Modelling Financial High-Frequency Data

Prof. Dr. Nikolaus Hautsch
(Humbold Universität zu Berlin)

November 7, 2008

Due to the permanently increasing availability of high-frequency financial data, the empirical analysis of trading behavior and the modelling of trading processes has become a major theme in modern financial econometrics. Major properties of financial high-frequency data is the irregular spacing in time, a strong persistence in volatility, liquidity and market activity, and a typically high dimensionality of trading processes and order book processes. In this talk, we present an overview of recent and ongoing work on multivariate models for trading processes and order book dynamics. Firstly, we introduce multivariate dynamic intensity specifications which allow capturing the irregular spacing of observations and treating the trading process as a point process. In this context, we discuss recent work on autoregressive intensity models and Hawkes type processes. Secondly, we present multivariate multiplicative error models as a natural framework to model the dynamic interdependencies between positive-valued random variables, such as volatilities, trading intensities, trade sizes, market depth, and transaction costs. Finally, we discuss semiparametric dynamic factor models as a powerful framework to flexibly model high-dimensional order book curves varying over time. By modelling order book curves nonparametrically in space and parametrically in time we obtain a flexible and unifying framework for order book modelling and forecasting. We will present applications of the discussed models using order book data from the Australian Stock Exchange.