

Advanced VaR Modelling

MAFC Executive Training Series 2011

Course Outline

Synopsis

Participants learn the techniques of best-practice, quantitative risk modelling. We focus on techniques that are backed by empirical research and are designed to match the complexities of modern financial markets. It addresses the risk modelling issues that are particularly important in times of market crisis; volatility clustering and failure of normality. Special attention is paid to the problem of incorporating extreme market events in risk models. Throughout the course, case studies and computer workshops will be used to illustrate and apply technical tools and models.



CE Qualified Activity

As a participant in the CFA Institute Approved-Provider Program, MAFC has determined that this program qualifies for 6 credit hours. If you are a CFA Institute member, CE credit for your participation in this program will be automatically recorded in your CE Diary.

Who should attend

The course will primarily be of interest to risk management professionals employed by banks, regulators, fund managers, non-financial corporations and consulting firms. Professionals involved in risk management software development may also benefit, along with financial engineers and traders. The course is taught at a relatively advanced level and is intended to meet the growing need in industry for quantitative analysts to model and control financial risks.

Professional Risk Manager Certification

Macquarie Applied Finance Centre offers this course in conjunction with PRMIA (www.prmia.org), a leader in setting the standard for risk management education, and provides a professional certification program.



Assumed Knowledge

Intending course participants should have work experience in financial risk management, should have an interest in and an aptitude for mathematical concepts and should be familiar with Excel spreadsheets.

You will be expected to have familiarity with the following concepts, most of which would be covered in an undergraduate business degree:

- The Normal distribution.
- Simple statistical concepts such as mean, variance, standard deviation, correlation, covariance.
- The Greek letters of option pricing i.e. delta, gamma, vega, theta.
- Ordinary Least Squares Regression.
- Value-at-Risk models.
- Basic matrix algebra is an advantage.

Course Notes

On the day that the course is delivered, participants will be provided with comprehensive course notes, including two chapters of Alexander and Sheedy (eds) The Professional Risk Managers' Handbook, available at www.prmia.org. The course outline includes a list of references for those wishing to extend their knowledge further.

Calculators/Computers

We recommend that participants bring with them a financial calculator and a laptop equipped with Microsoft Excel. Please review detailed instructions (provided at the time of registration) to ensure that you have the necessary computer files for the workshops and that your laptop is suitable. If you do not have a suitable laptop to bring, it is likely that you will be able to share with another participant.

Lecturer

Dr Elizabeth Sheedy has worked in the finance industry for a number of institutions including Macquarie Bank and Westpac. Her industry experience was primarily in engineering structured derivatives products for corporate and institutional clients. She had a special interest in the management of currency risks, developing the first Australian currency overlay product for asset portfolios. Since joining the Macquarie Applied Finance Centre in 1993, she has undertaken several consulting roles relating to the use of derivatives by investors and fund managers. Elizabeth has co-edited a book on derivatives, a book on financial risk management and is on the Education Committee for PRMIA (Professional Risk Manager's International Association). Her current research and teaching focus is in financial risk management (for banks, fund managers and non-financial institutions) as well as volatility clustering and its application to stress testing market portfolios.



Detailed Outline

Topic 1 – Foundation Concepts

- Review of risk concepts
- Problems with Value at Risk (VaR) – can we learn something from the critics of VaR?
- Why quantitative risk models are crucial for risk management
- Testing for Normality

Topic 2 – Risk in the Absence of Normality

- Methods that capture extreme market movements (Student's t distribution, Extreme Value distributions)
- GARCH models to handle changing volatility
- Variations on GARCH (EWMA, asymmetric models)
- Which risk models perform best in crisis conditions

Topic 3 – Historic Simulation

- Standard historical simulation method and its failings
- Choosing the sample period – short vs long samples?
- Volatility weighted historical simulation

Topic 4 – Maximum Likelihood Estimation

- Maximum likelihood estimation (MLE) concept
- MLE and GARCH models
- Estimating the parameters of your risk model

Topic 5 – Monte Carlo Simulation and Options

- When to use Monte Carlo Simulation
- Portfolios containing options
- Stress testing a trading portfolio using simulation methods

Topic 6 – Model Risk

- Model risk and VaR Models
- How to select a risk model based on empirical analysis
- Backtesting of VaR models
- Case study: Analysing risk models performance in 2008

Topic 7 – Modelling Correlation

- Multi-asset portfolios
- Mapping to risk factors
- Volatility contagion between markets vs changing correlation
- Capturing changes in correlation and volatility within your risk model (DCC-GARCH)