Some Relevant Econophysics' Moments of History, Definitions, Methods, Models and New Trends

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ABSTRACT

New models result from a new way of thinking or from the trans-disciplinary methods used in new domains. Econophysics improve the quality of the classical research of Economics through its original models and methods. As a new or very young science Econophysics means either a new domain for physicists or new methods and ways of thinking for economists in the modern world. Physicists have recently established careers in the banking, financial, life insurance and marketing more easily than we could imagine only because their appetite for data and new laws of economic realities. After a brief historical background of the last three decades, a new section is defining what Econophysics is, and others underline significant methods, models, results, and trends. A final remark is inspired by the needs of globalize economies.

Key words: Econophysics, Statistical Physics, Econophysics model, Quantum Statistics, power law, diffusion.

1.INTRODUCTION

Econophysics has become an attractive field of research over the last three decades, despite the controversies between economists and physicists and due to its potential used for understanding the economic phenomena.

Josiah Willard Gibbs (1839-1903) was not only a pioneer in physical research, but most of all, *the father* of *Statistical Mechanics*. J. W. Gibbs inspired his remarkable student Irving Fisher (1867–1947), another father of American mathematical Economics in its neoclassical form and Statistical Theory of Index Numbers. After eighty years, J.W. Gibbs inspired Paul A. Samuelson's famous piece of work, *Foundations of Economic Analysis* (1947), one of the grand tomes that helped revive *Neoclassical economics* and relaunched the era of the mathematization of Economics. After more than one hundred years, methods and models of Statistical Mechanics or Quantum Statistics can be successfully applied to economic problems.

The great experience of physicists in working with experimental data gives them certain advantage to uncover quantitative laws in the statistical data available in Economics.

2.A BRIEF HISTORY OF ECONOPHYSICS

For the new Econophysics, its first applications involved have been almost invariably to financial markets and certainly comprised many different interacting actors, with the interactions occurring relatively frequently. Statistical mechanics or physics was developed in the second half of the XIXth century by James Clerk Maxwell, Ludwig Boltzmann, and Josiah Willard Gibbs. These physicists developed mathematical methods for describing the atoms statistical properties: the probability distribution of velocities of molecules in a gas (the Maxwell-Boltzmann distribution), and the general probability distribution of states with different energies (the Boltzmann–Gibbs distribution).

The role of physics models as the foundations for the standard neoclassical model that current econophysicists seek to displace is much older than two centuries:

- Canard N-F wrote, in 1801, that supply and demand were ontologically like contradicting physical forces;
- Léon Walras was deeply influenced by the physicist Louis Poinsot in his formulation of

this central concept of general equilibrium theory in economics;

- Irving Fisher, father of American mathematical economics in its neoclassical form, was a student of the father of statistical mechanics, J. Willard Gibbs.

The interest of physicists in financial and economic systems has roots that date back to 1936, when Majorana wrote a pioneering paper, published in 1942 and entitled *Il valore delle leggi statistiche nella fisica e nelle scienze sociali*, on the essential analogy between statistical laws in physics and social sciences. Many years later a statistical physicist Elliott Montroll coauthored with Badger W.W, in 1974, the book *Introduction to Quantitative Aspects of Social Phenomena.*

The application of concepts as power-law distributions, correlations, scaling, unpredictable time series and random processes to financial markets was possible during the past two or three decades years, not only physicists have achieved important results in statistical mechanics, nonlinear dynamics, and disordered systems, but due to other significant statistical investigations and mathematical formalizations.

First mathematical formalization of a random walk was published by Louis Bachelier in his doctoral thesis entitled *Théorie de la speculation,* at the Academy of Paris, on 29 March 1900, in which Bachelier determined the probability of price changes. The first description of a random walk made by a physicist was performed in 1905 by Albert Einstein and the mathematics of the random walk was made more rigorous by Norbert Wiener. Bachelier's original proposal of Gaussian distributed price changes was soon replaced by a lot of alternative models, from which the most appreciated was a geometric Brownian motion, where the differences of the logarithms of prices are Gaussian distributed [1].

Since the 1970s, a series of significant changes has taken place in the world of finance that finally will be born the new scientific field of Econophysics. One key year was 1973, when currencies began to be traded in financial markets, and it was published the first paper that presented a rational option-pricing formula [2].

A second revolution began in the 1980s, when electronic trading was adapted to the foreign exchange market and the result have became a huge amount of electronically stored financial data readily available. Since the same 1980s it has been recognized in the physical sciences that unpredictable time series and stochastic processes are not synonymous. The chaos theory has shown that unpredictable time series can arise from deterministic nonlinear economic systems and theoretical and empirical studies have investigated whether the time evolution of asset prices in financial markets might indeed be due to underlying nonlinear deterministic dynamics of a relative limited number of variables. Since the 1990s, a growing number of physicists have attempted to analyze and model financial markets and, more generally, economic systems, new interdisciplinary journals have been published, new conferences have been organized, and a lot of new potentially scientific fields, areas, themes and applications have been identified. The researches of Econophysics deal with the distributions of returns in financial markets, the time correlation of a financial series, the analogies and differences between price dynamics in a financial market and physical processes as turbulence or ecological systems, the distribution of economic stocks and growth rate variations, the distribution of firm sizes and growth rates, the distribution of city sizes, the distribution of scientific discoveries, the presence of a higher-order correlation in price changes motivated by the reconsideration of some beliefs, the distribution of income and wealth, the studies of the income distribution of firms and studies of the statistical properties of their growth rates.

The statistical properties of the economic performances of complex organizations such as universities, regions or countries have also been investigated in Econophysics. The new real characteristics of the Econophysics on medium and long term, will be a result of its new research like rural-urban migration or growth of cities, etc. The real criticism of Econophysics is the absence of age variable, because models of Econophysics consider immortal agents who live forever, like atoms, in spite of evolution of income and wealth as functions of age, that are studied in economics using the so-called overlapping-generations models. Even with the time, both physics and economics became more formal and rigid in their specializations, and the social origin of statistical physics was forgotten, the future is perhaps a common one. On the computer econophysicists have established a niche of their own by making models much simpler than most economists now choose to consider even using possible connection between financial or economical terms and *critical points* in statistical mechanics, where the response of a physical system to a small external perturbation becomes infinite because all the subparts of the system respond cooperatively, or the concept of "noise" in spite of the fact that some economists even claim that it is an insult to the intelligence of the market to invoke the presence of a noise term… Many different methods and techniques from physics and the other sciences have been explored by econophysicists, including chaos theory, neural networks and pattern recognition.

Econophysics means also a scientific approach to quantitative economy using ideas, models, conceptual and computational methods of statistical physics. In recent years many of physical theories like theory of turbulence, scaling, random matrix theory or renormalization group were successfully applied to economy giving a boost to modern computational techniques of data analysis, risk management, artificial markets, macro-economy [3]. And thus Econophysics became a regular discipline covering a large spectrum of problems of modern economy.

But even today in this new era of Econophysics still remains a negative impact of physics with economics for which both physicists and economists are in part responsible, because of the failure of economists to deal properly with certain empirical regularities and a lot of economists still have a mind set which is unusually closed, or it is caused by the fact that many physicists cannot understand even the simplest supply-and-demand model, or by the fact that physicists and economists belong to the distinct categories of physical or natural (hard) science and social (soft) etc. Science or financial markets are only a very small part of economic theory and some physicists naively believe and search for universal empirical regularities in economics that probably do not exist and seem to have been reluctant to work in areas where data sets are short and unreliable, but this characterizes a great deal of data in the social sciences and economics.

3. DEFINITIONAL ISSUES OF ECONOPHYSICS

The study of Economics and Economic phenomena with physical methods has experienced a surge of interest over the last decade for this great attention paid to Econophysics and its huge amount of high quality data made available by the internet technologies. Econophysics was from the beginning the application of the principles of Physics to the study of financial markets, under the hypothesis that economic world behaves like a collection of electrons or a group of water molecules that interact with each other, and the econophysicists are always considered that, with new tools of statistical Physics, and the recent breakthroughs in understanding chaotic systems, they are making a controversial start at tearing up some perplexing Economics and reducing them to a few elegant general principles with the help of some serious mathematics borrowed from the study of disordered materials.

The term *Econophysics* was introduced by analogy with similar terms which describe applications of Physics to different fields, such as Astrophysics, Geophysics, and Biophysics. Econophysics was first introduced by the prominent theoretical physicist Eugene Stanley in 1995, at the conference Dynamics of Complex Systems, which was held in Calcutta, later known as Kolkata, as a satellite meeting to the Statphys–19 conference in China [4]. The multidisciplinary field of Econophysics uses theory of probabilities and mathematical methods developed in statistical Physics to study statistical properties of complex economic systems consisting of a large number of complex units or population (firms, families, households) made of simple units or humans. Particularly important in defining Econophysics is the distinctly difference between statistical Physics and mathematical statistics in its focus, methods, and results.

Rosario Mantegna and Eugene H. Stanley have proposed the first definition of Econophysics as a multidisciplinary field or "the activities of physicists who are working on Economics problems to test a variety of new conceptual approaches deriving from the physical sciences" [1]. "Economics is a pure subject in statistical mechanics," says Stanley.

"It's not the case that one needs to master the field of Economics to study this."

It is a sociological definition, based on physicists who are doing the working on Economics problems. Why is Econophysicsan interdisciplinary and not multidisciplinary? Multidisciplinary suggests distinct disciplines discussing as with an economist and a physicist talking to each other. Interdisciplinary suggests a narrow specialty created out of elements of each separate discipline, such as a "water economist" who knows some Hydrology and Economics. The more usual way to define a multidisciplinary discipline is to do so in terms of the ideas or methods that it deals with as for example political economy or bioPhysics. However, transdisciplinary suggests a deeper synthesis of approaches and ideas from the disciplines involved, and is the term favored by the ecological Economics for what they are trying to develop.Another definition more relevant and synthetic considers Econophysics an "interdisciplinary research field applying methods of statistical Physics to problems in Economics and finance"[4].

Between Econophysics and Sociophysics are some important differences: while the first focuses on the narrower subject of economic behavior of humans, where more quantitative data is available, whereas the second studies a broader range of social issues. But generally speaking, the boundary between Econophysics and Sociophysics is not sharp, and the two fields enjoy a good rapport.

Econophysics is still a new word, even after twelve years, used to describe work being done by physicists in which financial and economic systems are treated as complex systems. Thus, for physicists, studying the economy means studying a wealth of data on a well-defined complex system.

The contemporary way to define Econophysics is to do so in terms of the ideas that it involves in effect physicists doing Economics with theories from Physics, this raises the question of how the two disciplines relate to each other and it explains interest rates and fluctuations of stock market prices, these theories draw analogies to earthquakes, turbulence, sand piles, fractals, radioactivity, energy states in nuclei, and the composition of elementary particles (Bouchaud).

On the computer econophysicists have established a niche of their own by making models much simpler than most economists now choose to consider even using possible connection between financial or economical terms and *critical points* in statistical mechanics, where the response of a physical system to a small external perturbation becomes infinite because all the subparts of the system respond cooperatively, or the concept of "noise" in spite of the fact that some economists even claim that it is an insult to the intelligence of the market to invoke the presence of a noise term. Many different methods and techniques from Physics and the other sciences have been explored by econophysicists, sometimes frantically, including chaos theory, neural networks and pattern recognition. Another interesting and modern definition considers Econophysics a scientific approach to quantitative economy using ideas, models, conceptual and computational methods of statistical Physics. In recent years many of physical theories like theory of turbulence, scaling, random matrix theory or renormalization group were successfully applied to economy giving a boost to modern computational techniques of data analysis, risk management, artificial markets, macro-economy [3]. And thus Econophysics became a regular discipline covering a large spectrum of problems of modern economy. A large definition of Econophysics describes it like a new area developed by the cooperation between physicists, economists, mathematicians, which applies idea, method and models in Statistical Physics and Complexity to analyze data from economical phenomena [5].

Econophysics is actually nothing more than the composition of the words Physics and Economics, a link between the two completely separate disciplines that lies within the characteristic behaviour exhibited by financial markets similar to other known physical systems. The aim of Econophysics is to understand the universal behaviours of a market. (Alessio Farhadi). There are some different types of Econophysics, too: an experimental or observational type, trying to analyze real data from real markets and to make sense of them, and a theoretical type trying to find microscopic models which give for some quantities good agreement with the experimental facts (Bertrand Roehner, a theoretical physicist based at the University of Paris). First Econophysics models published by physicists in a Physics journal were those of Mantegna, (1991) and Takayasu (1992), though developed a few years earlier. But a Monte Carlo simulation of a market was already published in 1964 by Stigler from the Chicago Economics School [6]. Nobel laureate of Economics, H.M. Markowitz published too with Kim a model for the 1987, about the crash on Wall Street, with two types of investors similar to many later models of physicists [7].

After 2000, Econophysics has matured enough to allow generalized applications, their field being called sometimes Econo-engineering.

Without being similarly defined, Econophysics remains the science that uses models taken especially from statistical Physics to describe some economic phenomena, an interdisciplinary research field, applying theories and methods originally developed by physicists in order to solve problems in Economics, usually those including uncertainty or stochastic elements and nonlinear dynamics.

Basic tools of Econophysics are probabilistic and statistical methods often taken from Statistical Physics or Quantum Statistics. Most Econophysics approaches, models and papers that have written so far refer to the economic processes including systems with large number of elements such as financial or banking markets, stock markets, incomes, production or product's sales, individual incomes etc., where statistical Physics methods are mainly applied.

4. SOME RELEVANT ECONOPHYSICS' METHODS AND MODELS

The contemporary Econophysics involves in effect physicists doing economics with theories and methods from physics, and this raises the question of how the two disciplines relate to each other and it explains interest rates and fluctuations of stock market prices, these theories draw analogies to earthquakes, turbulence, sand piles, fractals, radioactivity, energy states in nuclei, and the composition of elementary particles (Bouchaud). Today it becomes possible for methods and concepts of Statistical Physics and Quantum Statistics to have real influence in economic thought, but it is also possible that economical, mathematical, econometrical methods and concepts can influence Physics thought too. The methods of Econophysics define its main goal in applying Statistical Physics, Quantum Statistics, etc. and other methods used in Physics to economic data and economic processes. Why the methods and techniques from Physics can be successfully applied to economical and financial problems? Could be this the result of the great experience of physicists in working with experimental data gives them a unique advantage to uncover quantitative laws in the statistical data available in Economics? Is indeed Econophysics bringing new insights and new perspectives, which are likely to revolutionize the classical economics?

The study of dynamical systems is mostly based in expressing them in terms of (partial) differential equations which are further solved by analytic methods (or numerically). But this is somehow against our intuitions: we never meet in our life density distributions of our friends, cars, utility functions etc. We have converted integers into a real numbers by averaging over certain areas. This can be done either by averaging over large enough volumes or over long period of times. Statistical physics is a framework that allows systems consisting of many heterogeneous particles to be rigorously analyzed. Inside Econophysics these techniques are applied to economic particles, namely investors, traders, consumers, and so on. Markets are then viewed as (macroscopic) complex systems with an internal microscopic) structure consisting of many of these particles interacting so as to generate the systemic properties (the microstructural components being reactive in this case, as mentioned already, thus resulting in an adaptive complex system).When the first physicists tried to analyze financial markets applying method of statistical physics they did not view these markets as particularly fine examples of complex systems, as cases of complexity in action. Some of them have even believed they are discovering laws or some stability evidence in the form of the scaling laws that Pareto first investigated (but that have been found in a much wider variety of economic observables). In truth, the stability evidence discovered or the empirical distribution is not a stable or definitive one (a conclusive one), because all the markets are characterized by non-stationarity, that is a general feature of adaptive complex systems: "the empirical distribution is not fixed once and for all by any law of nature [but] is also subject to change with agents' collective behaviour" [8].

Theory confirms that characteristics of complex systems involve three necessary conditions:
- complex system must contain many subunits (the exact number being left vague).
- subunits must be interdependent (at least some of the time).
- interactions between the subunits must be nonlinear (at least some of the time).
These properties are said to be emergent when they amount to new complex or systemic structure and an adaptive complex system add the following condition:
- individual subunits modify their properties and behaviour with respect to a changing environment resulting in the generation of new systemic properties.
Finally the organizing adaptive complex system also add an important condition:
- individual subunits modify their own properties and behaviour with respect to the properties and behaviour of the unit system they jointly determine (Latora & Marchiori, 2004)
In a comparison to classical statistical thought, Econophysics have revealed that heterogeneous in reality must be explained with homogeneous in theory. And this is the main role of method of statistical physics to unify and simplify economics. Science or financial markets are only a very small part of economic theory and some physicists naively believe and search for universal empirical regularities in Economics that probably do not exist and seem to have been reluctant to work in areas where data sets are short and unreliable, but this characterizes a great deal of data in Economics.

In Econophysics, the activities of research focused on economic phenomena but are analyzed by concept, method and model of physics. Here three typical examples are:
a) the derivation of a price's distribution in the stock market (the change in the price "*x*" of stock market could be considered a random among dealers, then can derive a diffusion equation as a Brownian motion, for distribution *f(x,t)* of price in the stock market) [9]:

$$\frac{\partial f\ \ x,t}{\partial t} = \frac{1}{k} \times \frac{\partial^2 f\ \ x,t}{\partial x^2}$$

b) distributions of the form that follows a *power law* as: $\ln p(x) = -\alpha \ln x + C$, where the constant α is called exponent of the power law, and *C* is constant and mostly uninteresting (once α is fixed, it is determined by the requirement of normalisation to 1), or in the case of taking the exponential of both sides, this is equivalent to: $p(x) = Cx^{-\alpha}$ (a power-law distribution occurs in an extraordinarily diverse range of phenomena such as Finance, Macroeconomics, Demography's urbanism) [10]
c) a fractal and chaos analysis originating as Benoite Mandelbrot pointed out that the change in the price of the stock market has a fractal structure for certain range of time interval [11,12], and characterized as a self-similar structure expressed as: $x(t) = Ct^{D}$, where *D* is a fractal dimension, calculated by the box counting method. (The fractal structure is special case of a chaos and chaotic behavior is very common in a non-linear system as for an economic system; whether the process is chaotic or not can be determined by sign of Lyapunov index λ defined as: $\lambda = 1/n \, \Sigma \log | F'(t) |$, and when λ is positive (negative) then the process is chaotic (non- chaotic). [9]

Modern Econophysics has developed a new learning system for econophysicists, a system consisting of several methodological parts:
1)Basic Mathematics' methods,
2)Basic Econometrics'methods,
3)Echonophysics' methods, including chaos' methods and fractals' methods,
4)Virtual market's methods.
reviewing classical methods and concepts concerning to each part: Mathematical representation and analysis of the economic data for basic Econometrics; the chaos and fractal including the Lyapunov index and the fractal dimension for Econophysics; the Sato-Takayasu model and simulation for virtual market. [9]

5. SOME RESULTS AND NEW TRENDS

From the perspective of the authors (an economist and a physicist), the two main elements of Econophysics for an update review are the results and the new domains in refereed literature. But in fact it is really difficult to do it properly without two significant opinions. Both are from the most important representatives of American school of Econophysics.
A. First opinion belongs to Eugene H. Stanley, the well-known father of the new science (physicist to Boston University, Department of Physics), and it was written during a scientific talk about recent applications of correlated

randomness to economics for which statistical physics is proving to be particularly useful:

1. Traditional economic theory does not predict outliers, but recent analysis of truly huge quantities of empirical data suggests that statistical physics do not fail for it.
2. In classical Economics, neither the existence of power laws nor the exact exponents have any accepted theoretical basis, but the method of Econophysics does it.
3. Some economic phenomena are described by power law tails has been recognized for over one hundred years, but it becomes a scientific reality due to statistical physics.
4. Nowadays, the concepts of scaling and universality provide the conceptual framework for understanding the geometric problem of percolation frequently used in Econophysics.
5. Since economic systems are comprised of a large number of interacting units has the potential of displaying power-law behavior, it is perhaps not unreasonable to examine economic phenomena within the conceptual framework of scaling and universality.
6. The massing of empirical facts led to find laws in statistical physics, but finding them is only the first or empirical part of Econophysics task, and the second or theoretical part generates more difficulties because it means understanding new laws.
7. While the primary function of a market is to provide a venue where buyers and sellers can transact, the more the buyers and sellers at any time, the more efficient the market is in matching buyers and sellers, so a desirable feature of a competitive market becomes liquidity. Quantifying the fluctuations that reflects the underlying liquidity for a particular stock, offers a way of understanding the dynamics of market liquidity.
8. One supplementary reason the Economics is of interest to statistical physicists is the system made up of many subunits (Ising Econophysics model in which subunits are called spins, nothing else but buyers and sellers). The orientation of whether we buy or sell is influenced not only by our neighbors but also by news (bad news, means to sell). So the state of any subunit is a function of the states of all the other subunits and of a field parameter. One of the most important things Econophysics had to do was quantify demand. And Econophysics did this by analyzing huge databases comprising every stock bought or sold, which gives not only the selling price and buying price, but also the asking price and the offer price.
9. The cross-correlation is another important problem that Econophysics has been studying, and that means how the fluctuations of one stock price correlate with those of another.
10. The first Econophysics' model was unifying the power laws (large movements in stock market activity arise from the trades of the large participants).
11. No one can predict future trends, but approximate inequalities are sometimes predictable. Econophysics, where physicists collaborate with economists and the result is more probable to be useful and responsible, has benefited from collaborations with top-quality energetic economists.
12. Econophysics realize its contribution of most utility in Economics is nothing else but the novelty of thinking about and analyzing data, especially since many methods from Mathematics and Statistics are not focused on handling the strange behavior of non-stationary functions that obey scale invariance, over a limited region of the range of variables [1].

B. The second is the opinion of Victor Yakovenko (physicist to University of Maryland, Department of Physics) identifies next results:

1. Econophysics attention was primarily focused on analysis of financial markets and its important achievements define new statistical mechanics of money distribution (starting with fundamental law of the equilibrium statistical mechanics of Boltzmann-Gibbs distribution and finishing with Gamma distribution.
2. Econophysics literature has often used, on exchange models, the terms money and wealth as interchangeably. For all econophysicists wealth is equal to money plus the other property that an agent has. In order to estimate the monetary value of property, Econophysics need to know the price, and thus appears models with a conserved commodity, more and more models with stochastic growth of wealth.
3. Econophysics discovers a lot more empirical data available for distribution of income from tax agencies or population surveys and creates new theoretical income distribution's models.
4. If in Physics, a difference of temperatures allows to set up a thermal machine, then automatically the difference of money or income

temperatures between different countries allows extraction of the profit in international trade. This process very much resembles what is going on in this new globalized economy where the perpetual trade deficit of the United States is the consequence of second law of thermodynamics and the difference of temperatures between the USA and the low-temperature countries (China).

5. If in Physics language, the segregation found by Schelling represents a phase transition of the system (similar to interaction energy between two neighboring atoms that depends on whether their magnetic moments point in the same or in the opposite directions), while in economics it becomes transition, and this new concept means that a small amount of one substance dissolves into another up to some limit, but phase separation (segregation) develops for higher concentrations, and thus physicists have decided to be helpful for practical applications of such models [4]. In the last three to five years, a selected list of only ten new domains of Econophysics could be really amazing:

1. A thermodynamic formulation of Economics (J.Mimkes)
2. Understanding and managing the future evolution of a competitive multi-agent population (D.M.D.Smith, N.F.Johnson)
3. Empirical studies and models of income distributions in society (P.Richmond & others),
4. The contribution of money transfer models to Economics (Y.Wang, N.Xi, N.Ding)
5. Econophysics of stock and foreign currency exchange markets (M.Ausloos)
6. Econophysics of precious stones (Watanabe, N. Uchida, N. Kikuchi)
7. Quantum Econophysics (E. Guevara)
8. Statistical mechanics of money (A. A. Dragulescu and V. M. Yakovenko)
9. The Production Function (G. Fioretti)
10. Basel II for Physicists:A Discussion Paper (E.Scalas)

Europhysics will continue to contribute due to its statistical physics method to economics in a variety of different directions, ranging from macroeconomics to market microstructure, and that such work will have increasing implications for economic policy making.

Some of the new trends and new opportunities for the Econophysics are Indexphysics or the new construction of economic and social indices (from Consumer Price Index or CPI to Human Development Index or HDI), Physics of Distribution or physics analysis of wealth, political or economical power, and resources to optimize the dimension of firms, institution and other socio-economical entities, convergence and divergence on the micro market, the spectrum of evolution for the macro market with the best results in lower transaction costs and more efficient strategies, typical of physical systems with many interacting units, Econo-Engineering or Econodynamic Engineering, etc.

7. A FINAL REMARK

This paper was devoted to the globalizing scientific research and theory under new names like in Econophysics' interdisciplinary methods, models, fields and trends. In the future, it seems possible that the boundaries between sciences will be considered more as determined by methods, and not by the subjects of research. But it is also possible like the methods and the models to be nearly the same in many types of future scientific researches and theories. Finally, we hope that our contribution to review some of the most important papers, models, methods and trends of the new science called Econophysics was accomplished.

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