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Fields of Concentration:
Environmental Economics
Industrial Organization
Development Economics
Applied Econometrics

Qualifying Examinations Completed:
2023 (Oral): Industrial Organization, Econometrics

Dissertation Title: *Essays on Environmental Economics and Industrial Organization*

Committee:
Professor Rohini Pande (Co-Chair)
Professor Katja Seim (Co-Chair)
Professor Lauren Bergquist
Professor Steven Berry

Education:
Ph.D., Economics, Yale University, 2027 (expected)
M.Phil., Economics, Yale University, 2025
M.A., Economics, Yale University, 2025
B.A., Economics (Honors) & Data Science, New York University, *Summa Cum Laude*, 2021

Fellowships, Honors and Awards:
University Dissertation Fellowship, Yale University, 2026–2027
Yale University Graduate Fellowship, 2021–2027
Cowles Foundation Fellowship, Yale University, 2021–2026
Phi Beta Kappa, New York University, 2021
Dean's Award in Arts and Sciences, NYU Shanghai, 2021

President's Service Award, New York University, 2019 (team recipient)
Global Elite Scholarship, NYU Shanghai, 2017–2021

Research Grants:

Yale EGC Sylff Research Award, 2026, "From Foreign Policies to Local Roads: The Role of Used Vehicle Flows in Mediating Clean Transitions", *$9,407.73*
Yale EGC Evenson Fund Travel Research Award, 2025, "From Foreign Policies to Local Roads: The Role of Used Vehicle Flows in Mediating Clean Transitions", *$4,442*
Yale Department of Economics Data Acquisition Funding, 2025, *$3,000*

Teaching Experience:

Fall 2025, Teaching Assistant to Professor Ray Fair, Applied Econometrics: Politics, Sports, Microeconomics, Yale College
Spring 2025, Teaching Assistant to Professor Yusuke Narita, Intermediate Data Analysis and Econometrics, Yale College
Fall 2024, Teaching Assistant to Professor Cormac O'Dea, Introductory Microeconomics, Yale College
Spring 2024, Teaching Assistant to Professor Joseph Altonji, Intermediate Data Analysis and Econometrics, Yale College
Fall 2023, Teaching Assistant to Professor Ray Fair, Applied Econometrics: Politics, Sports, Microeconomics, Yale College

Research Experience:

Research Assistant to Professor Laura Boudreau, Columbia University, 2023
Research Assistant to Professor Katja Seim, Yale University, 2022
Research Assistant to Professor Sylvain Chassang, New York University, 2020

Working Papers:

"Dirty Trade: How Global Used Vehicle Trade Mediates Clean Transitions", (November 2026), *Job Market Paper*
"Measuring the Option Value of Change: Theory and an Application to Operation Ceasefire" with Sylvain Chassang and Michal Kolesár, (March 2026)
"New-Car Waves, Used-Car Cascades: The Geography of Replacement" with Nico Lukas Kasparetz, (November 2026)

Work in Progress:

"The Incidence of Overlapping Environmental Regulations" with Xiang Ma and Junming Zhu
"Clean Today, Dirty Tomorrow: Strategic Emissions under Dynamic Environmental Enforcement" with Mengdi Liu, Bing Zhang, and Junming Zhu
"Long-Term Contracts, Locked-In Coal, and Energy Transition" with Gabriel Dias Santamarina

Seminar and Conference Presentations:

Stanford SITE, July 2026
Harvard-Yale DEV PhD Workshop, January 2026

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References:

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Dissertation Abstract

Dirty Trade: How Global Used Vehicle Trade Mediates Clean Transitions [Job Market Paper]

Many developing countries depend heavily on imported used vehicles, which originate predominantly from a few major exporting countries such as Japan. When exporting countries implement clean vehicle policies to accelerate their transitions to greener economies, displaced used vehicles may enter the global market, with unclear effects on emissions and welfare in importing countries. This paper studies how Japan's Clean Energy Vehicle subsidies from 2013 to 2024 affected Uganda, where around 90% of first-time registered passenger vehicles were used imports from Japan, and how Uganda should design its import restrictions in response.

I link Japanese subsidy schedules with comprehensive data on first-time registrations, prices, and emissions of vehicles in Uganda. Exploiting variation in subsidies across new vehicles and over time, as well as variation in the similarity between used vehicles and subsidized new vehicles, I find that a 1,000 USD increase in exposure to Japanese subsidies increased the number of first-time registered vehicles in Uganda by 5.8% and decreased their average price by 2.6%. The effects

were concentrated among vehicles aged 6–13 years, which were younger and generally less emissions-intensive than the average first-time registered vehicle in Uganda.

To quantify the broader effects of Japanese subsidies on fleet dynamics, total emissions, and welfare, I estimate an equilibrium model of vehicle demand and supply in Uganda with endogenous inflows and scrappage. In each period, consumers decide whether to scrap existing vehicles and choose among the surviving stock and vehicles eligible for import. Prices of importable vehicles reflect foreign supply conditions and local costs, while prices of the other vehicles adjust to clear the domestic market. Simulations show that Japanese subsidies expand Uganda's fleet despite increased scrappage, while shifting its composition toward less emissions-intensive vehicles. Consumer surplus increases, but so do total emissions, as fleet expansion outweighs the reduction in average emissions per kilometer. Overall, Japanese subsidies increase welfare in Uganda.

Finally, I apply the estimated model to evaluate a recent proposal in Uganda to tighten its import age limit from 15 to 13 years. The tighter limit reduces the fleet size and average emissions per kilometer, lowering total emissions at the cost of consumer surplus. Japanese subsidies alter this trade-off by lowering the prices of younger vehicles, encouraging greater substitution toward less emissions-intensive vehicles while mitigating the reduction in the fleet size. Consequently, Japanese subsidies reduce not only the losses in consumer surplus but also the emissions savings, as the smaller reduction in the fleet size dominates the larger reduction in average emissions per kilometer. Overall, tightening the limit reduces welfare under existing Japanese subsidies, whereas it would have increased welfare in their absence.

New-Car Waves, Used-Car Cascades: The Geography of Replacement, with Nico Lukas Kasparetz

New vehicle launches can trigger waves of vehicle replacement across countries as displaced vehicles are reallocated through international used-car markets. We study how new vehicle launches in Europe affect vehicle replacement in Germany and Romania, an import-dependent market that sources predominantly from Germany. We combine vehicle-level registration records from both countries with launch schedules in Europe and electric vehicle (EV) subsidy schedules in Germany. Exploiting variation in launch timing and similarity between incumbent and newly introduced vehicles, we find that launches increased new vehicle sales and de-registrations of incumbent vehicles in Germany. In Romania, launches did not increase new vehicle sales. They increased first-time registrations of used vehicles imported from Germany and de-registrations of generally older and more emissions-intensive incumbent vehicles. The effects were substantially larger for EV launches, partly because of EV subsidies in Germany. To evaluate the effects of alternative German EV subsidy designs on emissions and welfare in Germany and Romania, including designs that condition subsidies on scrappage and thus prevent displaced vehicles from triggering further waves of replacement abroad, we develop a dynamic model of vehicle replacement in both countries.

The Incidence of Overlapping Environmental Regulations, with Xiang Ma and Junming Zhu

When sector-specific environmental policies operate alongside aggregate emissions targets, additional abatement induced in one sector may reduce the abatement required elsewhere. We examine the incidence of aggregate targets when there are concurrent sector-specific policies. Our setting is China's Eleventh Five-Year Plan, under which cities faced similar percentage reduction targets for SO_2 emissions alongside substantial abatement requirements for power plants. We find that cities achieved similar proportional reductions in aggregate SO_2 emissions, with smaller reductions among other industrial firms offsetting larger reductions from power plants nearly one-for-one. Greater exposure to power-sector requirements reduced declines in input demand and output among other industrial firms, and the effects varied systematically with firm characteristics. Together, the findings suggest that sector-specific regulations can largely reallocate, rather than increase, aggregate abatement while substantially changing the incidence of compliance.