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Fields of Concentration:
Primary Fields: International Economics, Spatial Economics
Secondary Field: Environmental Economics

Qualifying Examinations Completed:
2022 (Oral): Macroeconomics, Spatial Economics
2021 (Written): Microeconomics, Macroeconomics

Dissertation Title: *Essays on the Spatial Economics of Environmental and Energy Policy*

Committee:
Professor Costas Arkolakis (Chair)
Professor Kenneth Gillingham
Professor Amit Khandelwal
Professor Samuel Kortum

Education:
Ph.D., Economics, Yale University, 2027 (expected)
M.Phil., Economics, Yale University, 2023
M.A., Economics, Yale University, 2023
M.A., Economics, Seoul National University, 2020
B.A., Economics, Seoul National University, 2018 (summa cum laude)

Fellowships, Honors, and Awards:
Department Travel Grants (two awards), Yale University, 2026
Allan Shelden III Fellowship, Yale University, 2025
University Dissertation Fellowship, Yale University, 2024–2025
Ryoichi Sasakawa Young Leaders Fellowship (SYLFF), Yale University, 2024
Doctoral Fellowship, Yale University, 2020–2024
Cowles Foundation Fellowship, Yale University, 2020–2024
Research and Lecture Scholarship, Seoul National University, 2019–2020
Brain Korea 21 Plus Research Scholarship, Seoul National University, 2018–2020
Seoul National College of Commerce Alumni Association Scholarship, 2017

Seoul National University Foundation Scholarship, 2014
Academic Merit Scholarship, Seoul National University, 2012–2017

Research Grants:

Data Acquisition Grant, Department of Economics, Yale University, 2026 (USD 3,000)
Data Acquisition Grant, Economic Growth Center, Yale University, 2025 (USD 5,000)
SYLFF Research Award, Yale University, 2024 (USD 24,078)
SYLFF Research Award, Yale University, 2023 (USD 5,913)

Teaching Experience:

Fall 2026, Guest Lecturer, Urban and Environmental Economics (G), Yale University
Spring 2026, Teaching Assistant to Profs. Giuseppe Moscarini and Aleh Tsyvinski,
Introductory Macroeconomics (U), Yale University
Fall 2024, Guest Lecturer, Urban and Environmental Economics (G), Yale University
Fall 2024, Teaching Assistant to Prof. Ana Cecilia Fieler,
International Finance (U), Yale University
Spring 2023, Teaching Assistant to Prof. Giuseppe Moscarini,
Macroeconomics (G), Yale University
Fall 2022, Teaching Assistant to Profs. Giuseppe Moscarini and Fabrizio Zilibotti,
Introductory Macroeconomics (U), Yale University
Spring 2020, Teaching Assistant to Prof. Soyoung Kim,
Recent Trends in Macroeconomics (G), Seoul National University
Fall 2019, Teaching Assistant to Prof. Woong Yong Park,
Advanced Macroeconomics (G), Seoul National University
Spring 2019, Teaching Assistant to Prof. Soyoung Kim,
Topics in International Monetary Economics (G), Seoul National University
Spring/Fall 2018, Teaching Assistant to Prof. Soyoung Kim,
Macroeconomics (U), Seoul National University

Research Experience:

Research Assistant to Prof. Nicholas Ryan, Yale University, 2026
Research Assistant to Prof. Costas Arkolakis, Yale University, 2021–2022, 2024
Research Assistant to Prof. Lorenzo Caliendo, Yale University, 2023
Research Assistant to Profs. David Atkin and Amit Khandelwal, Yale University, 2022–2023
Research Assistant to Prof. Soyoung Kim, Seoul National University, 2018–2020

Work Experience:

Military Service, Republic of Korea Army (2014–2015)

Working Papers:

"The Spatial Consequences of Industrial Environmental Regulation", (Nov 2026),
Job Market Paper
"Deep Industrial Decarbonization: Theory and Evidence from South Korea"
with Costas Arkolakis and Emmanuel Murray Leclair, (Jan 2026), *Working Paper*
"Public and Private Investment in Electric Vehicle Charging Infrastructure"
with Seung-Yong Yoo, (Nov 2026), *Working Paper*

"An Anatomy of Multinational Production: Evidence from Affiliate Labor Composition"
with Wei Xiang, (Nov 2026), *Working Paper*

Work In Progress:

"Effects of Tariff Shocks under the International Financial Trilemma"
with Yeon Jik Lee, (Aug 2026)
"The Energy Transition of Buildings: Evidence from Korea", (Aug 2026)

Seminar and Conference Presentations:

2026: Southern Economic Association (scheduled),
Society for Economic Dynamics,
LSE Environment Camp.
2025: The 2025 BK21-Jiam Conference on Big Data and Economics,
Urban Economics Association,
Econometric Society World Congress,
Society for Economic Dynamics.

Professional Service:

Referee: *Journal of International Economics, Research Policy*
Organizer: Young Economists Symposium, Yale University, 2022

Languages:

Korean (native), English (fluent), German (beginner)

References:

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Dissertation Abstract

The Spatial Consequences of Industrial Environmental Regulation [Job Market Paper]

How do regulations on local air pollution affect emissions and production when firms can shift pollution across plants, sectors, and places? This question matters because such regulations often target large polluters in densely populated, heavily polluted regions, where pollution damages are greatest. Yet such targeting creates a problem for policy evaluation: emissions declines among regulated plants may reflect both true abatement and shifts of pollution elsewhere. Comparisons of regulated and unregulated units can therefore overstate emissions reductions. Moreover, because these are local air pollutants rather than greenhouse gases, the aggregate pollution damage can fall with pollution shifts to low-damage places.

I study South Korea's 2020 geographic expansion of its cap-and-trade program for local air pollutants: nitrogen oxides, sulfur oxides, and total suspended particulates. Measuring pollution shifts is challenging because it is often difficult to find suitable control plants due to coverage limitations, and data rarely link emissions, production, and abatement technology. I address these challenges by combining national administrative records and censuses on emissions, sales, fuels, and emission-control equipment from 2016 to 2023, covering all regulated and unregulated manufacturing and power plants in Korea.

Using difference-in-differences, I first show that manufacturing emissions fall by 33–37% across pollutants in regulated districts, relative to the same industries in unregulated districts. Regulated manufacturing plants exhibit larger increases in electricity use, electricity's share of energy use, and emission-control equipment use than matched unregulated unaffiliated plants. The evidence is consistent with pollution shifts to unregulated plants within the same manufacturing firms, to power generation, and to nearby unregulated districts, suggesting that spillovers may affect the comparison units.

To translate these relative effects into aggregate effects when policy exposure and pollution damages vary across places, I develop a spatial model of manufacturing and upstream power plants. The model features the abatement and pollution shift channels above and is calibrated to match the potentially contaminated reduced-form estimates. I find that geographic pollution shifts account for 19% of the manufacturing emissions difference-in-differences estimate. I also use the model to assess aggregate impacts. The actual policy reduces pollution damage by 38% at the cost of a 1% decline in consumption. Regulated districts experience lower pollution damages but larger consumption losses, while unregulated districts experience higher pollution damages and smaller consumption losses. This reduction in pollution damage reflects the concentration of emissions reductions in high-damage locations. Holding national emissions totals fixed for each pollutant, a nationwide alternative with higher emissions prices in districts with greater population exposure achieves larger damage reductions at a lower consumption cost than the actual policy.

Deep Industrial Decarbonization: Theory and Evidence from South Korea,

with Costas Arkolakis and Emmanuel Murray Leclair

Industrial electrification is central to decarbonization, but little is known about which policies induce firms to electrify or when such switches meaningfully reduce emissions. We study these

questions in South Korea, where the share of manufacturing plants relying exclusively on electricity rose from 35 to 65% between 2016 and 2022 amid the introduction of environmental regulations and green-technology subsidies. However, emissions reductions from manufacturing remain limited because the largest polluters are least likely to electrify. Using new establishment-level data on fuel use and emissions, we examine whether this electrification was driven by regulations or subsidies and forecast their long-run effects. We develop and estimate a dynamic spatial model in which firms pay fixed costs to adopt or drop fuels, regulations affect local fuel prices, and subsidies reduce clean-fuel adoption costs. The quantitative results attribute most electrification to subsidies targeted at small and medium-sized firms rather than to environmental regulations.

Public and Private Investment in Electric Vehicle Charging Infrastructure,
with Seung-Yong Yoo

We study how public investment in electric vehicle (EV) charging infrastructure affects private investment, charging access, and EV adoption. Public investment can crowd out private investment through business stealing or crowd it in through better charging access and EV adoption (indirect network effect). Our empirical setting is Korea's direct provision and installation subsidies over 2018–2024. Using vehicle registrations, charger ownership and subsidy records, and charging activity data, we find evidence of net crowding in alongside business stealing: For slow charging, subsidies increase private investment and EV sales while reducing utilization. Because drivers substitute across charging locations, public investment can generate spatial spillovers in charging access and private investment. Thus, we develop a static spatial model of vehicle choice, charging demand, and charging supply, incorporating heterogeneous firms' capacity and pricing decisions, direct provision, subsidy eligibility, and project approval. Counterfactuals quantify how alternative budget allocations and subsidy rules affect charging access, EV adoption, and welfare across space.

An Anatomy of Multinational Production: Evidence from Affiliate Labor Composition,
with Wei Xiang

A multinational firm can use its ideas in every country where it operates, while other firms cannot. What carries these ideas to its foreign affiliates: goods shipped from the parent, or people from the home country? Surveys of Korean foreign affiliates, which record both channels, point to people. Expats, the Korean nationals employed at an affiliate, hold executive or managerial jobs in 79.5% of affiliate-years, whereas imports from the parent occur in 42.7%. Most affiliates have expats from their first year, and these expats stay as local management expands. Relative to local managers, expats are more common in richer and more distant host countries, and expat managers are more common in industries with greater management requirements. The pattern is consistent with expats handling communication between headquarters and the affiliate. We develop a multinational production model with knowledge hierarchies to quantify how much cross-border communication costs contribute to cross-country differences in output per worker.