

Fall 2022 Course Syllabus

MIS7420-001, Seminar in Management Information Systems

Course Information

Course Title	Seminar in Management Information Systems
Course #	MIS 7420-001 (85398 / 012654)
Time	Monday 8:30 AM-12:45 PM
Location:	JSOM 11.202
Professor:	<i>Vijay Mookerjee, Eric Zheng</i>
Office:	<i>JSOM3.429 (Vijay) and JSOM 3.404 (Eric)</i>
Office Phone:	<i>972-883-4414 (Vijay); 972-883-5914 (Eric)</i>
Office Hours:	<i>By Appointment</i>

Course Description

This research seminar consists of two parts.

The first part focuses on causal inference in empirical studies. Students will learn various causal inference methods to deal with common problems in empirical business studies. We'll address econometric issues relating to heterogeneity, endogeneity, serial correlation, self-selection bias, empirical generalization and causation; explore common empirical methods including econometrics analysis, panel data analysis, instrument variable estimation, latent variable modeling, data matching, synthetic control and machine learning based causal inference. If time permits, we'll also discuss several advanced empirical methods such as Bayesian econometrics, MCMC simulation, latent growth modeling and structural modeling techniques. Students will learn how to use advanced empirical methods to study real-world business problems, get hands-on experience on empirical research, work out an assignment using these models learned in replicating a paper and develop a research proposal related to one or more of the topics covered in this course.

Part2 focuses on the stochastic differential equation (SDE) approaches.

Grades will be based on three parts: presentation of papers in each class (25%), one group project (35%) and an individual term paper (40%), but the grading scheme may be subject to necessary changes.

Part I: Causale Inference for Empirical Analysis

Session 1 (08/22/22): Overview on the class

- **Course organization, assigning articles**
- **Introduction to empirical research in IS: history, present and future**
- **Basic econometrics: how to do OLS right?**
- **How to conduct a good empirical study?**
 - Addressing causality
 - Typical procedures for conducting an empirical study
- **Primary Readings**
 - Cheng Nie, Eric Zheng, Sumit Sarkar. 2022. “Competing with the sharing economy: incumbents’ reaction on review manipulation” *MIS Quarterly*, forthcoming.
 - Evgeny Lyandres, Berardino Palazzo, Daniel Rabetti, 2022. ICO Success and Post-ICO Performance, *Management Science*, forthcoming.
 - Carlos Cinelli, Andrew Forney, Judea Pearl. 2022. A Crash Course in Good and Bad Controls. *Journal of Sociological Methods and Research*. Forthcoming.
- **Supplemental readings**
 - Profiling the research productivity of tenured information systems faculty at U.S. Institutions. Douglas L. Dean, Paul Benjamin Lowry. *MIS Quarterly* 2011, 35 (1), 1-15.
 - Bertrand, M., Dufflo, E., Mullainathan, S. 2004. How much should we trust DID estimates“, *Quarterly Journal of Economics*, 119 (1), 248-275.
- **Project Warm-up**

In the project, we will replicate my paper – Competing with the Sharing Economy – details to be discussed in class.

Session 2: Experiment and Qusai-Experiment

- **Primary Readings**
 - Miguel Matos, Idris Adjerid. 2022. Consumer Consent and Firm Targeting after GDPR: the Case of a Large Telecom Provider. *Management Science* 68 (5), 3330-3378. (experiment, LA-PSM)
 - Vandith Pamuru, Warut Khernamnuai, Karthik Kannan. 2021. The Impact of an AR Game on Local Businesses: A Study of Pokemon Go on Restaurants. *Information Systems Research*. 32(3), 950-966. (DID, PSM)
 - Tingting Nian, Yuheng Hu, Cheng Chen. 2022. Examining the Impact of TV-Induced Emotions on Online WoM Toward TV Advertising. *Information Systems Research*. 32(2), 605-632. (DID, pretrend, placebo, CEM)
- **Supplemental readings**
 - Jing Peng, 2022. Identification of Causal Mechanism from Randomized Experiments: A Framework for Endogenous Mediation Analysis. *ISR*, Forthcoming.

- Liangfei Qiu, Arunima Chhikara, Asoo Vakharia, 2021. Multidimensional Observational Learning in Social Networks: Theory and Experimental Evidence. *Information Systems Research* 32(3), 876-894. (experiments)
- Andrew Baker, David, Larcker, Charles, Wang. 2022. How much should we trust staggered DID estimates? *Journal of Financial Economics*, 144, 470-395
- Banerjee, A., Chassang, S., Montero, S., Snowberg, E. 2020., “A theory of experimenters: robustness, randomization, and balance”, *American Economic Review*, 110 (4), 1206-1230.
- Gorkem Ozer, Brad Greenwood, Anand Gopal. 2022. Digital Multisided Platforms and Women’s Health: An Empirical Analysis of P2P Lending and Abortion Rates. *ISR*, Forthcoming (DID, pretrend, PSM, CEM,

Session 3: Panel Data Analysis with Instrument Variables

- **Primary Readings**

- Yong-Chin Tan, Sandeep Chandukala, Srinivas Reddy. 2022. Augmented Reality in Retail and Its Impact on Sales. *Journal of Marketing*, 86 (1), 48-66. DDD, IV
- Kyle Barron, Edward Kung, Davide Prosperio, 2021. The Effects of Home-Sharing on House Prices and Rents: Evidence from Airbnb. *Marketing Science*. 40(1), 23-47. (IV validity)
- Shu He, Liangfei Qiu, Xusheng Cheng. 2022. Surge Pricing and Short-term Wage Elasticity of Labor Supply in Real-time Ridesharing Market. *MIS Quarterly*, 46(1), 193-227. (IV, nonlinearity, clustering, autocorrelation)

- **Supplemental readings**

- Guihua Wang, Jun Li, Wallace Hopp. 2022. An Instrument Variable Forest Approach for Detecting Heterogenous Treatment Effects in Observational Studies. *Management Science*, 68(5), 3399-3418. (IVT, IVF)
- Hilal Atasoy, Rajiv Banker, Paul Pavlou. 2022. Infomraiton Technology Skills and Labor Market Outcomes for Workers. *Information Systems Research*. (SUR, Heckit)
- Rouven Haschka. 2022. Handling Endogenous Regressor Using Copulas: A Gneralization to Linear Panel Models with Fixed Effects and Correlated Regressors. *Journal of Marketing Research*, 59(4), 860-881.
- Peter Rossi, Even the rich can make themselves poor: a critical examination of IV methods in marketing applications. *Marketing Science*, 2014.
- Chaisemartin, C., D’Haultfoeulle, X. 2020. “Two-way fixed effects estimators with heterogeneous treatment effects”, *American Economics Review*, Forthcoming.
- Guo, Z., Kang, H., Cai, T., Small, D. 2018. Confidence intervals for causal effects with invalid instruments by using two-stage hard thresholding with voting. *Journal of Royal Statistical Society, Series B*.

Session 4: Matching Approaches (PSM, CEM, SCM, GSC, FECT)

- **Primary Readings**

- Gary King, Richard Nielsen. 2019. Why PSM should not be used for matching?

- Licheng Liu, Ye Wang, Yiqing Xu. 2021. A practical guide to counterfactual estimators for causal inference with panel data. (FECT)
- Dmitry Arkhangelsky, Susan Athey, David Hirshberg, Guido Imbens, Stephaan Wager. 2021. Synthetic Difference-in-Differences. *American Economic Review*, 111(12), 4088-4118.
- Xitong Li, Jorn Grahl, Oliver Hinz. 2022. How do recommender systems lead to consumer purchase? A causal mediation analysis of a field experiment. *Information Systems Research*, 33(2), 620-637. (Experiment, IV, CMA)
- **Supplemental readings**
 - Qiang Gao, Mingfeng Lin, D. J. Wu. 2021. Education Crowdfunding and Student Performance: An Empirical Study. *Information Systems Research*, 32 (1), 53-71. (IV, PSM)
 - Yang Wang, Vandana Ramachandran, Olivia Sheng. 2021. Do fit opinions matter? The impact of fit context on online product returns. *Information Systems Research*. 32(1), 268-289. (GSC)
 - Jiaxu Peng, Jungpil Hahn, Kewei Huang. 2022. Handling missing values in IS, ISR, forthcoming
 - Yiqin Xu. 2017. Generalized synthetic control method: causal inference with interactive fixed effects models. *Political Analysis*, 25, 57-76. Data and source code can be downloaded from dx.doi.org/10.7910/DVN/8AKACJ (Xu 2016).
 - Abadie, A., Diamond, A., Hainmueller, J. 2010. Synthetic control methods for comparative case studies: estimating the effect of California's Tobacco control program. *Journal of Statistical Association*, 105 (490), 493-506.
 - David Powell, 2021. Synthetic Control Estimation Beyond Comparative Case Studies. JEBS.
 - Rubin, D., R. Waterman. 2006. Estimating the causal effects of marketing interventions using propensity score methodology. *Statist. Sci.* 21(2) 206–222.

Session 5: Some advanced econometrics models

- **Hierarchical Bayes, Latent Variables, HMM, HLM, Causal Forest, PVAR, MCMC**
- **Primary Readings**
 - Hossein, Ghasemkhani, Paulo Goes, Arvind Tripathi. 2022. Effect of Market Information on Bidder Attrition in Online Auction Markets. *MIS Quarterly*, 46(2), 1009-1034 (HMM, Bayesian)
 - Constant Pieters, Rik Pieters, Aurelie Lemmens. 2022. Six Methods for Latent Moderation Analysis in Marketing Research: A Comparison and Guidelines. *Journal of Marketing Research*. Forthcoming.
 - Shengjun Mao, Sanjeev Dewan, Ian Ho. 2022. Personalized ranking at a mobile app distribution platform. *Information Systems Research*, forthcoming (MCMC, hierarchical Bayes)
 - Yenyao Wang, Chenhui Guo, Anjana Susurla, Vallabh Sambamurthy. 2022. Online to Offline: The Impact of Social Media on Offline Sales in the Automobile Industry. *Information Systems Research*, 32(2), 582-604 (PVAR, Granger Causality).

- **Supplemental readings**
 - Yi Qian, Hui Xie. 2022. Simplifying Bias Correction for Selective Sampling: A Unified Distribution-Free Approach to Handling Endogenously Selected Samples. *Marketing Science*, 41(2), 336-360.
 - Edward Kenney, Zongming Ma, Matthew Mchugh, Dylan Small. 2016. Nonparametric Methods for Doubly Robust Estimation of Continuous Treatment Effects. *JASA*.
 - Stepfan Wager, Susan Athey. 2018. Estimation and Inference of Heterogenous Treatment Effects using Random Forest. *JASA*, 113:523, 1228-1242.

Session 6: Combining machine learning with econometrics

- **AI, machine learning, agent-based modeling with econometrics**
- **Primary Readings**
 - Sendhil Mullainathan, Ziad Obermeyer, 2022. Diagnosing Physical Error: A Machine Learning Approach to Low-Value Healthcare, *Quarterly Journal of Economics*, 137(2), 679-727.
 - Runshan Fu, Yan Huang, Param Singh. 2021. Crowds, Lending, Machine and Bias. *Information Systems Research*, 32(1), 72-92.
 - Tong Wang, Cheng He, Fujie Jin, Jeffrey Hu. 2022. Evaluating the efectiveness of marketing campaign for malls using a novel interpretable machine learning model. *Information Systems Research*. 33(2), 659-677. (GAN)
 - Panos Adamopoulos, Anindya Ghose, Alex Tuzhilin. 2022. Heterogenous Demand Effects of Recommendation Strategies in a Mobile Application: Evidence from Econometric Models and Machine-Learning Instruments. *MIS Quarterly*, 46(1), 101-150. (IV, deep learning, BLP)
 - Chenshuo Sun, Panos Admopoulos, Anindya Ghose, Xueming Luo. 2022. Predicting Stages in Omnichannel Path to Purchase: A Deep Learning Model. *Information Systems Research*. 33(2), 429-445.
- **Supplemental readings**
 - Qiao Mengke, Kewei Huang, 2022. Correcting Misclassification Bias in Regression Models with Variables Generated via Data Mining. *Information Systems Research*. 32(2), 462-480.
 - Mingyung Kim, Eric Bradlow, Raghuram Iyengar. 2022. Selecting Data Granularity and Model Specification Using the Scaled Power Likelihood with Multiple Weights. *Marketing Science*, 41(4), 420-438.
 - Chernozhukov et al. (2017) Machine Learning in Econometrics: Double/Debiased/Neyman Machine Learning of Treatment Effects. *AER*
 - Kleinberg, J., Lakkaraju, H., Leskovec, J., Ludwig, J., Mullainthan, S. Human decisions and machine predictions. *The Quarterly Journal of Economics* (2018), 237–293.

Session 7: Building your own models (Structural Econometrics)

- **Primary Readings**

- Maryam Farboodi, Adrien Matray, Laura Veldkamp, Venky Venkateswaran. 2022. Where has all the data gone? *Review of Financial Studies*, 35, 3101-3138.
- Arnaud Bruyn, Thomas Otter. 2022. Bayesian Consumer Profiling: How to Estimate Consumer Characteristics from Aggregate Data. *Journal of Marketing Research*, 59(4), 755-774.
- Hui Li, Yijin Kim, Kannan Srinivasan. 2022. Market Shift in the sharing economy: the impact of Airbnb on housing rental. *Management Science*, forthcoming. (Choice structural model)
- Jing Peng, 2022. Identification of Causal Mechanism from Randomized Experiments: A Framework for Endogenous Mediation Analysis. *ISR*, Forthcoming.

- **Supplemental readings**

Week 8 (10/10, tentative): Mid-term check point - Group Project Submission and Term Paper Warm-up

- Discussion topic: How to write publishable paper? How to choose and conduct significant research? How to go through the review process? How to respond to reviewers?

Students will present their group project by replicating the analysis and results in “Competing with the sharing economy”. Students will also present their ideas for the term paper and feedback will be provided during class.

Part II, Week 8-15. Will be announced by Vijay