

Tianzong Wang

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EDUCATION

The University of Manchester, U.K.

09/2020-03/2024

Ph.D. in Finance, Supervisor: Stuart Hyde and Sungjun Cho

Research Interest: Market Microstructure, High-Frequency Financial Econometrics, Machine Learning and Time Series analysis

Case Western Reserve University, U.S

08/2015-05/2017

Master of Science in Finance

Fudan University, China

09/2010-01/2015

Bachelor's Degree in Physics and Accounting

INDUSTRIAL EXPERIENCE

Quantitative Researcher Vice President | *Economic Forecasting Group, Bank of New York Mellon, U.S* 02/2017 - 04/2019

- Developed tier 1 economic forecasting model set using R and EViews, which replaced Moody's mainstream model. The model replaces Moody's expanded macroeconomic variables with structural models rooted in the forecast of the core macroeconomic variable set by the Federal Reserve and further predicts bank-specific variables following assumptions from Federal Reserve reports and internal asset management groups.
- The in-house framework saved a cost of more than 1 million USD per year, reduced the turnaround processing time by more than 80%, allowed custom prediction from various market scenarios, and improved prediction accuracy.
- The framework utilizes various time series and statistical models including Principal Component Analysis, ARIMA, Dynamic Factor Analysis, State Space Models, and the Kalman Filter.
- Successfully defended the model from internal model validation teams and the Federal Reserve as the core macroeconomic forecasting model of various departments.
- Led the Economic and Financial Forecast Scenario Validation Group for 2018-2019.

Quantitative Analyst | *Research and Development Team, FNA, financial network analytics, UK* 01/2020 - 02/2022

- Developed the first agent-based simulator from comprehensive finance speculations. The simulator was capable of simulating the intraday market across multiple asset classes and various investor classes that are driven by proven financial intuitions and theories rather than pure algorithms and mechanisms, capturing the market microstructure patterns such as liquidity, gridlock, and bubbles.
- Created a comprehensive time series suite encompassing major models and algorithms in Python, including but not limited to linear regression models, Garch family models, and related statistical tests (e.g. Granger Causality, ADF test, and PP test). The suite initiated the time series analysis on the FNAIab platform.
- Supervised an intern within the Research & Development team, providing guidance and oversight

ACADEMIC RESEARCH

Mispricing, Learning, and Price Discovery | *Job Market Paper* Paper and Appendix

- Presented on SoFiE – Market Microstructure Session (2023) and Financial Econometrics Conference: To mark Stephen Taylor's Retirement (2023)
- We propose a new information share framework by extending the unobserved component information share framework of De Jong and Schotman (2010) by incorporating the additional endogenous error-correction mechanism proposed by Andersen et al. (2022) and a cross-sectional error-correction mechanism. The framework can capture the intraday level information share for the first time while estimating various error-correction mechanisms simultaneously.
- Implement the model on the SPY and E-Mini market, capturing various intraday patterns with better accuracy and stability, and fewer numerical issues.

Information Share and Model Averaging | *Working Paper*

- Presented in Lancaster-Manchester PhD workshop
- Propose a new approach to information share with model averaging methodologies, which significantly increased the accuracy of information share and latent efficient price series estimation in various data-generating processes.

- We examine various classic and leading-edge model averaging methodologies including AIC Smooth, Bayesian Model Averaging, and Jackknife Model Averaging. The model is estimated by the Kalman filter and GMM approach.

Stock Market Simulator | *Working Paper*

- We develop a new framework to simulate centralized equity markets intraday, incorporating investors with diverse expectation formation and trading strategies.
- The simulator provides insights into how the proportions and interactions of different investor types can lead to varying realized prices, which may significantly deviate from fundamental values.
- The simulator also enables the assessment of how different market scenarios and shocks impact realized prices, investor behaviors, asset holdings, and cash balances.

Cross-Section Signal vs. Endogenous Market Microstructure Variables Across Frequencies, Solo Paper | *Working Progress*

- I examine the contribution proportion of cross-section sparse signals of return and various endogenous market microstructure variables, on the rolling forecast prediction power of stock return and market microstructure variables at different frequencies by several machine learning models (e.g. Lasso, regression tree, random forest, Adaboost, and GBDT). This study reports the preferred variable set and methodology for prediction, which is different across frequencies. Furthermore, I propose a forecasting model with the refined signal variable set for each frequency and compare it to existing models.

Beyond Sentiment, Machine Learning on Reports, Solo Paper | *Working Progress*

- Investigate the extent to which the incremental benefits of various machine learning sentiment indicators from dictionary indicators, derived from 10-K reports, on stock return prediction can be attributed to other variables within the report.
- Evaluate the supplementary contributions of variables present in the 10-K report towards the better prediction of stock returns with machine learning models, e.g. GPT-3, Bert, and llama.

ADDITIONAL INFORMATION

Programming Skills | *MATLAB, Python, R, SAS, CAD, Eviews, VBA, EXCEL, SQL*

Modeling Skills | *Time Series Modeling (ARIMA, GARCH, State-Space Model/Kalman Filter), Bayesian and Frequentist Model Averaging, Agent-Based Model, Lasso, Elastic Net, Regression Tree, Random Forest, Adaboost, GBDT and Large Language Models (Bert, GPT-3, llama, Pytorch/transformer)*

Teaching Assistant | *Foundation of Finance I and II*

Awards | *Scholarships*

- Academic Research Scholarship, Second-level and Third-level Scholarship of Fudan University 2012-2014
- First Prize of National Mathematics Olympic Competition, Ranked 14, Beijing China, 2010
- CFA level I, FRM level 1