The Italian Econometric Society (SIdE) in collaboration with the Venice centre in Economic and Risk Analytics for Public Policies (VERA) Ca' Foscari University of Venice organizes the course for PhD students in:

Bayesian Multivariate Models and Forecasting in Economics and Finance

Venice, August 24-28, 2020

Coordinator:

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Lecturers

Roberto Casarin, University of Venice, Italy
Matteo Ciccarelli, European Central Bank, DG Research
Francesco Ravazzolo, Free University of Bozen-Bolzano, Italy

Requirements

Intermediate knowledge of econometrics; intermediate knowledge of Bayesian statistics and MCMC methods.

Description

The course is advanced and covers state-of-the-art techniques and recent developments in Bayesian Multivariate Models, for structural analysis and forecasting, nonparametric methods and forecast combinations with a broad range of applications in economics and finance. The methods introduced in the lectures will be illustrated with hands-on applications in MATLAB.

Course outline:

1. Review of Bayesian estimation
   1.1 Linear Regression Model (LRM) with spherical and non-spherical errors
   1.2 LRM with Time varying parameters and stochastic volatility

2. Multivariate models
   2.1 Introduction to VAR models
   2.2 VARs estimated with panel data
   2.3 Panel VAR models

3. Bayesian Markov-switching VAR models
   3.1 Markov-switching (MS) models and Hamilton Filter
   3.2 MS-VAR and MCMC methods
   3.3 Multi-country panel MS-VAR
   3.4 VAR with MS Stochastic Correlation
   3.5 Application to macroeconomics (e.g. business cycle) and finance (exchange rates and CDS on sovereign bonds)

4. Structural Graphical VAR Models
   4.1 Bayesian Networks and MCMC methods for Graphical Models
   4.2 Graphical VAR models
   4.3 Applications to macroeconomics and financial contagion

5. Bayesian Nonparametric Models
   5.1 Bayesian Nonparametric
      - ✓ Dirichlet and Pitman-Yor process priors
      - ✓ Infinite mixture representation
      - ✓ Dependent Pitman-Yor process priors
      - ✓ Slice sampling and MCMC sampling for nonparametric models
   5.2 Nonparametric VAR models
   5.3 Nonparametric density combination models
   5.4 Applications to macroeconomics (business cycle) and finance (stock markets).

6. Forecasting with Bayesian multivariate models
   6.1 How to compute point and density forecasts from Monte Carlo draws
   6.2 Evaluation of forecasts
   6.3 Applications to macroeconomics (GDP growth, inflation, interest rate and unemployment) and finance (electricity prices and cryptocurrencies)

7. Density forecast combinations
   7.1 Bayesian model averaging
   7.2 Extension to time-varying combination weights and learning
   7.3 Combinations of large data sets
   7.4 Parallel computation
   7.5 Applications to macroeconomics and finance

Software Used For The Applications: Matlab

Participants will use their laptops with MATLAB already installed on them.

Preliminary readings/Reference textbook for the course

Aastveit, K.A., J. Mitchell, F. Ravazzolo and H.K. van Dijk (2018). "The Evolution of Forecast Density Combinations in Economics", Oxford Research Encyclopedia of Economics and Finance.

Ahelegbey D. F., Billio, M. and Casarin, R. (2015), Bayesian Graphical Models for Structural Vector

Autoregressive Processes, Journal of Applied Econometrics, forthcoming.

Arias, Jonas E. & Rubio-Ramírez, Juan F. & Waggoner, Daniel F., 2014. "Inference Based on SVARs Identified with Sign and Zero Restrictions: Theory and Applications," Dynare Working Papers 30, CEPREMAP.

Bassetti, F, R. Casarin and F. Ravazzolo (2020). “Density Forecasting”. In Fuleky, P. (eds) Macroeconomic Forecasting in the Era of Big Data, Springer.

Billio, Casarin, Ravazzolo and van Dijk, 2013. Time-varying Combinations of Predictive Densities using Nonlinear Filtering, Journal of Econometrics, 177(2), 213–232.

Canova and Ciccarelli, 2013. Panel Vector Autoregressive Models: A Survey. Advances in Econometrics, eds. T. Fomby, L. Kilian and A. Murphy, Volume 32, 2013.

Canova and Ciccarelli, 2012. ClubMed? Cyclical fluctuations in the Mediterranean basin. Journal of International Economics, 88: 162-175.

Casarin, R., Sartore, D. and Tronzano, M. (2016), A Bayesian Markov-switching correlation model for contagion analysis on exchange rate markets, Journal of Business and Economic Statistics, forthcoming.

Casarin, Grassi, Ravazzolo and van Dijk, 2015. Parallel Sequential Monte Carlo for Efficient Density Combination: The Deco Matlab Toolbox, Journal of Statistical Software, 68(3).

Catania, L., S. Grassi and F. Ravazzolo, 2019. Forecasting Cryptocurrencies under Model and Parameter Instability. International Journal of Forecasting, 39(2), 485-501.

Catania L., Grassi S., Ravazzolo F., 2018. Predicting the Volatility of Cryptocurrency Time-Series. In: Corazza M., Durbán M., Grané A., Perna C., Sibillo M. (eds) *Mathematical and Statistical Methods for Actuarial Sciences and Finance*. Springer.

Clark and Ravazzolo, 2015. The Macroeconomic Forecasting Performance of Autoregressive Models with Alternative Specifications of Time-Varying Volatility, Journal of Applied Econometrics, 30(4), 551-575.

Ciccarelli, Ortega and Valderrama 2015, Heterogeneity and cross-country spillovers in macroeconomic-financial linkages, The B.E. Journal of Macroeconomics, 16: 231-276

Ciccarelli, Maddaloni and Peydró, 2015 Trusting the bankers: a new look at the credit channel of monetary policy transmission, Review of Economic Dynamics, 18:979-1002.

Del Negro, M. and Schorfheide, F. (2010). Bayesian Macroeconometrics, Handbook of Bayesian Econometrics.

Gianfreda, A., F. Ravazzolo and L. Rossini, 2019. Comparing the Forecasting Performances of Linear Models for Electricity Prices with High RES Penetration. International Journal of Forecasting, forthcoming.

Lerch, S., T. Thorarinsdottir, F. Ravazzolo and T. Gneiting, 2017. Forecaster's Dilemma: Extreme Events and Forecast Evaluation. *Statistical Science*, 32(1), 106-127.

Litterman, R. B. (1986). Forecasting with Bayesian vector autoregressions five years of experience. Journal of Business and Economic Statistics, (4):25-38.

Kilian, L. F. (2011). Structural Vector Autoregression, Mimeo.

Kim, C.J. and C.R. Nelson (1999), “State-Space Models with Regime Switching,” MIT Press, Cambridge, MA.Koop, G. (2003) Bayesian Econometrics, J. Wiley.

West, M., and J. Harrison (1997). Bayesian Forecasting and Dynamic Models, 2nd Ed., Springer, 1997

Handouts, readings and further material will be provided before the beginning of and during the lectures.

Venue

The course will be held in the Campus Economico San Giobbe at Università Ca’ Foscari, Venezia, Italy. Address: Dipartimento di Scienze Economiche - S. Giobbe, 873 - 30121 Venezia. Participants will be hosted in the Ca' Foscari Residence in Santa Marta (as an exception, in case of reduced availability of rooms they will be accommodated in local hotels).

Timetables

Each Module requires full-time attendance, and participation is not compatible with other jobs at the same time (e.g. preparation of other exams). Lectures and tutorials will be in English, with the following schedule (provisional):
Monday to Friday: lectures: 9.00-13.00, 15.00-17.00 (18.00).

Fees and Enrollment

Fees:
Students, new graduated students, PhD students and temporary university staff: 690€
University staff: 800€
Others: 2300€
Fee includes: accommodation (usually in double room with breakfast and lunch starting from Sunday evening).
Participants who wish to attend two or three Courses, are allowed the following reduced fees per Course:
-Students, new graduated students, PhD students and temporary university staff: 590€ per Course
-University staff: 700€ per Course
-Others: 2000€ per Course
Fees for Master and PhD students from Ca' Foscari University of Venice : 30€
Fee for students from Ca' Foscari University of Venice does not include accommodation.
Master and PhD students from Ca’ Foscari University of Venice who wish to attend two or three Courses are allowed the following reduced fees per Course:
-Two Courses in Venice and one or more Courses in Bertinoro: 30€ per Course in Venice + 590€ per Course in Bertinoro

Enrollment
SIdE courses and summer schools are open to scholar and practitioners of all levels, but are particularly aimed at junior researchers and PhD students. The only requirement is SIdE membership (annual fee 60 Euro). Regular members of SIdE are admitted upon application to the Steering Committee. Together with the application to SIdE, prospective regular members give their consent to the distribution of their CV and list of publications, in the spirit of disclosure of research in econometrics stated in the goals of SIdE. The interest in econometrics is identified by the curriculum of studies and/or the scientific or professional career.
How to apply:

Go to http://www.side-iea.it/become-member and provide personal details (name, affiliation), and upload your CV (pdf file, max 2 Mb). Once your application is validated, you will receive a link to a payment gateway for the collection of membership dues. Once the payment is confirmed by our Staff, you will receive a username and password to login into your personal profile and access to restricted contents and the Enrollment procedure

Important dates:

Application Deadline: April 18th, 2020
Deadline for Fee Payment is May 16th 2020

Contacts

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Sponsors:

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