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Education

Ph.D. in Economics University of California, Riverside, Riverside, CA	June 2018 (expected)
M.A. in Economics University of California, Riverside, Riverside, CA	December 2016
B.S. in Mathematics (<i>magna cum laude</i>) University of California, Riverside, Riverside, CA	June 2013
B.A. in Business Economics (<i>magna cum laude</i>) University of California, Riverside, Riverside, CA	June 2013
Covina High School, Covina, CA	June 2009

Research Areas

Econometrics, Applied Econometrics,
Machine Learning, High Dimensional Statistics, Big Data, Business Analytics

Research Paper

“Double-Boosting GMM for High Dimensional IV Regression Models.” *Job market paper*

Abstract: The standard solutions to solve the endogeneity in a regression model are the two-stage least squares (2SLS) and the generalized method of moments (GMM). However, both methods are inconsistent in a high dimensional IV regression model, especially when some of instruments are irrelevant and/or invalid. To have a consistent estimation, it is critical to select valid and relevant instruments. In particular, we consider the case when endogenous variables X are unknown nonlinear functions of observable instruments W , which can be approximated by some sieve functions $Z=h(W)$ such as polynomials of W . The sieve approximation helps to capture the nonlinearity between endogenous variables X and instruments W . At the same time, it increases the dimension of instruments rapidly. In this paper, we introduce a new selection method, Double Boosting (DB), which consistently selects relevant and valid instruments simultaneously as the sample size n increases. We allow the instruments to be in high dimension, so the consistency of selection still holds even when $\dim(Z)\gg n$. Furthermore, we also show that DB will not select weakly relevant instruments (weak instruments) or weakly valid instruments (weakly exogenous instruments), with the extents of weakness being defined in the sense of local to zero asymptotics. Monte Carlo simulation demonstrates a comparison between Double Boosting GMM (DB-GMM) and other methods such as penalized GMM (PGMM, Cheng and Liao 2015) and the standard Boosting GMM (BGMM, Ng and Bai 2008). In the application of estimating the BLP-type (Berry, Levinson and Pakes 1995) automobile demand function, where price is endogenous and instruments are high dimensional functions of product characteristics, we find that the estimated price elasticity of demand by DB-GMM is more elastic.

Papers in Progress

1. “Boosting Neural Nets for High-dimensional Nonlinear IV Regression.”
2. “Estimation of Panel Data Models for US State Level House Price with Many Instruments.”

Awards and Fellowships

1. Outstanding Teaching Assistant, University of California, Riverside, 2016 - 2017
2. Chancellor’s Distinguished Fellowship, University of California, Riverside, 2013 - 2018
3. Deborah K. Bosch Memorial Mathematics Award, Department of Mathematics, University of California, Riverside, 2013
4. Chancellor’s Honor List, University of California, Riverside, 2010-2011, 2011-2012
5. Dean’s Honor List, University of California, Riverside, 2010-2012, Winter 2013

Presentations

1. “Double-Boosting GMM for High Dimensional IV Regression Models”
 - UCR Econometrics Seminar Series, October 6, 2017
http://econ.ucr.edu/seminars_colloquia/2017-18/econometrics/fall.html
 - UCR Statistics Department, November 7, 2017
<http://statistics.ucr.edu/documents/colloquia/Hao%20Xu%20Colloquium%2011-7-17.pdf>
2. “Boosting Penalized GMM Estimation with Many Instruments That Are Possibly Irrelevant or Invalid”
 - UCR Econometrics Seminar Series, November 2016
http://econ.ucr.edu/seminars_colloquia/2016-17/econometrics/fall.html

Journal Referee

- International Journal of Forecasting

Teaching Experience

Teaching Assistant

Ph.D. Level:

- ECON 205C, Econometric Methods III (Professor TH Lee) Spring 2016

Undergraduate Level:

- ECON 101, Statistics for Economics Winter 2016, Summer 2016, Summer 2017, Fall 2017
- ECON 104A, Intermediate Microeconomic: Theory I Fall 2014, Summer 2015
- ECON 104B, Intermediate Microeconomic: Theory II Winter 2017
- ECON 107, Introductory Econometrics Winter 2015, Fall 2015, Fall 2016
- ECON 112, Forecasting in Business and Economic Spring 2015, Spring 2017

Skills

Software: Matlab, R, Eviews, STATA, LaTeX, Microsoft Office

Language: Chinese (Native), English (Fluent)

Citizenship

People's Republic of China

US Permanent Resident

References (alphabetical)

Gloria González-Rivera

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Tae-Hwy Lee (chair)

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