The Impact of Trade Related Investment Measures In Developing Countries

A DISSERTATION SUBMITTED TO THE GRADUATE DIVISION OF
THE UNIVERSITY OF HAWAI'I IN PARTIAL FULFILLMENT OF
THE REQUIREMENTS FOR THE DEGREE OF

DOCTOR OF PHILOSOPHY

IN

ECONOMICS

MAY 2003

By
Jian Zhang

Dissertation Committee:

Denise Eby Konan, Chairperson
Byron Gangnes
Sumner J. La Croix
Yeong Her Yeh
Wes Peterson

ACKNOWLEDGEMENTS

I was very fortunate to have Denise Eby Konan as my adviser. She encouraged me, provided helpful and patient advice, loaned me her time and her books and offered me seminal suggestions. Denise has a knack for inspiring me to persevere, strive towards self-improvement, and take my own path. Without her help, I could not have made such swift progress or finished my dissertation. I also owe a debt of gratitude to Wes Peterson who always gave me helpful advice and spent a lot of time mentoring me. In addition, I would like to thank Sumner La Croix for supporting me, sharing his insights regarding my thesis and offering guidance during my study period. I would also like to thank Byron Gangnes and Yeong Her Yeh for helping me whenever I consulted them and providing constructive comments and suggestions.

I am very grateful to the University of Hawaii at Manoa (UHM) Department of Economics, the East-West Center, the Department of Computer Science at UHM, the UHM College of Business Administration Department of Management and Information Sciences and the UHM College of Education for providing me with the generous scholarships that enabled me to concentrate on my research. Further, I would like to thank the College of Social Sciences at UHM for providing travel funds for an international conference that I attended. I also owe thanks to Theresa M Greaney, Ari Van Assche, Sumner La Croix and other seminar participants from the Department of Economics at UHM. I am also grateful to participants from the annual East West Center International Graduate Students Conference in 2002 and annual international conference of the Chinese Academy of Social Sciences in Beijing. I also would like to thank Robert

Alexander, Stelovsky Jan, Meheroo Jussawalla, Gayatri Chakravorty Spivak, Hongbing Kou, Tung X. Bui, Mendl Djunaidy, Kang Wu, Hung Gay Fung, Greg Stone and many other friends who read my paper and offered many helpful suggestions and corrections.

Last but not least, I am very grateful to my family — especially my husband, my parents, my sisters and brothers in-law, who always gave me their full support and encouragement.

ABSTRACT

As foreign direct investment (FDI) grows rapidly in this highly integrated world, numerous new challenges confront the existing global trading system. Both developed countries and their developing counterparts have been trying to reach harmonious bilateral or multilateral agreements. However, disputes between multinational enterprises (MNEs) and host countries continue to increase as FDI rises. Trade Related Investment Measures (TRIMs) were proposed by the United States in the 1994 Uruguay Round as a way to create a better investment environment in both developed and developing countries. Since many theoretical and empirical analyses of TRIMs agreement are ambiguous or incomplete, this three-essay dissertation will examine theoretical and empirical trade-related investment policies with a focus on the strategic regulation of TRIMs policies in developing countries.

The first essay provides background information about TRIMs agreement that are currently employed around the world. It also includes definitions, controversial debates and applications, a description of the theoretical framework for analysis of the TRIMs agreement and the historical development of the TRIMs agreement from the Uruguay Round to the Doha meeting in 2001. The objective of this essay is to emphasize the importance of the TRIMs agreement in the structure of the global economy and their significant economic impacts on host countries.

The second essay considers the impacts of the TRIMs policies on developing countries by employing a theoretical model. A dynamic general equilibrium model is used to examine two types of TRIMs policy instruments, local content requirements

(LCRs) and government investment incentives (GIIs), such as subsidies given to MNEs operating in host countries. The model shows that increasing LCRs will benefit the economy of developing countries through increases in R&D and technology transfer in the short run. However, in the long run, increased LCRs will hinder their economic development because production of less competitive goods of higher cost will reduce domestic demand. GIIs use in developing countries will result in increase in available resource inputs for relative wages for R&D or technology adapting sector, while decreasing these inputs and relative wages for manufacturing sectors.

Finally, the third essay studies TRIMs policies in a CGE (Computable General Equilibrium) model of a small open economy, and quantifies the economic impacts of the strengthening of TRIMs policies under a post Uruguay Round scenario in Tunisia. The employed model is based on the model of Konan and Maskus (2000), which concentrates on trade liberalization in Tunisia. In our model, the policy instruments are government subsidies and taxes. Strengthening of these TRIMs policies was examined for 35 sectors. In order to analyze TRIMs policies, another important feature, FDI, was integrated into this CGE model. It was found that TRIMs policies tend to have a significant impact on service and other capital-intensive sectors, but have only a minor impact on mining, utilities, agriculture and other highly protected and labor intensive sectors. Government taxes on MNEs would cause a loss in the GDP of a host country and lower its relative wages, while investment incentives would increase both the GDP of the host country and its relative wages.

The TRIMs agreement, however, impact manufacturing sectors most significantly because these sectors have the highest share of FDI. On the other hand, though service sectors also have been significantly affected by the TRIMs agreement, the overall impacts are much less because of the relatively lower share of FDI in these sectors.

These three analyses imply that the elimination of LCRs in host countries would benefit the development and growth of the economy of the host countries, while government subsidies or tax credits to MNEs would stimulate R&D research and promote technology transfer. Therefore, government investment incentives to MNEs should not be eliminated if they benefit the host country's economy. Further research should be conducted to examine to what extent investment incentives are optimal for the economy.

TABLE OF CONTENTS

LIST OF TABLES

Table **Page**

LIST OF FIGURES

Figure **Page**

LIST OF ABBREVIATIONS

EC	European Community
EU	European Union
CES	constant elasticity of substitution
CET	constant elasticity of transformation
CGE	computational general equilibrium
FDI	foreign direct investment
FIRA	foreign investment review agency
FTA	free trade area
FTAP	foreign trade analysis project
GATT	General Agreement on Tariffs and Trade
GATS	General Agreement on Trade in Services
GDP	gross domestic product
GIIs	government investment incentives
GNP	gross national product
GTAP	General Trade Analysis Project
IPRs	intellectual property rights
LCR	local content requirement
MAI	Multilateral Agreement on Investment
MNE	multinational enterprise
NTB	non-trade barrier
NGO	nongovernment organization
OECD	Organization for Economic Cooperation and Development
R&D	research and development
SAM	social accounting matrix
TND	Tunisian Dinar
TRIM	trade-related investment measures
TRIPs	trade-related intellectual property rights
UN	United Nations
UNCTAD	United Nations Conference on Trade and Development
UR	Uruguay Round
VAT	value added tax
WTO	World Trade Organization

Chapter I. Introduction

TRIMs (Trade Related Investment Measures) are investment policies which aim to adjust the relationship between foreign investors and the host country. Since the 1990s, there has been an increase in foreign direct investment (FDI) and other forms of private capital resulting from "globalization". However, traditional trade policies, which have focused mainly on trade in goods, are no longer effective in today's trade environment because services and investment have brought about unique structural changes.

The TRIMs agreement have been analyzed for several decades. They were first formally introduced by the United States during the Uruguay Round (UR) of the General Agreement on Tariffs and Trade (GATT) negotiations. Their aim was to improve the investment environment in the developing countries and to create a situation that benefits both the developing and developed countries; however, no essential agreement was reached regarding the TRIMs agreement at the Doha meeting in 2001.

Over the last several decades, policies related to FDI have varied from country to country. In countries that have historically focused on import-substituting industrialization, such as most of Africa, Latin America, and Southeast Asia, FDI was not allowed in some industries and MNEs were subject to severe restrictions in others. Even in Korea, Japan, Taiwan and other countries where technology transfer was a major concern of the government, MNEs were rarely permitted to operate, restrictions on FDI also were frequently imposed. Although there has been a global trend toward FDI liberalization in the last decade, many industrialized and developing countries have

continued to impose some restrictions in the form of the TRIMs agreement. Some examples of these TRIMs restrictions include foreign exchange restrictions, export requirements, local content requirements (LCRs), and equity ownership limits. Most countries impose these TRIMs policies in order to increase or maximize benefits for their domestic firms. TRIMs policies are regarded as an important component of broader national economic policy regimes designed to achieve such goals as industrialization through import substitution, technology development and diffusion, skill acquisition and entrepreneurship, local employment, regional development, and export expansion. For example, the subsidiaries of MNEs in a developing country may have less incentive to improve their local technology or promote technology transfer because they enjoy local market rents due to import barriers. The host country government might choose to impose policies, such as performance requirements, in order to redirect the rents that MNEs obtain in the local market.

For most of the countries, the major motivation for implementing TRIMs policies is maintenance of a degree of policy sovereignty and control of local rents. Other motivations for implementing TRIMs policies include domestic industrial development, technology transfer, and balance of payments mitigation. Some host countries bargain intensely over the terms of TRIMs agreements so that they can use them as a firewall for protection against such MNEs abuses as transfer pricing, excessive use of foreign inputs, insufficient technology transfer, monopoly pricing, and monopoly hiring. TRIMs agreement are regarded as instruments of anti-market power and commercial abuse by MNEs that bargain intensely over the terms and codes of conduct. These developing

countries have no incentives to remove TRIMs policies and frequently worry about the impacts such removal. For example, developing countries fear that TRIMs policies removal will cause them to lose sovereignty or surrender economic control to foreign interests. In addition, they believe that a freer market for investment and trade could yield sub-optimal levels of technology transfer and a sustained condition of lagging economic development.

Developed countries, however, want to eliminate TRIMs policies to allow freer markets for investment and trade and improve MNE access to foreign markets.

Theoretical economic analysis of the TRIMs agreement can be divided into two categories according to how economists view the perceived effects of TRIMs policies. Firstly, neo-classical analyses assumes perfect competition that TRIMs policies clearly distort patterns of trade and development. This type of analysis proves that TRIMs policies have strong potential to reduce the welfare of both source and host countries.

This neoclassical theory contrasts with the second category strategic trade theory. According to strategic trade theory, due to imperfect competition and an oligopoly market structure, public policy interventions can shift rents and producer surpluses to countries in which the investment is located. According to Paul Krugman's simple model (Krugman 1979), there is a substantial rent-and-producer surplus that is enticing to all potential hosts. TRIMs policies that capture this producer surplus may not be first-best tools, but may have advantages in an international trade system because they may increase the flow of information between the home and host countries, reduce high exit costs in the home country, and increase fluidity in intra-firm trade.

The goal of this thesis is to determine the theoretical impacts of LCRs and investment incentives on developing host countries. The goal is to determine the impacts of TRIMs policies on the host country by employing a dynamic general equilibrium model adapted from Helpman's model.

According to neoclassical trade theory, LCRs cause immiserizing growth through less efficiency, higher product prices, and lower both production and consumption, While government investment incentives (GIIs) in certain sectors impose an implicit tax on other sectors that become less competitive. On the other hand, according to strategic trade theory, TRIMs may or may not enhance the welfare of the host country. In the general equilibrium model framework, increasing LCRs will likely increase employment, raise the intensity of innovation, and increase imitation in the developing region in the long-run steady state. Furthermore, the intensity of imitation in the developing country will increase more than the innovation rate in the developed country. As for tax incentives, if the host government increases subsidies or tax credits to MNEs, resources available for manufacturing will decrease while resources in the R&D sector will increase, and relative wages in the developing country will increase.

To verify these theory results, the Computational General Equilibrium (CGE) model of Konan and Maskus (Konan and Maskus, 2000) is extended to incorporate FDI in simulating the effects of TRIMs policies in Tunisia, a relatively small open economy. The structure of this paper is as follows: chapter 2 will detail the basic concept, background information, and current status of the TRIMs agreement; chapter 3 will

describe a theoretical model for TRIMs policies; Chapter 4, will present an empirical CGE simulation of effects; and chapter 5 is the conclusion.

Chapter II. Trade Related Investment Measures

2.1 Introduction

International investment flows have become an integral element of the global economy, and serve as a key engine of growth and economic prosperity in both developed and developing economies. In order to survive, firms must remain competitive in the world marketplace by engaging in practices such as strategic sourcing and strategic location decisions. Intra-firm trade between multinational enterprises and their affiliates accounts for more than one-third of world exports. Thus, countries actively compete to attract and retain investment this irrespective of ownership. As restrictions on FDI are increasingly believed to be undermining these efforts, the strengthening of trade-related investment measures (TRIMs) that might reduce distortions on trade and welfare seems beneficial.

Developing countries, however, have difficulty recognizing the benefits of removing TRIMs policies in their economies. Even though countries have engaged in negotiations over the TRIMs agreement since the Uruguay Round (UR), no comprehensive multilateral framework agreements on investment rules have been approved because developing countries remain concerned, perhaps because they overlook the potential economic impacts of TRIMs policies and technology transfer between regions. At the Doha meeting in 2001, developing countries were still reluctant to discuss investment policy, and believe that TRIMs policies and investment policies proposed by the United State of America (USA) and the European Union (EU) would only benefit rich countries. These developing countries argue that the existing

international regime of individual Bilateral Investment Treaties (BITs) combined with regional investment agreements has led to confusion. They believe that a WTO agreement would establish a stable, non-discriminatory environment that would increase investment flows.

On the other hand, developed countries have realized the benefits of FDI and technology transfer across national boundaries. They intend to create a global investment policy to enhance the global economy, particularly FDI between developed and developing countries. The EU, the USA, and Japan play important roles in the world trading and investment system. For example, at the WTO Doha meeting, the EU wanted to discuss three "new" areas: investment policy, competition policy, and the environment. The Europeans have insisted on including these issues in the WTO agenda over the last few years, making both strategic and tactical arguments for these negotiations. The strategic argument is that the world needs trade rules that go beyond tariffs, and that rules on competition and investment policy are the natural evolution of the 21st century's multilateral trading system. The tactical argument meets Europe's broader agenda insofar as it touches on politically sensitive agriculture concessions.

The EU advocated for an investment policy agreement in the Doha Round mainly because it would allow for possible future negotiations involving multilateral rules based on competition policy. At the Marrakesh ministerial meeting (1994), 'trade and competition policy' was identified as an item to be considered for possible inclusion in the future WTO work program. Since then, trade and competition policy have become a major issue in the international trade debate, and its main proponent is the EU.

During the last two decades, as trade and investment liberalization efforts have intensified and sharply reduced government-induced barriers to trade, greater international community attention has been given to barriers imposed by the private sector, such as those related to competition. For example, anti-trust or competition policies implemented by a single authority cannot fully address. MNEs with operations in several countries benefit from international anti-competitive abuses of market position. Indeed, developing countries have been concerned about this anti-competitive phenomenon since the 1980s[1]. However, discrepancies between national approaches to competition policy and the discretionary nature of competition policies have created difficulties in harmonizing rules or implementing multilateral decision-making in certain cases.

For instance, although the United States and the EU have similar objectives as advocates for investment in the global trading system, the USA tends to have a more narrow agenda than the EU. This difference was revealed in the Doha Round in which TRIMs policies were supported by the USA while competition policies were supported by the EU. This chapter intends to demonstrate the importance of TRIMs policies for all countries, but focuses especially on host developing countries.

2.2 From the Uruguay Round (UR) to the Doha Round

The US and other industrial countries proposed aggressive adoption of the TRIMs agreement as a new issue at the UR. These industrialized countries were seeking to

[1] In response to these concerns, the United Nations Conference on Trade and Development (UNCTAD) enacted international rules to control restrictive business practices that comprised a non-binding restrictive instrument known as "The Set of Multilaterally Agreed Equitable Principles and Rules for the Control of Restrictive Business Practices".

reduce the impact of host country restrictions and requirements on FDI so that MNEs would be less restricted. Developing countries tend to focus on performance requirements that channel FDI in a way that meets their national development policy objectives, offsets preferential treatment or incentives, and pre-empts anti-competitive practices of MNEs.

Aside from this general disagreement, there were two basic issues that separated participants in the UR TRIMs negotiations. The first issue concerned the problem of whether or not the regulations developed regarding investment measures should be limited by existing General Agreement on Tariffs and Trade (GATT) Articles or expanded to develop a new investment regime. The second issue considered whether TRIMs policies should be prohibited entirely or dealt with on a case-by-case basis demonstration of direct and significant restrictive and adverse effects on trade.

The United States and Japan favored an international investment regime that would establish rights for foreign investors and reduce constraints on MNEs. The US was particularly concerned that policies that distort investment flows could significantly impact trade flows adversely and that these policies should be subject to multilateral trade disciplines (Hoekman and Kostecki, 2001). For its part, the EU believed that the direct and indirect trade effects of investment measures should be evaluated separately (The Economist, October, 2001). As it believed that indirect trade effects were caused by TRIMs policies related to licensing, local equity and technology transfer requirements, remittances and exchange restrictions, and investment incentives, it proposed that TRIMs policies with indirect effects should be subject to consultation and dispute settlement procedures.

On the other hand, developing countries wanted to ensure that negotiations on investment measures or regulations were restricted to those which had been proven to have direct and significant negative effects on trade. They also believed that GATT was not necessarily the appropriate forum to address investment-related policies because they thought that attempting to agree to broad-ranging multilateral disciplines on these policies greatly exceeded the scope of the GATT (Hoekman and Kostecki, 2001).

Because of such disagreement, results from the UR regarding TRIMs policies were limited. All that was achieved during UR was confirmation of the interpretation of certain GATT provisions contained in the Foreign Investment Review Agency (FIRA) case pertaining to narrow trade-related measures, and the agreement was covers investment only in goods. Although the proposed TRIMs agreement contained a total of 14 measures, eight measures proposed by the United States, the final agreement was whittled down to only three categories[2] (for contents of TRIMs policies, see Appendix A). The resulting TRIMs agreement only used an illustrative list to identify policies that conflicted with GATT Articles III:4 and XI:1. (The Economist, October, 2001).

As the Doha Round approached, some developing countries suggested that the five-page text regarding the TRIMs agreement should not be extended, and argued for an extension of the length of the transition period for developing country members to comply with TRIMs agreement. There were four major reasons for this argument: (1) only developing countries had yet to eliminate prohibited TRIMs policies; (2) many

[2] The UR confirmed that Articles III (national treatment) and XI (prohibition of quota) of GATT applied to local content and trade balancing requirements (Mutti, 1992), but the agreement that resulted from the UR dealt with a few obvious abuses, and left some equally obvious ones aside because they did not fit into Articles III and XI of GATT.

developing countries continue to perceive that the agreement was against their development interests; (3) the five-year transition period allowed for TRIMs policies elimination was not enough time for the host countries to realize benefits from reduced distortion; (4) the 90-day period was considered too short of a period for WTO members to examine investment regime compatibility with the TRIMs agreement guidelines and to notify the WTO office their compliance.

Meanwhile, the investment conditions in the same developed countries caused them to wish to address other issues regarding TRIMs policies. The United States has begun to move away from a position as a net investor abroad and towards a position as a net recipient of investment from other countries. Both the EU and the United States were also concerned about possible negative effects of this inward investment such as lack of local content in the plants that were no more than assembly operations for imports made abroad.

Because of these concerns and changes, the new trade talk between developed and developing countries reached a higher level at the 2001 WTO Doha Round but results remained limited. The EU did succeed in getting favorable agreements regarding the environment and agricultural negotiations. Other OECD countries, however, were only able to make a commitment to further negotiations on issues including investment, competition policy, government procurement, and trade facilitation after the fifth ministerial meeting in 2003 and only with a "written consensus" from member countries.

During DR, India and other developing countries fought harder than ever before to prevent Quad (Canada, US, EU and Japan) domination. Although they were unable to

either force a development round or gain concrete commitments to address their concerns with implementation issues, they succeeded in getting favorable agreements regarding trade related intellectual property (TRIPs), and in generating discussion regarding agricultural exports subsidies and anti-dumping rules. They created a new negotiating dynamic at the Doha ministerial meeting by demanding and playing an important role in shaping the "Doha Development Agenda". This agenda set a "work program" for the WTO and its various working groups and committees to follow until the next ministerial meeting in 2003[3].

After Doha, it was quite difficult to assess who were the winners and who were the losers. Doha failed to effectively address the ongoing development concerns of developing countries and failed to resolve the WTO's crisis of legitimacy that dates to the 1999 Seattle Ministerial meeting. Doha "succeeded", however, by conventional measures in providing a place for each member to express their concerns and to make negotiations, and in resulting a declaration that everyone signed, irrespective of the internal contradictions and qualifications within it.

2.2.1 Definition of The TRIMs Agreement

The narrow definition of TRIMs would be "the measures designed to influence trade volume or trade patterns." The content of the TRIMs agreement can be seen in Appendix A. Such measures include export performance requirements mandating that a minimum level of output be exported and local content regulations stipulating that a minimum amount of inputs be sourced domestically. However, the broad definition of

[3] See http://www.wto.org

TRIMs policies should include any government policies, such as macroeconomic, regional, employment, and industrial policies.

The following is the content that the U.S. delegation provided for the extensive list of the TRIMs agreement in Uruguay Round negotiations in 1992 (Maskus and Konan 1992)

1. Local content requirements specify that a minimum volume or value of inputs or percentage of the value of local production be produced from sources in the host country.
2. Export performance requirements mandate that a minimum volume or value of output or percentage of output be exported.
3. Trade balancing requirements link an investing firm's exports of output to its imports of inputs in some way, say by requiring that the firm sustain a minimum trade surplus.
4. Product mandating requirements demand that a firm supply specified markets, typically in the host country but also in other countries, with output produced only in designated local facilities.
5. Domestic sales requirements specifying that an investor produces certain goods for the local market.
6. Manufacturing limitations place restrictions on the amount and types of products that can be produced in local affiliates in order to reserve the market for locally owned firms.
7. Technology transfer and licensing requirements compel the investor to transfer specified technologies on noncommercial terms, perform particular levels or types

of research and development locally, or license production in the host country, often with limitation on royalties paid.

8. Remittance limitations restrict the ability of investors to repatriate earnings from an investment and may also control foreign exchange allocations for this and other purposes.
9. Local equity requirements specify that a minimum percentage of a firm's equity must be owned by local investors.
10. Investment incentives provide financial advantages, such as tax limitations, duty remissions, and subsidies, or inducements for foreign investors to locate facilities in the host country. In general, such incentives are offered to offset the negative effects of the various performance requirements imposed.

This list is the widest categorization of proposed TRIMs agreements that has been advanced for potential discipline. The major questions concern the trade distortions caused by these measures. It is obvious that all of them may cause distortion to international trade. The first three measures may be considered directly trade-distorting in the sense that such distortion is their primary intent. The possible trade distortions emerging from the other TRIMs policies on this list are less direct but self-evident. For example, manufacturing requirements can affect decisions on production location and therefore have an impact on trade patterns. While licensing and equity requirements can change the firm's perceived trade-off between the net benefits of licensing and exports. Remittance limitations may affect a firm's decision to enter or withdraw from a specific

market and result in a sub-optimal global distribution of production and trade (USTR, 1987a).[4]

The distinction between direct trade impacts and indirect trade impacts of the TRIMs agreement is central to the multilateral negotiations. Some consensus has emerged that GATT has competence over those policies with direct trade-distorting intent. The remaining question is whether such policies are to be prohibited. There is seldom agreement about GATT's potential role in disciplining the broader, indirect measure.

Whether the TRIMs agreement distort trade is still a question. The empirical evidence that existing measures have resulted in significant distortions is limited (Maskus and Konan, 1992). This is due to difficulties in measuring the relation of the TRIMs policies to investment decisions and subsequent trade flows. TRIM requirements tend to be focused on specific industries, with the automotive, chemical and petrochemical and computer/information industries leading the list. The characteristics of trade-related investment measures are more likely to exist in the developing countries than the developed countries. The extent of investment covered by TRIM regulations is heavily weighted towards the developed countries.

Local content requirements are more frequent than export performance requirements in the automotive industry, with the reverse being true in computer information industries (Mutti, 1992). In chemicals and petrochemicals, both domestic content and export performance requirements are prominent.

---

[4] For a comprehensive list with a functional classification of TRIMs, see Guisigner and Associates (1985).

The data on coverage of investors suggests that developed country regulations cover more breadth of investment. For example, the amount of United States' investments in the countries with the most extensive presence of TRIM regulations is $30 billion in the top 20 "middle income developing countries", versus $230 billion in the top 20 "developed countries."

The negotiating mandate on the TRIMs agreement, as adopted at Putnte Del Este, states:

Following an examination of the operation of GATT articles related to the trade restrictive and distorting effects of investment measures, negotiations should elaborate, as appropriate, further provisions that may be necessary to avoid such adverse effects on trade (Maskus and Konan, 1992).

Several proposals for the TRIMs policies have been analyzed. First, the proposals hope that by allowing limited exceptions and by imposing rigorous standards of demonstration on complainants, the developing countries will be induced to join the agreement. Second, an attempt must be made to convince major capital-importing developing countries that joining the agreement will provide them with net benefits. Although this task would be difficult, one convincing argument is that the use of highly restrictive TRIMs policies is counterproductive to development efforts. Gradual liberalization of the TRIMs agreement may be expected in most cases to attract more FDI and technology as firms react to more open and less opaque policy regimes. Furthermore, such investment would likely provide greater efficiency gains than current flows that may be induced by the combination of protected markets, incentives, and performance

requirements. This possibility would be enhanced by more general liberalization of surrounding trade and industrial policies in host countries.

2.3 The Impact of TRIMs on the Economy: Theory and Evidence

There are two principal frameworks for analyzing the impact of the TRIMs agreement: the neo-classical framework of perfect competition and the newer "strategic trade" framework of oligopoly and imperfect competition. The TRIMs agreement debate demonstrates how important choosing an appropriate theoretical framework is for designing policy responses.

2.3.1 The TRIMs Agreement in Neo-classical analysis

In the neo-classical analysis, we often assume a perfectly competition market structure: there are many firms; every firm is a price taker; and the firms charge the price equal to marginal cost. Government intervention in this case would lead to negative welfare and distortion. The conventional case against the TRIMs agreement comes from extending the neo-classical presumption against public intervention to international markets, asserting that protection and promotion create distortions in the pattern of both trade and development.

A TRIMs requirement which mandates a certain amount of domestic content on the part of foreign investors, like any other form of import protection, raises the cost of production to the subsidiaries upon which it is imposed, reducing consumption, and withdrawing resources that could be more productively used elsewhere in the economy.

A TRIMs requirement to export also has a problem. Within the neo-classical model, output costs in the local market must by definition be higher than world prices or else domestic subsidiaries of foreign corporations would be exporting on their own. Consequently, with the export requirement, a government subsidy comes to induce the firm to respond. This will reduce consumption further and draw more resources into the inefficient sector.

For these reasons, it is not difficult to understand why the neo-classical economic tradition is critical of LCRs and export-promotion TRIMs. It is obvious that it is undesirable from the host country as well as from the home country and global perspectives.

2.3.2 The TRIMs Agreement in Strategic Trade Theory

Strategic trade analysis centers on industries in which there are market imperfections and barriers to the entry of competitors. It concentrates on public policy in second-best contexts where only a relatively small number of firms exist, with oligopolistic interactions among them.

In contrast to neoclassical analysis, the strategic trade framework assumes imperfect competition, with barriers to entry into the industry that include increasing returns to scale and that generate rents for the participants (Spencer and Brander 1983; Krugman 1986). Such rents may sometimes emerge in the form of higher than normal profits, but more often they show up in terms of high wages and benefits and R&D expenditure (Katz and Summers 1989).

The strategic trade theory calls into question traditional concepts about comparative advantage. In developed countries, strategic trade theory has been used to nurture domestic firms in such industries as semiconductors, supercomputers and aerospace. However, there is considerable concern in the economics community that strategic trade theory may be used to justify an epidemic of special pleading for protection and promotion which runs contrary to market based competition. Paul Krugman has argued that there is a risk that interest groups that have a stake in trade policy will use this framework to advocate policies that are not likely to benefit the nation as a whole. Jagdish Bhagwati believes that the dangers of imperfect competition are best served by increasing trade liberalization, not reducing it.

There are two arguments of particular relevance to developing countries: First is that properly constructed public intervention on the part of the host country can shift rents from parent corporations to host country tax authorities and/or host country consumers. The second is that properly constructed public intervention on the part of host country authorities can transfer production from home country or third country locales to equivalent locales in the host country, improving host country welfare. On the other hand, improperly constructed public policies can disproportionately malign impact on trade and development. Thus, strategic trade theory leaves public policy analysts with a more difficult task than neo-classical trade theory. Using an imperfect competition framework, the impact of public intervention cannot be assumed to be automatically undesirable or distortionary, but neither can it be assumed to be beneficial or welfare-

enhancing. The dangers of misusing strategic-trade analysis can easily be used by special interests seeking protection.

2.4 Conclusion

The failure of the UR regarding the TRIMs agreement occurred because different interest groups had different focuses and expectations. In Doha Round, the United States wanted to have general disciplines to restrict the TRIMs agreement, and thus proposed a "narrow" agenda including liberalizing of trade in agriculture, textile and services, committing to cut some remaining tariffs on industrial goods and streamlining customs procedures. America also earnestly tried to negotiate agreement for implementation of Trade Related Intelligent Property Rights (TRIPS) which were originally discussed in the UR.

The proposal of the United States was not supported by Japan and the EU (The Economist, October 2001). The EU was concerned about the direct and indirect effects of an investment policy and proposed to separate these effects and how these policies should be implemented in developing countries. Its resultant "broad" agenda proposal was considered a "new issue" in the Doha Round. This included polices on investment, competition, and the environment. However, some economists believe that the EU's emphasis on environment may have been an excuse for reintroducing agriculture protection.

Relatively poor developing countries which felt they were treated unfairly in the Uruguay Round hoped that they could get more favorable agreements in the Doha meeting However, since they doubted whether many of the proposed policies by the developed countries could be implemented effectively in their countries, therefore, there was no essential progress on the TRIMs agreement in the Doha Round. Overall, however, the developing countries, were more concerned regarding the a priori presumption that investment measures were inherently trade restrictive or distorting, and therefore they did not have much incentive to sign onto the TRIMs agreement.

Theoretically, under neoclassical assumptions of perfect competition, the imposition of the TRIMs agreement (LCRs and GIIs) on foreign firms hurts the prospects of the host country. On the contrary, with imperfect competition under strategic-trade theory, the implementation of the TRIMs agreement may enhance the welfare of host countries. Thus standards about the impact of the TRIMs agreement in the host economy have not been confirmed. Uncertainty remains regarding whether the TRIMs agreement should be prohibited or should be conducted on a case by case basis. The developing countries would seem to benefit from joining the bargaining table of the TRIMs agreement so that negotiation of agreements in which gain exceed losses might be possible. In this manner, a developing country trade policy involving protection-cum-domestic content like the TRIMs agreement may become an acceptable means of reducing the impact of oligopoly power enjoyed by international investors and correcting for their distortions in local markets.

Chapter III. The Impact of Trade Related Investment Measures in Developing Countries

3.1 Introduction

Over the past two decades, there has been an increase in foreign direct investment (FDI) in the world economy, and the percentage rate of FDI incurred by developed countries in developing countries has grown especially fast. Many countries receiving FDI, however, have imposed numerous restrictions on investment that are aimed to protect and foster domestic industries, and to prevent the outflow of foreign exchange reserves. The source countries (where the Multinational Enterprise (MNEs) are located) have also tried to protect and extract MNE benefits in the host countries (where MNEs invest). Therefore, disputes between countries have increased.

A host country government's interventions aimed at influencing the operations that FDI may engage in carrying an array of costs and risks. Do the benefits and opportunities outweigh these costs and risks? What might be the penalty for not having LCRs (local content requirements), or on the other hand, MNE investment incentives? What is the likelihood of the host country carrying out appropriate policy successfully? This paper considers theoretically government policy in the host country that direct on public efforts to attract FDI by imposing LCRs, and by creating investment incentives.

In the 2001 WTO meeting in Doha, the leaders of 129 countries tried to reach some bilateral or multilateral agreement on world trade issues. The TRIMs agreement (Trade Related Investment Measures) were on the agenda, but due to the hard fighting of some developing countries, no essential agreement was reached.

LCRs specify that a minimum level of local resources must be used in operations at foreign owned plants, measured either as a percentage of the value of productions or an absolute amount. These requirements are prevalent in developing countries, particularly Brazil and India, as well as in some industrial countries. LCRs discriminate against imports, and are most common in the production of autos, chemicals, pharmaceuticals, and high technology goods. Qiu and Dao's model (2001) for heterogeneous multinational firms shows that LCRs affect a firm's decision to entry into a new market. When there is lower LCRs, FDI is more likely adopted. When facing the same LCRs, less efficient firms are more likely to adopt another FDI mode. Qiu and Dao's paper also characterizes the conditions under which the host government's optimal uniform LCRs will result in both firms choosing the FDI mode or one firm chooses FDI mode while the other firm chooses the export mode.

An early analytical contribution to the LCRs discussion is Grossman (1981). He described a partial equilibrium of a competitive firm by using both domestic and imported factors that produces some final output. The firm is subject to LCRs through a penalty tariff on imported inputs. Grossman demonstrated the resource-allocation effects of the local content, and also considered the effect of a monopoly in the domestic input producing sector. He concluded that no distinction was made between foreign and domestic final-good firms.

Government subsidy is also considered as another policy instrument in the model. Earlier contributions to this question are from Paul Segerstrom paper (1991) and Keith E. Maskus and Gui-Fang Yang (2001). Segerstrom found that innovation subsidies

unambiguously promoted and enhanced economic growth, and welfare was enhanced; however, only if the steady-state intensity of innovative effort exceeded a critical level. Yang and Maskus found that stronger IPRs increase the licensor's share of rents and reduce the costs of licensing contracts. The returns to both licensing and innovation would rise while additional resources would be available for R&D. In this essay, if the government in the less developed country subsidies MNEs, this will increase resources in R&D sector while shrinking the resources in manufacture.

FDI has long been recognized as a means of transferring technology. Raymond Vernon's (1966) seminal product life cycle model assumed that technology was transferred as producers in the less developed country imitated the production of products which were innovated by the developed country. The firm in the developed country innovates the new product. The firm in the less developed country eventually imitates the new products as they mature. FDI acts as a bridge of technology transfer between countries. Paul Krugman (1979), Segerstrom (1991), Helpman (1991) and Yang and Maskus (2001) also follow Vernon's definition of technology transfer between the developed and the developing country. However, that technology transfer may be an engine of growth in the developing countries was overlooked in previous literatures. Motivated by the impact of LCRs and government subsidies or investment incentive under the FDI through technology channel, there should be an optimum agreement for both the developed and developing countries. The governments in developing countrys can implement the TRIMs agreement in order to reduce disputes and reach win-win situation. Therefore, a dynamic general equilibrium model is employed, that approach of

which is adapted from Elhanan Helpman (1993), and Gui Fang Yang and Maskus (2001), as well as ideas from Segerstrom (1991). This essay aims to examine how the impact of the TRIMs agreement affect the innovation and imitation between developed and developing countries. It specifically focuses on the impact of LCRs and government subsidy policies.

The structure of the paper is as follows: Section 2 provides a literature review, Section 3 presents a dynamic general equilibrium model in order to analyze the impact of government policy and finally Section 4 offers a conclusion.

3.2 Theory on LCRs and Government Investment Incentives (GIIs)

The TRIMs agreement belong to a world of imperfect competition or a world in which there exist other distortions. Under neoclassical assumptions of perfect competition, LCRs that mandate a certain amount of domestic content on the part of foreign investors force local subsidiaries to substitute more expensive indigenous goods and services for less expensive imports, which results in inefficiencies, diverts resources from more productive uses, raises prices, reduces consumption, and make consumers worse off. Protected from cheaper imports, the foreign firms in the sector with LCRs may reap high profit, resulting in immiserizing growth, which was identified by Diaz Alejandro (1977).

Within the neoclassical framework, investment incentives worsen the host country's economy. Because production costs in the local market must be higher than world prices, a public subsidy must accompany the export requirement to render the

operation viable. In fact, the subsidy levies an implicit tax on the rest of economy, leaving other sectors less competitive and pull back the host economy development. In sum, under neoclassical assumptions of perfect competition, the imposition of either LCRs or government subsidies on FDI damages the prospects of the host country's economy.

However, under imperfect competition framework, infant-industry arguments have been based on the possibility that imperfections in local capital or labor markets might prevent would-be investors from demonstrating that local operations could be successful. According to infant industry arguments, in order to compensate such imperfections, government should intervene to help firms to provide the needed demonstration effect. However, there has never been good evidence on how pervasive such hypothetical imperfections in local capital or labor markets might be.

In contrast to neoclassical analysis, the strategic-trade framework or so called "new trade" theory assumes imperfect competition with barriers to entry into the industry that include increasing returns to scale and that generate rents for the host and source countries (Brander and Spencer 1983; Krugman 1986). Such rents may show up in terms of high wages and benefits and strong R&D expenditures (Katz and Summers 1989). In other words, positive spillover or technology transfer that provides benefits to the host economy can exceed those that can be captured by investors themselves.

Moreover, under strategic-trade conditions, relative production costs may still play an important role in the locational decisions of MNEs. The absence of the perfect competition assumption means that the pressures that might push firms along the path of

international comparative advantage are weaker and deterministic than the neoclassical model indicates. Imperfect competition provides MNEs more opportunities or space in which to locate their activities. MNEs can behave as satisficers rather than profit maximizers. Where MNEs choose to produce and consequent arrangement of trade among nations is not exogenously determined.

Finally, there are adverse systemic implications for strategic-trade. Strategic-trade introduces a disturbing zero-sum dimension into the usual win-win structure of trade and investment policy. Strategic-trade theory not only gives more opportunities for the MNEs to make decision but also suggests that countries that intervene most aggressively will benefit at the expense of those that do not. How can these beggar-thy-neighbor dynamics be muted or eliminated is also one of the objectives of the TRIMs agreement.

In this essay we present an endogenous growth model which extends Helpman's model. We focus on how the rate of innovation and imitation between two countries affected by the TRIMs policy. The paper addresses the following questions: (1) how the local content requirement affects the host country economy; and (2) How does government investment incentive (GIIs) influences the R&D activities and imitation activities in the host country?

3.3 The Model

3.3.1 Model Setup

The basic model is an adaptation of Helpman's (1991) model of FDI and technology transfers between the developed country and the developing country.

I assume all production of the developed country occurs within a MNE. The headquarter of the MNE innovates all new products. Technology is transferred to the developing country through the establishment of a MNE subsidiary. The MNE establishes subsidiary in the developing country because of low labor costs. It is assumed that the gap in per capita income between the two regions is sufficiently large, such that the firm in the developed country always innovates while the firm in the developing country either imitates or manufactures through FDI.

There are two types of producers in the developing country: the first is the MNE subsidiary, who manufactures new products using technology developed in the developed country. This type of the firm is labeled as NS. The second type of firm is an independent imitator in the developing country. It is labeled as S. The firms in the developing country have know-how, via imitation, and the technology for producing a state-of-the-art variety. MNE headquarter firms in the developed country are the innovator, who produces the top level of technology. It is labeled as n^{NN}. MNE subsidiaries in the less developed country are labeled as n^{NS}. The firms in less developing country are denoted as n^{S}. It is assumed that these three type of firms exhaust the possibilities for profitable enterprises and that each product in the continuum has exactly one producer. Therefore we have $n^{NN} + n^{NS} + n^{S} = 1$.

The model assumes that a fixed set of goods potentially can be produced in an unlimited number of vertically differentiated varieties or "Qualities." Firms continue to innovate for higher quality goods in order to maximize profit.

$$u = \int_0^{\infty} e^{-\rho t} \log u(t) dt \qquad (3-1)$$

Following Grossman and Helpman (1991), we consider a small country endowed with a single primary factor, called labor. Suppose that an economy with a continuum of industries is indexed by ω (0, 1). Each product potentially may be improved a countable infinite number of times, indexed by qualities j = 0, 1, 2, 3... The increments to quality are common to all products and exogenously given by λ >1, where λ represents the extent to which higher-quality products improve on lower-quality products. Each product can be supplied in all discovered quality levels.

3.3.2 Demand Side

For simplicity, it is assumed that the consumers in both countries have the same utility function and preference. Consumers live forever and share identical preferences. The intertemporal utility function for the representative consumer is given by

$$u(t) = \int_0^1 \ln\left[\sum_{j=0}^{\infty} \lambda^j d_{ji}(\omega)\right] d\omega \qquad (3-2)$$

Where ρ is the subjective discount rate, and u (t) represents instantaneous utility at time period *t*. We specify where $d_{ji}(\omega)$ denotes the quantity consumed of a product of quality j produced by industry ω at time *t*. Every consumer maximizes discounted utility subject to an inter-temporal budget constraint.

$$\int_0^{\infty} e^{-R(t)} E(t)dt = B(0) \qquad (3-3)$$

where R (t) is the cumulative interest factor up to time t:

$$R(t) = \int_0^t r(s)ds$$

B(0) is the value of initial asset holdings plus the present value of factor income, and E(t) is the consumers expenditure flow at time *t*, given by

$$E(t) = \int_0^1 \sum_{j=0}^{\infty} p_{jt}(\omega) d_{jt}(\omega) d\omega, \qquad (3-4)$$

where $p_{jt}(\omega)$ is the price of a product ω of the quality *j* at time *t*.

The representative household maximizes utility at two stages: in the first stage, she optimally allocates lifetime wealth across time, and in the second stage, she optimally allocates spending *E(t)* at each point of time. The consumer maximize the instantaneous utility function in Equation (3-2), given $p_{jt}(\omega)$ and *E (t)* from Equation (3-4). The Euler Equation for this calculus of variations problem yields

$$\sum_{j \in jt(\omega)} \lambda^j d_{jt}(\omega) = \frac{E(t)\lambda^h}{p^{ht}(\omega)} \qquad (3-5)$$

Where $jt(\omega)$ is the set of available quality levels with the lowest quality-adjusted prices, $p_{jt}(\omega)/z^I$, and $h = h(\omega)$ is the highest quality level in $jt(\omega)$. We assume that, among the firms charging the lowest quality-adjusted prices, consumers buy only from the firms that sell the highest-quality products. Therefore Equation (3-5) yields the static demand functions

$$d_{jt}(\omega) = \begin{Bmatrix} \dfrac{E(t)}{p_{jt}(\omega)} & for \quad j = h_t(\omega) \\ 0 & otherwise \end{Bmatrix} \tag{3-6}$$

Where E (t) denotes expenditure at time t and price $p_{jt}(\omega)$ represents the price of quality ω of product j at time t. Equation (3-6) describes unitary price and expenditure elasticities. Products of different industries enter utility symmetrically, and the elasticity of substitution between every pair of product lines is equal to one. Thus consumers maximize utility through spending evenly across the product lines, and by purchasing the single brand $jt(\omega)$ in each line that carries the lowest price per unit of quality.

At the first stage, after substituting Equations (3-2) and Equations (3-6) into Equation (3-1), the consumer maximizes Equation (3-1) subject to Equation (3-3). The Euler Equation yields

$$\frac{\dot{E}(t)}{E(t)} = r(t) - \rho \tag{3-7}$$

In steady-state equilibrium, nominal expenditure $E(t)$ is constant over time, which implies that

$$r(t) = \rho \tag{3-8}$$

The actual level of expenditure E is determined by the consumer's steady-state assets B. Since all consumers have identical homothetic preferences, throughout the rest of this paper we let E denote aggregate steady-state expenditure and let Equation (3-6) represent aggregate demand functions. Equation (3-7) implies that any steady-state equilibrium in

consumer expenditure must involve a constant market interest rate $r(t)$ over time that is equal to the consumer's subjective discount rate.

3.3.3 Supply Side

Let's consider the profit rates of three different kinds of firms. First, the firm in the less developed country imitates the products that the MNE subsidiaries produce in the host country. It is the only one in the less developed country to have successfully copied the top-of-the-line variety in some product line. This company competes with the developed country inventor of the product that it imitated. In the duopoly equilibrium the firm in the less developed country faces a perfectly elastic demand when it charges a price of w^N, zero demand at prices above this level, and unit elastic demand at prices below it. Given this situation, the firm will charge w^N in order to catch the entire market. When the price is w^N, if we assume the expenditure E is 1, the sales is given by $1/w^N$, and the instantaneous profit equals

$$\pi^S = \frac{w^N - w^S}{w^N} \tag{3-9}$$

In the same industry, no other firms earn positive profit.

Next consider the competitive situation facing a firm in the developed country that has successfully improved upon a product that the firm in the less developed country had successfully imitated. The quality leader in the developed country can charge a premium over the price offered by its rival. It can capture the entire market by charging anything less than λ times this amount. Therefore the instantaneous profits are

$$\pi^{NS} = \frac{\lambda w^S - w^N}{\lambda w^S} \tag{3-10}$$

If $\lambda w^S < w^N$, the firm in the less developed country will capture the entire market. In this case, no firm in the developed country will invest in the developing market. This situation violates the labor market clearing condition in the developed country. Thus we only assume that $\lambda w^S > w^N$ will exist in an equilibrium with technology transfer between the two countries.

A firm in the developed country that has the exclusive ability to produce a top-of the-line product faces competition from a rival in the same country that has the ability to produce its previous products. The quality leader will set price λw^N in order to catch the entire market. Therefore the profit equals

$$\pi^{NN} = \frac{\lambda w^N - w^N}{\lambda w^N} \tag{3-11}$$

when two firms in the developed country have the same ability to produce the same state-of-the-art product, each will earn zero profits in Bertrand competition.

3.3.4 Imitation and Innovation Activities

The quality leader, MNE headquarters invented the current state-of-the-art product in some industry *j*. It will have a probability *Idt* of success in innovation by devoting $a_N I$ units of labor to research during a time interval of length *dt*. Whereas two quality followers, MNE subsidiaries participated mainly in transferring and adopting

some past technology from the headquarter, or is a new entrant into the research competition must devote $a_{NS}I$ units of labor to research for the interval dt to achieve this same probability Idt of success, and $a_{NS} > a_N$.

We assume that all quality leaders in the developed country will lose their profit if the developing country imitators conduct R&D with equal intensity. Firms in the developed country with products that have been copied by the developing country can capture an expected gain of $v^{NS}I^S dt$ at cost $w^N a_N I^S dt$ by conducting R&D at intensity I^S, where v^{NS} denotes the value of a typical firm that has a producer in the developing country as its nearest competitor. I^S represents the scale of the research effort targeted at every product in the developing country. where I^N is the aggregate intensity of research effort targeted at the typical new product. Maximization of profits implies that

$$v^{NS} = a_N w^N \tag{3-12}$$

Similarly, we let v^{NN} represent the value of a firm in the developed country that has another firm in the same country as its closest competitor. We have

$$v^{NN} = a_{NS} w^N \tag{3-13}$$

A firm in the developing country that devotes $a_m m$ units of labor to the work of imitation for a time interval of length dt will succeed in its efforts to develop a marketable copy of the targeted product with probability mdt. This investment will yield the gain of $mv^S dt$ at a cost of $w^S a_m mdt$, where v^S represents the value of a typical brand in the developing country. Value maximization implies that

$$v^S = a_m w^S \tag{3-14}$$

where m is the per brand intensity of imitative activity in the developing country.

3.3.5 No-arbitrage condition

If the firms in the developed country face competition from imitation of the firm in the developing country or a closer rival from the developed country, their product might be improved upon by another entrepreneur in the developed country, or it might be successfully copied by a firm in the developing country. The probabilities of these events occurring in a small interval of time of length dt are $I^N dt$ and mdt, respectively. In either case the owner loses his profits. Equating in the usual way the sums of the profit rates and the expected rates of capital gain to the opportunity cost of funds in the developed country, we get

$$\frac{\pi^{NS}}{v^{NS}} + \frac{\dot{v}^{NS}}{v^{NS}} - m = r^N \tag{3-15}$$

$$\frac{\pi^{NN}}{v^{NN}} + \frac{\dot{v}^{NN}}{v^{NN}} - (I^N + m) = r^N \tag{3-16}$$

and

$$\frac{\pi^S}{v^S} + \frac{\dot{v}^S}{v^S} - I^S = r^S \tag{3-17}$$

where r^N is the yield on a bond in the developed country.

Assume that the MNE subsidiary has no innovation and just accepts the blue print from its parent firm. As long as the less developed firm knows the technology for some products, it earns an infinite stream of oligopoly profits. The owners of the firm collect profits $\pi^S dt$ in a time interval of length dt and gain $\dot{v}^S dt$. Each firms in the developing country faces a probability $I^S dt$ of displacement from the market in a time interval of length dt. The total return on equity claims must equal the opportunity cost, r^S of the invested capital.

In steady state, the relative prices are constant, all nominal variables must grow at the same rate. We normalize E(t) =1 for all t, the value of profit did not change in steady state. This implies that $r^N = r^S = \rho$ in the long run. Combining with Equations (3-12), Equation (3-13) and (3-14), we can derive the following steady state relationships:

$$\frac{\pi^{NS}}{a_N w^N} = \rho + I^N + m \tag{3-18}$$

$$\frac{\pi^{NN}}{a_{NS} w^N} = \rho + I^N + m \tag{3-19}$$

$$\frac{\pi^S}{a_m w^S} = \rho + I^S. \tag{3-20}$$

3.3.6 Labor Market Condition

Finally, the labor markets must clear in each country at every moment of time. In the developed country a number n^S firms each employ $a_N I^S$ units of labor in research in order to prevent rivals from becoming imitators. The MNE subsidiary demands $a_{NS} I^S$

units of labor to adapt the product or transfer technology to the targeted in the developing country at each of n^N products of the developed country. The MNE headquarter that has a firm in the developed country as nearest rival that each demands $1/\lambda w^N$ units of labor for manufacturing. There are n^{NS} firms in the developed country with firms in the developing country as nearest rivals, each of which demands $1/\lambda w^S$ units of labor for manufacturing. Summing up the various components of labor demand to the exogenous supply L^N, we have

$$a_L I^S n^S + a_F I^N n^N + \frac{n^{NN}}{\lambda w^N} + \frac{n^{NS}}{\lambda w^S} = L^N \qquad (3-21)$$

$$a_m m n^N + \frac{n^S}{w^N} = L^S \qquad (3-22)$$

In the developing country the activities of imitation demand $a_m m n^N$ units of labor, since n^N products are targeted with intensity m. The manufacturing sector demands n^S / w^N units of labor to produce $1/w^N$ units of each of n^S brands. L^N stands for the size of the less developed labor force.

3.3.7 Steady State Equilibrium

In steady state, measure of products produced in the developed and less developed markets are constant. In other words, the outflow of the production from the developing market must be the same as that into the developed market, the outflow of the production

from the developed market must be the same as that into the less developed market. The developing country obtains the new technologies at the rate mn^N, and loses product lines at the rate $I^S n^S$. These can be expressed as:

$$mn^N = \iota^S n^S \tag{3-23}$$

Similarly, within the group of developed country-based product lines, the MNE innovates the new technology at the rate at mn^{NN} and loses product lines at the rate $I^N n^{NS}$. Therefore we have

$$I^N n^{NS} = mn^{NN} \tag{3-24}$$

There are two kinds of equilibrium to be considered, the MNE headquarters which engages in R&D, and the MNE subsidiary which also conducts R&D. In the former case, we have $I = I^N n^N + I^S n^S$, the aggregate rate of imitation $\delta = mn^N$; the aggregate rate of technology transfer to the developing country, and the $\omega = w^S / w^N$, the relative wage of the developing country. From labor-market-clearing condition Equation (3-21) and (3-22), and using the steady state relationships Equation (3-23) and (3-24), we get

$$a_{NS}(\iota - \delta) + a_N \delta + \frac{n^N(1-\delta/I}{\lambda w^N} + \frac{\delta n^N}{I\lambda\omega w^N} = L^N \tag{3-25}$$

and

$$a_m \delta + \frac{1-n^N}{w^N} = L^S \tag{3-26}$$

Combining the profit functions Equation (3-9)-(3-11) with the no-arbitrage condition (3-18)-(3-20) and also employing the steady state relationships Equation (3-23)-(3-24), we derive

$$\frac{(1-1/\lambda\omega)n^N}{w^N} = a_N(I+\rho n^N) \tag{3-27}$$

$$\frac{(1-1/\lambda)n^N}{w^N} = a_{NS}(I+\rho n^N) \tag{3-28}$$

$$\frac{(1/\omega-1)(1-n^N)}{w^N} = a_m[\rho(1-n^N)+\delta]. \tag{3-29}$$

Consider the case when the imitation rate of the developing country is very slow, which is close to the real world situation. Assuming that the MNE branches and the developing country have no strong ability to imitate the products of the developed country, that is $\iota^N = 0$ in the steady state, This means that the flow of innovation from the developed country is the same as the flow of imitation in the developing country, $\iota = \delta$. We can simplify Equation (3-22) and Equation (3-23) by substituting these assumptions into Equation (3-22), (3-23).

$$a_N I + \frac{n^N}{\lambda\omega w^N} = L^N \tag{3-30}$$

$$a_m I + \frac{1-n^N}{w^N} = L^S \tag{3-31}$$

If we substitute profit function of the headquarter MNE Equation (3-11) and the developing country Equation(3-9), then Equation (3-16) and (3-17) becomes

$$\frac{(1-1/\lambda\omega)n^N}{w^N} = a_N(I+\rho n^N) \tag{3-32}$$

$$\frac{(1/\omega-1)(1-n^N)}{w^N} = a_m[\rho(1-n^N)+\delta]. \tag{3-33}$$

If we substitute the two labor-market-clearing conditions Equation (3-21) and (3-22) into the developed country's no-arbitrage condition Equation (3-32), we get

$$(\frac{L^S-a_mI}{m-I}-\frac{L^N-a_NI}{I})\frac{m}{a_N} = \rho+m. \tag{3-34}$$

Similarly we substitute Equation (3-21) and (3-22) into the developing country's no-arbitrage condition Equation (3-33) and we find

$$\left[\frac{\lambda(L^N-a_NI)}{I}-\frac{L^S-a_mI}{m-I}\right]\frac{m}{a_m} = \rho+\frac{\mathrm{Im}}{m-I} \tag{3-35}$$

Combine the Equation (3-34) and (3-35), we can get

$$\left(\frac{L^S-a_mI}{m-I}-\frac{L^N}{I}\right)\frac{1}{a_N} = \left[\frac{\lambda(L^N-a_I)}{I}-\frac{L^S}{m-I}\right]\frac{1}{a_m} = \rho \tag{3-36}$$

Figure 3.1 illustrates a diagram of I and m which satisfies the joint resource constraint by Equation (3-34). We label it as C_0C_0 curve, which is positively sloped and convex. It slopes upward because the left hand side of Equation (3-36) increases with innovation and declines with the rate of imitation. Another curve that also satisfies the joint resource constraint by Equation (3-35), is labeled V_0V_0. The V_0V_0 curve may slope downward or upward, here we focus on the V_0V_0 downward case because this case

makes more sense in the real world and empirical work. (Proof can be seen in Appendix B).

The intersection of the C_0C_0 curve and the V_0V_0 curve at point E, gives the steady-state equilibrium rates of innovation and imitation. The C_0C_0 curve is upward sloping because the higher the rate of imitation or reverse engineering, the faster the innovation rate in the developing country, since we derived this line from Equation (3-35). The V_0V_0 curve is downward sloping since there is a tradeoff between allocating resources between R&D and manufacturing, the higher the technology transfer or imitation will lead to lower resource allocation on the R&D sector, therefore the lower will be innovation in the developed country. We can calculate this from Equation (3-34).

3.3.8 Steady-State Comparative Statics

Performance requirement: Local content requirements (LCRs)

Now consider developing country government imposes LCRs which includes requiring the MNEs to increase labor or other local input factors of production. Thus L^S increases and both C_0C_0 curve and V_0V_0 curve will shift to the right and become C_1C_1 curve and V_1V_1 curve (For Proof see Appendix C). In this case, both the intensity of innovation and imitation increase. (Appendix C will also show that an increase in L^S leads the V_1V_1 curve to shift by more than the C_1C_1 curve.)

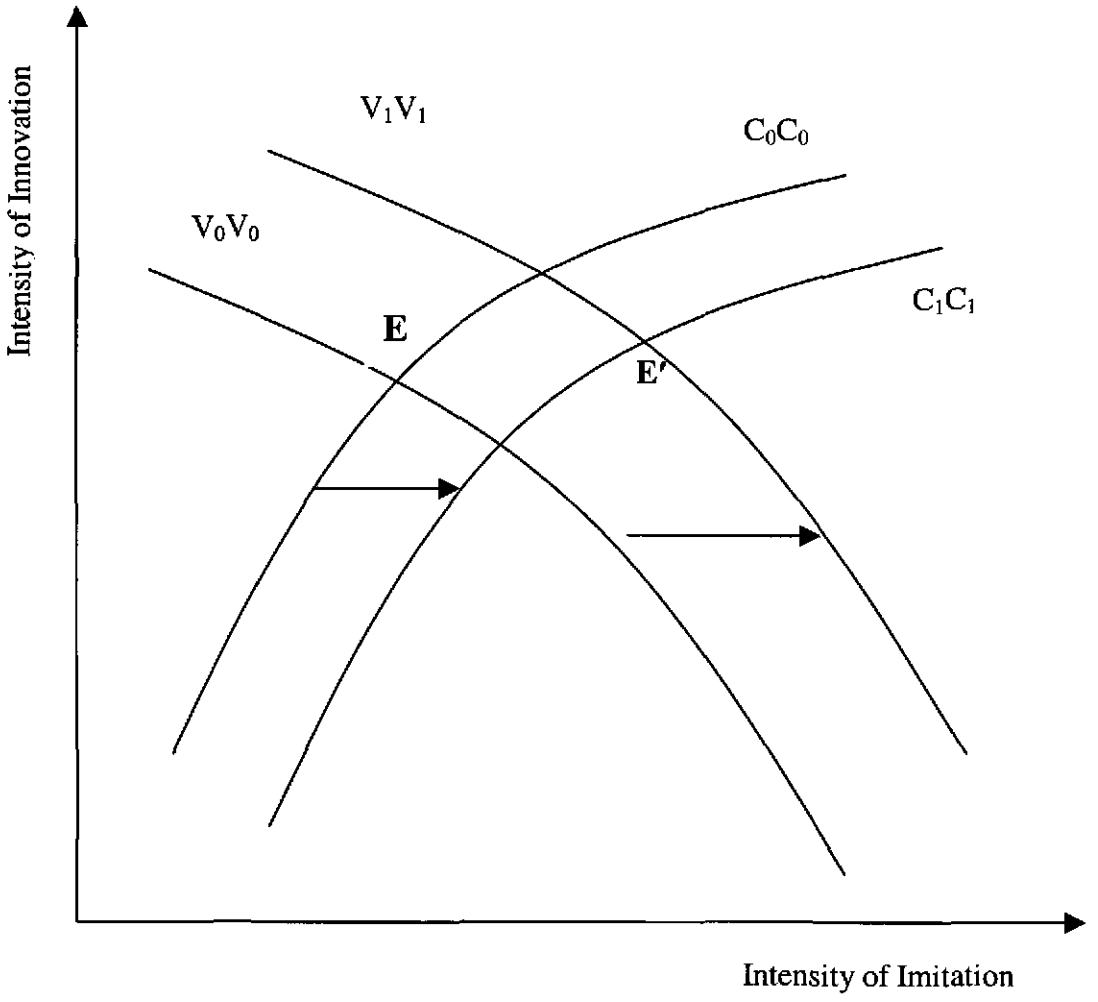

Figure 1. Innovation and Imitation between MNE and Host Country

$$\frac{dm}{dL^S}\Big|_{SS} = \frac{m/I(m-I)}{\lambda(L^N - a_N I)/I^2 + L^S/(m-I)^2} > 0 \qquad (3-37)$$

$$\frac{dm}{dL^S}\Big|_{NN} = \frac{m/I(m-I)}{\lambda(L^S - a_m I)/(m-I)^2 + L^N/I^2} > 0 \qquad (3-38)$$

Proposition 1:

In the steady state, if a government in the developing country requires the MNE subsidiaries to increase local content requirements, both the intensity of innovation in the developed and the intensity of imitation in the less developed country will increase. Furthermore, the intensity of imitation in the less developed country will increase more than the innovation rate in the developed country.

The intuition behind Proposition 1 is as follows: Strengthening local content requirements increases the employment in the subsidiaries of MNE in the less developed country, which means more workers in the developing country are involved in manufacturing and reverse engineering. The rate of imitation in the less developed country will match the rate of innovation in the developed country. In order to keep a higher standard of living, the developed country will keep innovating new products, which shortens the product cycle. Therefore the intensity of innovation and the intensity of imitation both increase. Because more workers are added into the MNE subsidiary, the intensity of imitation increases more than that of intensity of innovation.

Government Investment Incentives (GIIs):

In order to attract more FDI, the less developed country government may grant subsidies to the R&D activities of the developed firm. The impact of GIIs on the host country economy is unclear in the literature. To date, theoretical impact of GIIs have not been analyzed in a dynamic general equilibrium frame work.

To model investment incentives, the no-arbitrage condition can be changed. When the less developed country government subsidizes FDI, the systems of Equations (3-32)-(3-33) are modified, and the right hand side of these Equations are multiplied by $(1-\theta^N),(1-\theta^S)$ respectively (proof see Appendix D).

We can get:

$$\frac{dn^S}{d\theta^S}|_{\theta^S=\theta^N=0}=\frac{a_N(n^S)^2 b^N}{\Pi w^N}>0, \tag{3-39}$$

$$\frac{d\omega}{d\theta^S}|_{\theta^{S=}=\theta^N=0}=-\frac{\omega^2 a_N b_S(\rho a_m n^N/\lambda\omega+n^N/w^N+L^N n^S/n^N}{\Pi}>0 \tag{3-40}$$

Proposition 2:

In a steady state, with a big technology gap between the two countries, if the government in the developing country provides investment incentive to the MNE, it will decrease resources in the manufacturing sector while increasing resources in the R&D sector, and the less developed country's relative wage will increase.

This proposition implies that a small subsidy and tax incentives in the developing country shrinks the fraction of resources in manufacturing and increases the resources in MNE subsidies in adapting the new blueprints. This will stimulate the R&D sectors and

increase the profit margin in those R&D sectors. Higher wages attract more skilled workers flow into this R&D sectors until the wages in MNE sector equals other non-MNE sectors. Therefore fewer resources are devoted to manufacturing. The relative wage gap also increases because of higher productivity of skilled workers.

3.4 Conclusion

This paper develops a dynamic general equilibrium model to analyze the impacts of two commonly used trade related investment measures (TRIMs), LCRs and government investment incentives (GIIs) in developing countries where MNEs conduct FDI. Local content requirements are intended to force foreign subsidiaries to use local inputs. Although this requirement results in higher employment rate for the domestic industry, this production protected from foreign competition will result in an industry that is unlikely to produce high-quality, low-priced and internationally competitive final products. In conventional theory, in the long run, LCR will cause import substitution, consumers will pay higher costs for the lower quality products, growth of domestic demand will stagnate, and economic development of the host country will be hindered.

In the short run, however, under this general equilibrium model and imperfect competition framework, LCRs may benefit the economy of the host country in terms of technology transfer. This analysis shows that in the case in which a big technology gap exists between the host and home countries, increased the employment requirements by the less developed government will increase that country's rate of innovation, imitation and economic growth in the short run.

Tax incentives are widely used by policy makers in many developing countries, because tax credits and other incentives to MNEs will shorten the product cycle and increase R&D activities and technology transfer in the less developed country. In theory, in the long run, these incentives will benefit overall economic development of the host countries, but will cause a redistribution of wealth to those sectors that are subsidized. The second finding of this analysis, consistent with Rybczynski Theorem and much empirical works is that giving tax concessions or investment incentives in a less developed country will increase resources in the R&D and the technology-adapting sectors while decreasing resources in the manufacturing sector. Relative wage between the developed and developing countries will also be expected to decrease.

These findings are developed from analysis of the effects of two types of the TRIMs agreement in the case in which there is a big gap[5] in technology adoption between developed and developing countries in a bilateral trade framework. Further work can be done regarding the impact of other TRIMs agreement on innovation and imitation. Extension might also include analysis of the small gap case in which the speed of imitator is very fast and the technology gap between the two countries is very small. Regional and multilateral investment cooperation might also be analyzed to show how these agreements may maximize benefits for all countries. Finally, analysis of effects of technology transfer on relative growth rates and welfare between developed and less developed countries can also be considered.

[5] Big gap means a firm which quality follower inefficiently imitates the new products of a quality leader, and cause long product cycle and large technology level difference between two regions.

Chapter IV. Trade Related Investment Measures in a Small Open Economy: The Case of Tunisia

4.1 Introduction

The Tunisia economy has been undergoing a series of attempts to institute major economic reforms has undertaken in the Tunisian economy since 1997. With these reforms, Tunisia has entered into a new phase of economic development directed towards becoming globally competitive through opening up to FDI, international trade, and technology transfer from foreign countries. There is an ongoing concern in Tunisia regarding the impacts of trade-related investment measures (TRIMs) on output, employment and other variables that affect the economic well-being of the country's population. It becomes important to evaluate the effects of such policy reforms on factor prices and output, along with inter-sectoral movement of resources, such as labor and capital. To address this issue in this essay, we use a 35-sector computable general equilibrium (CGE) model for Tunisia. Though such ex-ante analysis may not be replicated ex-post due to various macroeconomic and other factors that the model does not capture, the positive results nevertheless go a long way toward establishing the credibility of the reforms process. We do hope that our analysis will provide a more solid insight into the ongoing policy debate.

A CGE model was developed to analyze TRIMs policies. The objective of this model was to determine how TRIMs policies have impacted 35 main host country economic sectors such as agriculture and food, manufacturing, mines and utilities, and

service. The most important feature of this model is to consider FDI with TRIMs in CGE framework. We outline some essential features of our model and the data used in Section 4.5. Section 1 is the introduction. Recent literatures on the determinants of FDI and FDI in CGE model are summarized in Section 4.2. Section 4.3 reports Tunisia 1994 and 1997 Investment Code. With this as background, we present in Section 4.4 details of the adaptation of a computational TRIMs policies in CGE model. In Section 4.5 we outline the simulation results, and finally Section 4.6 is the conclusion regarding the possible implications of implementing the various TRIMs policies on Tunisia's economy.

The starting point for our model is the prototype CGE model built for studying trade liberalization by Konan and Maskus (2000). Some modifications were made to this model in order to capture the major features of the TRIMs policies on the Tunisia economy. To begin with, this is the first major attempt to model the FDI in the CGE model related to TRIMs policies. FDI is modeled as representing capital inflow into the host country. We also assume that capital market clearance and labor market clearance still hold in this small open economy, and that the exchange rate varies in order to clear the capital market.[6] Secondly, rather than considering trade relationships between several regions, this model only focuses on Tunisian foreign investment policies. Government investment incentives and taxes on the MNEs are built into the model as policy instruments. Third, there is no labor differentiation between countries, all labor is assumed to have the same skill level. Finally, four simulation scenarios are generated,

[6] real exchange rate = $\frac{\text{nominal exchange rate x Tunisian price}}{\text{foreign price}}$

which include (1) the impact of government subsidies/investment incentive or tax simulation on major economic indicators; (2) the impact of government tax simulation on four major aggregate sectors; (3) the impact of government subsidies/investment incentive or tax simulation on output; (4) the impact of government subsidies/investment incentive or tax simulation on capital; and (5) the impact of elasticity substitution between domestic and foreign capital scenarios on major economic indicators.

Our results indicate that the impact of TRIMs policies on FDI in Tunisia varies from sector to sector. And that overall, Tunisia would gain significantly from government subsidies or tax incentives to MNE while loss in tax policy. The greatest impacts of the TRIMs policies on gross domestic product are on capital intensive sectors and service sectors and the impacts are small on labor intensive sectors such as agriculture or capital immobile sectors. Imposing a tax on MNEs would induce a loss in GDP, and income and relative wage will decrease. The opposite holds if the government of the host country subsidizes MNEs.

Although solid information about FDI in each sector in Tunisia is not sufficient to calibrate Social Accounting Matrix (SAM) for TRIMs policies, we employ available figures to develop a CGE model that incorporates several TRIMs policies in all 35 sectors. We consider separately whether TRIMs policies in each major sector may be identified as a tax and subsidy. The barriers in different sectors can be treated as taxes or subsidies on producer's input cost. Before we could set up a CGE model to represent TRIMs policies as barriers to FDI, a review of the literature on how other economists have modeled the impacts of FDI in CGE models was necessary.

4.2 Literature Review of Barriers to FDI in CGE model

The major approach to FDI in CGE model is Foreign Trade Analysis Project (FTAP). FTAP model treats FDI as capital inflow into the economy. The treatment of FDI follows the seminal work of Petri (1997). FTAP incorporates increasing returns to scale and large-group monopolistic competition in all sectors. Francois, McDonald and Nordstrom (1995), and others adopted this method for manufacturing and resource sectors, and Brown et al (1995) and Markusen, Rutherford and Tarr (1999) used similar treatments for services. Finally, FTAP makes provision for capital accumulation and international borrowing and lending, which is based on the work developed by McDougall (1993) who used a treatment of international (portfolio) capital mobility and the work of GTAP by Verikios and Hanslow (1999). FTAP is implemented by using the GEMPACK software suite. Its structure is fully documented in Hanslow, Phamduc and Verikios (1999).

Various barriers need to be incorporated into an explicit economic modeling framework in order to determine how the existence or removal of these barriers will affect conditions of competition and costs of production, economic welfare, and the inter-sectoral movement of capital and labor. Generally, barriers to FDI are modeled in one of two ways. First, the barrier to foreign firms may take the form of an increased fixed cost of locating in a host country. Second, the barrier may take the form of a tax on installed capital. In our model we use the second method.

Some indication of major modeling work done to date is provided as follows: There are four categories for the modeling of barriers to FDI:

(1) Reduction in services barriers – Brown et al.(1996a,b), Robinson et al.(1999), Francois et al. (1996), and Tamms (1999);

(2) Flows of FDI respond to changes in rates of return – Martin and Yagashima (1993); Donovan and Mai (1996); McKibbin and Wilcoxen (1996); Bora and Guisigner (1997); Adams (1998), and Dee et al.(1996, 1998);

(3) Link between parents and foreign affiliates and distinctions between foreign and domestic firms — Markusen et al. (1993, 1999); Benjamin and Diao (1997); Petri(1997); and Dee and Hanslow (1999).

(4) Adapted Michigan model –Brown (1999).

The first approach concerns reduction in services barriers. Brown et al.(1996a, b) based on 8-region, 29-sector, 1990-reference year version of Michigan CGE model, with all goods and services tradable. They used Hoekman's (1995) estimation of tariff equivalents covering all modes of providing services, including FDI. Factors involved in FDI assumed to be part of factor markets in country of origin.

Another example of this approach is Francois et al (1996). By using 1989 as reference year in his CGE model, he calculated the effects of price wedges that can be attributed to the Jones Act that restricts U.S. trade in domestic water transportation services. Robinson (1999) based on 10-region, 11 sector, 1995-reference year CGE model, with all goods and services tradable. He used Hoekman's (1995) "guesstimates" of services tariff equivalents, with allowance for growth in total factor productivity stimulated from imports of services by developing countries.

The second approach is that flows of FDI respond to changes in rates of return. Martin and Yagashima (1993) analyzed the trade liberalization in Asia-Pacific region coupled with assumed changes in inward FDI. Bora and Guisigner (1997) developed an investment liberalization model, with allowance for international capital mobility. Dee et al. (1996) based on 13-region, 4-sector, 1992-reference year CGE model, with all goods and services tradable, monopolistic competition in the resources, food processing, and manufacturing sectors, and allowance of capital accumulation and international factor mobility.

The third approach analyzes links between parents and foreign affiliates and distinctions between foreign and domestic firms. Markusen et al (1995) analyzed the trade liberalization in the automobile industry in the NAFTA countries, using a model with multinational firms or national firms responding to changes in their market shares.

Among the above approaches, Petri's model (1997) set a standard in applied general equilibrium model by using a nested utility function. Goods are differentiated between MNE headquarter and host countries. Capital, labor, and intermediate inputs are produced locally while an intermediate input is imported from headquarters. Capital is allocated internationally according to the return of the capital. However, investors invest where they can earn the highest profit. Barriers to FDI are modeled as a tax on FDI profit.

Markusen, Ruther and Tarr (1999) developed another approach to model barriers to FDI. In their model, the foreign firm faces a constant marginal cost composed of skilled and unskilled labor and an intermediate input imported from headquarters. Foreign firms should first make a fixed investment. The market structure for services is

monopolistically competitive. Services providers set an optimal mark-up of price over marginal cost. Free entry guarantees that profit is zero.

Dee and Hanslow's paper (1999) was based on a 19-region, 3-sector, 1995-reference year CGE model, with modifications of Petri's (1995) framework and updating of data on FDI stocks, output, and rates of return. They employed the average of services barriers for banking and telecommunications services contained in Kalirajan et al.(1999) and Warren(2000).

The fourth approach is the Michigan model (1999). The Michigan CGE model developed from Petri and Markusen et al. is the last approach that we analyze here. In Michigan CGE model, MNEs produce a differentiated product and allocate production to their various host country locations. Consumers use a three-stage budgeting procedure (Brown 1999). Consumers first allocate expenditure between an aggregate of the output of a representative firm headquartered domestically and an aggregate of the output of firms headquartered in other countries. At the second stage, expenditure on the import aggregate is allocated across the varieties produced by representative firms headquartered in each of the foreign countries. At the third stage, expenditure on the output of each representative firm is allocated across the various plant locations.

In the Michigan model, from the production side, MNEs invest capital and labor in their headquarters location. Each MNE not only faces the fixed cost of labor and capital at home, but also faces a fixed startup cost of capital and labor in the host location. Firms set a price for the output of each plant with an optimal mark-up of price over marginal cost. Labor is regarded as being freely mobile between sectors but not

across borders. Capital is perfectly mobile between countries. The risk premium paid by capital importers in a country depends on the overall change in its capital stock.

4.3 The FDI in Tunisia, Tunisia's 1994 and 1997 Investment Code

4.3.1 FDI in Tunisia in 1990s

Tunisia has attracted a net average flow of 123 million US dollars during the period 1992-1999, which took account of 0.2 percent of the total world FDI. Recently, the FDI inflows appear to be concentrated in three sectors, energy, tourism, and textiles. That part of the energy sector accounted for 90 percent of the total volume of FDI during the period 1992-1995, and 45 percent during the fourth years following the application of the FTA (free trade area) with the EU. The manufacturing sector also has increased over the course of these two periods, growing from 3.4 percent during the first period to 4.6 percent in the second. The growth of the tourist sector has more than doubled during this same time period, which increased from 3.2 to 7.1 percent. The relative increase in these two sectors is due to the privatization program in the manufacturing sector and to the decline of investments in the energy sector during this period. The privatization process in the manufacture and tourism sectors made these two sector's share dominance in total FDI.

The reliance on privatization to attract FDI continues to fluctuate in capital inflows into Tunisia. The increase in the volume of investments from 403 million TD in 1997 to 760 million TD in 1998 shows that Tunisia is ameliorating its performance of foreign investment policies. In 1994 and 1998, FDI inflow reached its peak. The increase

of 1994 was due to the building of the Mediterranean gas pipeline sending Algerian gas to Italy and from the investments realized on the Miskar oil Site, which is operated by British Gas.

Table 4.1 Trend in Direct Foreign Investments in Tunisia by Sectors (in Millions TD)

	1992	1993	1994	1995	1996	1997	1998	1999
Energy	89.4	93.3	91.1	80.4	61.2	67.3	26.6	44.6
Tourism, real estate	2.5	1.1	3.1	9.2	17.8	5.7	3.2	8.5
Financial Inst.	0.6	1.1	0	0	0	0	0	0
Manufacturing	3	2.3	2.6	7.9	18.2	21.3	68.9	45.3
Other Sectors	4.5	2.3	3.2	2.4	2.8	5.7	1.3	1.7
Total	5161	6599	5424	3051	2725	4029	7599	4372

Source: Central Bank of Tunisia

Table 4.2 Some Indicators of FDI in Tunisia (in percentage)

	1992	1993	1994	1995	1996	1997	1998	1999
FDE/GDP	3.8	4.5	3.4	1.8	1.4	1.9	3.3	1.7
FDI/GFCF	13.8	16.1	12.7	7.6	6.2	7.8	13.4	6.8
DFI/ECF	26.5	26.6	20.6	13.5	11.3	14.5	31.4	14.8
FDI per Capita in US dollars	68.8	76	61	37	30.9	39.7	71.8	39.1

Source: Central Bank of Tunisia
Notes: GFCF: Gross Fixed Capital Formation
ECF: External Capital Inflow

As we can see from Table 4-3, the manufacturing sector absorbs more than 65% of the total FDI. the energy sector 31%, 2.5% for tourism sector and agriculture only 0.4% and services sector 0.7%.

Table 4.3 FDI Flow Breakdown Per Industry (1995)

Sector	TND million	Share of FDI	Amount
Manufacture	673	65%	437.45
Energy	320	31%	99.2
Tourism	26	2.50%	0.65
Agriculture	4	0.40%	0.016
Services	7	0.70%	0.049

Source: Foreign Investment Promotion Agency (FIPA) -Tunisia

Foreign investment in manufacturing plays an important role in Tunisia's economy. FDI inflows reaching $650 million in 1998 were up from $339 million in 1997. Most of the foreign investment has been directed toward the energy sector, prospecting and developing oil and gas fields and building pipelines. Foreign investment in textiles has also been considerable, while other sectors such as shoes and leather, vehicle parts, electronics, pharmaceuticals and computer software have also benefited from FDI. Nearly 85% of the manufacturing companies were established in Tunisia to re-export all their production to other markets. Partnership is significant: nearly half of these companies have joint ventures with Tunisians. The manufacturing sector of the MNEs absorbed 9% of the total labor force in Tunisia. According to the Tunisia Investment Code of 1994, foreign companies can only bring in up to 4% of their own employees, which implies that 96% of the employees have to be recruited from the local labor force.

4.3.2 Tunisia's 1994 and 1997 Investment Code

Tunisia has been revising its investment policies since the earliest investment code was established in the 1960s. Especially since the 1990s, FDI in Tunisia has increased dramatically. In the following analysis, we focus only on the investment codes implemented during the last decade.

Restrictions on FDI that affect commercial presence in Tunisia are contained in Tunisia's Code des Incitations aux Investissements of 1993 and in its GATS Schedule of Commitments of 1994 and 1997. These restrictions or requirements apply to all service sectors except for banking, insurance, mines and energy, and distribution. All major

potential investments in Tunisia are subject to pre-screening. Any foreign investment exceeding 50% of equity in a company (with the exception of wholly export-oriented investments) is necessary to get approval from the Tunisian Investment Commission to invest in Tunisia market. Any cost or uncertain situation related to the application during the screening process may serve to discourage potential foreign investors from investing in Tunisia and to minimize FDI.

Tunisia introduced a number of investment incentives in a new Investment Code 1994. The code is global in character and covers all sectors except domestic trade and investments in mining, energy, and finance. 100% ownership is allowed by foreign investors, with some exceptions in industries that are not wholly exporting, and in agriculture where long-term leasing is permitted. Incentives of investment can be either fiscal (tax reductions or waivers) or financial (grants or subsidies). The fiscal incentives of investment range from 35% for all activities covered by the Investment Code, 50% for activities related to environmental protection and investments in development support activities and services, and 100% for wholly exporting activities, companies located in regional development areas and agricultural development projects. All activities covered by the Code are eligible for a suspension of the value added tax (VAT) and the consumption tax on locally manufactured capital goods, for the reduction of tariffs to 10% and suspension of the VAT and the consumption tax on imported equipment when no similar equipment is made locally. Companies with off-shore status may import duty-free and can sell part of their production domestically subject to some restrictions.

Partially exporting companies are allowed tax exemption and refunds of customs duties. There are special tax incentives for regional development projects.

As for the local content requirements (LCRs), foreign firms may account for up to 4% of the total employment in foreign investments, have certain personal tax advantages, are permitted free repatriation of profits, receive investment protection under treaty, and are protected from double taxation. This regime is clearly relatively open for FDI. Interestingly, the tourism sector (hotels and restaurants, convention services) along with a few other sectors such as business services, consulting, and computer-related services, environmental protection services, activities linked to cultural services such as plastic and graphic arts, file production, and research and development are the sectors in Tunisia where no screening is carried out for foreign investment, nor are any limitations applied to equity participation. In what follows we allow for FDI to respond to the changes in relative prices caused by the TRIMs policies, and make an attempt to explicitly consider the impact of the various TRIMs policies in the economy.

Tunisian Code of investment promotion grants three main types of advantages:

(1) Reinvested profits become tax free within the limit of 35 percent of the taxed revenues and profits;

(2) A custom duty exemption on equipment goods, which cannot be found locally;

(3) Limitation of the VAT to 10 percent on the import of equipment goods, and the possibility to benefit from repayment-schedule regime for all production equipment and other materials whose period of use has exceeded seven years;

(4) The additional advantages for totally exporting companies consist of:

(4a) A complete exemption for reinvested profits and revenues;

(4b) A total exemption of duties and taxes concerning equipment goods, including the goods shipping equipment, raw materials, semi-products, and services necessary to the production;

(4c) The right to put on sale up to 20% of their production on the local market.

Commercialized products remain under the taxes and duties in force. There are some other investments which benefit from additional incentives. These investments can be located in various particular fields, namely investments that help the development of poor areas, agriculture development, environment protection and technological promotion field.

4.4 Adaptation of a Computational TRIMs Policies in CGE model

The model employed in this study draws from the structure developed by Konan and Maskus (2000). The main difference between their model and this one is that we consider FDI inflow and the host country government's TRIMs policy. In addition, all trade liberalization policy instruments were removed from the original model. TRIMs policy is modeled as a tax or investment incentives on foreign investment inflows in host country.

Due to lack of sufficient information in each sector, the total amount of FDI is calculated from the source that we got from the Central Bank of Tunisia (Table4.2). FDI in 1995 accounted for 7.6% of the total GDP, which is about 2.40 million TD.

The TRIMs agreement are represented as a value added tax on foreign capital. Different kinds of TRIMs policies are applied to different sectors. For example, LCR is widely used in manufacturing sectors. In our model, investment incentives are modeled as reducing the non-trade barriers in each sector, while government taxes are modeled as increasing the non-trade barriers in each sector.

Our model includes 35 production sectors and one representative consumers which include government and households, plus 2 production factors. Among the factors, labor and capital are used by all sectors.

The data for the model consist of a Social Accounting Matrix (SAM) and other parameters, such as elasticities of substitution and transformation, cost of TRIMs policies in each sector, and policy parameters. The data is assembled into a consistent set of relationships between intermediate demand, final demand, and value-added transactions using the 1995 input-output table for Tunisia on a diskette provided by the Institute National De La Statistique. The base year of the input output table is 1983. The rectangular SAM implies that row sums and column sums are zero, which means that supply equals demand for all goods and factors, tax payments equal tax receipts, there are no excess profits in production, the value of each household expenditure equals the value of factor income plus transfers, and the value of government tax revenue equals the value of transfers to households.

In order to model FDI and TRIMs policies, the new features of a CGE model were re-built based on the Konan and Maskus (2000) model. The structure of the model

can be viewed in Figure 2 and Figure 3, which represent the production side and the consumer side of the CGE model.

Labor is taken to be freely mobile between sectors but not across borders. There is an equilibrium wage for each country. Capital is mobile internationally. New firms that enter the international market need to borrow capital on international markets in order to setup firms in the host country. The degree of international capital mobility can be set exogenously. The rate of return paid for capital depends on the international interest rate plus a risk premium. The elasticity of the risk premium with respect to the volume of capital imports can be set exogenously. We assume that capital imports that result in a one percent increase in the capital stock generate an interest rate risk premium of 0.6 percent. That is, the risk premium elasticity is 0.6. This rate is set according to the empirical work from Drusilla K. Brown and Robert M. Stern (1999).

A competitive, constant return to scale computable general equilibrium model is used to explore the impact of TRIMs policies on the economy. The formal equations and notation of the model are presented in the Appendix E. Tunisia is assumed as a small open economy, implying policy changes are assumed not to significantly alter prices in other regions of the world. Therefore, price and interest rate are both exogenous. There are two closures that are imposed in this model: the savings-investment balance (Equation A11) and endogenous current account balance (Equation A13). The former Equation is based on the assumption that the capital stock changes depends on the international interest rate plus a risk premium. The risk premium paid by capital importers in a country depends on the overall change in its capital stock. We experiment

with various risk-premium elasticities in order to demonstrate the role of capital mobility in determining the effect of TRIMs policies in FDI.

From the domestic production side, constant returns to scale and perfect competition imply that price equals marginal costs of products. Final outputs are produced according to a Leontief function using intermediate inputs and real value added. A constant elasticity of substitution (CES) production describes the substitutability between labor and capital inputs in producing real value-added. Intermediate and final goods are differentiated by country of origin according to the Armington assumption. Therefore export and import prices differ between regions. In each sector, we assume that foreign MNE firms and domestic firms are exactly the same in terms of technology. Demand for domestically produced and imported goods is represented by a CES function, and intermediate imports are differentiated by region of supply in a CES structure. Production follows a nested two-stage constant elasticity of transformation (CET) function. Total output is equal to the sum of domestic supply and total exports. Capital is assumed perfect mobility, and labor is not mobile across border.

Intermediate inputs are disaggregated into domestic sources and imports to incorporate importing costs. Value added input is divided into labor value added and capital value added. Furthermore, value added function can be split into labor value added and capital value added, where capital value added can be decomposed into domestic capital value added and foreign capital value added. The valued added function can be represented as (Appendix E, Equation 1):

$$V_i = \left[a_{Li} L_i^{(\sigma_i - 1)/\sigma_i} + a_{Ki} K_i^{(\sigma_i - 1)/\sigma_i} \right]^{\sigma_i/(\sigma_i - 1)} \quad (4\text{-}1)$$

Where L_i and K_i are labor and capital respectively. V_i represents the value added. σ represents the elasticity between capital value added and labor value added.

We use an Armington approach for modeling FDI, in order to differentiate between domestic capital and foreign capital. Thus, total capital value added can be expressed as follows (Appendix E, Equation 1):

$$K = \left[b_f KF_i^{(\gamma_i - 1)/\gamma_i} + b_d KD_i^{(\gamma_i - 1)/\gamma_i} \right]^{(\gamma_i - 1)/\gamma_i} \quad (4\text{-}2)$$

where KF and KD represent foreign capital and domestic capital respectively. And K represents total capital value added. Total capital is differentiated by domestic capital and foreign capital in CES structure. γ represents the elasticity of substitution between domestic and foreign capital. The sensitivity of the capital account to the interest rate differential is a measure of the degree of capital mobility (asset substitution). The degree of capital mobility plays a key role in the CGE model. In order to test this sensitivity, we set the elasticity of substitution between domestic capital and foreign capital as a different value in one of the simulations.

We set an endogenous tax replacement in the program in order to treat the neutrality of government budget. In other words, government taxes or subsidies, foreign capital, and lump sum transfers of revenue to the domestic consumers, and SAM are balanced.

Government tax or subsidies can be shown in Equation 7 of Appendix D.

$$c_i Y_i = \sum_j (1+v_i) p_j d_{ji} + \sum_j p_j^m m_{ji} + (1+\tau v_i) w_K K_i + w_L L_{li} \qquad (4-3)$$

government taxes, investment incentives are levied on the foreign capital inflow. In the benchmark, government taxes and investment incentives are set to zero. In order to keep the government budget balance, the government will transfer revenues via lump sums to the consumers. Equation 12 in Appendix E shows the government budget constraints.

$$\sum_i P_i^G G_i = D + \sum_i t_{vi} P_i^C V_i + \tau_{vi} P_i^m F K_{il}^F \qquad (4-4)$$

where government expenditure is equal to the government budget deficit plus the taxes or subsidies (investment incentives)on value added, and taxes or subsidies on foreign capital inflow. The first item on the right hand side of Equation 4-4 represents the government budget deficit, the second item represents taxes or subsidies on value added and the last one stands for the taxes or subsidies on foreign capital. Here τ equals the taxation rate or subsidies in the model, and t is the value added tax rate.

Consumers use a two-stage budgeting procedure. A representative consumer maximized a nested CES utility function with a corresponding two-stage budget constraint. In the initial stage, the consumer makes a decision about how much to spend on goods from each sector, given the budget constraint. Income elasticities across sectors are set at unity as given by a Cobb-Douglas (CD) utility nest. In the second stage, the consumer determines domestic and aggregate import expenditures in each sector according to a CES function. Then the consumer selects purchases of imports from each region given a budget for imports. These second stage function characterize the split

between government consumption and investment spending on domestic and imported goods and services. The representative consumer received income from primary factor, net transfer from the government, the current account deficit, as well as any net economic rents from the operation of non-tariff barriers to trade.

Market equilibrium requires that consumers be willing to consume all the output sold by firms. Each country is governed by a balance of trade constraint. The country raises foreign exchange by selling products, exporting capital, and receiving rents or loss from firm foreign subsidiaries.

The government budget deficit is a deduction in available income for the representative agent, constituting a transfer to government consumption. The government also collects taxes or gives credit from/to the subsidiaries of the MNEs. The deficit is held fixed during this simulation. If a policy causes prices to fall, thereby reducing the tax revenues required to finance government expenditures, this tax saving is transferred to the representative agent. In the meantime, if TRIMs policies such as government subsidies results in lost government revenues, the revenues are recouped by means of allowing tax rate τ to vary. The standard TRIMs policy cost rate was 5 percent in the 1995 benchmark.

Full employment is assumed, the economy wide level of employment is held constant in each country. This assumption is made because overall employment is determined by macroeconomic forces and policies that are not covered by the GAMS.

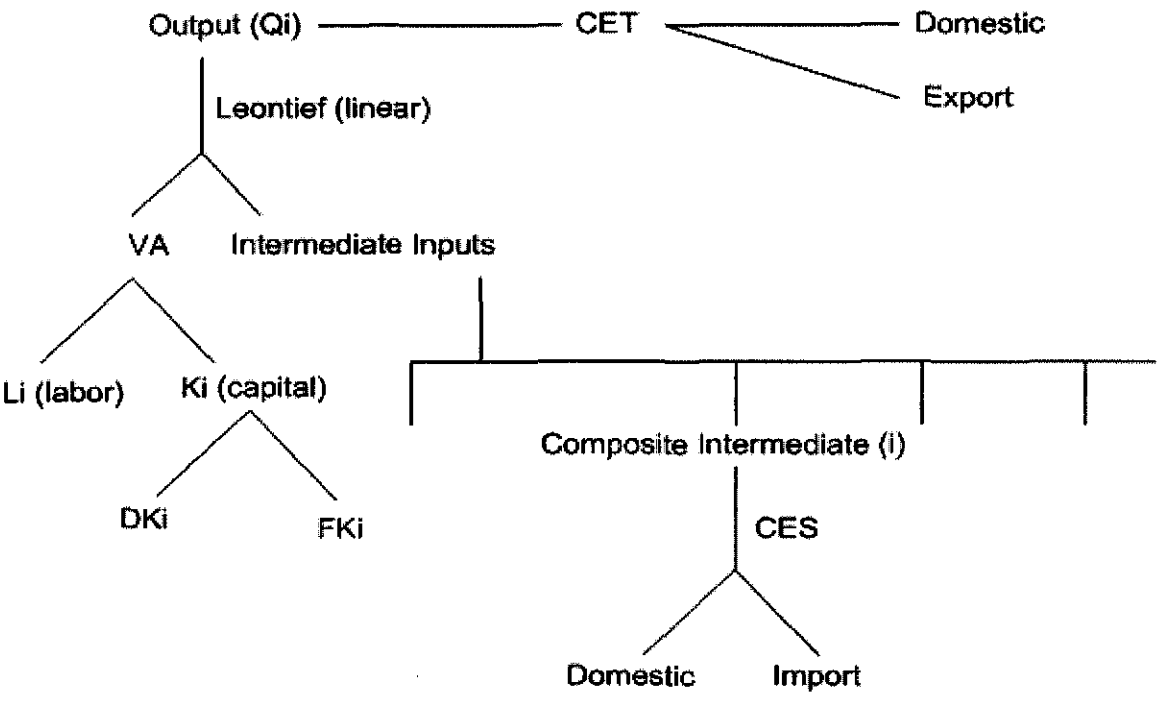

Figure 2. Production Side of the TRIMs Policies in a CGE Model

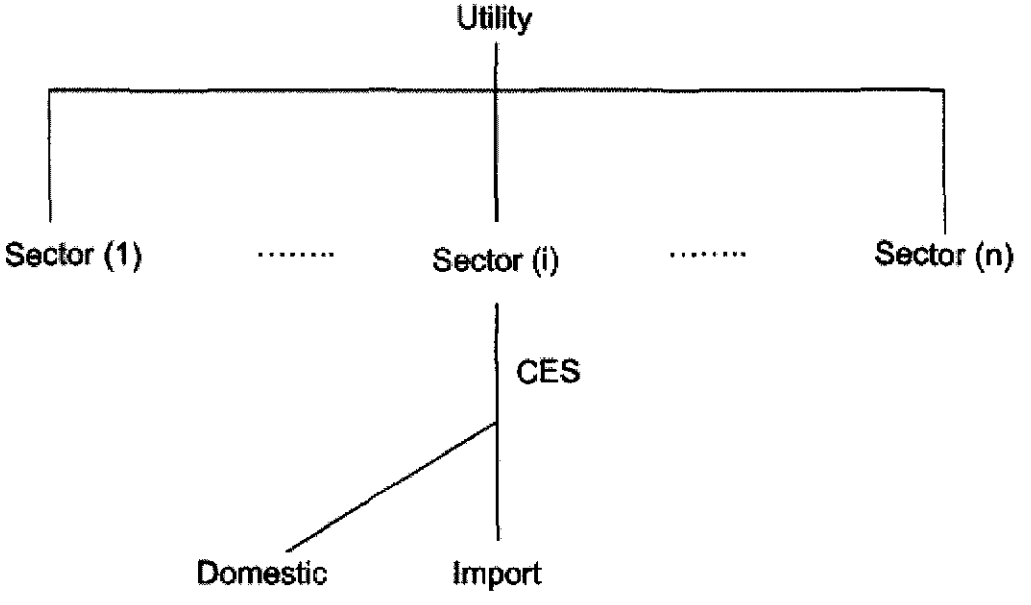

Figure 3. Consumer Side of the TRIMs Policies in a CGE Model

4.5 Simulation Results

Table 4-4 shows the impacts of government subsidies on several major economic indicators in the Tunisian economy. Increasing government investment incentives on MNEs will increase GNP, wages and income of the host country, while increasing government taxes will have opposite effects on the economy of the host country. GDP , wage and income will increase by 2.3%,1.78% and 2.56% respectively if the host country government imposes 5% government investment incentives. Domestic price level will increase by 0.21% when government subsidies increase by 5% and will decrease by 0.07% when government taxes increase by 0.15%. Exchange rate will depreciate when the government subsidies MNE and appreciate when government taxes MNEs.

Another explanation could be that the capital market clears when foreign capital flows into the host country. An increase in government investment incentives would lead to more foreign capital inflow in the global financial market, the direct effect of this policy is increased net exports (exports minus imports) for any given real exchange rate. Consequently, the demand for host country currency rises. This increase in the demand for the currency of the host country causes the value of its currency to appreciate, the appreciation of its currency tends to reduce net exports, offsetting the direct effect of the foreign capital inflow on the host country's balance of payment.

Table 4.4 Impact of Government Subsidies and Taxes on Major Economic Indicators (in Percentage)

	Subsidies increases by		Tax increases by		
	0.05	0.10	0.15	0.20	0.25
GDP	2.30	3.28	-4.408	-5.327	-5.920
WAGE	1.78	2.66	-1.390	-2.403	-3.033
PRICE	0.21	0.35	-0.07	-0.12	-0.18
EXRATE	0.33	0.54	-0.04	-0.17	-0.24
INCOME	2.56	3.47	-4.481	-4.867	-5.767

Source: Simulation Results

Table 4.5 Impact of Government Taxes on Major Sectors (in Percentage)

		Government taxes increases by:				
	Benchmark	0.05	0.10	0.15	0.20	0.25
AG	0.191	0.175	0.174	0.167	0.161	0.156
MAN	0.321	0.281	0.268	0.261	0.234	0.228
MU	0.069	0.073	0.077	0.058	0.053	0.050
SERV	0.420	0.471	0.481	0.514	0.552	0.566

Source: Simulation Results

Table 4-5 above shows the impact of government taxes or TRIMs policy on four sectors: agriculture, manufacturing, mining & utilities and service sectors. This table describes the percentage of output share in each sector which influenced by the government taxes. As the rate of taxes increases, the resources in agriculture, manufacture and mining and utilities sectors are shrinking. Among these changes, the

agriculture sector was affected less than the other sectors. As taxes increase, the resources in agriculture sectors are gradually moving out. The same situation holds for manufacturing sectors, and mining and utilities sectors. On the other hand, the output share of services sector increases from 0.42 to 0.566. This result implies that an increase in government taxes would decrease the output of labor intensive sectors, and increase the output of capital intensive sectors. Capital and labor would move from labor intensive sectors such as agriculture, manufacture to capital intensive sectors. This result is attributed to the capital mobility in each sector. For those labor intensive sectors capital mobility in each sector is lower, while the capital mobility of the capital intensive sectors is high, and these is more flexibility for these sectors to change their structure or spending due to external changes. Another reason for this result is the government protections in some sectors such as mining and utility sectors. This protection dampens the impact of the movement of the factors in this sector.

From Table 4-6 describes the output share changes affected by the government TRIMs policy. We can see that the total output share in manufacturing sectors are higher than that in other sectors and is more affected by the TRIMs policies such as government subsidies and taxes. The sectors with second highest output share are the service sectors. Increasing government subsidies will increase output in different sectors while increasing taxes will decrease the output and capital in most sectors. The output values will increase or decrease compared with the benchmark value depending on with the government subsidies or taxes. Since the combined manufacturing sectors account for 65% of the total

FDI, TRIMs policy plays an important role in affecting the domestic economy, especially the manufacturing sectors.

However, the gain or loss in different sectors is not evenly distributed. From Table 4-6, we can observe that the outputs of most service sectors increased prior to the government investment incentives compared with those after the government investment incentives were implemented, while few manufacturing sectors benefited after the investment incentives were imposed. Therefore, the net impact on the total outputs depends on the net effects each measure has on the different sectors which are influenced by the government policies.

Table 4.6: Impact of Change in Government Policies on Output Values

SECTOR		Investment Incentives		Taxes:		
	Benchmark	0.05	0.10	0.01	0.05	0.08
AGRICULTURE						
1. Vegetable products, non-foodstuffs(AG)	2.779	2.793	3.039	2.539	2.098	1.768
2. Food (FOO)	3.677	3.747	4.076	3.278	2.687	2.259
MANUFACTURING						
3. Mat. De Construction Ceramique Et Verre(CEM)	1.107	1.103	1.117	1.071	1.008	0.973
4. Metaux Non Ferreux Produits(MET)	0.391	0.313	0.377	0.364	0.315	0.288
5. Ouvrages En Metaux(MTW)	0.476	0.414	0.475	0.446	0.370	0.321
6. Machines Eq. Agri Et Indus(MAC)	0.232	0.366	0.247	0.206	0.173	0.159
7. Automobiles Camions Cycles(TRA)	0.388	0.414	0.417	0.346	0.285	0.249
8. Mat De Trans E Repar(AUR)	0.025	0.020	0.024	0.024	0.023	0.021
9. Materiels Electrique(EL1)	0.410	0.186	0.350	0.302	0.163	0.116
10. Materiel Electronique(EL2)	0.243	0.246	0.251	0.220	0.188	0.170
11 Equipements Managers(APP)	0.119	0.123	0.132	0.107	0.089	0.076
12 Produits Chimiques(CHM)	1.918	1.441	1.915	1.712	1.227	0.952
13 Vetements, Textile(CLO)	3.531	3..672	1.827	2.780	3.900	1.679
14 Cuirs Art De Mar Chaussures(LEA)	0.555	0.339	0.536	0.502	0.338	0.245
15 Produits Des Indus Du Bois (WOO)	0.576	0.581	0.614	0.537	0.478	0.435
16 Papeir Livres Et Disques(PAP)	0.434	0.377	0.433	0.431	0.351	0.295
17 Produits En Matieres Plastiques(PLA)	0.248	0.234	0.252	0.243	0.186	0.147
18 Produits Divers(OTH)	0.211	0.166	0.205	0.206	0.132	0.092
PETROLEM AND MINING						
19 Minerais Et Mineraus(MIN)	0.195	0.125	0.187	0.173	0.125	0.099
20 Petrole Brut Petroliers Et Gaz(PET)	1.434	4.594	1.641	1.181	0.848	0.702
UTILITIES						
21 Electricite(ELE)	0.562	0.526	0.568	0.557	0.512	0.475
22 EAU(WAT)	0.142	0.165	0.154	0.133	0.117	0.105
SERVICES						
23 Batiment Et Travaux Publics(CNS)	2.044	2.809	2.446	2.304	2.182	2.119
24 Commerce(COM)	2.368	1.779	1.946	2.171	1.705	1.301
25 Services De Transport(TRN)	1.695	2.449	1.859	1.447	1.077	0.875
26 Serv De Poste Et De Telecom(TEL)	0.322	0.482	0.322	0.329	0.271	0.226
27 Services D'hotellerie(HOT)	0.803	0.814	0.855	0.763	0.711	0.667
28 Services De Restauration(RES)	0.981	1.059	1.139	0.852	0.675	0.526
29 Services Financiers(FIN)	0.778	0.788	0.841	0.727	0.596	0.495
30 Service D'assurance(INS)	0.110	0.123	0.116	0.105	0.083	0.068
31 Serv Destines Aux Entreprises(BUS)	0.295	0.911	0.346	0.200	0.131	0.109
32 Locations Services Immobiliers(REN)	0.109	0.224	0.196	0.032		
33 Reparations(REP)	0.314	0.365	0.340	0.289	0.259	0.239
34 Serv D'entretien De Sante(EDH)	0.539	0.571	0.610	0.482	0.409	0.347
35 Serv Publique et Non Marchands(PUB)	3.857	4.039	3.914	3.821	4.540	4.879

Source: Simulation Results

Table 4-7 describes the impact of TRIMs policies on the capital share in each sector. The data shows that all the highest total capital values in this CGE model with TRIMs policies are those in the service sectors. Mining and utility sectors have the lowest capital value. This result implies that TRIMs policies tend to have a stronger impact on capital intensive sectors rather than on other protected or labor intensive sectors. The service sectors tend to receive more benefit than other sectors when government investment incentives are imposed. This is mainly attributed to the lower non-trade barriers for the FDI in Tunisia. Another reason is that the capital mobility in service sectors is higher than that in other sectors, since the higher the capital mobility is, the easier it is to avoid the liability of taxes.

We can summarize from these simulation results as follows: that eliminating government taxes or host country barriers to FDI will result in a greater overall improvement in living standards and increase the GDP level in the host country, while heavier government taxes will lead to higher inefficiency but lower the output. However, investment incentives or credits would have strong positive effects on the host country economy although previous literature did not explicitly demonstrate this positive effects. Furthermore, the effectiveness of the taxes or subsidies depends on whether the sectors are capital intensive or labor intensive.

Table 4.7 Impact of Change in Government Policies on Capital Share

SECTOR		Investment Incentives		Taxes		
	Benchmark	0.05	0.10	0.01	0.05	0.08
AGRICULTURE						
1. Vegetable products, non-foodstuffs(AG)	3.062	2.982	3.322	2.807	2.518	2.304
2. Food (FOO)	1.030	0.922	1.117	0.934	0.824	0.734
MANUFACTURING						
3. Mat. De Construction Ceramique Et Verre(CEM)	0.470	0.396	0.460	0.467	0.480	0.496
4. Metaux Non Ferreux Produits(MET)	0.072	0.052	0.068	0.068	0.062	0.058
5. Ouvrages En Metaux(MTW)	0.166	0.123	0.161	0.160	0.145	0.135
6. Machines Eq. Agri Et Indus(MAC)	0.015	0.026	0.016	0.013	0.011	0.010
7. Automobiles Camions Cycles(TRA)	0.108	0.106	0.114	0.097	0.087	0.082
8. Mat De Trans E Repar(AUR)	0.006	0.004	0.006	0.006	0.006	0.005
9. Materiels Electrique(EL1)	0.145	0.057	0.120	0.109	0.065	0.050
10. Materiel Electronique(EL2)	0.026	0.026	0.027	0.024	0.021	0.019
11 Equipements Managers(APP)	0.026	0.024	0.028	0.023	0.021	0.019
12 Produits Chimiques(CHM)	0.499	0.324	0.485	0.455	0.362	0.306
13 Vetements, Textile(CLO)	1.074	0.164	0.531	2.057	1.357	0.616
14 Cuirs Art De Mar Chaussures(LEA)	0.234	0.118	0.218	0.218	0.161	0.126
15 Produits Des Indus Du Bois (WOO)	0.284	0.233	0.292	0.273	0.272	0.268
16 Papeir Livres Et Disques(PAP)	0.140	0.105	0.135	0.142	0.127	0.115
17 Produits En Matieres Plastiques(PLA)	0.074	0.062	0.073	0.073	0.062	0.053
18 Produits Divers(OTH)	0.060	0.043	0.057	0.059	0.041	0.031
PETROLEM AND MINING						
19 Minerais Et Mineraus(MIN)	0.075	0.042	0.070	0.067	0.051	0.041
20 Petrole Brut Petroliers Et Gaz(PET)	1.213	3.899	1.382	1.001	0.786	0.713
UTILITIES						
21 Electricite(ELE)	0.393	0.367	0.395	0.391	0.389	0.390
22 EAU(WAT)	0.113	0.100	0.117	0.110	0.107	0.103
SERVICES						
23 Batiment Et Travaux Publics(CNS)	0.779	0.773	0.781	0.778	0.784	0.790
24 Commerce(COM)	2.525	2.511	2.436	2.640	2.247	1.890
25 Services De Transport(TRN)	1.276	1.822	1.392	1.090	0.871	0.759
26 Serv De Poste Et De Telecom(TEL)	0.404	0.736	0.413	0.404	0.352	0.317
27 Services D'hotellerie(HOT)	0.734	0.706	0.773	0.702	0.715	0.730
28 Services De Restauration(RES)	0.897	0.909	1.028	0.785	0.676	0.572
29 Services Financiers(FIN)	0.961	0.944	1.031	0.899	0.797	0.716
30 Service D'assurance(INS)	0.072	0.078	0.075	0.069	0.060	0.053
31 Serv Destines Aux Entreprises(BUS)	0.259	0.789	0.302	0.175	0.124	0.112
32 Locations Services Immobiliers(REN)	0.120	0.229	0.212	0.035		
33 Reparations(REP)	0.342	0.379	0.365	0.316	0.310	0.312
34 Serv D'entretien De Sante(EDH)	0.570	0.580	0.639	0.512	0.474	0.439
35 Serv Publique et Non Marchands(PUB)	2.293	2.373	2.319	2.270	2.832	3.196

Source: Simulation Results

4.6 Conclusion and Agenda for Further Research

This chapter analyzed the impact of government taxes and government investment incentives (GIIs) TRIMs policies on the Tunisian economy. The simulation results show that the economy of Tunisia would become significantly efficient through implementation of GIIs. However, taxing MNEs would cause inefficient resource allocation and result in real GDP and wage decreases.

Furthermore, regardless of whether Tunisia undertakes investment incentives or taxes, change is not evenly distributed among all sectors because TRIMs polciesimplementation implies a relatively dramatic economic structure adjustment. Output of services and other capital intensive sectors is more elastic with respect to TRIMs policies implementation than output of textile, clothing, other labor intensive and highly protected sectors and lose more from government taxes. Since the labor intensive manufacturing sectors accounts for 65% of the total FDI, TRIMs policies would have weak impact on the Tunisia economy. The two energy sectors absorb 31% of total FDI and include one labor intensive and one capital intensive sector. Although most studies conclude that energy sectors are highly protected, the simulation results show that the capital-intensive energy sector is highly responsive to TRIMs policies. The capital-intensive service sectors are strongly affected by government TRIMs policies, but only account for 0.7% of total FDI, so the impact of TRIMs policies in these sectors on the overall economy is not significant.

As this study focused only on the impacts of government taxes and GIIs in a non-specific model of FDI in one country, further research can be conducted regarding the

effects of other TRIMs policies such as local content requirements, export performance requirements and technology transfer requirements. The structure of the model can also be further improved by making it sector specific and considering FDI in two or more countries simultaneously or incorporating FDI into other components of the input-output table.

Chapter V. Conclusion

The dramatic growth of FDI that has accompanied global economic integration challenges policy makers of both developed and developing countries. In order to protect their national intesrests, most developing countries have imposed TRIMs policies on foreign investment companies. This three-essay dissertation examines the history of the TRIMs agreement, impacts of selected TRIMs policies in developing countries, and the empirical effects of some of these TRIMs policies in a representative developing country.

The first essay synthesizes the literature regarding the definitions, history, and theory of TRIMs policies application and negotiations. Despite intense negotiations in the Uruguay Round and the Doha Round of WTO talks, progress in multilateral TRIMs agreements remains insignificant because of differing concerns of different groups of countries about the perceived effects of the TRIMs agreement. Theoretically, these effects are also ambiguous with analyses using neoclassical theory and new trade theory resulting in potentially different welfare effects for host and source countries. Thus, a gap exists in the literature in terms of appropriate policy implications for the TRIMs agreement that might encourage more success in future agreements.

The second essay attempts to narrow this theoretical gap by developing a general equilibrium model of the effects of LCRs and GIIs on developing host countries. This model reveals that LCRs would benefit the host country in the short run when the technology gap is large but would hinder the long-run development of the host economy due to the stagnation of demand. GIIs implementation, however, would induce a decrease in the relative wages between the countries while stimulating the transfer of

technology and R&D development to the host country such that resources in the R&D sectors increase and resources in labor-intensive sectors decrease.

The last essay employs a CGE model to empirically simulate the theoretical impacts of government taxes and GIIs on some macroeconomic indicators in Tunisia. In support of the above theoretical results, wages relative to the source country and GDP will increase from implementation of GIIs and decrease from government taxes on MNEs. Additionally, the relative labor or capital intensity of different sectors will determine the relative impact of these TRIMs policies on output and capital shares. Service and other capital-intensive sectors would be more elastic to TRIMs policies than mining, utilities, agriculture, and other protected labor-intensive sectors. However, as labor-intensive sectors account for a very large proportion of FDI in Tunisia, the effect of TRIMs policies on the overall economy is very small.

In conclusion, from a development perspective, multilateral agreements on investment should be designed to help developing countries attract FDI that is compatible with national policy objectives such as promoting economic growth, industrialization and technology transfer. Per the results of this study, TRIMs policies generally have negative effects on economic development and growth in host countries, but, like GIIs in Tunisia, some TRIMs policies can have positive impacts. Thus, this study indicates that TRIMs policies implementation needs to be evaluated on a case-by-case basis and concludes that future development of CGE models that better replicate real world conditions might enhance these evaluations.

Appendix A. Trade-related Investment Measures and Their Possible Impact on Trade and Investment

Measure	Possible economic impact
Investment incentives	Influence location of investment
Tax concessions	
Tariff concessions	
Subsideies	
Investment grants	
Performance requirements	
local equity requirements	Restrict ownership of investments
licensing requirements	Require technology transfer
Remittance restrictions	Restrict external financial transfers
Foreign exchange restrictions	Restrict external financial transfers
Manufacturing limitations	Restrict production
Transfer-of-technology requirements	Require technology transfer
Domestic sales requirements	Displace imports
Manufacturing requirements	Displace imports
Product-mandating requirements	Displace other exports
Trade-balancing requirements	Displace other exports
Local content requirements	Displace imports
Export requirements	Displace other imports
Import-substitution requirements	Displace imports
Corporate measures	
Market allocation	Restrict exports
Collusive tendering	Excessive pricing for imports
Refusal to deal	Restrict exports/imports
Exclusive dealing	Export prohibition
Tied sales	Displace other imports and exports
Resale-price maintenance	Excessive pricing for imports
Price fixing	Excessive pricing
Differential pricing	Excessive pricing
Transfer pricing	Excessive pricing for imports; low pricing for exports
Home-country measures	
Export limitation on foreign affiliates	Restrict trade
Preferential taxes for incomes on Investment	Subsidize investment

Source: United Nations Center on Transnational Corporations, based on negotiating proposals in the Uruguary Round and other material.

Appendix B. Proof of Proposition 3.1

In this appendix we derive the properties of the VV and CC curves.

$$\left.\frac{dI}{dm}\right|_{CC} = \frac{I}{m}\left[\frac{\lambda(L^N - a_N I)/I^2 + L^S/(m-I)^2}{\lambda L^N/I^2 + L^S/(m-I)^2}\right] \tag{B1}$$

Using Equation (36), we can calculate the slope of the CC curve.

From Equation (30), we can prove that

$$L^N - a_N I > 0 \tag{B2}$$

therefore we have

$$0 < \left.\frac{dI}{dm}\right|_{CC} < \frac{I}{m} \tag{B3}$$

By the same means the slope of VV is derived from Equation (36),

$$\left.\frac{dI}{dm}\right|_{VV} = \frac{I}{m}\left[\frac{(L^S - a_m I)/(m-I)^2 + L^N/I^2}{(L^S - a_m m)/(m-I)^2 + L^N/I^2}\right] \tag{B4}$$

From Equation (31) we can derive that

$$L^S - a_m I > 0 \tag{B5}$$

Which implies the numerator is positive. If $L^S - a_m m > 0$, then the denominator is also positive, and the VV curve slopes upward. Even if $L^S - a_m m < 0$, the denominator maybe

still be positive. In the case where the denominator is negative, the VV curve will be downward sloping. Since $m > mn^N = I$, the slope of the VV curve is positive when the denominator always exceeds *I/m*,

$$\left.\frac{dI}{dm}\right|_{VV} < 0 \qquad \text{(B6-1)}$$

or

$$\left.\frac{dI}{dm}\right|_{VV} > \frac{I}{m} \qquad \text{(B6-2)}$$

Though theoretically the VV curve can be downward sloping, an upward sloping curve smore closely fits the results of empirical work. $L^S > a_m m$ is the sufficient condition to make the VV curve slope upward. Because $I = mn^N$, this condition is equivalent to $n^N > a_m I / L^S$. Therefore the VV curve slope upward whenever the fraction of innovative products in the developed region exceeds the share of the less developed labor force employed in research activities.

Appendix C. Proof of Proposition 3.2

Let's calculate the magnitude of the horizontal shifts of these curves in response to an increase in L^S.

$$\left.\frac{dm}{dL^S}\right|_{CC} = \frac{m/I(m-I)}{\lambda(L^N - a_N I)/I^2 + L^S/(m-I)^2} > 0 \qquad \text{(C1)}$$

$$\left.\frac{dm}{dL^S}\right|_{NN} = \frac{m/I(m-I)}{(L^S - a_m I)/(m-I)^2 + L^N/I^2} > 0 \qquad \text{(C2)}$$

The difference of (C1) and (C2) is equal to

$$\frac{(1-1/\lambda)L^N - a_N I}{I^2/\lambda} + \frac{a_m I}{(m-I)^2} \qquad \text{(C3)}$$

From (30), we get

$$(1-\frac{1}{\lambda})L^N - a_n I = \frac{1}{\lambda}\left[(1-\frac{1}{\lambda})\frac{n^N}{\omega w^N} - a_N I\right] > \frac{1}{\lambda}\left[(1-\frac{1}{\lambda\omega})\frac{n^N}{\omega^N} - a_N I\right] = \frac{\rho n^N a_N}{\lambda} > 0 \qquad \text{(C4)}$$

Therefore the denominator of (C1) is the larger of the two Equations. An increase in L^S causes the VV curve to shift by more than the CC curve.

Appendix D. Proof of Proposition 3.2

Now if we multiply the right-hand side of Equations (32) and (33) by $(1-\theta^N), (1-\theta^S)$ respectively, we can compute the response of relative wages and product shares to changes in the sizes of the developing and the developed regions when investment incentive is introduced. We would then obtain the following system of Equations for the comparative statics calculations:

$$\begin{bmatrix} a_N & -\frac{n^N}{\lambda w^N} & \frac{1}{\lambda\omega w^N} & -\frac{n^N}{\lambda\omega} \\ a_m & 0 & -\frac{1}{w^N} & -n^S \\ -a_N & \frac{n^N}{\lambda w^N} & \frac{a_N\delta}{n^N} & (\frac{1}{\omega\lambda}-1)n^N \\ -a_m & -\frac{n^S}{w^N} & -\frac{a_m\delta}{n^S} & (1-\frac{1}{\omega})n^S \end{bmatrix} \begin{bmatrix} d\delta \\ \frac{d\omega}{\omega^2} \\ dn^N \\ \frac{dw^N}{(w^N)^2} \end{bmatrix} = \begin{bmatrix} dL^N \\ dL^S \\ -\gamma_N d\theta^N \\ -\gamma_S d\theta^S \end{bmatrix} \quad \text{(D1)}$$

where $\gamma_N = a_N(\rho n^N + \delta)$ and $\gamma_S = a_m(\rho n^S + \delta)$. We denote the determinant of the matrix on the left-hand side of (D1) by Π, the calculation shows that $\Pi<0$.

By using this matrix (D1), we can see that an increase in the size of a region increases the fraction of products manufactured there. The effects of changes in labor supply on relative wages are ambiguous.

$$\frac{dn^N}{d\theta^N}|_{\theta^S=\theta^N=0} = \frac{a_N(n^S)^2 b^N}{\Pi w^N} > 0, \quad \text{(D2)}$$

$$\frac{d\omega}{d\theta^S}\Big|_{\theta^{S*}=\theta^N=0} = -\frac{\omega^2 a_N b_S (\rho a_m n^N / \lambda\omega + n^N / w^N + L^N n^S / n^N}{\Pi} < 0 \qquad \text{(D3)}$$

Therefore investment incentives (GIIs) policies in host developing country increases resources devoted to the innovation and simultaneously reduces the resources in manufacturing. GIIs also decreases the relative wage between in host developing country and source country.

Appendix E. Chapter IV Model Equations and Notation

Domestic Equations

A) Production

1. Value Added Function

$$V_i = [a_{Li} L_i^{(\sigma i-1)/\sigma i} + a_{Ki} K_i^{(\sigma i-1)/\sigma i}]^{\sigma i/(\sigma i-1)}$$

$$K_i = [a_{Ki} DK_i^{(\sigma i-1)/\sigma i} + b_{FK_i} FK_i^{(\sigma_i-1)/\sigma_i}]^{\sigma i/(\sigma i-1)}$$

2. Imported Intermediate

$$\mathrm{M_{iN}} = \sum_i [\delta_i m_{iN}^{(\eta i-1)/\eta i}]^{\eta i/(\eta i-1)}$$

3. Composite Intermediate

$$z_{ji} = [\gamma_{di} d_{ji}^{(\eta j-1)/\eta j} + \gamma_{mi} m_{ji}^{(\eta j-1)/\eta j}]^{\eta j/(\eta j-1)}$$

4. Final Goods Technology

$$Y_i = \min[z_{1i}/a_{1i}, \ldots, z_{ni}/a_{ni}, DV_i/a_{VA}]$$

5. Domestic & Foreign Sales

$$Y_i = \left[\alpha_{Di} D_i^{(\phi-1)/\phi} + \alpha_{Xi} X_i^{(\phi-1)/\phi}\right]^{\phi/(\phi-1)}$$

6. Export Allocation

$$X_i = \left[X_i^{(ei-1)/ei}\right]^{ei/(ei-1)}$$

7. Marginal Cost Condition

$$c_i Y_i = \sum_j (1+v_i) p_j d_{ji} + \sum_j p_j^m m_{ji} + (1+\tau v_i) w_K K_i + w_L L_{li}$$

B) Utility

8. Utility Function

$$\mathrm{U} = \prod_i C_i^{\lambda i} \; ; \; \sum_i \lambda_i = 1$$

9. Domestic & Import Consumption

$$C_i = [\phi_{Di} D_{iC}^{(\psi i-1)/\psi i} + \phi_{Mic} M_{ic}^{(\psi i-1)/\psi i}]^{\psi i/\psi i-i}$$

(applies also to G_i and I_i^F)

10. Import Allocation

$$M_{iC} = [\sum_r \delta_{ri} M_{ric}^{(\eta i-1)/\eta i}]^{\eta i/\eta i-1}$$

(applies also to M_{ig} and M_{il}^F)

C) Constraints and Balancing Items

11. Agent's Budget Constraint

$$\sum_i P_i^C C_i = w_K \bar{E}_K + w_L \sum_i L_i + w_L{}^F L^F - \sum_i P_i^F I_i^F - \sum_i P_i I_i^I - r^F K^F$$
$$+D + \sum_i P_i^m M_i + \sum_i v_i Y_i$$

12. Government Budget Constraint

$$\sum_i P_i^G G_i = D + \sum_i \tau_{vi} P_i^C V_i + \tau_{vi} P_i^m F K_{il}^F$$

13. Current Account Balance

$$0 = \sum_i (1/e)[P_i^m M_i - P_i^x X_i + rK]$$

14. Product Market Clearance

$$S_i = \sum_j a_{ij} Y_j + G_i + I_i^F + I_i^I + C_i$$

15. Factor Market Clearance

$$\overline{DK} = \sum_i K_i \; ; \; \bar{L} = \sum_i L_i$$

16. Zero Profits

$$P_i D_i + P_i^X X_i = c_i Y_i$$

17. Supply Value Balance

$$P_i S_i = P_i^Z \sum_j a_{ij}(1+v_i)Y_j + P_i^C D_{iC} + P_i^{IF} D_{il}^F + P_i^G D_{iG} + P_i^{IF} I_i^I + (1+\tau_{Vi})P_{ri}^m$$

$$(M_{riC} + M_{riG} + M_{ril}{}^F)$$

D) Price Relationships and Identities

18. Components of Domestic Sales

$$D_i = D_{iC} + D_{il}{}^F + I_i^I + D_{iG}$$

19. Components of Import

$$M_i = M_{iN} + M_{iC} + M_{il}{}^F + M_{iG}$$

20. Domestic Price of Intermediate Imports

$$P_i^N = (1+\tau_{Vi})P_i^m$$

(holds also for imports for G)

21. Domestic Price of Imports for Consumption

$$P_i^C = (1+\tau_{vi})P_i^m$$

(holds also for imports for I^F)

22. Consumer Price of Domestic Goods

$$P_i^C = (1+v_i)P_i$$

(holds also for purchases for I^F)

23. Capital-Market Equilibrium

$$\tau_{K1} + w_{K1} = \ldots = \tau_{Kn} + w_{Kn}$$

List of Variables

L_i	domestic labor inputs, sector i (i =1,….,4)
K_i	capital (other value added) inputs, both mobile and immobile
V_i	value added
M_i	total imports
M_{in}	imports of commodity i for intermediate use
Z_{ij}	composite intermediate input of j into i(j = 1,….,4)
D_{ji}, m_{ji}	intermediate usages of domestic and imported goods
Y_i	output of good i
D_i, X_i	output for domestic sales and exports
Q_i	output for MNE sales
D_{iC}, D_{iG}, D_{Ii}	domestic sales: private and public consumption, and capital formation
X_i	exports of good i
c_i	index of marginal cost of production
p_i	domestic producer price index
P_i^Z, P_i^C, P_i^F, P_i^G	domestic price index (home and imported prices)
w_K, w_L	factor price indexes (where wk is fixed in resource-constrained sectors
U	utility
$\tilde{p}_i$	composite price index for total domestic supply
C_i, G_i	private and public consumption
I_i^F , I_i^I	fixed capital formation and inventory investment
M_{iI}^F	imports for fixed capital formation
M_{iC}, M_{iG}	imports for private and public consumption
K^F	net payments on foreign capital holdings
e	real exchange rate
B	current-account balance
D	government budget deficit (held fixed)
S_i	supply on domestic market (Di +Mi)
P_i^N	domestic price index for intermediate imports
P_i^C, P_i^G	domestic price indexes for imports for private and public consumption
P_{iI}^F	price index for private consumption/fixed capital of domestic goods
τ_{Vi}	endogenous tax rate on value added
DK_{ij}	domestic capital demand
B_i^T	trade balance of country i
X_{ij}	exports of good j by country i

List of Parameters

σ_i	substitution elasticity between capital and labor
η_a	substitution elasticity between intermediates and value added
η_i	Armington elasticity on imports between regions
η_j	substitution elasticity between domestic and imported intermediate goods
ε_i	transformation elasticity between domestic and exported output
e_i	transformation elasticity on exports between regions
ψ_i	substitution elasticity between domestic and imported consumption
u_i	NTB administrative cost rate on imports
v_i	service sector rents on domestic output
E_K, E_L	endowment of capital and labor
P_i^m	price of imports
P_i^x	price of exports
w^F	wage for local workers in MNEs
r^F	price of foreign capital payments

References

Chapter II

"Beyond Doha", The Economist, November 15, 2001.

Bora, B., P. J. Lloyd, and M. Pangestu. "Industrial Policy and the WTO", *Policy Issues in International Trade and Commodities: Study Series No.6: United Nations Conference on Trade and Development* (Geneva: United Nations, 2000).

Francois, J. "Assessing the Results of General Equilibrium Studies of Multilateral Trade Negotiations", *Policy Issues In International Trade and Commodities: Study Series No.3: United Nations Conference on Trade and Development* (Geneva: United Nations, 2000).

Hoekman, B., A. Mattoo, and P. English. *Development, Trade and the WTO: A Handbook* (Washington, DC: The World Bank, 2002).

Hoekman, B. and M. M. Kostecki. *The Political Economy of the World Trading System: 2rd Edition* (New York: Oxford University Press, 2001).

Katz, L.F and L.H. Summers. "Industry Rents: Evidence and Implications", *Brookings Papers on Economic Activity*, pp. 209-75, Special Issue, 1989.

Krugman, P. *Strategic Trade Policy and the New International Economics* (Cambridge, MA: MIT Press, 1986).

Maskus , K. E. and D. E. Konan. "Developing New Rules and Disciplines on Trade-Related Investment Measures" in *Studies in International Trade Policy: The Multilateral Trading System*, eds., Iboshi, P.I., M.G. Plummer and S. F. Naya (Honolulu: East-West Center, 1994).

McDonald, B. *The World Trading System, The Uruguay Round and Beyond* (Hampshire, England: Macmillan Press Ltd. and St. Martin's Press, Inc., 1998).

Moran, T. H. *Foreign Direct Investment and Development: The New Policy Agenda for Developing Countries and Economies in Transition* (Washington, DC: Institute For International Economics, 1998).

Mutti, J. "Trade Related Investment Measures, Policy Change and the Role of the GATT," in *Analytical and Negotiating Issues in the Global Trading System*, eds., A. Deardorff and R. Stern (Ann Arbor: University of Michigan Press, 1994) pp. 455-492.

Spencer, B.J. and J.A. Brander. "International R&D Rivalry and Industrial Strategy", *Review of Economic Studies*, Vol.163, pp.707-722, October 1983.

Stern, R. M. *The Multilateral Trading System, Analysis and Options for Change* (Ann Arbor: The University of Michigan Press, 1992).

UNCTAD. *Bilateral Investment Treaties in the Mid-1990s* (Geneva: United Nations, 1998).

UNCTAD. *Positive Agenda and Future Trade Negotiations: Issues for Future Trade Negotiations* (Geneva: United Nations, 2000).

UNCTAD. *Preparing For Future Multilateral Trade Negotiations: Issues and Research Needs From A Development* Perspective (Geneva: United Nations, 1999).

UNCTAD and the United Nations Centre on Transnational Corporations. *The Impact of Trade-Related Investment Measures on Trade and Development, Theory, Evidence and Policy Implications* (Geneva: United Nations, 1991).

United States Information Service. *The Uruguay Round Trade Agreements* (Washington, DC: Embassy of the United States of America, 1993).

Whalley, J. *What Can the Developing Countries Infer From the Uruguay Round Models for Future Negotiations, Policy Issues In International Trade and Commodities: Study Series No.4: United Nations Conference on Trade and Development* (Geneva: United Nations, 2000).

"Why Doha Matters", *The Economist*, July 28, 2001.

Chapter III

Glass, A. J. and K. Saggi. "Intellectual Property Rights, Foreign Direct Investment, and Innovation", *Ohio State University Working Paper 95-06* (Columbus, OH: Ohio State University,1995).

Grossman, G.M. and E. Helpman. "Quality Ladders And Product Cycles", *Quarterly Journal of* Economics, 106, pp. 557-586, 1991.

Helpman, E. "Innovation, Imitation, And Intellectual Property Rights", *Econometrica*, 61, 1247-1280, 1993.

Konan, D. E. "Strategic Taxation of the Multinational Enterprise: A New Argument for Double Taxation", *Journal of Public Economics* Vol. 63, No. 2, January 1997.

Konan, D. E., B. Hoekman, and K. E. Maskus. "An Egypt-U.S. Free Trade Agreement: Economic Incentives and Effects" in *Building Bridges: An Egypt-US Free Trade Agreement*, eds., R. Lawrence and W. Martin (Washington, DC: Brookings Institution, 1998).

Konan, D.E. and C. S. Yue. "Direct Foreign Investment Policies in Asean and the United States: Opportunities for Developing New Investment Codes" in *Building Blocks Of U.S.-ASEAN Economics Cooperation*: An evolutionary Approach, eds., Iboshi, P.I., M.G.Plummer and S. F. Naya (Honolulu: East-West Center, 1994).

Konan, D. E. and K. E. Maskus. "Developing New Rules and Disciplines on Trade-Related Investment Measures" in *The Multilateral Trading System: Analysis and Options for Change*, ed., Robert. M. Stern (Ann Arbor: University of Michigan Press, 1993).

Konan, D. E. and K. E. Maskus. "Egyptian Trade Liberalization", *Review of Development Economics*, Vol. 1, No. 3, 1997.

Konan, D. E. and K. E. Maskus. "Joint Trade Liberalization and Tax Reform in a Small Open Economy: The Case of Egypt", *Journal of Development Economics,* Vol.61, pp. 365-392. 2000.

Konan, D. E., S. J. La Croix, J. A. Roumasset, and J. Heinrich. "Intellectual Property Rights in the Asian-Pacific Region: Problems, Patterns, And Policy", *Asian-Pacific Economic* Literature, Vol. 9, No. 2, November 1995.

Krugman, P. "A Model Of Innovation, Technology Transfer, and The World Distribution Of Income", *Journal of Political Economy*, vol. 87, pp. 253-266, 1979.

Markusen, J.R. "Contracts, Intellectual Property Rights, And Multinational Investment In Developing Countries", *Journal of International Economics,* Vol. 53, pp. 189-204, 2000.

Mutti, J. "Trade Related Investment Measures, Policy Change and the Role of the GATT," in *Analytical and Negotiating Issues in the Global Trading System*, eds., A. Deardorff and R. Stern (Ann Arbor: University of Michigan Press, 1994) pp. 455-492.

Qiu, D. and Z. Tao. "Export, foreign direct investment and local content requirement", *Journal of Development Economics*, vol. 66, pp. 101-125, 2001.

Segerstron, P.S. "Innovation, Imitation, And Economic Growth", *Journal of Political Economy, 99*, pp. 807-827, 1991.

Vernon, R.. "International Investment And International Trade In The Product Cycle", *Quarterly Journal of Economics*, 80, pp. 190-207, 1966.

Yang, G. and K. E. Maskus. "Intellectual Property Rights, Licensing, and Innovation in an Endogenous Product-Cycle Model", *Journal of International Economics*, vol. 53, pp. 169-187, 2001.

Chapter IV

Adams, P.D. "Long-run Effects of APEC Trade Liberalization: An Applied General Equilibrium Analysis", *The World Economy*, Vol. 21, pp. 931-952, 1998.

Bajo-Rubio, O. and S. Sosvilla-Rivero. "An Econometric Analysis Of Foreign Direct Investment In Spain", *Southern Economic Journal*, vol. 61, pp.104-20, 1994.

Baldwin, Richard E. "Measurable Dynamic Gains From Trade", *Journal of Political Economy*, vol. 100, pp. 162-74, 1992.

Benjamin, N. and X. Diao. "Liberalizing Services Trade in APEC: A General Equilibrium Analysis with Imperfect Competition", mimeo, 1997.

Bora, B. and S. Guisinger. "Impact of Investment Liberalization in APEC", mimeo, 1997.

Brown, D. K. and R. M. Stern, "Computable General Equilibrium Estimates Of The Gain From US-Canadian Trade Trade Liberalization" in *Economic Aspects of Regional Trading Arrangement*, eds., D. Greenway, T. Hyclak, and R. J. Thornton (London: Harvester Wheatsheaf, 1989).

Brown, D. K., A. V. Deardorff, and R. M. Stern. "Expanding NAFTA: Economic Effects of Accession of Chile and Other Major South American Nations," *North American Journal of Economics and Finance*, vol. 6, pp.149-170, Fall 1995.

Brown, D. K., A. V. Deardorff, and R. M. Stern. "Modeling Multilateral Liberalization in Services", *Asia Pacific Economic Review*, vol. 2, pp. 21-34, 1996a.

Brown, D. K., A. V. Deardorff, and R. M. Stern. "The Liberalization of Services Trade: Potential Impacts in the Aftermath of the Uruguay Round," in *The Uruguay Round and the Developing Countries*, eds., W. Martin and L. A. Winters (Cambridge: Cambridge University Press, 1996b).

Dee, P. and K. Hanslow. "Multilateral Liberalisation of Services Trade", *Productivity Commission Staff Research Paper* (Canberra: Ausinfo, 2000).

Donovan, D. and Y.H. Mai. "APEC Trade Liberalization: The Impact of Increased Capital Mobility", *Australian Commodities*, Vol. 3, pp. 520-526, 1996.

Francois, J., B. McDonald, and H. Nordstrom. "The Uruguay Round: A Global General Equilibrium Assessment," *CEPR Discussion Papers 1067* (London: Center for Economic Policy Research, 1994).

Konan, D. E. and K. E. Maskus. "A Computable General Equilibrium Analysis Of Egyptian Trade Liberalization Scenarios" in *Regional Partners in Global Markets: Limits and Possibilities of the Euro-Med Agreements*, eds., A. Galal and B. Hoekman (London: Center for Economic Policy Research and Brookings Institution, 1997).

Konan, D. E. and K. Kim. "The Economic Impact of The Transportation Sector in Hawaii" (mimeo, 2002).

Markusen, J., T. Rutherford, and D. Tarr. "Foreign Direct Investment in Services and the Domestic Market for Enterprise," for presentation at the Second Annual Conference on Global Economic Analysis, Ebberuk, Denmark, June 20-22, 1999.

Martin, W. and K. Yanagashima. "Concerted Trade Liberalization and Economic Development in the Asia-Pacific Region", background paper for *East Asia's Trade and Investment*, World Bank, International Economics Department, Washington, DC, 1993.

McDougall, R. "Incorporating International Capital Mobility into SALTER", *SALTER Working Paper No. 21* (Canberra: Industry Commission, 1993).

McKibbin, W. and P.J. Wilcoxen. "The Role of Services in Modeling the Global Economy", *Asia-Pacific Economic Review*, Vol. 2, pp. 2-13, 1996.

Murows, A., D. Kendrick, and A. Brooke. *GAMS Release 2.25: A User's Guide* (Boston: Course Technology, Inc., 1992).

Petri, P. A. "Foreign Direct Investment in a Computable General Equilibrium Framework", paper prepared for the conference, *Making APEC Work: Economic Challenges and Policy Alternatives*, Keio University, Tokyo, March 13-14, 1997.

Rutherford, T. F. "Applied General Equilibrium Modeling with MPSGE as a GAMS Subsystem: An Overview of the Modeling Framework and Syntax", *Computational Economics*, vol. 14, pp. 1-46, 1999.

Tamms, V. "Frontier Cost Estimates of the Impact of Restrictctions in Air Transport Services", in *Impediments to Trade in Services: Measurement and Policy* Implications, eds., Christopher Findlay and Tony Warren (Sydney: Routledge, 1999).

UNCTAD. *Investment Policy Review: Egypt*, (Geneva: United Nations, 1999).

UNCTAD Series On Issues In International Investment Agreements.. "Transnational Corporations, Market Structure and Competition Policy: World Investment Report 1997", *United Nations Trends in International Investment Agreements: An Overview* (Geneva: United Nations, 1997).

Verikos, G. and K. Hanslow. "Modeling the Effects of Implementing the Uruguay Round: A Comparison Using the GTAP Model Under Alternative Treatments of International Capital Mobility", presented at the Second Annual Conference on Global Economic Analysis, Ebberuk, Denmark, June 20-22, 1999.