HAITIAN XIE

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EDUCATION

University of California, San Diego, CA, US　　　　　2017 - 2023 (Expected)
Ph.D. in Economics
Committee: Graham Elliott (Co-chair), Yixiao Sun (Co-chair), Songzi Du,
Ying Zhu, Dimitris Politis, Wenxin Zhou

Wuhan University, Wuhan, Hubei, China　　　　　2013-2017
B.A. in Economics
B.S. in Mathematics

Columbia University, New York, NY, US　　　　　Fall 2016
Visiting student

REFERENCES

Graham Elliott	UC San Diego	grelliott@ucsd.edu	(858) 534-4481
Yixiao Sun	UC San Diego	yisun@ucsd.edu	(858) 534-4692
Songzi Du	UC San Diego	sodu@ucsd.edu	(858) 265-8456

FIELDS OF INTEREST

Econometrics, Microeconomic Theory

FELLOWSHIPS, HONORS, AND AWARDS

Graduate Student Award, Southern Economic Association	2022
Summer Graduate Teaching Scholarship, UCSD	2022
Economics Graduate Students Travel and Research Grants, UCSD	2022

Clive Granger Research Fellowship *for the most promising graduate student research*, UCSD   2020
Advancement to Candidacy Fellowship, UCSD   2020
Graduate Summer Research Fellowship, UCSD   2018, 2019
Regents Fellowship, UCSD   2017
Samsung Scholarship, Wuhan University   2015

PUBLICATIONS

"Global Representation of the Conditional LATE Model: A Separability Result" (with Yu-Chang Chen). **Oxford Bulletin of Economics and Statistics**, 84: 789-798, August 2022.

Abstract: This paper studies the latent index representation of the conditional LATE model, making explicit the role of covariates in treatment selection. We find that if the directions of the monotonicity condition are the same across all values of the conditioning covariate, which is often assumed in the literature, then the treatment choice equation has to satisfy a separability condition between the instrument and the covariate. This global representation result establishes testable restrictions imposed on the way covariates enter the treatment choice equation. We later extend the representation theorem to incorporate multiple ordered levels of treatment.

JOB MARKET PAPER

"Nonlinear and Nonseparable Structural Functions in Fuzzy Regression Discontinuity Designs"

Abstract: Many empirical examples of regression discontinuity (RD) designs concern a continuous treatment variable, but the theoretical aspects of such models are less studied. This study examines the identification and estimation of the structural function in fuzzy RD designs with a continuous treatment variable. The structural function fully describes the causal impact of the treatment on the outcome. We show that the nonlinear and nonseparable structural function can be nonparametrically identified at the RD cutoff under shape restrictions, including monotonicity and smoothness conditions. Based on the nonparametric identification equation, we propose a three-step semiparametric estimation procedure and establish the asymptotic normality of the estimator. The semiparametric estimator achieves the same convergence rate as in the case of a binary treatment variable. As an application of the method, we estimate the causal effect of sleep time on health status by using the discontinuity in natural light timing at time zone boundaries.

PAPERS IN SUBMISSION

"Efficient and Robust Estimation of the Generalized LATE Model"

Revise and Resubmit, Journal of Business & Economic Statistics.

Abstract: This paper studies the estimation of causal parameters in the generalized local average treatment effect (GLATE) model, a generalization of the classical LATE model encompassing multi-valued treatment and instrument. We derive the efficient influence function (EIF) and the semiparametric efficiency bound (SPEB) for two types of parameters: local average structural function (LASF) and local average structural function for the treated (LASF-T). The moment condition generated by the EIF satisfies two robustness properties: double robustness and Neyman orthogonality. Based on the robust moment condition, we propose the double/debiased machine learning (DML) estimators for LASF and LASF-T. The DML estimator is semiparametric efficient and suitable for high dimensional settings. We also propose null-restricted inference methods that are robust against weak identification issues. As an

empirical application, we study the effects across different sources of health insurance by applying the developed methods to the Oregon Health Insurance Experiment.

"Uniform Convergence Results for the Local Linear Estimation of the Conditional Distribution"

Revise and Resubmit (second round), Statistics & Probability Letters.

Abstract: This paper examines the local linear regression (LLR) estimate of the conditional distribution function $F(y|x)$. We derive three uniform convergence results: the uniform bias expansion, the uniform convergence rate, and the uniform asymptotic linear representation. The uniformity in the above results is with respect to both x and y and therefore has not previously been addressed in the literature on local polynomial regression. Such uniform convergence results are especially useful when the conditional distribution estimator is the first stage of a semiparametric estimator. We demonstrate the usefulness of these uniform results with two examples: the stochastic equicontinuity condition in y, and the estimation of the integrated conditional distribution function.

"Strength in Numbers: Robust Mechanisms for Public Goods with Many Agents" (with Jin Xi)

Under Review.

Abstract: This study examines the mechanism design problem for public goods provision in a large economy with n independent agents. We propose a class of dominant-strategy incentive compatible and ex-post individually rational mechanisms, which we call the adjusted mean-thresholding (AMT) mechanisms. We show that when the cost of provision grows slower than the $\sqrt{n}$-rate, the AMT mechanisms are both eventually ex-ante budget balanced and asymptotically efficient. When the cost grows faster than the $\sqrt{n}$-rate, in contrast, we show that any incentive compatible, individually rational, and eventually ex-ante budget balanced mechanism must have provision probability converging to zero and hence cannot be asymptotically efficient. The AMT mechanisms have a simple form and are more informationally robust when compared to, for example, the second-best mechanism. This is because the construction of an AMT mechanism depends only on the first moment of the valuation distribution.

WORKING PAPERS

"Personalized Subsidy Rules" (with Yu-Chang Chen)

Abstract: Subsidies are commonly used to encourage behaviors that can lead to short- or long-term benefits. Typical examples include subsidized job training programs and provisions of preventive health products, in which both behavioral responses and associated gains can exhibit heterogeneity. This study uses the marginal treatment effect (MTE) framework to study personalized assignments of subsidies based on individual characteristics. First, we derive the optimality condition for a welfare-maximizing subsidy rule by showing that the welfare can be represented as a function of the MTE. Next, we show that subsidies generally result in better welfare than directly mandating the encouraged behavior because subsidy rules implicitly target individuals through unobserved heterogeneity in the behavioral response. When there is positive selection, that is, when individuals with higher returns are more likely to select the encouraged behavior, the optimal subsidy rule achieves the first-best welfare, which is the optimal welfare if a policy-maker can observe individuals' private information. We then provide methods to (partially) identify the optimal subsidy rule when the MTE is identified and unidentified. Particularly, positive selection allows for the point identification of the optimal subsidy rule even when the MTE curve is not identified. As an empirical application, we study the optimal wage subsidy using the experimental data from the Jordan New Opportunities for Women pilot study.

"Data-based Price Discrimination: Information Theoretic Limitations and A Minimax Optimal Strategy" (with Ying Zhu)

Abstract: This paper studies the gap between the classical pricing theory and the data-based pricing theory. We focus on the problem of price discrimination with a continuum of buyer types based on a finite sample of observations. Our first set of results provides sharp lower bounds in the worst-case scenario for the discrepancy between any data-based pricing strategies and the theoretical optimal third-degree price discrimination (3PD) strategy (respectively, uniform pricing strategy) derived from the distribution (where the sample is drawn) ranging over a large class of distributions. Consequently, there is an inevitable gap between revenues based on any data-based pricing strategy and the revenue based on the theoretical optimal 3PD (respectively, uniform pricing) strategy. We then propose easy-to-implement data-based 3PD and uniform pricing strategies and show each strategy is minimax optimal in the sense that the gap between their respective revenue and the revenue based on the theoretical optimal 3PD (respectively, uniform pricing) strategy matches our worst-case lower bounds up to constant factors (that are independent of the sample size n). We show that 3PD strategies are revenue superior to uniform pricing strategies if and only if the sample size n is large enough. In other words, if n is below a threshold, uniform pricing strategies are revenue superior to 3PD strategies. We further provide upper bounds for the gaps between the welfare generated by our minimax optimal 3PD (respectively, uniform pricing) strategy and the welfare based on the theoretical optimal 3PD (respectively, uniform pricing) strategy.

WORK IN PROGRESS

"Grenander-type Density Estimation of Second-price Auctions under Myerson Regularity"

Abstract: This study examines the density estimation of private values from second-price auctions. Instead of the standard smoothing-based density estimators, we propose a Grenander-type estimator based on a shape restriction. The shape restriction is a convexity constraint, which is an equivalent representation of the famous Myerson regularity condition in the auction theory. The proposed estimator is nonparametric and yet tunning-parameter-free. We derive the cube root consistency and a non-normal asymptotic distribution of the estimator under mild assumptions.

PRESENTATIONS

Peking University, National School of Development (seminar)	2022/12
Southern Economic Association 92nd Annual Meeting (invited)	2022/11
Young Economist Symposium	2022/08
Asian Meeting of the Econometric Society in East and South-East Asia	2022/08
The 16th International Symposium on Econometric Theory and Applications	2022/07
Asian Meeting of the Econometric Society in China	2022/06
The 5th International Conference on Econometrics and Statistics	2022/06
California Econometrics Conference (poster session)	2022/05

TEACHING EXPERIENCE

Instructor, UC San Diego

ECON120A Econometrics A (undergraduate)	2022

Teaching Assistant, UC San Diego

ECON178 Economic & Business Forecasting (undergraduate)	2022
ECON220A Econometrics A (Ph.D. level)	2019, 2020, 2021, 2022
ECON120B Econometrics B (undergraduate)	2021
ECON120C Econometrics C (undergraduate)	2021
ECON220C Econometrics C (Ph.D. level)	2019

PROFESSIONAL ACTIVITIES

Conference

Session Chair (Identification and Estimation of Treatment Effects) - SETA 2022
Session Chair (Regression Discontinuity Design) - AMES in East and South-East Asia 2022

Referee for

Economics Letters, Annals of Applied Statistics

OTHER INFORMATION

Software: R, Python, Julia, MATLAB, Mathematica, Stata, LaTeX, Bash, html
Languages: Chinese (Native), English (Fluent)
Citizenship: China