PERSONAL INFORMATION

Luca Merlo

✉ luca.merlo@unier.it

🌐 universitaeuropeadiroma.it/transizione-digitale/docenti/luca-merlo

⚙ luca-merlo.github.io

⚙ quantileregressionlab.github.io

ⓘD ORCID 0000-0001-5267-5390

Date of birth 15 April 1995 | Nationality Italian

CURRENT POSITION

2022 – present

Researcher (RTDA) in Statistics

Department of Human Sciences, European University of Rome, Rome, Italy

2024 – 2035

National Scientific Habilitation for Associate Professor in Statistics

Abilitazione Scientifica Nazionale a professore di Seconda fascia, settore 13/D1, dal 24/06/2024 al 24/06/2035

EDUCATION

April – June 2023

Visiting research scholar

Harvard T.H. Chan School of Public Health - Harvard University, Boston, United States

Research visit under the supervision of Prof. Francesca Dominici

July 2022

Visiting period

University of Pisa, Pisa, Italy

Research visit under the supervision of Prof. Nicola Salvati

2018 – 2022

PhD in Statistical Sciences

Sapienza University of Rome, Rome, Italy

Methodological Statistics curriculum

Final grade: Ottimo Cum Laude

Thesis title: On Quantile Regression Models for Multivariate Data

Supervisor: Prof. Lea Petrella

February – March 2020

Visiting period

University of Southampton, Southampton, United Kingdom

Research visit under the supervision of Prof. Nikos Tzavidis

2016 – 2018

Master's Degree in Finance and Insurance

Sapienza University of Rome, Rome, Italy

LM-16 Finance curriculum

Final grade: 110/110 Cum Laude

Thesis title: Selection of Value at Risk Models for Energy Commodities

Supervisor: Prof. Lea Petrella

Co-supervisor: Prof. Brunero Liseo

2013 – 2016

Bachelor's Degree in Economics

Sapienza University of Rome, Rome, Italy

L-33 Economics Sciences curriculum

Final grade: 110/110 Cum Laude

Thesis title: Introduction to Lp-quantiles

Supervisor: Prof. Lea Petrella

Co-supervisor: Prof. Valeria Bignozzi

September 2015 – January 2016   Erasmus term

Université Catholique de Louvain, Louvain-la-Neuve, Belgium

Six months period in the study program of the Faculty of Economics

GPA: 19/20

2008 – 2013   High School Degree

Liceo Statale Farnesina, Rome, Italy

Diploma di Liceo Scientifico, Piano Nazionale Informatico

Grade: 100/100

TEACHING ACTIVITIES

May 2024   Financial risk modeling and forecasting using quantile regression

Sapienza University of Rome, Rome, Italy

Course for PhD students of the MEMOTEF Department at the Faculty of Economics, 4 hours.

2023 – 2024   Statistics

European University of Rome, Rome, Italy

Bachelor's Degree in Economics and Business Management, 56 hours. Taught in English.

2023 – 2024   Business Informatics

European University of Rome, Rome, Italy

Bachelor's Degree in Economics and Business Management, 12 hours. Taught in English.

2023 – 2024   Machine learning and data analytics

European University of Rome, Rome, Italy

Master's Degree in Economics and Innovation Management, 42 hours. Taught in Italian.

July 2023   Financial risk modeling and forecasting using quantile regression methods

Sapienza University of Rome, Rome, Italy

Course for PhD students of the MEMOTEF Department at the Faculty of Economics, 10 hours.

2022 – 2023   Machine learning and data analytics

European University of Rome, Rome, Italy

Master's Degree in Economics and Innovation Management, 42 hours. Taught in Italian.

2022 – 2023   Statistics for business

European University of Rome, Rome, Italy

Bachelor's Degree in Economics and Business Management, 12 hours. Taught in English.

2022 – 2023	**Statistics for tourism**

European University of Rome, Rome, Italy

Bachelor's Degree in Tourism and valorisation of the territory, 8 hours. Taught in Italian.

July 2022	**Financial risk modeling and forecasting using quantile regression methods**

Sapienza University of Rome, Rome, Italy

Course for PhD students of the MEMOTEF Department at the Faculty of Economics, 10 hours.

March – April 2022	**Models for risk and forecasting**

Sapienza University of Rome, Rome, Italy

Teaching seminars and support activities for the course "Models for risk and forecasting", Master's Degree in Finance and Insurance, of Prof. Vincenzo Candila. Taught in English.

April 2022	**Time series and financial time series**

Sapienza University of Rome, Rome, Italy

Teaching seminars on R programming for the course "Time series and financial time series", Master's Degree in Finance and Insurance, of Prof. Lea Petrella. Taught in English.

March – May 2019	**Analisi delle serie storiche**

Sapienza University of Rome, Rome, Italy

Short course (10 hours) on R programming for the course "Analisi delle serie storiche", CdLM Finanza e Assicurazioni, of Prof. Lea Petrella. Taught in Italian.

January – September 2018	**University tutor**

Sapienza University of Rome, Rome, Italy

Tutoring and support activities to Bachelor's and Master's Degree students of the Faculty of Economics

WORK EXPERIENCE

November – December 2021	**Collaboration contract for research activities**

Sapienza University of Rome, Rome, Italy

Winner of the comparative selection procedure (contratto di lavoro autonomo bando 06/2021 prot. n. 0000659, 07/09/2021) for the development and implementation of computational algorithms in quantile regression analysis under the supervision of Prof. Petrella

January – December 2017	**Student Library Assistant**

Sapienza University of Rome, Rome, Italy

GRANTS AND AWARDS

2023	**Best PhD Thesis Award - SIS 2023**

Università Politecnica delle Marche, Ancona, Italy

Honorable Mention for the 2023 Best PhD Thesis Award in Statistics for the dissertation "On quantile regression models for multivariate data".

2023	**Best Young Contribution - SIS 2023**

Università Politecnica delle Marche, Ancona, Italy

Best Young Contribution Award at the SIS 2023 conference for the work "Quantile-based graphical models for continuous and discrete variables" (joint with Petrella, L. and Geraci, M.).

2018 – 2021	**PhD scholarship**

Sapienza University of Rome, Rome, Italy

Three-year PhD scholarship

2015 – 2016	**Merit scholarship for undergraduate students**

Sapienza University of Rome, Rome, Italy

2014 – 2015	**Merit scholarship for undergraduate students**

Sapienza University of Rome, Rome, Italy

2013 – 2014	**Merit scholarship for undergraduate students**

Sapienza University of Rome, Rome, Italy

RESEARCH INTERESTS

– Quantile regression, multivariate quantiles, M-quantiles
– Latent variable models, finite mixture models, graphical models
– Causal inference, matching methods
– EM algorithms
– Statistical models for risk measures, financial data and environmental issues
– Applications to longitudinal, time series and correlated data

FUNDED RESEARCH PROJECTS

2022	**Progetti di Ricerca Medi 2022**

Sapienza University of Rome, Rome, Italy

Member of the research group for the project: "Joint regression modelling of timing and intensity of events". Principal investigator: Prof. Marco Geraci

2021	**Progetti di Ricerca Medi 2021**

Sapienza University of Rome, Rome, Italy

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

2020	**Progetti di Avvio alla Ricerca 2020**

Sapienza University of Rome, Rome, Italy

Principal investigator of the research project: "Multivariate Mixed Hidden Markov Model for joint estimation of multiple quantiles"

2019	**Progetti di Avvio alla Ricerca 2019**

Sapienza University of Rome, Rome, Italy

Principal investigator of the research project: "Joint VaR and ES forecasting in a multiple quantile regression framework"

CONFERENCE PRESENTATIONS

2024	**Random effects in unconditional quantile regressions**

SIS 2024 - 52nd Scientific Meeting of the Italian Statistical Society

University of Bari Aldo Moro, Bari, Italy

Contributed talk, 17-20 June (joint with Salvati, N., Fabrizi, E., Frumento, P. and Petrella, L.)

2023	**Unified unconditional regression for multivariate quantiles, M-quantiles and expectiles**

WorkshopQRome - New perspectives of quantile regression in applied sciences

Sapienza University of Rome, Rome, Italy

Invited talk, 22 September (joint with Petrella, L., Salvati, N. and Tzavidis, N.)

2023 Quantile-based graphical models for continuous and discrete variables

StaTalk 2023

Sapienza University of Rome, Rome, Italy

Invited talk, 15 September (joint with Petrella, L. and Geraci, M.)

2023 Quantile-based graphical models for continuous and discrete variables

SIS 2023 - Statistical Learning, Sustainability and Impact Evaluation

Università Politecnica delle Marche, Ancona, Italy

Contributed talk, 21-23 June (joint with Petrella, L. and Geraci, M.)

2022 Quantile mixed hidden Markov models for multivariate longitudinal data: An application to children's SDQ scores

CMStatistics 2022 - 15th International Conference of the ERCIM WG on Computational and Methodological Statistics

King's College London, London, England

Invited talk, 17-19 December (joint with Petrella, L. and Tzavidis, N.)

2022 Quantile mixed hidden Markov models for multivariate longitudinal data

ECDA2022 - European Conference on Data Analysis

University of Naples Federico II, Naples, Italy

Invited talk, 14-16 September (joint with Petrella, L. and Tzavidis, N.)

2022 Modeling unconditional M-quantiles in a regression framework

SIS2022 - 51st Scientific Meeting of the Italian Statistical Society

University of Campania Luigi Vanvitelli, Caserta, Italy

Contributed talk, 22-24 June (joint with Petrella, L. and Salvati, N.)

2021 Forecasting VaR and ES using a joint quantile regression and its implications in portfolio allocation

CFE 2021 - 15th International Conference on Computational and Financial Econometrics

King's College London, London, England

Invited talk, 18-20 December (joint with Petrella, L., and Raponi, V.)

2021 Unconditional M-quantile regression

CLADAG2021 - 13th Scientific Meeting Classification and Data Analysis Group

University of Florence, Florence, Italy

Invited talk, 9-11 September (joint with Petrella, L. and Tzavidis, N.)

2021 Directional M-quantile regression for multivariate dependent outcomes

SIS2021 - 50th Scientific meeting of the Italian Statistical Society

University of Pisa, Pisa, Italy

Invited talk, 21-25 June (joint with Petrella, L. and Tzavidis, N.)

2020   Forecasting multiple VaR and ES using a dynamic joint quantile regression with an application to portfolio optimization

eMAF2020 - Mathematical and Statistical Methods for Actuarial Sciences and Finance

Ca' Foscari University of Venice, Venice, Italy

Contributed talk, 18-25 September (joint with Petrella, L. and Raponi, V.)

2019   A two-part finite mixture quantile regression model for semi-continuous longitudinal data

IES2019 - Statistical Evaluation Systems At $360°$: Techniques, Technologies And New Frontiers

European University of Rome, Rome, Italy

Invited talk, 4-5 July (joint with Maruotti, A. and Petrella, L.)

2019   Joint VaR and ES forecasting in a multiple quantile regression framework

SIS2019 - Smart Statistics for Smart Applications

Università Cattolica del Sacro Cuore, Milan, Italy

Poster session, 18-21 June (joint with Petrella, L., and Raponi, V.)

2018   Selection of Value at Risk Models for Energy Commodities

XIX Workshop On Quantitative Finance 2018

University Roma Tre, Rome, Italy

Poster session, 24-26 January (joint with Petrella, L., and Laporta, G. A.)

CONFERENCE ORGANIZATION ▪

December 2024   Organizer of the Organized Session "Recent advances in quantile and M-quantile regression" at the CMStatistics 2024

CMStatistics 2024 - 18th International Joint Conference of the ERCIM WG on Computational and Methodological Statistics

King's College London, London, United Kingdom

December 2023   Organizer of the Invited Session "Recent advances in quantile regression models" at the CMStatistics 2023

CMStatistics 2023 - 16th International Conference of the ERCIM WG on Computational and Methodological Statistics

HTW Berlin, University of Applied Sciences, Berlin, Germany

September 2023   Member of the Local Organizing Committee of the 1st Workshop on quantile regression in Rome

WorkshopQRome - New perspectives of quantile regression in applied sciences

Sapienza University of Rome, Rome, Italy

PUBLICATIONS ▪

1. Kingsbury Lee, S., Merlo, L., and Dominici, F., (2024). *Childhood PM$_{2.5}$ exposure and up-ward mobility in the United States*. Accepted in **Proceedings of the National Academy of Sciences**.

2. Foti, G., Merlo, L., Finstad G. L., and Giorgi G., (2024). *COVID-19 symptoms and mental health outcomes among Italian healthcare workers: a latent class analysis*. **Healthcare**, 12(14), doi: 10.3390/healthcare12141403.

3. Bignozzi, V., Merlo, L., and Petrella, L., (2024). *Inter-order relations between equivalence for L_p-quantiles of the Student's t distribution*. **Insurance: Mathematics and Economics**, doi: 10.1016/j.insmatheco.2024.02.001.

4. Foroni, B., Merlo, L., and Petrella, L., (2024). *Expectile hidden Markov regression models for analyzing cryptocurrency returns*. **Statistics and Computing**, 34(2), pp. 66, doi: 10.1007/s11222-023-10377-2.

5. Merlo, L., Petrella, L., Tzavidis, N., and Salvati, N., (2023). *Unified unconditional regression for multivariate quantiles, M-quantiles and expectiles*. **Journal of the American Statistical Association**, pp.1-26, doi: 10.1080/01621459.2023.2250512.

6. Merlo, L., Geraci, M., and Petrella, L., (2023). *Quantile-based graphical models for continuous and discrete variables*. **Book of Short Papers SIS 2023** (Proceedings), pp. 1069-1074.

7. Foroni, B., Merlo, L., and Petrella, L., (2023). *Using expectile regression with latent variables for digital assets*. **Book of Short Papers SIS 2023** (Proceedings), pp. 1309-1314.

8. Merlo, Luca, (2022). *On quantile regression models for multivariate data*. **PhD Thesis**, link: http://hdl.handle.net/11573/1613037.

9. Merlo, L., Maruotti, A., Petrella, L., and Punzo, A., (2022). *Quantile hidden semi-Markov models for multivariate time series*. **Statistics and Computing**, 32(4), pp.1-22.

10. Merlo, L., Petrella, L., and Tzavidis, N., (2022). *Quantile mixed hidden Markov models for multivariate longitudinal data: an application to children's Strengths and Difficulties Questionnaire scores*. **Journal of the Royal Statistical Society, Series C (Applied Statistics)**, 71(2), pp. 417-448.

11. Merlo, L., Petrella, L., Tzavidis, N., and Salvati, N., (2022). *Marginal M-quantile regression for multivariate dependent data*. **Computational Statistics & Data Analysis**, 173, 107500, link: https://www.sciencedirect.com/science/article/pii/S0167947322000809.

12. Foroni, B., Merlo, L., and Petrella, L., (2022). *Graphical Models for Commodities: A Quantile Approach*. **Mathematical and Statistical Methods for Actuarial Sciences and Finance - MAF 2022** (Proceedings), pp. 253-259.

13. Merlo, L., Petrella, L., and Raponi, V., (2021). *Forecasting VaR and ES using a joint quantile regression and its implications in portfolio allocation*. **Journal of Banking & Finance**, 133, 106248.

14. Merlo, L., Maruotti, A., and Petrella, L., (2021). *Two-part quantile regression models for semi-continuous longitudinal data: A finite mixture approach*. **Statistical Modelling**, doi: 10.1177/1471082X21993603.

15. Sciacchitano, Salvatore, et al., (2021). *Nonthyroidal illness syndrome (NTIS) in severe COVID-19 patients: role of T3 on the Na/K pump gene expression and on hydroelectrolytic equilibrium*. **Journal of Translational Medicine**, 19(1), pp. 1-18.

16. Scarci, M., et al., (2021). *COVID-19 After Lung Resection in Northern Italy*. **Seminars in Thoracic and Cardiovascular Surgery**, pp. S1043-0679.

17. Merlo, L., Petrella, L., and Tzavidis, N., (2021). *Unconditional M-quantile regression*. **Book of Short Papers CLADAG 2021** (Proceedings), pp. 163-166.

18. Merlo, L., Petrella, L., and Tzavidis, N., (2021). *Directional M-quantile regression for multivariate dependent outcomes*. **Book of Short Papers SIS 2021** (Proceedings), pp. 164-169.

19. Merlo, L., Petrella, L., and Raponi, V., (2021). *Forecasting Multiple VaR and ES Using a Dynamic Joint Quantile Regression with an Application to Portfolio Optimization*. **Mathematical and Statistical Methods for Actuarial Sciences and Finance - eMAF2020** (Proceedings), pp. 349-354.

20. Merlo, L., Petrella, L., and Raponi, V., (2020). *Sectoral decomposition of CO2 world emissions: a joint quantile regression approach*. **International Review of Environmental and Resource Economics**, 14(2-3), pp. 197-239.

21. Merlo, L., Petrella, L., and Tzavidis, N., (2020). *Multivariate Mixed Hidden Markov Model for joint estimation of multiple quantiles*. **Book of Short Papers SIS 2020** (Proceedings), pp. 144-149.

22. Petrella, L., Laporta, A.G. and Merlo, L., (2019). *Cross-country assessment of systemic risk in the European stock market: evidence from a CoVaR analysis*. **Social Indicators Research**, 146(1), pp.169-186.

23. Merlo, L., Maruotti, A., and Petrella, L., (2019). *A two-part finite mixture quantile regression model for semi-continuous longitudinal data*. **Book of Short Papers SIS 2019** (Proceedings), pp. 409-414.

24. Laporta, G. A., Merlo, L., and Petrella, L., (2018). *Selection of Value at Risk models for Energy Commodities*. **Energy Economics**, 74, pp. 628-643.

SUBMITTED PAPERS

1. Merlo, L., Geraci, M., and Petrella, L., (202X). *Quantile mixed graphical models with an application to mass public shootings in the United States.* Submitted to **Journal of the Royal Statistical Society: Series A**, link: `https://arxiv.org/abs/2309.05084`.

2. Merlo, L., Dominici, F., Petrella, L., Salvati, N., and Wu X., (202X). *Estimating causal quantile exposure response functions via matching*. Submitted to **Biometrika**, link: `https://arxiv.org/abs/2308.01628`.

3. Foroni, B., Merlo, L., and Petrella, L., (202X). *Hidden Markov graphical models with state-dependent generalized hyperbolic distributions*. Submitted to **Journal of Computational and Graphical Statistics**.

4. Foroni, B., Merlo, L., and Petrella, L., (202X). *Quantile and expectile copula-based hidden Markov regression models for the analysis of the cryptocurrency market*. Submitted to **Statistical Modelling** (second revision).

WORK IN PROGRESS

1. Salvati, N., Fabrizi, E., Frumento, P., Petrella, L., and Merlo, L., *Unconditional quantile mixed regression models for clustered data with an application to small area estimation*.

2. Foroni, B., Merlo, L., and Petrella, L., *Time-varying graphical models for financial markets: a quantile approach*.

3. Saiz, M., Petrella, L., and Merlo, L., *Two-part expectile regression models for longitudinal data*.

4. Ferrante, E., Petrella, L., and Merlo, L., *Hidden Markov nonparanormal graphical models*.

5. Profili, S., Innocenti, L., Sammarra A., and Merlo, L., *The effectiveness of HRD practices among chronically ill employees: the role of intrinsic motivation*.

6. Profili, S., Innocenti, L., Sammarra A., Foti, G., and Merlo, L., *Ability and motivation profiles among chronically ill employees: a latent profile analysis of utilisation HR practices and work engagement*.

OTHER ACTIVITIES

Referee for Journal of the Royal Statistical Society, Series C (Applied Statistics); Biometrical Journal; Journal of Classification; METRON; Statistical Methods & Applications; Computational Statistics & Data Analysis; Computational Statistics; Annals of Operations Research

2020 – present Member of the Italian Statistical Society (SIS); Member of the young group of the Italian Statistical Society (y-SIS)

PERSONAL SKILLS

Mother tongue Italian

Other languages

	UNDERSTANDING		SPEAKING		WRITING
	Listening	Reading	Spoken interaction	Spoken production	
English	C1	C1	C1	C1	C1
	First Certificate in English, University of Cambridge, Grade C				
French	B2	B2	B2	B2	B2

Levels: A1 and A2: Basic user – B1 and B2: Independent user – C1 and C2: Proficient user
Common European Framework of Reference for Languages

Computer skills
- Operating Systems: Windows, Linux, macOS
- Typesetting: Microsoft Office Suite, LaTeX
- Scientific and Programming: R, C, C++, MATLAB, Stata, Excel