CZECH FINANCIAL ACADEMY

Featured Seminars:

QUANTITATIVE RISK MEASUREMENT

PART 1: VALUE-AT-RISK, MONTE CARLO SIMULATIONS AND STRESS TESTING

November 29 – December 1, 2010

QUANTITATIVE RISK MEASUREMENT

PART 2: MULTIVARIATE STATISTICS AND EXTREME VALUE MODELLING

December 2 – 3, 2010

Registration Deadline: November 15, 2010

3+2

CZECH FINANCIAL ACADEMY

QUANTITATIVE RISK MEASUREMENT 1: VALUE-AT-RISK, MONTE CARLO SIMULATIONS AND STRESS TESTING

DATES: **November 29 – December 1, 2010** • PRICE: **€ 2,100** • LOCATION: **Prague, Mövenpick Hotel**

UPDATED

- **An Introduction to Quantitative Risk Analysis**
- **Basic Risk Measures and their Limitations**
- **Value-at-Risk and other Measures of Downside Risk**
- **Measuring VaR for Linear and Non-Linear Positions**
- **Back-testing VaR Models**
- **Stress Testing for Market, Credit, Liquidity and Operational Risks**
- **Building and Implementing Risk Management System**

3+2

The purpose of this seminar is to give you a good understanding of quantitative methods for calculating Value-at-Risk and for back-testing and stress-testing of risk measurement models.

We start with an overall introduction to modern risk analysis and explain why risk measurement has become more important and challenging. We briefly review basic risk measures such as beta, duration, modified duration, convexity and standard deviation and discuss their limitations in a world with increasingly complex financial instruments.

We then give a thorough explanation of how "Value-at-Risk" and other measures of shortfall risk can be calculated for linear as well as non-linear exposures. We explain the use of delta-normal and delta-gamma-normal methods for the calculation of VaR for forwards, swaps and options, and we explain and demonstrate the use numerical techniques (including historical simulation and Monte Carlo simulation) for calculating VaR of more complex instruments and portfolios.

We explain how to back-test these "Value-at-Risk" models. As a particular case study, we look at the back-testing requirements of the Basel II framework. We also take you a step further to show how the impact of estimation risks can be considered by using dynamic parametric VaR models and by correcting standard back-testing procedures.

Further, we explain how to perform stress testing of risk management models for Basel II compliance and to improve internal risk management. We cover a range of methodologies, from simple sensitivity tests to complex stress tests, which aim to assess the impact of a severe macroeconomic stress event on measures like earnings and economic capital. We give examples of stress test for different risk types including market, credit, operational and liquidity risk.

Finally, we discuss how risk management system can be built, tested and implemented.

MONDAY, NOVEMBER 29

09.00–09.15

Welcome and Introduction

09.15–12.00

Introduction to Quantitative Risk Analysis

- The Evolution of Risk Management
- Risk and Randomness
- Mathematical Finance
- Statistics & Econometrics
- Actuarial Mathematics
- The New Regulatory Framework

Basic Risk Measures and their Limitations

- General vs. Idiosyncratic Risk
- Measures of Sensitivity
  - Duration, Beta
- Basic Measures of Volatility
  - Variance, standard deviation, covariance
- A Closer Look at Loss Distributions
  - Risk factors and loss distributions
  - Conditional/unconditional Loss Distribution
- Exercises

12.00–13.00

Lunch

13.00–16.30

Introduction to Value-at-Risk and other Measures of Downside Risk

- Overview of Coherent Measures of Risk
- General Introduction to Value-at-Risk
  - The risk management revolution
  - Caveats in using VaR in risk management
- Measuring Multiperiod VaR and Scaling
- Forecasting Volatilities and Correlations
- Bounds for Aggregate Risk
- Harlow's Lower Partial Moments
- Probability of Shortfall
  - Expected shortfall
  - Variance of expected shortfall
- Exercises

TUESDAY, NOVEMBER 30

09.00–09.15

Recap

09.15–12.00

Measuring VaR for Linear Instruments

- Measuring VaR for Portfolios of Linear Instruments
  - Position mapping
  - Correlation and portfolio volatility
  - Undiversified VaR
  - Diversified VaR
  - VaR for asset portfolios
  - VaR for assets/liabilities
- VaR for Linear Derivatives Positions
  - FRAs and Deposit Futures
  - Bond Forwards and Futures
  - FX Forwards
  - Interest Rate and FX Swaps

  Exercises

12.00–13.00

Lunch

13.00–16.30

Measuring VaR for Non-Linear Positions

- Local versus Full Valuation
- Delta-Normal Method
- Full Valuation
- Delta-Gamma Approximation
- Historical Simulation Methods
- Monte Carlo Simulation Methods
  - Building blocks in Monte Carlo simulation
  - Constructing and simulating the SDE
  - Sampling from multivariate distributions
  - Simulating pay-off profiles
  - Calculating percentiles/VaR
  - Using Monte Carlo Simulation and Principal Components Analysis
- Exercises

WEDNESDAY, DECEMBER 1

09.00–09.15

Recap

09.15–12.00

Backtesting VaR Models

- Setup for Backtesting
- Model Backtesting with Exceptions
- Decision Rule to Accept or Reject Model
- Model Verification: Other Approaches
- Case: Backtesting in Basel
- Conditional Coverage Models
- Examples and Exercises

Stress Testing

- Why Stress Testing?
- Implementing Scenario Analysis
- Generating Unidimensional Scenarios
- Multidimensional Scenario Analysis
- Stress-Testing Model Parameters
- Managing Stress Tests

12.00–13.00

Lunch

13.00–16.00

Building and Implementing Risk Management Systems

- Using VaR to Measure and Control Risk
- Using VaR for Active Risk Management
- VaR in Investment Management
- The Technology of Risk
- VaR and Liquidity Risk
- Operational and Integrated Risk Management
- VaR, Economic Capital and RAROC
- Exercises

Evaluation and Termination of the Seminar

QUANTITATIVE RISK MEASUREMENT 2: MULTIVARIATE STATISTICS AND EXTREME VALUE MODELLING

DATES: **December 2 – 3, 2010** • PRICE: **€ 1,500** • LOCATION: **Prague, Mövenpick Hotel**

UPDATED

- **Basics of Multivariate Modelling**
- **Correlation Analysis, Regression Analysis and Discriminant Analysis**
- **Estimating VaR from Multivariate Normal Distributions**
- **Estimating Non-Normal Multivariate Distributions Using GARCH Modelling**
- **Measuring VaR Using Principal Components Analysis**
- **Measuring Risks Using Extreme Value Theory**
- **Using EVT for Stress Testing and Economic Capital Planning**

The purpose of this seminar is to give you a good understanding of the use of multivariate statistics and Extreme Value modelling in quantifying and managing risk.

We start with a general introduction to multivariate statistics and analysis. We give an overview of the applications of multivariate modelling in finance, and we explain the basics of correlation and correlation analysis.

We then explain and demonstrate how you can use multiple regression analysis to determine relationships between economic and financial variables, and we explain the use "discriminant analysis" to compute linear predictors from sets of normally distributed data to allow for classification of new observations.

Further, we explain and show how sampling from multivariate return distributions can be performed and how "Value-at-Risk" can be derived from a total portfolio loss distribution that is generated using simulation techniques. We also explain how you can overcome the assumptions about normally distributed returns by using GARCH techniques to project volatilities from historical data.

We also explain and demonstrate how principal components analysis can be used to determine a smaller set of "synthetic" variables that could explain the original set (for example variations in the yield curve).

We then introduce Extreme Value Theory and explain and demonstrate its applications in finance.

We present the two main approaches to estimating tail distributions: the "Block Maxima" and the "Peaks over Threshold" groups of models. Emphasis will be on the practical day-to-day applications of these models, rather than on their theoretical mathematical properties. We demonstrate how a "Generalized Pareto Distribution" can be fitted to real-life financial data (stock prices etc.), and we visualize results using graphical tools.

We then turn to look at how EVT can be used in financial risk management. We discuss the opportunities and pitfalls of using EVT. We use extreme value theory to calculate conditional and non-conditional VaR, and we compare these measures with the VaR measures obtained using e.g. normal distribution assumptions. Finally, we discuss the use of EVT in "Stress Testing", in quantifying operational risks, and in asset allocation.

THURSDAY, DECEMBER 2

09.00–09.15

Welcome and Introduction

09.15–12.00

Measuring Risk Using Multivariate Statistical Analysis

- Basics of Multivariate Modelling
  - The use of multivariate modelling in finance
  - Correlation analysis
  - Multivariate correlation analysis
  - Partial, serial and canonical correlation
- Regression Analysis
  - The regression line and the regression model
  - Multiple regression
  - Applications of multiple regression in finance
  - Collinearity and other problems
  - Examples of the use of regression analysis in finance
- Discriminant Analysis
  - The discriminate function
  - Discriminant vs. regression analysis
  - Examples of the use of discriminant analysis in finance
- Examples, Simulations and Exercises

12.00–13.00

Lunch

13.00–16.30

Measuring Risk Using Multivariate Statistical Analysis (Continued)

- The Multivariate Normal Distribution
  - Sampling from multivariate normal distribution
  - Estimating VaR from multivariate normal distribution
  - Testing normality and multivariate normality
- Estimating VaR from Non-Normal Multivariate Distributions
  - GARCH modelling and forecasting of volatility and correlation
- Principal Components Analysis
  - Overview of multi-factor interest rate risk models
  - Eigenvalues, eigenvectors and the yield curve
  - Calculating and interpreting factor loadings
  - Using the factor model to calculate VaR
  - Factor immunization for hedging yield curve fluctuations
  - Monte Carlo simulation using PCA
- Examples, Simulations and Exercises

FRIDAY, DECEMBER 3

09.00–09.15

Brief recap

09.15–12.00

Measuring and Managing Risk Using Extreme Value Theory

- General Introduction to Extreme Value Analysis
  - Explaining rare and unexpected events using EVT
  - Examples of catastrophic losses
- Basic EVT Tools
  - Statistical analysis of historical data
  - Quantiles vs. tail distributions
  - Mathematical foundation of EVT
- Models for Extreme Values
  - General theory and overview of models
  - Block Maxima models
  - Peak-over-Threshold models
  - The Generalized Pareto Distribution
  - Modelling predictive distributions using Bayesian methods
  - Modelling multivariate extremes
  - Multivariate extreme value copulas
- Exercises

12.00–13.00

Lunch

13.00–16.30

Measuring and Managing Risk Using Extreme Value Theory (continued)

- Measuring Risk Using EVT
  - Estimating and interpreting "Value-at-Risk" using EVT
  - Estimating expected shortfall
  - Extreme market risk
  - Stress testing using EVT
  - EVT and stochastic volatility models (GARCH)
  - Examples, simulations and exercises
- Using EVT in Risk Management and Asset Management
  - Calculating regulatory capital using EVT
  - Modelling and measuring operational risk
  - Developing scenarios for future extreme losses
  - Asset allocation using EVT
  - Examples, simulations and exercises

Evaluation and Termination of the Seminar

Terms and Policies of the Czech Financial Academy

CZECH FINANCIAL ACADEMY
The Czech Financial Academy is a joint venture between the consultancy companies MONECO and BASISPOINT that offers a comprehensive programme of English-language seminars, trainings and practical workshops lectured by qualified tutors. Our objective is to provide the industry professionals with advanced financial know-how and up-to-date analytical methods and skills.

SEMINAR VENUE
All Czech Financial Academy seminars are held at the international four-star Mövenpick Hotel in Prague at Mozartova 1 (Mozart Street). Accommodation is not included in the seminar price, but we are happy to offer hotel reservations at discounted prices for our clients.

TUITION LANGUAGE
Seminar tuition is in English language, as are all manuals, training software etc. Therefore, in order to benefit from participation, at least a passive knowledge of English, including common financial phrases and related terminology, is required.

REGISTRATION
Clients who decided to participate, should submit us in advance a registration for a particular seminar (letter, fax, internet etc.). Subject to availability, the participant will then receive a confirmation of participation. The number of participants is always strictly limited in order to secure an effective and focused learning environment.

SEMINAR PRICES
The quoted seminar prices are per person and include all the training manuals, lunches and refreshments, certification diploma in English and selected software solutions used at the seminar. The price does not include hotel accommodation. Quoted prices are exclusive of local V.A.T. "Bundle" prices represent the total fee for participation in mutually related seminars (i.e. "Models 3+2, 2+3, 2+2, 1+3, 3+1, 1+2+2 and 2+2+1"). "Bundle" prices are provided in the Calendar of the Czech Financial Academy Seminars.

DISCOUNTS
Bulk discounts are offered when submitting an application for the participation of more than one person. A 10% discount is offered when at least two participants from one company register for a seminar or one participant registers at once for two or more seminars. The discounts do not apply for "bundle" prices, as these already represent discounted prices.

INVOICING AND PAYMENT
An invoice for the seminar price will be sent to the participants no later than 3 weeks prior to the beginning of the seminar. Full payment of the invoice must be made before the start of the seminar as a precondition of participation.

TERMS OF CANCELLATION
If for whatever reasons a registered participant is unable to attend, a substitute delegate may be appointed to participate instead. For cancellations received 20 days or more before the beginning of the seminar, a 10% cancellation fee of the full price will be invoiced i.e. 90% of the price is refunded. For cancellations received less than 20 days prior to the beginning of the seminar, the full price is payable i.e. no refund will be provided. All cancellations must be in writing. The organizers of the Czech Financial Academy reserve the right to cancel the individual participation or cancel the entire seminar or part of it for whatever unspecified reasons, including possible force majeure. In this case, the price paid will be refunded in full or in part, accordingly.

REGISTRATION FORM

Registration Deadline: November 15, 2010

Seminar		Date	Price	Bundle
• Quantitative Risk Measurement – Part 1: Value-at-Risk, Monte Carlo Simulations and Stress Testing	☐	November 29 – December 1, 2010	€ 2,100	€ 3,000 3+2 ☐
• Quantitative Risk Measurement – Part 2: Multivariate Statistics and Extreme Value Modelling	☐	December 2 – 3, 2010	€ 1,500	

COMPANY

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Approving Manager:

Person responsible for training:

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