KATHLEEN T. LI

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EDUCATION

University of Pennsylvania, The Wharton School, Philadelphia, PA
Ph.D, Marketing, expected May 2018
M.S., Marketing, August 2014
Dissertation: Three Essays on the Estimation of Average Treatment Effects in Quasi-Experimental Panel Data
Committee: David R. Bell (co-chair), Christophe Van den Bulte (co-chair), Eric T. Bradlow, Dylan S. Small

Rice University, Houston, TX
B.A., Summa Cum Laude, Economics, May 2011
B.A., Summa Cum Laude, Mathematics, May 2011
B.A., Summa Cum Laude, Statistics, May 2011

RESEARCH INTERESTS

Substantive: Online vs. Offline Channels, Digital Marketing, Causal Inference

Methods: Econometrics, Estimation of Treatment Effects, Synthetic Control Methods, Factor Model Methods, Bootstrap Methods

PUBLICATION

Li, Kathleen T. and David R. Bell (2017), "Estimation of Average Treatment Effects with Panel Data: Asymptotic Theory and Implementation," *Journal of Econometrics*, 197, 65-75.

JOB MARKET PAPER

Li, Kathleen T., "Statistical Inference for Average Treatment Effects Estimated by Synthetic Control Methods"

WORKING PAPER

Li, Kathleen T. and David R. Bell, "Augmented Difference-in-Differences: Estimation and Inference of Average Treatment Effects"

HONORS AND AWARDS

Wharton Marketing Graduate Fellowship (2011-2014, 2016-present)
INFORMS Doctoral Consortium Fellow (2017)
NSF Foundation Graduate Research Fellowship Awardee (2011)
Duckworth Fellowship Nominee (2013)
Rice University Roy Trustee Distinguished Scholarship (2007-2011)
President's Honor Roll (2007-2010)
Phi Beta Kappa (2011-present)
SACNAS Conference Travel Scholarship (2009)
BP America Economics and Trading Scholarship (2008, awarded $10,000)
Jackie Schnell Memorial Scholarship for Academic Excellence and Service (2008)
National Siemens Award for Advanced Placement (2007) - one female and one male selected in the US each year based on seven math and science AP exams
National Merit Finalist (2007)

TEACHING EXPERIENCES

Instructor:

Intermediate Business Analysis
Economics Department, College of Business Administration
Sam Houston State University, August 2015 – May 2016

Teaching Assistant:

Pricing Policy (Executive MBA, Undergraduate)
Professor Jagmohan S. Raj, Professor Z. John Zhang
University of Pennsylvania, Feb - May 2017, Aug - Dec 2013
Marketing Research (Undergraduate), Professor Jehoshua Eliashberg
University of Pennsylvania, Aug- Dec 2013
Models for Marketing Strategy (Undergraduate), Professor Jehoshua Eliashberg
University of Pennsylvania, Aug - Dec 2013
Intermediate Microeconomics (Undergraduate), Professor James N. Brown
Rice University, Jan 2009 – May 2011

PRESENTATIONS

"Augmented Difference-in-Differences: Practical and Consistent Estimation of Average Treatment Effects," 39th INFORM Marketing Science Conference, University of Southern California, June 7-10, 2017

"Estimation of Average Treatment Effects with Panel Data: Asymptotic Theory and Implementation," Sam Houston State University, Math and Statistics Department Seminar, Sept 2, 2015

SERVICE

Reviewer, Journal of Econometrics, 2017
Pan Asian American Graduate Student Association, President, 2013-2014

PROFESSIONAL AFFLIATIONS

American Marketing Association, American Economic Association

RELEVANT COURSEWORK

Research Methods in Marketing	Robert J. Meyer
Measurement and Data Analysis	Raghuram Iyengar
Analytical Models in Marketing	Jagmohan S. Raju
Empirical Models in Marketing	Maria Ana Vitorino
Marketing Strategy	Christophe Van den Bulte
Judgement and Decision-Making	Barbara Mellers
Consumer Behavior	Patti Williams
Decision Processes	Uri Simonsohn
Econometrics I	Frank Schorfheide/Xu Cheng
Econometrics III	Flavio Cunha
Empirical Methods in Industrial Organization	Xun Tang
Game Theory and Applications	Yuichi Yamamoto
Contract Theory and Applications	Daniel Gottlieb
Microeconomic Theory II (audit)	George J. Mailath
Bayesian Methods and Computation	Shane T. Jensen
Statistical Methods	Andreas Buja
Microeconomic Theory I	Simon Grant

LANGUAGES

Computer: R, Matlab, Stata
Natural: English (native speaker), Mandarin Chinese

REFERENCES

David R. Bell (co-chair)
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RESEARCH ABSTRACTS

Dissertation Title

Three Essays on the Estimation of Average Treatment Effects in Quasi-Experimental Panel Data

Essay 1

Estimation of Average Treatment Effects with Panel Data: Asymptotic Theory and Implementation

The first essay develops the asymptotic theory for the novel ATE estimation method proposed by Hsiao, Ching and Wan (J. Appl. Econometrics, 2012). The three main contributions are: (i) relaxing some of the distributional assumptions made by HCW and showing that the HCW method works for a much wider than currently accepted range of data generating processes; (ii) deriving the asymptotic distribution of HCW's average treatment effect estimator (under both stationary and trend-stationary data cases) which facilitates inference; (iii) showing that the LASSO method is computationally more efficient and leads to more accurate out-of-sample prediction results than many commonly adopted model selection approaches such as BIC, AIC, AICC and the leave-many-out cross validation methods (Du and Zhang, J. Econometrics, 2015).

Essay 2

Augmented Difference-in-Differences: Estimation and Inference of Average Treatment Effects

The second essay derives and illustrates a new practical ATE estimator for commonly encountered settings where control units violate the parallel lines assumption (treatment and control units follow parallel sample paths in the pre-treatment time period) essential to Difference-in-Differences (DID). Our proposed method, the augmented DID (ADID), exploits the correlation between treated and non-treated units as its identifying assumption, and complements the standard DID when the latter breaks down. We show that a carefully designed bootstrap method can be used to conduct inferences for average treatment effects. First, we prove the validity of the bootstrap method for stationary data. Second, simulations show that the bootstrap method works well for a wide range of data generating processes including stationary, non-stationary and non-linear processes. Finally, we estimate the ATE of offline showroom openings on sales for a prominent online-first retailer. The “parallel line assumption” is violated for this data rendering DID not suitable for estimating ATE. In contrast, ADID can be used to give reliable ATE estimate because the ADID estimator is robust to non-random selection for treated and control units.

Essay 3 (JOB MARKET PAPER)

Statistical Inference for Average Treatment Effects Estimated by Synthetic Control Methods

The third essay builds on the synthetic control method (SCM), a powerful tool for estimating average treatment effects (ATE) developed by Abadie and Gardeazabal (AER, 2003) and Abadie et al (JASA, 2010). SCM is increasingly popular in fields such as statistics, economics, and marketing and has been called "arguably the most important innovation in the evaluation literature in the last fifteen years" (Athey and Imbens, NBER, 2016). While the widely used Differences-in-Differences (DID) method requires the parallel trends assumption (that treatment and control units follow parallel sample paths before treatment), SCM uses a weaker version of this identifying assumption. Instead of using one control unit, SCM uses a weighted average of many control units that better mimics the treatment unit. Essentially, this boils down to a weaker version of the parallel lines assumption: outcomes for the treatment unit and a weighted average of the control units must follow parallel paths over time in the pre-treatment period. However, SCM has two main limitations. First, when there is heterogeneity among control units and treatment units (which occurs frequently in economic and marketing data settings), the synthetic control version of parallel lines assumption may not hold and it can perform poorly in sample and out of sample. Second, to date, there has been no formal inference theory for synthetic control ATE estimator. Existing work mostly use placebo tests for inference.

This essay addresses both these limitations of SCM. First, I modify the synthetic control method so it can be applied even when there is heterogeneity in treatment and control units' paths. Second, I derive the asymptotic distribution of the synthetic control and modified synthetic control ATE estimators using projection theory, and show that a properly designed subsampling method can be used to obtain confidence intervals and conduct inference, whereas the standard bootstrap cannot. Simulations and empirical applications examining the effect of opening physical showrooms by two different e-tailers demonstrate the usefulness of the modified synthetic control method.