Yi Ding

CURRICULUM VITAE

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EDUCATION

Hong Kong University of Science and Technology

Ph.D. in Business Statistics

Tsinghua University

B.Sc. in Mathematics and Applied Mathematics

ACADEMIC EXPERIENCE

The University of Macau, Assistant Professor in Business Intelligence Analytics, Faculty of Business Administration, 2022.11 –

Northwestern University, Visiting Scholar, Kellogg School of Management, 2023.05 – 2023.08

The Hong Kong Polytechnic University, Research Assistant Professor, Department of Applied Mathematics, 2020.08 – 2022.11

RESEARCH INTEREST

Financial econometrics; High-dimensional statistics; Financial technology; Statistical learning; Portfolio optimization; Asset allocation; High-frequency financial data

RESEARCH PAPERS

- **Ding, Yi** and Li, Yingying and Zheng, Xinghua, "High dimensional minimum variance portfolio under statistical factor model" (2021), *Journal of Econometrics*, 2021, 222(1): 502-515.
- **Ding, Yi** and Li, Yingying and Song, Rui, "Statistical learning for individualized asset allocation", *Journal of the American Statistical Association*, 2022: 1-11.
- **Ding, Yi** and Li, Yingying and Liu, Guoli and Zheng, Xinghua, "Stock co-jump networks", *Journal of Econometrics*, 2023

- **Ding, Yi** and Zheng, Xinghua, "High dimensional covariance matrices under dynamic volatility models: asymptotics and shrinkage estimation" (2023), R&R under *Annals of Statistics*

  Abstract: We study the estimation of unconditional covariance matrix and its spectral distribution under high-dimensional dynamic volatility models. Data under such models have nonlinear dependency both cross-sectionally and temporally. We first investigate the empirical spectral distribution (ESD) of the sample covariance matrix under scalar BEKK models and establish conditions under which the limiting spectral distribution (LSD) is either the same as or different from the i.i.d. case. We then propose a time-variation adjusted (TV-adj) sample covariance matrix and prove that its LSD follows the same Marcenko-Pastur law as the i.i.d. case. Based on the LSD of the TV-adj sample covariance matrix, we obtain a consistent population spectrum estimator. We further develop a TV-adj nonlinear shrinkage estimator that consistently estimates the asymptotically optimal shrinkage estimator.

- **Ding, Yi** and Engle, Robert and Li, Yingying and Zheng, Xinghua, "Factor modeling for volatility" (2023), working paper

  Abstract: Under a high-frequency and high-dimensional setup, we establish a framework to estimate the factor structure in idiosyncratic volatility, and more importantly, stock volatility. We provide explicit conditions for the consistency of conducting principal component analysis on realized volatilities in identifying the factor structure in volatility. Empirically, we confirm the factor structure in idiosyncratic volatilities of S&P 500 Index constituents. Furthermore, with strong empirical evidence, we propose a simplified single factor model for stock volatility, where volatility is represented by a common volatility factor and a multiplicative lognormal idiosyncratic component. We further utilize the simplified single factor model for volatility forecasting and show that our proposed approach outperforms various benchmark methods.

- Andersen, Torben and **Ding, Yi** and Todorov, Viktor, "Granular origin of tail risk in asset prices" (2023), working paper

  Abstract: We study the cross-sectional jump tail risk and asset pricing implications. We develop estimators of the power law tail index for the cross section of systematic jumps and idiosyncratic jumps using high-frequency returns from a large cross-section and establish their asymptotic distributions. Moreover, we propose a goodness-of-fit test for the fitting of the power law in systematic and idiosyncratic jump tails. Empirically, we find that the systematic jump tail risk and idiosyncratic jump tails risk both behave differently than the volatilities and they exhibit different features in their time-series. Finally, we find that both the jump tail risks carry significant risk premium but with opposite signs.

- **Ding, Yi** and Zheng, Xinghua, "High-dimensional covariance matrix estimation under elliptical factor model with $2 + \varepsilon$th moment" (2023), working paper

  Abstract: We study the estimation of the high-dimensional covariance matrix under elliptical factor models with $2 + \varepsilon$th moment. For such heavy-tailed data, robust estimators like the Huber-type estimator in Fan et al. (2018) can not achieve sub-Gaussian optimal convergence

rates. We develop a idiosyncratic-projected self-normalization (IPSN) method to remove the effect of the heavy-tailed elliptical parameter. Based on IPSN, we propose robust pilot estimators for the scatter matrix and show that our estimators enjoy the optimal sub-Gaussian rates. We further develop a consistent generic POET estimator of the covariance matrix based on our proposed pilot estimators.

- Chen, Zhanhui and **Ding, Yi** and Li, Yingying and Zheng, Xinghua, "High-dimensional stochastic discount factor learning" (2023), work in progress

PRESENTATIONS

Conference Presentations

2nd Joint Conference on Statistics and Data Science in China (**JCSDS 2024**), invited talk, Kunming (scheduled July 2024)

15th Annual Meeting of the Society for Financial Econometrics (**SoFiE 2023**), Seoul (June 2023)

Society of Industrial and Applied Mathematics (SIAM) Conference on Financial Mathematics and Engineering (**SIAM/FM23**), Philadelphia (June 2023)

International Chinese Statistical Association (ICSA) (**ICSA2023**), Chengdu (July 2023)

Asian Meeting of the Econometric Society (**AMES 2023**), Beijing (June 2023) & Singapore (August 2023)

16th International Conference on Computational and Financial Econometrics (**CFE 2022**) &15th International Conference on Computational and Methodological Statistics (**CMStatistics 2022**), invited talk, London (Dec. 2022)

14th Annual Meeting of the Society for Financial Econometrics (**SoFiE 2022**), Cambridge (June 2022)

NSFC-UST FinTech Symposium (**FinTech Symposium 2021**) , invited talk, Hong Kong (Dec. 2021)

11th ICSA International Conference (**ICSA 2019**), invited talk, Hangzhou (Dec. 2019)

3rd International Conference on Econometrics and Statistics (**EcoSta 2019**), invited talk, Tai Wan (June 2019)

2nd International Conference on Econometrics and Statistics (**EcoSta 2018**), invited talk, Hong Kong (June 2018)

1st International Conference on Econometrics and Statistics (**EcoSta 2017**), invited talk, Hong Kong (June 2017)

China Meeting of Econometric Society (**CMES 2017**), invited talk, Wuhan (June 2017)

Asia Meeting of the Econometrics Society (**AMES 2017**), Hong Kong (June 2017)

Invited Seminar Presentations

Nankai University (2023)

Northwestern University (2023)

Oxford University (2022)

Hong Kong University (2020)

City University of Hong Kong (2019)

Shenzhen University (2019)

HONORS AND REWARDS

Best poster presentation award at the International Conference on Statistical Foundations of Data Science and their Applications (Fan60, Princeton), fund by Nonparametric Statistics Section of the American Statistical Association (ASA) (2023)

Multi-year research fund from University of Macau, PI, (2024–2025)

Research startup fund from University of Macau, PI, (2023–2025)

NSFC Young Scholar Fund from National Science Foundation of China, PI, (2022–2024)

General Research Fund (GRF) from Hong Kong Research Grants Council, PI, (2022–2024, out-transferred)

Research startup fund from Hong Kong Polytechnic University, PI, (2021–2024)

Dean's PhD Fellowship for Research Excellence from Hong Kong University of Science and Technology (2019–2020)

SoFiE 2019 Shanghai Conference Travel Grant from New York University (2019)

Dean's PhD Fellowship from Hong Kong University of Science and Technology (2016–2017)

Research Travel Grant from Hong Kong University of Science and Technology (2016–2017)

Post Graduate Studentship from Hong Kong University of Science and Technology (2015–2020)

Various scholarships from Tsinghua University (2005–2009)

TEACHING EXPERIENCE

Instructor: *Linear Algebra*, ISOM 2005, University of Macau, undergraduate course, Fall 2023

Instructor: *Business Modeling and Simulation*, ISOM 3025, University of Macau, undergraduate course, Spring 2023

Instructor: *Econometrics*, AMA 481/4381, Hong Kong Polytechnic University, undergraduate course, Fall 2020, Fall 2021, instructor rating: 4.3/5

Instructor: *Business Statistics*, ISOM 2500, Hong Kong University of Science and Technology, undergraduate course, Summer 2019, instructor rating: 87.5/100

Teaching Assistant: *Statistical Analysis of Financial Data in R*, ISOM 4530, Hong Kong University of Science and Technology, undergraduate course, Fall 2016, Fall 2017, Fall 2018, Fall 2019

Teaching Assistant: *Statistics for Financial Risk Management*, ISOM 4520, Hong Kong University of Science and Technology, undergraduate course, Spring 2016, Spring 2017

ACADEMIC SERVICE

Reviewer for Journal of Econometrics, Management Science, Annals of Applied Probability, Statistics and Its Interface, Journal of Empirical Finance, Journal of Business & Economic Statistics, Journal of Financial Econometrics, Finance and Stochastics

Reviewer for Research Grants Council, Hong Kong

Program committee member for SoFiE Annual Meeting 2024

Member of Econometric Society, The Society for Financial Econometrics