DGPE
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Danish Graduate Programme in Economics
University of Aarhus • University of Copenhagen

THE DANISH DOCTORAL SCHOOL OF FINANCE

CREATES
Center for Research in Econometric Analysis of Time Series

The Danish Graduate Programme in Economics (*DGPE*), the Danish Doctoral School of Finance and Center for Research in Econometric Analysis of TimE Series (CREATES) announce:

Ph.D. course on "Quantitative Risk Management: Modelling Dependence in Market and Credit Risk"

January 28-31st, 2008
Sandbjerg Manor, Sønderborg

Lectured by: Professor Alexander J. McNeil, Heriot-Watt University
Local Organizer: Henning Bunzel, Dept. of Economics, University of Aarhus

Course description

The material for this course is taken from the book "Quantitative Risk Management: Concepts, Techniques and Tools" by Alexander J. McNeil, Ruediger Frey and Paul Embrechts, Princeton University Press 2005. One of the main issues in the quantitative modelling of both market and credit risk is capturing the multivariate behaviour of risk across a portfolio. Standard approaches relying on assumptions of multivariate normality and focussed on correlation matrices are known to have their deficiencies, particularly in characterizing the potential for extreme risk. In this course we will take a tour through relevant non-Gaussian models, treating, among other things, normal mixture models, generalized hyperbolic models and copula models for market risk factors as well as copula models and mixed Bernoulli models for credit risk. All ideas will be illustrated with examples in S-Plus or R using the author's QRMlib library.

The course is free and includes registration, all meals and accommodation. Travel expenses are covered for Danish PhD students, but other participants must pay their own travel expenses. Participants should bring their own labtop.

Registration **no later than December 1st, 2007** to:

Kirsten Stentoft
School of Economics and Management
University of Aarhus
Building 1322
DK-8000 Aarhus C
e-mail: kstentoft@econ.au.dk

The course is directed to all Danish and international Ph.D. students, as well as post-docs and other researchers. Participation is limited to 20.

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Programme

Monday, January 28

13.00–14.30	Introduction to quantitative risk management: financial risk in perspective; loss distributions and risk measures
14.30–15.00	Coffee break
15.00-16.30	Multivariate models for market risk factors: empirical evidence and stylized facts; basic multivariate analysis; normal mixture models; elliptical models; generalized hyperbolic models; estimation and testing
19.00	Dinner, Sønderborg TBA

Tuesday, January 29

09.30-11.00	Capturing extremes and volatility: extremal behaviour of normal mixture distributions; developing multivariate time series models with non-Gaussian innovations
11.00	Coffee break
12.00	Lunch

13.00-14.30 Copulas: basic properties; factor copulas, mixture distributions and conditional independence models; dependence concepts based on copulas; copula families

18.00 Dinner, Sandbjerg

Wednesday, January 30

09.30-11.00 Use of copulas in risk management: estimation and simulation; use in risk aggregation and stress testing

11.00 Coffee break

12.00 Lunch

13.00-14.30 Introduction to credit risk: exposures, defaults, ratings, LGDs; Merton's model of the default of a single firm; common industry models (CreditMetrics, KMV, CreditRisk+); modelling dependence with factor models; role of copulas in credit models; relation to Bernoulli mixture models

19.00 Course dinner, Sandbjerg

Thursday, January 31st,

09.30-11.00 Calculating the portfolio loss distribution: large portfolio behaviour and the Basel II regulatory capital formula; Monte Carlo approaches

11.00 Coffee break

12.00 Lunch

13.00-14.30 Calibration of portfolio credit risk models: estimating default correlation; estimating facto models with GLMM (generalized linear mixed modelling) techniques; Bayesian inference