



High Dimensional Nonstationary Time Series

IRTG 1792 Short Course

Yuanhua Feng



Fractionally integrated Log-GARCH with application to VaR and Expected Shortfall

Most commonly used volatility models are the generalized ARCH (GARCH) and its two well-known extensions, namely the APARCH and the EGARCH. Another GARCH extension, which received less attention is the so-called Log-GARCH. The usefulness of this model is recently re-discovered by several authors. Moreover, fractionally integrated GARCH models, including the FIGARCH, the FIAPARCH and the FIEGARCH, are proposed to capture long memory in volatility. However long-memory extension of the Log-GARCH does not yet exist.

We will first give a summary on long-memory GARCH models and then introduce a FI-Log-GARCH model to fill the above mentioned gap. It is shown that this new long-memory GARCH model exhibits some theoretical advantages and is closely related to the lone-memory stochastic volatility model. Its practical relevance is confirmed by rolling forecasts of the value at risk (VaR) and expected shortfall (ES). The performances of the four FIGARCH-type models are assessed by different backtesting methods and compared to each other. Semiparametric extensions of those models to capture slowly changing volatility will also be discussed.

Yuanhua Feng was educated at two universities in Beijing, China, and at the University of Konstanz, Germany, where he received his PhD in 1998. He is working in Faculty of Business Administration and Economics at the Paderborn University, Germany.

October 3, 2020 | 11:00-12:30 | Buckow



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