AGSOE 4: Financial Markets and Risk Management III

Time: Monday 14:00–16:00 Location: BAR 205

AGSOE 4.1 Mon 14:00 BAR 205

Reliable Quantification and Efficient Estimation of Credit Risk — •Jörn Dunkel[1] and Stefan Weber[2] — [1]Rudolf Peierls Centre for Theoretical Physics, University of Oxford, 1 Keble Road, Oxford OX1 3NP, United Kingdom — [2]School of Operations Research and Information Engineering, 279 Rhodes Hall, Cornell University, Ithaca, NY 14853, USA

The present crisis in the global financial markets requires a critical review of current regulatory practice. Substantial efforts are required to devise efficient quantitative methods for a more reliable estimation of financial risks in the future. These tools must be able to detect extreme loss scenarios that are unlikely to occur but whose impact may be dramatic as illustrated by the recent liquidity crisis of Lehman Brothers, Merrill Lynch, AIG, and others. We report here a novel Monte-Carlo approach for the efficient computation of improved, convex risk measures. Unlike the current industry standard Value-at-Risk, these new risk measures are sensitive to the tails of loss distributions. They can provide a basis for more sensible risk management policies and help to prevent future financial turmoil.

AGSOE 4.2 Mon 14:30 BAR 205

Double risks portfolio optimization problem for pension funds — •Uli Spreitzer[1] and Vladimir Reznik[2] — [1]Bonus Pensionskasse, 1060 Vienna, Austria — [2]Watson Wyatt, 65189 Wiesbaden, Germany

It is obvious, that an optimization with respect to minimize e.g. the downside- risk can effect an increase of the risk, that the rate of return is below a priori guarantied rate of return. And vice versa an optimization with minimization of the risk e.g. , that the rate of return is below a priori guarantied rate of return can result in, that the downside-risk is not optimized. We will show a theory of optimization of several combinations of two measures of risk, as competitiors risk, downside risks, guarantied rate risk.

AGSOE 4.3 Mon 15:00 BAR 205

Credit Risk and the limits of diversification — •Rudi Schäfer[1], Alexander Koivusalo[2], and Thomas Guhr[1] — [1]Fachbereich Physik, Universität Duisburg-Essen, Germany — [2]Mathematical Physics, LTH, Lund University, Sweden

In view of the current financial crises the modeling of credit risk is of great importance. We study a structural model which is based on a jump-diffusion process for the risk factors. In a portfolio of credit contracts, the correlations between the individual risk factors have a pronounced effect on the distribution of the portfolio losses. Even weak correlations lead to a heavy-tailed loss distribution and severely limit the benefits of diversification. We compare these findings to the predictions of reduced form models and discuss difficulties in measuring the correlations of defaults and recovery rates.

AGSOE 4.4 Mon 15:30 BAR 205

Time-dependent correlations in financial markets — •Michael Münnix, Rudi Schäfer, and Thomas Guhr — Fachbereich Physik, Universität Duisburg-Essen, Germany

Correlations between different financial assets are the crucial input for risk assessment and portfolio optimization. However, these correlations change with time. We show empirical results for the dynamics of the correlation structure in the S&P 500 stocks. Further, we use Monte-Carlo simulations to investigate how noise reduction techniques can help to identify changes in the correlation structure.

AGSOE 4.5 Mon 15:45 BAR 205

A numerical analysis of eigenvalues and eigenvectors of covariance matrices — •Daniel Fulger[1,2], Enrico Scalas[1], Giulia Iori[3], Mauro Politi[2], and Guido Germano[2] — [1]Amedeo Avogadro University of East Piedmont, Alessandria, Italy — [2]Philipps-Universität Marburg, Germany — [3]City University, London, UK

Covariance matrices are related to similarity and dissimilarity matrices, which are often used as a starting point for classification purposes through clustering. We present numerical analyses of the eigenvalues and eigenvectors of covariance matrices built from independent or from correlated random variables for the cases $Q > 1$ or $Q < 1$, where $Q = T/N$ is the ratio of observations T to the number of random variables N. The former case, where there are more observations than variables, is common in physics and in finance, while the latter occurs typically for biological problems such as microarray analysis. We discuss how to compute covariance matrices from synchronous or asynchronous data, we compare the numerical eigenvalue spectra of independent or free independent random variables with analytical results of classical or free random matrix theory, and present several case studies with groups of correlated random variables in a noisy sea of independent random variables.