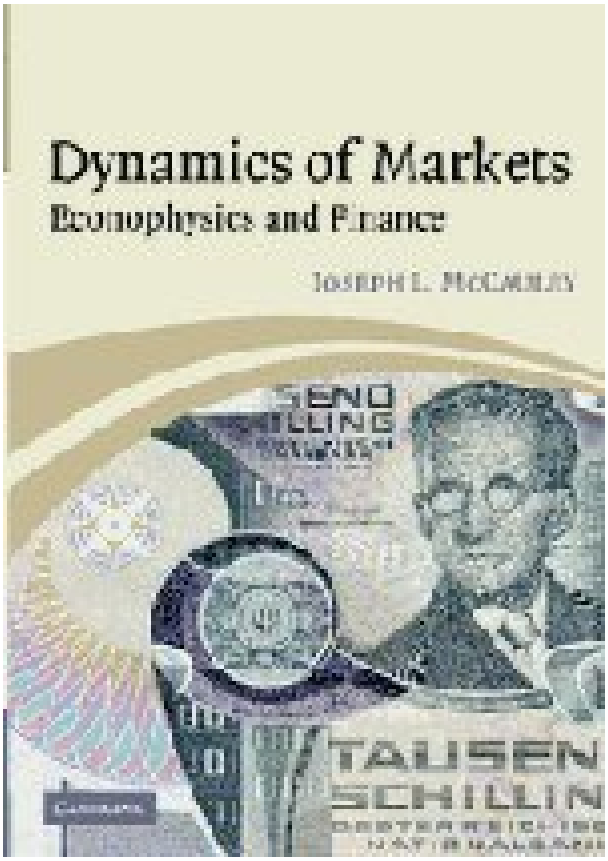
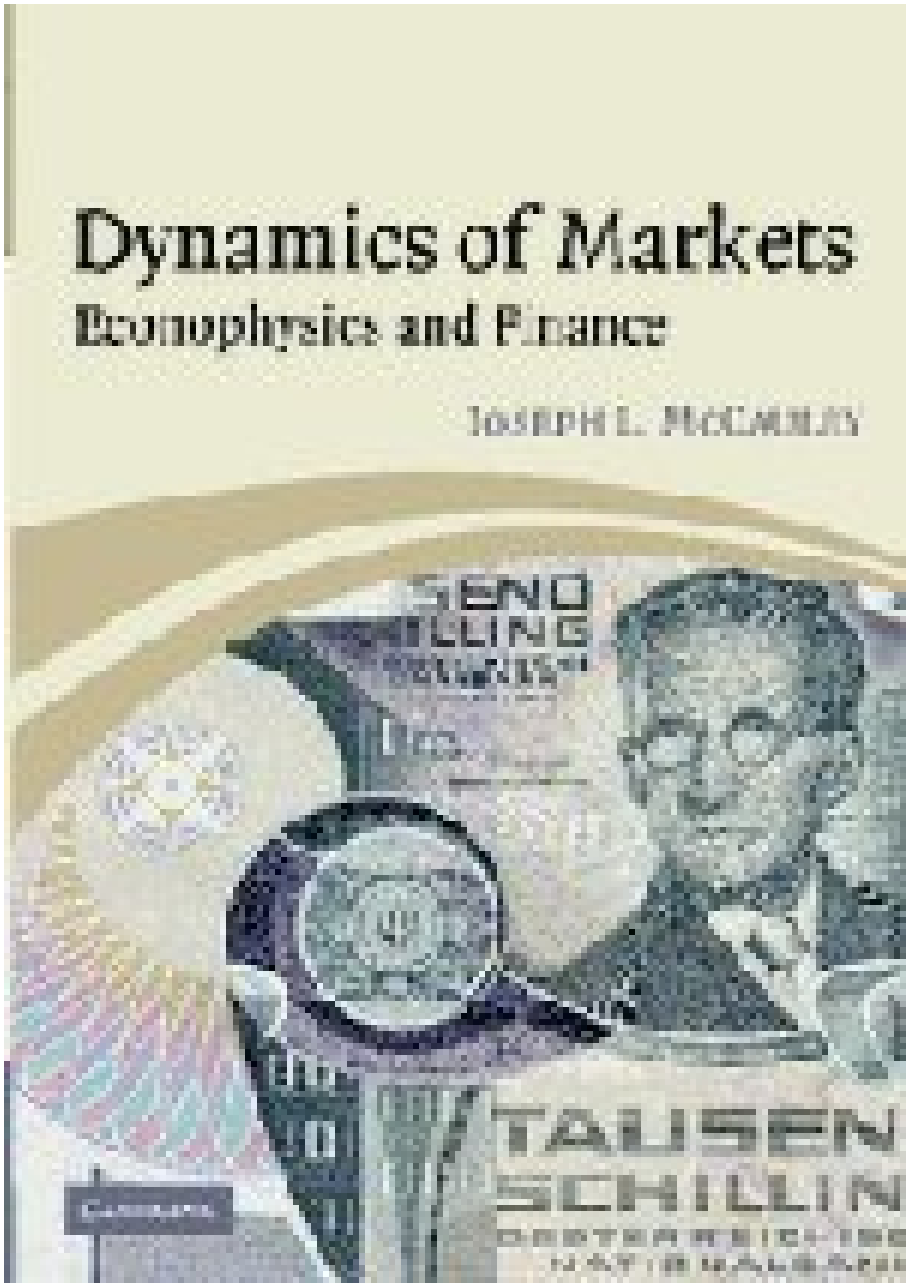
DYNAMICS OF MARKETS: ECONOPHYSICS AND FINANCE BY JOSEPH L. MCCAULEY





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Review

"This book is a case in point. This is an important contribution to the understanding of how financial markets actually perform and both students and researchers interested in econophysics should study this book carefully." American Mathematical Society

About the Author

Joseph McCauley is Professor of Physics at the University of Houston, Texas.

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Standard texts and research in economics and finance ignore the absence of evidence from the analysis of real, unmassaged market data to support the notion of Adam Smith's stabilizing Invisible Hand. In stark contrast, this text introduces a new empirically-based model of financial market dynamics that explains the volatility of prices options correctly and clarifies the instability of financial markets. The emphasis is on understanding how real markets behave, not how they hypothetically 'should' behave.

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33 of 34 people found the following review helpful.
Dynamics of Markets - Econophysics and Finance
By Enrico Scalas
Dynamics of Markets - Econophysics and Finance

by Joseph McCauley

reviewed by: Enrico Scalas

In 1720, Newton invested his money in the South Sea bubble and lost £20000, a lot of money in those days [1].

So, physicists do not always do it better in financial markets.

Having said that, let us now go on and consider the merits and limits of this book by Joseph McCauley.

The book is divided into nine chapters. Chapters 1, 3, 8 and 9 cover material from epistemology (ch. 1),

probability theory (ch. 3), fluid dynamics (ch. 8), and the theory of computation (ch. 9). Chapters 2, 4, 5,6 and 7 are mainly devoted to economics and finance. Namely, chapter 2 critically reviews the general theory of equilibrium, chapter 4 is on the dynamics of markets, chapter 5 and 6 present portfolio selection theory and

option pricing, respectively, and, finally, chapter 7 is a criticism of thermodynamic analogies in finance.

The range of interests of the author is overwhelming and this book is the first attempt to put together many concepts taken from various disciplines in a coordinate view. I am a fan of this method and I much appreciate the effort of the author. However, this is also a limit, as the reader looking for recipes to price options or to select a suitable portfolio will be somehow disappointed. In the very same way, those looking for a

rational criticism of neo-classical assumptions in economics are likely to read the chapters on option pricing without great passion.

In a short review, it is impossible to take into account all the aspects of McCauley's book.

I will just discuss one: equilibrium in economics. But, before that, let me underline that this is the first book in Econophysics where everything in finance is done by explicitly formulating and calculating Green functions. Second, the author presents the European option price predictions in a closed algebraic form and, third, Gaussian returns play no role in the predictions fully based on the empirical distribution.

The author presents a nice criticism of the concept of equilibrium in economics which, in itself, is worth

buying and reading the book. The arguments are scattered throughout the book, as the author is interested

in discussing the behaviour of financial market. For economics and finance, the author provides convincing evidence that the only legitimate form of equilibrium is vanishing excess demand. But price fluctuations in actual financial markets cannot be effectively explained by a sequence of different economic equilibria determined by varying exogenous factors. Then, the only possibility is that excess demand is considered as a stochastic process leading to diffusive models for price (or return) dynamics. Thus, the use of the Green-function formalism in Finance is a natural and logical choice.

McCauley's discussion on equilibrium would have been helped by reference to Kaldor's 1972 paper on the irrelevance of equilibrium economics [2]. Kaldor's point of view coincides with the one of McCauley when he argues that ultimately theories must be confronted with the real world. In discussing the difference between an axiomatic theorem and a scientific theory, Kaldor quotes Einstein: > [3]

Also in this book, as in many contemporary books, there are various misprints and the constant reference to wrong equation numbers is disturbing.

I think that this book can be read with profit both by physicists interested in complex systems and by economists interested in the principles of their discipline. Economists can always refer to Newton's example mentioned above, when they read in the book about the success of physicists in finance.

References

[1] C. Reed, "The Damn'd South Sea" Britain's greatest financial speculation and its unhappy ending,

documented in a rich Harvard collection. Harvard Magazine, May-June 1999.

[2] N. Kaldor, "The Irrelevance of Equilibrium Economics", The Economic Journal, vol. 82, n. 328, 1237-1255, 1972.

[3] A. Einstein, "Ideas and Opinions", Gramercy; Reprint edition (December 12, 1988).

14 of 15 people found the following review helpful.
A new kind of finance
By Paolo Laureti
Neo-classical economic theory is not a good approximation of real markets, as many have argued in the past and more insistently in the last decade. Very rarely, on the other hand, criticisms are so accurately motivated as in this book. In fact the author uncovers both theoretical and empirical inconsistencies of standard economics tex-books, showing the reader a path towards a re-foundation of finance theory. A new model of option pricing, based on the empirical distribution of returns, is proposed therein. After a brief introduction to the mathematics involved, the book presents, for each subject treated, the standard economic approach and a different point of view. It then falsifies the former and illustrates the latter with clear examples: an effective pedagogical procedure.

In the first part the main ideas of the dominant microeconomic theory, which assumes stable global equilibrium, are reviewed critically. Physicists learn that the quest for a global solution of nonlinear systems of equations is very rarely successful. Nevertheless it is widely believed that global deregulation leads to an efficient market, the mythical stable optimum theorized by neo-classical economics. Standard finance theory is introduced in the core of the book. The author's precise criticisms hit the often misused notion of equilibrium and the Modigliani-Miller theorem. This states that a firm's market price is independent from its debt-to-equity ratio, whereas Enron' s collapse seems to provide evidence of the opposite. Special attention is devoted to portfolio selection theories and to the Black-Scholes equation for pricing options in particular. Then the author illustrates his empirically based theory of market dynamics, which is a markovian stochastic process where the diffusion coefficient is not constant. Options can be priced accordingly, using the empirical distribution of returns -instead of the Gaussian one. The last part of the book discusses other applications of the physics of complex systems to finance. The author argues that thermodynamic analogies fail in economics, describing the example of a hedging strategy. Scaling and correlations are also treated in this part, before a brief review of the main conclusions drawn by various physicists who analyzed financial data.

The author guides readers of any level through the chapters they could be interested in and provides them with an accurate bibliography. But this book is not only a useful contribution to econophysics and finance theory. Especially after American elections, neo-libaral policies are going to receive a strong support from the Bush administration. McCauley demonstrates that their claims are not at all supported by empirical evidence nor by scientific rigor. amazon

10 of 13 people found the following review helpful.
Lot of criticism, lack substance
By G. N. Hernandez
In spite of its title, Dynamics of markets by McCauley is more about a criticism for the traditional point of view of economics rather than a textbook showing original ideas. Moreover the book is ambitious about is scope and depth, but proves to fall short on both. Altough the criticism of the author about economics seems logical and the arguments seems sound there is no alternative theory presented on the book. The passion of the author about the subject overcomes the objectivity of the arguments, rendering the book interesting as an alternative reading but not as a good textbook an a subject that by its nature is extremely difficult.

As reading on eh book progress it becomes clear that the author despises and considers wrong every idea and theory antagonic to his point of view. Moreover the criticism against many different theories becomes repetitive, as is a variation of the author's argument about the wrongness of economic equilibrius. The book keeps claiming in every chapter that numerous models that are being currently used by world banks, tradespeople and stock brokers among other are utterly wrong, without giving more that a couple of sentences to call judgement on them.

The book is also full of typografical error which makes extremely difficult to follow and reproduce any derivation, which is essential in order to learn a technical subject. What is worse, there are passages of the text that proves the blatant ignorance of author have on some key aspects of the theory of mathematical finance, such as the technical details of arbitrage pricing and martingales.

Its literary style is not a good either, as many chapter seems to be a semi-random collection of related ideas, without greater structure. This is yet another factor working again the manuscript as a textbook.

I do not recommed this book for anyone seriously interested to the subject, except maybe for the valuable material in chapter 2 on the criticism of the notions of equilibrium. Beyond that, avoid the material as the poor style, typografical errors and poor structure only creates confusion instead of transmiting information.

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Review
"This book is a case in point. This is an important contribution to the understanding of how financial markets actually perform and both students and researchers interested in econophysics should study this book carefully." American Mathematical Society

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