Daniele Girolimetto PhD student - Research fellow

Contact Information

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danigiro [GitHub]

Current Position

Research fellow Nov 2023 – present
Department of Statistical Science, University of Padova

Education

PhD in Statistics Oct 2020 – present
Department of Statistical Science, University of Padova
Supervisors: Tommaso Di Fonzo, George Athanasopoulos and Rob J Hyndman

Master's Degree in Statistical Sciences Oct 2018–Sept 2020
Department of Statistical Science, University of Padova 110 cum laude
Thesis title: "*Cross-sectional, temporal and cross-temporal forecast reconciliation for time series*"
Supervisor: Tommaso Di Fonzo

Bachelor's Degree in Statistical Sciences for Economics and Business Oct 2015 – July 2018
Department of Statistical Science, University of Padova 110 cum laude
Thesis title: "*INAR processes with symmetric innovations' distribution*"
Supervisor: Luisa Bisaglia

Past Experiences

Visiting PhD Scholar Sept 2022 – Feb 2023
Department of Econometrics and Business Statistics, Monash University

Academic Tutor Oct 2019 – June 2020
Small lectures and exercises in Calculus (BSc courses) and Statistics (MSc course), Department of Statistical Science, University of Padova

Workshop and Summer School

- Summer School *Replicability crisis in Science?* organized by the Department of Statistical Sciences and by the Department of Philosophy, Sociology, Education and Applied Psychology of the University of Padova (Padua, Italy – 18-22 Sept 2023)
- 7th *Continuing Education in Macroeconometrics* workshop organized by Monash Business School (Melbourne, Australia – 7-8 Nov 2022)

Awards

- Award "Best student presentation" (1st place) from the International Institute of Forecasters within the conference ISF 2023 (Charlottesville, USA)
- Travel award for the conference ISF 2023 (Charlottesville, USA)
- Selected participant to the workshop *"Stat Data Camp"* (ed. 2020) and *"Data Research Camp"* (ed. 2022), organized by University of Padova
- *"Mille e una lode" scholarship* (ed. 2016, 2017 and 2018), one of the best 1000 students enrolled at University of Padova

Research grants

- Relevant national interest research project (PRIN) "PRICE: A New Paradigm for High-Frequency Finance", local PI: Prof. M. Caporin (University di Padova, 2023/-present)
- Grant "Probabilistic forecast reconciliation". PI: Luisa Bisaglia (Department of Statistical Science, University di Padova, 2022/2023)

Softwares

> **FoReco**: Forecast Reconciliation — R Package, 2020 – present
Classical (bottom-up and top-down), optimal and heuristic forecast point and probabilistic reconciliation for cross-sectional, temporal, and cross-temporal linearly constrained time series.

> **haR**: Heterogeneous AutoRegressive (HAR) model — R Package, 2023 – present
Estimate and forecast the HAR (Heterogeneous Autoregressive) model and its extensions.

> **TimeGPTapi**: Interact with the 'TimeGPT' API — R Package, 2023 – present
Interface to interact with the TimeGPT API developed by Nixtla. TimeGPT is a generative pre-trained transformer model specialized in prediction.

See my `[GitHub]` *for a complete overview of my routines and packages.*

Conferences & invited talks

Conferences

2023 9th International Conference on Time Series and Forecasting (Gran Canaria–12/14 July)
> 43rd International Symposium on Forecasting (Charlottesville, USA – 25/28 June)
> Quantitative Finance and Financial Econometrics 2023 (Marseille, France – 6/9 June)

2022 42nd IIF International Symposium on Forecasting (Oxford, England – 10/12 July)
> 8th International conference on Time Series and Forecasting (Gran Canaria–27/30 June)
> 51th Meeting of the Italian Statistical Society (Caserta, Italy – 22/24 June)

2021 2021 ASA Joint Statistical Meeting (8/12 Aug)
> 41st IIF International Symposium on Forecasting (27/30 June)
> 50th Meeting of the Italian Statistical Society (21/25 June)

2020 40th IIF International Symposium on Forecasting (26/28 Oct)
> 2020 ASA Joint Statistical Meeting (2/6 Aug)
> 2020 Meeting of the Italian Statistical Society

Invited talks

2023 IIF Workshop on Forecast Reconciliation (Prato, Italy - 7/8 Sept)
> "*Forecast Reconciliation for Hierarchically Organized Data*", Learning Labs workshop by Forecasting For Social Good (F4SG), International Institute of Forecasters (31 Mar)

2022 NUMBAT Seminar (Melbourne, Australia – 14 October)

Publications

Journal Articles

[5] Girolimetto, D., & Di Fonzo, T. (2023). Point and Probabilistic Forecast Reconciliation for General Linearly Constrained Multiple Time Series. *Statistical Methods & Applications*, in press. arXiv: 2305.05330.

[4] Girolimetto, D., Athanasopoulos, G., Di Fonzo, T., & Hyndman, R. J. (2023). Cross-temporal probabilistic forecast reconciliation: Methodological and practical issues. *International Journal of Forecasting*, in press. arXiv: 2303.17277.
DOI: 10.1016/j.ijforecast.2023.10.003.

[3] Di Fonzo, T., & Girolimetto, D. (2023). Cross-Temporal Forecast Reconciliation: Optimal Combination Method and Heuristic Alternatives. *International Journal of Forecasting*, 39(1), 39–57. arXiv: 2006.08570. DOI: 10.1016/j.ijforecast.2021.08.004

[2] Di Fonzo, T., & Girolimetto, D. (2023). Spatio-Temporal Reconciliation of Solar Forecasts. Solar Energy, 251, 13–29. arXiv: 2209.07146. DOI: 10.1016/j.solener.2023.01.003

[1] Di Fonzo, T., & Girolimetto, D. (2022). Forecast Combination-Based Forecast Reconciliation: Insights and Extensions. *International Journal of Forecasting*, in press. arXiv: 2106.05653. DOI: 10.1016/j.ijforecast.2022.07.001

Conference & abstract proceedings

[3] Di Fonzo, T., & Girolimetto, D. (2022). Fully Reconciled Probabilistic GDP Forecasts from Income and Expenditure Sides. In A. Balzanella, M. Bini, C. Cavicchia, & R. Verde (Eds.), *Book of Short Papers SIS 2022* (pp. 1376–1381). Pearson. ISBN: 978-88-919-3231-0.

[2] Girolimetto, D., & Di Fonzo, T. (2022). Point and Probabilistic Forecast Reconciliation for General Linearly Constrained Multiple Time Series. In O. Valenzuela, F. Rojas, H. Pomares, L. J. Herrera, & I. Rojas (Eds.), *ITISE 2022, Proceedings of Abstract* (pp. 34–35). ISBN: 978-84-19214-24-9.

[1] Bisaglia, L., Di Fonzo, T., & Girolimetto, D. (2020). Fully Reconciled GDP Forecasts from Income and Expenditure Sides. In A. Pollice, N. Salvati, & F. Schirripa Spagnolo (Eds.), *Book of Short Papers SIS 2020* (pp. 951–956). Pearson. ISBN: 978-88-919-1077-6. arXiv: 2004.03864.

Working paper

[1] Caporin, M., Di Fonzo, T., & Girolimetto, D. (2023). Exploiting Intraday Decompositions in Realized Volatility Forecasting: A Forecast Reconciliation Approach. arXiv: 2306.02952.

See my [GScholar] *for a complete overview of my publications.*

Research Interests

Statistical methods for time series analysis

Estimation, identification, and forecasting of univariate and multivariate time series. Keywords: *Bootstrap methods; Integer-valued time series; High-frequency data; Financial, energy, economics applications; Linear and non linear relationship; Forecast reconciliation; Hierarchical forecasting; Time series aggregation and decomposition; Multi-step forecasting.*

Computational statistics and statistical computing

Development of computational algorithms for statistical analysis and practical implementation of tools and software. Keywords: *Optimisation algorithms; Efficiency in computation; Simulation methods; Software packages; Programming languages (R, Python, Julia); Statistical applications; Data visualisation; Replicability and reproducibility; Big data.*

Modern approaches for time series

Study novel architectures and methodologies associated with modern approaches (such as machine learning and deep learning) for analysing time series data. Keywords: *Gaussian processes; Random forest; Gradient boosting; Long Short-Term Memory (LSTM); Recurrent Neural Networks (RNN); Convolutional Neural Networks (CNN); Ensemble methods for time series; Online learning; Unsupervised and supervised learning; Real-word data application.*

More Info

More information and auxiliary documents can be found at danigiro.github.io.

November 20, 2023

Daniele Girolimetto