MA14-008 - Portfolio Risk and Asset Allocation: Utilizing High-Frequency Information in High Dimensions

Abstract

Measuring and predicting risk of financial positions and using risk forecasts for decision making is of high social relevance. The recent financial and economic crisis taught us that misperception and underestimation of risk can have dramatic consequences for both the financial sector and the entire society. New challenges arise due to an increasing emphasis on the analysis of extreme events, the requirement of managing large-scale portfolios and the possibility of exploiting high-frequency market information. To address these issues, the objective of this project is twofold. On the one hand, we aim for a deeper understanding of high-dimensional dependencies of asset returns, reflected by more advanced estimates of covariance structures, tail dependencies and measures reflecting extreme (correlation) risks. On the other hand, we will develop mathematical and statistical tools for optimizing large-dimensional portfolio positions and for monitoring and managing their risks under realistic conditions. The innovations of this project are (i) the development of a theoretical and empirical framework to control for transaction costs in high-frequency based portfolio optimization, (ii) the further development of high-dimensional copula models and measures
of tail dependence, and (iii) the construction of forecasts of large-scale asset return covariances exploiting high-frequency data.

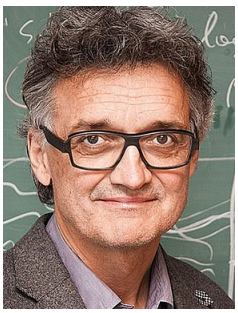
Scientific disciplines:
Financial mathematics (40%) | Statistics (40%) | Operations research (20%)

Keywords:
Financial High-Frequency Data; Tail Dependence; Asset Return Covariance; Transaction Costs; Portfolio Risks; Copulae;

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Further links to the persons involved and to the project can be found under
https://wwtf.at/funding/programmes/past/ma/MA14-008/