

Research Statement

Yiqing Xie

University of Colorado at Boulder

Multinational firms have played a more and more important role in the world economy with both international trade and foreign direct investment being fast growing economic activities. Multinational firms need to make a series of decisions before and after they enter the world market. There are three major steps in the decision process relating to the productivity of multinational firms that have triggered a lot of research interest. The first step in the decision process is the relationship between a firm's export decision and its R&D investment (productivity) choice – what type of firm will self-select into the export market. The second step of the decision process is associated with the mode choice – exporting, licensing, or foreign direct investment. The third step of the decision process is how to implement FDI or licensing in the host country if a firm has already made its mode choice. In order to set up a foreign direct investment, a firm can choose between greenfield investment and cross-border acquisition. In addition, this parent firm can also choose to acquire a more productive host country (local) firm or a less productive one under this cross-border acquisition choice. As to the licensing implementation choice, a firm also can choose to license its technology to a more productive local firm or a less productive one.

My dissertation research aims to search for a general method to analyze these three major steps in the decision process (exporting choice, mode choice and FDI or licensing implementation choice) and to relate these to the productivity decision at firm level in a single theoretical framework. I also test some of the theoretical hypotheses derived in the theory chapters empirically. This research statement summarizes my current projects that address these three major steps in the decision making process of a multinational firm, and it also provides an overview of my future research agenda.

I. The Causality between Productivity and Trade

I construct a trade model that captures the “self-selection” effect of trade on both individual firm's productivity choice and industry's aggregate productivity in this paper to analyze the first step of the decision making process of a multinational firm. Firms are heterogeneous in their cost functions with different efficiency parameters (R&D investment to productivity transformability θ and base

productivity η) which influence the returns from R&D investment to the reduction of marginal cost. These heterogeneous firms first determine their productivity levels by choosing R&D investment in an oligopolistic Cournot competition market in the closed economy. Then they revise their endogenous productivity choice by changing their R&D investment after exposure to trade. The changes in market size and toughness of competition after trade affect the R&D investment choice of an individual firm, and thus affect the productivity choice of that firm.

After exposure to trade, besides the intra-industry reallocation of market shares and profits among all firms, firms with less efficient cost functions are more likely to exit the market, which induces industry's aggregate productivity improvements. Meanwhile larger market size in the open economy will encourage firms to invest in R&D and improve their individual productivity.

Letting firms choose their own productivity levels by introducing cost functions enhances the trade effect on profit decrease of all firms in the open economy due to not only the pro-competitive effect (more competing firms reduce the market price), but also the productivity-improvement effect (firms' lower marginal cost choices are associated with much higher outputs).

II. Exporting, Licensing, FDI and Productivity Choice: Evidence from Chilean Data

(Job Market Paper)

The second paper develops a trade model in which two heterogeneous firms located in two different countries make their productivity choices by choosing their optimal R&D investment levels and then make a mode choice between exporting, licensing and FDI under Cournot competition in an open economy. The ex-ante difference in the cost efficiency of two firms will lead to difference combinations of ex-post productivity difference and mode choice. A small ex-ante difference ends up with the choice of licensing and zero ex-post productivity difference; an intermediate ex-ante difference leads to the combination of exporting and an enlarged ex-post productivity difference; a large ex-ante difference brings the choice of FDI and an even larger ex-post productivity difference. Besides the ex-ante productivity effect, the model also shows how the difference in market demand sizes of two countries causes different preference among mode choices.

I test two sets of theoretical hypotheses developed in this paper by using Chilean firm-level panel data from 2001 to 2007. These are how different mode choices are associated with different productivity *levels* and plant sizes, and how the productivity *difference* between more productive foreign plants and less

productive domestic firms affects the optimal mode choice decision. The empirical results are consistent with the model predictions.

III. Firm's Choice of How to Implement FDI or Licensing

In the third paper, I simplify the Cournot competition model in the previous two papers by fixing firms' productivity levels to analyze the third step in the decision process – a largely unexplored question in the trade literature. An investing firm's optimal FDI or licensing implementation choice depends on the level of heterogeneity among local firms and the average profitability across all firms in the market. There is a trade-off between the fixed FDI set-up cost and the investing firm's ex-post market share under different FDI implementation choices. Greenfield FDI is preferred when the average market profitability is high, while cross-border acquisition of a more productive local firm is optimal when the average profitability is low. The investing firm will choose to acquire a less productive local firm with an intermediate market average profitability. The result for licensing implementation choice is similar, with licensing to a less productive local firm if the average profitability is high and licensing to a more productive local firm if the average profitability is low.

IV. Future Research Agenda

My ongoing research is to find empirical supports for the last paper (**Firm's Choice of How to Implement FDI or Licensing**) by using Chinese firm level data from 1998 to 2007. The Chinese firm level data has enough firms (observations), years and number of industries to test the features of FDI implementation choices including Greenfield investment and different types of foreign acquisitions. Especially for foreign acquisitions, other relatively smaller countries such as Chile usually do not have enough observations for the firm-level transitions from domestic ownership to foreign ownership.

One of my projects that is about to complete is the study on the interacted effect of fixed trade cost and productivity on a firm's exporting decision (coauthored with Luis Castro and Ben Li). Compared to productivity, much less is known about the empirical relevance of fixed trade costs. Using Chilean plant level data, this paper constructs measures of fixed trade costs for each industry, region, and year and estimates the effects of fixed trade costs on firm-level exporting performance. This paper reaches four findings. First, fixed trade costs negatively affect export propensity (firm extensive margin) but not export volume (firm intensive margin). Second, there is an interaction between fixed trade costs and

productivity; specifically, the effect of fixed trade costs at the firm extensive margin is weakened by high productivity. Third, the presence of high-productivity non-exporters is associated with high fixed trade costs. Fourth, the interaction between productivity and fixed trade costs applies to firms that switch from not exporting to exporting, but not to firms that export from the start; this suggests that fixed trade costs are more likely to be an exogenous constraint than an endogenous choice.

References

- [1] Luis Castro, Ben Li and Yiqing Xie, 2011. “Heterogeneous Fixed Trade Cost and Firm-level Exporting Performance”, working paper.
- [2] Wilfred J. Ethier and James R. Markusen, 1996. “Multinational Firms, Technology diffusion and Trade”, *Journal of International Economics*, 41: 1 – 28.
- [3] Maria Guadalupe, Olga Kuzmina and Catherine Thomas, 2010. “Innovation and Foreign Ownership”, NBER working paper 16573.
- [4] Elhanan Helpman, Marc J. Melitz, and Stephen R. Yeaple, 2004. “Export versus FDI with Heterogeneous Firms”, *American Economic Review*, 94(1): 300 – 316.
- [5] James R. Markusen, 2002. *Multinationals and the Theory of International Trade*, MIT Press.
- [6] Marc J. Melitz, 2003. “The Impact of Trade on Intra-Industry Reallocations and Aggregate Industry Productivity”, *Econometrica*, 71: 1695 – 1725.
- [7] Volker Nocke, Stephen Yeaple, 2007. “Cross-border mergers and acquisitions vs. greenfield foreign direct investment: The role of firm heterogeneity”, *Journal of International Economics*, 72: 336 – 365.
- [8] Nina Pavcnik, 2002. “Trade Liberalization, Exit, and Productivity Improvements: Evidence from Chilean Plants”, *Review of Economic Studies*, 69: 245 – 276.