BOOK REVIEW

ECONOPHYSICS: BACKGROUND AND APPLICATIONS
IN ECONOMICS, FINANCE, AND SOCIOPHYSICS

Constantin Manea*
University of Pitești, România

Ever since the official birth of the new trans-disciplinary field of econophysics, whose admitted date is the very beginning of the last decade of the twentieth century, a number of Romanian researchers have authored some highly appreciated and frequently cited papers published in international literature, especially articles. Such authors whom we could mention, in a purely random selection, and in alphabetical order only, are Mircea Bulinski, Radu Chișleag, Adrian Drăgulescu, Mircea Gligor, Margareta Ignat, Sorin Solomon, Ion Spânulescu, etc. In 2003, the first book in this line was published in Romania, titled Econophysics and authored by Mircea Gligor and Margareta Ignat, followed four years later by Investment Econophysics, authored by Ion Spânulescu and Anca Gheorghiu. A relatively small number of summer schools dealing with issues of econophysics and complexity science, organized jointly by E.S.A. and the University of Bucharest, then the international workshops EDEN I-IV of the University of Pitești, with moderators Gheorghe Săvoiu and Ion Iorga Simă, whose notable result was the publication of the first Romanian online journal Econophysics, Sociophysics and other multidisciplinary sciences (or ESMS Journal), which continues to be published on the site http://www.esmsj.upit.ro/), or the international conferences of Econophysics, new economy and complexity (ENEC) of the Hyperion University in Bucharest, coordinated by Ion Spânulescu, are only some landmarks of a dynamic process of evolutive repertoire-drawing of the Romanian econophysicists’ activity.

A theoretical and practical analysis of the multiple interferences between physics and economics in the trans- and multi-disciplinary interstice of the last two decades, particularizing the new science of econophysics, represents the essence of a recent online book, i.e. the Kindle edition of the work titled Econophysics: Background and Applications in Economics, Finance, and Sociophysics (Econofizica: Context și aplicații în economie, finanțe și sociofizică), whose editor is Gheorghe Săvoiu, and which was authored by him

* Author’s contact: e-mail: kostea_m@yahoo.com
The book has a balanced three-part structure; to begin with, it provides an image of the contextual background of the emergence and evolution of modern econophysics, by the joint contribution of economic thinking and the profoundly simplifying modelling specific to physics, focusing initially on statistical physics: the first chapter describes both the history and the important role of econophysics in contemporary scientific research, while the second chapter delimits the multidisciplinary modelling knowledge, based on scenarios and models of econophysics, from the of isolating knowledge of classical economics’ unidisciplinarity. This first part of the book is written by two professors at the University of Pitești, respectively Gheorghe Săvoiu și Ion Iorga Simăn, and manages to identify and describe the main benefits of a multidisciplinary coexistence in the new economy, by applying the highly precise and general models of physics to identifying and quantifying the essence of the economic phenomenon, redefining the relationship between physics and economics, and also between physicists and economists, and defining the so promising concept of modern econophysics, and, hence, the new profession of the econophysicist.

The second part of the book enjoys a generous title (Economics and Finance) and amalgamates, in its five applicative chapters, a few econophysical solutions, mainly applied to several economic fields. Regarding the efficiency of capital markets, as hypothesis or approximation, a third chapter describes an analysis of informational symmetry of the U.S. economy and finance, capitalizing on the Dow Jones daily data between 1920 and 2008 (the paper is signed by Gheorghe Săvoiu and Constantin Andronache). The non-linear mechanisms generated by power laws in social-economic systems appear to be far more appropriate for understanding and anticipating trends; an exciting econophysics exposition of these mechanisms is presented by Mircea Gligor, in the fourth chapter. A thorny question, concerning the possibility of credit risk prediction, finds its response in the simulations, characteristic of econophysics, based on the Monte Carlo method, dealt with in chapter V of the book, elaborated by Aretina–Magdalena David–Pearson, who turns into a methodical and experienced guide to the interrogative approach generated by the latest major global recession begun in the financial domain. The sixth chapter describes a model of quantum mechanics able to offer a credible explanation of the violation of a number of financial rules, anticipating the context of crises and recessions. The auspices to this scientific journey were provided by an unparalleled guide, characterized by succinct expression of physical modelling and accurate assessment of the economic impact, namely Professor Radu Chișlea. The seventh chapter draws, in a statistical and comprehensive manner, the repertory of the achievements in econophysics, as well as its amazing potential, and expounds the new expectations in this trans- and multidisciplinary science, which investigates economic processes by means of physics. The authors of this vast repertorying are Gheorghe Săvoiu and Constantin Andronache, and their effort fully repays the reader who is eager to know the main valences of econophysics and the hopes of this new science based on its ability to investigate the economic process.
The third part of the book includes three additional chapters and is exclusively devoted to sociophysics, anticipated as a sociological insight through physical modelling, with comprehensive explanations that extend beyond the scope of socio-economics, moving from the integrative and systemic knowledge of the educational impact of the Bologna reform in academic education, by means of an original physical model, presented, within the same unmatched physical instrumental compass, by Professor Radu Chișteag in chapter VIII, to the modelling based on the statistical physics of group decisions, in a wonderful chapter IX, written by Mircea Gligor, and concluding with several questions about modern sociophysics, an apparent rival of econophysics, which has virtually become a new science of deeply understanding the sociological phenomenon, no less than an applied field of physics in modern academia. This tenth and last chapter concludes the theoretical and applicative, shaping and gnoseological, and also strongly epistemological universe of econophysics and sociophysics. The authors, Gheorghe Săvoiu and Ion-Iorga Simăn, end, on a balanced and optimistic note, a transition from the micro- to the macro- scale, therefore highlighting the amazing speed of development and adequacy of the new sciences based on physical models and methods, which fertilize, in an unexpected manner, the social and economic contemporary universe, increasing the degree of accuracy and validity of forecasts and simulations in the new global economy.

This on-line book, made by a group of enthusiastic researchers whose way of working together was tested by the EDEN I-IV workshops, is an attractive book, dedicated to the emergence and rising importance of trans- and multidisciplinarity in economics, which emphasizes, in the closing section, the idea that the most important issue for this new science, called econophysics, remains its ability to measure, report and understand change in economic and social realities, much more quickly than classical economics still does. Econophysics will become a stronger science, not so much through its methodological component, or its distinctive modelling excess, but through its increasing adaptability to the changes in the economic and social reality, based on the best methods, techniques, tools, instruments, concepts and solutions taken over from physical thinking, which is more able to generalize, and conduct simulations, experiments and relativizations.

Concluding, we have to recognize the pleasure of reading and harmonizing the scientific language in a trans- and multi-disciplinary book, added to the novelty of seeing it published online, which is actually the future of academic publishing in the coming decades of the new century, the 21st. The major scientific publishers, as is the case of Elsevier Publishers for this book, are decanting a vast huge written material, first in the on-line collections of Amazon and Kindle, while still retaining the alternative of classic books, paperback editions, to the traditionalist reader’s delight, but they clearly and permanently tip the scales in favour of online books.
About the editor and the authors

Gheorghe Săvoiu, Economist, Senior lecturer PhD
University of Pitesti, Romania, Faculty of Economics
Gheorghe Săvoiu has graduated at the Academy of
Economic Studies – Bucharest, Faculty of Commerce,
1981 and graduate doctor’s degree in economic science,
on the 11th of November 2000, Faculty of Economic
Cybernetics, Statistics and Informatics.
(Co)Author of more than 25 books, 15 papers ISI
Thompson (Web of Knowledge), and more than 200
journal and conference papers.
Major domains of interest: statistics, econometrics,
econophysics, sociophysics, logic, philosophy, economics,
rural tourism, marketing researches, ecology, management’s
methods, demography, price universe and interpreter indices.

Radu Chişlea
Physicist, Proffesor PhD, Faculty of Applied Sciences, Bucharest Polytechnic University,
Bucharest, Romania

Andronache Constantin
Physicist, Research Associate PhD, Boston College, Chestnut Hill, MA, USA

Mirea Gligor
Physicist, Professor PhD. National College “Roman Vodă”, Roman, Neamţ, Romania

Aretina – Magdalena David – Pearson
Physicist, Lecturer PhD. Faculty of Applied Sciences, Bucharest Polytechnic University,
Bucharest, Romania.

Ion Iorga Simâń
Physicist, Proffesor PhD, Faculty of Science, University of Pitesti, Romania