Qi Xu

Curriculum Vitae

Department of Economics
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Field of Specialization Theoretical Econometrics, Causal Inference

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EDUCATION

Vanderbilt University, Nashville, TN

Ph.D Candidate in Economics *expected* 2023

Fudan Univerity, Shanghai, China

M.A. in Economics 2016

University of International Business and Economics, Beijing, China

B.A. in Economics 2013

RESEARCH

"Sensitivity Analysis of Treatment Effects with Endogenously Censored Duration Outcome" (job market paper)

With a non-randomly censored duration outcome, we perform sensitivity analyses on various treatment effect parameters when the dependence between the event time and the censoring variable is modeled by a family of Archimedean copula. Bounds of policy effects are characterized as smooth functionals of the copula graphic estimands that satisfy an index sufficiency condition. We then provide an estimation procedure and establish uniform inference theories for the proposed semiparametric estimators. Confidence bands are constructed using multiplier bootstrap. The estimators demonstrate good finite sample properties in Monte Carlo simulations. The methodology is applied to study the efficacy of treatment protocols for acute lymphoblastic leukaemia.

"Covariate Distribution Balance via Propensity Scores" (with Pedro Sant'Anna and Xiaojun Song, June, 2022, *Journal of Applied Econometrics*)

This paper proposes new estimators for the propensity score that aim to maximize the covariate distribution balance among different treatment groups. Heuristically, our proposed procedure attempts to estimate a propensity score model by making the underlying covariate distribution of different treatment groups as close to each other as possible. Our estimators are data-driven and can be used to estimate different treatment effect parameters under different identifying assumptions, including unconfoundedness and local treatment effects. We derive the asymptotic properties of inverse probability weighted estimators for the average, distributional, and quantile treatment effects based on the proposed propensity score estimator and illustrate their finite sample performance via Monte Carlo simulations and an empirical application. We analyze the effect of 401(k) retirement plans on asset accumulation. Our

findings are comparable to those by existing estimation procedures. However, our proposed estimators tend to improve upon covariate distributional imbalances.

"Two Sample Unconditional Quantile Effect" (with Atsushi Inoue and Tong Li, under review)

This paper proposes a new framework to evaluate *unconditional quantile effects* (UQE) in a data combination model. The UQE measures the effect of a marginal counterfactual change in the unconditional distribution of a covariate on quantiles of the unconditional distribution of a target outcome. Under rank similarity and conditional independence assumptions, we provide a set of identification results for UQEs when the target covariate is continuously distributed and when it is discrete, respectively. Based on these identification results, we propose semiparametric estimators and establish their large sample properties. Applying our method to a variant of Mincer's earnings function, we study the counterfactual quantile effect of actual work experience on income.

"Difference-in-Difference with Compositional Changes" (with Pedro Sant'Anna)

This paper proposes a doubly robust estimator for the average treatment effect on the treated (ATT) in a difference-in-differences setup. Identification of the ATT is studied without assuming that the covariate distribution stays constant over time. We derive semiparametric efficiency bound for our target policy parameter and show that our proposed estimator attains this semiparametric efficiency bound. A new uniform stochastic expansion of local polynomial logit estimator is provided, based on which, we show the proposed ATT estimator exhibits favorable theoretical properties under mild conditions on the first-step convergence speed. Finally, we develop a Hausman-type test for the compositional stationarity assumption. The finite sample performance of the estimator and the test is examined by means of a Monte Carlo experiment and an empirical application.

"Markov Chain Monte Carlo Based Inference for Dynamic Discrete Choice Models" (with Atsushi Inoue, Tong Li, and Tatsushi Oka, work in progress)

This project aims to conduct inference for structural parameters in dynamic discrete choice models (DDCM). The paper focuses on the case where the structural parameters are allowed to be partially identified. Employing a MCMC based procedure developed by Chen, Christensen & Tamer (2018), we are able to construct Bayesian credible sets and establish their frequentist coverage properties. In particular, we prove that the highest posterior density set achieves valid coverage for the identified set under mild regularity conditions. As an empirical illustration, we apply our procedure to estimate a firm export decision model.

"Partial Identification and Inference about Policy Relevant Parameters with Multivalued Treatment" (work in progress)

The project aims to analyze identification and estimation of various treatment effects when the treatment choices are endogenous and may take on more than two values. Multivalued treatment models have traditionally been studied under restrictive assumptions such as ordered choice , unordered monotonicity, and more recently, partial monotonicity. Extending Mogstad, Santos, and Torgovitsky (2018, Econometrica), I propose a computationally attractive approach that systematically calculate nonparametric bounds on policy relevant treatment effects, under minimal identifying restrictions. A novel polynomial optimization algorithm that is suitable for medium-to-large scale global minimization is proposed to approximate the identified set.

PROFESSIONAL EXPERIENCE

Journal Referee

Journal of Applied Econometrics, Journal of Econometrics, Journal of Econometric Methods

Conference

CeMMAP UCL/Vanderbilt Joint Conference, Nashville, TN (October, 2019)

Research Assistant (Vanderbilt University, 06/2018-Present)

Dr Tong Li, Dr Atsushi Inoue

Teaching Assistant (Vanderbilt University, 08/2017-Present)

Ph.D Level: Econometric I & II, Microeconometrics, Mathematics for Economists

Undergraduate Level: Econometric Methods, Applied Econometrics, Economic Statistics, Microeconomics, Intermediate Microeconomic Theory, Game Theory, Principles of Microeconomics, Principles of Macroeconomics How Data Shape Our World

Summer Course Instructor (Vanderbilt University, 07/2020-08/2020)

Economic Statistics

FELLOWSHIPS

Vanderbilt University Fellowship 2016-Present

Departmental Summer Research Grant Summer 2017

PERSONAL

Programming Language C++, LaTeX, MATLAB, Python, R, Stata

Language Chinese (Native), English (Professional), Spanish (Basic)

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