Research Statement

Michigan State University

Saera Oh   Dept. Agricultural, Food, and Resource Economics

I am a trade economist interested in the heterogeneity underlying international trade patterns. My research focuses on multinational firms' trade behavior and broader patterns of aggregated trade particularly in the context of geopolitical risks and evolving trade policies. I have been trained as an empirical researcher skilled in analyzing large-scale, high-granularity data. The more I study, the more I recognize the fundamental importance of linking empiric and theory. My current work represents a transition toward this integration using detailed data to uncover patterns and developing theoretical structures to interpret them. My dual Ph.D. training in Agricultural, Food, and Resource Economics (AFRE) and Economics reflects my broader goal of uniting empirical precision with theoretical depth. At the same time, I view myself as an entrepreneurial researcher who is open to adopting new skills, acquiring novel data sources, and applying innovative methodologies. This perspective continues to shape my future research agenda, where I plan to incorporate machine learning tools to deepen our understanding of firms' export and import behavior.

In the following sections, I highlight my completed and ongoing research, which can be organized into two main areas: (i) related-party trade[§] among multinational enterprises, and (ii) agriculture in international trade. Extending these research areas, my future agenda explores the use of machine learning methods to detect anomalies in goods trade and to deepen our understanding of firms' export and import behavior.

Research on related-party trade

In my job market paper, *"Related Party Trade and Gravity: Revisiting the Distance Effects,"* I study how distance shapes the export behavior of multinational affiliates by distinguishing trade within firms from trade across firms. Using shipment-level Bill of Lading data from India, I develop a new method to identify related-party (within-firm) and arm's-length (across-firm) exports, including affiliate-to-affiliate transactions that are typically unobservable in standard datasets. I document that foreign affiliates export through both channels, sell distinct products across them, and that related-party exports were historically directed toward more distant markets—a pattern that has weakened in recent years. To interpret these patterns, I build a partial-equilibrium model allowing trade costs to differ between related-party and arm's-length modes and derive firm-destination level gravity equation. I estimate the model using Poisson pseudo-maximum likelihood and find that related-party exports are less sensitive to distance than arm's-length exports, though the gap has narrowed over time. This erosion of the internal distance advantage helps explain the rise of inter-firm trade among multinational affiliates. The current version is the first draft of this research, and I see various ways to improve it. One clear direction is to modify the model so that distance costs play a more explicit role as a mechanism for understanding the reconfiguration of multinational production. In addition, I would like to explore whether the model can account for the scope of goods exported and support counterfactual analyses based on changes in distance costs.

In an ongoing project, *"Transfer Pricing and Policy Shocks: Evidence from Mexico's Trade with China and the United States"* (with Oren Ziv), we study how transfer pricing differs from the arm's length price for Mexican firms that import from China and export to the United States. Using BoL data from Mexico, we examine how firms' pricing behavior shifted before and after the first

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[§]The definition of related-party trade varies across statistical agencies and trade flows. For example, the U.S. Census Bureau classifies imports as related-party transactions when one party owns, controls, or holds at least 5 percent of the voting shares of the other, and exports as related-party when either party owns 10 percent or more of the other. While my study relies on name-matching and ownership structure to identify related-party transactions, this official definition helps illustrate how the term is employed in trade statistics and the broader literature.

Trump administration tariff policy. Understanding how transfer pricing adjustments interact with trade policy is crucial, as it informs policymakers about the effectiveness of tariffs and the strategic behavior of multinational firms under changing regulatory environments. We also explore whether the renewal of the United States Mexico Canada Agreement (USMCA), particularly revisions to its rules of origin provisions, affects firms that import and export similar goods. This research advances theoretical understanding of multinational firm behavior under policy uncertainty while providing novel empirical evidence on the interaction between transfer pricing and trade policy.

Research on agriculture in international trade

In a paper entitled *"Geopolitical Risks and Agricultural Trade Diversification in Southern Africa: Port-level Evidence from the Russia-Ukraine War"* (with Sunghun Lim), we examine the impacts of Russia's invasion of Ukraine on wheat supplies in South Africa and its trade diversification using an event-study approach. Global food security has become increasingly vulnerable to geopolitical shocks. The Russia–Ukraine war disrupted one of the world's largest grain trade routes, creating widespread concerns over supply shortages and heightened volatility in agricultural markets. These disruptions were particularly salient for African countries, many of which rely heavily on imported wheat and face limited domestic production capacity. Using port-level trade data, we show that South Africa rapidly diversified its imports to mitigate geopolitical risks in the aftermath of the war. This diversification prevented a war-induced decline in average wheat imports but increased the volatility of annual imports. More importantly, it contributed to wheat supplies for southern African landlocked countries that heavily rely on border imports from South Africa. This paper was published in the Journal of the Agricultural and Applied Economics Association in December 2024.

In another study, *"Global Value Chains and Intellectual Property Rights in Agricultural Trade"* (with Sunghun Lim and Titus Awokuse), we examine the impact of intellectual property rights (IPR)-related trade policy on agri-food global value chains (AGVCs). Although intellectual property rights play a role in governing cross-border flows of knowledge and innovation, their implications for agricultural trade have received less attention. We use IPR provisions in regional trade agreements as a proxy for IPR-related trade policy and analyze the trade effects of IPR provisions based on their specific characteristics, utilizing deep trade agreement data published by the World Bank. This data allows us to classify the IPR provisions into "WTO-plus" and "WTO-extra" aspects of IPR provisions. The former pertains to what is mandated by the World Trade Organization (WTO) and includes supplementary procedural regulations, while the latter requires adherence to extra IP-related treaties to expand the IP protection system beyond WTO regulations. The results show that contents of the IPR provisions matter and when IPR protection is mandated through complementary provisions they indeed enhance trade. This manuscript is nearly ready for journal submission.

In an ongoing project *"Trade Policy, Crop Choice, and Water Stress: Evidence from Mexican Agriculture"* (with Hyeseon Shin), we investigate how trade policy shapes crop selection in Mexican agriculture and evaluate the impact of trade policy on local water resources. International trade can influence the crop choices of local farmers, as some crops are significantly more water-intensive than others. Yet, trade patterns do not always align with comparative advantages in water availability. For example, water-scarce countries may continue to export water-intensive crops, potentially worsening local water shortages. We construct an open-economy general equilibrium model with a nested crop-choice framework, which allows us to explicitly capture heterogeneous responses across different types

of land to price changes resulting from trade policies or trade shocks. By assuming a complementary relationship between land and water in production technology, we can examine changes in water use and discuss the implications of these changes in the context of water stress and Mexico's hydrological infrastructure investments under various scenarios, including the new U.S. trade policy on Mexican avocados.

Future Research: Anomalies in Import and Export Data and their Implications

A broad area of research I plan to explore in the future relates to anomalies in import and export data and their implications. Anomaly detection (or outlier detection) is a challenging field that focuses on identifying observations that deviate from general data distributions. While working with Bill of Lading (BoL) data in recent years, I have found them well suited for anomaly detection because they reveal consistent firm-level behavior patterns and allow systematic identification of deviations. Such anomalies may arise for different reasons: they can reflect unlawful practices like tax avoidance through abusive transfer pricing in related-party trade, where manipulated prices generate irregular unit values, or they can capture strategic responses to external shocks, such as abrupt shifts in trading partners, product mixes, or ports of loading and unloading. Each source of anomaly leaves distinct and traceable patterns in the data, providing a basis for analysis.

Machine learning methods are particularly powerful for anomaly detection, as they excel at uncovering subtle, high-dimensional patterns that traditional statistical approaches may miss. In the social sciences, machine learning–based anomaly detection has been widely applied in finance to identify fraudulent transactions, and in logistics to flag irregular cargo movements or shipping routes linked to crimes such as money laundering or trafficking. In contrast, applications in international economics have received comparatively little attention. Beyond a few cases—such as foreign exchange market monitoring, customs authorities detecting misinvoicing, and the European Commission's efforts to identify extreme outliers in trade data—rigorous application to firm-level dynamics remains limited.

Based on this observation, I would like to explore the following research questions: 1) Do external shocks create asymmetric anomalies between import and export behaviors, and how do they evolve over time? 2) Can anomalies in import data predict a firm's unusual export behavior? How might this contribute to understanding changes in global supply chains? 3) Using the lens of related-party trade also generates an interesting research question: how do the frequency and nature of anomalies differ between related-party and arm's-length trade? Transfer pricing in related-party trade can distort normal patterns, creating anomalies that differ from those in arm's-length transactions. Such anomalies may reveal strategic behaviors such as profit shifting or tax avoidance, which are otherwise difficult to observe without full access to firms' accounting information. Particularly, based on first question, it might enable me to use the frequency and persistence of ML-detected anomalies as novel moments to identify firm-level adjustment frictions. I use these anomaly moments to discipline the costs firms face when changing their importing and exporting patterns, and how those costs depend on their current relationships and trade status in dynamic heterogeneous-firm model with import and export potentially.

Teaching Statement

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My teaching philosophy is threefold: learning, motivation, and approach. While the creation and dissemination of knowledge remain central to higher education, learning today extends far beyond the physical classroom. Information and digital tools are widely accessible, but what continues to distinguish college education is the opportunity for students to engage with a dedicated instructor who models lifelong learning, encourages independent and critical thinking, and offers meaningful guidance. In this spirit, I strive to create inclusive and engaging learning environments, integrate technology thoughtfully to enhance learning, and value the diverse perspectives that students bring to the classroom.

Iterative Cycle of Learning and Teaching

During my master's program at Seoul National University, I served as a teaching assistant for a course on international agricultural development and cooperation. I guided students through group projects and reviewed their essays during office hours. Because the lectures were based on case study surveys, I sometimes encountered new concepts myself. Rather than seeing this as a limitation, I studied alongside the students and helped them connect each case to broader themes in development. The most rewarding outcome came when one group, focusing on sustainable development and social capital, developed its project under my guidance into a report that received departmental funding. This recognition enabled them to travel to the UK to visit leading development agencies. This experience strengthened my belief that teaching is not a one-way transfer of knowledge but a collaborative process that deepens learning for everyone involved.

Approach to Teaching

Integrating Technology — I believe that effective teaching today requires integrating technology thoughtfully to enhance engagement and promote active learning while upholding academic integrity. Tools such as live polls or collaborative online boards can make lectures more interactive, help gauge students' understanding in real time, and encourage discussion. I also recognize that students are increasingly encountering artificial intelligence (AI) tools in their studies and future workplaces. Rather than avoiding this reality, I guide students to think critically about when and how such tools can be used responsibly. For instance, I might use AI-generated examples to spark discussion about the strengths and limitations of algorithmic reasoning, or to illustrate how human judgment and contextual understanding remain essential. My goal is to cultivate digital literacy and ethical awareness by helping students navigate evolving technologies with discernment and confidence.

Teaching Across Cultures and Appreciating Diverse Learning Paths — Having studied abroad and worked before beginning my Ph.D., I have developed a deep appreciation for how students' cultural backgrounds and individual experiences shape their approaches to learning. These experiences have shown me that students bring varied motivations, preparation, and ways of thinking to the classroom. As classrooms become increasingly diverse alongside social and economic change, it is important for instructors to recognize and value these differences. My experience as an international student has made me especially attentive to inclusive teaching practices, such as clear communication, varied examples, and encouragement of multiple forms of participation, which help all students succeed. I aim to carry this awareness into my own teaching by creating a supportive environment where students feel confident sharing ideas and learning from one another.

Future Teaching Directions

With doctoral training in both Agricultural, Food, and Resource Economics and Economics, I am prepared to teach a wide range of undergraduate and graduate courses that bridge applied microeconomics, quantitative methods, and international economics. My coursework included *Microeconomics*, *Macroeconomics*, *Cross-Section and Applied Econometrics*, *Agricultural and Development Economics*, *Information Economics and Institutions*, *Industrial Organization*, and *Labor Economics.* These experiences equip me to teach courses in economic theory, empirical methods, and international and agricultural economics among many others.

As data become increasingly central to economic research and decision-making, I view teaching data analysis and management as essential to modern economics. The ability to connect theoretical reasoning with data-driven evidence has become a defining skill for economists in both academic and applied settings. I aim to help students build this connection by integrating data work with conceptual understanding. Working with data has also been a central part of my own research training and dissertation work. For instance, I use large-scale shipment-level transactions data so that streamlining and integration each database have been central to my research process. Through this work, I have developed strong technical skills in managing and analyzing large datasets. Somewhat ironically, this process taught me that rigor in empirical research depends as much on theoretical grounding and economic reasoning as on technical mastery. While new and unique data can offer exciting evidences, the process of validating and synthesizing information is often demanding and time-consuming. These experiences have deepened my appreciation for the clarity, discipline, and creativity that good empirical work requires. In teaching, I aim to cultivate the same balance by emphasizing both technical proficiency and the use of theory to guide data analysis, so that evidence serves to illuminate rather than replace economic reasoning. I design hands-on exercises using entrepreneurial and innovative data sources to encourage students to think creatively about empirical questions and to apply programming tools such as R, Python, and Stata in meaningful ways. My goal is to help students develop the capacity to integrate data-driven insights with sound economic logic across academic, policy, and industry settings.

Service Statement

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I view service as an essential part of academic life and an opportunity to contribute to the collective mission of advancing knowledge, supporting students, and sustaining a strong scholarly community. I am committed to contributing actively and equitably to departmental, university, and professional service responsibilities as part of my role as a faculty member.

Within my department, I have served as Secretary-Treasurer of the Department of Agricultural, Food, and Resource Economics (AFRE) Graduate Student Organization at Michigan State University from 2022 to 2024. In this role, I managed the organization's budget, coordinated professional development events, and organized academic and social activities that strengthened graduate student engagement and fostered a collegial environment. This experience deepened my appreciation for how departmental service enhances communication and builds supportive relationships among students and faculty. As a faculty member, I would be eager to continue contributing through participation in committees such as Graduate Admissions and Recruitment, Seminar, Undergraduate or Graduate Policy, or those related to climate and inclusion. These areas align closely with my interests in mentoring, interdisciplinary collaboration, and community building. Through such service, I hope to help sustain a collaborative departmental culture that supports both scholarly excellence and student success.

At the university level, I believe that effective service means fostering meaningful collaboration across disciplines and supporting the next generation of scholars through mentorship. My dual degree training in AFRE and in Economics has given me first-hand experience working across departmental boundaries and understanding how institutional coordination can advance both research and teaching. At Michigan State University, I have benefited from the Memorandum of Understanding that enables joint advising, shared teaching, and cross-departmental collaboration between the two programs. This experience has shown me how structured cooperation between units can enrich intellectual exchange and strengthen graduate education. Building on this foundation, I hope to contribute to similar institutional linkages by supporting joint research initiatives. I am particularly committed to service that enhances graduate training, promotes diversity and inclusion, and cultivates a cohesive and collaborative academic community.

Beyond the university, I have been actively engaged in professional service. I have served as an abstract reviewer for the Agricultural and Applied Economics Association Annual Meeting (2023–2025) and the European Association of Agricultural Economists Annual Meeting (2023). These experiences have allowed me to contribute to maintaining scholarly standards and to stay connected with the broader academic community. As my career progresses, I plan to expand my professional service through journal refereeing, conference organization, and mentoring of early-career researchers. I am also interested in contributing to initiatives that promote open science, reproducibility, and transparency in empirical research.

Ultimately, I approach service with the same sense of diligence, reliability, and collegiality that I bring to my research and teaching. I recognize that effective service requires cooperation, leadership, and a genuine commitment to shared governance. I will gladly undertake my share of departmental, college, and professional service, viewing it as an opportunity to help shape a supportive and forward-looking academic community in which both faculty and students can thrive.