

RUI DA

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ACADEMIC APPOINTMENTS

Indiana University Kelley School of Business
Acting Assistant Professor of Finance

07/2023 - present

EDUCATION

University of Chicago Booth School of Business
Ph.D. in Business Administration

2024 (expected)

Princeton University
Ph.D. student in Physics

2013 - 2015

Nanjing University
B.Sc. in Physics

2013

RESEARCH INTERESTS

Financial Economics, Econometrics, Machine Learning in Finance

PUBLICATIONS

[When Moving-Average Models Meet High-Frequency Data: Uniform Inference on Volatility](#)
with Dacheng Xiu
Econometrica, November, 2021

We conduct inference on volatility with noisy high-frequency data. We assume the observed transaction price follows a continuous-time Itô-semimartingale, contaminated by a discrete-time moving-average noise process associated with the arrival of trades. We estimate volatility, defined as the quadratic variation of the semimartingale, by maximizing the likelihood of a misspecified moving-average model, with its order selected based on an information criterion. Our inference is uniformly valid over a large class of noise processes whose magnitude and dependence structure vary with sample size. We show that the convergence rate of our estimator dominates $n^{1/4}$ as noise vanishes, and is determined by the selected order of noise dependence when noise is sufficiently small. Our implementation guarantees positive estimates in finite samples.

WORKING PAPERS

[The Statistical Limit of Arbitrage](#)
with Stefan Nagel and Dacheng Xiu
November, 2022

When alphas are weak and rare, and arbitrageurs have to learn about alphas from historical data, there is a gap between Sharpe ratio that is feasible for them to achieve and the infeasible Sharpe ratio that could be obtained with perfect knowledge of parameters in the return generating process. This statistical limit to arbitrage widens the bounds within which alphas can survive in equilibrium relative

to the arbitrage pricing theory (APT) in which arbitrageurs are endowed with perfect knowledge. We derive the optimal Sharpe ratio achievable by any feasible arbitrage strategy, and illustrate in a simple model how this Sharpe ratio varies with the strength and sparsity of alpha signals, which characterize the difficulty of arbitrageurs' learning problem. Furthermore, we design an "all-weather" arbitrage strategy that achieves this optimal Sharpe ratio regardless of the conditions of alpha signals. Our empirical analysis of equity returns shows that this optimal strategy, along with other feasible strategies based on multiple-testing, LASSO, and Ridge methods, achieve a moderately low Sharpe ratio out of sample, in spite of a considerably higher infeasible Sharpe ratio, consistent with absence of feasible near-arbitrage opportunities and relevance of statistical limits to arbitrage.

Market Efficiency with Many Investors

Modern financial markets contain many investors. In this context, we study the role of information in investor decision-making, and the informational efficiency and liquidity of the market. An equilibrium is characterized in closed-form for a continuous-time economy with many market participants and imperfect competition, in which investors receive private information with varying quality, and are heterogeneous in their misperception of the information quality. In equilibrium, investor heterogeneity in their misperception generates return predictability by investors' trading, and trading of different investors follows a simple factor structure with weak factors. To conduct empirical analysis that builds on these equilibrium implications, we develop a new big-data econometric method that utilizes the factor structure to accommodate the high-dimensionality of these implications. Applying the framework to price and institution holding data of the US stock market, we document that individual institution's trading with impotent predictive power can collectively generate significant return predictability that persists for about a quarter. We estimate dynamic price impact of around 0.25 at quarterly frequency, a moderate misperception of institutions on their information quality, and institutions' contributions to the informational efficiency of the market.

Disentangling Autocorrelated Intraday Returns

with Dacheng Xiu

revision requested by Journal of Econometrics, May, 2021

We propose a semiparametric approach to disentangling the autocovariance of equity returns at high frequency. We assume the observed price consists of an efficient component that follows a nonparametric continuous-time Itô-semimartingale, along with a market microstructure component that follows a discrete-time moving-average model. Our quasi-likelihood procedure relies on a misspecified moving-average model selected by information criteria. We establish the model-selection consistency, provide a central limit theory on autocovariance parameters, and show their consistency uniformly over a large class of models that allow for an arbitrary noise magnitude and a flexible dependence structure. We also provide a quadratic representation of the likelihood estimator, which sheds light on its connection with nonparametric kernel estimators. Our simulation evidence suggests that our estimator outperforms the nonparametric alternatives particularly when noise magnitude is small. We apply this estimator to S&P 1500 index constituents, and find that in recent years the microstructure friction has become smaller but existed in 5-minute returns, particularly in small caps, and that the average duration of autocorrelations for large caps has shrunk considerably to merely 10 seconds.

AWARDS

J. Michael Harrison Doctoral Prize
The Oscar Mayer Fellowship

2021
2020 - 2021

Ph.D. Program Fellowship, The University of Chicago Booth School of Business 2016 - 2020
Natural Science Fellowship, Princeton University 2013 - 2014
Cross-disciplinary Scholars in Science and Technology, University of California, Los Angeles 2012

REFeree ACTIVITIES

Economics and Statistics, Management Science, Journal of Econometrics, Journal of Business & Economic Statistics, Journal of Financial Econometrics, Statistica Sinica

SEMINARS AND CONFERENCES

Colorado University Boulder, Purdue University, Texas A&M University, Indiana University, McGill University, University College London, Hong Kong University of Science and Technology, Singapore Management University, SFS Cavalcade North America 2023

TEACHING

Intermediate Investment (Undergraduate), Indiana University Kelley School of Business Spring 2024

REFERENCES

Zhiguo He (co-chair)

James Irwin Miller Professor of Finance
Stanford University
Graduate School of Business
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Stefan Nagel

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Curriculum Vitae Rui Da

Last updated on May, 2024