1. Record Nr. UNINA9910437864103321

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Titolo	Discrete Time Series, Processes, and Applications in Finance / / by Gilles Zumbach
Pubbl/distr/stampa	Berlin, Heidelberg : , : Springer Berlin Heidelberg : , : Imprint : Springer, , 2013
ISBN	1-283-69758-0 3-642-31742-1
Edizione	[1st ed. 2013.]
Descrizione fisica	1 online resource (325 p.)
Collana	Springer Finance, , 2195-0687
Disciplina	621.38
Soggetti	Social sciences - Mathematics Probabilities Statistics Mathematics in Business, Economics and Finance Probability Theory Statistics in Business, Management, Economics, Finance, Insurance
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Preface -- List of Figures.-List of Tables -- 1. Introduction -- 2. Notation, naming and general definitions -- 3.Stylized facts -- 4. Empirical mug shots -- 5.Process Overview -- 6.Logarithmic versus relative random walks -- 7.ARCH processes -- 8.Stochastic volatility processes -- 9.Regime switching process -- 10.Price and volatility using high-frequency data -- 11.Time reversal asymmetry -- 12. Characterizing heteroskedasticity -- 13.The innovation distributions -- 14.Leverage effect -- 15.Processes and market risk evaluation -- 16. Option pricing -- 17.Properties of large covariance matrices -- 18. Multivariate ARCH processes -- 19.The processes compatible with the stylized facts -- 20.Further thoughts.-Bibliography -- Index.
Sommario/riassunto	Most financial and investment decisions are based on considerations of possible future changes and require forecasts on the evolution of the financial world. Time series and processes are the natural tools for describing the dynamic behavior of financial data, leading to the required forecasts. This book presents a survey of the empirical

properties of financial time series, their descriptions by means of mathematical processes, and some implications for important financial applications used in many areas like risk evaluation, option pricing or portfolio construction. The statistical tools used to extract information from raw data are introduced. Extensive multiscale empirical statistics provide a solid benchmark of stylized facts (heteroskedasticity, long memory, fat-tails, leverage…), in order to assess various mathematical structures that can capture the observed regularities. The author introduces a broad range of processes and evaluates them systematically against the benchmark, summarizing the successes and limitations of these models from an empirical point of view. The outcome is that only multiscale ARCH processes with long memory, discrete multiplicative structures and non-normal innovations are able to capture correctly the empirical properties. In particular, only a discrete time series framework allows to capture all the stylized facts in a process, whereas the stochastic calculus used in the continuum limit is too constraining. The present volume offers various applications and extensions for this class of processes including high-frequency volatility estimators, market risk evaluation, covariance estimation and multivariate extensions of the processes. The book discusses many practical implications and is addressed to practitioners and quants in the financial industry, as well as to academics, including graduate (Master or PhD level) students. The prerequisites are basic statistics and some elementary financial mathematics. Gilles Zumbach has worked for several institutions, including banks, hedge funds and service providers and continues to be engaged in research on many topics in finance. His primary areas of interest are volatility, ARCH processes and financial applications.