frontiers | Frontiers in Physics

TYPE Editorial
PUBLISHED 25 November 2022
DOI 10.3389/fphy.2022.1068088

OPEN ACCESS

EDITED AND REVIEWED BY
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SPECIALTY SECTION
This article was submitted to Social Physics,
a section of the journal
Frontiers in Physics

RECEIVED 12 October 2022
ACCEPTED 14 October 2022
PUBLISHED 25 November 2022

CITATION
Haven E, Ausloos M, Jafari R and Saakian D (2022), Editorial: The paradigm of complexity and the real data of socio-economy.
Front. Phys. 10:1068088.
doi: 10.3389/fphy.2022.1068088

Editorial: The paradigm of complexity and the real data of socio-economy

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KEYWORDS

complexity, cliometrics, networks, random matrix theory, correlation matrices, econophysics

Editorial on the Research Topic
The paradigm of complexity and the real data of socio-economy

This special issue is composed of four papers which are diverse in topic.

The first paper deals with elucidating the links between cliometrics and complexity. Cliometrics has very interesting applications where economic history is analyzed from an economics-based modelling perspective. Here the paper does not use standard economic modelling techniques, but rather novel ways of analyses, sourced from econophysics and complexity theory.

Abry et al. provide very interesting insights on how, for instance, a topological representation of asset market networks can yield stylized facts. The authors discuss planar maximal filtered graphs/threshold networks- and minimum spanning trees (MST). The authors make a careful distinction between how econophysics aids in uncovering how long term correlations between equity markets are due to globalization, but how cliometrics considers the structure of global markets—over very long periods of time. Dynamic graphs are used in that regard; cliophysics can ascertain the network structure of globalization. The paper also contributes to showing how cliophysics can help in better understanding international monetary regimes.

Jian-An Li et al. consider the statistical properties of trade networks on five categories of pesticides. They find results which can be of interest to international economics, in that they observe that pesticides are produced for export where there is a comparative advantage relative to either labor and/or technology. The authors find that, across five groups of pesticides (over a time span of 13 years), all yearly distributions of links in the trade network collapse on the same curve. This can

be seen in the paper Figure 7 which indicates that there is a slowing down in the trade globalization of pesticides.

In the paper by Poghosyan and Saakian, the functional equation of the product of random (2×2) matrices is being investigated under the constraint that the random choice of matrices is Markovian. The authors identify the phase structure of such correlated random matrices product, and derive an exact analytical expression for the transition points between different phases of this product, for an infinite series of matrices. Those new results can be applied to many interdisciplinary settings, e.g., in biology.

In a fourth paper, Vahabi et al. analyze the collective behavior of banks listed on the Tehran stock exchange and of Iranian regional banks listed on the Shanghai SSE180 stock exchange index, as being active in emerging markets. The authors compare their behavior with that of regional banks either listed on the Standard and Poor's 500 index or on the Nikkei225 index, i.e., belonging to mature markets. Thus, the authors draw data from 4 indices. The data covering 21 regional banks was collected over a 3-years period, from March 2016 to March 2019. Using the Random Matrix Theory method, it is found that mature markets have a higher degree of collective behavior than the emerging markets. Such a degree is measured through the participation ratio, node participation ratio and relative participation ratio. Dendrograms and heat maps of the correlation matrices are also presented. The authors conclude that mature markets are more vulnerable to perturbations because of their high level of collective behavior.

Author contributions

All authors listed have made a substantial, direct, and intellectual contribution to the work and approved it for publication.

Conflict of interest

The author declares that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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