Recent Developments in Forecasting

By

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Hosted online with Banca d'Italia, Italy

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Deadline: 6pm (UK time), Wednesday 7 May 2021

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 forecasting and relate classical and Bayesian approaches.

Understanding these issues provides a foundation for all forecasting problems. Binary forecasting or classification is most closely related to decision making. The simplicity of the loss function allows many strong results. 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 provide a framework for thinking about methods as well as explain how some of the popular machine learning methods work and their properties. With this in place, we cover a variety of variable selection and model aggregation methods.

The final part of the course covers how to choose among competing forecasts and formally compare forecasting performance across two or possibly large numbers of forecasts. Ignoring the search across multiple models for a good forecasting model can introduce data mining biases, and we discuss ways to handle this problem.

The course draws on material from the following book (referred to as ET):
G. Elliott and A. Timmermann, 2016, **Economic Forecasting**. Princeton University Press.

Part I: Foundations and the Binary Forecasting Problem

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

Part II: Predictive Modelling Methods and Model Instability

III. Forecasting under model instability
1. Detection of breaks in time-series forecasting models (Rossi, 2013, Elliott and Mueller, 2006)
2. Choice of estimation window in the presence of instability (Pesaran and Timmermann, 2007)
3. Ad-hoc Strategies vs. Parametric Models of the Change Process (ET chapter 19, Pettenuzzo and Timmermann, 2011, 2017)
4. Exploring Panel Data for Detecting and Forecasting under Breaks (Smith and Timmermann, 2017)

IV. Forecasting with Many Regressors
1. Sparse vs. Dense Models: PCA, PLS, LASSO and variants
2. Machine Learning Methods: Trees and neural nets (Gu, Kelly, and Xia, 2020, Coulombe et al, 2020)

V. Model Selection and Forecast Combination Methods
1. Model Selection Methods (ET, chapter 6)
2. Model Aggregation approaches (Elliott, Gargano, and Timmerman, 2013).

Part III: Evaluating and Comparing Forecasting Performance

VI. Comparing forecasting performance: Horse races and p-hacking
1. Comparisons of forecast performance. (ET chapter 17, Clark and McCracken 2001, Diebold and Mariano 1995, Giacomini and White, 2006)

2. Evaluating and comparing many forecasting models (White, 2000, Sullivan, Timmermann and White, 1999, Romano and Wolf, 2005, Hansen, Lunde, and Nason, 2011)
3. Data mining and p-hacking (Harvey, Liu, and Zhu, 2016)
4. Comparing forecasting performance in a single cross-section (Qu, Timmermann and Zhu, 2020)

How to apply:

The course will take place online in the evenings for Europe, from 5pm CEST:

- June 1st lecture (3 hours)
- June 3rd lecture (3 hours)
- June 4th practice (1.5 hours)
- June 7th lecture (3 hours)
- June 8th practice (3 hours)

Candidates who have a CEPR profile should apply by submitting their CV online at portal.cepr.org/eabcn-training-school-recent-developments-forecasting **by 6pm (UK time), 7 May, 2021**. If you do not currently have a CEPR profile, please create a new one here and then click on the registration link.

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 €1000.

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 a Atkinson/Epstein Chair in Management Leadership at the Rady School of Management and is also a professor in economics at UC San Diego's department of economics since 1994. He obtained his PhD from University of Cambridge after initial economics training at the University of Copenhagen. Timmermann is a very productive scholar in finance and applied econometrics. He serves as an associate editor on leading journals in finance, economics and forecasting including Journal of Business and Economic Statistics, Journal of Economic Dynamics and Control, Journal of Financial Econometrics, and Journal of Forecasting. He has published in journals such as Journal of American Statistical Association, Review of Economic Studies, Journal of Finance, and Journal of Econometrics.