Research Statement

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I am an economist working on several theoretical and empirical topics in International Trade. My research relies on micro data (in particular firm data) from different countries to study the institutional and political factors that explain the causes and implications of global trade. My work can be categorized into three broad themes, namely (1) the micro approach to studying global value chains; (2) internationalization strategies of firms in emerging markets; and (3) the institutional and political constraints and consequences of trade. While a lot of my previous studies use Chinese data, they provide important policy insights for other developing nations. The specific research projects that I have been working on are described as follows.

Research Theme 1: Global Value Chains (the Micro Approach)

The first theme of my research is to take a micro approach to studying the global value chains using different countries' firm and transaction-level data. This approach is a significant departure from the existing literature that relies on aggregate data and input-output tables. The benefits of using micro data is that I can verify the underlying factors behind a country's participation and evolution of global value chains from the most micro foundation. In most of my research in this area, I show that firms' optimal reactions to market imperfections or policy changes often become important factors shaping a country's aggregate trade patterns.

In the paper "Domestic Value Added in Exports: Theory and Firm Evidence from China" (Kee and Tang, 2016), we study China's rising domestic content in exports using firm- and customs transaction-level data. The micro approach embraces firm heterogeneity and hence reduces aggregation bias. The study shows that the substitution of domestic for imported materials by individual processing exporters caused China's domestic content in exports to increase from 65 to 70 percent in 2000-2007. Guided by a heterogeneous-firm model of domestic and foreign outsourcing, we find empirical evidence that such substitution was induced by the country's trade and investment liberalization, which deepened its engagement in global value chains and led to a greater variety of domestic materials becoming available at lower prices.

While my work in this area deviates from the conventional approach, I have conducted research that links my proposed micro approach with the traditional macro approach. In the paper "Extending the Input-Output Table Based on Firm-level Data" (Tang, Wang, and Wang, 2016), we propose methods to extend a standard input-output (IO) table to incorporate firm heterogeneity when portraying the domestic segment of global value chains in a country. We develop a quadratic optimization model that uses statistics from custom and firm census data to extend any IO table to a detailed one that reports inter-sector transactions between different types of firms. Our proposed methods permit the construction of standard errors of all values in the estimated IO tables, based on random samples bootstrapped from firm-level data. As an illustration, we implement our estimation model using Chinese IO tables and firm census data. We then use the extended IO tables to estimate the direct and indirect domestic value added and profits in exports of different types of firms in China. Based on our reconciled data sets for 2007 and 2010, we find that both state-owned enterprises (SOEs) and small and medium domestic private enterprises (SMEs) have much higher value-added exports (VAX) to gross exports ratios, compared to foreign-invested and large domestic private firms. The VAX of all firm types increased between 2007 and 2010, especially for SOEs. In a companion paper "The Domestic Segment of Global Supply Chains in China under State Capitalism" (Tang, Wang, and Wang, 2014), we take a political spin of the paper and use the same methodology to examine the roles of SOEs along the domestic segment of global value chains in China's exports. In addition to the findings in Tang, Wang, and Wang (2016), we highlight that SOEs are consistently more upstream while SMEs are consistently more downstream within industries. These findings suggest that SOEs still play an important role in shaping China's exports, after years of sequential privatization and a potential return of state capitalism in China in recent years.

Micro data permit analysis in greater detail about how global production is being organized across border. Specifically, there is a large literature studying how contractual frictions affect firms' choices of organizational forms in global sourcing (see Antràs's "Global Production: Firms, Contracts, and Trade Structure" (2015) for a book-length synthesis of the topics). Some of my research in this theme contributes to this literature. Related to the more conventional model of incomplete contracts and trade, my paper "Determinants of Vertical Integration in Export Processing: Theory and Evidence from China" with Ana Fernandes (Fernandes and Tang, 2012) studies the determinants of vertical integration versus outsourcing in export processing. The paper exploits the coexistence of two export processing regimes in China, which designate by law who owns and controls the imported components for our empirical analysis. We extend the Antràs-Helpman model by considering controls over imported components for assembly, which affect the tradeoff between firms' vertical integration and outsourcing. Our empirical results show that when Chinese plants control the use of components, the export share of foreign-owned plants is positively correlated with the intensity of inputs provided by the headquarter (capital, skill, and R&D intensity). These results are consistent with the property-rights theory of intra-firm trade. However, when foreign firms own and control the components, there is no evidence of a positive relationship between the intensity of headquarters' inputs and the prevalence of vertical integration. The results are consistent with our model that considers control over imported components as an alternative to asset ownership to alleviate hold-up by export-processing plants.

While the existing literature typically focuses on the determinants of intra-firm trade versus arms-length trade, the reality is more complicated. My recent paper "Relational Contracts in Global Sourcing: Theory and Evidence from the United States" (Kamal and Tang, 2015) studies an overlooked reality that firms often rely on repeated interactions as an alternative to vertical integration to alleviate the hold-up problems in international trade. We build a relational contracting model to study under what circumstances repeated interactions can substitute for or complement formal contracts (vertical integration) in trade when complete contracts cannot be written to specify investment levels. By considering sector-level headquarter intensity and suppliers' countries' discount factors, our parsimonious model shows that first-best investments can actually be achieved through relational contracts, in the absence of complete contracts. The first-best outcomes are more likely to be sustained for global production that involves an intermediate level of headquarter intensities, and if the suppliers are from countries in which buyers expect a higher life-time value of cooperation. We find empirical evidence from 15 years of US Census Bureau's importer-exporter matched data for the main theoretical predictions. We also find that a sudden increase in the supply of input suppliers from China after the country's WTO accession make short-term buyer-supplier relationships more likely to be terminated, but long-term relationships more likely to last. The more unstable buyer-supplier relationships due to the increased outside options from China partially explain the rising share of related party imports into the US.

My older work on the domestic segment of global value chains (Tang, Wang, and Wang, 2014 and 2016) relies on IO tables and estimation for an analysis. To directly assess how offshoring affects the domestic production network, I wrote "Offshoring, Relationship-Specificity, and Domestic Production Networks" (Furusawa, Inui, Ito, and Tang, 2015). The paper uses novel domestic buyer-supplier linked data from Japan to examine both theoretically how firms' offshoring decisions lead to reorganization of domestic production networks. We build a buyer-seller model that features supplier heterogeneity in efficiency and distance, as well as intermediate inputs that vary in the degree of specificity to the relationship with the buyer. Sourcing inputs from more regions requires additional up-front fixed costs, but reduces variable costs due to the use of the more efficient suppliers. The more productive buyers source inputs from the more distant locations, but less so for the more relationship-specific inputs. A reduction in offshoring costs leads to buyers' displacement of the less efficient domestic suppliers by foreign suppliers, particularly for generic inputs. The resulting reduction in variable costs will induce buyers to expand their scope of domestic outsourcing, offsetting some if not all of the displacement effect. Using unique and exhaustive data on the buyer-seller network in Japan, we find evidence supporting the main predictions of the model.

Research Theme 2: Internationalization Strategies of Firms in Emerging Markets

The second theme of my research is about how firms in emerging markets penetrate into foreign countries. I have written papers that empirically identify the importance of learning to export, how trade intermediaries help firms verify product quality in foreign markets, and how firms exploit their own competitive advantage by either specializing in their core products or engaging in outward (horizontal) direct investment.

In "Learning to Export from Neighbors" (Fernandes and Tang, 2014), we study whether new exporters learn from neighboring firms about export opportunities in new markets. We develop a statistical decision model in which a firm updates its prior belief about demand in a foreign market based on several factors, including the number of neighbors currently selling there, the level and heterogeneity of their export sales, and the firm's own prior knowledge about the market. A positive signal about demand inferred from neighbors' export performance raises the firm's probability of entry and initial sales in the market but, conditional on survival, lowers its post-entry growth. These learning effects are stronger when there are more neighbors to learn from or when the firm is less familiar with the market. We find supporting evidence for the main predictions of the model from transaction-level data for all Chinese exporters over the 2000-2006 period. Our findings are robust to controlling for firms' supply shocks, countries' demand shocks, and city-country fixed effects. In ongoing research "Learning from Neighbors about Export Opportunities", Kasahara and I build a dynamic model of learning and structurally estimate the option value of waiting and quantify the value of information provided by neighboring firms (Kasahara and Tang, 2015)?

In "Fast Fashion: Theory and Evidence from Portuguese Textile and Clothing Firms" (Fernandes and Tang, 2016), we use exceptionally rich and representative data on Portuguese firms to study how import competition from China, both at home and in third markets, induces firms in high-wage economies to exploit their competitive advantage in fast trade and quality production. For identification, we exploit the exogenous increase in competition at the fine product level following the removal of Multi-Fibre Arrangement (MFA) quotas on Chinese textile and clothing (T&C) exports in 2005. We find no evidence of changes in employment, wages, value added, output, for sales among the Portuguese T&C firms despite the sharp increase in competition, contrary to existing evidence from many developed countries. We then exploit the rich data on prices and quantities of firms' input, import, output, and export transactions, as well as the distance and frequency of exports, to paint a comprehensive picture of quality upgrading. We find that it is the medium-sized firms that upgrade quality and increase the frequency of exports (within a year) the most. Quality upgrading and fast trade are accompanied by firms importing more expensive materials, hiring more skilled workers, substituting foreign for domestic outsourcing, and specializing in exports to closer destinations. We rationalize these findings by a simple heterogeneous-firm model that features endogenous quality choices and time-sensitive demand.

In "Quality Differentiation and Trade Intermediation" (Tang and Zhang, 2014), we study both theoretically and empirically whether intermediaries alleviate the quality problem in international trade. We develop a heterogeneous-firm model that features vertical and horizontal differentiation of products, a coexistence of direct exporting and indirect exporting through intermediaries, and firms' investment in marketing. When complete contracts are not available, intermediaries underinvest in marketing from the perspective of the producer. For products that are more horizontally differentiated, weaker competition permits even the low-quality firms to export, but via intermediaries. These two mechanisms yield a negative (positive) cross-product relation between vertical (horizontal) differentiation and the prevalence of trade intermediation. Intermediation is more prevalent in the more (both physically and culturally) distant destinations, especially for the more differentiated (vertically and horizontally) products. We find supporting evidence using Chinese product-level data.

In a sequence of perhaps more policy-oriented research papers (Chen and Tang 2014, 2015; Dollar, Chen, and Tang, 2015), I use unique project-level data of outward direct investment by Chinese firms from MOFCOM to portray the increasing and controversial China's overseas investments. Consistent with the common theme of my micro approach, I take a firm-level approach to study the objectives of Chinese outward direct investments (ODI). In "Why is China Investing in Africa: Evidence from the Firm Level" (Chen, Dollar, and Tang, 2015), we focus on Chinese investment in Africa. The aggregate data on China's ODI in 45 Sub-Saharan African countries reveal that China's share of the stock of foreign investment is small, though growing rapidly. China's attraction to resource-rich countries is no different from Western investment. China's ODI is uncorrelated with a measure of property rights and rule of law, whereas Western investment favors the better governance environments. As a result, Chinese investment in strong and weak governance environments is about the same, but its share of foreign investment is higher in the weak governance states. We code the ODI projects between 1998 and 2012 from our micro data into 25 sectors. Contrary to common perceptions, there are few projects in natural resource sectors. Most projects are in services, with a significant number in manufacturing as well. In our country-sector-level regressions based on firms' transaction-level data, we find that Chinese ODI is profit-driven, just like investors from other countries. In particular, our regressions show that Chinese ODI is relatively more concentrated in skill-intensive sectors in skill-abundant countries, but in capital-intensive sectors in capital-scarce countries. These patterns are mostly observed in politically unstable countries, suggesting stronger incentives to seek profits in tougher environments.

In "The Dragon is Flying West: Micro-level Evidence of Chinese Outward Direct Investment" (Chen and Tang, 2015), we use the entire sample of Chinese firms' ODI and examine the global patterns of Chinese ODI from the most micro level compared to the existing literature. Using a comprehensive dataset that covers close to 10,000 Chinese ODI deals from 1998 to 2009, we find that in contrast to the common perception, over half of the ODI deals are in service sectors, with many of them appearing to be export-related. In addition to documenting the pattern and trend of the PRC's ODI, we empirically examine both the determinants and effects of ODI at the firm level. We find that ex ante larger, more productive, and more export-intensive firms are more likely to start investing abroad. Using matching estimation techniques, we find that ODI is associated with better firm performance, including higher total factor productivity, employment, and export intensity, and product innovation. To assess the relative contributions of technology transfer, export promotion, and resource seeking to the positive effects of ODI, we use ODI data merged with customs transaction-level trade data. We find that firms' ODI participation is associated with significantly better trade performance, measured by export and import volumes, export and import unit values, and number of export destinations. Contrary to perceived technology-seeking and resource-seeking motives, we find no evidence that ODI firms import more capital or intermediate inputs compared to non-ODI firms.

The last paper in this research theme that I wrote brings a classic trade theory – the Heckscher-Ohlin model into the state-of-the-art mode of multiproduct firms. In "Factor Intensity, product switching, and productivity: Evidence from Chinese exporters" (Ma, Tang, and Zhang, 2014), we analyze how a firm's specialization in its core products after exporting affects its factor intensity and productivity. Using Chinese manufacturing firm data for the 1998–2007 period, we find that firms become less capital-intensive but more productive after exporting, compared to non-exporters that share similar ex ante characteristics. To rationalize these findings that contrast with existing studies, we develop a variant of the model by Bernard, Redding, and Schott "Multi-Product Firms and Product Switching" (AER 2010) to consider firms producing multiple products with varying capital intensity. The model predicts that when a firm in a labor-abundant country starts exporting, it specializes in its core competencies by allocating more resources to produce more labor-intensive products. High firm ex ante productivity is associated with a smaller decline in capital intensity after exporting. A sharper post-export decline in capital intensity is associated with a larger increase in measured total factor productivity. We find firm-level evidence supporting these predictions. Using transaction-level data for the 2000–2006 period, we show that Chinese new exporters add products that are less capital-intensive than their existing products and drop those that are more capital-intensive in subsequent years

Research Theme 3: Domestic Institutions, Politics, and Economic Performance

The third theme of my research is about the relationships between domestic institutions, politics, trade and other economic outcomes. I have written papers about how a country's labor market institutions shape its comparative advantage, how foreign direct investment transfers culture across border, how political cycles shape trade policies, and how countries political relationships affect their trade volume and patterns.

In "Labor Market Institutions, Firm-specific Skills, and Trade Patterns" (Tang, 2012), I study how a country's labor market institutions, by affecting workers' skill acquisition, can shape its export patterns. I develop an open-economy model in which workers undertake non-contractible activities to acquire firm-specific skills on the job. In the model, labor market protection raises workers' incentives to acquire firm-specific skills relative to general skills, turning labor laws into a source of comparative advantage. In particular, the model shows that countries with more protective labor laws export relatively more in firm-specific skill-intensive sectors at both the intensive and extensive margins. To test the theoretical predictions, I construct sector proxies for the firm-specific and industry-specific skill intensity by estimating returns to firm tenure and industry tenure for different U.S. manufacturing sectors during the 1974–1993 period. By estimating sector-level gravity equations for 84 countries, I find evidence supporting the predicted effects of labor market institutions at both margins of exports.

In "International Politics and Import Diversification" (Mityakov, Tang, and Tsui, 2013), we examine how international politics affects trade in the absence of empires or wars. We first show that deterioration of relations between the United States and another country, measured by divergence in their United Nations General Assembly voting patterns, reduced U.S. imports from that country during 1962–2000. Though statistically significant, the magnitude of the effect of political distance on trade is small. Indeed, we show that except for petroleum and some chemical products, U.S. imports are not affected by international politics. American firms, however, diversify their oil imports significantly away from political opponents of the United States. Oil trade is often associated with backward vertical foreign direct investment that is subject to the expropriation risk. In contrast to the usual claim that oil is a strategic commodity, we provide suggestive evidence that trade in products when rents are appropriable is more likely to be affected by international politics.

In "Do Multinational Firms Transfer Culture? Evidence on Female Employment in China" (Tang and Zhang, 2016), we study whether multinational firms' transfer corporate culture across countries, revealed by foreign affiliates and local firms' preferences for female workers. We build a parsimonious task-based model that features heterogeneity in firms' productivity and biases towards female workers. The model features women having a comparative advantage in skill-intensive versus brawn-intensive tasks, and multiple sectors that differ in their dependence on these tasks. The model predicts that an increased prevalence of foreign firms in the market induces discriminating firms to increase female employment, due to competition as well as learning. We then confront the model predictions using manufacturing firm data from China over the period of 2004-2007. We find that foreign-invested enterprises (FIEs) from countries with lower gender inequality tend to hire proportionately more women and are more likely to appoint female managers. Domestic firms increase their female employment in response to the presence of FIEs. This cultural spillover is stronger in sectors in which women have a comparative advantage and from FIEs whose home countries are less biased against women. We find little evidence showing that competition is the main channel, suggesting the importance of imitation. Our results reveal an under-explored externality of FDI, beyond technology spillover.

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