconomic analysis and the various 'schools' therein as the wider context of the studied specific contributions is ignored completely. See Snowdon, Brian; Vane, Howard R., *Modern Macroeconomics. Its Origins, Development and Current State*, Cheltenham 2005. Moreover, the reported relationship between Tinbergen and the state of research of this time is unsatisfactory, because the sizable (and indeed growing) body of theoretical work e.g. by Knut Wicksell, Ralph G. Hawtrey or Friedrich A. v. Hayek is again ignored completely. See Schumpeter (note 2), pp. 1117-1135. This in turn led to the avoidance of further important questions, such as why Tinbergen chose to proceed on such a limited theoretical basis. All in all, these shortcomings have to be set against the stated achievements of the book. Even without being able to provide a reliable quantitative measurement the overall balance clearly tips in favour of the latter.

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