Biwen Ling

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RESEARCH INTERESTS

General Areas: Actuarial Science, Quantitative Finance.
Specific Topics: Valuation in Insurance, Systematic Risk, Correlation Trading, Risk Sharing.

EDUCATION

Ph.D. in Business Economics, KU Leuven — Oct. 2021 – Present
- Supervisor: Prof. Dr. Jan Dhaene, Prof. Dr. Daniël Linders.

M.S. in Actuarial Science, University of Illinois Urbana-Champaign — Aug. 2018 – Dec. 2019
- GPA: 3.91/4.0.

B.S. in Mathematics and Applied Mathematics, Nankai University — Sep. 2015 – Jun. 2019
- GPA: 3.5/4.0.

RESEARCH VISIT

Visiting Scholar, University of Amsterdam (host: Prof. Dr. Daniël Linders) — Apr.2023 – May. 2023

PUBLICATION

Dhaene J., Linders D., Ling B., Wang Q. (2024). Understanding the Correlation Risk Premium. *Annals of Actuarial Science*, published online, 2024: 1–24.

WORKING PAPER

A Decomposition Framework for Managing Hybrid Liabilities, *with Linders D., Dhaene J., and Boonen T.J.*
Abstract: In this paper, we propose a four-step decomposition of hybrid liabilities into a hedgeable part, an idiosyncratic part, a financial systematic part, and an actuarial systematic part. We generalize existing approaches for decomposing hybrid liabilities by incorporating dependence between financial and actuarial markets and allowing heterogeneity in policyholder-specific risks. Our model provides a market- and model-consistent valuation framework which we illustrate using a portfolio of with-profit pure endowment contracts.

Dispersion Swaps in a Continuous-Time Financial Market, *with Linders D. and Tavin B.*
Abstract: This paper further investigates a novel derivative called dispersion swap, which was first introduced in Dhaene et al. (2024), within a multi-asset continuous-time financial market. Similar to correlation and covariance swaps, dispersion swaps can trade correlation risk in the financial market. In this continuous-time market, we consider a stochastic correlation among assets and show that the set of equivalent risk-neutral measures can be characterized by the market price of risk for the stochastic correlation. We derive the general condition of market completeness and show how to price the dispersion swap within the continuous-time market framework. Utilizing the Vasicek model and the Jacobi bounded process to model instantaneous stochastic correlation, we present numerical results for pricing dispersion swaps and demonstrate that dispersion swaps can be a useful tool to hedge the correlation risk in the financial market.

WORK IN PROGRESS

Optimal Self-protection in Decentralized Insurance, *with Hu W., Li C., and Zhang Y.*

CONFERENCE & SEMINARS

2025
Second Doctoral Seminar (Leuven, Belgium).
2024
Actuarial and Financial Mathematics Conference (Brussels, Belgium), The 2nd International Conference on Actuarial Science, Quantitative Finance, and Risk Management (Beijing, China), China International Conference on Insurance and Risk Management (Ningbo, China), Seminar at SUS Tech (Shenzhen, China), KU Leuven, Bayes, and UvA PhD Workshop (London, UK).

2023

Winter School for Young Researchers on Actuarial Risks (Valencia, Spain), Actuarial and Financial Mathematics Conference (Brussels, Belgium), First Doctoral Seminar (Leuven, Belgium).

2022

25th International Congress on Insurance: Mathematics and Economics (online), KU Leuven, Bayes, and UvA PhD Workshop (Amsterdam, Netherlands).

INDUSTRY PRESENTATION

Invited Seminar at KBC Group, Brussels — Dec. 2024

- Title: Exploring Correlation Risk Premium: From Discrete-Time Insights to Continuous-Time Hedging Strategies.

TEACHING EXPERIENCE

Teaching Assistant, KU Leuven — Oct. 2021 – Present

- Course: D0R57b Foundations of Quantitative Risk Measurement (master level).
  - Delivered 6 tutorial sessions per semester.
  - Prepared and graded the final exam questions.

Thesis Supervisor for Master Students in Actuarial Science, KU Leuven — Oct. 2021 – Present

- Topics: Dynamic Hedging for Equity-Linked Insurance Claims, Machine Learning Techniques for Pricing Basket Options.

Graduate Supervisor, Illinois Risk Lab — Sep. 2019 - Dec. 2019

- Project: European basket option pricing: independence and comonotonicity approximations.

Teaching Assistant, University of Illinois Urbana-Champaign — Sep. 2019 - Dec. 2019

- Courses: ASRM 510 Financial Mathematics (master level), ASRM 471 Life Contingencies I (bachelor level).
  - Organized weekly office hours.
  - Prepared and graded the final exam questions.

GRANTS

KU Leuven Ph.D. Fellowship — Oct. 2021 – Sep. 2025

University of Illinois Urbana-Champaign Teaching Assistant Scholarship — Sep. 2019 - Dec. 2019

INDUSTRY EXPERIENCE

PwC Mainland China and Hong Kong — Beijing, China

Associate, Risk Assurance — Jan. 2021 - Mar. 2019

China Merchants Bank Co., Ltd. — Xi'an, China

Summer Intern, Credit Department — Jun. 2018 - Aug. 2018

The Prudential Assurance Company Limited — Hong Kong, China

Intern, Life Insurance Department — Jun. 2017

SKILLS

Programming & Software: Python, R, MATLAB, LaTeX, SQL.

Languages: Chinese (native), English (fluent).