CURRICULUM VITAE
SILVIA MUZZIOLI

PERSONAL DETAILS:
Muzzioli, Silvia
ORCID ID: 0000-0003-0738-6690
SCOPUS ID: 6507158710
RESEARCHER ID: B-3717-2016
Date of birth: 01/01/1974
Nationality: Italian
URL for web site: http://personale.unimore.it/AddressBook/Home/smuzziol

ADDRESS:
Department of Economics "Marco Biagi"
University of Modena and Reggio Emilia
Viale Berengario, 51
I-41121 Modena, ITALY
phone   39-059-2056771
e-mail :   silvia.muzzioli@unimore.it

CURRENT POSITION:
Full Professor in Quantitative Methods for Economics and Finance, Department of Economics "Marco Biagi", University of Modena and Reggio Emilia, Italy.

NATIONAL SCIENTIFIC QUALIFICATIONS:
20 April 2021 - : national scientific qualification as **Full Professor** in Quantitative Methods for Economics and Finance.
04 June 2021 - : national scientific qualification as **Full Professor** in Economic Policy.
19 May 2021 - : national scientific qualification as **Full Professor** in Economics of Financial Intermediaries and Corporate Finance
05 February 2014 - : national scientific qualification as **Full Professor** in Quantitative Methods for Economics and Finance.
04 December 2014 - : national scientific qualification as Associate Professor in Statistics applied to Economics.

PAST POSITIONS:

01 November 2014 – 30 December 2021:
        Associate Professor in Quantitative Methods for Economics and Finance, Department of Economics "Marco Biagi", University of Modena and Reggio Emilia, Italy
01 October 2001- 30 October 2014:
        Assistant Professor (tenure) in Quantitative Methods for Economics and Finance, Department of Economics "Marco Biagi", University of Modena and Reggio Emilia, Italy
January -September 2001:
        Research assistant for the project "Fuzzy methods for derivatives pricing"
        Department of Economics "Marco Biagi", University of Modena and Reggio Emilia, Italy

CAREER BREAKS:
15/09/2005 to 27/05/2006   Maternity leave 8 months.
23/08/2008 to 26/01/2009   Maternity leave 5 months.

EDUCATION:

05 February 2001   PhD Computational methods for financial forecasting and decision making Department of Mathematics, Statistics, Computer Science and applications, University of Bergamo, Italy
January 2000   Master of Science in Banking and Finance, HEC, University of Lausanne, Switzerland

COMPETITIVE RESEARCH GRANTS:

PRINCIPAL INVESTIGATOR OF INTERNATIONAL RESEARCH PROJECTS:

2022-2024   Principal Investigator of the interdisciplinary research project: "COmposite INdicators of market Sentiment (COINS)", **Budget € 44.580,00** Euro, funded by University of Modena and Reggio Emilia, National Departments involved: Department of Economics, Department of Physics, Informatics and Mathematics, Department of Communication and Economics (University of Modena and Reggio Emilia). International Departments involved: Department of Data Analysis and Mathematical Modelling, Ghent University, Ghent (Belgium); Department of Finance, Fox School of Business and Management - Temple University, Philadelphia (USA); Department of Computer Science and Artificial Intelligence, University of Granada, Granada (Spain).

2019-2022   Principal Investigator of the interdisciplinary research project: "Risk assessment in the EU: new indices based on machine learning methods.", **Budget € 40.000,00 Euro,** funded by University of Modena and Reggio Emilia, National Departments involved: Department of Economics, University of Modena and Reggio Emilia and Department of Physics, Informatics and Mathematics. International Departments involved: Department of Applied Mathematics, Biometrics and Process Control, Ghent University, Ghent (Belgium).

2018-2020   Principal Investigator of the interdisciplinary research project: "The role of asymmetry and Kolmogorov equations in financial risk modelling (ARM)", **Budget € 50.000,00 Euro,** funded by University of Modena and Reggio Emilia, National Departments involved: Department of Economics, University of Modena and Reggio Emilia and Department of Physics, Informatics and Mathematics. International Departments involved: Department of Applied Mathematics, Biometrics and Process Control, Ghent University, Ghent (Belgium).

2015-2018   Principal Investigator of the international research project: "Implied Volatility and higher order moments: new measures and indexes of financial connectedness", **Budget: € 66.233,57**, funded by Dep. of Economics "Marco Biagi" (23.633,57) and Fondazione Cassa di Risparmio di Modena (42.600,00); National Departments involved: Department of Economics, University of Modena and Reggio Emilia and Department of Economics, Mathematics and Statistics, University of Palermo; international Departments involved: Department of Applied Mathematics, Biometrics and Process Control, Ghent University, Ghent (Belgium), Department of Finance, Temple University, Philadelphia, USA.

2010-2013   Principal Investigator of the international research project: "Volatility modelling and forecasting with option prices: the proposal of a volatility index for the Italian market", **Budget € 23.529,41**, funded by Fondazione Cassa di Risparmio di Modena and MIUR. National Departments involved: Department of Economics, University of Modena and Reggio Emilia and Department of Mathematics, Statistics, Computing and Applications of the University of Bergamo, international Departments involved: Department of Banking and Financial Management, University of Piraeus, Athens (Greece), Business Administration Department, Universidad Rey Juan Carlos, URJC, Madrid (Spain), Department of Applied Mathematics, Biometrics and Process Control, Ghent University, Ghent (Belgium).

PRINCIPAL INVESTIGATOR OF NATIONAL PROJECTS:

2021-2023   Principal Investigator of the project FAR21 "Market Sentiment and trading behaviour" **Budget: € 27.000**, funded by the University of Modena and Reggio Emilia.

2016-2018   Principal Investigator of the national project: "A skewness index for Europe (EU-SKEW)" **Budget: € 7.000,00,** funded by the University of Modena and Reggio Emilia.

2001-2002   Principal Investigator of the Young researchers project "Fuzzy models for pricing structured products", **Budget € 5.000,00**, funded by the University of Modena and Reggio Emilia.

OTHER GRANTS:

FFABR 2017: budget: **€ 3000,00** awarded by the Minister of Education for research.

Mobility project for young researchers 2019 funded by University of Modena and Reggio Emilia, budget: **€ 3.000,00** beneficiary: Dott. Luca Gambarelli.

EDITORIAL ACTIVITY:

01/2019-01/2021 member of the Editorial Board of the journal Fuzzy Sets and Systems (impact factor 2.675).

06/2020 - Associate Editor of Multinational Finance Journal
(http://www.mfsociety.org/page.php?pageID=161)

2017- Director of the series: "DEMB working paper series" ISSN on line: 2281-440X.

FELLOWSHIPS:

2012- KERMIT Research Unit Knowledge-based Systems.

SUPERVISION OF GRADUATE STUDENTS AND POSTDOCTORAL FELLOWS:

2001 –   60 students among Bachelor, Master and PhD

01-03-2022 – 28-02-2023   Research grant "Market Sentiment and trading behaviour" annual grant, research assistant: Luca Gambarelli.

16-03-2020 – 15-09-2021   Research grant "Risk assessment in the EU: new indices based on machine learning methods." annual grant, research assistant: Giovanni Campisi.

01-02-2019- 31-01-2020   Research grant "The role of Asymmetry and Kolmogorov equations in financial Risk Modelling (ARM)." annual grant, research assistant: Giovanni Campisi.

15-01-2016- 15-01-2018   Research grant "Implied moments (IMOM)", research assistant: Luca Gambarelli

OFFICIAL APPOINTMENTS:

28-2-2021-   Registered in the REPRISE register for the sections: basic research; competitive industrial research and social development

25/01/21- member of the selection committee for awarding the title of Research Doctor for the PhD in "Labour, Development and Innovation" (XXXIII cycle)

23/11/2020- Expert for the evaluation of proposals for Doctoral scholarships in the national program for research and innovation 2014-2020 and of the Research Extract Plan and Innovation 2015-2017, pursuant to the D.D. of 30 July 2020, n. 1233/2020

2018-   Member of the Doctoral Research School Council, International Doctoral Research School in Labour, Development and Innovation, Marco Biagi Foundation, University of Modena and Reggio Emilia

2016-   Independent Expert of the European Commission for the evaluation of proposals, prize applications and tenders, monitoring of actions, grant agreements, public procurement contracts, preparation, implementation and evaluation of EU programmes and design of policies Expert Id:EX2016D293311.

2013 –   Appointed referee for R&D projects funded by the Italian Ministry of Education and Research (MIUR)

2020 February-March member of the selection committee for the Public competition for recruitment of a fixed-term researcher under art. 24, paragraph 3 lett. a), of Italian Law 240/2010, Department of Economics and Statistics, University of Trieste.

2020 February-March member of the selection committee for the Public competition for recruitment of a research assistant, Department of Economics, University of Modena and Reggio Emilia.

11-2019 Availability as referee for the Research Executive Agency (REA) in the call WIDEPSREAD-05-2020.

2019 March-April member of the selection committee for the Public competition for recruitment of a research assistant, Department of Economics, University of Modena and Reggio Emilia.

2018 December-January 2019 member of the selection committee for the Public competition for recruitment of a research assistant, Department of Economics, University of Modena and Reggio Emilia

2018-November Evaluator for the SAFD PhD School - University of Bergamo

2018 November member of the selection committee for the Public competition for recruitment of a research assistant, Department of Economics, University of Modena and Reggio Emilia.

2016-2017   Referee for VQR 11-14 evaluation of the quality of Italian research.

2017 September-October   member of the selection committee for the Public competition for recruitment of a fixed-term researcher under art. 24, paragraph 3 lett. a), of Italian Law 240/2010, Department of Economics, University of Verona.

2017 May   member of the PhD committee in Models and Methods for Economics and Business and PhD committee Economics, Applied Mathematics and operations research, University of Bergamo

2015 December member of the selection committee for the Public competition for recruitment of a research assistant, Department of Economics, University of Modena and Reggio Emilia.

MEMBER OF SCIENTIFIC COMMITTEES:

Multinational Finance Society, 25th annual meeting, Budapest, (2018), 26th annual meeting, Jerusalem (2019).
The 12th International Workshop on Fuzzy Logic and Applications, Genova (2018).

MEMBER OF RESEARCH GROUPS AND QUALIFIED RESEARCH CENTERS :

22/02/2021 Coordinator of FINMORE: a multi-disciplinary group gathering the best contributions on finance and fintech among researchers of the University of Modena and Reggio Emilia.

25-08-2020 Artificial Intelligence Research and Innovation Center (AIRI), AIRI is an accredited laboratory of the High Technology Network of the Emilia-Romagna Region.

JOURNAL REFEREE (selected):

Fuzzy Sets and Systems, Fuzzy Optimization and Decision Making, IEEE Transactions on fuzzy systems, IEEE transactions on industrial informatics, European Journal of Operational Research, Applied Economics, Quantitative Finance, PLOS ONE, Journal of International Money and Finance,

Annals of Finance, Economic Modelling, International Journal of Approximate Reasoning, Computational Economics, Information Sciences, International Journal of Uncertainty, Fuzziness and Knowledge Based Systems, Journal of Futures Markets, Journal of Economics and Business, Journal of Financial Management, Markets and Institutions, Soft Computing, OR Spectrum, Applied Mathematical Modelling, International Journal of Information Technology and Decision Making, Mathematical and Computational Applications, Computers and Mathematics with Applications, The Quarterly review of Economics and Finance.

RECENT INVITED SEMINARS:

Department of Finance, Fox School of Business, Temple University, Philadelphia (2019), Department of Economics, University of Verona (2019), Department of Physics, Informatics and Mathematics, University of Modena and Reggio Emilia (2018), Department of Commerce, Finance and Shipping, Cyprus University of Technology (2017), Department of Economics and Social Sciences, Università Politecnica delle Marche (2016), Department of Physics, Informatics and Mathematics, University of Modena and Reggio Emilia (2016), Department of Economics and Statistics, University of Siena (2015), Department of Mathematical Modelling, Statistics and Bioinformatics, Ghent University, Belgium (2013), Department of Mathematics, University of Bologna (2012), Department of Banking and Financial Management, University of Piraeus, Athens, Greece (2011); Department of Quantitative Methods for Economics and Business, University of Milano-Bicocca (2011).

SHORT VISITS:

Yale School of Management (1-7 September 2019), Temple University, Philadelphia, Fox School of Business (17 June- 15 September 2019), Czech University of Life Sciences (June 2018), Cyprus University of Technology (September 2017), Temple University, Philadelphia, Fox School of Business (October 2015), University of Ghent (June 2013), University of Piraeus (June 2011).

RECENT INTERNATIONAL AND NATIONAL CONFERENCE PRESENTATIONS:

28th Annual Conference of the Multinational Finance Society, Gdańsk (2022), FMA Annual Meeting Virtual (2021), WILF 2021 Virtual International Workshop on Fuzzy Logic and Applications (2021), 27th Annual Conference of the Multinational Finance Society Virtual (2020), Workshop on Quantitative Finance, Zurich (2019), AMASES Naples (2018), 12th International Workshop on Fuzzy Logic and Applications, Genova (2018), Multinational Finance Society 25th annual conference, Budapest (2018), European Financial Management Association 2018 annual meeting, Milan (2018), XIX Workshop in Quantitative Finance, Rome (2018), AMASES Cagliari (2017), FUZZIEEE 2017 Naples (2017), Multinational Finance Society 24th annual conference, Bucharest (2017), XVIII Workshop on Quantitative Finance, Milan (2017), 7th CEQURA Conference, Monaco, (2016), XVII Workshop on Quantitative Finance, Pisa (2016), Financial Management Association Annual Meeting, Orlando, Florida, (2015), XXXIX AMASES Padova (2015), XVI Workshop on Quantitative Finance, Parma (2015), Financial Management Association European Conference, Maastricht (2014);

CURRENT TEACHING ACTIVITIES:

2021-   Mathematical Models for Finance (36 hours), Department of Physics, Informatics and Mathematics, University of Modena and Reggio Emilia, Italy.

2018-   Fuzzy Sets and Systems in the course Methods for Research (12 hours), PhD in Labour, Development and Innovation.

2014-   Mathematics and financial mathematics (48 hours), Department of Economics, University of Modena and Reggio Emilia.

2012-   Financial modelling (applications) (48 hours), Department of Economics, University of Modena and Reggio Emilia, Italy.

2012-   Mathematics for economics and finance (48 hours) (in English), Department of Economics, University of Modena and Reggio Emilia, Italy.

PAST TEACHING ACTIVITIES (UNDERGRADUATE, GRADUATE AND MASTER COURSES):

2013-2014   Data Analysis for Economics (21 hours) Department of Economics, University of Modena and Reggio Emilia

2011-2012   Data Analysis for Finance (42 hours) Department of Economics, University of Modena and Reggio Emilia.

2006-2010   Financial Mathematics (34 hours) Department of Economics, University of Modena and Reggio Emilia.

2006-2009   Risk Management (34 hours) Department of Economics, University of Modena and Reggio Emilia

2009-2010   Risk Management (21 hours) Department of Economics, University of Modena and Reggio Emilia).

2002-2008   Computer Science for Finance (Bonds and Equities), (32 hours) Department of Economics, University of Modena and Reggio Emilia.

2002-2005   Computer Science for Finance (Derivatives), (32 hours) Department of Economics, University of Modena and Reggio Emilia.

2002-2004   Computer Science (16 hours) Master in "International Management" Department of Economics, University of Modena and Reggio Emilia.

1997-2011   Mathematics (introductory course) (16 to 30 hours) Department of Economics, University of Modena and Reggio Emilia

CURRENT INSTITUTIONAL RESPONSIBILITIES:

2021-   Member of the working group for the new Master degree in Data Analysis for Economics and Management at the Marco Biagi Dep. of Economics, University of

Modena and Reggio Emilia

2020 -   Delegate of the department for the evaluation of quality of the research (VQR 15-19) and coordinator of the department committee for VQR 15-19.

2016 –   Delegate of the Department for Research, Department of Economics of the University of Modena and Reggio Emilia

2016 –   Member of the executive board of the Department of Economics of the University of Modena and Reggio Emilia

2017 –   Faculty member in charge of Departmental Seminars at the Department of Economics of the University of Modena and Reggio Emilia

2007 –   ERASMUS Coordinator University Rey Juan Carlos, Madrid.

RECENT PAST INSTITUTIONAL RESPONSIBILITIES:

14/10/2020-13/01/2021 Member of the department committee on public engagement of the University of Modena and Reggio Emilia

02/2019-11/2019   Member of the committee on Research Assessment of the University of Modena and Reggio Emilia

2016 – 2020   Quality Manager of the Department, Department of Economics of the University of Modena and Reggio Emilia

2016-2020   Coordinator of the committee on the quality and assessment of the Research of the Department (SUA-RD), Department of Economics of the University of Modena and Reggio Emilia, Italy

2016 –2017   Delegate of the Department for Business and Community Engagement, Department of Economics of the University of Modena and Reggio Emilia

2015 –2015   Member of the Quality committee of the Department, Department of Economics of the University of Modena and Reggio Emilia

2014-2015   Member of the joint Committee on teaching (students-faculty members), Department of Economics of the University of Modena and Reggio Emilia

BUSINESS AND COMMUNITY ENGAGEMENT:

● 20/11/2020 member of the Board of Directors and member of the advisory board of Start-up IDEM which has among the missions that of measuring and certifying gender-equality in the workplace.

- 20/10/2020- 19/10/2025 Scientist in charge of the agreement between the Department of Economics marco Biagi and SINTHERA for teaching and research.

- 20/10/2020-19/10/2021 Scientist in charge of the research project "Machine learning methods for economics and finance" financed by SINTHERA, 16.000 Euro.

- January 2020-January 2023 Scientist in charge of the agreement between UNIMORE (University of Modena and Reggio Emilia) and CONSOB (Italian national commission for listed companies and the stock exchange)

- December 2019-January 2020 Scientist in charge of letter of intents (Confindustria Emilia Romagna, ART-ER, Nomisma, Elfi Systems, Sinthera) for the cooperation in the project BIG DEAL submitted to H2020-MSCA-ITN-2020: BIG DEAL "Big data and Machine learning for the European financial market risk assessment", budget: Euro 2.828.466,72.

- November 2018 - April 2018 Member of the committee on the state exam for accountants.

- University representative for UNIMORE for the spin-off K-LOOPS (Scientist in charge: Prof. Marcello Pellicciari, year 2019) for the development and marketing of software for simulation of energy efficient processes.

- 29 November 2019. Organization of the Digital workshop on fuzzy methods "How to measure innovation, competitiveness and risk: the advantages of a fuzzy approach", Marco Biagi Foundation.

- 17 December 2018. Organization of the event on "The golden age of aggregation", with the seminar of Prof. Bernard De Baets (University of Ghent, Belgium)

- 8 May 2018. Organization of the event on "Big Data Analytics", with the seminar of Prof. Alberto Fernandez, University of Granada (Spain).

- 7 May 2019 – Seminar at CRISE, UNIMORE, in collaboration with the National Association of Engineers and Accountants "Mathematics and Statistics for the Economy: risk assessment and strategic choices".

- January 19- Participation to the project "Multilayer Analysis on the digital maturity of firms in the Emilia-Romagna Region" PI: Prof. Solinas Giovanni, budget: 40.000 Euro, agreement with Regione Emilia-Romagna, Unioncamere Emilia-Romagna and University of Modena and Reggio Emilia.

- June - September 2018 Scientist in charge of the joint commercial project "Evaluation and construction of leasing plans" with the society "SIFA' Società Italiana Flotte Aziendali S.p.A".

- May 2016 - May 2017 Scientist in charge of the joint project "Analysis and diffusion of the mathematical culture" with the association Pensieri A Fumetti.
  12 May 2017 Event: "Pensieri a fumetti Festival", speech on: "Un giallo matematico: il ritrovamento degli appunti di Archimede".

- December - April 2017 Scientist in charge of the joint commercial project "Mathematical aspects of leasing" with the society "SIFA' Società Italiana Flotte Aziendali S.p.A".

- July 2017 candidate as speaker at CAMPUS PARTY 2017 "Risk indicators for the financial market".

- May 2017 - Scientist in charge of the project of spin-off "EasyRisk": participant in the "Start Cup Emilia Romagna" competition 2017: final rank: 15th out of 127 projects.

AWARDS:

2006   The paper: S. Muzzioli, H. Reynaerts, "Fuzzy linear systems of the form A1x+b1=A2x+b2" Fuzzy Sets and Systems, 157, 7, 2006, 939-951 was ranked 19th on the list: Science Direct Top 25 hottest articles List for the journal Fuzzy Sets and Systems from October 2005 to March 2006 (http://top25.sciencedirect.com/subject/engineering/12/journal/fuzzy-sets-and-systems/01650114/archive/6/).

2000   University of Lausanne: "Prix de l'Association Vaudoise des Banques" for the Master's Thesis.

MEMBERSHIPS:

Present: AFA American Finance Association, FMA Financial Management Association, KERMIT Research Unit Knowledge-based Systems (http://www.kermit.ugent.be), AMASES Associazione per la Matematica Applicata alle Scienze Economiche e Sociali, CEFIN Centro Studi Banca e Finanza.

Past: MFA Midwest Finance Association, EFA European Finance Association, IFABS International Finance and Banking Society, FEBS Financial Engineering and Banking Society.

REFERENCES:

Bernard De Baets, Department of Mathematical Modelling, Statistics and Bioinformatics, Ghent University, Belgium, Bernard.DeBaets@UGent.be.
Elyas Elyasiani, Fox School of Business and Management, Temple University, Philadelphia, PA, USA, elyas@temple.edu.
Panayiotis Theodossiou, School of Management and Economics, Cyprus University of Technology, p.theodossiou@cut.ac.cy.

RESEARCH INTERESTS:
Risk measurement and management
Risk transmission
Asset pricing
Volatility (and higher moments) modelling and forecasting
Derivatives pricing
Econometric modelling

Fuzzy sets and systems, fuzzy regression, fuzzy rule based classification systems
Big data in economics and finance
Machine learning
Measuring regional competitiveness, regional innovation,
LGBT+ inclusion in University

BIBLIOMETRY:

Total citation report on 11/11/2022: 1154 (Google Scholar), 587 (Web of Science), 670 citations (Scopus), h-index: 17 (Google Scholar), 13 (Web of Science), 13 (Scopus).

SELECTED PUBLICATIONS:

1. Muzzioli, S., Gambarelli, L., De Baets, B. (2020). "Option implied moments obtained through fuzzy regression". *Fuzzy Optimization and Decision Making*, 19, 211-238, 2020.
2. E. Elyasiani, L. Gambarelli, S. Muzzioli, "Moment risk premia and the cross-section of stock returns in the European stock market", *Journal of Banking and Finance*, 111, 2020.
3. F.G. Caloia, A. Cipollini, S. Muzzioli, "How do normalization schemes affect net spillovers? A replication of the Diebold and Yilmaz (2012) study", *Energy Economics*, 84, 2019.
4. S. Muzzioli, B. De Baets, "Fuzzy Approaches to option price modelling" *IEEE Transactions on Fuzzy Systems*, 25 (2), 2017, 392-401. (journal impact factor 6.701).
5. A. Cipollini, I. Lo Cascio, S. Muzzioli, "Volatility co-movements: a time scale decomposition analysis", *Journal of Empirical Finance*, 34, 2015, 34-44 (journal impact factor 0.907).
6. S. Muzzioli, A. Ruggieri, B. De Baets, "A comparison of fuzzy regression methods for the estimation of the implied volatility smile function", *Fuzzy Sets and Systems*, 2015, 131-143, doi:10.1016/j.fss.2014.11.015 (journal impact factor 2.098, n. of citations: Scopus 4, Web of Science 3).
7. S. Muzzioli, B. De Baets, "A comparative assessment of different fuzzy regression methods for volatility forecasting" *Fuzzy Optimization and Decision Making*, 12 (4), 2013, 433-450, DOI: 10.1007/s10700-013-9161-1 (journal impact factor 2.569, n. of citations: Scopus 3, Web of Science 2).
8. S. Muzzioli, "The information content of option based forecasts of volatility: evidence from the Italian stock market", *Quarterly Journal of Finance*, 3 (1), 2013, 1350005 (46 pages), DOI: 10.1142/S2010139213500055.
9. S. Muzzioli, "Option-based forecasts of volatility: An empirical study in the DAX-index options market" *European Journal of Finance*, 16 (6) 2010, 561-586 (journal impact factor 0.559, n. of citations: Scopus 10, Web of Science 7).
10. V. Moriggia, S. Muzzioli, C. Torricelli, "On the no arbitrage condition in option implied trees" *European Journal of Operational Research*, 193, 2009, 212-221 (journal impact factor 2.679, n. of citations: Scopus 4, Web of Science 3).
11. S. Muzzioli, H. Reynaerts, "The solution of fuzzy linear systems by non-linear programming: a financial application", *European Journal of Operational Research*, 177, 2007, 1218-1231 (journal impact factor 2.679, n. of citations: Scopus 27, Web of Science 24).
12. S. Muzzioli, H. Reynaerts, "Fuzzy linear systems of the form A1x+b1=A2x+b2" *Fuzzy Sets and Systems*, 157, 7, 2006, 939-951 (journal impact factor 2.098, n. of citations: Scopus 59, Web of Science 45).

13. S. Muzzioli, C. Torricelli, "A Multiperiod Binomial Model for Pricing Options in a Vague World" *Journal of Economic Dynamics and Control*, 28, 2004, 861-887 (journal impact factor 0.879, n. of citations: Scopus 32, Web of Science 32).

14. G. Facchinetti, R. Ghiselli Ricci, S. Muzzioli, "Note on ranking fuzzy triangular numbers", *International Journal of Intelligent Systems*, 13 (7), July 1998, 613-622 (journal impact factor 2.05, n. of citations: Scopus 137, Web of Science 105).

COMPLETE LIST OF PUBLICATIONS:

PAPERS IN REFEREED JOURNALS:

1. G. Campisi, L. La Rocca, L., S. Muzzioli (2022). Assessing skewness in financial markets. *STATISTICA NEERLANDICA*. https://doi.org/10.1111/stan.12273
2. G. Campisi, S. Muzzioli (2022) Asymmetric semi-volatility spillover in a nonlinear model of interacting markets. *International Mathematical Forum*, 17 (3), 117-127.
3. E. Elyasiani, S. Muzzioli (2022). The power of deterministic option-implied trees in pricing European options. *Applied Economics*, 54(22), 2596-2609.
4. Campisi, G., Muzzioli, S., Zaffaroni, A. (2021). Nonlinear dynamics in asset pricing: the role of a sentiment index. Nonlinear Dynamics, 105(3), 2509-2523.
5. F. Anceschi, Francesca, S. Muzzioli, S. Polidoro (2021) "Existence of a fundamental solution of partial differential equations associated to Asian options", *Nonlinear Analysis: Real World Applications*, Nonlinear Analysis: Real World Applications, 62, 103373.
6. G. Campisi, S. Muzzioli, F. Tramontana, "Uncertainty about fundamental and pessimistic traders: a piecewise-linear maps approach", *Decisions in Economics and Finance*, 44(2), 707-726.
7. G. Campisi, S. Muzzioli (2021), "Designing volatility indices for Austria, Finland and Spain" *Financial Markets and Portfolio Management*, 35, 369–455.
8. E. Elyasiani, L. Gambarelli, S. Muzzioli, (2021). "The skewness index: uncovering the relation with volatility and market returns". *Applied Economics*, 53(31), 3619-3635.
9. G. Campisi, S. Muzzioli, "Investor sentiment and trading behavior", *Chaos* 30, 093103, 2020, 1-14, doi: 10.1063/5.0011636.
10. E. Elyasiani, L. Gambarelli, S. Muzzioli (2020). "The use of option prices to assess the skewness risk premium". *Applied Economics*, 52(55), 6057-6074.
11. Muzzioli, S., Gambarelli, L., De Baets, B. "Option implied moments obtained through fuzzy regression". *Fuzzy Optimization and Decision Making*, 19, 211-238, 2020.
12. E. Elyasiani, L. Gambarelli, S. Muzzioli, "Moment risk premia and the cross-section of stock returns in the European stock market", *Journal of Banking and Finance*, 111, 2020.
13. F.G. Caloia, A. Cipollini, S. Muzzioli, "How do normalization schemes affect net spillovers? A replication of the Diebold and Yilmaz (2012) study", *Energy Economics*, 84, 2019.
14. E. Elyasiani, L. Gambarelli, S. Muzzioli, The Risk-Asymmetry Index as a New Measure of Risk, *Multinational Finance Journal*, 22 (3/4), 2018, 173-210.
15. S. Muzzioli, L. Gambarelli, B. De Baets, "Indices for financial market volatility obtained through fuzzy regression", *International Journal of Information Technology and Decision Making*, 17(6), 2018, 1659-1691.
16. F.G. Caloia, A. Cipollini, S. Muzzioli, "Asymmetric semi-volatility spillover effects in EMU stock markets", *International Review of Financial Analysis*, 57, 2018, 221-230. https://doi.org/10.1016/j.irfa.2018.03.001

17. A. Cipollini, I. Lo Cascio, S. Muzzioli, "Risk aversion connectedness in Five European Countries", *Economic Modelling*, 71, 2018, 68-79. https://doi.org/10.1016/j.econmod.2017.12.003.
18. E. Elyasiani, L. Gambarelli, S. Muzzioli, "The information content of corridor volatility measures during calm and turmoil periods", *Quantitative Finance and Economics*, 1(4), 2017, 454-473. doi: 10.3934/QFE.2017.4.454.
19. S. Muzzioli, B. De Baets, "Fuzzy Approaches to option price modelling" *IEEE Transactions on Fuzzy Systems*, 25 (2), 2017, 392-401.
20. A. Cipollini, I. Lo Cascio, S. Muzzioli, "Volatility co-movements: a time-scale decomposition analysis", *Journal of Empirical Finance*, 34, 2015, 34-44.
21. S. Muzzioli, "The optimal corridor for implied volatility: From periods of calm to turmoil", *Journal of Economics and Business*, 81, 2015, 77-94.
22. S. Muzzioli, A. Ruggieri, B. De Baets, "A comparison of fuzzy regression methods for the estimation of the implied volatility smile function", *Fuzzy Sets and Systems*, 2015, 131-143, doi:10.1016/j.fss.2014.11.015
23. S. Muzzioli, "The information content of option based forecasts of volatility: evidence from the Italian stock market", *Quarterly Journal of Finance*, 3 (1), 2013, 1350005 (46 pages), DOI: 10.1142/S2010139213500055.
24. S. Muzzioli, B. De Baets, "A comparative assessment of different fuzzy regression methods for volatility forecasting" *Fuzzy Optimization and Decision Making*, 12 (4), 2013, 433-450, DOI: 10.1007/s10700-013-9161-1
25. S. Muzzioli, "The forecasting performance of corridor implied volatility in the Italian market", *Computational Economics*, 41 (3) 2013, 359-386, published on-line 17 October 2012 (DOI) 10.1007/s10614-012-9343-x.
26. S. Muzzioli, "Put-Call Parity and options' forecasting power" *Advances and Applications in Statistics*, 30 (1) 2012, 1-17.
27. S. Muzzioli, "The Skew Pattern of Implied Volatility in the DAX Index Options Market" *Frontiers in Finance and Economics*, 8 (1) 2011, 43-68.
28. S. Muzzioli, "Option-based forecasts of volatility: An empirical study in the DAX-index options market" *European Journal of Finance*, 16 (6) 2010, 561-586.
29. V. Moriggia, S. Muzzioli, C. Torricelli, "On the no arbitrage condition in option implied trees" *European Journal of Operational Research*, 193, 2009, 212-221.
30. S. Muzzioli, H. Reynaerts, "American Option Pricing with Imprecise Risk-Neutral Probabilities" *International Journal of Approximate Reasoning*, 49, 2008, 140-147.
31. V. Moriggia, S. Muzzioli, C. Torricelli, "Call and put implied volatilities and the derivation of option implied trees" *Frontiers In Finance and Economics*, vol.4, n.1, 2007, 35-64.
32. S. Muzzioli, H. Reynaerts, "Solving parametric fuzzy linear systems by a non linear programming method" *Computational Economics*, 29, 2007, 107-117.
33. S. Muzzioli, H. Reynaerts, "The solution of fuzzy linear systems by non-linear programming: a financial application", *European Journal of Operational Research*, 177, 2007, 1218-1231.
34. S. Muzzioli, H. Reynaerts, "Fuzzy linear systems of the form A1x+b1=A2x+b2" *Fuzzy Sets and Systems*, 157, 7, 2006, 939-951.
35. S. Muzzioli, C. Torricelli, "The pricing of options on an interval binomial tree. An application to the DAX index option market", *European Journal of Operational Research*, 163, 2005, 192-200.
36. S. Muzzioli, C. Torricelli, "A Multiperiod Binomial Model for Pricing Options in a Vague World" *Journal of Economic Dynamics and Control*, 28, 2004, 861-887.
37. S. Muzzioli, C. Torricelli, "Implied Trees in Illiquid Markets: a Choquet Pricing Approach" *International Journal of Intelligent Systems*, 17 (6), June 2002, 577-594.
38. S. Muzzioli, C. Torricelli, "A model for pricing an option with a fuzzy payoff", *Fuzzy Economic Review*, VI (1), May 2001, 49-62.

39. G. Facchinetti, R. Ghiselli Ricci, S. Muzzioli, "Note on ranking fuzzy triangular numbers", *International Journal of Intelligent Systems*, 13 (7), July 1998, 613-622.

CHAPTERS IN EDITED VOLUMES:

40. Muzzioli S., Gambarelli L. De Baets B. "Towards a fuzzy index of skewness" *Lecture Notes in Computer Science (LNCS/LNAI) n.11291*, R. Fullér et al. (Eds.), Springer, (2019) 164-175.
41. Muzzioli S., "The Future of Fuzzy Sets in Finance: New Challenges in Machine Learning and Explainable AI", *Lecture Notes in Computer Science (LNCS/LNAI) n.11291*, R. Fullér et al. (Eds.), Springer, (2019) 265-268.
42. S. Muzzioli, "The relation between implied and realised volatility in the DAX index options market", in *M. Corazza, C. Pizzi (Eds.), Mathematical and Statistical Methods for Actuarial Sciences and Finance, Springer-Verlag Italia (2010), 215-224*.
43. S. Muzzioli, H. Reynaerts, "Option pricing in the presence of uncertainty", in *Batyrshin, I.; Kacprzyk, J.; Sheremetov, L.; Zadeh, L.A. (Eds.), Perception-based Data Mining and Decision Making in Economics and Finance, Series: Studies in Computational Intelligence, Vol. 36, Springer-Verlag (2007), 275-301*.
44. S. Muzzioli, H. Reynaerts, "Fuzzy binary tree model for European options" in *A. Di Bucchianico, R.M.M. Mattheij, M.A. Peletier (Eds.), Progress in industrial mathematics at ECMI 2004, Math. Ind., 8, Springer, Berlin, (2006), 437-441, (ISBN: 978-3-540-28072-9. http://dx.doi.org/10.1007/3-540-28073-1_69)*.

PROCEEDINGS:

45. Russo T., Addabbo T., Muzzioli S. De Baets B. (2021) "The development of the LGBT+ University Inclusion Index and its application to Italian universities". *Proceedings of the 13th International Workshop on Fuzzy Logic and Applications*, available at: http://ceur-ws.org/Vol-3074.
46. Gambarelli, L., Muzzioli, S. De Baets, B. (2021). "Towards new volatility measures for the EU stock market". *Proceedings of the 13th International Workshop on Fuzzy Logic and Applications*, available at: http://ceur-ws.org/Vol-3074
47. S. Muzzioli, L. Gambarelli, B. De Baets, Towards a Fuzzy Volatility Index for the Italian Market, *Proceedings of the IEEE, FUZZ IEEE 2017 conference*, 10.1109/FUZZ-IEEE.2017.8015446.
48. E. Elyasiani, S. Muzzioli, A. Ruggieri, "Pricing and forecasting power of option implied trees and implied moments", *Proceedings of the XVI Workshop in Quantitative Finance,* paper available at the web-site: http://www.qfinancexvi.altervista.org/Programme.pdf
49. S. Muzzioli, "Corridor implied volatility and the variance risk premium in the Italian market" In L.E.Blose, V. Gondhalekar (eds) *Proceedings of the Midwest Finance Association*, *2012 Annual Meeting,* New Orleans, February 22-25, Vol. 9, pp 1-36.
50. S. Muzzioli, "Towards a volatility index for the Italian stock market", In L.E. Blose (ed) *Proceedings of the Midwest Finance Association, 2011 Annual Meeting,* Chicago March 3-5, Vol. 8, pp 1-29.
51. H. Reynaerts, S. Muzzioli, "Solving fuzzy systems of linear equations by a nonlinear programming method", *Proceedings of the International Symposium on Applied Stochastic Models and Data Analysis,* Brest 17-20 May 2005, 1370-1376.

52. S. Muzzioli, H. Reynaerts, "Fuzzy binary tree model for European style vanilla options" *Proceedings of the International Conference on Fuzzy Sets and Soft Computing in Economics and Finance (FSSCEF2004),* St. Petersburg (Russia), 17-20 June 2004, Vol 1, 222-229.

53. S. Muzzioli, C. Torricelli, "A methodology for pricing options in illiquid markets: an application to the DAX-index option market", *Proceedings of the Conference of the XXX Euro Working Group on Financial Modelling,* Capri, 2-4 May 2002.

54. S. Muzzioli, C. Torricelli, "A Multiperiod Binomial Model for Pricing Options in an Uncertain World" *Proceedings of the 2nd International Symposium on Imprecise Probabilities and Their Applications, Ithaca,* New York, June, 26-29, 2001, Gert De Cooman, Terrence L. Fine, Teddy Seidenfeld Eds., Shaker Publishing, The Netherlands, 255-264.

55. S. Muzzioli, C. Torricelli, "A model for pricing an option with a fuzzy payoff", *Proceedings of the Portuguese Finance Network 1st Finance Conference,* University of Minho, Braga, Portugal, June 28-July 1 2000, file n 104.pdf of the cd-rom.

56. S. Muzzioli, C. Torricelli, "Pricing options on a vague asset", *Proceedings of the 5th International Conference of the Decision Sciences Institute on "Integrating Technology & Human Decisions: Global Bridges into the 21st Century"*, 4-7 July, 1999, Athens, Greece, Dimitris K. Despotis, Constantin Zopounidis Eds., New Technologies Publications, Athens, Greece, 546-548.

WORKING PAPERS:

57. Damiani, F., Muzzioli, S., De Baets, B. (2022) "Regional innovation in southern Europe: a poset-based analysis" *DEMB working paper n. 209*

58. Gambarelli., L., Marchi, G., Muzzioli, S. (2022) "Asymmetric correlations and hedging effectiveness of cryptocurrencies for the European stock market", *DEMB working paper n. 205*

59. Gambarelli., L., Muzzioli, S. (2022) "News Sentiment indicators and the Cross-Section of Stock Returns in the European Stock Market", *DEMB working paper n. 204*

60. Gambarelli., L., Muzzioli, S., De Baets, B. (2022) "An OWA Analysis of the VSTOXX volatility index", *DEMB working paper n. 203*

61. Campisi, G., De Baets, B., Gambarelli., L., Muzzioli, S., (2022) "Forecasting returns in the US market through fuzzy rule-based classification systems", *DEMB working paper n. 202*

62. Campisi G., Muzzioli S. (2022) "Asymmetric semi-volatility spillover in a nonlinear model of interacting markets" , *DEMB working paper n. 201*

63. Ferrarini F., Muzzioli S., De Baets B., (2021) "A TOPSIS analysis of regional innovation at European level" *DEMB Working Paper n.189*.

64. Damiani F., Muzzioli S., De Baets B., (2021) "A poset-based analysis of regional innovation at European level" *DEMB Working Paper n.188*.

65. Russo T., Addabbo T., Muzzioli S. De Baets B. (2021) "Tools and practices for LGBT+ inclusion in Tertiary Education, the development of the LGBT+ University Inclusion Index and its application to Italian Universities" *DEMB Working Paper n.187*.

66. Campisi G., Muzzioli S., Tramontana F., (2021) "Uncertainty about fundamental and pessimistic traders: a piecewise-linear maps approach", *DEMB Working Paper n.186*.

67. Muzzioli S., Campisi G., De Baets B., (2021) "A comparison of machine learning methods for predicting stock returns in the US market" , *DEMB Working Paper n.184*.

68. Anceschi, F., Muzzioli S., Polidoro S., Existence of a Fundamental Solution of Partial Differential Equations associated to Asian Options, arXiv:2007.09037.

69. Campisi G., Muzzioli S. (2020) "Investor sentiment and trading behavior", *DEMB Working Paper n.163.*
70. Campisi G., La Rocca L., Muzzioli S. (2020) "Assessing skewness in financial markets", *DEMB Working Paper n.164.*
71. Campisi G., Muzzioli S. (2020) "Fundamentalists heterogeneity and the role of the sentiment indicator", *DEMB Working Paper n.167.*
72. Campisi G., Muzzioli, S. (2019) "Construction and properties of volatility indices for Austria, Finland and Spain" *DEMB Working Paper n. 156.*
73. Gambarelli, L., Muzzioli, S. (2019) "Risk asymmetry indices in Europe", *DEMB Working Paper n. 157.*
74. Elyasiani, E., Gambarelli, L., Muzzioli, S. (2018) "The properties of a skewness index and its relation with volatility and returns", *DEMB Working Paper n.133, http://merlino.unimo.it/campusone/web_dep/wpdemb/0133.pdf.*
75. Elyasiani, E., Gambarelli, L., Muzzioli, S. (2018) "The use of option prices in order to evaluate the skewness risk premium", *DEMB Working Paper n.132, http://merlino.unimo.it/campusone/web_dep/wpdemb/0132.pdf.*
76. F.G. Caloia, A. Cipollini, S. Muzzioli (2018) "On the financial connectedness of the commodity market: a replication of the Diebold and Yilmaz (2012) study*", DEMB Working Paper n.131, http://merlino.unimo.it/campusone/web_dep/wpdemb/0131.pdf.*
77. Elyasiani, E., Gambarelli, L., Muzzioli, S. (2016) "Moment Risk Premia and the Cross-Section of Stock Returns" DEMB Working Paper n. 103. http://merlino.unimo.it/campusone/web_dep/wpdemb/0103.pdf
78. Elyasiani, E., Gambarelli, L., Muzzioli, S. (2016) "The Risk-Asymmetry index" CEFIN Working Paper n. 61. http://www.cefin.unimore.it/new/wp-content/uploads/2016/12/Cefin_WP_61.pdf
79. Elyasiani, E., Gambarelli, L., Muzzioli, S. (2016) "Fear or greed? What does a skewness index measure?" DEMB Working Paper n.102, December 2016
    a. http://merlino.unimo.it/campusone/web_dep/wpdemb/0102.pdf
80. Elyasiani, E., Muzzioli, S., Ruggieri, A., (2016) "Forecasting and pricing powers of option-implied tree models: Tranquil and volatile market conditions" DEMB Working Paper n.99. http://merlino.unimo.it/campusone/web_dep/wpdemb/0099.pdf
81. F.G. Caloia, A. Cipollini, S. Muzzioli "A note on normalization schemes, the case of generalized forecast error variance decompositions", DEMB Working paper n. 92, August 2016.
82. A. Cipollini, I. Lo Cascio, S. Muzzioli, "Financial connectedness among volatility risk premia", CEFIN Working paper n. 47, December 2015.
83. E. Elyasiani, L. Gambarelli, S. Muzzioli "Towards a skewness index for the Italian stock market" Working paper of the Department of Economics "Marco Biagi", n. 64, November 2015.
84. A. Cipollini, I. Lo Cascio, S. Muzzioli, "Volatility risk premia and financial connectedness", RECent Working paper, n. 109, December 2014.
85. A. Cipollini, I. Lo Cascio, S. Muzzioli, "Volatility risk premia and financial connectedness", Working paper of the Department of Economics "Marco Biagi", n. 47, December 2014.
86. S. Muzzioli, "The optimal corridor for implied volatility: from calm to turmoil periods", Working paper of the Department of Economics "Marco Biagi", n. 29, December 2013.
87. S. Muzzioli, A. Ruggieri, B. De Baets, "A comparison of fuzzy regression methods for the estimation of the implied volatility smile function", Working paper of the Department of Economics "Marco Biagi", n. 28, November 2013.
88. A. Cipollini, I. Lo Cascio, S. Muzzioli, "Volatility co-movements: a time scale decomposition analysis", CEFIN working paper n.44, November 2013.

89. S. Muzzioli, A. Ruggieri, *"Option Implied trees and implied moments"*, Working paper of the Department of Economics "Marco Biagi", n. 15, June 2013.

90. S. Muzzioli, "Corridor Implied Volatility and the Variance Risk Premium in the Italian Market" (August 30, 2011). Midwest Finance Association 2012 Annual Meetings Paper. Available at SSRN: http://ssrn.com/abstract=1919662 or http://dx.doi.org/10.2139/ssrn.1919662

91. S. Muzzioli, B. De Baets, "Assessing the information content of option-based volatility forecasts using fuzzy regression methods", Materiali di discussione n.669, Novembre 2011, Dipartimento di Economia Politica, Università degli Studi di Modena e Reggio Emilia ISSN:2039-14.

92. S. Muzzioli, "Corridor Implied Volatility and the Variance Risk Premium in the Italian Market", CEFIN working paper n. 30, November 2011, Available at SSRN: http://ssrn.com/abstract=1919662.

93. S. Muzzioli, "Towards a volatility index for the Italian stock market", CEFIN working paper n. 23, September 2010.

94. S. Muzzioli, "The skew pattern of implied volatility in the DAX-index options market", Materiali di discussione n.617, Luglio 2009, Dipartimento di Economia Politica, Università degli Studi di Modena e Reggio Emilia.

95. S. Muzzioli, "Option based forecasts of volatility: An empirical study in the DAX index options market", CEFIN working paper n. 11, May 2008.

96. S. Muzzioli, "The relation between implied and realised volatility: are call options more informative than put options? Evidence from the DAX index options market", *CEFIN working paper n. 4, October 2007*.

97. S. Muzzioli, H. Reynaerts, "American option pricing with imprecise risk neutral probabilities: from plain intervals to fuzzy sets", Technical Paper Series of the Center of Statistics of the Ghent University, n.1, 2007 available at: www.cvstat.ugent.be .

98. S. Muzzioli, H. Reynaerts, "Fuzzy up and down probabilities in a financial problem", Technical Paper Series of the Center of Statistics of the Ghent University, n .4, 2005 available at: www.cvstat.ugent.be .

99. V. Moriggia, S. Muzzioli, C. Torricelli, "The no arbitrage condition in option implied trees: evidence from the Italian index options market", Materiali di discussione n.491, Maggio 2005, Dipartimento di Economia Politica, Università degli Studi di Modena e Reggio Emilia.

100. V. Moriggia, S. Muzzioli, C. Torricelli, "Option implied trees when the put call parity is not fulfilled", Materiali di discussione n.448, Novembre 2003, Dipartimento di Economia Politica, Università degli Studi di Modena e Reggio Emilia.

101. S. Muzzioli, "A note on fuzzy linear systems" *Materiali di discussione n.447, Novembre 2003,* Dipartimento di Economia Politica, Università degli Studi di Modena e Reggio Emilia.

102. V. Moriggia, S. Muzzioli, C. Torricelli, "Option implied trees under put-call parity violations" Quaderno del Dipartimento di Matematica, Statistica, Informatica e Applicazioni, Università di Bergamo, n. 3, 2003.

103. S. Muzzioli, C. Torricelli, "Implied Trees in Illiquid Markets: a Choquet Pricing Approach" Materiali di discussione n.368, Luglio 2001, Dipartimento di Economia Politica, Università degli Studi di Modena e Reggio Emilia.

104. S. Muzzioli, C. Torricelli, "Combining the theory of evidence with fuzzy sets for binomial option pricing", Materiali di discussione n.312, Maggio 2000, Dipartimento di Economia Politica, Università di Modena e Reggio Emilia.

105. S. Muzzioli, C. Torricelli, "A model for pricing an option with a fuzzy payoff", Materiali di discussione n.282, settembre 1999, Dipartimento di Economia Politica, Università di Modena

106.   G. Facchinetti, R. Ghiselli Ricci, S. Muzzioli, "New methods for ranking triangular fuzzy numbers: an investment choice", Materiali di Discussione n.206, ottobre 1997, Dipartimento di Economia Politica, Università di Modena.

OTHERS:

107.   S. Muzzioli, "Option Pricing in a Fuzzy Environment", 2000, Master's Dissertation, Master of Science in Banking and Finance, University of Lausanne, Switzerland.

Modena, 11/11/22