Research Statement

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My research interests are in the fields of international trade and economic geography. My research has focused on two key questions. First, what determines quality specialization across space, and how it matters for gains from trade and gains from agglomeration. Second, what determines trade policy, and what distributional consequences trade policies have on workers. Answering these questions requires me to connect the model with data. To this end, I have obtained vast experience in building theoretical models, matching the model to its data counterparts, coding the quantitative model, running computer simulations to estimate the model, and performing empirical analysis of the data.

Quality Specialization Across Space

My job market paper, titled "*Quantifying Quality Specialization Across Space: Skills, Sorting, and Agglomeration*", studies the supply-side determinants of quality specialization across space. My motivation in writing this paper and later inviting my coauthors to collaborate, is based on the empirical observation that product quality is higher in big cities. However, no existing work has rationalized this fact. To this end, we build and structurally estimate a general equilibrium model using firm-level data from China. Keys to our model are sorting of heterogeneous firms into big cities and agglomeration benefits accrued to skilled workers who are pivotal in quality upgrading. Two findings emerge from the project. First, sorting and agglomeration of skilled workers each explains half of the quality specialization pattern across Chinese cities. Second, if we relax the land use regulation in housing production by 20% and attract more skilled workers to big cities, it would have raised product quality in big cities by 5.5% and indirect welfare of all residents by 6.2% through reallocation of economic activities across space. I aim to submit this paper to the *Economic Journal* or the *Journal of Development Economics* for publication by July 2020.

My second paper, titled "*Information Frictions, Pro-Competitive Effects, and the Search for Quality*", studies how reducing information frictions matters in spatial competition and in inducing firms to upgrade product quality. The motivation in pursuing this project, is based on the observation that low-quality products often prevail in secluded regions. My hypothesis is that information frictions play a crucial role in preventing more efficient firms from supplying higher-quality products to these regions. To investigate this hypothesis, my coauthor and I introduce monopolistic competition, heterogeneous firms, and quality upgrading into a sequential search model with trade (Allen, 2014). The key element in our model is that heterogeneous producers must search to learn about the quality-augmented price index elsewhere and to decide whether to compete in a specific destination based

on the degree of local competition. Our model predicts that a fall in information frictions such as the building of ICT infrastructures (e.g., faster mobile networks) will lead to spatial penetration of cheaper and higher-quality products, enhance local competition, and induce quality upgrading. We qualitatively corroborate the theoretical predictions using firm-level unit value data and variations in ICT infrastructures across Chinese cities. Currently, I am complementing the existing paper by calibrating the general equilibrium model to discuss its welfare implications, as well as exploiting more empirical evidence using China Custom data. After these works are done, I plan to submit this paper to the *Journal of International Economics* by July 2020.

In the future, I will add another paper, which is currently in progress, to my research agenda on quality specialization. This project, titled "*Does Market Integration Lead to Spatial Concentration of Higher-Quality Products? Evidence from Expansion of China's Highway System*", aims to complement my job market paper and studies the effect of falling trade cost on the quality specialization pattern within a country. My prior is that, these effects will be vastly different from those predicted by the international trade literature as individuals or firm entities are reasonably mobile within a country. However, a quantitative approach to study this question would be difficult under the current state of literature.[1] As such, I focus my attention on providing empirical evidence with credible identification strategies. I approach this question in the context of the expansion of national highways in China, which substantially reduces trade costs within the country. Such policies often aim to reduce spatial inequality across Chinese regions, but they may also backfire as firms are more willing to sort into big cities when the market access improves. In addition, the priorities of such policies are often place-based and are contingent on locational characteristics. To address these difficulties, I build my work on an instrument that is often used in the spatial literature, which is to use the least-cost spanning network based on engineering estimates to construct an alternative network of highways. Currently, I have finished collecting and cleaning the data, and I look forward to implementing the empirical design in a few months. I plan to complete and submit this paper to the *Journal of Urban Economics* or the *Regional Science and Urban Economics* by October 2020.

International Trade Policies

Another research agenda of mine focuses on what determines international trade policies and what distributional consequences are associated with these trade policies. One paper, titled "*Quantifying the Transition Dynamics of Trade Liberalization: Roy Meets Heckscher-Ohlin*", studies the transitional dynamics of trade liberalization. This project, for which the draft is coming soon, aims to rationalize the empirical observations that factories in China were initially exporting matches and shoes upon accession to WTO; they only started to export more high-tech products such as electronic components in recent years. We quantify this pattern and its distributional consequences by developing a Ricardian-Heckscher-Ohlin model with dynamic Roy elements such as occupational choice and occupation-specific human capital accumulation. The key insight from our model is that occupational human capital accumulation of individuals is also a source of endogenous comparative advantage. As such, a country that is relatively more productive in some sectors may not have com-

[1] There are two technical difficulties. First, it is hard to prove the uniqueness of the model with two types of labor. Second, it is computationally feasible to solve a model with firm sorting and fixed cost in upgrading quality.

parative advantage in the initial period, because the supply of occupation-specific human capital in these industries is limited. Furthermore, exports of these goods will grow slowly as it takes time for workers to accumulate occupation-specific human capital. We quantify this transition dynamics under North-South two-country settings and calibrate the parameters using data from China and the United States. The welfare implications are such that trade liberalization hurts North occupations with a fast accumulation of specific human capital more initially. The impact gradually extends to other occupations in later years, although aggregate welfare increases. Our work implies that the priority of trade adjustment assistance programs matters. I plan to polish and submit this paper to the *Journal of International Economics* by October 2020.

The second paper in this agenda, which is currently in progress, studies how global value chains or input-output linkages shape optimal trade policies, as evidenced by the recent U.S.-China trade disputes. This project, titled "*Trade Wars and Trade Talks with Global Value Chains*", quantitatively examines the level of optimal tariffs in a canonical Armington model with input-output linkages, profit-shifting motives, and political economy. The building blocks of our model are imported from those in Ossa (2014), and we augment Ossa's model with input-output linkages similar to the structure in Caliendo and Parro (2015). We have characterized the equilibrium in changes with hat algebra, finished collecting sector-level data on trade, tariffs production, input-output linkages from 30 countries, and estimated the parameters of the model. We are now quantifying the level of optimal tariffs, trade war Nash tariffs, and trade agreement tariffs using the MPEC algorithm for large-scale optimization. I aim to finish and submit this paper to the *Journal of International Economics* by October 2020.

The third project, which is also work in progress, examines the impact of higher-order uncertainty on exporters during trade wars. The title of this paper is "*Uncertain about Uncertainty: The Impact of Trade Wars on Exporter Confidence*". To do so, we introduce higher-order uncertainty and coordination of production (Angeletos and LaO, 2013) into a two-country model with trade policy uncertainty. In particular, we assume that exporters in each country hold imperfect beliefs regarding the probability of trade war. As a result, we show that there is an additional channel in which exports are dampened by the probability of a trade war, and it is independent of the expected value of exports under perfect information. Quantitatively, we find that this extra trade-dampening effect magnifies when the probability of a trade war rises. We label this effect as the fall in exporter confidence because it involves changes in higher-order expectations. Currently, we are applying a machine learning algorithm to extract a textual measure of belief disagreement about trade policy from a database of daily newspapers. We intend to use this measure in the calibration of our quantitative model. I plan to finish this paper and submit it to the *Journal of International Economics* by December 2020.

Future Works

Apart from the works mentioned above, I also have a pipeline of future projects. Currently, I am exploiting three other projects that study the interaction among urban, trade, and labor markets joint with coauthors from leading universities in Beijing and Shanghai. We have finished acquiring a substantial proportion of micro-data across different years.