

SAAD MOUTI, PH.D.

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SUMMARY

I am a Postdoctoral fellow at Worcester Polytechnic Institute's Mathematical Sciences Department in Financial Mathematics and Statistics. Previously worked as a visiting assistant professor at UC Santa Barbara's Department of Probability and Statistics and as a postdoctoral fellow at the Consortium for Data Analytics in Risk (CDAR). My research intersects theoretical, applied, and engineering approaches in data science for financial markets, with a keen focus on asset pricing theory, sustainable and energy finance, volatility modeling, and causal inference applications. In addition to my research, I have broad teaching experience in mathematics, probability, statistics, and financial mathematics at the undergraduate and graduate levels, as well as mentoring data science and quantitative finance projects. Proud alumnus of Pierre and Marie Curie University, where I earned my Ph.D. in Applied Mathematics in Finance under Professor Mathieu Rosenbaum and Nicole El Karoui. Additional academic credentials include a Master of Financial Engineering from Grenoble National School of Computer Science and Applied Mathematics with a double MSc in Quantitative Finance from Grenoble IAE, and an MSc in Statistical Signal Processing from Dauphine University, Paris. I also worked in the industry as an insurance quantitative analyst at AXA, where I had the chance to develop practical expertise in the financial domain.

WORK and RESEARCH EXPERIENCE

Mathematical Sciences (Worcester Polytechnic Institute), Worcester MA August. 2024 – Present
Postdoctoral fellow under Prof. Fangfang Wang

- Research:
 - Asset Pricing Models Performance: Pricing model performance in the two-pass cross-sectional regression of excess returns with traded assets in collaboration with Professor Fangfang Wang (WPI) and Professor Paulo Maio (Hanken School of Economics)
 - Market clearing problem of carbon-free energy allocation in the case of multiple loads: work in progress with Professor Mike Ludkovski (UCSB)
 - Causal Factor Models and the impact of ESG factors: work in progress with Professor Gareth Peters (UCSB)
- Teaching:
 - Multivariate Calculus: Fall Term 2024 and Spring Term 2025
 - Probability and applications: Fall Term 2024 and Spring Term 2025
- Service:
 - Co-organizing the Financial Mathematics Seminar at WPI
 - Co-organizing the Spring 2025 AMS Sectional Meeting in Frontiers of Financial Mathematics with focus on sustainable and energy finance topics at Hartford CT

Department of Statistics and Applied Probability (UC Santa Barbara),
– July 2024

Santa Barbara CA July. 2021

Visiting Assistant Professor under Prof. Michael Ludkovski

- Research:
 - Machine/Deep learning in asset pricing: Published “Sustainable Investing and the Cross-Section of Returns and Maximum Drawdown”
 - Causal inference for nutrition and health (affiliated with the NnedPro Global Center for Nutrition and Health) using survival models: published two papers from my research at UC Berkeley.
 - Optimization of carbon-free energy allocation as a portfolio allocation problem: Published a conference paper
- Teaching:
 - Probability and statistics, financial mathematics, applied stochastic processes, applied statistics, regression analysis, SOA actuarial exams tutorial
- Service:
 - Supervised projects in statistics and financial mathematics for undergraduate students
 - Co-organized the Center for Financial Mathematics and Actuarial Research Lab for undergraduate projects

Consortium for Data Analytics in Risk (UC Berkeley), Berkeley CA

May. 2018 – June 2021

Postdoctoral fellow under Prof. Lisa Goldberg and Prof. Robert Anderson

- Research:
 - Environmental, Social, and Governance (ESG) investing and factor modeling of individual stocks using companies’ characteristics and supervised learning
 - Supervised learning methods stocks’ risk and return
 - Causal inference framework to linear factor models to explore the alpha and beta signals on ESG factors
 - Identification of type-2 diabetes risk factors based on causal inference, combining causal graphical models and potential outcomes framework
 - Also supervised multiple student projects and supervised the UC Berkeley team at the FinTech Hackathon at the Southwestern University of Finance and Economics (Chengdu, China)
- Service:
 - Supervised undergraduate projects at the CDAR
 - Board member and chair of Berkeley Postdoctoral Entrepreneurship Program (BPEP). Participated and led the effort to promote entrepreneurship for postdocs and visiting scholars.
 - Team leader for the UC Berkeley team in the Chengdu 80 FinTech Hackathon in Chengdu, China. Finished second two years in a row.

AXA Group Risk Management, Paris

2012 - 2015 & May 2016 - Dec. 2017

Quantitative Engineer

- Part-time between 2012 and 2015 while pursuing my Ph.D. and full-time as of May 2016. Implemented a pricing tool for different variable annuities products in C++ from scratch using their commercial brochure, and developed a template model to launch the pricing and output results and analyses
- Studied the rational policyholder behavior for variable annuities which led to changing the design of some of these products

- Led the preparation of various reviews, which were presented to the Chief Risk Officer and resulted in changing assumptions at the entity level
- Investigated dynamic hedging strategies in the IFRS and US GAAP framework for option-like products
- Developed portfolio management techniques such as Capped Volatility Funds and Constant Proportion
- Portfolio Insurance to reduce risk and boost funds performance, which led to improving the risk-return profile
- Participated in modeling mortality and computing capital requirement
- Supervised and mentored several interns

Laboratoire de Probabilités, Statistique et Modélisation (Paris VI) / AXA Paris Apr. 2012 - Dec. 2017

Ph.D. Student

- Addressed the problem of option pricing under market impact constraints and solved optimal execution when buying large quantities of options under market impact constraints.
- Reviewed the rough volatility model using the Parkinson and Garman-Klass volatility proxies.
- Examined the smoothness of option price-based volatility proxies and analyzed rough volatility and standard Markovian models and their impact on implied volatility time series.
- Studied portfolio insurance techniques, particularly constant proportion portfolio insurance and implemented solutions to reduce gap risk related to this allocation strategy
- Studied the lapse risk related to guaranteed minimum accumulation benefit and withdrawal benefit, and compared Monte Carlo and PDE methods
- Studied optimal behavior in guaranteed minimum income benefits from a policyholder's point of view using dynamic programming

EDUCATION

Pierre and Marie Curie University (UPMC) Paris, France

December 2017

• Ph.D. in Applied Mathematics in Finance

- Supervised by Prof. Nicole El Karoui (Pierre and Marie Curie University), and Prof. Mathieu Rosenbaum (Ecole Polytechnique)
- Title: "Risk management for Insurance Companies: a Financial Markets Approach"
- Funded by the Industrial Research Initiative program and partially conducted at AXA Group Risk Management

Dauphine University, Paris, France

September 2011

• M.Sc. in Statistical Processing of Information

- Applied statistics and probability with courses like Bayesian Statistics, Monte Carlo Methods, and Times Series Analysis

ENSIMAG, Grenoble, France

September 2010

• Master of Financial Engineering & M.Sc. in Quantitative Finance

- Applied Mathematics and Computer Science
- Double degree in Quantitative Finance
- Merit scholarship for "Grandes Ecoles d'Ingenieurs"

OTHER TEACHING EXPERIENCE AND INTERNSHIPS

Teaching

- 2012-2016: Finance and Insurance Lecturer, Evry University.

Internships

- 2011: 8 months internship at AXA Group Risk Management in implied volatility surface modeling.
- 2010: 6 months internship at AXA Hedging Services in capped volatility funds.

Conferences and Talks

- 2013 6th Financial Risks International Forum: Liquidity Risk, Paris, France
- 2014 7th Financial Risks International Forum: Big Data in Finance and Insurance, Paris, France
- 2014 Market Microstructure confronting many viewpoints, Paris, France
- 2016 Frontiers in Stochastic Modeling for Finance, Padova, Italy
- 2016 Workshop on rough volatility modeling, Imperial College, London, England
- 2023 Southern California Probability Symposium, UC San Diego CA, USA.
- 2025 AMS Sectional Meeting, Hartford CT, USA

SKILLS & INTERESTS

- Programming: Python, R, Matlab, C++, VBA, SQL
- Language Skills: *Fluent in English, French, and Arabic*
- Hobbies: *Fitness Enthusiast: Regular gym-goer with past experience in CrossFit and participation in obstacle races. Tennis: Competed in junior tournaments and provided tennis coaching during college years.*

SELECTED PUBLICATIONS

M. Ludkovski, S. Mouti, G. Swindle. Least-cost structuring of 24/7 carbon-free electricity procurements. Conference paper, presented at PES Seattle, 2024.

A. Kalife, L. Goodenège, T. Xiaolu, S. Mouti, M. Bellmane. Sustainable life insurance: Managing risk appetite for insurance savings and retirement products. CRC Press, 2023.

S. Mouti. Rough volatility: Evidence from range volatility estimators. Working paper, 2023

X. Dai, S. Mouti, M. L. do Vale, S. Ray, J. Bohn, L. Goldberg. A resampling approach for causal inference on novel two-point time-series with application to identify risk factors for type-2 diabetes and cardiovascular disease. Statistics in Biosciences (SIBS), 2023.

L. Goldberg and S. Mouti. Sustainable investing and the cross-section of returns and maximum drawdown. The Journal of Finance and Data Science, Volume 8, 2022.

A. Kalife. G. L. Ruiz, S. Mouti, and X. Tan, Optimal behavior strategy in the Guaranteed Minimum Income Benefit product. Insurance Markets and Companies, 2018.

G. Livieri, S. Mouti, A. Pallavicini, and M. Rosenbaum, Rough volatility: Evidence from option prices. IISE Transactions, Volume 50, 2018.

A. Kalife and S. Mouti, On optimal options book execution strategies with market impact. Market Microstructure and Liquidity, Volume 6, Issue 3, December 2016