



# High Dimensional Nonstationary Time Series IRTG 1792 Short Course

**Mike Ellington**

## Applications of Time-Varying Parameter Models using Financial and Economic Data

Time-varying parameter models are becoming somewhat of an industry standard within the Finance and Economic literature. This talk provides an overview of the techniques used in order to estimate time-varying parameter models with applications using Financial and Economic data. We begin by examining Bayesian estimation methods in linear regression analysis using conjugate priors before relaxing the assumption of constant parameters and homoscedastic errors. We then present traditional Markov Chain Monte Carlo (MCMC) estimation methods used to estimate time-varying parameter Vector Autoregressive (TVP-VAR) models in a 3-variable economy. We then move on to discuss more contemporary methods that enable us to compute time-varying models with greater computational efficiency. We outline a class of models that alleviate the need for MCMC estimation algorithms which permits efficient computations of sophisticated econometric models using big data. Using data on all constituents listed on the S&P500, we show that we are able to calculate and track horizon specific time-varying network connections for an entire market. The talk finishes by highlighting the asset pricing implications of network risk over and above existing pricing factors.



Dr Ellington is a Lecturer in Finance at the University of Liverpool Management School. He is an expert in the estimation of time-varying parameter models with specific applications using Financial and Economic data. His current projects are: Asset Pricing using Time-Frequency Dependent Network Centrality; Stock Market Liquidity and Return Predictability, A Bayesian Nonparametric Approach; Search Frictions and Evolving Labour Market Dynamics; and Modelling Shadow Interest Rates. His broader research interests include: Bayesian Analysis; Nonlinear Time-series, Financial Econometrics, Financial Markets and the Macroeconomy, Money and Monetary Policy, and Asset Pricing and Trading Volume. Mike's previous papers have been published in internationally excellent journals such as Journal of Economic Dynamics and Control, Journal of International Money and Finance, and Journal of Banking & Finance. He has also presented his work at a number of prestigious conferences; as well as the Bank of England. One of his recent publications is also recognised by the Center for Financial Stability of New York.



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