Euro Area Business Cycle Network Training School

Volatility: Measurement, Modelling and Forecasting

By

Torben G. Andersen

European University Institute
Florence

13 – 15 November 2013
Deadline: Friday 9 September 2013

General Description

We are pleased to announce details of the latest EABCN Training School; a three-day course entitled “Volatility: Measurement, Modelling and Forecasting”. Professor Torben G. Andersen will teach the course. It is primarily aimed at participants in the Euro Area Business Cycle Network but applications will also be considered from doctoral students, post-doctoral researchers and economists working in central banks and government institutions outside of the network, as well as commercial organisations (fees applicable for non-network organisations).

Course Detail

The last 25-30 years has witnessed increasing interest in the modelling and forecasting of (conditional) return volatility. The developments started with the GARCH models. Later on, the models were complemented by so-called stochastic volatility models, which fit more neatly into the continuous-time framework of theoretical finance. Since the mid-1990’s, these concepts have been supplemented by the notion of realized volatility, designed to accommodate and harness the rich information conveyed by high-frequency intraday returns. Models based on intraday data and the theory of realized volatility are now commonplace in academics as well as among finance practitioners. Moreover, they are increasingly monitored by central banks, as they provide tools for more quickly understanding the market impact of economic events in real time.

In parallel, there has been a proliferation of so-called model-free implied volatility measures obtained from exchange-traded options. These alternative forecasts have the advantage of being forward-looking. The caveat is that they include both the expectations of future return volatility and a compensation for exposure to volatility risk – the so-called volatility risk premium. These implied volatilities can be combined with the time series procedures to improve volatility forecasts. Equally importantly, they provide information about the “pricing” of volatility risk. As such, the combination of high-frequency data and option prices has ushered in an entirely new approach to the extraction of volatility expectations and risk premia in global financial markets.
This course covers empirical methods for volatility measurement, modelling and forecasting. Part 1 considers the highly parametric setting of GARCH models as well as the more complex setting of stochastic volatility models. Part 2 focuses on the relatively simple model-free realized volatility measures. Finally, Part 3 explores the implied volatility measures and the related procedures for extracting measures of the time-varying volatility risk premium. In all cases, we will consider the complications and possibilities associated with longer term volatility forecasts and the inclusion of macroeconomic variables in the forecast procedures.

Some basic familiarity with time series econometrics and finance theory will be useful.

The course will be divided in 9 modules, 2/3 of the time to theory and methods and 1/3 to computer sessions. The following programme outlines the structure of the course:

**Wednesday 13 November**
- a. Module 1 (2 hours): Volatility forecasting with Exponential Smoothing and GARCH
- b. Module 2 (2 hours): GARCH extensions and Stochastic Volatility models
- c. Module 3 (2 hours): Practical session – Intro to GARCH Volatility Forecasting

**Thursday 14 November**
- a. Module 4 (2 hours): Basic theory of Realized Volatility
- b. Module 5 (2 hours): Empirical volatility facts and Realized Volatility forecasting
- c. Module 6 (2 hours): Practical session – Realized Volatility forecasting techniques

**Friday 15 November**
- a. Module 7 (2 hours): Risk-neutral density and model-free implied volatility extraction
- b. Module 8 (2 hours): Studying the Volatility Risk Premium
- c. Module 9 (2 hours): Practical session – Generating Volatility Risk Premium estimates

**Administrative Information:**

The course will take place in Florence at the European University Institute and participants will be invited to make their own arrangements regarding their accommodation and meals. Further information will be available to successful applicants. Candidates should fill in the enclosed form and return it to CEPR’s Events Officer, Nadine Clarke (nclarke@cepr.org) by **September 9th, 2013**. We ask that you send a current version of your CV with your application. EABCN gratefully thanks the generous assistance from the European University Institute in the contest of the Pierre Werner Programme.

**About the Instructor:**

Torben G. Andersen is the Nathan S. and Mary P. Sharp Distinguished Professor of Finance at the Kellogg School of Management, Northwestern University, where he has been since 1991. He is also associated with the National Bureau of Economic research (NBER), Cambridge, Massachusetts, and CREATEs at the University of Aarhus, Denmark. He is a Fellow of the Econometric Society and the Society for Financial Econometrics. His main research interests are financial econometrics, time series analysis and empirical finance. He obtained his Ph.D. in Economics from Yale University. He is currently Co-Editor of the Journal of Financial Econometrics and has previously served as the Editor-in-Chief of the Journal of Business and Economic Statistics and as Associate Editor of the Journal of Finance and the Review of Financial Studies.