

C. Alexander: Market Risk Analysis (four-volume set)

John Wiley & Sons, 2008/2009

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Published online: 10 July 2009

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It is highly doubtful whether there could be a more appropriate time to release this four-volume set, *Market Risk Analysis*, by Carol Alexander, since the current financial crisis has demonstrated the need (and, sometimes, inability) to understand the risks resulting from adverse movements in the prices of financial instruments. Even though the author of this impressive work often mentions and refers to risk management, the series is rightly called *Market Risk Analysis* because the focus is on mathematical ways to model and analyze market risks, a necessary prerequisite for managing such risks. The series consists of four books with many cross-references and consistent notation throughout, but each book is self-contained and can be purchased and read separately.

Volume 1 provides the essential mathematical and financial background needed to understand the concepts introduced in the other three volumes. There are six chapters in Volume 1, one each on calculus, linear algebra (including a very enticing treatment of principal component analysis, or PCA), probability and statistics, linear regression, numerical methods, and portfolio mathematics. Of course, there are many other books solely devoted to each of these topics by itself, but the way in which the author provides an introduction to such vast topics and covers so much ground in a concise but never superficial way in a single volume deserves special praise. Even if you are not at all interested in market risk analysis but simply want a clear overview of quantitative models employed in finance, you can make good use of this book.

The second volume deals with financial econometrics from a practical point of view, focusing on time-series econometrics. Over the course of eight chapters, the reader is introduced to factor models, PCA, models of volatility and correlation, GARCH models, cointegration, and copulas. As the author is a mathematician by

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profession, a reader who is not might worry about having difficulty with the technical details underlying econometrics. However, such worries are groundless. The author strikes a magnificent balance by providing the few necessary formal proofs and then complementing them with numerous empirical examples, thus emphasizing what is and (of equal importance!) what is not important to financial practitioners.

Volume 3 contains five extensive chapters and introduces the fundamentals needed for pricing, hedging, and trading financial instruments. Again, it is a telling sign of the author's superb handling of this material that there are books twice the size of Volume 3 that deal with only *one* of its subjects! The author points out, in this regard, that each chapter on its own can be used for teaching purposes as the basis for a one-semester postgraduate course.

Volume 4 incorporates the foundations developed in the first three volumes to provide a comprehensive treatment of Value at Risk (VaR) models and includes chapters on parametric linear VaR models, historical simulation models, Monte Carlo VaR, and VaR for special types of financial instruments.

Carol Alexander is clearly an academic with a strong interest in practical applications. This makes the book well suited for practitioners who have work experience and a knowledge of markets and instruments and want to deepen their understanding, as well as for readers with a quantitative background wanting to learn about finance. Whatever the reader's background, he or she will benefit from the fact that these are books written in a very pedagogical way by a formidable teacher who keeps her audience in mind at all times. This is manifested by the copious number of exercises provided to help the reader grasp each concept. Each of the four volumes is accompanied by a CD-ROM containing Excel workbooks with the case studies and examples used in the book. Although there are many other (and more sophisticated) programs than Excel with which one can solve financial problems, Excel may well be the lowest (or even only) common denominator among all readers and thus the software of choice. The book's additional materials are excellent and innovative. On the book's webpage (www.marketriskanalysis.com), one can interact with other readers in a discussion forum for each volume, as well as in a forum on general market risk analysis. There are even videoclips of the author introducing each volume to be found on YouTube. In the foreword to one of the books, the author explains that she initially planned to write only one book but ended up with four. As a reader, one can only be grateful for this expansion, and I recommend this series to any student or practitioner serious about understanding and learning to analyze market risk.