THE UNIVERSITY OF SYDNEY
Business School

Time Series and Forecasting Symposium TSF2024

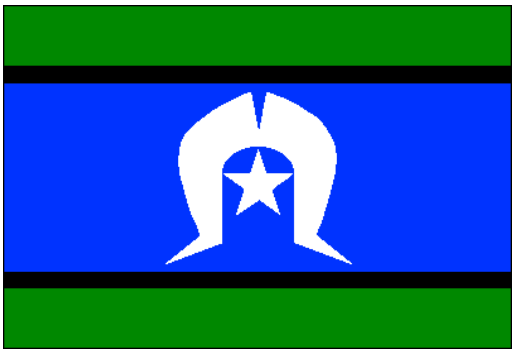
28-29 November 2024

The University of Sydney, CBD Campus

Level 17, 133 Castlereagh Street, Sydney, Australia

Acknowledgement of Country

We acknowledge the traditional owners of the lands on which the University of Sydney is located, the Gadigal people of the Eora Nation, and we pay our respect to the knowledge embedded forever within the Aboriginal Custodianship of Country.



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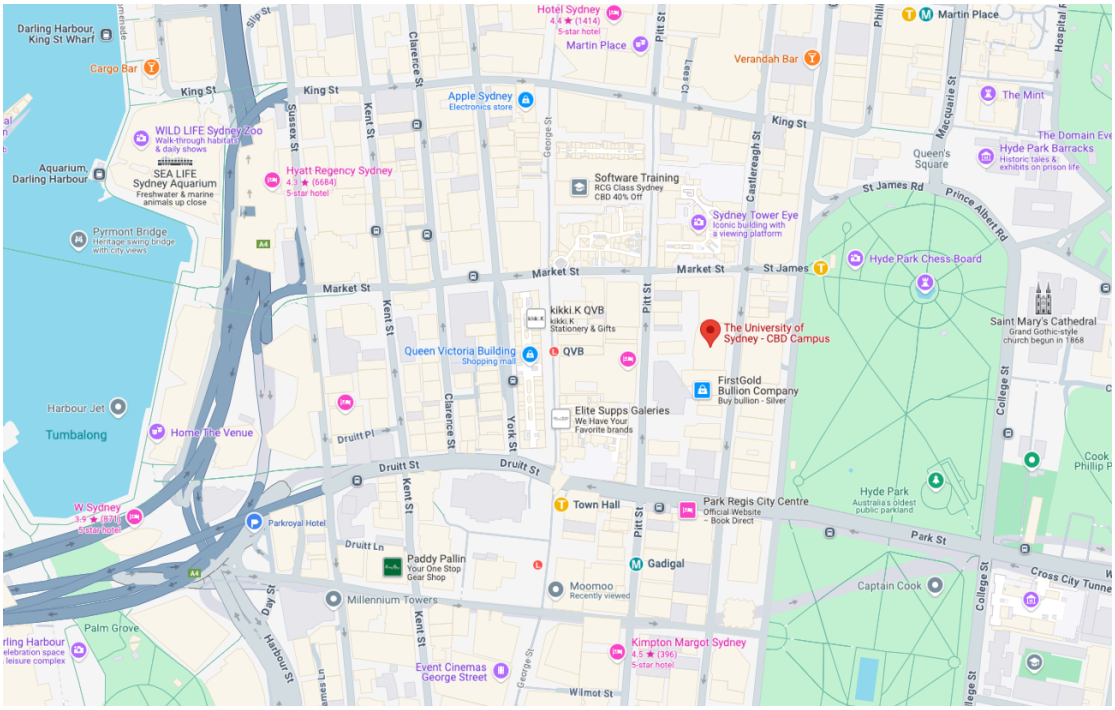
Location Guide



The University of Sydney, CBD Campus

Address: Level 17, 133 Castlereagh Street, Sydney, Australia

Getting There

By train
The nearest train stations are St James Station and Town Hall Station.

By metro
The nearest metro stations are Gadigal Station and Martin Place Station.

By bus
The nearest bus stops are located on Castlereagh Street or on Elizabeth Street.

By car
There is no car parking available onsite. However, Piccadilly Secure Parking (137 Castlereagh St) provides parking spaces. We suggest pre-booking online to avoid a high cost.

Symposium Details

The Time Series & Forecasting Symposium is an annual research event of the Time Series and Forecasting Research Group at the University of Sydney Business School. This symposium aims to promote time series analysis and forecasting in business and other areas. It consists of oral and poster presentations in all areas related to time series and forecasting. The main themes are: time series econometrics, volatility modelling and risk forecasting, risk assessment and management, high-dimensional modelling and forecasting, computational methods, robust inferences, machine learning, and deep learning.
Website: https://www.sydney.edu.au/business/our-research/research-groups/time-series-and-forecasting/symposium.html

Time Series and Forecasting Research Group Leaders

Richard Gerlach, Discipline of Business Analytics, The University of Sydney

Boris Choy, Discipline of Business Analytics, The University of Sydney

Organising Committee

Boris Choy (Chair), Discipline of Business Analytics, The University of Sydney

Simon Kwok, School of Economics, The University of Sydney

Mengheng Li, Economics Discipline Group, UTS Business School, University of Technology Sydney

Xuan (Winny) Li, School of Computer Science and Engineering, University of New South Wales

Hanlin Shang, Department of Actuarial Studies and Business Analytics, Macquarie University

Nuttanan Wichitaksorn, Department of Mathematical Sciences, Auckland University of Technology

Yuning (Caroline) Zhang, Discipline of Business Analytics, The University of Sydney

Registration

All in-person registrations include refreshments, lunches and the symposium dinner.

Presentation Format

Keynote talk are 50 minutes each including Q&A

Invited talks are 40 minutes each including Q&A

Contributed talks are 30 minutes each including Q&A

Student talks are 3 minutes each, and poster presentations are held throughout the two days

Dinner

Thursday, 28 November 2024, 6pm

Venue: Sky Phoenix Chinese restaurant (Level 6, Westfield Sydney, 188 Pitt Street, Sydney, NSW 2000)

Further Queries

If you have any queries please do not hesitate to contact: **tsf.symposium@sydney.edu.au** or **boris.choy@sydney.edu.au**

Program

Day 1: Thursday 28 November 2024

9:00 – 10:00 **Registration & Morning Tea**

10:00 – 10:10	**Welcome** **Richard Gerlach** *Co-Lead, Time Series and Forecasting Research Group, The University of Sydney Business School* **Boris Choy** *Chair, TSF2024 Organising Committee, The University of Sydney Business School*
Session 1 *Session Chair:* **Boris Choy**	
10:10 – 11:00	**Keynote Talk** **Wai Keung Li**, *Education University of Hong Kong* On Threshold Nonlinear Time Series with a Buffer Zone
11:00 – 12:00	**Contributed Talks** **Timo Teräsvirta**, *Aarhus University* Dynamic Time-Varying Betas and Climate and Political Risk Factors for Four Largest Australian Banks **Jonathan Dark**, *University of Melbourne* Climate Value at Risk

12:00 – 13:20 **Lunch**

Session 2 *Session Chair:* **Hanlin Shang**	
13:20 – 14:00	**Invited Talk** **Qihe Tang**, *University of New South Wales* Modeling and Pricing Event-Linked Securities with a Focus on Recovery Risk
14:00 – 15:00	**Contributed Talks** **Valentin Zelenyuk**, *University of Queensland* Statistical Inference for Hicks–Moorsteen Productivity Indices

	Mengheng Li, University of Technology Sydney A Particle-Kalman Double Filtering Method for State Space Models with Superposed Latent States

15:00 – 15:30 **Afternoon Tea**

Session 3 *Session Chair*: **Nuttanan Wichitaksorn**	
15:30 – 17:00	**Contributed Talks** **Pär Österholm**, *Örebro University* Analysis of UK Households' Directional Forecasts of Interest Rates? **Ritvana Rrukaj**, *Norwegian University of Life Sciences* A Signal Processing Approach to Forecasting Seasonal Load in Electricity Markets **Hanlin Shang**, Macquarie University Forecasting Age Distribution of Deaths: Cumulative Distribution Function Transformation

18:00 – 20:30 **Symposium Dinner at Sky Phoenix Chinese Restaurant on Level 6 Westfield Sydney**

Day 2: Friday 29 November 2024

Session 4 *Session Chair:* **Richard Gerlach**	
9:10 – 10:00	**Keynote Talk** **Mike Smith**, *Melbourne Business School* Deep Distributional Time Series Models and the Probabilistic Forecasting of Intraday Electricity Prices

10:00 – 10:30 **Morning Tea**

Session 5 *Session Chair:* **Mengheng Li**	
10:30 – 12:00	**Contributed Talks** **Ken Siu**, *Macquarie University* Bayesian Nonlinear Expectation for Time Series Modelling and Its Application to Bitcoin **Thomas Goodwin**, University of New South Wales Dynamic Linear Regression Models for Semi-Long Memory Time Series **Simon Kwok**, *University of Sydney* P-Bubbles, Q-Bubbles, and Risk Premia

12:00 – 13:20 **Lunch**

Session 6 *Session Chair:* **Simon Kwok**	
13:20 – 14:00	**Invited Talk** **Roberto Renò**, *ESSEC Business School* Taking Advantage of Biased Proxies for Forecast Evaluation
14:00 – 15:30	**Contributed Talks** **Clara Grazian**, University of Sydney Bayesian Consistency for Long Memory Processes: A Semiparametric Perspective **Sang-Hyeok Lee**, *Korean Maritime Institute, Korea* Unveiling the Structure of Noise in Business Time Series Forecasting: A Novel Approach **Tomasz Wozniak**, University of Melbourne Time-Varying Identification of Structural Vector Autoregressions

15:30 – 16:00 **Afternoon Tea**

Session 7 *Session Chair:* **Caroline Zhang**	
16:00 – 17:00	**3-Minute Talks** **Yangzhuoran Yang**, *Monash University* Forecast Linear Augmented Projection (FLAP): A Free Lunch to Reduce Forecast Error Variance **Yuru Sun**, *Monash University* Jump Modelling with Dirichlet Process Mixture **Zheng Fan**, *University of Melbourne* Dynamic Shrinkage and Selection in Bayesian Predictive Synthesis for Exchange Rate Forecasting **James Cohen Gabor**, *University of Sydney* Novel Bayesian Algorithms for ARFIMA Long-Memory Processes: A Comparison Between MCMC and ABC Approaches **Farhana Abedin**, *University of South Australia* Determinants of Trade Finance Dynamics: Cross-country Analysis using Panel VAR Approach **Samhan Samhan**, *University of New South Wales* Review of Net Electricity Load Forecasting Research and Its Challenges **Bryan Bajar**, *Macquarie University* Self-Normalisation for Dynamical Systems
17:00 – 17:10	Short break
17:10 – 17:30	**Award Presentation** **Keynote and Invited Speakers** **Closing Ceremony** **Boris Choy** *Chair, TSF2024 Organising Committee, The University of Sydney Business School*

List of Abstracts (Day 1)

Session 1: Keynote & Contributed Talks

On Threshold Nonlinear Time Series with a Buffer Zone

Wai Keung Li
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Abstract: A time series with a buffer (hysteretic) zone was first introduced in the autoregressive form in Li et al. (2015) and Zhu et al. (2014). The time series is an extension of the classical nonlinear threshold time series by allowing the current time series structure to be unchanged if its immediate past lies within a buffered region. Since its introduction it has found applications in many fields including exchange rates and environmental modelling. It has also been extended in various directions covering, for example, smooth transition and non-stationarity structures. This talk will give an updated review on the developments of the buffered time series models including the most recent moving average version. This will be illustrated by applications to real data.

Dynamic Time-Varying Betas and Climate and Political Risk Factors for Four Largest Australian Banks

Timo Teräsvirta
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Abstract: In this paper, we consider two types of risk, the climate risk and the political one, for four major Australian banks, commonly called the Big Four. They account for about 20% of the value of the Australian stock market and are therefore important to the Australian economy. We first introduce a new time-varying beta called the dynamic time-varying beta. It is related to but different from (and less noisy than) the dynamic conditional beta that forms a part of the definition of the climate risk introduced by Jung et al. (2023). Maximum likelihood estimators for this new beta are consistent and asymptotically normal. The dynamic time-varying beta is used for estimating the climate and the newly defined political risk for the Big Four using portfolios designed for Australian conditions. The results are compared with climate risk estimates based on the dynamic conditional beta and generated by V-Lab, a website of the New York University, Stern School of Business. While our climate risk estimates do not suggest a positive climate risk for the Big Four, the V-Lab estimates do. These differences are to a large extent due to different climate portfolios, less so to different betas. This is joint work with Annastiina Silvennoinen (QUT) and Glen Wade (QUT).

Climate Value at Risk

Jonathan Dark
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Abstract: We develop a new approach to calculate forward looking Climate Value at Risk (Climate-VaR) for a geographic region. Our approach is general and can be applied to any economic risk from extreme weather. We employ multivariate Poisson and conditional Generalised Pareto distributions (GPDs) that link scale and shape parameters to climate and demographic covariates. Covariate projections under Shared Socioeconomic Pathways (SSPs 126, 245, 370 and 585), are then used to simulate 10 year aggregate loss distributions. We illustrate our method by estimating the flood risk to property across Western North America to the end of this century.

Session 2: Invited & Contributed Talks

Modeling and Pricing Event-Linked Securities with a Focus on Recovery Risk

Qihe Tang
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Abstract: Event-linked securities—typically defaultable bonds and catastrophe bonds—are financial instruments whose payments are contingent on the occurrence of specific events, such as defaults or natural disasters. Consider such a security traded in a financial market that is subject to shocks and regime shifts. Its recovery payment has a hybrid structure, comprising two components: one contingent on historical information up to the time of the event and the other an independent variable indexed by the regime during the event. Five types of risks are embedded: shock risk, regime-shift risk, diffusion risk, event risk, and unpredictability risk. We construct a risk-neutral pricing measure that prices all five types of risks in an integrated manner. As an application, we examine a hypothetical hurricane bond.

Statistical Inference for Hicks–Moorsteen Productivity Indices

Valentin Zelenyuk
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Abstract: The statistical framework for the Malmquist productivity index (MPI) is now well-developed and emphasizes the importance of developing such a framework for its alternatives. In this paper, we try to fill this gap in the literature for another popular measure, known as the Hicks–Moorsteen Productivity Index (HMPI). Unlike MPI, the HMPI has a total factor productivity interpretation in the sense of measuring productivity as the ratio of aggregated outputs to aggregated inputs and has other useful advantages over MPI. In this work, we develop a novel framework for statistical inference for HMPI in various contexts: when its components are known or when they are replaced with non-parametric envelopment estimators. This will be done for a particular firm's HMPI as well as for the simple mean (unweighted) HMPI and the aggregate (weighted) HMPI. Our results further enrich the recent theoretical developments of nonparametric envelopment estimators for the various efficiency and productivity measures. We also examine the performance of these theoretical results for both the unweighted and weighted mean of HMPI for a finite sample, using Monte-Carlo simulations and also provide an empirical illustration along with the computation code.

A Particle-Kalman Double Filtering Method for State Space Models with Superposed Latent States

Mengheng Li
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Abstract: Estimating parameters and states in nonlinear and non-Gaussian state space models (SSMs) relies on particle filters that can quickly degenerate as the state dimension increases. We focus on the inefficiency problem for SSMs with superposed latent states, including the multiple-component stochastic volatility model and the multifactor intensity model. We propose to reduce the state dimension by running a particle filter with the superposition, and then use the Kalman filter to retrieve all individual states. We show that the double filtering method is easy to code and allows for likelihood-based estimation and inference. Our simulation study shows the superior computational and statistical efficiency of our method, compared to well-designed particle filters that do not exploit the superposition. We apply the method to study different components in the common idiosyncratic volatility of stock returns and explore their pricing implications.

Session 3: Contributed Talks

Analysis of UK Households' Directional Forecasts of Interest Rates?

Pär Österholm
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Abstract: In this paper, we evaluate the directional interest-rate forecasts of UK households from the Bank of England's Inflation Attitudes Survey. Employing a test for directional forecast accuracy and data on the survey balance ranging from 1999Q4 to 2023Q2, we find that the balance is not able to predict in which direction the interest rate will move over the coming year. In addition, regression models based on the balance are not able to generate forecasts for the quantitative change in the interest rate that have higher precision than a naïve forecast. In order to provide information as to whether our findings are due to the inherent difficulty of forecasting interest rates or if households are not very insightful regarding interest rates, we investigate whether households have been able to correctly assess the directional change of the interest rate over the previous twelve months; our results indicate some amount of "literacy" among the households regarding the interest rates that they face. Finally, probit analyses based on individual-response level data suggest that literacy regarding interest rates – proxied by the respondent having been correct regarding the directional change over the previous twelve months – does not appear helpful when forecasting.

A Signal Processing Approach to Forecasting Seasonal Load in Electricity Markets

Ritvana Rrukaj
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Abstract: Medium-term load forecasting is a critical tool utilized by electricity market operators for system planning and load-serving entities (LSEs) for procuring power supply contracts. In this paper, we employed signal processing techniques to model seasonal (90-day) load in the New York wholesale electricity market (NYISO). Using a novel series of filtration techniques, we first smoothed raw NYISO load data and then fit an almost-periodic model to these filtered data. We further modeled the resulting noisy residuals using autoregressive (AR) regressions. We performed out-of-sample forecasts of our model using test data from 2019 and 2020. Finally, we benchmarked our model's forecasting accuracy against ARIMA, Holt-Winters, and ARIMA with Fourier terms models. The ARIMA with Fourier terms model yielded the best forecasting results, a result that suggests that the most effective way to model these filtered seasonal load data combines autoregressive moving average (ARMA) model terms and Fourier terms that further capture nonlinear dynamics.

Forecasting Age Distribution of Deaths: Cumulative Distribution Function Transformation

Hanlin Shang
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Abstract: Like density functions, period life-table death counts are nonnegative and have a constrained integral, and thus live in a constrained nonlinear space. Implementing established modelling and forecasting methods without obeying these constraints can be problematic for such nonlinear data. We introduce cumulative distribution function transformation to forecast the life-table death counts. Using the Japanese life-table death counts obtained from the Japanese Mortality Database (2024), we evaluate the point and interval forecast accuracies of the proposed approach, which compares favourably to an existing compositional data analytic approach. The improved forecast accuracy of life-table death counts is of great interest to demographers for estimating age-specific survival probabilities and life expectancy and actuaries for determining temporary annuity prices for different ages and maturities.

List of Abstracts (Day 2)

Session 4: Keynote and Contributed Talks

Deep Distributional Time Series Models and the Probabilistic Forecasting of Intraday Electricity Prices

Mike Smith
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Abstract: Recurrent neural networks (RNNs) with rich feature vectors of past values can provide accurate point forecasts for series that exhibit complex serial dependence. We propose two approaches to constructing deep time series probabilistic models based on a variant of RNN called an echo state network (ESN). The first is where the output layer of the ESN has stochastic disturbances and a Bayesian prior for regularization. The second employs the implicit copula of an ESN with Gaussian disturbances, which is a Gaussian copula process on the feature space. Combining this copula process with a nonparametrically estimated marginal distribution produces a distributional time series model. The resulting probabilistic forecasts are deep functions of the feature vector and marginally calibrated. In both approaches, Markov chain Monte Carlo methods are used to estimate the models and compute forecasts. The proposed models are suitable for the complex task of forecasting intraday electricity prices. Using data from the Australian market, we show that our deep time series models provide accurate short-term probabilistic price forecasts, with the copula model dominating. Moreover, the models provide a flexible framework for incorporating probabilistic forecasts of electricity demand, which increases upper tail forecast accuracy from the copula model significantly.

Session 5: Contributed Talks

Bayesian Nonlinear Expectation for Time Series Modelling and Its Application to Bitcoin

Ken Siu
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Abstract: A two-stage approach to parametric nonlinear time series modelling in discrete time is proposed with the objective of incorporating uncertainty in the conditional mean and volatility. At the first stage, a reference time series model is specified and estimated. At the second stage, Bayesian nonlinear expectations are introduced to incorporate model uncertainty in prediction via specifying a family of alternative models. The construction of Bayesian nonlinear expectations for prediction is based on closed-form Bayesian credible intervals evaluated using conjugate priors and residuals of the estimated reference model. Using real Bitcoin data including some periods of Covid 19, the proposed method is applied to forecast Bitcoin returns and evaluate Bitcoin risks under three major parametric nonlinear time series models, namely the self-exciting threshold autoregressive model, the generalized autoregressive conditional heteroscedasticity model, and the stochastic volatility model. (This paper has been published in Empirical Economics (2023) 64, 505-537. https://doi.org/10.1007/s00181-022-02255-z).

Dynamic Linear Regression Models for Semi-Long Memory Time Series

Thomas Goodwin
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Abstract: Dynamic linear regression models forecast the values of a time series based on a linear combination of a set of exogenous time series while incorporating a time series process for the error term. This error process is often assumed to follow an autoregressive integrated moving average (ARIMA) model, or seasonal variants thereof, which are unable to capture a long-range dependency structure of the error process. A novel dynamic linear regression model that incorporates the long-range dependency feature of the errors is proposed, showing it can improve the model's forecasting ability.

P-Bubbles, Q-Bubbles, and Risk Premia

Simon Kwok
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Abstract: According to the time series approach, bubbles occur when the price process of a risky asset is a submartingale in the statistical measure (P-bubbles). By contrast, the local martingale theory suggests that bubbles are present when the price process is a strict local martingale in the risk-neutral measure (Q-bubbles). This paper unifies the discussion by showing that the two types of bubbles are distinct components of the asset's risk premium. An empirical study on equities and ETFs reveals that the incremental information contained in Q-bubbles is useful for explaining a crucial part of equity risk premium, improving out-of-sample regression of excess returns, and constructing profitable market-timing trading strategies.

Session 6: Invited and Contributed Talks

Taking Advantage of Biased Proxies for Forecast Evaluation

Roberto Renò
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Abstract: This paper rehabilitates biased proxies for the assessment of the predictive accuracy of competing forecasts. By relaxing the ubiquitous assumption of proxy unbiasedness adopted in the theoretical and empirical literature, we show how to optimally combine (possibly) biased proxies to maximize the probability of inferring the ranking that would be obtained using the true latent variable, a property that we dub proxy reliability. Our procedure still preserves the robustness of the loss function, in the sense of Patton (2011b), and allows testing for equal predictive accuracy, as in Diebold and Mariano (1995). We demonstrate the usefulness of the method with compelling empirical applications on GDP growth and financial market volatility forecasting. This is joint work with Giuseppe Buccheri and Giorgio Vocalelli.

Bayesian Consistency for Long Memory Processes: A Semiparametric Perspective

Clara Grazian
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Abstract: In this work, we will investigate a Bayesian approach to estimating the parameters of long memory models. Long memory, characterized by the phenomenon of hyperbolic autocorrelation decay in time series, has garnered significant attention. This is because, in many situations, the assumption of short memory, such as the Markovianity assumption, can be deemed too restrictive. Applications for long memory models can be readily found in fields such as astronomy, finance, and environmental sciences. However, current parametric and semiparametric approaches to modeling long memory present challenges, particularly in the estimation process. In this study, we will introduce various methods applied to this problem from a Bayesian perspective, along with a novel semiparametric approach for deriving the posterior distribution of the long memory parameter. Additionally, we will establish the asymptotic properties of the model. An advantage of this approach is that it allows to implement state-of-the-art efficient algorithms for nonparametric Bayesian models.

Unveiling the Structure of Noise in Business Time Series Forecasting: A Novel Approach

Sang-Hyeok Lee
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Abstract: This study proposes a novel approach to business univariate time series forecasting by focusing on the structure of noise, which is often overlooked in traditional models. Unlike conventional methods that emphasize overfitting and underfitting, this research explores the potential of noise having an underlying structure, particularly in volatile time series like shipping freight rates. Using small time scales and leveraging mathematical properties of noise, the study demonstrates that noise can be modeled independently of trend, seasonality, cycle, and impact. The findings suggest that it is possible to develop a short-term forecasting model that remains unaffected by economic shocks. This approach aligns with traditional shipping economics, offering new insights into the relationship between long-term trends and short-term fluctuations.

Time-Varying Identification of Structural Vector Autoregressions

Tomasz Wozniak
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Abstract: We propose a novel Bayesian heteroskedastic Markov-switching structural vector autoregression with data-driven time-varying identification. The model selects from alternative patterns of exclusion restrictions identifying structural shocks within the Markov process regimes. We implement the selection by specifying a multinomial prior distribution over these patterns which is interpreted as a spike'n'slab prior for individual parameters. Combining a slow-moving Markov-switching structural matrix with heteroskedastic structural shocks following a fast-moving stochastic volatility process enables the identification through time-varying volatility within each regime. As a result, the exclusion restrictions become over-identifying, and their selection is driven by the signal from the data. Our empirical illustration shows that data support time variation in the identification patterns of the US monetary policy shock. In the sample-dominating first regime, it is identified by an interest rate reaction function augmented by term spreads. The second regime gains persistence after the global financial and COVID crises. There, the shock is captured by an interest rate reaction function that includes money. Finally, we verify that time-varying volatility identifies the monetary policy shock within the regimes.

Session 7: Student Posters and 3-Minute Presentations

Forecast Linear Augmented Projection (FLAP): A Free Lunch to Reduce Forecast Error Variance

Yangzhuoran Yang
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Abstract: We propose a novel forecast linear augmented projection (FLAP) method that can reduce the forecast error variance of any multivariate forecast. The method first constructs new component series which are linear combinations of the original series. Forecasts are then generated for both the original and component series. Finally, the full vector of forecasts is projected onto a linear subspace where the constraints implied by the combination weights hold. We show that the projection using the original forecast error covariance matrix will result in improved forecasts. Notably, the new forecast error variance of each series is non-increasing with the number of components, and mild conditions are established for which it is strictly decreasing. It is also shown that the proposed method achieves maximum forecast error variance reduction among linear projection methods. We demonstrate our proposed method with an estimated covariance matrix using simulations and two empirical applications based on Australian tourism and FRED-MD data. In all cases, forecasts are improved. Notably, using FLAP with Principal Component Analysis (PCA) to construct the new series leads to substantial forecast error variance reduction.

Jump Modelling with Dirichlet Process Mixture

Yuru Sun
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Abstract: Modelling extreme price movements – jumps, is crucial for risk management and option pricing in financial market and has been a challenging topic since jumps are difficult to detect together with the latent volatility movements. Jump diffusion models work as a complementary to volatility models, which accommodate fat tails of return distribution and the empirical implied volatility smile. We propose a Bayesian nonparametric method using Dirichlet process mixture to model jump. We investigate the robustness of this method under different jump specifications and verify its usefulness via option implied volatility. We are currently conducting the empirical analysis on several stock indices.

Dynamic Shrinkage and Selection for Exchange Rate Forecasting

Zheng Fan
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Abstract: This paper presents an innovative approach to dynamic variable selection in exchange rate forecasting. The proposed method introduces adaptive dynamic variable selection, allowing for time-varying sparsity by selecting relevant predictors based on their changing importance over time. This enhances the standard dynamic shrinkage process by incorporating a time-varying selection mechanism that optimizes model adaptability in the presence of shifting economic conditions. The Bayesian predictive synthesis framework is also employed to combine forecasts from multiple models, improving predictive accuracy and reducing overfitting. This methodology effectively addresses model instabilities and dynamically adjusts their relevance, resulting in more reliable exchange rate forecasts. Empirical analysis using exchange rate data demonstrates the effectiveness of this approach, showing significant improvements in forecast accuracy compared to traditional methods.

Novel Bayesian Algorithms for ARFIMA Long-Memory Processes: A Comparison Between MCMC and ABC Approaches

James Cohen Gabor
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Abstract: This work presents a comparative study of two Bayesian approaches - Markov Chain Monte Carlo (MCMC) and Approximate Bayesian Computation (ABC) - for estimating the parameters of autoregressive fractionally-integrated moving average (ARFIMA) models, which are widely used to capture long-memory in time series data. We propose a novel MCMC algorithm that filters the time series into distinct long-memory and ARMA components, and benchmarked it against standard approaches. Additionally, a new ABC method is proposed, using three different summary statistics used for posterior estimation. The methods are implemented and evaluated through an extensive simulation study, as well as applied to a real-world financial dataset, specifically the quarterly U.S. Gross National Product (GNP) series. The results demonstrate the effectiveness of the Bayesian methods in estimating long-memory and short-memory parameters, with the filtered MCMC showing superior performance in various metrics. This study enhances our understanding of Bayesian techniques in ARFIMA modeling, providing insights into their advantages and limitations when applied to complex time series data.

Determinants of Trade Finance Dynamics: Cross-country Analysis using Panel VAR approach

Farhana Abedin
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Abstract: This paper modelled thirty-six Panel Vector Autoregressive models to shed light on the important factors that drive the trade finance market. This paper contributes to the literature by collating a comprehensive dataset from available trade finance proxies that captures the complex relationships among the trade finance actors and the indicators. The paper also contributes by collating the key sixteen variables from macroeconomic, financial, and institutional perspective that play crucial role in determining the trade finance gap. This paper observes the dynamic interdependencies between trade finance indicators and key determinant variables over the period of 2000 to 2021 for a panel of 43 countries. The paper found that real effective exchange rate and inflation are the most important macroeconomic factors in determining long term dynamics of trade finance. Among financial determinant variables, the Chinn-Ito Financial Openness Index (KAOPEN) and Cboe Volatility Index (VIX) play significant role in influencing trade finance indicators, suggesting that countries' openness to cross-border capital flows and market volatility as major driving forces. A countries regulatory quality is a crucial indicator among the institutional quality variables, indicating that government's ability to formulate and implement sound policies that support the countries development which ensures well-functioning trade finance market.

Review of Net Electricity Load Forecasting Research and Its Challenges

Samhan Samhan
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Abstract: The energy transition is inevitable, with solar energy gaining prominence as PV panel prices drop. In Australia, installed PV capacity has surpassed 30GW, three times more than in 2018. Most systems are distributed PV (D-PV), creating forecasting challenges for grid operators, who can only see net load (load minus PV generation). Short-term forecasting is hard due to customer behavior and solar intermittency, while long-term planning struggles with issues like minimum and negative demand. As solar penetration rises, research on net load forecasting has surged in the last five years. Net load forecasting models are split into statistical and machine learning categories. However, research faces issues. Many models lack robustness, with 70% using non-public datasets, 60% tested on one dataset, and less than 41% compared to benchmarks. Accuracy is often prioritized over model interpretability and computational cost. Over 90% of studies focus on short-term forecasts, leaving gaps in mid- and long-term forecasting. The financial impact of accurate net load forecasting, both short and long-term, is also underexplored. In summary, despite growing D-PV penetration, challenges remain in model robustness, forecast criteria, and financial analysis.

Self-Normalisation for Dynamical Systems

Bryan Bajar
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Abstract: Dynamical systems effectively model nonlinear, temporal processes across various fields, including ecology, medicine, engineering, and finance. While these systems follow deterministic evolution mechanisms, they can exhibit apparent stochastic behaviour. Despite existing literature on point estimation, the statistical inference of dynamical systems remains largely unexplored. This work investigates the technique of "Self-Normalization," which is computationally efficient and free of phase reconstruction, as a viable alternative for statistical inference in dynamical systems. We present simulation results for various dynamical systems and discuss the theoretical challenges.

List of Participants

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