Euro Area Business Cycle Network Training School

Recent Developments in Forecasting

By

Graham Elliott (UC San Diego)

Allan Timmermann (UC San Diego)

Hosted by: Banca d'Italia, Italy

3-5 June 2020 – THE EVENT IS POSTPONED: THE NEW DATE WILL BE ANNOUNCED IN DUE CORSE

Deadline: 6pm (UK time), 31 January 2020

General Description

We are pleased to announce details of the latest EABCN Training School; a three-day course entitled "Recent Developments in Forecasting". Professors Graham Elliott and Allan Timmermann 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 Contents

The course introduces participants to a variety of advanced topics and recent developments in economic forecasting. The first part of the course examines the forecasting problem in general, showing that point forecasting is parameter estimation with a conditional model of the outcome and density forecasting is estimation of a conditional density. We clarify what we mean by optimal forecasts and relate classical and Bayesian approaches. Understanding these issues provides an understanding that gives a foundation for subsequent forecasting problems.

Binary forecasting or classification is closely related to decision making. The simplicity of the binary loss function allows many strong results to be established in a transparent manner. Parametric, Semiparametric and nonparametric methods will be discussed and properties of the approaches examined.

Often the difference between good and bad forecasting approaches hinges on how they deal with changes to the underlying data generating process. The course therefore next addresses the consequences of model instability on forecasting performance and discusses strategies for dealing with such instability, using empirical illustrations from macroeconomics and finance. We also discuss how one can use multivariate (panel) information to better deal with model instability in a forecasting context.

A major issue in modern forecasting is the large number of potential predictors. Much work has been undertaken in econometrics, statistics and computer science in recent years. We will provide a framework for thinking about methods as well as explain how some of the popular methods work and their properties.

The third part of the course covers forecast evaluation, forecast comparisons, and monitoring of forecasting performance. We discuss which properties an optimal forecast should have and describe methods for evaluating whether a given forecast is efficient. Ignoring the search across multiple models for a good forecasting model can introduce data mining biases, and we discuss ways to handle this problem. Next, we introduce methods for comparing the predictive accuracy of competing forecasts in situations with a pair of alternative forecasts as well as in settings with large numbers of forecasts. We analyse how real-time monitoring of competing models' forecasting performance has the potential to improve upon the forecasting performance of individual models.

Point forecasts do not reveal the uncertainty surrounding a given forecast and so many economic institutions have moved on to report interval and density (probability distribution) forecasts. The third part of the course introduces methods for generating these types of forecasts, covering both univariate and multivariate approaches. Finally, we discuss how to evaluate the accuracy of interval and density forecasts.

The course draws on material from the Princeton University Press book (referred to as ET):

G. Elliott and A. Timmermann, 2016, **Economic Forecasting**.

Part I: Predictive Modelling and Model Instability

I. The Forecasting Problem

1. Economic loss functions and 'optimal' forecasting (ET chapter 2-3)
2. Classical and Bayesian Forecasts (ET chapter 4-5)

II. The Binary Forecasting Problem (ET chapter 12)

1. Loss functions
2. Point and Density Forecasting
3. Methods for Classification/Binary Forecasting

III. Forecasting under model instability

1. Detection of breaks in time-series forecasting models (Rossi, 2013, McClean and Pontiff, 2016)
2. Strategies for handling model instability (ET chapter 19)
3. Parametric models of the change process (Pettenuzzo and Timmermann, 2011, 2017)
4. Combining cross-sectional and time-series data for detecting and forecasting under breaks (Smith and Timmermann, 2017)

IV. Forecasting with Many Regressors

1. Model Selection and Model Aggregation
2. LASSO and variants
3. Model Aggregation approaches.

Part II: Evaluating, comparing, and monitoring forecasting performance

V. Forecast Evaluation

1. Properties of optimal forecasts (ET chapter 15, Patton and Timmermann, 2007)
2. Evaluation of single forecasts and forecasting models (ET chapter 16, Patton and Timmermann, 2012, West 1996)
3. Optimality properties of quantile forecasts (Christoffersen, 1998, ET chapter 18)

4. Optimality properties of density forecasts (Diebold, Gunther, and Tay, 1998, ET chapter 18)

VI. Comparing forecasting performance: Horse races

1. Comparisons of forecast performance. (ET chapter 17, Clark and McCracken 2001, Diebold and Mariano 1995)
2. Comparing forecasting performance with panel data (Timmermann and Zhu, 2019)
3. Methods for comparison of large sets of forecasting models (White, 2000, Sullivan, Timmermann and White, 1999, Romano and Wolf, 2005, Hansen, Lunde, and Nason, 2011, Chordia, Goyal, and Saretto, 2017, Harvey, Liu, and Zhu, 2016, Hou, Xue, and Zhang, 2017)
4. Monitoring forecasting performance and conditional performance evaluation (Giacomini and White, 2006, Timmermann and Zhu, 2017)

How to apply:

The course will take place at the Bank of Italy in Rome, Italy. Participants will be invited to make their own arrangements regarding their travel, accommodation and meals. Further information will be available to successful applicants. **Candidates should apply by sending an email with your CV details to Mariolina Ciccone, in the CEPR events team (mciccone@cepr.org) by 6pm (UK time), 31 January, 2020**.

PhD students should also send a statement that specifies the ways participating in the school will be useful for their current research (max 300 words).

Participants from non-academic institutions where the employer is not a member of the EABCN network are charged a course fee of € 2000.

About the Instructors:

Graham Elliott is a professor of economics. He works in the field of econometrics, developing statistical methods for economic and other applications. He is a fellow of the Center for Applied Macroeconomic Analysis (CAMA), author of the reference/text "Economic Forecasting" jointly with Allan Timmermann, former co-editor of the International Journal of Forecasting (IJF) and co-editor of Volumes 1 and 2 of the Handbook of Forecasting.

Allan Timmermann holds the Atkinson/Epstein Chair in Management Leadership at the Rady School of Management and is a Distinguished Professor at UC San Diego. He obtained his PhD from University of Cambridge after initial economics training at the University of Copenhagen and London School of Economics. Timmermann is a very productive scholar in finance and applied econometrics. He is the co-editor of Journal of Financial Econometrics and serves as an associate editor on leading journals in finance, economics and forecasting including Journal of Business and Economic Statistics, Journal of Applied Econometrics, and Review of Asset Pricing Studies. He has published in journals such as Econometrica, Journal of American Statistical Association, Review of Economic Studies, Journal of Finance, Review of Financial Studies, and Journal of Financial Economics.