

Stochastic Volatility Modelling

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Readership: Statistics, mathematical finance and applied mathematics researchers and PhD students.

The book provides an in-depth and comprehensive discussion of stochastic volatility models. The author combines his exceptional theoretical expertise with the experience he has gained as a quant in *Société Générale* to write an insightful treatment that should be appreciated by both the mathematical finance researchers and the practitioners willing to use volatility models when dealing with actual financial and risk management problems.

The writing style is very accessible and lively for such a technical subject, which makes for a smooth and enjoyable reading. The mathematical theory is interlaced with commentaries that relate to its practical aspects. This keeps a reader interested in following sometimes rather complex arguments and notation. Each chapter (except the Introduction) is recapped by the so-called *Reader's Digest* that allows to review the covered material in a less formal manner. There are a great many examples through which practical consequences of discussed models are highlighted. Numerous graphs help visualise the empirical results and their connection to the theory.

The contents, after a fairly extensive introduction to the financial modelling of volatility, focus on a number of continuous time stochastic volatility models. It is assumed that a reader is familiar with fundamentals of mathematical finance and probabilistic tools that the theory requires. This includes knowledge of the theory of martingales and the properties of Lévy processes. Nevertheless, on several occasions, appendices to chapters assist efficiently in providing

some review of the required theory as well as some additional details of the used methods. Alongside presentation of the main topic, some guidance is offered by the author about what is the prerequisite for understanding the chapter's contents.

The topics covered by the book include variance swaps, the Heston model and forward variance models. There is also a short chapter on multi-asset stochastic volatility and a very efficient introduction to local-stochastic volatility models. The book also discusses the equity smile as well as the linkage between static and dynamic properties.

If there is one missing component of the book that limits enjoyment of reading, it is the lack of a computational toolbox that would allow following the presented examples of applications by *hands on data* analysis. Such a treatment would have clearly enhanced experience and enforced understanding of the practical implications of the theory while also enabling verification of the theory in new empirical contexts. The examples presented in the text are very illuminating, but there is no reference to any computational tools that have been used to obtain the conclusions and the graphs.

In summary, the book is strongly recommended, possibly a must, for both theoretically and practically oriented financial analysts. The main reason for this strong recommendation is that the book, in a unique fashion, succeeded in presenting mathematically advanced volatility models while keeping financial analyst practice as the main driving force of the presentation.

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