

Essays on International Trade and Intellectual Property Rights

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Foreword

This volume is the result of a research project carried out at the Department of Economics at the Stockholm School of Economics (SSE).

This volume is submitted as a doctor's thesis at SSE. In keeping with the policies of SSE, the author has been entirely free to conduct and present her research in the manner of her choosing as an expression of her own ideas.

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Göran Lindqvist

Director of Research
Stockholm School of Economics

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Professor and Head of the
Department of Economics
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Simply and impossibly: To my family.

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Amanda Jakobsson

Stockholm, May 2013

And since this thesis concerns intellectual property rights (and Jonathan Safran Foer ought to have copyright on his dedication in *Everything is Illuminated*): I hereby acknowledge that I borrowed it when dedicating this thesis.

Table of Contents

1	Introduction	1
2	In Support of the TRIPS Agreement	9
2.1	Introduction	9
2.2	The Model	12
2.3	Numerical Results	37
2.4	Concluding Comments	48
A	Appendix: Related Literature	50
B	Appendix: Solving The Model	58
	References	78
3	A Simple Model of TRIPS	83
3.1	Introduction	83
3.2	The Model	86
3.3	Numerical Results	106
3.4	Related Literature	121
3.5	Concluding Comments	125
A	Appendix: Solving The Model	127
	References	145
4	Export-Learning and FDI with Heterogeneous Firms	151
4.1	Introduction	151
4.2	The Model	155
4.3	Numerical Results	183

4.4	Concluding Comments	195
A	Appendix: Solving The Model	197
	References	215

Chapter 1

Introduction

The recent wave of globalization has been associated with a large increase in trade in intermediate inputs and a huge increase in foreign direct investment (FDI) going to developing countries. In search of new markets, firms enter into developing countries through exporting and FDI. However, developing countries are not only increasingly important for world demand. With technological development, many countries have increased their capacity to produce high-technology goods, resulting in many firms choosing to set up foreign affiliates in developing countries. This international fragmentation of production has challenged the world trading system as production is moved to countries where production costs are lower, but institutions are weaker.

Intellectual property rights (IPR) protection in developing countries has been the topic of intense debate for decades. The multilateral treaty that to date governs international disputes on intellectual property rights is the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS), signed in 1994. The TRIPS agreement required all World Trade Organization (WTO) member countries to formally introduce copyrights and patents, as well as enforcement procedures and dispute mechanisms regarding intellectual property. Since most developed countries already had such systems in place, the TRIPS agreement affected mainly developing countries as they were forced to strengthen their IPR protection policies to remain in the WTO. Both before and after its signing, the TRIPS agreement was under intense criticism. One

of the main criticisms is explained by Douglas Irwin in the book *Free Trade Under Fire* (2009, p. 231): "Many developing countries complain that, unlike mutually beneficial tariff reductions, the TRIPS agreement merely transfers income from developing to developed countries by strengthening the ability of multinational corporations to charge higher prices in poorer countries." In this thesis, I show that it is not necessarily true that a multilateral agreement for stronger intellectual property rights protection is bad for developing countries.

Most models in international trade theory are static models. Yet, globalization is a process that occurs over time. Many relevant issues in current international economics, for example, organization of international production chains, technological spillovers and skill formation, are of dynamic nature. In the three chapters in this thesis, I study international trade and FDI between developed and developing countries in dynamic general equilibrium frameworks.

"In Support of the TRIPS Agreement"

This joint paper with Paul S. Segerstrom challenges the conventional wisdom that the TRIPS agreement is bad for developing countries. We present a dynamic general equilibrium model of North-South trade that allows us to study the implications of stronger intellectual property rights (IPR) protection and simultaneous trade liberalization. For developing countries that belong to the WTO, patent reforms done to satisfy the conditions of the TRIPs agreement are implemented at the same time as tariffs and other trade barriers are lowered to comply with other WTO decisions. To address the impact of the TRIPS agreement on innovation, international technology transfer and consumer welfare, we need to disentangle the effect of trade liberalization from the effect of intellectual property rights protection.

In the model, firms in the North (developed countries) engage in innovative research and development (R&D) to develop new product varieties, and once successful, these northern firms earn global monopoly profits from selling the new products. Northern firms also engage in adaptive R&D to learn how to produce their products in the lower-wage South (developing countries). When

the firms succeed, their foreign affiliates located in the South earn even higher global monopoly profits. Southern firms engage in imitative R&D to learn how to produce both the product varieties of northern firms and their foreign affiliates. Over time, the production of every product variety moves from the North to the South and international technology transfer occurs both through foreign direct investment (FDI) and imitation.

We calibrate the model to fit two benchmark cases: the 1990 benchmark (the world prior to the implementation of the TRIPS agreement) and the 2005 benchmark (the world after the implementation of the TRIPS agreement). Going from the 1990 to the 2005 benchmark, we are able to replicate the large ten-fold observed increase in FDI inflows to developing countries from 1990 to 2005. Our results suggest that for plausible parameter values, TRIPS (stronger southern IPR protection) leads to more FDI, more innovation and considerably higher long-run southern consumer welfare. The South also benefits from the trade liberalization that occurred from 1990 to 2005 but the welfare gains from TRIPS are considerably larger. Furthermore, we find that trade liberalization by itself has a negligible effect in stimulating FDI, so most of the ten-fold observed increase in FDI inflows to developing countries (from 1990 to 2005) can be attributed to stronger southern IPR protection. This big increase in FDI is the main reason why TRIPS is good for developing countries in our analysis.

“A Simple Model of TRIPS”

Developing countries within the WTO implemented patent reforms to satisfy the conditions of the TRIPS agreement at the same time as they experienced lower trade barriers in compliance with other WTO policies. This paper presents a simple dynamic general equilibrium model that can be used to study the implications of stronger IPR protection and simultaneous trade liberalization. The model builds on the model of TRIPS presented in Jakobsen and Segerstrom (2012),¹ but is considerably simpler. In this simple model,

¹Chapter 2 in this volume.

imitation occurs at exogenously given rates, there are no decreasing returns to R&D and all firms face the same marginal cost of production.

From the 1990 benchmark to the 2005 benchmark, the model replicates the observed ten-fold increase in FDI inflow going to developing countries. Stronger IPR protection in the South leads to more FDI, and consequently, more innovation as northern resources are freed up from production. There is a redistribution of production from the higher-cost North to the lower-cost South leading to lower prices for a larger share of the consumption basket for the typical consumer in both regions. More goods being sold for lower prices and increased product variety due to innovation leads to higher long-run consumer welfare in both the North and the South. For southern consumers there is an additional benefit from paying less aggregate trade costs when more production takes place in their home market.

Trade liberalization benefits consumers in both regions through lower prices, but has no effect on the relative shares of production across different types of firms, and thereby no effect on innovation or FDI. Solving the model under the assumption of very costly FDI generates a corner solution where all international technology transfer occurs through imitation. In this case, stronger southern IPR protection leads to welfare losses for both regions. The results from this special case confirm the findings from earlier dynamic general equilibrium models of North-South trade without FDI. Therefore, this simple model highlights the key aspect of taking the role of FDI into account when studying IPR protection and trade liberalization in a dynamic framework.

“Export-Learning and FDI with Heterogeneous Firms”

From the firm-level datasets that became available in the 1990s, researchers learned that only a small share of firms export and an even smaller share of firms are multinationals. The data also showed that exporters and multinational firms are different from non-exporting firms. In particular, exporting firms tend to be more productive than firms that do not export, and multinational firms tend to be even more productive than exporting firms. Existing

trade theory could not explain these interesting facts, and consequently, the last decade has witnessed an explosion in research on firm entry into foreign markets.

In Helpman, Melitz and Yeaple (2004), building on the influential paper by Melitz (2003), a firm's decision to enter the foreign market through either exporting or FDI is a one-time decision. However, recent empirical evidence suggests that learning how to serve foreign markets (via exports and then via FDI) is a gradual process that takes time.² The static model in Helpman et al (2004) and the many extensions that followed Melitz (2003) cannot capture a gradual learning process where learning how to export is a stepping stone to doing FDI and becoming a multinational firm. Instead, a dynamic model is needed to capture this process for firms' international activities.

I present a dynamic general equilibrium model with heterogeneous firms that can innovate, learn how to export, and go on to become multinational firms. In the model, innovation and international technology transfer are affected by exporting and FDI - something that has been neglected in the earlier Melitz (2003)-style models and offers new insights about the effects of policy changes on consumer welfare. I obtain higher export-learning and FDI rates for high-productivity firms than for low-productivity firms, and as a result, exporters are on average more productive than non-exporters, and multinational firms are on average more productive than exporters. In equilibrium, there are still some low-productivity exporters, some low-productivity multinational firms, and some high-productivity non-exporters. Low-productivity firms export and engage in FDI but they are just not as successful in these activities as high-productivity firms.

Consistent with recent empirical evidence, I find that stronger IPR protection in the South induces both high-productivity and low-productivity foreign affiliates of northern firms to increase their R&D expenditures and results in faster rates of technology transfer within these multinational firms. High-

²Conconi, Sapir and Zanardi (2013) find that, looking at all Belgian manufacturing firms that started to engage in FDI during 1998-2008, these firms were already serving the foreign market via exports in almost 90 per cent of the cases.

productivity firms respond more to FDI-related policies than low-productivity firms by transferring more production to the South than low-productivity firms. As a result of stronger IPR protection, more product varieties end up being produced in the South and exports of new products from the South to the North increase. I also find that stronger IPR protection stimulates innovative R&D spending by northern firms.

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