



SAPIENZA
UNIVERSITÀ DI ROMA

Topics in large-scale time series models for economics and finance

Workshop in memory of Stefano Fachin

Thursday 22 February 2024

Location:

[Aula I, ground floor,](#)

[Department of Statistical Sciences](#)

Organizers: M. Franchi, B. Maggi, M.G. Pittau, R. Zelli

Program

09:00 – 09:10: Registration

09:10 – 09:30: Welcome address

Prof.ssa Giovanna Jona Lasinio, Head of the Department of Statistical Sciences.

Prof. Luca Fanelli, President of the Italian Econometric Association (SIdE).

09:30 - 10:45: Presentations

09:30-09:55: G. Cubadda, *The Time-Varying Multivariate Autoregressive Index Model*.

09:55-10:20: G. Arbia, *Robust spatial correlation and spatial outlier detection*.

10:20-10:45: P. Paruolo, *Inference on general permanent-transitory decompositions*.

10:45 - 11:15: Coffee break

11:15 - 12:05: Presentations

11:15-11:40: G. Storti, *Adaptive combinations of tail-risk forecasts*.

11:40-12:05: G. Gallo, *Modeling volatility meaningful events and the classification of monetary policy announcements*.

12:05 - 13:15: Memories of Stefano

G. Arbia, F. Battaglia, S. Destefanis, F. Di Iorio, G. Gallo, A. Gavosto, F. Grasso, R. Lucchetti, E. Orsingher, E. Otranto, M. Vichi.

13:15 - 14:45: Lunch

14:45 - 15:30: Invited lecture

14:45 - 15:30: M. Lippi, *High-Dimensional Dynamic Factor Models do it better. A comparison with Structural VAR techniques*.

15:30 - 16:20: Presentations

15:30-15:55: G. Fiorentini, *Information matrix tests for multivariate Gaussian mixtures*.

15:55-16:20: R. Lucchetti, *Revisiting the dynamic factor approach for yield curve modelling*.

16:20 - 16:50: Coffee break

16:50 - 17:40: Presentations

16:50-17:15: C. Ciccarelli, *Notes on the rate of regional industrial growth in Italy, 1861-1913*.

17:15-17:40: F. Di Iorio, *Green TFP in OECD Countries: a panel stochastic frontiers approach*.

17:40 – 17:45: Concluding remarks

Abstracts

The Time-Varying Multivariate Autoregressive Index Model

By G. Cubadda (Tor Vergata University of Rome), S. Grassi (Tor Vergata University of Rome), and B. Guardabascio (University of Perugia)

Many economic variables feature changes in their conditional mean and volatility, and time-varying Vector Autoregressive Models are often used to handle such complexity in the data. Unfortunately, as the number of series grows, they present increasing estimation and interpretation problems. This paper tries to address this issue by proposing a new Multivariate Autoregressive Index model that features time-varying mean and volatility. Technically, we develop a new estimation methodology that mixes switching algorithms with the forgetting factors strategy of Koop and Korobilis (2012). This substantially reduces the computational burden and allows one to select or weigh, in real-time, the number of common components and other features of the data without further computational cost. Using US macroeconomic data, we provide a forecasting exercise that demonstrates the feasibility and usefulness of this new model.

Robust spatial correlation and spatial outlier detection

By G. Arbia (Catholic University of the Sacred Heart, Rome) and V. Nardelli (Catholic University of the Sacred Heart, Rome)

Methods are proposed for robustizing traditional spatial correlation measures, and a Monte Carlo study is made to compare their performances relative to each other and to their non-robust versions. The new measures are then extended to local indicators of spatial association and used for identifying local observations that may disproportionately influence spatial correlation in a map.

Inference on general permanent-transitory decompositions

By M. Franchi (Sapienza University of Rome), I. Georgiev (University of Bologna), P. Paruolo (European Commission, JRC)

This paper studies asymptotic properties of empirical canonical correlations analysis between p time series of length T and K elements of a (discretized) orthonormal system in $L^2[0, 1]$. For a large class of permanent-transitory decompositions, including all commonly used low-frequency models, it is found that the largest s squared empirical canonical correlations converge in probability to 1 while the remaining $r := p - s$ converge in probability to 0, when data are generated by a process with s permanent and r transitory components. This result is used to define a consistent information criterion to infer the number of permanent components and a super-consistent estimator of the permanent-transitory decomposition. Monte Carlo results illustrate that the proposed estimators work well for small to large values of p .

Modeling volatility meaningful events and the classification of monetary policy announcements

By G. M. Gallo (Italian Court of Audits, New York University in Florence and CRENoS), D. Lacava (University of Messina) and E. Otranto (University of Messina and CRENoS)

Central Banks interventions are frequent in response to exogenous events with direct implications on financial market volatility. In this paper, we introduce the Asymmetric Multiplicative Error Model with Meaningful Volatility events (AMEM–MV), which accounts for a specific component of volatility related to meaningful policy-related events within an intraday framework. Taking the Federal Reserve as a reference, we propose a new model-based classification of monetary announcements based on their impact on the jump component of volatility. Focusing on a short window following each Fed’s communication, we isolate the impact of monetary announcements from any contamination carried by relevant events that may occur within the same announcement day.

Adaptive combinations of tail-risk forecasts

By A. Amendola (University of Salerno), V. Candila (University of Salerno), A. Naimoli (University of Salerno), and G. Storti (University of Salerno)

In order to meet the increasingly stringent global standards of banking management and regulation, several methods for forecasting tail risk measures like the Value-at-Risk (VaR) and Expected Shortfall (ES) have been proposed in the literature. However, regardless of the approach used, there are several sources of uncertainty like model specification, factors related to data, and estimation procedure, for instance, which could significantly affect the accuracy of VaR and ES measures. Aiming to mitigate the influence of these sources of uncertainty and improve the predictive performance achieved by individual models, we propose a novel forecast combination strategy based on the Model Confidence Set (MCS). In particular, we use consistent joint VaR and ES loss functions within the MCS framework to adaptively combine forecasts generated by a wide range of parametric, semi-parametric, and non-parametric models. Our results reveal that the proposed combined predictors provide a suitable alternative for forecasting risk measures, passing the usual backtests, entering the set of superior models of the MCS, and exhibiting lower standard deviations than other model specifications.

High-Dimensional Dynamic Factor Models do it better. A comparison with Structural VAR techniques.

By M. Lippi (EIEF)

Structural VAR models produce results that can vary dramatically with the variables chosen, which is due to deficient information and/or contamination of the variables by measurement errors. I illustrate a novel procedure, the Common Component SVAR (CC-SVAR), which solves both problems. First, the common components of the variables of interest are estimated using High-Dimensional Factor techniques. Second, SVAR analysis is performed using such components. The key feature is that the number of common components is larger than the number of shocks, so that the SVAR is singular. Consistency results for singular VARs are provided. The CC-SVAR procedure is applied to monetary policy shocks. Our finding is that, with the CC-SVAR, results are robust and a well-known puzzle disappears.

Information matrix tests for multivariate Gaussian mixtures

By D. Amegual (CEMFI), G. Fiorentini (Università di Firenze and RCEA) and E. Sentana (CEMFI)

The EM principle implies that the moments underlying the Information Matrix test for finite Gaussian mixtures are the expectation given the observed data of the moments tested if the underlying components were observed. This principle also leads to closed-form expressions for their asymptotic covariance matrix adjusted for sampling uncertainty in the parameter estimators under the null. Monte Carlo simulations indicate that the parametric bootstrap provides reliable finite sample sizes and good power against various misspecification alternatives. We confirm that 3-component Gaussian mixtures accurately capture the cross-sectional distributions of per capita income in the Penn World Tables between 1960 and 2000.

Revisiting the dynamic factor approach for yield curve modelling

By C. Casoli (Fondazione Eni Enrico Mattei) and R. Lucchetti (Università Politecnica delle Marche)

In this paper, we revisit early contributions by Diebold and Li (2006) and Diebold et al. (2006) in the light of more recent development in the literature on Dynamic Factor Models and provide evidence on how differences in the methods for extracting yield curve factors are reflected in their forecasting performance. The fact that interest rates normally behave as $I(1)$ variables in most cases has been handled in DFMs either by ignoring the possible consequences of nonstationarity or by differencing the data. However, as shown by Casoli and Lucchetti (2021), unit roots can be accommodated if cointegration relationship between the observables are present.

Notes on the rate of regional industrial growth in Italy, 1861-1913

By B. A'Hearn (Pembroke College University of Oxford), C. Ciccarelli (Tor Vergata University of Rome), S. Fachin (Sapienza University of Rome), and Tommaso Proietti (Tor Vergata University of Rome)

We use annual value added data at 1911 prices, disaggregated by regions and manufacturing sectors to offer a new perspective on the development of the Italian industry during 1861-1913. Out of 160 time series, principal components analysis identifies just two common features (a rising trend and a long-term cycle) and an associated set of loading coefficients (tied to the absorbing social capability of regions) as sufficient to capture the main dynamics involved. By exploiting new data for 1850 ca, we also show that subsequent industrial developments of most advanced technological sectors in Northern regions are associated with human capital inherited from the preunification decades.

Green TFP in OECD Countries: a panel stochastic frontiers approach

By F. Di Iorio (Università degli Studi di Napoli Federico II), R. Lucchetti (Università Politecnica delle Marche) and S. Fachin (Sapienza University of Rome)

The growing focus on sustainability issues has coincided with an explosion of qualitative and quantitative analyses of 'green growth'. Green TFP is a new definition based on the traditional accounting framework of total factor productivity that accounts for energy consumption and environmental pollution. These characteristics allow the GTFP to be used to assess whether a country or region can achieve long-term sustainable development. This paper intends to explore the possibility to achieve an estimation of spillover effects using panel factor models both from the OECD

database of GTFP measures and using a new estimation of GTFP by panel Stochastic Frontier Analysis. The main research goal is to highlight the presence of one or more latent factors that may be driving the GTFP dynamics and provide valuable support for the identification of the mechanisms that influence spillover effects between regions and/or countries and provide support for scenario analysis to assess the impact of sustainability policies.



Mappa città universitaria

Table 1: Aula I, ground floor of Department of Statistical Sciences (**CU002**, NE entrance)

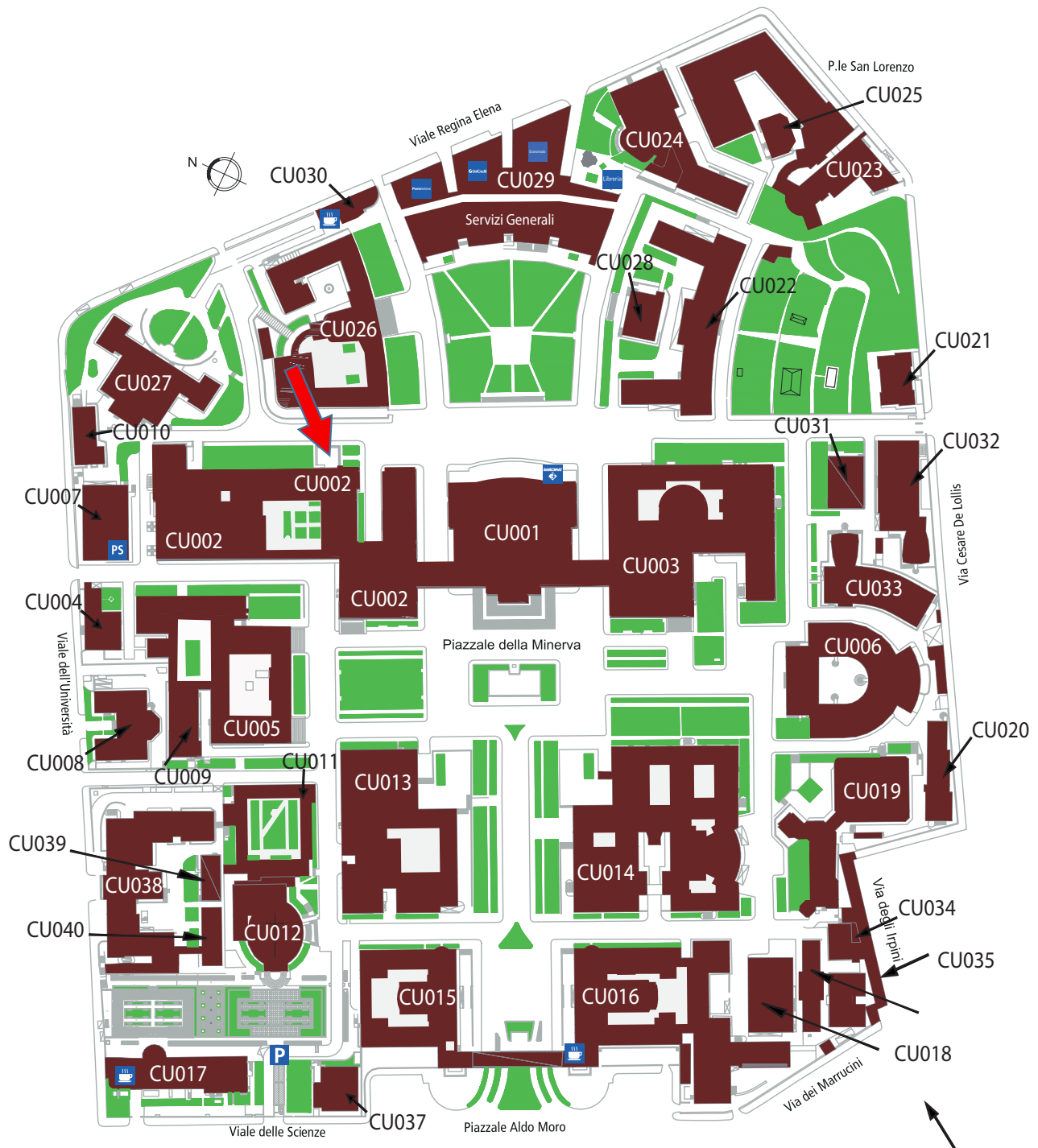


Table 2: The Department of Statistical Sciences

