Department of Finance
Shanghai University
China
✉ weiguanwang@outlook.com
⌂ weiguanwang.github.io/
Citizenship: Chinese

Weiguan WANG (王伟冠)

Academic Positions

2021–present   **Assistant Professor of Finance**, *Shanghai University*, China.

Research Interests

Financial Engineering, FinTech, Hedging, Machine Learning, Portfolio Management

Education

2016–2021   **Ph.D. Mathematics**, *London School of Economics and Political Science*.
Supervisor: Johannes Ruf
Thesis: Statistical Hedging with Neural Networks
Defence committee: Johannes Muhle-Karbe and Mihail Zervos

2014–2015   **MSc. Financial Mathematics**, *University College London*, Distinction.
Thesis: Optimal Execution Under Nonlinear Transient Market Impact Model

2009–2013   **BEng Automation**, *Donghua University*, Shanghai, First Class.

Publications

Published and forthcoming papers in peer-reviewed journals

- Neural networks for option pricing and hedging: A literature review, **Journal of Computational Finance**, 2020. (with Johannes Ruf). [Journal, SSRN]
Abstract: Neural networks have been used as a nonparametric method for option pricing and hedging since the early 1990s. Far over a hundred papers have been published on this topic. This note intends to provide a comprehensive review. Papers are compared in terms of input features, output variables, benchmark models, performance measures, data partition methods, and underlying assets. Furthermore, related work and regularisation techniques are discussed.

- Hedging with linear regressions and neural networks, available at SSRN. (with Johannes Ruf). Forthcoming in the **Journal of Business & Economic Statistics**. [SSRN, Code]
Abstract: We study neural networks as nonparametric estimation tools for the hedging of options. To this end, we design a network, named HedgeNet, that directly outputs a hedging strategy. This network is trained to minimise the hedging error instead of the pricing error. Applied to end-of-day and tick prices of S&P 500 and Euro Stoxx 50 options, the network is able to reduce the mean squared hedging error of the Black-Scholes benchmark significantly. We illustrate, however, that a similar benefit arises by simple linear regressions that incorporate the leverage effect.

Papers submitted to peer-reviewed journals

- Information leakage in backtesting. (with Johannes Ruf.) [SSRN, Code]
  Abstract: Testing the performance of statistical models with historical time series requires a careful handling of the data. Even if a dataset is seemingly completely separated in an in-sample and an out-of-sample set information may be leaked. Such leakage can lead to a significant overestimation of the out-of-sample performance of a predictive model. We provide experimental evidence to illustrate how randomised data splits lead to overfitting in the presence of time series structure. The experiment is set up in the framework of option replication, with real-world and simulated data.

Working papers

Work in progress
- Statistical hedging in multi-period with neural networks.

Conferences

Contributed talks
- Information Leakage in Backtesting, 7th International Young Finance Scholar's Conference, in virtual, 2021
- Hedging with Linear Regressions and Neural Networks, LSE Financial Mathematics Reading Group, 2018 & 2019

Participated conferences
- 12th European Summer School in Mathematical Finance, Padova, 2019
- LSE Ph.D. Day, London, 2018, 2019
- 17th Winter School in Mathematical Finance, Lunteren, 2017
- LSE Risk and Stochastic Conference, London, 2016 & 2017

Teaching

Teaching Assistant

2018–2019	Computational Methods in Financial Maths	*LSE, Summer School*
2017–2019	Mathematical Methods	*LSE, Undergraduate*
2017–2019	Programming in C++	*LSE, MSc. Fin. Maths*

Referee Activities

Journal of Finance and Data Science, Journal of Commodity Markets

Awards and Prizes

2019	Final year Ph.D. Scholarship	*LSE*
2013	Excellent Graduate	*Donghua University*
2011 & 2012	Academic Excellence Prize	*Donghua University*
2010	Shanghai Scholarship	*Shanghai Municipal Education Commission*
2010	University Scholarship	*Donghua University*

Industrial Experiences

20.12–21.01	**Quant Analyst (intern)**, *Huatai Securities (华泰证券)*, Shanghai, Fixed Income. Constructed zero curves, implemented Z-Spread calculation, and conducted research in understanding the movement of Z-Spread in Chinese fixed income market.

20.08–20.09   **Quant Analyst (intern)**, *Qianxiang Asset Management (千象资产)*, Shanghai, Commodity Trading.
Implemented optimal liquidation algorithms under transient market impact models.

20.06–20.08   **Quant Analyst (intern)**, *Zheshang Securities (浙商证券)*, Shanghai, Financial Derivatives.
Validated pricing models for exotic options including shark fin, snowball, and others.

Computer Skills

C++, LaTeX, Linux, Matlab, Microsoft Office, Python, R