LAB for AI-POWERED FINTECH

香港城市大學 City University of Hong Kong

COLUMBIA UNIVERSITY IN THE CITY OF NEW YORK

Joint Seminar by AIFT and Columbia University

Factor Pricing Using Interpretable and Arbitrage-Free Trees

by Dr. Gavin FENG

Assistant Professor
City University of Hong Kong

Abstract

This paper provides a regression tree factor model (RTFM) that provides a unified framework to generate the stochastic discount factor (SDF) and understand cross-sectional return variation. We have designed a multi-period tree model for the imbalanced panel data structure of individual asset returns with the asset pricing non-arbitrage split criterion. The top-down generated leaf-basis portfolios constitute mean-variance clusters when splitting the cross-section of assets, and the generated SDF is a bottom-up output that fits cross-sectional returns. Using U.S. equity data, we find RTFM outperforms standard factor models for different pricing and prediction measures. A five-factor model constructed by boosted RTFM can not be explained by Fama-French models and delivers a 1.79 out-of-sample (3.50 in-sample) annualized Sharpe ratio. The out-of-bag variable importance evaluation shows only a few significant characteristics to drive cross-sectional return variation, such as volume volatility, industry-adjusted size, and asset turnover. Finally, We apply RTFM to split the panel of return data over time and cross-section dimension and find inflation as the most important macro indicator for predictor rotation.

Biography

Guanhao (Gavin) Feng is an assistant professor of business statistics at the City University of Hong Kong. He is also the program leader of MSc in Business Data Analytics (Quantitative Analysis for Business stream). Gavin's research work has been published or accepted at the Journal of Finance and Journal of Econometrics. He has been invited to present at major academic conferences and international investment professional conferences. Gavin obtained his Ph.D. and MBA degrees from the University of Chicago in 2017. His research interests include financial econometrics, empirical asset pricing, machine learning, and fintech.

Date and Time

24 Sep 2021 (Fri) at 9-10am (HK Time)

Policy Evaluation and Temporal-Difference Learning in Continuous Time and Space

by Dr. Yanwei JIA

Associate Research Scientist
Adjunct Assistant Professor
Columbia University

Abstract

We propose a unified framework to study policy evaluation (PE) and the associated temporal difference (TD) methods for reinforcement learning in continuous time and space. We show that PE is equivalent to maintaining the martingale condition of a process. From this perspective, we present two methods for designing PE algorithms. The first one, using a "martingale loss function", interprets the classical gradient Monte-Carlo algorithm. The second method is based on a system of equations called the ``martingale orthogonality conditions". Solving these equations in different ways recovers various classical TD algorithms, such as TD, LSTD, and GTD. We apply these results to option pricing and portfolio selection. This is a joint work with Prof. Xun Yu Zhou.

Biography

Dr. Yanwei Jia is an associate research scientist and adjunct assistant professor in the Department of Industrial Engineering and Operations Research at Columbia University. He holds PhD in Quantitative Finance from the National University of Singapore, and BSc in Mathematics and Applied Mathematics from Tsinghua University. His research interest falls broadly into modeling and solving decision-making problems, with a focus on the problems that arise from financial engineering and the information or subjective judgment/preference implied in the individuals' decisions, to bridge the gap between theory and data. Recently, he is looking into topics in FinTech that aims at combining human behavior/judgment, observational data, and machine learning techniques, to make decision-making more efficient.

Date and Time

23 Sep 2021 (Thurs) at 9-10pm (US Eastern Time)

Venue: AIFT meeting room
Units 1101-1102 & 1121-1123,19W
Hong Kong Science Park

URL: https://bit.ly/3nHMVxQ
Meeting ID: 963 6926 9277
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