SVETLOZAR (ZARI) TODOROV RACHEV

CONTACT

zari.rachev@ttu.edu
zarirachev.com
Google Scholar
Wikipedia

EDUCATION

M.SC. IN MATHEMATICS
Sofia University, Bulgaria, July 1974
Thesis: "Reliability of Aging Systems"

Ph.D. IN MATHEMATICS
Lomonosov University Moscow, USSR.
Faculty of Mechanics and Mathematics,
October 12, 1979.
Dissertation: *"The structure of the metrics in the space of random variables and their distributions."*

DOCTOR OF SCIENCE
(Habilitation) in Physics and Mathematics,
Steklov Mathematical Institute, Moscow,
USSR. April 10, 1986.
Dissertation: *"Probability metrics and their applications to the stability problems for stochastic models"*

ABOUT

DATE OF BIRTH: September 6, 1951
CITIZENSHIP: U.S.A.
CURRENT POSITION: Professor, Department. of Mathematics & Statistics, Texas Tech University

PREVIOUS APPOINTMENTS

2017 – CURRENT
Professor, Department. of Mathematics & Statistics, Texas Tech University

2012 – 2016
Professor, College of Business Program Director, Finance and Accounting Stony Brook University Research Professor, Department of Applied Math and Statistics

2011 – 2012
Frey Family Foundation Chair of Quantitative Finance Department of Applied Mathematics and Statistics Stony Brook University

1998 – 2010
Endowed Chair of Statistics Econometrics and Mathematical Finance School of Economics and Business Engineering Karlsruhe Institute of Technology

1989 – 1998
Professor, Department of Statistics and Applied Probability University of California at Santa Barbara (1994-1995, Department Chairman)

1988 – 1988
Visiting Associate Professor Stony Brook University

1987 – 1987
John H. Van Vleck, Visiting Professor, Wesleyan University, Connecticut and Visiting Associate Professor, Centre for Stochastic Processes University of North Carolina at Chapel Hill

1984 – 1986
Senior Research Fellow, Bulgarian Academy of Sciences and Visiting Senior Research Fellow Steklov Mathematical Institute, Academy of Sciences of the USSR, Moscow

1980 – 1984
Research Fellow, Mathematical Institute, Bulgarian Academy of Sciences

1977 – 1979
Post-graduate Student, Lomonosov University, Faculty of Mechanics and Mathematics, Department of Probability, Moscow, USSR

1974 – 1977
Mathematician, Mathematical Institute, Bulgarian Academy of Sciences

SVETLOZAR (ZARI) TODOROV RACHEV

PROFESSOR, DEPARTMENT OF MATHEMATICS & STATISTICS, TEXAS TECH UNIVERSITY
zari.rachev@ttu.edu | zarirachev.com | Google Scholar | Wikipedia

AWARDS & HONORS

Fellow, Institute of Mathematical Statistics
Elected Member, International Statistical Institute
Foreign Member, Russian Academy of Natural Sciences
Honorary Doctor of Science, St. Petersburg Technical University
Senior Humboldt Professor Award, Barney E. Rushing, Jr. Faculty
Distinguished Research Award, STEM, Texas Tech University
Excellence in Innovation Award, Texas Tech University
2026 SIAM Graduate Professor of the Year, Texas Tech University

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PUBLISHED BROADCAST INTERVIEWS

ZARI RACHEV FACTBOX-TOOLS TO PREDICT MARKET SHOCKS, REUTERS, MAY 24, 2009
https://www.reuters.com/article/models-math/factbox-tools-to-predict-marketshocks-idUSL169274620090525
https://www.reuters.com/article/us-models-finanalytica/assessing-the-risk-ofa-cataclysm-idUSTRE54O00R20090525

RISIKOMANAGER JOURNAL: Interview with Prof. Dr. Svetlozar Rachev, Chair of Statistics, Econometrics and Mathematical Finance at University of Karlsruhe (TH) and Prof. Stefan Mittnik (Ph.D.) Chair of Financial Econometrics at University of Munich New Approaches for Portfolio Optimization Parting with the Bell Curve
https://statistik.econ.kit.edu/download/doc_secure1/RM-Interview-RachevMittnik-EnglishTranslation.pdF

PATENTS

RACHEV ET AL. SYSTEM AND METHOD FOR THE VALUATION OF DERIVATIVES
United States Patent, Serial No. 10/888,414, Filed July 9, 2004, Docket No. Patent Number 7,630,931, Date Of Patent: December 8, 2009

RACHEV ET AL. SYSTEM AND METHOD FOR PROVIDING OPTIMIZATION OF A FINANCIAL PORTFOLIO USING A PARAMETRIC LEPTOKURTIC DISTRIBUTION
United States Patent, Serial No. 10/888,414, Filed July 9, 2004, Docket No. 031/0424.US.UTL, May, 2010

RACHEV ET AL. RISK MANAGEMENT SYSTEM AND METHOD FOR DETERMINING RISK CHARACTERISTICS EXPLAINING HEAVY TAILS OF RISK FACTORS
U.S. Patent Trademark Office, Patent No. 7,778,897, August 17, 2010

RACHEV ET AL. SYSTEM AND METHOD FOR PROVIDING REALLOCATION AND REVERSE OPTIMIZATION OF A FINANCIAL PORTFOLIO USING A PARAMETRIC LEPTOKURTIC DISTRIBUTION
United States Patent, U.S. Patent Trademark Office, Patent No. 7,890,409, February 15, 2011

RACHEV ET AL. SYSTEM AND METHOD FOR GENERATING RANDOM VECTORS FOR ESTIMATING PORTFOLIO RISK
United States Patent, U.S. Patent Trademark Office, Patient No. 8,170,941, May 1, 2012

SVETLOZAR (ZARI) TODOROV RACHEV

PROFESSOR, DEPARTMENT OF MATHEMATICS & STATISTICS, TEXAS TECH UNIVERSITY
zari.rachev@ttu.edu | zarirachev.com | Google Scholar | Wikipedia

MENTORED POSTDOCTORAL STUDENTS

Dr. Young Shin Kim (Karlsruhe Institute of Technology, School of Business and Economics)
Dr. Jiho Park (Texas Tech University, Dept. of Mathematics & Statistics)
Dr. Davide Lauria (Texas Tech University, Dept. of Mathematics & Statistics)

MENTORED PH.D STUDENTS

Prachi Chaturvedi (UCSB, Departments of Statistics and Applied Probability)
Bessy Athanasopoulos (UCSB, Departments of Statistics and Applied Probability)
Bertrand Gamrowski (Ecole Polytechnique, Paris)
Thomas Kozubowski (UCSB, Departments of Statistics and Applied Probability)
Anna Panorska (UCSB, Departments of Statistics and Applied Probability)
Benny Cheng (UCSB, Departments of Statistics and Applied Probability)
Chufang Wu (UCSB, Departments of Statistics and Applied Probability)
Vera Haynatzka (UCSB, Departments of Statistics and Applied Probability)
Seonkoo Han (UCSB, Departments of Statistics and Applied Probability)
Norbert Schumacher (UCSB, Departments of Statistics and Applied Probability)
Irina Khindanova (UCSB, Departments of Economics)
Yesim Tokat (UCSB, Departments of Economics)
Biliana Bagasheva (UCSB, Departments of Statistics and Applied Probability)
Anna Chernobai (UCSB, Departments of Statistics and Applied Probability)
Alex Vollert (University of Karlsruhe, School of Economics and Business Engineering)
Christian Peter (University of Karlsruhe, School of Economics and Business Engineering)
Lorena Vinueza (University of Karlsruhe, School of Economics and Business Engineering)
Stefan Trueck (University of Karlsruhe, School of Economics and Business Engineering)
Christian Menn (University of Karlsruhe, School of Economics and Business Engineering)
Stefan Woerner (University of Karlsruhe, School of Economics and Business Engineering)
Dylan D'Souza (UCSB, Departments of Economics)
Stoyan Stoyanov (University of Karlsruhe, School of Economics and Business Engineering)
Wei Sun (University of Karlsruhe, School of Economics and Business Engineering)
Sebastian Kring (University of Karlsruhe, School of Economics and Business Engineering)
Markus Hoechstoetter (University of Karlsruhe, School of Economics and Business Engineering)
Michael Grebeck (UCSB, Departments of Statistics and Applied Probability)
Jorge Hernandez (UCSB, Departments of Statistics and Applied Probability)
Carlo Marinelli (Columbia University, Department of Statistics)
Teo Jašić (Karlsruhe, School of Economics and Business Engineering)
Dezhong Wang (UCSB, Departments of Statistics and Applied Probability)
Sergio Focardi (Karlsruhe, School of Economics and Business Engineering)
Anna Serbinenko (Karlsruhe, School of Economics and Business Engineering)
Christoph Moeller (Karlsruhe, School of Economics and Business Engineering)
Jan Fraenkle (Karlsruhe, School of Economics and Business Engineering)
Christian Diekmann (Karlsruhe, School of Economics and Business Engineering)
Michael Stein (Karlsruhe, School of Economics and Business Engineering)
Christian Scherrer-Montbrun (Karlsruhe, School of Economics and Business Engineering)
Thomas Meinl (Karlsruhe, School of Economics and Business Engineering)
Matthias Scherer (Karlsruhe, School of Economics and Business Engineering)
Michele Leonardo Bianchi (Karlsruhe, School of Economics and Business Engineering)
Omid Rezania (Karlsruhe, School of Economics and Business Engineering)
Sinan Aktan (Karlsruhe, School of Economics and Business Engineering)
Alexander Beck (Karlsruhe, School of Economics and Business Engineering)
Drik Krause (Karlsruhe, School of Economics and Business Engineering)
Abdolreza Nazemi (Karlsruhe, School of Economics and Business Engineering)
Papenbrock, Jochen (Karlsruhe, School of Economics and Business Engineering)
Michael Pieper (Karlsruhe, School of Economics and Business Engineering)
Xiaochu Zhang (Stony Brook University, Dept. of Applied Math & Statistics)
Xiaoping Zhou (Stony Brook University, Dept. of Applied Math & Statistics)
Tetsuo Kurosaki (Stony Brook University, Dept. of Applied Math & Statistics)

SVETLOZAR (ZARI) TODOROV RACHEV

PROFESSOR, DEPARTMENT OF MATHEMATICS & STATISTICS, TEXAS TECH UNIVERSITY

zari.rachev@ttu.edu | zarirachev.com | Google Scholar | Wikipedia

MENTORED PH.D STUDENTS (CONTINUED)

Barret Shao (Stony Brook University, Dept. of Applied Math & Statistics)
Naoshi Tsuchida (Stony Brook University, Dept. of Applied Math & Statistics)
Angela Tsao (Stony Brook University, Dept. of Applied Math & Statistics)
Yikang Chai (Stony Brook University, Dept. of Applied Math & Statistics)
Tianyu Lu (Stony Brook University, Dept. of Applied Math & Statistics)
Yuzhong Zhang (Stony Brook University, Dept. of Applied Math & Statistics)
Hua Mo (Stony Brook University, Dept. of Applied Math & Statistics)
Xiang Shi (Stony Brook University, Dept. of Applied Math & Statistics)
Po-Keng Cheng (Stony Brook University, Dept. of Applied Math & Statistics)
Fangfei Dong (Stony Brook University, Dept. of Applied Math & Statistics)
Yuan Hu (Texas Tech University, Dept. of Mathematics & Statistics)
Ali Muqadas Jaffri (Assistant Professor in the College of Business at North Dakota State University)
Abootaleb Shirvani (Assistant Professor at Kean University)
Bhathiya Divelgama (Texas Tech University, Dept. of Mathematics & Statistics)
Jagdish Gnawali (Texas Tech University, Dept. of Mathematics & Statistics)

MENTORED MASTER'S DEGREE STUDENTS

Isaac McCarthy (Master's Degree, Exam)
Thisari Mahanama (Master's Degree, Exam)
Blessing Omotade (Master's Degree, Exam)
Peter Yegon (Master's Degree, Supervised Report)
Olustosin Daramola (Master's Degree, Supervised Report)

CURRENT TEACHING AT TEXAS TECH UNIVERSITY

https://www.depts.ttu.edu/math/teaching/current_schedules.php

FALL 2026

MATH 4000-D02 Selected Topics: Actuarial Mathematics for Life Contingent Risks
MATH 5099-002 Individual Study: Advanced Generative Modeling for Financial Time Series
MATH 5099-003 Individual Study: Scenario-Based Portfolio Optimization and Risk Management
MATH 5399-D01 Advanced Problems: Mathematical Finance
MATH 6353-D01 Fin Derivatives & Stoch Calc
MATH 7000-012 Research
MATH 7000-013 Research: Greed Fear Under Model and Ambiguity Risk - Robust Option Valuation
MATH 7000-014 Research: Liquidity-Aware Credit Equity Rotation with Schedule-Feasible Execution
MATH 7000-020 Research: Dynamic Asset Pricing under Rough Volatility, Jumps, and Ambiguity
MATH 7000-023 Research: Greed Fear Efficient Frontiers
MATH 7000-027 Research: Analytics for a Portfolio of Currency ETFs
MATH 7000-030 Research: Explainable Artificial Intelligence for Intelligent Financial Decision Support
MATH 8000-007 Doctor's Dissertation
STAT 7000-009 Research: Technical Analysis and Market Efficiency under a Rational-Finance Lens
STAT 7000-013 Research: Artificial Intelligence in Portfolio Management and Behavioral Finance
STAT 7000-014 Research: Portfolio Optimization under Distributional Ambiguity and Tail Risk
STAT 7000-016 Research: Machine Learning, Rational Finance, and Artificial Intelligence

SPRING 2027

MATH 4000-D02 Selected Topics: Actuarial Mathematics for Life Contingent Risks
MATH 6351-D01 Quantitative Finance

SVETLOZAR (ZARI) TODOROV RACHEV

PROFESSOR, DEPARTMENT OF MATHEMATICS & STATISTICS, TEXAS TECH UNIVERSITY
zari.rachev@ttu.edu | zarirachev.com | Google Scholar | Wikipedia

PUBLICATIONS: BOOKS & MONOGRAPHS

Risk Management for Cryptocurrency Portfolios (2025). Walter de Gruyter GmbH & Co KG. Monograph.

W. Brent Lindquist, Svetlozar T. Rachev, Yuan Hu, and Abootaleb Shirvani, Advanced Tools for Risk Management, Springer series, "Dynamic Modeling and Econometrics in Economics and Finance," Springer, 2022.
https://www.springer.com/series/5859/books?page=1

Frank J. Fabozzi, Sergio M. Focardi, Svetlozar T. Rachev, and Bala Arshanapalli, Basics of Financial Econometrics: Tools, Concepts, and Asset Management Applications, Wiley, 2014.
https://onlinelibrary.wiley.com/doi/book/10.1002/9781118856406 2.

Stoyan Stoyanov, Svetlozar Rachev, and Frank Fabozzi, Optimal Portfolio Management in Highly Volatile Markets, Scholars Press, 2013
https://www.amazon.com/Optimal-Portfolio-Management-Volatile- Markets/dp/3639514130

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S. T. Rachev, Y. Kim, M. Bianchi, and F. Fabozzi, Financial Models with Levy Processes and Volatility Clustering, Springer, 2011
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S. Trueck and S. T. Rachev, Rating Based Modeling of Credit Risk: Theory and Application of Migration Matrices, Academic Press Advances Finance, 2008
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http://www.wiley.com/WileyCDA/WileyTitle/productCd-047005316X.html

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http://www.wiley.com/WileyCDA/WileyTitle/productCd-0471784508.html

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http://www.wiley.com/WileyCDA/WileyTitle/productCd-0471780510.html

L. Klebanov, T. Kozubowski, and S. T. Rachev, Ill-Posed Problems in Probability and Stability of Random Sums, NOVA Science Publishers, 2006
https://www.novapublishers.com/catalog/product_info.php?products_id=4546

S. T. Rachev, C. Menn, and F. Fabozzi, Fat-Tailed and Skewed Asset Return Distributions: Implications for Risk Management, Portfolio selection and Option Pricing, John Wiley, 2005
http://www.wiley.com/WileyCDA/WileyTitle/productCd-0471718866.html

S. T. Rachev and S. Mittnik, Stable Paretian Models in Finance, Series in Financial Economics and Quantitative Analysis, John Wiley, 2000
http://www.wiley.com/WileyCDA/WileyTitle/productCd-0471953148.html

S. T. Rachev and L. Rueschendorf, Mass Transportation Problems, Vol II: Applications, Springer, 1999
http://www.springer.com/statistics/book/978-0-387-98352-3

PROFESSOR, DEPARTMENT OF MATHEMATICS & STATISTICS, TEXAS TECH UNIVERSITY

zari.rachev@ttu.edu | zarirachev.com | Google Scholar | Wikipedia

S. T. Rachev and L. Rueschendorf, Mass Transportation Problems, Vol I: Theory, Springer, 1998
http://www.springer.com/mathematics/probability/book/978-0-387-98350-9construction_of.html?id=2_V9AAAAIAAJ

S. T. Rachev, Probability Metrics and the Stability of Stochastic Models, Wiley, 1991
http://www.springer.com/mathematics/probability/book/978-0-387-98350-9

PUBLICATIONS: HANDBOOKS & SPECIAL VOLUMES

Rachev, S. T., Probability Metrics and the Stability of Stochastic Models, Wiley, Chichester, New York, 1991
http://books.google.com/books/about/Probability_metrics_and_the_stability_of.html?id=5grvAAAAMAAJ

V. Kashnikov and S. T. Rachev, Mathematical Methods for Construction for Queuing Models, Nauka, (in Russian) 1988; English translation, Wadsworth & Brooks/Cole Advanced Books, 1990.
http://books.google.com/books/about/Mathematical_methods_for_construction_of.html?id=2_V9AAAAIAAJ

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W. Lindquist and S. Rachev, Mathematical and Empirical Finance, a special issue of the Journal of Risk & Financial Management, 2023

S. T. Rachev, E. Sun, F. Fabozzi, O. Charchano, and Y. Kim, A Quasi-Maximum Likelihood Estimation Strategy for Value-at Risk Forecasting: Application to Equity Index Futures? Markets, Handbook of Financial Econometrics and Statistics, SpringerReference.com April 15, 2013

S. T. Rachev, A. Chernobai, and F. Fabozzi, Composite Goodness-of-Fit Tests for Left Truncated Loss Sample, Springer Reference.com April 15, 2013

S. T. Rachev and F., Fabozzi (Guest Editors), Special Issue on Studies in Mathematical and Empirical Finance, Mathematical Methods of Operations Research, Vol. 69/3, July 2009
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G. Bol, S. T. Rachev, and R. Würth (Editors), Risk Assessment: Decisions in Banking and Finance, Springer/Physika, 2009
http://www.springer.com/business+%26+management/finance/book/978-3-7908-2049-2

S. T. Rachev (Editor), Handbook of Computational and Numerical Methods in Finance, Birkhäuser, 2004
http://www.springer.com/birkhauser/mathematics/book/978-0-8176-3219-9

G. Bol, G. Nakhaeizadeh, S. T. Rachev, T. Rieder, and K. Vollmer (Editors), Credit Risk: Measurement, Evaluations and Management, Springer Verlag, Physika-Verlag Series, 2003
http://www.springer.com/business+%26+management/finance/book/978-3-7908-0054-8

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http://www.elsevier.com/wps/find/bookdescription.cws_home/622468/description#description

S. T. Rachev (Editor), Mathematical Models in Market and Credit Risk Editor, Mathematical Methods of Operations Research, Vol. 55/2, 2002, Springer
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S. Mittnik and S. T. Rachev (Editors), Stable Non-Gaussian Models in Finance and Econometrics, Mathematical and Computer Modeling, 29(10–12), 1999
http://www.sciencedirect.com/science/journal/08957177/29

S. Mittnik and S. T. Rachev (Editors), Distributional Modeling in Finance, Mathematical and Computer Modeling, 29(10–12), 1999
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http://www.springer.com/mathematics/probability/book/978-0-387-94788-4

G. Anastassiou and S. T. Rachev (Editors), Approximation, Probability and Related Fields, Plenum Press, 1994
http://books.google.com/books?id=w-vuAAAAMAAJ&q=Approximation,+Probability+and+Related+Fields&dq=Approximation,+Probability+and+Related+Fields

PUBLICATIONS: PAPERS (2026-2009)

2026

A Sovereign Environmental Wealth Index: A Financial Framework for Measuring and Managing Sustainability Risk (2026).
Journal of Risk and Financial Management 19 (8), 601

Featured Papers in Finance and Society Wellbeing (2026)

Long-Range Dependence in Financial Markets: Empirical Evidence and Generative Modeling Challenges. (2026).
Studies in Nonlinear Dynamics & Econometrics

An axiomatic risk-reward framework for sustainable investing: G. Torri et al. (2026).
Decisions in Economics and Finance, 1-44

Option Pricing under Stochastic Volatility and Jumps: A PIDE Framework with Empirical Evidence (2026).

Downside-Sensitive Portfolio Optimization and Risk Overlays for Real Estate Securities. (2026).
The Journal of Risk and Financial Management, 19 (6), 385.

Professors Joe Gani and Chris Heyde and Their Contributions to Finance and Risk Management (2026).
The Journal of Risk and Financial Management, 19 (6), 378.

Memory, Roughness, and Information Persistence in Financial Markets: A Structural Approach to Volatility Forecasting (2026).

Featured Papers in Finance and Society Wellbeing—In Honor of Professors Joe Gani and Chris Heyde (2026).
The Journal of Risk and Financial Management 19 (5), 367.

Pre-Trade Uncertainty and the Subordinated Uncertainty Index (2026).
Available at SSRN 6576880

Constructing Insurable Risk Portfolios: by Edward W. Frees, Chapman & Hall/CRC, 2025, ISBN 9781032745046 (2026).
Technometrics 68 (2), 431-432.

Tail-Aware Portfolio Optimization for Listed Real-Estate Securities Under Downside Risk (2026).

Asset Pricing in the Presence of Market Friction Noise (2026).
Journal of Risk and Financial Management, 19(4), 243.

Google Trends—Augmented XGBoost for Market Volatility Prediction: A Machine Learning Early Warning System (2026).
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Evaluating Factor Contributions for Sold Homes (2026). Journal of Risk and Financial Management, 19(2), 146.

Equity-Imposed Tilts in Affine Term Structure Models: Evidence from Option-Implied Asymmetries (2026).
The Journal of Fixed Income, 35(4), 7–24.

SVETLOZAR (ZARI) TODOROV RACHEV

PROFESSOR, DEPARTMENT OF MATHEMATICS & STATISTICS, TEXAS TECH UNIVERSITY
zari.rachev@ttu.edu | zarirachev.com | Google Scholar | Wikipedia

Operating Imperfect AI: Reliability Drift and Human Congestion (2026).
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Option-Implied Zero-Coupon Yields: Unifying Bond and Equity Markets (2026).
Journal of Risk and Financial Management, 19(1), 91.

Performance and Risk Analytics of Asian Exchange-Traded Funds (2026).
Journal of Risk and Financial Management, 19(1), 69.

Machine Learning in Finance: Trends, Developments and Business Practices in the Financial Sector (2026).
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Data Science and Risk Analytics in Finance and Insurance (2026).
International Statistical Review

New Perspectives in Mathematical and Statistical Methods for Actuarial Sciences and Finance (2026).
Edited by Michele La Rocca, Massimiliano Menzietti, Cira Perna, and Marilena Sibillo Springer
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When Equilibrium Exists but Cannot Be Implemented (2026).
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2025

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A Unified Financial Index for Geopolitical and Environmental Risks: Construction, Risk Management, and Derivative Applications (2025).
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Bridging Asset Pricing and Market Microstructure: Option Valuation in Roll's Framework (2025).
Journal of Risk and Financial Management, 18(5), 230.

Sustainability-Valued Discrete Option Pricing in Complete Markets (2025).
Journal of Sustainable Finance & Investment, 15(2), 403–437.

Hedging via Perpetual Derivatives: Trinomial Option Pricing and Implied Parameter Surface Analysis (2025).
Journal of Risk and Financial Management, 18(4), 192.

Optimizing Portfolios with Pakistan-Exposed Exchange-Traded Funds: Risk and Performance Insight (2025).
Journal of Risk and Financial Management, 18(3), 158.

Environmental, Social and Governance-Valued Portfolio Optimization and Dynamic Asset Pricing (2025).
Journal of Risk and Financial Management, 18(3), 153.

Risk-Adjusted Performance of Random Forest Models in High-Frequency Trading (2025).
Journal of Risk and Financial Management, 18(3), 142.

Alternatives to Classical Option Pricing (2025).
Annals of Operations Research, 346(1), 489–509.

Editorial for the Special Issue of Journal of Risk and Financial Management: Featured Papers in Mathematics and Finance, SZT Rachev, WB Lindquist, Journal of Risk and Financial Management 18 (1), 43

Option-Implied Probabilities and Bond Valuation, Ayush Jha; Ali Jaffri; Svetlozar T. Rachev; Frank J. Fabozzi
The Journal of Fixed Income, October 31, 2025. DOI: 10.3905/jfi.2025.1.218.

SVETLOZAR (ZARI) TODOROV RACHEV

PROFESSOR, DEPARTMENT OF MATHEMATICS & STATISTICS, TEXAS TECH UNIVERSITY
zari.rachev@ttu.edu | zarirachev.com | Google Scholar | Wikipedia

A Unified Financial Index for Geopolitical and Environmental Risks: Construction, Risk Management, and Derivative Applications, AM Jaffri, A Shirvani, A Jha, ST Rachev, FJ Fabozzi, Risk Management, and Derivative Applications (June 01, 2025)

Bridging Asset Pricing and Market Microstructure: Option Valuation in Roll's Framework, D Lauria, WB Lindquist, ST Rachev, Y Hu Journal of Risk and Financial Management 18 (5), 230

Sustainability-valued discrete option pricing in complete markets, Y Hu, WB Lindquist, ST Rachev Journal of Sustainable Finance & Investment 15 (2), 403-437

Hedging via Perpetual Derivatives: Trinomial Option Pricing and Implied Parameter Surface Analysis, J Gnawali, WB Lindquist, ST Rachev Journal of Risk and Financial Management 18 (4), 192

Beyond the bid–ask: strategic insights into spread prediction and the global mid-price phenomenon, Y He, A Shirvani, B Shao, S Rachev, F Fabozzi, Econometric Reviews, 1-42

Optimizing portfolios with Pakistan-exposed exchange-traded funds: Risk and performance insight, A Jaffri, A Shirvani, A Jha, ST Rachev, FJ Fabozzi, Journal of Risk and Financial Management 18 (3), 158

Environmental, Social and Governance-Valued Portfolio Optimization and Dynamic Asset Pricing, D Lauria, WB Lindquist, S Mittnik, ST Rachev, Journal of Risk and Financial Management 18 (3), 153

Risk-Adjusted Performance of Random Forest Models in High-Frequency Trading, A Deep, A Shirvani, C Monico, S Rachev, F Fabozzi, Journal of Risk and Financial Management 18 (3), 142

Alternatives to classical option pricing, WB Lindquist, ST Rachev, Annals of Operations Research 346 (1), 489-509

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PROFESSOR, DEPARTMENT OF MATHEMATICS & STATISTICS, TEXAS TECH UNIVERSITY
zari.rachev@ttu.edu | zarirachev.com | Google Scholar | Wikipedia

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PROFESSOR, DEPARTMENT OF MATHEMATICS & STATISTICS, TEXAS TECH UNIVERSITY
zari.rachev@ttu.edu | zarirachev.com | Google Scholar | Wikipedia

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SVETLOZAR (ZARI) TODOROV RACHEV

PROFESSOR, DEPARTMENT OF MATHEMATICS & STATISTICS, TEXAS TECH UNIVERSITY
zari.rachev@ttu.edu | zarirachev.com | Google Scholar | Wikipedia

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PROFESSOR, DEPARTMENT OF MATHEMATICS & STATISTICS, TEXAS TECH UNIVERSITY

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SVETLOZAR (ZARI) TODOROV RACHEV

PROFESSOR, DEPARTMENT OF MATHEMATICS & STATISTICS, TEXAS TECH UNIVERSITY

zari.rachev@ttu.edu | zarirachev.com | Google Scholar | Wikipedia

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zari.rachev@ttu.edu | zarirachev.com | Google Scholar | Wikipedia

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SVETLOZAR (ZARI) TODOROV RACHEV

PROFESSOR, DEPARTMENT OF MATHEMATICS & STATISTICS, TEXAS TECH UNIVERSITY

zari.rachev@ttu.edu | zarirachev.com | Google Scholar | Wikipedia

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SVETLOZAR (ZARI) TODOROV RACHEV

PROFESSOR, DEPARTMENT OF MATHEMATICS & STATISTICS, TEXAS TECH UNIVERSITY
zari.rachev@ttu.edu | zarirachev.com | Google Scholar | Wikipedia

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SVETLOZAR (ZARI) TODOROV RACHEV

PROFESSOR, DEPARTMENT OF MATHEMATICS & STATISTICS, TEXAS TECH UNIVERSITY

zari.rachev@ttu.edu | zarirachev.com | Google Scholar | Wikipedia

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SVETLOZAR (ZARI) TODOROV RACHEV

PROFESSOR, DEPARTMENT OF MATHEMATICS & STATISTICS, TEXAS TECH UNIVERSITY
zari.rachev@ttu.edu | zarirachev.com | Google Scholar | Wikipedia

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SVETLOZAR (ZARI) TODOROV RACHEV

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zari.rachev@ttu.edu | zarirachev.com | Google Scholar | Wikipedia

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