

Book Reviews: *Theory of Financial Risks: From Statistical Mechanics to Risk Management and Stochastic Processes from Physics to Finance*

Theory of Financial Risks: From Statistical Mechanics to Risk Management. Jean-Philippe Bouchaud and Marc Potters, Cambridge University Press, Cambridge, 2001.

Stochastic Processes from Physics to Finance. Wolfgang Paul and Jörg Baschnagel, Springer, Berlin, 1999.

The availability of high-frequency financial data beginning in the mid eighties constitutes a significant step toward reliably quantifying statistical aspects of speculative markets. It is now possible to profitably apply many tools from statistical physics to the study of properties of financial time series. The new vista provided by these new tools has piqued the interest of members physicists in this new field of application. These two books present material that unite physical techniques and the analysis of financial data.

These books, although both addressing the problem from the point of view of statistical mechanics and using stochastic processes as the main tool, are both very different in aim and scope. The book by W. Paul and J. Baschnagel is a summary of lectures given by the authors to graduate physics students and is intended as an introduction to random processes with applications either to physics and finance. It covers standard topics such as diffusion theory (with applications to Ising models and quantum mechanics), fractal and Levý processes. There is, in addition, a chapter that surveys financial applications with topics that range from Black–Scholes option pricing to the modeling of financial crashes. The book can well serve as the basis for a graduate course on stochastic process with applications to modern finance.

The book by Bouchaud and Potters reflects the work done in finance by the authors since the early nineties when they became interested on financial applications based on concepts originally developed in statistical physics. The book is interesting since it develops techniques to analyze

financial problems from a non-conventional point of view. It could ultimately provide a more realistic approach to analyzing problems in finance than traditional statistical techniques. Thus, the authors equipped by tools from statistical mechanics quite conclusively prove the impossibility of zero-risk strategies as the orthodox line of thought claims (e.g., Black–Sholes theory). Other financial beliefs such as trading with stop-loss strategies are also criticized. The book is well written and self-contained, starting with an overall view of probability theory, followed by chapters dealing with statistics of real prices, extreme risks and optimal portfolios and option prices. It is recommended to anyone interested on a new and fresh approach to the dynamics of financial markets.

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