



UNIVERSITY  
OF WARSAW

Proceedings of combined conference  
13th Econophysics Colloquium (EC)  
and 9th Symposium of Physics in Economy  
and Social Sciences (FENS)

University of Warsaw, 2017 July 5–7, Warsaw, Poland

*Editors of the Proceedings:*

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WARSAW

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POLISH ACADEMY OF SCIENCES  
INSTITUTE OF PHYSICS

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### Frame aims:

- Presentation of methodologies, theories, methods and models developed in physics, mathematics, and computer science that can be successfully applied in economics and social sciences.
- Meeting of people representing different scientific fields who are interested in multi-, cross-, and interdisciplinary cooperations.
- Strengthening the interaction between the academia and the industry, including business people, bank representatives, insurance institutions, IT companies, and the stock exchange.
- Popularization of the relatively new, quickly developing fields of multi-, cross-, and interdisciplinary sciences like econophysics and sociophysics among graduate students, Ph.D. students, and anyone interested in such subjects.

### Acknowledgements:

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## Preface

Physics, economics, sociology, mathematics, and computer science are fields of science which, as a result of cross-fertilisation, have created the multi-, cross-, and interdisciplinary areas of science and research such as econophysics and sociophysics, thriving in the last two and a half decades. They use knowledge, methodologies, methods and tools of physics for modeling, explaining and forecasting economic and social phenomena and processes. The (thirteenth) Econophysics Colloquium (EC2017) combined with (ninth) Polish Symposium on Physics in Economy and Social Sciences (Polish acronym FENS2017) were the remarkable meetings on these new areas. These events gathered physicists, economists, market practitioners, and researchers from many other fields. This combination of both conferences is an exceptional event that raises the importance of both because they make truly international and strongly coupled with each other meetings. The both conferences were attended by some of the most influential researchers and speakers in the area of econophysics and inspiring very active practitioners. They provided an opportunity to discuss, from various points of view, the socio-economical reality. This is extremely important at the present turbulent time, when reality is characterized by unusually high volatility making a major impact on our everyday life.

The list of previous Econophysics Colloquia (EC), containing detailed informations, are located on the webpage: [Econophysics Colloquia](#). EC started at 2005 in Canberra (Australia) and in subsequent years were held in the following locations around the world: Tokyo (Japan 2006), Ancona (Italy 2007), Kiel (Germany 2008), Erice (Italy 2009), Taipei (Taiwan 2010), Vienna (Austria 2011), Zürich (Switzerland 2012), Pohang (Korea 2013), Kobe (Japan 2014), Prague (Czechia 2015), São Paulo (Brazil 2016). Selected papers of these Econophysics Colloquia were published, e.g., in *Physica A: Statistical Mechanics and its Applications* Vol. 370, Issue 1, Pages 1-162 (1 October 2006)

The FENS Symposia, partially inspired by Econophysics Colloquia, significantly contributed to build of the Polish econo- and sociophysics society. The Symposium FENS 2017 was a continuation of the eight editions of previous symposia that were held in [Warszawa \(2004\)](#), [Kraków \(2006\)](#), [Wrocław \(2007\)](#), [Rzeszów \(2009\)](#), [Warszawa \(2010\)](#), [Gdańsk \(2012\)](#), [Lublin \(2014\)](#), and [Rzeszów \(2015\)](#). The selected papers from these meetings were already published in [Acta Physica Polonica B](#) and [Acta Physica Polonica A](#). The presented issue provides selected lectures given at the latest FENS 2017 meeting at Warsaw University, July 5–7th, 2017.

This issue contains only part of the works presented at the conference. The second part will contain *Physica A: Statistical Mechanics and its Applications*, Special Issue.

Editors of the Proceedings

## List of Speakers:

### Plenary speaker

- H. Eugene Stanley (Boston University), *Are organizing principles from physics of relevance to economic and social sciences?*

### Invited Speakers:

#### Macroeconomy:

- Marcel Ausloos (University of Leicester), *SME investment best strategies*
- Sonia M. Bentes (Universitário de Lisboa), *Modelling the asymmetric behaviour of stock market volatility: New evidence*
- Ladislav Kristoufek (Charles University in Prague), *Fractal methods for fractional cointegration*
- Mateusz Pipień (Cracow University of Economics), *Some recent advances in empirical analyses of economic cycles*
- Rafał Weron (Wrocław University of Technology), *Probabilistic forecasting in energy markets: Why? When? How?*
- Fabrizio Lillo (University of Bologna), *Systemic risk due to fire sale spillover and portfolio overlaps*

#### Financial markets & microstructures:

- Dariusz Grech (University of Wrocław), *Asymmetry of price returns - analysis and perspectives from non-extensive statistical physics point of view*
- Vyngintas Gontis (Institute of Theoretical Physics and Astronomy, Vilnius University, Lithuania), *The first passage time statistics as empirical test of observed long-range memory in the financial markets*
- Thomas Lux (Christian-Albrechts-Universität Kiel & Universität Jaume I), *Estimation of Agent-Based Models of Financial Markets: A State-Space Approach*
- Silvio Queirós (Brazilian Center for Research in Physics), *The not so stylised shapes of financial markets: Intraday profiles of returns and trading volume*

#### Sociophysics:

- Stanisław Drożdż (Institute of Nuclear Physics of Polish Academy of Sciences & Cracow University of Technology), *Volatility correlations in narrative*
- Janusz Hołyst (Warsaw University of Technology), *Hierarchical Partitions of Social Networks Between Rivaling Leaders*
- János Kertész (Central European University & Budapest University of Technology and Economics), *Multiplex Modeling of the Society*
- Krzysztof Kułakowski (AGH University of Science and Technology), *Paradox of integration - a computational model*
- Tobias Preis (University of Warwick), *Sensing human activity using online data*
- Peter Richmond (The University of Dublin), *On the relationship between income, fertility rates and the state of democracy in society*
- Boris Podobnik (University of Rijeka), *Estimating the tipping point of right-wing populism in response to unbalanced immigration*
- Enrico Scalas (University of Sussex), *Stylised models for the distribution of wealth*
- Sitabhra Sinha (The Institute of Mathematical Sciences, Chennai), *Is it rational for Homo Economicus to be "nice" to others? The co-action solution resolves social dilemmas*
- Zbigniew Struzik (Tokyo University), *Should we (try to) understand life?*
- Katarzyna Sznajd-Weron (Wrocław University of Technology), *Conformity in numbers: How to validate social agent-based models*

#### Networks:

- Shlomo Havlin (Bar-Ilan University), *Cascading Failures and Recovery in Networks: applications to finance*
- Rosario N. Mantegna (Palermo University & Central European University), *Bootstrap validation of proximity based networks*
- Misako Takayasu (Center for TDB-Advanced Data Analysis and Modeling Tokyo Institute of Technology, Japan), *Network Fragility of Business Firms*

#### General:

- Tiziana Di Matteo (King's College London), *Multiscaling: real source and consequence*
- Hideki Takayasu (Sony Computer Science Laboratory & Meiji University), *Construction of mathematical models of bankruptcy of firms from the big data*
- Arkadiusz Orłowski (Warsaw University of Life Sciences & Polish Academy of Sciences), *Methods of machine learning and pattern recognition with applications to econophysics*