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Areas of Research

Econometrics, Causal Inference, Design and Analysis of Randomized Experiments, Reinforcement Learning

Dissertation Committee

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Education

Ph.D. Econometrics and Statistics, The University of Chicago Booth School of Business, 2020-2024

M.S. Management Science and Engineering, Stanford University, 2018-2020

MPhil Economic Research (with Distinction), University of Cambridge, 2017-2018

Bachelor in Economics, Peking University, 2014-2017

B.A. Farsi, Beijing Foreign Studies University, 2013-2017

Research

Working Papers

Inference for Two-stage Experiments under Covariate-Adaptive Randomization (**Job Market Paper**), revision requested at *Journal of Econometrics*

Abstract: This paper studies inference in two-stage randomized experiments under covariate-adaptive randomization. In the initial stage of this experimental design, clusters (e.g., households, schools, or graph partitions) are stratified and randomly assigned to control or treatment groups based on cluster-level covariates. Subsequently, an independent second-stage design is carried out, wherein units within each treated cluster are further stratified and randomly assigned to either

control or treatment groups, based on individual-level covariates. Under the homogeneous partial interference assumption, I establish conditions under which the proposed difference-in-“average of averages” estimators are consistent and asymptotically normal for the corresponding average primary and spillover effects and develop consistent estimators of their asymptotic variances. Combining these results establishes the asymptotic validity of tests based on these estimators. My findings suggest that ignoring covariate information in the design stage can result in efficiency loss, and commonly used inference methods that ignore or improperly use covariate information can lead to either conservative or invalid inference. Then, I apply these results to studying optimal use of covariate information under covariate-adaptive randomization in large samples, and demonstrate that a specific generalized matched-pair design achieves minimum asymptotic variance for each proposed estimator. Finally, I discuss covariate adjustment, which incorporates additional baseline covariates not used for treatment assignment. The practical relevance of the theoretical results is illustrated through a simulation study and an empirical application.

Efficient Treatment Effect Estimation in Observational Studies under Heterogeneous Partial Interference (with Zhaonan Qu, Ruoxuan Xiong and Guido Imbens), revision requested at *Journal of Business & Economic Statistics*

On the Efficiency of Finely Stratified Experiments (with Yuehao Bai, Azeem Shaikh and Max Tabord-Meehan) under review

Publications and Forthcoming Papers

Inference in Cluster Randomized Trials with Matched Pairs (with Yuehao Bai, Azeem Shaikh and Max Tabord-Meehan), accepted by the *Journal of Econometrics*

Inference for Matched Tuples and Fully Blocked Factorial Designs (with Yuehao Bai and Max Tabord-Meehan), *Quantitative Economics* 15(2), 279–330.

Revisiting the Analysis of Matched Pair and Stratified Experimental Designs in the Presence of Attrition (with Yuehao Bai, Meng Hsuan Hsieh, and Max Tabord-Meehan), *Journal of Applied Econometrics* 39(2), 256–268.

Proximal Causal Inference for Synthetic Control with Surrogates (with Eric J. Tchetgen Tchetgen and Carlos Varjão), *The 27th International Conference on Artificial Intelligence and Statistics (AISTATS)*, 2024

Learning Intuitive Policies Using Action Features (with Mingwei Ma, Samuel Sokota, Max Kleiman-Weiner, Jakob Foerster), *International Conference on Machine Learning (ICML)*, 2023

Work in Progress

Randomization Inference for Multi-Sided Market Experiments (with Azeem Shaikh and Panos Toulis)

Auto-G-Computation of Doubly Robust Estimation on a Network (with Eric J. Tchetgen Tchetgen)

Professional Experience

Amazon.com Inc, Postdoctoral Scientist (with Eric J. Tchetgen Tchetgen), Aug 2024 - Aug 2025

- Leading research to advance methodological innovation in causal inference, machine learning, and deep learning, driven by complex challenges on the Amazon marketplace.

Tower Research Capital, Quantitative Trader Intern, May 2023 - Nov 2023

Amazon.com Inc, Applied Scientist Intern (with Eric J. Tchetgen Tchetgen), Jun 2022 - Sep 2022

Facebook AI Research, Student Researcher (with Jakob Foerster), Jun 2021 - Sep 2021

Awards

2022, Amazon Graduate Fellowship

2021, Katherine Dusak Miller PhD Fellowship, Booth School of Business, University of Chicago

2018, Cambridge Trust Scholarship, University of Cambridge

2016, "Research on Chinese economy" Scholarship, National School of Development, Peking University

Conferences & Presentations

2024: Econometrics Junior Conference (University of Notre Dame)

Teaching Experience

Teaching Assistant

- Applied Econometrics, BUS 41903, University of Chicago Booth School of Business, 2023

Referee Activities

Journal of Applied Econometrics, The International Conference on Learning Representations (ICLR)