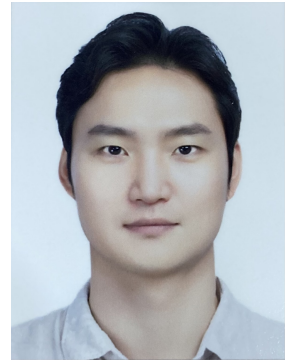# Beomseok Seo

Ph.D., Economist
Office of Economic Modeling and Policy Analysis, Bank of Korea
39 Namdaemun-ro, Jung-gu, Seoul, 04531, Rep. of KOREA
Email: bsseo@bok.or.kr
Web: https://seo-beomseok.github.io

EDUCATION

Ph.D., Statistics, **Penn State University**, University Park, PA   Aug 2016 - Aug 2021

- Thesis: Interpretable Statistical Learning: From Hidden Markov Models to Neural Networks.
- Advisor: Jia Li

B.A., Economics & Statistics, **Korea University**, Seoul, Korea   Mar 2005 - Feb 2011

EMPLOYMENT

Economist, *The Bank of Korea*, Seoul, Korea

- **Office of Economic Modeling and Policy Analysis**,   *Feb 2023 - Present*
- **Statistics Research Unit**,   *Jun 2021 - Jan 2023*
- **Economic Statistics Department**,   *Feb 2013 - Jun 2016*
- **Financial Markets Department**,   *Jan 2011 - Feb 2013*

Adjunct Professor,

- **Dept. of Quantitative Applied Economics**, *Sungkyunkwan Univ.*, Seoul   *Sep 2023 - Present*
- **Dept. of Statistics**, *Korea Univ.*, Seoul   *Sep 2023 - Present*

Researcher, *Pennsylvania State University*, State College, PA

- **Dept. of Statistics**,   *Summer 2018, Summer 2020, & Summer 2021*
- **Smeal College of Business**,   *Summer 2020*
- **Dept. of Political Science**,   *Summer 2017*

Korea Army, Paju, Korea   *Aug 2006 - Jul 2008*

RESEARCH INTERESTS

My research interests include a range of related problems in

- Interpretable statistical modeling and machine learning,
- Developing tools to better understand macroeconomics, finance, and monetary policy,
- Dealing with various text-related economic and financial problems.

PEER-REVIEWED JOURNAL ARTICLES

* Corresponding author

Beomseok Seo*, Younghwan Lee, Hyungbae Cho (2024) "Measuring News Sentiment of Korea Using Transformer." Korean Economic Review, 40(1), 149-176.

Beomseok Seo*, Lynn Lin, Jia Li (2022) "Mixture of Linear Models Co-supervised by Deep Neural Networks." Journal of Computational and Graphical Statistics, 31(4), 1303-1317.

Beomseok Seo*, Lynn Lin, Jia Li (2021). "Block-wise Variable Selection for Clustering via Latent States of Mixture Models." Journal of Computational and Graphical Statistics, 31(1), 138-150.

Jia Li, **Beomseok Seo**, Lynn Lin (2019) "Optimal Transport, Mean Partition, and Uncertainty Assessment in Cluster Analysis." Statistical Analysis and Data Mining: The ASA Data Science Journal, 12(5), 359-377.

Seung Jun Shin, **Beomseok Seo***, (2024) "Real-Time Private Consumption Prediction Using Big Data." (in Korean). Korean Journal of Applied Statistics. (Accepted)

Jae Keun Yoo, Yujin Park, **Beomseok Seo***, (2024) "Using Noise Filtering and Sufficient Dimension Reduction Method on Unstructured Economic Data." (in Korean). Korean Journal of Applied Statistics. (Accepted)

WORK IN PROGRESS

Beomseok Seo*, (2024+) "Econometric Forecasting Using Ubiquitous News Text: Text-enhanced Factor Model."   In revision

Beomseok Seo*, Jia Li (2024+) "SEE-Net: Synced and Explanation-Enhanced Neural Network."
                                                                                   Will be submitted soon

Young Joon Lee, Soohyon Kim, **Beomseok Seo**, Ki Young Park (2024+) "Measuring Monetary Policy Surprises Using Text Mining: The Case of Korea."   Will be submitted soon

Beomseok Seo*, Hyungbae Cho, Dongjae Lee (2024+) "Point and Risk estImation using an enSemble of Models for Nowcasting: Prism-Now."   Will be submitted soon

WORKING PAPERS

Beomseok Seo*, Hyungbae Cho, Dongjae Lee (2023) "Point and Risk estImation using an enSemble of Models for Nowcasting: Prism-Now." Bank of Korea Working Paper, 2023(27).

Beomseok Seo*, (2023) "Econometric Forecasting Using Ubiquitous News Text: Text-enhanced Factor Model." Bank of Korea Working Paper, 2023(10).

Beomseok Seo* (2023) "Industry Monitoring Using AI Algorithm: Analyst Reports Text Mining", Bank of Korea Issue Note, 2023(5).

Seung Jun Shin, **Beomseok Seo*** (2022) "Real Time Private Consumption Prediction Using Big Data. (in Korean) [빅데이터를 이용한 실시간 민간소비 예측]", Bank of Korea Working Paper, 2022(16).

Beomseok Seo*, Younghwan Lee, Hyungbae Cho (2022) "Machine-Learning-Based News Sentiment Index (NSI) of Korea", Bank of Korea Working Paper, 2022(15).

Beomseok Seo*, (2022) "Economic Forecasting Using News Texts: Construction and Utilization of Economic Sector Text Indices. (in Korean) [뉴스텍스트를 이용한 경기예측: 경제 부문별 텍스트 지표의 작성과 활용]", Bank of Korea Issue Note, 2022(18).

Beomseok Seo*, Younghwan Lee, Hyungbae Cho (2022) "Construction and Utilization of News Sentiment Index (NSI) Using Machine Learning. (in Korean) [기계학습을 이용한 뉴스심리지수(NSI)의 작성과 활용]", Bank of Korea National Account Review, 2022(1), 68-90.

Beomseok Seo* (2021) "Interpretable Statistical Learning: From Hidden Markov Models to Neural Networks", Penn State University Ph.D Dissertation, State College, PA.

SELECTED CONFERENCE & SEMINAR TALKS

Czech National Bank (*CNB*), *Macroeconomic Forecasting Division Seminar*, Prague	*Oct 2023*
European Central Bank (*ECB*), *DG-E Wide Seminar*, Frankfrut	*Oct 2023*
Bank for International Settlements (*BIS*), *Meeting with IDE and Machine Learning Community*, Basel	
	Oct 2023
The Korean Statistical Society & Bank of Korea Joint Forum 2022, Seoul	*Sep 2022*
Central Bank Research Association (*CEBRA*) *Conference 2022*, Barcelona	*Aug 2022*
Korea Information Society Development Institute (*KISDI*), Seoul	*Jun 2022*
The Korean Statistical Society Conference (*TKSS*) *2022*, Seoul	*Jun 2022*
Korea University Dept. of Statistics, Seoul	*May 2022*
Workshop on Data-Driven Future Prediction Policy Support Model Research by the Society for Economic, Humanities, and Social Studies, Seoul	*May 2022*
Bank of Korea Statistics Forum 2021, Seoul	*Nov 2021*
The Korean Statistical Society Conference (*TKSS*) *2021*, Seoul	*Nov 2021*
Ewha Womans University Dept. of Statistics 2021, Seoul	*Oct 2021*
Computational and Financial Econometrics (*CFE*) *2019*, London	*Dec 2019*
Joint Statistical Meetings(*JSM*) *2019*, Denver	*Jul 2019*
Joint Statistical Meetings(*JSM*) *2018*, Vancouver	*Jul 2018*
50th Anniversary Conference of the Statistics Dept., State College	*May 2018*

TEACHING EXPERIENCE

Adjunct Professor, *Korea University*, Seoul
- *Department of Statistics*
  - STA830, Machine Learning for Finance and Economics (MA in Statistics),   *Fall 2023*

Adjunct Professor, *Sungkyunkwan University*, Seoul
- *Department of Quantitative Applied Economics*
  - QAE5009, Big Data Analytics in Macroeconomics (MA in Economics),   *Fall 2023*

Instructor, *Penn State University*, State College, PA
- *Department of Statistics*
  - STAT200, Elementary Statistics (Undergraduate in Statistics),   *Summer 2019, Summer 2021*
  - STAT418, Introduction to Probability and Stochastic Processes (Undergraduate in Engineering),   *Spring 2020*

FELLOWSHIPS, HONORS, AND AWARDS

Best Research Excellent Employee Award of The Bank of Korea.   *Jun 2023*

Teaching Fellowship offered by Penn State Univ.   *Spring 2017 - Spring 2021*

Best Poster Award of The Statistics Dept. at Penn State Univ.   *May 2018*

Graduate Study Fellowships awarded by The Bank of Korea.   *Fall 2016 - Spring 2018*

Best Honors Scholarship in Korea University Dept. of Economics.   *Fall 2010*

Academic Excellence Scholarship in Korea University Dept. of Economics.
Spring 2006, Fall 2009, Spring 2010

ADDITIONAL TRAINING EXPERIENCE

Barcelona Graduate School of Economics, Summer School, Barcelona
- Time Series Vector Auto Regressive Models   *Jul 2014*

IMF, Singapore Regional Training Institute, Singapore
- Financial Markets and Instruments   *Dec 2012*

Advanced Mathematics Program of The Bank of Korea Academy, Seoul
- Stochastic Process, Real Analysis, Differential Equations   *Mar 2012 - Dec 2015*

LANGUAGES

English, Korean (fluent)

PROGRAMMING LANGUAGES

Python/Tensorflow, R, SQL (advanced), MATLAB, C/C++, CSS (intermediate)

PROGRAMS

Text Indices Hub, *Interactive website*. (Launching initially takes several minutes.)
- Providing Theme Frequency in News Indices (TFNI), Text-based Business Confidence Indicators (TBCI).

MLM, *Python modules on GitHub*,
- Interpretable non-linear regression or classification based on "Mixture of Linear Models Co-supervised by Deep Neural Networks"

HDclustVS, *R package on GitHub*,
- A Block-wise Variable Selection Method for High-dimensional Clustering via Latent States of Mixture Models

OTclust, *R package on CRAN*,
- Mean Partition, Uncertainty Assessment, Cluster Validation and Visualization Selection for Cluster