Hyung Gyu Rho

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Education

Pennsylvania State University **Aug 2016 – May 2022 (expected)**

Ph.D. in Economics (GPA: 3.69/4.00) *State College, PA, USA*

The University of Melbourne **2015**

Bachelor of Commerce (Economics, Hon's; WAM: 91.29) *Melbourne, VIC, Australia*

The University of Melbourne **Jul 2011 – Jul 2014**

Bachelor of Commerce (Economics and Finance; WAM: 75.83) *Melbourne, VIC, Australia*

Academic Experience

INTEREST: Econometrics, Applied Econometrics, Industrial Organization, Consumer Choice
ADVISORS: Prof. Joris Pinkse (co-advisor) and A.Prof. Sung Jae Jun (co-advisor)

Research Papers

Testing an Exclusion Restriction in a Consideration Set Model (JMP)

- In this paper, I propose a nonparametric test of an exclusion restriction in consideration set models. In consideration set models, it is known that point identification is obtainable when there are two variables – one only affects preferences, and the other only affects attention. On the contrary, if only one of such variables is available, then partial identification is obtainable. Provided that the econometrician has a variable that only affects attention (preferences), My test can be used to test the validity of a candidate exclusion restriction – a variable that might only affect preferences (attention). My test is based on measuring the residual sum of squared using kernel methods. I show that my test is consistent.

Welfare Cost of Information Asymmetry in E-commerce: Evidence from Expedia

- In this paper, I study welfare cost that arises from information asymmetry between consumers and platforms in E-commerce when platforms endogenously determine their ranking method. In E-commerce, platforms usually have more product information than consumers. To make consumer search easier, they employ a recommendation list of products, called a ranking, placing the most relevant products to consumers' search queries on the top of the list. However, Platforms could place potentially more profitable products in a good position in a ranking. This could happen because consumers have limited product information, and their attention might be drawn to products in good places. To quantify welfare cost under this circumstance, I develop a structural model where platforms decide their ranking method before any consumer enters the market and commits to it. After that, consumers enter the market and make a choice. My result shows that platforms indeed take advantage of consumers' ignorance. As a counterfactual analysis, I consider a scenario where consumers have full knowledge. When consumers have full knowledge, platforms re-design their ranking method in favor of consumers. As a result, consumer welfare improves by 2.24%. Surprisingly, it also increases platforms' profit by around 58%. This is because consumers are more likely to buy a product when they have complete information.

Identification of a Random Consideration Set Model with Arbitrary Dependence

- In this paper, I discuss identification of consideration set models. Consideration set models relax the assumption that consumers consider all products in a market. Rather, consumers endogenously choose which products to consider buying. This consideration is determined by their attention. I discuss identification of model parameters while allowing arbitrary dependence between preferences and attention. Specifically, I present three identification results. The first identification argument relies on an exclusion restriction and an identification at infinity concept. I assume that there is a variable that affects preferences but not attention; I require this variable to have unbounded support. The second identification argument relaxes the unbounded support assumption, but it requires a stronger exclusion restriction. I need an additional variable that affects attention, but not preferences. Under these assumptions, I show that I can identify parameters of interest. Lastly, I show identification under the normality assumption.

Special Regressor with Limited Support Assumption

- In this paper, I study a special regressor with limited support. I show that if a special regressor has limited support, then I can transform a binary regression into a truncated regression. Then, I attempt to show asymptotic properties of my special regressor method with limited support.

Data Projects

Kaggle Competition: Jane Street Market Prediction | *top 2%, Silver Medal* **Aug 2021**

- Developed a machine learning model to identify each trading opportunity within 16 milliseconds.
- The training data include two years of training opportunities with 130 anonymous features.
- Developed five models based on neural networks: a simple nueral network, Tabnet, transformer, a convolutional network, and ResNet along with autoencoder for feature extraction.
- Used TensorFlow lite to meet the inference time constraint.

Kaggle Competition: Riiid! Answer Correctness Prediction | *top 3%, Silver Medal* **Jan 2021**

- Developed a predictive model whether students answer questions correctly or not.
- The training data contain 100M interactions from 300K students.
- Implemented a transformer model and light GBM with feature engineering.

Kaggle Competition: Real or Not? NLP with Disaster Tweets (with Gourika Khanna) | **2020**

- Developed a model to classify tweets whether it is about a real disaster.
- Implemented BERT, LASSO, and ensemble learning along with feature extraction.
- Achieved 0.84151 F1 Score

Kaggle Competition: Toxic Comment Classification Challenge (with Tanji Hwang) | **2019**

- Developed a model to classify tweets into seven categories: not toxic, toxic, sever toxic, obscene, treat, insult, identity hate.
- Used a range of machine learning techniques from random forest to BERT.
- Achieved the prediction score of 0.98648

Work Experience

The University of Melbourne **Jul 2021 – Dec 2021**
Tutor *Melbourne, VIC, Australia*

- Behavioural Economics (ECON 30019)

Pennsylvania State University **Aug 2016 – May 2021**
Instructor, Teaching Assistant *State College, PA, USA*

- Instructor: Introduction to Econometrics (ECON 306, Online)
- Teaching Assistant: Econometrics I (Econ 501, Ph.D.; Econ 510, Master)
- Teaching Assitant: Urban Economics (ECON 432)

The University of Melbourne **Mar 2015 – Jun 2016**
Tutor *Melbourne, VIC, Australia*

- Microeconomics (ECON 300190)
- Microeconomics 2 (ECON 90045)
- Economics of Financial Markets (ECON 30024)

The University of Melbourne **Jul 2015 – Jun 2016**
Research Assistant *Melbourne, VIC, Australia*

- Provided research assistance for Dr. Georgy Artemov
- Performed data mining, data cleaning, and analysis

Scholarship and Awards

Department of Economics Teaching Assistantship, Pennsylvania State University Aug 2016 – May 2021
Australian Finance Conference Exhibition in Economics of Financial Markets 2013

Additional Information

Languages: Korean (Native), English (Fluent)
Programming: Python, MATLAB, MySQL, Stata
Other Software: Latex, MS Office
Nationality: S.Korea (citizenship), Australia (Permanent Residency)