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EDUCATION

Ph.D., Economics, University of California, Davis	2024 (Expected)
B.A., Economics, Seoul National University	2011

RESEARCH INTERESTS

International Economics, Macroeconomics

WORKING PAPERS

Transition to a Green Economy: Policy Competition and Cooperation (*Job Market Paper*)

What does a country gain or lose by free-riding off the climate benefits by other countries' carbon abatement efforts versus taking action to hasten a conversion to green energy sources at home? By incorporating industry lifecycle theory and the negative externalities from greenhouse gas emissions into an open-economy macroeconomic model, I analyze the welfare effects of industrial policies that subsidize production of capital goods (like solar panels or wind turbines) used to produce green energy. The model predicts that a production subsidy for the green capital goods industry is desirable for the home country, as it accelerates innovation in the industry and consequently green energy adoption. This acceleration at home delays innovation abroad, generating a beggar-thy-neighbor effect, despite the environmental benefits from home innovation. Thus, in a Nash equilibrium, both nations competitively raise production subsidies, improving welfare in both countries by reducing distortions created by the subsidy and greenhouse gas emissions. A cooperative equilibrium still yields a Pareto improvement, given the incomplete resolution of the free-riding problem in the Nash equilibrium. To quantitatively analyze the welfare and environmental effects of policies implemented by the US and the EU, I estimate the innovation timing elasticity, showing for the first time that the pace of innovation increases with the number of firms operating in an industry. The estimate is not large but sufficient to tip the balance from free-riding to subsidizing green capital goods production in the quantitative analysis.

Industrial Policy in the context of Industry Lifecycle: Catch-Up versus Frontier Technology Races

The welfare effects of industrial policy can vary depending on where the targeted industry happens to be in its lifecycle. In this study, I develop an open economy macroeconomic model incorporating industry lifecycle theory to investigate how the timing of industrial policy affects innovation and welfare in both the home and foreign countries. The model provides distinct welfare implications in two scenarios: *catch-up* and *frontier technology races*. In the former scenario, the targeted industry is still in its infancy at home with high growth potential, but already mature abroad. In contrast, in a race, both the home and foreign industries have high growth potential and so are in competition with each other to innovate first. For the home country, a production subsidy accelerates innovation in the targeted industry and thus can enhance welfare in both scenarios, despite a trade-off between short-term losses and long-term gains. For the foreign country, in the catch-up scenario, a home production subsidy unambiguously increases foreign welfare. Conversely, in the scenario of frontier technology races, the home production subsidy may induce a beggar-thy-neighbor effect by delaying innovation abroad. In such circumstances, the foreign country responds by implementing aggressive countervailing policies to mitigate the negative spillover effects. If both countries instead cooperatively support the industry, the welfare outcome is a Pareto improvement compared to the Nash equilibrium.

Automation, Human Task Innovation and Labor Share: Unveiling the Role of the Elasticity of Substitution
(with Deokjae Jeong)

This paper investigates the elements contributing to the decline in labor share, with a particular focus on the roles of ‘automation’ and ‘innovation in human-exclusive tasks.’ We construct a general equilibrium model that separately incorporates both robot and non-robot capital to derive an econometric specification. Based on the regression results, we estimate the elasticity of substitution between labor and non-robot capital to be less than one, while the elasticity of substitution between tasks is greater than, but close to, one. Together with these estimates, our regression results yield three major findings. First, we identify two distinct channels through which robots impact labor share: automation and the decrease in the price of robots. Both channels are found to negatively affect labor share. Our general equilibrium model predicts that the impact of declining robot prices will intensify as robots become more prevalent. Second, we are the first to empirically evaluate the impact of human-exclusive task innovation on labor share. Our accounting analysis suggests that the positive influence of human-exclusive innovation outweighs the adverse effects of automation. Lastly, by utilizing estimates of the elasticity of substitution between labor and non-robot capital, as well as between tasks, we elucidate the mechanisms through which factor prices impact the labor share. Specifically, we find that both the negative effect of automation and the positive effect of human-exclusive task innovation are amplified through the aggregated task price channel.

The Market Potential and Optimality of Industrial Policy: Revisiting Korean Industrial Policy in the 1970s
(with Seok (Sean) Kim)

We assess optimal industrial policy factoring in external economies of scale under changing global market conditions. Since policy effects naturally materialize with a time lag, policy assessment should compare the short-run distortion of the intervention to its long-run gain. In this context, we expand the small open economy model of Bartelme et al. (2021) into a two-period dynamic setting to figure out how important the dynamics of global market conditions are in determining optimal policy. Optimal industrial policy in our model depends not only on the scale elasticity, but also on a multiplier which is larger when more resources are re-allocated to the industry in the long-run based on export market penetration. This optimal policy implies that an industry with a growing future market should receive stronger support than earlier papers suggest. We quantitatively evaluate the industrial policy of South Korea in the 1970s. With the estimate of the scale elasticity of 29 manufacturing industries, our quantitative analysis presents two main results. First, even though the scale elasticity of targeted industries does not dominate that of non-targeted industries, industrial policy increased the welfare of South Korea. Second, the suggested optimal subsidy rate for the targeted industries is even higher than the actual rate.

WORKS IN PROGRESS

Innovation and Spillover along the Product Lifecycle: Firm Level Evidence

PUBLICATIONS

- Network Indicators for Monitoring Intraday Liquidity in BOK-Wire+, *Journal of Financial Market Infrastructures*, 2014 (with Kimmo Soramäki and Jaeho Yoon)
- Financial Market Infrastructure Interdependencies in Korea, *Analytical Framework in Assessing Systemic Financial Market Infrastructure*, SEACEN Centre, 2014 (with Jongsang Lee)

POLICY PAPERS

Assessment of Chinese Financial Market Unrest, and Outlook, *Monetary Policy Report*, November 2015 (both in English and Korean, with Hyungseok Oh)

PRESENTATIONS (*: Scheduled)

Southern Economic Association 93rd Annual Meeting*	2023
Western Economics Association International 98th Annual Conference	2023
Western Economics Association International 17th International Conference (Virtual)	2023
Korean Industrial Economic Association Fall Conference	2022
UC Davis Macro/International Lunchtime Seminar	2022 (X2), 2023 (X2)

PROFESSIONAL EXPERIENCE

Economist, The Bank of Korea	2016 – Present
Senior Officer, Ministry of Strategy and Finance (seconded from the Bank of Korea)	2017 – 2018
Junior Economist, The Bank of Korea	2012 – 2016
Manager, Korea Securities Depository	2011
Intern, DB Insurance	2011

TEACHING EXPERIENCE

Teaching Assistant, UC Davis	2018 – Present
<ul style="list-style-type: none"> Undergraduate level: Principle of Microeconomics, Intermediate Microeconomics, Intermediate Macroeconomics, Game Theory Graduate level: Microeconomic Theory (Core Ph.D. course), Math Camp 	

HONORS, AWARDS, AND SCHOLARSHIP

Travel Award, UC Davis Economics Department	2022, 2023
Non-Resident Tuition Fellowship, UC Davis	2019 – 2021
Doctoral Study Abroad Fellowship, The Bank of Korea	2018 – 2020
Best Paper 2016, The Bank of Korea	2016
Third Place, The Bank of Korea Research Paper Competition	2014
Second Place, The Meritz Securities Research Paper Competition	2011
Scholarship for Academic Excellence, Seoul National University	2004, 2007 – 2010

SKILLS AND OTHER INFORMATION

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- **Statistical Software:** Stata, Matlab, E-view and R
 - **Languages:** English (fluent), Korean (native)

REFERENCES

Katheryn Russ (Chair)	Paul Bergin	Robert Feenstra	Ina Simonovska
Professor &	Professor,	Distinguished Professor	Associate Professor,
Department Chair,	UC Davis,	Emeritus,	UC Davis,
UC Davis,	prbergin@ucdavis.edu	UC Davis,	inasimonovska@ucdavis.edu
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