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Education

University of Chicago *2020–present*
Ph.D. Economics

London School of Economics and Political Science *2018–2019*
MSc Econometrics and Mathematical Economics

University of Hong Kong *2013–2017*
BSc(QFin) Double major in Quantitative Finance and Mathematics

References

Professor Alexander Torgovitsky (Chair)
University of Chicago
Kenneth C. Griffin Department of Economics
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Professor Stéphane Bonhomme
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Professor Azeem Shaikh
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Professor Max Tabord-Meehan
University of Toronto
Department of Economics
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Research and Teaching Fields

Primary: Econometrics
Secondary: Applied econometrics, Industrial organization

Job Market Paper

Aggregating treatment effects across multiple outcomes

Abstract: *Empirical researchers commonly observe multiple outcomes intended to measure an underlying abstract variable. For example, the abstract variable "crime" can be measured using crime rates for different types of offenses, and "wealth" can be measured using different asset ownerships. How should one aggregate these multiple outcomes into a single quantity? In this paper, I show the shortcomings of common approaches and propose a new approach to aggregate outcomes. First, I document that three methods are commonly used in the empirical literature: principal component analysis (PCA), inverse-variance matrix (IVM) weighting, and standardized averaging (SA). I show that PCA has several unattractive properties: it is sensitive to arbitrary choices of normalization, it can lead to non-standard*

limiting distributions, it can produce negative weights on some outcomes, and it does not even necessarily maximize precision. IVM does not suffer from the first two problems, but also has the negative weighting problem. SA is more attractive, but need not maximize precision. I use statistical decision theory to develop an approach to aggregating outcomes that minimizes mean-squared error while ensuring interpretable weights. The framework allows the researcher to flexibly incorporate prior information about the relative quality of different outcomes. It also allows for valid inference that takes the prior information into account. I apply the decision-theoretic procedure to two recent empirical applications.

Working Papers

Combining clusters for the approximate randomization test

Revise and resubmit, Journal of Econometrics

Abstract: *This paper develops procedures to combine clusters for the approximate randomization test proposed by Canay, Romano, and Shaikh (2017). Their test can be used to conduct inference with a small number of clusters and imposes weak requirements on the correlation structure. However, their test requires the target parameter to be identified within each cluster. A leading example where this requirement fails to hold is when a variable has no variation within clusters. For instance, this happens in difference-in-differences designs because the treatment variable equals zero in the control clusters. Under this scenario, combining control and treated clusters can solve the identification problem, and the test remains valid. However, there is an arbitrariness in how the clusters are combined. In this paper, I develop computationally efficient procedures to combine clusters when this identification requirement does not hold. Clusters are combined to maximize local asymptotic power. The simulation study and empirical application show that the procedures to combine clusters perform well in various settings.*

Sensitivity analysis for dynamic discrete choice models

Revise and resubmit, Quantitative Economics

Abstract: *In dynamic discrete choice models, some parameters, such as the discount factor, are being fixed instead of being estimated. This paper proposes two sensitivity analysis procedures for dynamic discrete choice models with respect to the fixed parameters. First, I develop a local sensitivity measure that estimates the change in the target parameter for a unit change in the fixed parameter. This measure is fast to compute as it does not require model re-estimation. Second, I propose a global sensitivity analysis procedure that uses model primitives to study the relationship between target parameters and fixed parameters. I show how to apply the sensitivity analysis procedures of this paper through two empirical applications.*

Awards, Scholarships, and Grants

Matthew & Luann Jacobs Graduate and Margaret G Reid Fellowships	*2025–2026*
University of Chicago Social Sciences Division Fellowship	*2020–2025*
University of Chicago First Year Scholars Summer Grant	*2020–2021*

Teaching Experience

Ph.D. level

Empirical Analysis 1	TA for Prof. Azeem Shaikh	*Fall 2021, 2022*
Empirical Analysis 3	TA for Prof. James Heckman	*Spring 2022*
Applied Microeconometrics	TA for Prof. Alexander Torgovitsky	*Winter 2023*

Master's level

Introduction to Empirical Analysis 2	TA for Prof. Joseph Hardwick	*Winter 2022*

Research Experience

Research Professional for Prof. Alexander Torgovitsky and Prof. Guillaume Pouliot *2019–2020*