

CONTACT INFORMATION

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EDUCATION

- Ph.D. in Economics, University of Pittsburgh, August 2017-
- M.S., Economics, Sungkyunkwan University, Seoul, Korea, 2017
- B.A., Economics and Philosophy, Sungkyunkwan University, Seoul, Korea, 2015

RESEARCH INTERESTS

- Empirical Industrial Organization, Health Economics, and Machine Learning
 - Secondary Interests: Applied Microeconomics, Applied Econometrics

PUBLICATIONS

- [Estimating Switching Costs for Telecommunications Services and Bundles](#) (with Hyunchul Kim, Accepted at Applied Economics, Pre-Ph.D. work)

WORKING PAPERS

- [Double/Debiased Machine Learning for Static Games with Incomplete Information: An Application to Limited Pharmacy Access](#)

Abstract: Although the availability of high-dimensional data sets is increasing, structural game models have difficulty incorporating them. In this paper, I integrate double/debiased machine learning into static games with incomplete information. I provide both estimation and inference methods for these models and show how the popular estimation method of Bajari et al(2010) can be adapted to accommodate the presence of high-dimensional nuisance parameters.

For an empirical application of the tools I develop, I study the important issue of rural pharmacy access. I document that the decline of independent pharmacies is associated with the entry of chains, leading to more limited pharmacy access in rural towns. This is because independent pharmacies are more likely to be located in rural towns, whereas chain pharmacies prefer locations with higher demand (e.g., urban areas and shopping malls) - typically farther from rural towns. To capture strategic interactions, I model independent pharmacy entry and exit as a static game of incomplete information. This paper finds that the effect of a rival independent pharmacy is 50% larger using the developed methodologies than using the method of Bajari et al(2010). This difference is primarily due to machine learning's ability to accommodate flexible functional forms and its higher predictive performance. The first counterfactual simulation finds that new chain pharmacy entries can explain 40% of the closures among independent pharmacies from 2000 to 2019. The second counterfactual evaluates the effect of a subsidy program on improving limited pharmacy access, similar to the physician bonus program for Medicare-related services that targets areas with limited medical access. The analysis shows that 16% of rural towns previously identified as having restricted pharmacy access would no longer be categorized as such.

WORK IN PROGRESS

- Horizontal Merger and Post Entry: Evidence from Acquisition in the Retail Pharmacy Market

CONFERENCE AND PRESENTATIONS

- Boston University IO Reading Group, Fall 2023
- EARIE (European Association for Research in Industrial Economics) 2023 at Rome, Summer 2023
- IAAE (International Association for Applied Econometrics) 2023 at Oslo, Summer 2023
- NASM (North America Summer Meeting of the Econometric Society) at Los Angeles, Summer 2023
- The 37th Annual Conference of the Pennsylvania Economic Association at Washington, Summer 2023
- Pittsburgh Medley Conference, Pittsburgh, Summer 2022
- Applied Microeconomics Colloquium, Carnegie Mellon University, Summer 2020

- Applied Microeconomics Seminar, University of Pittsburgh Econometrics Seminar, Spring & Fall 2019
- Econometrics Seminar, University of Pittsburgh, Fall 2020

HONORS AND AWARDS

- Travel Grants
 - GPSG Travel Grants 2023, A&S PBC Travel Grants 2023, A&S GSO Travel Grants 2023, University of Pittsburgh Travel Grants 2022-2023/2023-2024
- Social Science Doctoral Dissertation Fellowships (\$23,500), Fall 2019 - Summer 2020
- Summer Research Fellowship, University of Pittsburgh (\$3,000), Summer 2019
- Arts and Sciences Fellowship, University of Pittsburgh (\$23,500), Fall 2017 - Spring 2018

**TEACHING
EXPERIENCE**

- Instructor, University of Pittsburgh
 - Applied Econometrics, Summer 2021.
- Teaching Assistant, University of Pittsburgh
 - 1st-year Ph.D. Year Econometrics 2, Spring 2020.
 - Introduction to Microeconomics, Spring 2019, Fall 2021, Fall 2022
 - Introduction to Macroeconomics, Fall 2019, Summer 2020,
- Grader, University of Pittsburgh
 - Game Theory, Fall 2018, Fall 2023
 - Intermediate Macroeconomics, Spring 2022
 - Introduction to Econometrics, Spring 2023

**WORKING
EXPERIENCE**

- Economist Intern - Core AI, Amazon, Seattle, May 2022-August 2022.
 - Estimated the (causal) price elasticity with respect to new sellers in the Amazon marketplace.
 - Conducted analysis on causal inference, implemented modern machine learning tools including Double/Debiased Machine Learning and Causal Forest and presented research results to management and internal audiences.
 - Improved model libraries owned by Amazon, utilizing its unique dataset and leveraging theories in Statistics and Econometrics within the Core-AI.
 - Rated as "hired".

**OTHER
PROFESSIONAL
EXPERIENCE**

- Mentor for 2nd Year Student in Ph.D. Economics, University of Pittsburgh, 2019-2021
- Department Delegate, Arts & Sciences GSO, University of Pittsburgh, 2019-2020
- Research Assistant to Prof. Arie Beresteanu, University of Pittsburgh, Summer 2020
- Military Service: Sergeant, Administrative Specialist, South Korea, 2009-2011

COMPUTER SKILLS

- Programming skills: Python, MATLAB, Julia, R and Stata
- SQL, \LaTeX , and Microsoft Office

REFERENCES

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