# Beatrice Foroni

*Curriculum Vitae* *Last update 18 dicembre 2024*

## Personal Information


| | |
|---|---|
| E-mail | beatrice.foroni@ec.unipi.it |
| Nationality | Italian |


## Education and titles

### PostDoc

| | |
|---|---|
| April 2024 - April 2025 | **PostDoc**, *Estimation and Prediction of Indicators for measuring and monitoring Sustainable Development Goals*, University of Pisa<br>Supervisor Prof. Nicola Salvati |
| April 2023 - April 2024 | **PostDoc**, *Generalized Dynamic Graphical Models for the impact of the COVID-19 pandemic on financial markets*, University of Rome Sapienza<br>Supervisor Prof. Lea Petrella |

### PhD

| | |
|---|---|
| Nov. 2019 – June 2023 | **PhD in Models for Economics and Finance**, *University of Rome Sapienza*, Supervisor Prof. Lea Petrella |
| title | *New Insights on Hidden Markov Models for Time Series Data Analysis* |
| final mark | Ottimo cum Laude |
| date | 14/06/2023 |
| supervisor | Prof.ssa L. Petrella |
| co-advisor | Prof. Luca Merlo |
| description | Development of novel methods for the analysis of financial data by using hidden Markov models based approaches. |

### Master Thesis (D.M. 270/2004, LM-16)

| | |
|---|---|
| Oct. 2017 – Jul. 2019 | **Master degree in Finance and Insurance**, *University of Rome Sapienza* |
| title | *Copula Graphical Lasso Network for Commodities* |
| final mark | Summa cum Laude |
| date | 12/07/2019 |
| supervisor | Prof.ssa L. Petrella |
| co-advisor | Prof. P. De Angelis |
| description | Use of the Nonparanormal Gaussian LASSO - Graphical Model to study the interdependence structure of fifteen commodity future's among agricultural, energy and metal sectors. |

### Bachelor Thesis (L-35)

2012–2017 **Bachelor degree in Mathematics**, *University of Rome Sapienza*

title *Moto Browniano: dalla fisica alla probabilità*

date 20/03/2017

supervisor Prof. Sergio Caprara

## Research interests

GARCH models

Graphical Models

Copula-based models for financial time series

Quantile Regression

Expectile Regression

Hidden Markov Models

M-quantiles

## Academic experiences

Sept. 2024 - Dec. 2024 **European Statistical System and Data Production Model**, University of Pisa - Department of Economics and Management

Master's Degree in Economics, 48 hours. Taught in English.

Sept. 2024 - Dec. 2024 **Tutoring activity for Advanced Statistics, SECS-S/01**, University of Pisa - Department of Economics and Management, University of Pisa - Department of Economics and Management; Scuola Superiore Sant'Anna, Pisa, Italy

Master of Science in Economics, 40 hours. Taught in English.

May 2024 **Financial risk modeling and forecasting using quantile regression methods**, University of Rome La Sapienza - Faculty of Economics, Rome

Course for PhD students of the MEMOTEF Department, 8 hours. Taught in English.

Feb. 2024 - May 2024 **Teaching Assistant in Econometrics, SECS-S/01**, LUISS Guido Carli University, Business Administration bachelor's degree, Rome

Sept. 2023 - Dec 2023 **Teaching activity in Statistics, disciplinar sector SECS-S/01**, University of Rome La Sapienza - Faculty of Economics, Rome

Winner of the comparative procedure 1132/2023 for the performance of additional teaching activities for the course of Statistics to master's degree students of the Faculty of Economics.

Feb. 2023 - May 2023 **Teaching Assistant in Statistics, SECS-S/01**, LUISS Guido Carli University, Business Administration bachelor's degree, Rome

Sept. 2021 - Aug. 2022 **Integrating tutoring and teaching activity for disciplinar sector SECS-S/01, for a total of 40 monthly hours for 12 months**, LUISS Guido Carli University - Faculty of Political Science, Rome

Mar. 2021 - Sept. 2021 **Integrating tutoring and teaching activity for disciplinar sector SECS-S/01, for a total of 40 hours**, University of Rome La Sapienza - Faculty of Economics, Rome

Winner of the comparative procedure 1223/2020 for the performance of additional teaching activities and tutoring for courses falling within the disciplinary scientific sector SECS-S/01 *Statistics*.

Mar. 2020 - Mar. 2021 **Integrating tutoring and teaching activity for disciplinar sector SECS-S/06, for a total of 40 hours**, University of Rome La Sapienza - Faculty of Economics, Rome

Winner of the comparative procedure 80/2020 for the performance of additional teaching activities and tutoring for courses falling within the disciplinary scientific sector SECS-S/06 *Mathematical methods of economics and actuarial and financial sciences*.

## Conferences, schools and seminars

### Conference presentations

December 2024 **Hidden Markov Quantile Graphical Model**, 18th International Conference of the ERCIM WG on Computational and Methodological Statistics (CMStatistics2023), King's College
London, UK

June 2024 **Hidden Markov graphical models with generalized hyperbolic distributions: a financial analysis on commodities and green energy indexes**, SIS 2024, University of Bari Aldo Moro
Bari, Italy

December 2023 **Quantile and expectile copula-based hidden Markov regression models for the analysis of the cryptocurrency market**, 16th International Conference of the ERCIM WG on Computational and Methodological Statistics (CMStatistics2023), HTW Berlin, University of Applied Sciences
Berlin, Germany

June 2023 **Using expectile regression with latent variables for digital assets**, Statistical Learning, Sustainability and Impact Evaluation - SIS 2023, UNIVPM
Ancona, Italy

September 2022 **Time varying quantile graphical model: a financial perspective**, European Conference on Data Analysis - ECDA2022, Federico II University
Naples

May 2022 **Analyzing the Correlation Structure of Financial Markets Using a Quantile Graphical Model**, 51st Scientific Meeting of the Italian Statistical Society - SIS 2022, University of Campania "Luigi Vanvitelli"
Caserta, Italy

May 2022 **Time-varying graphical models for financial markets: a quantile approach**, 9th International Conference on Risk Analysis - ICRA 2022, University of Perugia
Perugia, Italy

April 2022 **Graphical models for commodities: a quantile approach**, 10th International Hybrid Conference on Mathematical and Statistical Methods for Actuarial Sciences and Finance - MAF 2022, University of Salerno
Salerno, Italy

March-April 2022 **Graphical models for commodities: a quantile approach**, XXIII Workshop on Quantitative Finance - QFW2022, University of Tor Vergata
Rome

May 2021 **Sparse graphical model for joint estimation of conditional quantiles**, Network Models for Financial Contagion and Systemic Risk, University of Pavia
Pavia, Italy

### Conference organization

22 September 2023 **Member of the Local Organizing Committee of the 1st Workshop on quantile regression in Rome**, University of Rome La Sapienza - Faculty of Economics, Rome, Italy
WorkshopQRome - New perspectives of quantile regression in applied sciences

### Summer Schools

June - July 2021 **Network Econometrics**, Postgraduate Course of Econometrics - 2021, University Ca' Foscari
Venice, Italy

July - August 2018 **Strumenti e Tecniche MATLAB per il Calcolo Parallelo, l'Apprendimento Automatico e l'Analisi Massiva dei Dati**, Scuola di Calcolo Scientifico con MATLAB - 2018, University of Palermo
Palermo, Italy

July 2018 **Programmazione e Calcolo Scientifico con MATLAB**, Scuola di Calcolo Scientifico con MATLAB - 2018, University of Palermo
Palermo, Italy

## Grants and Awards

2024 **PhD Contribution Honourable Mention - SIS 2024**, University Aldo Moro, Bari
PhD Contribution Honourable Mention at the SIS 2024 conference for the work "Hidden Markov graphical models with generalized hyperbolic distributions: a financial analysis on commodities and green energy indexes" (joint with Petrella, L. and Merlo, L.).

## Research Projects

2024 **Quantile Regression Lab**
Co-founder of the research group Quantile Regression Lab (quantileregressionlab.github.io)

2023 **Progetti di Ricerca Medi 2023**, Sapienza University of Rome, Rome
Principal investigator of the research project "Quantile and Expectile Hidden Markov regression models with regime-switching copulas for digital assets"

2021 **Progetti di Ricerca Medi 2021**, Sapienza University of Rome, Rome
Member of the research group for the project: "Generalized Dynamic Graphical Models for the impact of the COVID-19 pandemic on financial markets". Principal investigator: Prof. Lea Petrella

## Publications

### Articles in journals

1. Foroni, B., Merlo, L., and Petrella, L., (2024). *Quantile and expectile copula-based hidden Markov regression models for the analysis of the cryptocurrency market.* Accepted in **Statistical Modelling**
2. Foroni, B., Merlo, L., Petrella, L. (2024). *Expectile hidden Markov regression models for analyzing cryptocurrency returns.* **Statistics and Computing**, Volume 34, article number 66: https://doi.org/10.1007/s11222-023-10377-2
3. Foroni, B., Morelli, G., Petrella, L. (2022). *The network of commodity risk.* **Energy Systems**, 1-47. Online publication: https://doi.org/10.1007/s12667-022-00530-7
4. Foroni, B., Merlo, L., Petrella, L. (2023). *Using expectile regression with latent variables for digital assets.* **Book of Short Papers SIS 2023** (Proceedings of the Statistical Learning, Sustainability and Impact Evaluation - SIS 2023), pp. 1309-1314.
5. Foroni B., Merlo L., Petrella L. (2022). *Graphical Models for Commodities: A Quantile Approach*, **Mathematical and Statistical Methods for Actuarial Sciences and Finance** (Proceedings of the 10th International Hybrid Conference on Mathematical and Statistical Methods for Actuarial Sciences and Finance - MAF 2022), pp. 957-962.
6. Foroni B., Merlo L., Petrella L. (2022). *Analyzing the Correlation Structure of Financial Markets Using a Quantile Graphical Model*, **Book of Short Papers SIS 2022** (Proceedings of the 51st Scientific Meeting of the Italian Statistical Society - SIS 2022), pp. 852-857.
7. Foroni B., Mazza S., Morelli G., Petrella L. (2020). *GLASSO Estimation of Commodity Risks*, **Book of Short Papers SIS 2020** (Proceedings of the 50st Scientific Meeting of the Italian Statistical Society - SIS 2020 (Postponed)), pp. 253-259

### Submitted Papers

1. Foroni, B., Merlo, L., Petrella, L. (202X). *Hidden Markov graphical models with state-dependent generalized hyperbolic distributions.* Under Revision for **Canadian Journal of Statistics**

## Memberships

*SIS*, Societa' Italiana di Statistica

*SIdE*, Societa' Italiana di Econometria

## Experience

### Vocational

2017 **Unpaid traineeship**, *A.I.A.P.C.*, Roma
Collection of statistical data for the analysis of football matches.

## Languages

Italian mother tongue

| | |
|---|---|
| English | Fluent spoken and written English |
| French | Basic spoken and written French |

## IT skills

| | |
|---|---|
| OS | MacOS, Windows, Unix |
| Program Languages | R, Python, C++, LaTeX |
| Software package | Matlab |
| Application softwares | Office, Adobe Suite |

## Additional Informations

| | |
|---|---|
| DELF B2 | Diplôme d'études en langue française, niveau B2 |

La sottoscritta Beatrice Foroni,
ai sensi e per gli effetti degli articoli 46 e 47 e consapevole delle sanzioni penali previste dall'articolo 76 del D.P.R. 28 dicembre 2000, n. 445 nelle ipotesi di falsità in atti e dichiarazioni mendaci, dichiara che le informazioni riportate nel presente curriculum vitae corrispondono a verità.

Luogo e data

Roma, 18 dicembre 2024