

**FOREIGN DIRECT INVESTMENT, TRADE  
LIBERALIZATION, AND LABOR MARKET:  
EVIDENCE FROM VIETNAMESE  
MANUFACTURING**

**Inaugural-Dissertation  
zur Erlangung des akademischen Grades eines Doktors  
der Wirtschafts- und Sozialwissenschaften  
der Wirtschafts- und Sozialwissenschaftlichen Fakultät  
der Christian-Albrechts-Universität zu Kiel**

**vorgelegt von  
M.A. Pham Thi Bich Ngoc  
aus Vietnam**

**Kiel, 2013**

Gedruckt mit Genehmigung der  
Wirtschafts- und Sozialwissenschaftlichen Fakultät  
der Christian-Albrechts-Universität zu Kiel

Dekan: Prof. Horst Raff, Ph.D.

Erstberichterstattender: Prof. Holger Görg, Ph.D.

Zweitberichterstattender: Prof. Aoife Hanley, Ph.D.

Tag der Abgabe der Arbeit: 20. November 2012

Tag der mündlichen Prüfung: 17. January 2013

## Acknowledgements

This dissertation is one ‘root’ for over 3 years that I have studied at the Doctoral Program (CAU), after solving internal factors, i.e. my passion for international trade, my worries and efforts during the period, and external factors, i.e. all lectures, support and encouragement of the people to whom I forever owe my debt.

Above all, I’d like to express my deepest gratitude to Holger Görg, the first supervisor, for his ‘image’ in every page of my papers. He funded me the costs for data and greatly encouraged me in the difficult times. He took a lot of time to revise the language of my writing and provided invaluable comments and suggestions, through which the quality of my research could be further improved. I am very thankful to Aoife Hanley, the second supervisor, for her encouragement and fruitful comments. I also wish to thank Horst Raff for his interesting courses and advice for my work’s orientation, Harmen Lerment for the chance to gain more knowledge through ASP courses, and Matthias Lücke for warm guidance and suggestions. Of course, I cannot forget those friends in Kiel who provided me much interest and stimulus for my study and living in Kiel. Especially, I thank Tillman for his kindness and very constructive discussions on my work. I am also grateful to Miriam Schneider and Jan Bensien, who built up an image of the German in my mind: ‘Alles in Ordnung’, responsible for work, but warm-hearted inside. For the chance to study here, I am indebted to the Vietnamese Ministry of Education and Training (MOET) for a 3-year scholarship, Hoa Sen University for their encouragement, and DAAD for their support and guidance during my study in Germany.

There is one special ‘friend’ who has accompanied with me for nearly 10 years; my co-author, my classmate in both MA and PhD programs, also my husband and the father of Mai, my little 5-year-old daughter and Hai, my son who was born in December 2012. Words are not enough to express my thanks to Long and my little daughter who always bring me happy smiles and help me to forget all difficulties in life. I definitely cannot forget I am the child of my parents, and therefore I thank them, and my brothers and sisters for their love and beliefs. Without their caring for my daughter for nearly a year in Vietnam when she was only 2 years old, my husband and I could not study at Kiel University. This work is dedicated to my beloved family.

# Table of Contents

|   |     |
|---|-----|
| List of Tables .....  | iv  |
| List of Figures .....   | v   |
| List of Appendixes .....  | vi  |
| List of Abbreviations .....   | vii |
| 1. INTRODUCTION .....   | 2   |
| 1.1. Research Problem .....   | 2   |
| 1.2. Research Focus and Design .....  | 6   |
| 2. FOREIGN DIRECT INVESTMENT PRODUCTIVITY SPILLOVER AND THE ABSORPTIVE<br>CAPACITY THROUGH MANAGERIAL SKILL AND OWNERSHIP ..... | 9   |
| 2.1. Introduction.....  | 9   |
| 2.2. FDI in the Vietnamese Manufacturing.....   | 12  |
| 2.3. Theoretical and Literature Review.....   | 16  |
| 2.4. Research Methodology and Estimation Strategy .....   | 19  |
| 2.5. Data and Descriptive Statistics .....  | 23  |
| 2.6. Empirical Result and Analysis.....   | 26  |
| 2.6.1. <i>Productivity spillovers through intra-sector and inter-sector linkages</i> .....                                      | 26  |
| 2.6.2. <i>Productivity spillovers by managerial skill and ownership</i> .....   | 31  |
| 2.7. Conclusion .....   | 33  |
| 3. TRADE LIBERALIZATION AND BACKWARD LINKAGES FROM FOREIGN DIRECT<br>INVESTMENT: THE ROLE OF INVESTORS' ORIGINS .....           | 35  |
| 3.1. Introduction.....  | 35  |
| 3.2. FDI in the Vietnamese Process Manufacturing .....  | 41  |
| 3.3. Data and Methodology.....  | 44  |
| 3.3.1. <i>Data source</i> .....   | 44  |
| 3.3.2. <i>The model and calculation strategy</i> .....  | 45  |
| 3.3.3. <i>The Levinson and Petrin method</i> .....  | 47  |
| 3.3.4. <i>Summary statistics</i> .....  | 49  |
| 3.4. Spillovers through Backward Linkages by Nationality .....  | 53  |

|        |   |    |
|--------|---|----|
| 3.4.1. | <i>Backward spillovers by investors' nationality</i> .....                            | 53 |
| 3.4.2. | <i>The relation between backward spillover and LTI</i> .....                          | 56 |
| 3.4.3. | <i>An extension: in relation to the crowding effect</i> .....                         | 57 |
| 3.5.   | Conclusion .....  | 60 |
| 4.     | TRADE LIBERALIZATION AND LABOR MARKET ADJUSTMENTS IN VIETNAMESE<br>MANUFACTURING..... | 62 |
| 4.1.   | Introduction.....   | 62 |
| 4.2.   | Literature on Trade Liberalization and Labor Markets.....                             | 64 |
| 4.3.   | Labor Markets in Vietnam under Trade Liberalization .....                             | 67 |
| 4.3.1. | <i>Trade liberalization and some facts</i> .....                                      | 67 |
| 4.3.2. | <i>Labor market in Vietnam: An overview</i> .....                                     | 69 |
| 4.3.3. | <i>Overview on SMEs</i> .....   | 71 |
| 4.4.   | Data Description .....  | 71 |
| 4.5.   | Employment and Wage Effects of Trade Liberalization at the Industry-Level ....        | 75 |
| 4.6.   | Employment and Wage Effects of Trade Liberalization at the Firm-Level .....           | 77 |
| 4.7.   | Conclusion .....  | 87 |
| 5.     | CONCLUSION .....  | 90 |
| 5.1.   | FDI and Productivity Spillovers .....   | 90 |
| 5.2.   | Trade Liberalization and Labor Market .....   | 92 |

## List of Tables

|  |    |
|--|----|
| Table 2.1: Inward FDI in Manufacturing in the Vietnamese Economy, 2006-2009 .....    | 14 |
| Table 2.2: Summary Statistics, 2007-2009 .....                                       | 25 |
| Table 2.3: Productivity Spillovers through Linkages, 2007-2009.....                  | 26 |
| Table 2.4: Productivity Spillovers by Managerial Skill and Ownership, 2008-2009..... | 31 |
| Table 3.1: Inward FDI in the Vietnamese Economy, 2006-2010.....                      | 42 |
| Table 3.2: Summary Statistics .....  | 49 |
| Table 3.3: Low-tech Intensity Indicator of FDI by Nationality, 2007-2010 .....       | 52 |
| Table 3.4: Backward Spillovers by Nationality, 2007-2010 .....                       | 53 |
| Table 3.5: Factors Impact Backward Spillovers .....                                  | 59 |
| Table 4.1: Number and Share of SMEs by Size of Capital and Employees.....            | 71 |
| Table 4.2: Summary Statistics, 2003-2008.....  | 74 |
| Table 4.3: Industry Employment and Wage Equations with OLS and Within Estimations    | 76 |
| Table 4.4: Results of 2SLS Firm Employment Equations.....                            | 80 |
| Table 4.5: Within Estimates of Firm Wage Equations .....                             | 82 |
| Table 4.6: Results of 2SLS Firm Wage Equations Regarding Gender Composition .....    | 84 |
| Table 4.7: Results of 2SLS Firm Wage Equations Regarding Skill Composition .....     | 86 |

## List of Figures

|  |    |
|--|----|
| Figure 2.1: Inward FDI in Vietnam, 1991-2009 .....                                   | 13 |
| Figure 2.2: Shares of Inward FDI by Sector .....                                     | 15 |
| Figure 3.1: Inward FDI in Manufacturing by Nationality, 2006-2010.....               | 43 |
| Figure 3.2: The Investors' Shares in Manufacturing by Nationality, 2007 - 2010 ..... | 51 |
| Figure 3.3: The Relation between Backward Spillover and LTI, 2007 - 2010 .....       | 56 |
| Figure 4.1: Vietnam's Imports and Exports, 1990-2010 .....                           | 67 |
| Figure 4.2: Tendency of ERP and Import Penetration at Industry Level, 2003-2008..... | 68 |

## List of Appendixes

|   |     |
|---|-----|
| Appendix A.1: Means of Horizontal, Backward, and Forward by Industrial Sector .....           | 94  |
| Appendix A.2: Manufacturing Industries, 2 digits (VSIC, 1993) .....                           | 95  |
| Appendix B.1: Manufacturing Industries, 2 digits (VSIC, 1993), by Technology Level ...        | 96  |
| Appendix B.2: Distribution of Backwards and Horizontals by Origin .....                       | 97  |
| Appendix B.3: Map of Southeast Asia ( <a href="http://www.asean.org">www.asean.org</a> )..... | 99  |
| Appendix B.4: Domestic Firms' Exit and Foreign Firms' Presence by Origin.....                 | 100 |
| Appendix C.1: Effective Rate of Protection in Vietnam by Industry .....                       | 101 |
| Appendix C.2: Import Penetration in Vietnam by Industry .....                                 | 102 |
| Appendix C.3: Calculation Strategy and Explanations for Key Variables.....                    | 103 |



## List of Abbreviations

|        |   |
|--------|---|
| AFTA   | ASEAN Free Trade Area                                     |
| APEC   | Asia-Pacific Economic Cooperation                         |
| ASEAN  | Association of Southeast Asian Nations                    |
| CEPT   | Common Effective Preferential Tariff                      |
| DANIDA | Danish International Development Agency                   |
| EU     | European Union  |
| FDI    | Foreign Direct Investment                                 |
| FTA    | The Vietnamese Foreign Trade Association                  |
| GATT   | General Agreement on Tariffs and Trade                    |
| GDP    | Gross Domestic Product                                    |
| GMM    | Generalized Method of Moments                             |
| GSO    | The Vietnamese General Statistics Office                  |
| I/O    | Input-Output (table)                                      |
| OECD   | Organization for Economic Cooperation and Development     |
| OLS    | Ordinary Least Squares                                    |
| MFN    | Most Favoured Nation                                      |
| MOLISA | Vietnamese Ministry of Labor, Invalids and Social Affairs |
| MNEs   | Multinational enterprises                                 |
| MUTRAP | Vietnam Multilateral Trade Project                        |
| SOEs   | State owned enterprises                                   |
| UNCTAD | United Nations Conference on Trade and Development        |
| VCCI   | Vietnam Chamber of Commerce and Industry                  |
| VND    | Vietnam dong (the Vietnamese currency)                    |
| VSIC   | Vietnam Standard Industrial Classifications               |
| WB     | World Bank  |
| WTO    | World Trade Organization                                  |

# 1. INTRODUCTION

---

## 1.1. Research Problem

A strong globalization and liberalization process has tied economies in the world to become dependent on each other in recent decades. The establishment of the World Trade Organization in 1994 has helped to administer multilateral trade agreements. Some developing countries have opened their own economies to take full advantage of the opportunities for economic development through trade in general, and attracting FDI in particular. Despite the ongoing 2008 world economic and financial crisis producing a negative impact on FDI operations and the labor market, a tendency of FDI flows towards developing countries has emerged. Global FDI inflows in 2009 were \$1,114 billion, of which 43% flowed to developing countries, compared with 27% in 2007. The preference of transnational companies for developing countries in their investment plans might further increase over the period 2009-2011, particularly to the benefit of East, South and South-East Asia, with their growing markets and, to a very limited extent, the availability of cheap labor representing the most attractive factors in these sub-regions (UNCTAD, 2009).

However, with the world economy is becoming integrated, indigenous firms in domestic markets are obsessed with a business environment under hard competition with foreign affiliates. Moreover, workers in many developing countries are worrying about the adverse consequences of trade liberalization, and lagging employment opportunities for burgeoning labor forces. A more general concern of workers is that globalization might contribute to increased income inequality and poorer working conditions, and that they might not benefit from the prosperity that growth would otherwise bring.

How is a domestic firm or laborer in a developing economy affected under strong globalization and FDI influx? This dissertation contributes to the existing range of empirical studies by investigating two main aspects: (1) FDI spillovers to the productivity

of domestic firms, and (2) the response of the labor market to trade liberalization in Vietnamese manufacturing.

- *Why is Vietnam an interesting case?*

Vietnam is located in South-East Asia, and its integration within the international economy has increased significantly over the past decade, aided by substantial trade liberalization. After gaining independence in 1945, Vietnam followed a centrally planned economy until after the 1975 unification between North and South Vietnam. In 1986, the government launched Doi Moi, a restructuring policy toward a market economy, and thereafter Vietnam has signed many multilateral and bilateral trade and MFN agreements. Furthermore, the country joined ASEAN in 1995, APEC in 1998, and the WTO in 2007. Trade liberalization has coincided with GDP growth, which is always among the highest in the world. GDP growth accelerated to 9.8% annually in the 1990s, before falling to 7.3% in the 2000s. FDI inflows increased dramatically from \$0.34 billion in 1988 to a peak of \$71.73 billion in 2008, the year after Vietnam joined the WTO, but then has strongly declined due to the world financial crisis (GSO). According to UNCTAD (2008), Vietnam was one of the top 6 destinations for FDI in 2008-2010. Among factors such as market growth, economic growth prospects, further regional integration and the country opening up to FDI, etc., cheap labor is also considered very important. The Vietnamese labor force is increasing, with a significant labor movement from the countryside to large cities, causing a continuous increase in the proportion of the urban population of working age, for example, an increase of 1.8 million people between 2007 and 2009. In 2009, the total labor force was 49.3 million persons, accounting for around 57% of the population (MOLISA, 2010). Based on this brief outlook on the background of the Vietnamese economy, Vietnam is an interesting case to pursue researching in the fields of FDI, trade liberalization and the labor market.

- *FDI and productivity spillovers:*

FDI is not only expected to bring additional capital into host economies and enhance a competitive environment in domestic markets, but may also bring technical and managerial expertise, causing productivity spillovers from foreign to domestic enterprises. Productivity spillovers can occur through horizontal linkages of MNEs within their

industries or through vertical linkages (buyer-supplier linkages) from foreign firms in upstream (forward spillovers) or downstream industries (backward spillovers). Positive spillovers can occur via several channels: labor mobility between or within industries, demonstration or imitation effects through learning by watching, competition effects by improvement, and innovation efforts to remain competitive and productive (Kokko, 1996; Wang and Blomström, 1992; Glass and Saggi, 2002). Negative spillovers can appear when MNEs create a more competitive market situation, such as domestic firms losing the demand of established customers (Aitken and Harrison, 1999).

However, these spillovers could be prevented by internalization effects whereby MNEs block technological or managerial expertise leakages toward domestic competitors. By contrast, they might be motivated by inter-linkage effects whereby MNEs actively transfer knowledge to local suppliers or customers. Positive forward spillovers may arise from cheaper and more qualified inputs accession, knowledge and technology transfer from foreign MNEs under the pressure of increasing competition (Javorcik, 2004; Caves, 1996). Positive backward spillovers possibly occur through technical assistance or long-term contracts (Munday et al., 1995; Imrie and Morris, 1992). Nevertheless, these may be counteracted by the negative effects caused by contractual specifics and the market power of the seller or buyer (Driffield et al., 2002). Moreover, particular host economy characteristics can influence the absorption of such spillovers (Görg and Greenaway, 2004).

Within literature, many empirical studies have focused on investigating the evidence of FDI productivity spillovers. In particular, through using cross-sectional or panel data at the industry or firm level of developing countries, a large number of studies, including Kokko (1996), Sjöholm (1999), and Görg and Strobl (2005) for Mexico, Indonesia, and Ghana, respectively, have detected positive effects of horizontal spillovers. However, Aitken and Harrison (1999) and Bwalya (2005) find negative horizontal spillovers in the cases of Venezuela and Zambia. Aitken and Harrison (1999) capture foreign investment entirely from joint ventures, considering that the spillover differs for small and large domestic firms.

Recent studies have paid greater attention to the specific characteristics of inward FDI and host economies that can affect the spillovers. For instance, Javorcik (2004) is interested in effects operating across industries, finding positive backward spillovers associated with projects with shared domestic and foreign ownership, yet not with fully owned foreign investment. Girma, Görg and Pisu (2008) conclude different scopes and scales of horizontal, backward and forward spillovers for export-oriented vs. domestic market oriented FDI. Le and Pomfret (2008) and Lan (2008) stress the role of labor size, ownership, business orientation, location, mode of entry, the industry's technology level, R&D performing and financial development, whereas Javorcik and Spatareanu (2011) approach backward spillovers differentiated by the nationalities of foreign investors.

As mentioned above, existing literature has found mixed results for developing countries. Does the presence of foreign affiliates have positive or negative spillovers on local firms' productivity under trade liberalization in the case of Vietnam? Two papers, in chapters 2 and 3 respectively, focus on different directions: (1) FDI spillovers are affected by characteristics of domestic firms, i.e. managerial skill and ownership, and the relationship between sectors, i.e. manufacturing-to-manufacturing (intra-sector linkages) and service-to-manufacturing (inter-sector linkages); and (2) FDI spillovers are differentiated by the origin of investors.

- *Trade liberalization and labor market:*

Globalization is a relevant concern as it might be coupled with rising imports and related to job dislocation. Within the framework of the neoclassical trade theory (the Heckscher-Ohlin), the Stolper Samuelson theorem (Stolper and Samuelson, 1941) highlight that in the case of two goods and two factors, a decline in the relative price of a product reduces both the relative and absolute earnings of the factor used relatively intensively in its production. Therefore, when a labor-abundant developing country opens up to trade, it would experience a relative and absolute rise in the returns to the owners of labor capital, causing a decline in wage inequality.

In general, trade can affect employment and wages through several channels: (1) trade affects wages through income growth, exports and imports, which can raise productivity growth and thus create labor demand for high-skilled jobs; (2) under trade

pressure, for example skill-biased technological change, increased demand for skilled labor may lead to wage inequality; and (3) the impact of trade liberalization possibly occurs through the channel of industry wage premium, whereby different levels of rent sharing between firms and workers among industries can cause wage differentials (Feenstra and Hanson, 1997; Revenga, 1997).

Given this theoretical background, studies within existing literature have reached different findings concerning labor market adjustment to trade liberalization. For instance, Ravenga (1997) suggests the negative relation between trade reform and wages and employment in Mexico, whereas Stone and Cepeda (2011) find contrary results for 55 OECD and non-OECD countries. The effects of international trade on employment could also be negative (Sakurai, 2004, for Japan; McMillan and Verduzco, 2011, for Latin America), positive (Sen, 2002, for Bangladesh and Kenya; Gaston, 1998, for Australia), or hold no relevant (Currie and Harrison, 1997, for Morocco).

As settling the debate on trade and wages is far from straightforward, Feenstra and Hanson (2001) conclude that existing studies have only begun to scratch the surface of how the globalization of production changes industry structure and factor demand in both advanced and emerging economies. The paper in Chapter 4, which analyzes the wage and employment response to trade liberalization in Vietnam, adds to the body of evidence for the case of an emerging country.

## **1.2. Research Focus and Design**

The remaining chapters of this dissertation are as follows.

Chapter 2 aims at analyzing how the presence of foreign affiliates in Vietnamese manufacturing influences the productivity of domestic firms through horizontal and vertical linkages in the period of post-WTO accession, namely 2007-2009. In this paper, a firm-level data set from the GSO's annual enterprise surveys is used, finding that productivity spillovers from foreign affiliates in the same and upstream industries are negative, but those from foreign firms in downstream industries are positive.

To the best of our knowledge, this paper is the first to analyze the role of managerial skill, denoted as the educational level of the domestic firm's director, in driving

the spillovers absorptive capacity of domestic firms. In combination with the role of firm ownership, positive horizontal spillovers are found to be associated with local firms that are private and/or with high managerial skill. Furthermore, we add to the literature gap by focusing on the relationship between sectors (intra-sector and inter-sector linkages). The appearance of foreign firms in downstream manufacturing and upstream service sectors stimulates the productivity of domestic firms, yet upstream manufacturing and downstream service sectors prevent the spillovers. This finding relies on the nature of input linkages whereby core manufacturing inputs are more important than service inputs for a domestic manufacturing firm and market power whereby a domestic manufacturing firm wields different bargaining power when dealing business with a firm in intra-sectors or inter-sectors.

Chapter 3 also uses the same source of data. Based on an unbalanced firm-level data set for the Vietnamese manufacturing sector in the period 2007-2010, we highlight the role of investors' nationalities in sourcing different spillovers to domestic firms. In the paper, 8 FDI sources are analyzed: China, Japan, South Korea, Taiwan, the United States, ASEAN, and Europe. We contribute to existing literature by offering the hypothesis that within a developing country, those investors from origins who purchase more products in low-tech industries can cause better backward spillovers to domestic suppliers. Furthermore, the findings support the hypotheses that the share of intermediate inputs sourced locally by MNEs from a host country is likely to increase with the distance between the host and source economy (Rodrigues-Clare, 1996), and if the host country has regional preferential trade agreements with the source country (Javorcik and Spatareanu, 2011).

The hypothesis lies on the background that FDI from a source country could be high-tech or low-tech intensive, due to (1) the comparative advantage of the source economy, and (2) the demonstration effect from existing investors within the same industry. Trade liberalization in the host country is one necessary condition that can influence the decision on industry selection, since investors foresee an attractive prospect for their business. By contrast, as manufacturing firms in a developing country are expected to have comparative advantage in producing low-tech products, domestic

suppliers in low-tech industries could better absorb spillovers than those in high-tech industries.

The fourth chapter is based on a joint paper with Pham Dinh Long and Holger Görg. In this study, we combine two sources of data, the GSO and DANIDA's small and medium manufacturing enterprises surveys, to establish panel data sets at both industry and firm levels for Vietnamese manufacturing between 2003 and 2008. The analyses provide empirical evidence for a negative response of wages and employment at both industry and firm levels to trade reforms but the impacts are modest, especially on employment. Following the approaches of Revenga (1997) and Ghazali (2011), an explanation for this negative relationship is based on the industry wage premium channel which reflects the rent sharing between firms and employees. Furthermore, this paper is also interested in examining wage gaps associated with gender and skill composition, and the role of unions in bargaining rent-sharing at firm level. The findings suggest that although there exist wage inequalities between skilled-unskilled and male-female workers, these gaps are reduced under trade liberalization. Also, unionization is found to reduce skill earning differentials.

Finally, Chapter 5 provides some conclusion and an outlook for further research.



## **2. FOREIGN DIRECT INVESTMENT PRODUCTIVITY SPILLOVER AND THE ABSORPTIVE CAPACITY THROUGH MANAGERIAL SKILL AND OWNERSHIP**

Pham Thi Bich Ngoc

---

*This paper is in proceedings of the International Conference on Business, Economics and Information Technology in Ho Chi Minh City, Vietnam (19-20 March 2012). One of the earlier versions received the award of Turkish Derivatives Exchange in Honor of Prof. Refet Saygili for the exceptional paper at the 14th International Student Conference in Economics at Ege University, Izmir, Turkey (11-13 May 2011). It was also presented at the Brown Bag Workshop (University of Kiel, 06-07 July 2011) and the Lunchtime Seminar on International Economics (the Kiel Institute for the World Economy, 4 November 2011)*

---

### **2.1. Introduction**

Foreign direct investment (FDI) reflects the objective of establishing a lasting interest by a resident enterprise in one economy in an enterprise that is resident in another economy (OECD, 2008)<sup>1</sup>. In many cases multinational enterprises (MNEs) prefer setting up overseas instead of exporting directly and/or licensing their products or technologies (Findlay, 1978). Once an MNE sets up an affiliate in a country, it can bring along its

---

<sup>1</sup> The foreign investor owns 10% or more of the ordinary shares or voting power for an incorporated enterprise or an unincorporated enterprise in which the foreign investor has equivalent ownership (OECD, 2008).

advanced technology and/or its managerial expertise, possibly causing spillovers to domestic firms (Wang and Blomström, 1992)<sup>2</sup>. In addition, host governments often attract FDI, expecting positive effects for domestic economic growth, economic structure, exports, employment, and especially a positive impact on total factor productivity. A wide range of economic literature has dealt with FDI and, apart from investigating direct effects, many have discovered FDI spillovers influencing local firms such as wage, export and technological spillovers, of which the latter gain most attention<sup>3</sup>.

A well-developed literature deals with the FDI productivity spillovers into a domestic economy (see Görg and Greenaway, 2004, for a review). Domestic firms may improve their productivity when foreign firms enter in the same industry (*horizontal/ intra-industry spillovers*) or in a different industry (*vertical/ inter-industry spillovers*). The latter covers the foreign appearance in an upstream/supplying industry (*forward spillovers*) and in a downstream/buying industry (*backward linkages*).

By using an unbalanced firm-level data set for the Vietnamese manufacturing sector from 2007 to 2009, this study analyzes how the presence of foreign affiliates influences the productivity of domestic firms in manufacturing sector in the period post WTO accession. However, we no longer restrict ourselves to detect the spillovers through horizontal and vertical linkages but aim at two objectives.

First, we not only investigate horizontal and vertical spillovers as in the previous literature, but also differentiate between vertical spillovers from MNEs in manufacturing and service sectors. This enables us to observe intra-sector linkages (manufacturing-to-manufacturing) and inter-sector linkages (manufacturing-to-service). To our knowledge, only Kim and Kim (2010) separate the spillovers from upstream and downstream MNEs

---

<sup>2</sup> Findlay (1978) measured the spillovers as the ratio of the capital stock of foreign firms in the backward economy to the capital stock of the domestic firms. Wang and Blomström (1992) used the technological competition between foreign affiliates and domestic firms. Meanwhile, Fosfuriet *et al.* (2001) and Glass and Saggi (2002) captured spillovers caused by the movement of labors worked for foreign firms to domestic firms.

<sup>3</sup> For wage spillovers see Driffield and Girma (2003), and Lipsey and Sjöholm (2001). For export spillovers see Kneller and Pisu (2007), Ruane and Sutherland (2005), and Barrios *et al.* (2001).

by service and manufacturing sectors but they did not explain how different the spillovers were. Our study provides evidence that in a more competitive market situation, domestic firms could fail to learn from foreign affiliates in the same industries in terms of productivity spillovers. The econometric analysis shows that the appearance of foreign firms in downstream manufacturing and upstream service sectors stimulates productivity of domestic firms, while their appearance in upstream manufacturing and downstream service sectors prevents the spillovers.

Foreign investors in an economy can have effects on suppliers not just in terms of the quantities of goods that they purchase, but also through an impact on the quality of inputs, and the efficiency with which those inputs are supplied (Dunning, 1993). Domestic firms under trade liberalization in the period of the world financial crisis can use manufacturing inputs inefficiently but gain from foreign customers. In order to explain the manufacturing-to-service linkages, we rely on the nature of input linkages and market power. On the one hand, a domestic firm which produces manufacturing products can need more inputs from firms in manufacturing industries than those in service sectors. That reduces the power of foreign service firms in selling products to domestic manufacturing firms. On the other hand, for the case of Vietnam after WTO accession, foreign capital flows much more to service sector. The increased competition in the service sector not only forces foreign service enterprises to be more careful in making input decisions but also pushes them into a weaker position vis-à-vis local customers. Therefore, their presence in upstream sectors is expected to transfer spillovers to domestic manufacturing firms while their presence in downstream sectors is not.

Second, this study is, to the best of our knowledge, the first to examine the role of managerial skill in deciding the spillover absorption of local enterprises. The managerial skill is captured by the educational level of firms' directors. Management refers to skills in strategic planning, co-ordination, directing and controlling of large and complex decision-making processes. So management entails the acquisition of managerial competence, and effectiveness in the following key areas: problem solving, administration, human resource management, and organizational leadership. Hence, it is expected that a director with better management skills is more dynamic to observe and learn new technology and knowledge from the foreign affiliates in the same industry. We argue that a firm's director with higher

managerial skill can strongly stimulate the ‘demonstration’, ‘competition’ and ‘labor mobility’ channels in order to improve the firm’s productivity.

Specifically, the aim of our analysis is to analyze the spillover absorption of private firms/SOEs with varying managerial skill levels as the state owned enterprises (SOEs) still occupy a large proportion in the whole capital sources of the Vietnamese economy. We find that domestic private firms with high managerial skill are associated with positive horizontal spillovers.

The structure of this study is as follows. The next section describes patterns of inward FDI in the Vietnamese economy generally and in the manufacturing sector particularly. Sections 3 and 4 provide literature review and describe the methodology respectively. The data and empirical results are then presented in sections 5 and 6. The final section provides conclusions.

## **2.2. FDI in the Vietnamese Manufacturing**

The economic reform in 1986 set a milestone for Vietnam to change from a centrally-planned to a market oriented economy. Since then, the Vietnamese economy has grown rapidly with an average growth rate over 7% per annum, raising GDP per capita from US\$98 in 1990, up to US\$1,052 in 2009 (GSO<sup>4</sup>). In the process of industrialization and trade liberalization, Vietnam has been bound with bilateral or multilateral trade agreements. Trade policy has been gradually reformed intensively in recent years due to the commitments with ASEAN and WTO. Vietnam joined ASEAN in July 1995, completed the trade liberalization program under the ASEAN Free Trade Area (AFTA) in January, 2006, and became a member of WTO in 2007. Right after Vietnam joined WTO, manufacturing output increased to VND 302 trillion (around US\$ 15 billion) in 2008, up 24.3% compared to the previous year. However, the manufacturing sector occupies only 20.8% of the total capital resources of the whole economy even though it employs 48% of total employment (GSO, 2010a).

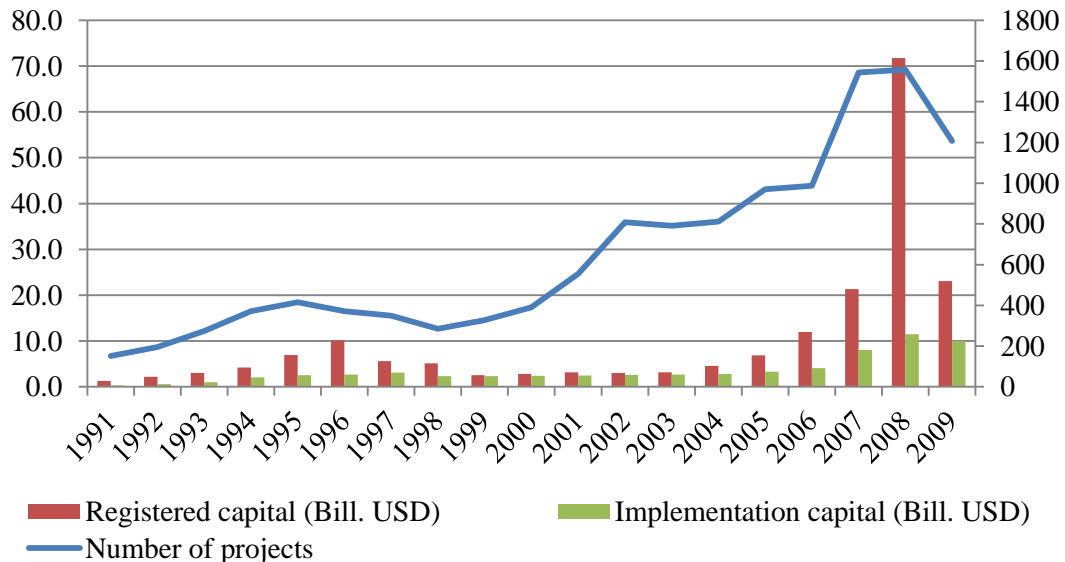
Investment policy has also changed to attract more FDI. The Law on FDI was firstly passed by the VII National Assembly in 1987, then amended five times in 1990,

---

<sup>4</sup> The Vietnamese General Statistics Office ([www.gso.gov.vn](http://www.gso.gov.vn))

1992, 1996, 2000, and 2003 and afterwards unified with the Law on Domestic Investment to be the Investment Law in 2005 which has been applied since 01/07/2006 in order to facilitate a better investment environment for foreign invested firms. The reform process in the early stage aimed at permitting the formation of private-foreign joint ventures, export and processing zones, and offering systems of tax exemption or tax reduction on profits. At the later stage, the amendment allowed FDI to be export oriented. Moreover, its objectives are to reduce transaction cost of establishing foreign investment and to ease and simplify the process of producing an investment license and gaining registration (Tien, 2008; Narjoko, 2009).

**Figure 2.1: Inward FDI in Vietnam, 1991-2009**



Source: the GSO ([www.gso.vn](http://www.gso.vn))

According to the GSO, annual registered FDI had increased dramatically from \$0.34 billion in 1988 to \$10.16 billion in 1996, but then dropped to \$2.57 billion in 1999 due to the Southeast Asian financial crisis. It then gradually recovered in the following years and finally boomed after Vietnam became the WTO's 150<sup>th</sup> member in 2007 to reach the top at \$71.73 billion in 2008, but reduced strongly afterwards. However, it seems that the implemented foreign capital has not developed in a similar way. The fraction of implemented to registered FDI reached the highest level at 91% in 1999 but fell to the

lowest at 16% in 2008. Meanwhile, the number of projects was going up quite steadily from the 1990s to 2008 (*Figure 2.1*).

**Table 2.1: Inward FDI in Manufacturing in the Vietnamese Economy, 2006-2009**

| %   | 2006          | 2007          | 2008           | 2009           |
|---|---------------|---------------|----------------|----------------|
| Percentage of total GDP in                |               |               |                |                |
| Manufacturing                             | 34.92         | 34.51         | 31.04          | 30.36          |
| <i>*except Mining &amp; Quarrying/</i>    |               |               |                |                |
| <i>Electricity, gas, and water supply</i> | <i>21.25</i>  | <i>21.26</i>  | <i>20.35</i>   | <i>20.09</i>   |
| Percentage of total GDP in foreign        |               |               |                |                |
| invested sector                           | 16.98         | 17.96         | 18.43          | 18.33          |
| Proportion of inward FDI in process       |               |               |                |                |
| manufacturing                             | 68.90         | -             | 45.15          | 17.06          |
| <b>Inward FDI:</b>                        |               |               |                |                |
| Number of projects                        | 987           | 1,544         | 1,557          | 1,208          |
| Registered capital (Mill. US\$)           | 12,004        | 21,347.8      | 71,726         | 23,107.3       |
| <i>The growth rate</i>                    | <i>75.50%</i> | <i>77.84%</i> | <i>235.99%</i> | <i>-67.78%</i> |
| Implemented capital (Mill. US\$)          | 4,100         | 8,030         | 11,500         | 10,000         |
| Leading counterparts                      | Korea         | Korea         | Malaysia       | US             |
| <i>Shares in total FDI</i>                | <i>25.9%</i>  | <i>25.3%</i>  | <i>20.87%</i>  | <i>43%</i>     |
| <b>FDI Contribution in:</b>               |               |               |                |                |
| GDP (%)                                   | 16.98         | 17.96         | 18.43          | 18.33          |
| Employment (%)                            | 21.52         | 22.84         | 22.43          | -              |
| Investment capital (%)                    | 16.20         | 24.30         | 30.90          | 25.50          |
| Taxation (%)                              | 43.82         | 35.88         | 40.44          | -              |

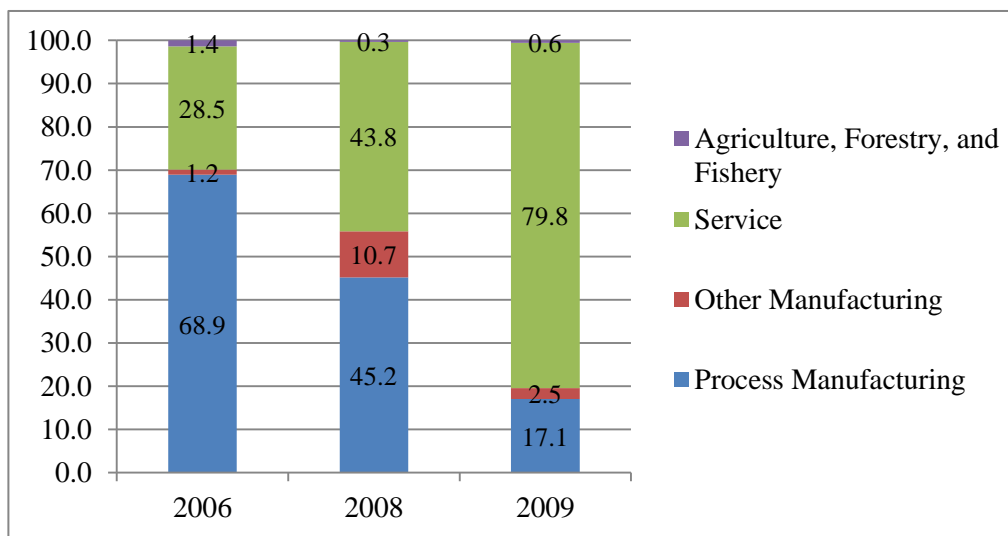
*Source:* Author's collections and calculations based on the GSO's data.

*Table 2.1* gives some information on manufacturing output and FDI inflows over the period 2006-2009. Accordingly, process manufacturing sectors accounted for 20.7% of the national GDP per annum. South Korea, Malaysia, United States were in turn the leading source countries invested in Vietnam. Although the world financial crisis in 2008 blew a cold wind to the economy, leaving inflation and recession, foreign enterprises operate productively in Vietnam. The fraction of MNEs' capital resources in the whole

economy was 18 % on average, but the indicator *profits before taxes* had a quite high share of 48.6 % in the period 2006-2008 (GSOa, 2010). The FDI sector accounted for 18% of GDP, 40% of tax and 22% annually of total employment.

While Vietnam witnessed a strong increase in total FDI inflows in this period, the proportion of FDI in process manufacturing sectors strongly decreased from 69% in 2006 to 17% in 2009. This downward trend was contrasted by an upward trend in FDI flows to service sectors (*Figure 2.2*).

**Figure 2.2: Shares of Inward FDI by Sector**



*Source:* Author's calculations based on the GSO's data.

In fact, the registered foreign capital in manufacturing grew from US\$ 8.4 trillion in 2006 up to US\$ 35.7 trillion in 2008. However, the growth was lower than that in service sectors. Foreign investors concentrated on industries of Real Estate, Renting Business Activity (e.g. US\$ 23.7 trillion in 2008, accounted for 37% in total FDI flows); then Transport, Storage, and Communication (US\$ 1.99 trillion; 3%) and Hotel and Restaurants (US\$ 1.4 trillion; 2.1%). The growth rates in these industries were 1,203%, 3,499%, and 171% respectively. FDI inflows in manufacturing sectors then decreased nearly 8 fold in 2009, compared to 1.5 fold in service sectors. It is possible that the world financial crisis directly brought difficulties to MNEs, especially foreign affiliates in manufacturing. Moreover, some macroeconomic problems in the Vietnamese economy

(for example, inflation increased from 8.3% in 2007 to 23% in 2008), might negatively influence the business of all enterprises.

### **2.3. Theoretical and Literature Review**

Productivity spillovers from foreign affiliates to domestic enterprises can go through horizontal and vertical linkages.

*Horizontal spillovers* can occur through several different channels: *demonstration effects*, *competition effects*, and *labor mobility effects*. Domestic firms can observe foreign firm's actions, skills or techniques and make efforts to imitate/acquire these techniques and apply them, which results in productivity improvements (*demonstration effects*). Furthermore, MNEs possess productive assets, such as know-how, marketing and managing skills, reputation. Thus, to stay competitive, domestic firms are forced to operate more efficiently and adopt new technologies (*competition effects*). Also, domestic firms may benefit from employing workers and managers who have been trained with advanced technical and managerial skills in foreign affiliates (*labor mobility effects*) (Kokko, 1996; Wang and Blomström, 1992; Glass and Saggi, 2002). A foreign presence could cause the domestic sector to develop with wider beneficial effects in the host region or industry (Markusen and Venables, 1999). Linkages between foreign and domestic firms can boost productivity of the domestic sector (Rodriguez-Clare, 1996).

However, it is difficult to explain negative horizontal spillovers based on these effects. When finding negative results for the Venezuelan firms, Aitken and Harrison (1999) argue that the foreign presence could reduce productivity of domestic firms, particularly in the short run. Foreign firm entry can draw demand from domestic firms, causing them to cut production. This channel is referred to as the *market stealing effects* (Anh *et al.*, 2008; Driffield and Love, 2006). Foreign firms with an advanced technology and know-how may lead the market and make domestic firms produce at a less efficient scale, which force them to lower productivity. Therefore, whether the horizontal spillovers are positive or negative depends on which effects prevail.

*Vertical spillovers* occur through forward and backward linkages. Referring to the *backward linkage*, Javorcik (2004) suggests that the supplier-buyer linkage can take place through (i) direct knowledge transfer from foreign customers to local suppliers; (ii) higher



requirements for product quality and on-time delivery introduced by multinationals which provide incentives to domestic suppliers to upgrade their production management or technology; and (iii) increased demand for intermediate products, which allows local suppliers to reap the benefits of scale economies. In the manufacturing environment in particular, foreign manufacturers can act in ways that improve the technical capability of their domestic suppliers, for example, in terms of design, procurement, market information and tooling, and in promoting quality and efficiency improvements (Munday *et al.*, 1995).

Nevertheless, the spillovers depend on the nature of the relationship between multinationals and domestic firms, being present in issues such as bargaining power, or agency problems (Driffield, Munday and Roberts, 2002; Goldsmith and Sporleder, 1998). For instance, long term contracts with a reduced number of suppliers provides increased scope for the spillovers, particularly where a foreign party possesses a set of ownership advantages embodied in specific assets, technology and knowledge (Dunning, 1993; Imrie and Morris, 1992). The existence of production spillovers from the foreign owned sector may not always be reflected in productivity of the domestic supplier sector. The spillovers depend on the nature of the foreign subsidiary, the freedom of local management teams to direct purchasing decisions, degree of vertical integration, the mix of components and materials bought locally (Angle, 1994; Driffield, Munday and Roberts, 2002).

A *forward linkage* takes place when domestic firms become more productive as a result of gaining access to new, improved or less costly intermediate inputs produced by multinationals in upstream sectors. Sales of these inputs by multinationals may be accompanied by provision of complementary services that may not be available in connection with imports (Rodriguez-Clare, 1996; Javorcik, 2004). Entry by foreign multinationals may change market concentration and increasing competition in the domestic economy (Dunning, 1993; Caves, 1996). Thus, domestic firms in downstream industries may be in a stronger bargaining position than those in upstream industries and benefit more from greater competence and technology of foreign affiliates. However, we should consider whether the foreign suppliers are domestic- or export- oriented and whether domestic firms are able to exploit high technology inputs. Scale and scope of spillovers depend on the actions of the inward investors, and the ability of the domestic sector to assimilate the imported technology (Driffield, 2001a).

In practice, spillovers from FDI are more likely to be vertical than horizontal since MNEs have incentives to prevent information leakage that would enhance the performance of their local competitors but at the same time may benefit from transferring knowledge to their local suppliers (Javorcik, 2004). MNEs can use ways of protection such as intellectual property, trade secrecy, paying higher wages to prevent labor turnover or locating in countries or industries where domestic firms have limited imitative capacities to begin with (Görg and Greenaway, 2004).

A wide range of empirical works have investigated the spillovers of inward FDI. Görg and Greenaway (2004) review findings of 45 cases on horizontal and/or vertical productivity spillover of FDI into host developed, transition, and developing economies in the period 1966-2000. In general, developing economies could suffer negative productivity spillover but mostly absorb positive spillovers from the appearance of foreign firms in the same industries. Backward productivity spillovers were found to be positive in Lithuania by Javorcik (2004) but negative in Zambia by Bwalya (2006). For the case of Vietnam, there exist several empirical studies which investigate the technological spillovers via horizontal, forward and backward linkages, focusing on the period 2000 to 2005 (Thuy, 2005; Le and Pomfret, 2008; Anh *et al.*, 2008; Chuc *et al.*, 2008; Lan, 2008). In contrast to the other mentioned studies, Lan (2008) deals explicitly with endogeneity, finding deviating effects of horizontal and forward spillovers but still similar backward effects. The author finds that the productivity of domestic Vietnamese manufacturing firms can be boosted by the presence of foreign affiliates in the same industries and in downstream sectors but reduced by their appearance in upstream sectors.

The mixed results of spillovers may, to some extent, be explained by differences in the level of absorptive capacity of domestic firms (Cantwell, 1989). Domestic firms do not benefit equally from the knowledge spillovers of foreign affiliates. According to Ben Hamida (2006), a firm's absorptive capacity depends upon its existing level of technological competence as well as its learning and investment efforts in order to acquire foreign knowledge. In particular, a larger technology gap can lower technological spillovers (Kokko, 1996; Glass and Saggi, 1998). Local exporters are more likely to benefit from positive spillovers than non-exporters (Barrios and Strobl, 2002; Girma,

Görg, and Pisu, 2008). R&D intensive local firms also absorb the spillovers better (Kinoshita, 2001).

Accordingly, Javorcik (2004) finds positive backward spillovers associated with projects with shared domestic and foreign ownership but not with fully owned foreign investment. Lan (2008) concludes that the Vietnamese firms with higher human capital stock, better financial development and lower technology gap could benefit from technological spillovers in the period 2000-2005. Meanwhile, Kim and Kim (2010) show that the presence of foreign firms in both downstream manufacturing and service sectors positively affects the productivity of the Korean manufacturing firms in the period from 2001 to 2008. They also stressed the importance of attracting FDI to the service sector as it results in a greater spillover effect than in other sectors.

Overall, although no aforementioned literature have directly suggested the role of managerial skills in driving FDI spillover absorption, this issue could be based on the framework: (1) a firm's absorptive capacity could depend on its characteristics (e.g. managerial skill); (2) As management is associated with the effectiveness in areas of administration, human resource management, and organizational leadership; a director with better management skills is expected to observe, to learn and adopt new technology and knowledge from foreign affiliates (*demonstration effects, competition effects*). He can stimulate and exploit the labor force moved from foreign affiliates (*labor mobility effects*). Moreover, he may have the ability to upgrade the bargaining power in dealing business with foreign partners.

#### **2.4. Research Methodology and Estimation Strategy**

The study utilizes an augmented three factor Cobb-Douglas production function:

$$\begin{aligned} \ln Y_{ijrt} = & \alpha + \beta_1 \ln K_{ijrt} + \beta_2 \ln L_{ijrt} + \beta_3 \ln M_{ijrt} + \beta_4 \text{Horizontal}_{jt} \\ & + \beta_5 \text{Backward}_{jt} + \beta_6 \text{Forward}_{jt} \\ & + \beta_7 \text{concentration} + \beta_8 \text{Indemand} + \alpha_i + \varepsilon_{ijt} \end{aligned}$$

$Y_{ijrt}$  the output, represented by the total sales of firm  $i$  operating in sector  $j$  in region  $r$  at time  $t$ .<sup>5</sup>  $K_{ijrt}$  the capital of firm  $i$ , defined as the value of fixed assets at the beginning of the year.  $M_{ijrt}$  Material inputs, calculated by total expenditure, minus total wages of firm  $i$ .  $Y_{ijrt}$ ,  $K_{ijrt}$ ,  $M_{ijrt}$  are all deflated to be at the base price in 2007 by using the Products Price Indexes of process manufacturing sectors; unit: VND million.  $L_{ijrt}$  the measure of labor defined by the number of employees of firm  $i$  in sector  $j$  in region  $r$  at the beginning of year  $t$ .<sup>6</sup>

Spillover effects are measured by the impact of foreign presence on the output level of domestic firms, controlling for inputs (Javorcik, 2004)<sup>7</sup>. We follow Javorcik (2004) and calculate the following spillovers variables (*Appendix A.1*):

**Horizontal  $_{jt}$ :** captures the presence of foreign firms in sector  $j$  at time  $t$ , defined by the foreign equity participation averaged over all firms in the sector, weighted by each firm's share in sectoral output:

$$H_{jt} = \frac{\sum_{\forall i \in j} \text{Foreignshare}_{it} * Y_{it}}{\sum_{\forall i \in j} Y_{it}}$$

**Backward  $_{jt}$ :** Proxy for the foreign presence in the industries that are being supplied by sector  $j$  (downstream industries), separated into manufacturing and service sectors<sup>8</sup>.

---

<sup>5</sup> All other studies for the case of Vietnam with the same data source (GSO) used 'real output' as the dependent variable. We argue that 'firm sales' is the best choice because (1) there could be false information of real output as this indicator is asked to give the right values at the base year 1994, (2) there are too many missing values of 'real output' in the period, and (3) using 'value added' instead, we will remove all negative-profit firms when taking log for both sides of the Cobb- Douglas function.

<sup>6</sup> This approach has limitation because it is impossible to distinguish the skilled and unskilled workers. Javorcik (2004) and Tybout *et al.*(1991) used labor expressed in terms of efficiency units, which are computed by dividing the wage bill by the medium wage.

<sup>7</sup> Ben Hamida (2006) argued that this way seems to be an appropriate measure for spillover effects through demonstration but not enough for competition and worker mobility effects.

<sup>8</sup> Kim and Kim (2010) applied directly the approach of Javorcik (2004) for calculating of primary/ manufacturing/ service backward and forward, but they did not expand the formula.

$$\begin{aligned}
Backward_{jt} &= \sum_{k \text{ if } k \neq j} a_{jk} Horizontal_{kt} = \sum_{m \text{ if } m \neq j} a_{jm} H_{mt} + \sum_s a_{js} H_{st} \\
&= Backward_{Manufacturing} + Backward_{service}
\end{aligned}$$

$a_{jk}$  is the proportion of sector  $j$ 's output supplied to sector  $k$ , taken directly from the Input-Output (I/O) table (2007). We assume the outputs coefficients  $(a_{jk})_s$  are unchanged over time.

**Forward<sub>jt</sub>**: Proxy for the foreign presence in the supplying industries to sector  $j$  (upstream industries), separated into manufacturing and service sectors.

$$\begin{aligned}
Forward_{jt} &= \sum_{m \text{ if } m \neq j} \sigma_{jm} \frac{\sum_{i \forall i \in m} Foreignshare_{it} * (Y_{it} - X_{it})}{\sum_{i \forall i \in m} (Y_{it} - X_{it})} \\
&= Forward_{manufacturing} + Forward_{service}
\end{aligned}$$

$\sigma_{jm}$  is the share of inputs purchased by industry  $j$  from industry  $m$  in total inputs sourced by sector  $j$ , taken directly from I/O table (2007). We also assume the inputs coefficients  $(\sigma_{jm})_s$  are unchanged over time.

$X_{it}$  is the exports of firm  $i$  at time  $t$ . There is no information of exports from the surveys. One previous research for the case of Vietnam assumes that proportion of foreign export within a sector is linearly correlated with the equity share of foreign firms (Anh *et al.*, 2008). Since this assumption seems not to be so convincing, we see instead that the difference between total output and export of firm  $i$  is domestic sales.

$$Y_{it} - X_{it} = Domestic\ sales$$

Domestic sales, which are not available in the data, can be replaced by value added tax (VAT) of domestic goods divided by the tax rate at 10 %.

Furthermore, this study controls for additional variables (beyond FDI) that may influence in the firms' productivities, such as the demand for intermediates and the level of industry concentration.

***demand<sub>jt</sub>***: demand for intermediates (as in Javorcik, 2004). We expect a positive relation between demand and firm productivity.

$$demand_{jt} = \sum_k a_{jk} * Y_{kt}$$

$a_{jk}$  is the I/O coefficient indicating the proportion of good  $j$  used to produce one unit of good  $k$ .

***concentration<sub>jt</sub>***: the Herfindahl index representing the level of industry concentration (as in Lan, 2008; Le and Promfet, 2008). An increasing index indicates less competition in the industry. This may either lead to less productivity improvement due to lower competitive pressure or to more productivity growth if firms are able to exploit increasing return of scale.

$$concentration_{jt} = \sum_{i=1}^n \left( \frac{y_{ijt}}{Y_{ijt}} \right)^2$$

We estimate the equation for (1) the whole set of domestic firms, and (2) separately for SOEs and private enterprises with low/high managerial skills respectively. The variables backward and forward are included in their decomposed forms, i.e. for service and manufacturing sectors separately.

We apply OLS, controlling for industry, time, and regional fixed effects; within group (firm fixed effects); and system GMM estimators. Standard errors are robustly adjusted to control for serial correlation and heteroskedasticity. Without independently and identically distributed error terms, the OLS estimator could be inconsistent because of the omission of unobserved factors such as different skills of employees, different level of management or different authority's capacity in different location which may affect the correlation between firm productivity and the presence of foreign enterprises. Moreover, the industry specific variables used in the model may lead to standard errors from OLS being underestimated. Therefore, the standard errors are corrected to be clustered for all observations in the same industry, year, and province. The fixed effects estimator can solve time invariant unobserved heterogeneity, but not all potential unobserved endogeneity. For a production function, time varying unobservables could be correlated with the factors input (capital, labor) because the decisions on inputs are able to be

observed by managers, leading to inconsistent estimates. Measurement errors represent one more source of additional endogeneity (Söderbom, 2009). Therefore, we apply system GMM using differences and lagged levels of the inputs as instruments<sup>9</sup>.

We apply a Hansen test for joint validity of the instruments.<sup>10</sup> The autocorrelation test proposed by Arellano and Bond is to test the serial correlation in the idiosyncratic disturbance term. Two-step GMM is applied using the Windmeijer (2005) finite-sample correction of the reported standard errors, without which those standard errors tend to be severely downward biased. We also ‘collapse’ the instrument set in confronting the problem of too many instruments<sup>11</sup>.

## **2.5. Data and Descriptive Statistics**

The firm data used in this study comes from the annual enterprise censuses conducted by the General Statistics Office of Vietnam for the period 2007 to 2009. The GSO has surveyed 100% of state-owned enterprises and all non-state firms. The number of enterprises increases from 155,771 in 2007 to 233,236 in 2009, covering almost all enterprises in agriculture, forestry and fishery, service and manufacturing sectors. The database contains information on the ownership structure of enterprises, value of output, number of employees, wages, sales, R&D activities, environmental protection activities, etc. Information on the educational level of firm directors is only available in 2 years 2008 and 2009. According to Vietnam Standard Industrial Classifications (VSIC, 1993), there are 29 manufacturing sectors including 23 process manufacturing, 4 mining and quarrying, and 2 sectors in electricity, gas and water supply. Only information of firms in 22 process

---

<sup>9</sup> System GMM is more consistent than Difference GMM in case endogeneity variables are close to a random walk, then the past levels (instruments of Difference GMM) convey little information about future changes (Roodman, 2006).

<sup>10</sup> If non-sphericity is suspected in the errors, as in robust one-step GMM, the Sargan test is inconsistent. In that case, a theoretical superior overidentification test for the one-step estimator is based on the Hansen statistic from a two-step estimate (Roodman, 2006). We apply the Hansen test in the study, as in Girma, Görg, and Pisu (2008) and Kim and Kim (2010).

<sup>11</sup> System GMM uses instruments as difference with levels. These instruments set could be collapsed into a single column. This embodies the same expectation but conveys slightly less information.

manufacturing sectors will be applied, excluding the Recycling sector where there is no foreign presence in the sample (*Appendix A.2*).

The I/O table is provided by the GSO in 2007 which is the most recent with the dimension of 138 categories in order to calculate the forward and backward linkages. The I/O table gives input coefficients relating to production technology applied to create products, gross capital formation, final consumptions and exports, and some other indicators.

The sample used in this study originates from an unbalanced panel data set which consists of 114,342 manufacturing observations, then further reduced to 77,308 observations after controlling for missing and zero values of firm sales, capital and employment. To observe a continuous affect, we generate a balanced panel data set including 23,850 observations of which 3,960 observations (equivalent to 16.6% of the whole) are foreign owned. Foreign invested enterprises include wholly foreign owned companies, joint ventures between SOEs or non-state companies and foreign partners. Based on the sample of firms in manufacturing, we can calculate the foreign presence in upstream and downstream manufacturing industries. In order to measure the foreign presence in upstream and downstream service sectors, we use a balanced panel data set for 11 service sectors which comprise 1,294 foreign owned and 94,457 domestically owned firms.<sup>12</sup>

*Table 2.2* introduces some summary statistics of foreign firms and domestic firms which are separated by firm ownership and managerial skill. SOEs include central and local SOEs or state limited companies, and joint-stock companies with the share of state capital higher than 50%. The privates/ non-states enterprises cover collectives, private enterprises or limited companies, partnership companies, joint- stock companies without state capital or with state capital less than 50%. A domestic firm whose director has a Bachelor degree or higher is denoted as having high managerial skill levels.

---

<sup>12</sup> There are 11 service industries in this sample: (1) Construction, (2) Wholesale And Retail Trade, Repair Of Motor Vehicles, (3) Hotels And Restaurants, (4) Transport, Storage And Communications; (5) Financial Intermediation, (6) Science And Technology Activities, (7) Real Estate, Renting And Business Activities, (8) Education; (9) Health And Social Work; (10) Cultural And Sport Activities, and (11) Others.



**Table 2.2: Summary Statistics, 2007-2009**

| <b>Variables</b>  | <b>Mean</b> | <b>Standard<br/>Deviation</b> | <b>Variables</b>  | <b>Mean</b> | <b>Standard<br/>Deviation</b> |
|---|-------------|-------------------------------|---|-------------|-------------------------------|
| <b>Foreign firms (3,960 obs.):</b>  |             |                               | <b>Domestic firms (19,890 obs.):</b>  |             |                               |
| Log sales   | 10.832      | 1.750                         | Log sales   | 9.009       | 1.912                         |
| Log capital   | 9.545       | 1.865                         | Log capital   | 7.390       | 2.004                         |
| Log labor   | 5.192       | 1.473                         | Log labor   | 3.856       | 1.426                         |
| Log materials   | 10.547      | 1.842                         | Log materials   | 8.720       | 2.051                         |
| Log demand  | 17.062      | .821                          | Log demand  | 17.180      | .871                          |
| Concentration   | .037        | .047                          | Concentration   | .028        | .037                          |
| <b>For domestic firms:</b>  |             |                               |   |             |                               |
| <b>- Non state enterprises (18,571 obs.)</b>  |             |                               | <b>- State owned enterprises (1,319 obs.)</b>   |             |                               |
| Log sales   | 8.837       | 1.814                         | Log sales   | 11.427      | 1.591                         |
| Log capital   | 7.205       | 1.895                         | Log capital   | 9.993       | 1.656                         |
| Log labor   | 3.722       | 1.346                         | Log labor   | 5.750       | 1.142                         |
| Log materials   | 8.548       | 1.964                         | Log materials   | 11.143      | 1.679                         |
| <hr/>   |             |                               |   |             |                               |
| <b>- With low managerial skill (5,761 obs.,<br/>including 5,370 obs. of private firms and<br/>18 obs. of SOEs)*</b> |             |                               | <b>- With high managerial skill (8,283 obs.,<br/>including 5,191 obs. of private firms and 825 obs. of<br/>SOEs)*</b> |             |                               |
| Log sales   | 8.478       | 1.736                         | Log sales   | 10.198      | 1.898                         |
| Log capital   | 6.921       | 1.773                         | Log capital   | 8.664       | 2.067                         |
| Log labor   | 3.561       | 1.180                         | Log labor   | 4.803       | 1.449                         |
| Log materials   | 8.145       | 1.940                         | Log materials   | 9.866       | 2.037                         |
| <hr/>   |             |                               |   |             |                               |
| Horizontal  | .387        | .138                          | Backward_manufacturing  | .106        | .097                          |
| Backward  | .120        | .096                          | Backward_service  | .013        | .016                          |
| Forward   | .130        | .068                          | Forward_manufacturing   | .122        | .068                          |
|   |             |                               | Forward_service   | .007        | .003                          |

\* Data for managerial skill is only available in 2008- 2009

As can be seen, capital, employment and sales of a foreign enterprise are respectively 29%, 35% and 20% higher than those of a local firm. Domestic firms which

are state owned, or at higher managerial skill have larger sizes in term of sales, capital, labor, and materials than other domestic firms. The average presence of foreign affiliates in the same manufacturing industry is 38%, and 12% and 13% in downstream and upstream industries respectively. Thus, it is possible that foreign invested enterprises tend to import material inputs and export their products rather than using domestic products. The foreign presence in manufacturing sectors is much higher than in service sectors.

When classifying domestic firms by ownership, SOEs account for just 6.6% of all observations but represent 47.2% of total capital and 25.2% of total employment. These firms employ mostly highly educated directors (825 cases compared to 18 cases with low managerial skill). By contrast, the number of high managerial skill directors in the private sector is equivalent to that of low managerial skill directors. Overall, enterprises with high managerial skill possess higher capital, labor, and raw materials and achieve higher sales.

## 2.6. Empirical Result and Analysis

### 2.6.1. Productivity spillovers through intra-sector and inter-sector linkages

*Table 2.3* shows FDI productivity spillovers to domestic manufacturing firms through horizontal, backward and forward linkages in the period 2007-2009. The vertical linkages are separated into linkages with manufacturing and service sectors. The OLS estimation is presented in column 1. Columns 2 reports firm fixed effect estimations. Both estimations show significant positive spillovers from foreign firms through horizontal linkages but negative spillovers through backward and forward linkages.

***Table 2.3: Productivity Spillovers through Linkages, 2007-2009***

|                  | (1)                    | (2)                    | (3)                  | (4)                  |
|------------------|------------------------|------------------------|----------------------|----------------------|
| <i>Variables</i> | <b>OLS level</b>       | <b>Within</b>          | <b>SYS</b>           | <b>SYS</b>           |
| Log capital      | 0.0180***<br>(0.00230) | 0.0150***<br>(0.00362) | 0.278***<br>(0.0850) | 0.279***<br>(0.0821) |
| Log labor        | 0.187***<br>(0.00479)  | 0.126***<br>(0.00755)  | 0.601***<br>(0.0938) | 0.568***<br>(0.0903) |
| Log materials    | 0.813***<br>(0.00456)  | 0.707***<br>(0.00977)  | 0.156***<br>(0.0541) | 0.197***<br>(0.0511) |

|                                   |                      |                      |                      |                       |
|-----------------------------------|----------------------|----------------------|----------------------|-----------------------|
| Horizontal                        | 0.314***<br>(0.0910) | 0.287***<br>(0.0860) | -0.132<br>(0.121)    | -0.711***<br>(0.137)  |
| Backward                          | -0.749***<br>(0.135) | -0.760***<br>(0.131) | 0.581***<br>(0.171)  |                       |
| Backward_<br><i>Manufacturing</i> |                      |                      |                      | 0.541***<br>(0.182)   |
| Backward_<br><i>Service</i>       |                      |                      |                      | -6.812***<br>(0.774)  |
| Forward                           | -0.774***<br>(0.195) | -0.541***<br>(0.174) | -0.773***<br>(0.239) |                       |
| Forward_<br><i>Manufacturing</i>  |                      |                      |                      | -0.687***<br>(0.233)  |
| Forward_<br><i>Service</i>        |                      |                      |                      | 19.33***<br>(4.644)   |
| Log demand                        | -0.0695<br>(0.0622)  | 0.00676<br>(0.0589)  | 0.151***<br>(0.0319) | 0.0891***<br>(0.0307) |
| Concentration                     | -0.521<br>(0.353)    | -0.817**<br>(0.361)  | 2.563***<br>(0.732)  | 2.654***<br>(0.708)   |
| Constant                          | 2.232**<br>(1.116)   | 1.898*<br>(1.047)    | 36.84**<br>(15.74)   | 86.25***<br>(22.22)   |
| <i>R-squared</i>                  | 0.981                | 0.829                |                      |                       |
| <i>AR(1)</i>                      |                      |                      | 0.000                | 0.000                 |
| <i>Hansen test</i>                |                      |                      | 0.174                | 0.271                 |
| <i>Observations</i>               | 19,890               | 19,890               | 19,890               | 19,890                |

(i) Robust standard errors in parentheses.

(ii) (\*\*\*), (\*\*), and (\*) denote significance at 1%, 5%, and 10%, respectively.

(iii) Columns (1) and (2) estimates include sector, year, and province dummies.

(iv) Columns (3) and (4) use GMM instruments log capital and log labor by 2 years for first differences equation and collapsed.

Columns 3 and 4 are for two-step system GMM estimates using capital and labor lagged by 2 years and the corresponding first differences as instruments. Robust standard

errors are corrected for finite sample bias. Hansen tests show p-values which are more than 5 percent so we can conclude that these instruments are valid. Assuming that errors are uncorrelated across firms, we reject the null of no serial correlation because p-values of the autocorrelation test are less than 5 percent. The analysis is based on the results of the system GMM estimators.

The results show that productivity of domestic firms is negatively correlated with the presence of foreign affiliates in the same sector and in upstream sectors, but positively correlated with foreign affiliates' presence in downstream sectors. The presence of positive backward spillovers suggests that the demand from foreign customers is one important source to stimulate productivity improvement of domestic suppliers, in line with Javorcik (2004). The finding of negative horizontal spillovers when separating backward and forward spillovers into manufacturing and service sectors stands in contrast to the results from OLS and within-group estimation in the first two columns. This suggests that input endogeneity issues can distort the true effects<sup>13</sup>. In detail, one standard unit increase in foreign presence which is equivalent to 1% increase in foreign sales in intra-industries causes a 0.71% decrease in productivity of domestic firms.

In addition, this result stands also in contrast to the finding of Lan (2008) for the case of Vietnam in the period 2000-2005. His study provided evidence of positive horizontal and backward spillovers but negative forward spillovers. The differences in the results may possibly be explained by the fact that the positive effects through competition, demonstration, and labor mobility were not strong enough to surpass the negative market stealing effects in the period post WTO accession. This seems plausible as Vietnamese enterprises confronted both a huge surge in foreign firm entry and the world financial crisis in this period. Also, foreign affiliates may have been more successful in preventing the leakage of technology and know-how to domestic competitors in this period.

The presence of significant negative forward spillovers is far from easy to explain. This may reflect three things. First, the inputs bought from foreign suppliers are possibly

---

<sup>13</sup> Lan (2008), after controlling input endogeneity by applying 2SLS, also found reversed results of horizontal and forward spillovers to indigenous manufacturing firms compared to the results in Anh *et al.* (2008), Chuc *et al.* (2008).

more expensive, causing increasing costs. Second, the local firms could have less ability to make use of costly inputs. Third, it could be that indigenous firms would be at a weaker position in making contracts with the foreign suppliers.

Taking *intra-sector* and *inter-sector* linkages into account, a one percent increase in the presence of foreign suppliers in manufacturing sectors causes a 0.69% reduction in a domestic firm's sales, but the same ratio of foreign suppliers in service sectors triggers a 19.3% gain in firm productivity. This is possibly due to the large surge in foreign firm entry in the period 2007-2009, which may have placed foreign firms in the service sector in tougher competition, thus reducing their bargaining power compared to foreign firms in manufacturing sectors. Indeed, the coefficients in the I/O table show that, manufacturing firms use high proportions of services from industries of "Transport, Storage, and Communication" and "Real Estate, Renting Business Activity" whose FDI growth rates were 3,499% and 1,203% respectively in 2008. An unavoidable competitive environment can lead to price reduction which strongly impact on productivity of customers. In addition, firms in service sectors may have been more willing to transfer knowledge to manufacturing local buyers, given that they would not perceive them as direct competitors.

By contrast, we still find negative forward spillovers through intra-sector linkages (manufacturing-to-manufacturing) as before. One possible explanation for this is that MNEs in upstream manufacturing sectors are mostly export-oriented<sup>14</sup>, which makes them less dependent on the sales to local firms. Additionally, domestic firms in the manufacturing sector heavily depend on inputs from suppliers in this sector. As argued above, this may place the domestic firms in a bad bargaining position, which may lead to higher input prices and, consequently, lower productivity.

The results further show evidence of positive manufacturing-to-manufacturing backward spillovers but negative manufacturing-to-service backward effects. A one percent increase in the presence of manufacturing foreign buyers produces a 0.54 % rise in the output of domestic enterprises. This suggests that, foreign manufacturers, creating a reasonable contact with their local suppliers via business contracts or relationship, can

---

<sup>14</sup> Exports of the FDI sector accounted 55% of total exports in the period 2007-2009 (GSO, 2011).

some extent improve the technical capability of the domestic suppliers. Such improvements may take the form of, for example, design, procurement, market information and tooling, and in promoting quality and efficiency improvements, as highlighted by Munday *et al.* (1995).

The negative backward spillovers through inter-sector linkages could be explained as follows. We argue that in the context of the type/sophistication of the product which is being manufactured, inputs from manufacturing sectors are non-core, hence, less important to a foreign firm in the service industry, leading to reduced bargaining power of domestic firms in manufacturing. Furthermore, when operating in a competitive environment, MNEs in service sectors can be very careful in making their input purchasing decisions.<sup>15</sup> The spillovers may depend on the freedom of local management teams to direct purchasing decisions, and the bargaining power of these foreign affiliates (Driffield, Munday and Roberts, 2002).

No longer stopping at finding sign and magnitude of horizontal and vertical spillovers, we try to figure out the real productivity effects to the Vietnamese manufacturing firms based on evidence of foreign presence in this period. As can be seen from the sample, foreign presence increases by 1.4% in the same industries (horizontal), 0.9% in downstream manufacturing industries (*backward\_manufacturing*), and 0.23% in upstream service industries (*forward\_service*); but reduces by 0.3% in downstream service industries (*backward\_service*), and 2.1% in upstream manufacturing industries (*forward\_manufacturing*). As a rough estimate of the total productivity spillovers to the Vietnamese manufacturing, we sum up all spillover coefficients given in Column 4. From that we can conclude that the productivity of a Vietnamese manufacturing firm in the period 2007-2009 went up by 8.3 % via vertical linkages but down by 1.02% via horizontal linkages.

---

<sup>15</sup> FDI inflows in service sectors is equivalent to those in manufacturing sectors in 2008 but 4.7 times higher in the following year (GSO)

### 2.6.2. Productivity spillovers by managerial skill and ownership

Table 2.4 presents horizontal and vertical spillovers to domestic firms, distinguishing SOEs and private enterprises with low/high managerial skills in the period 2008-2009. We use fixed effects estimators.<sup>16</sup> We do not include the case of SOEs with low managerial skill due to limited observations. Columns 1 through 3 show the results for firms with low managerial skill level while columns 4 through 7 present the findings for firms with high managerial skill level.

For the case of low managerial skills, negative backward and forward spillovers are found, while horizontal spillovers are statistically insignificant. Thus, domestic firms managed by lowly educated directors cannot learn from FDI entry in the same industries and experience reductions in productivity through inter-industry linkages. On the contrary, the evidence suggests that local enterprises with high managerial skills can take advantage of the foreign presence in the same industries. Private firms could be more dynamic than SOEs so that they push up their output through competition, demonstration or labor movement effects.<sup>17</sup> As expected, a higher skilled director (with higher education attainment), is more capable of observing and learning new technology and knowledge from the foreign competitors. He may make good decisions in keeping and stimulating high-skilled labor.

**Table 2.4: Productivity Spillovers by Managerial Skill and Ownership, 2008-2009**

| <i>Variables</i> | <i>Low Managerial Skill</i> |                |               | <i>High Managerial Skill</i> |                |               |         |
|------------------|-----------------------------|----------------|---------------|------------------------------|----------------|---------------|---------|
|                  | (1)                         | (2)            | (3)           | (4)                          | (5)            | (6)           | (7)     |
|                  | Domestic firms              | Domestic firms | Private firms | Domestic firms               | Domestic firms | Private firms | SOEs    |
| Log capital      | 0.0246*                     | 0.0251*        | 0.0250*       | 0.000840                     | 0.00209        | -0.000973     | -0.0123 |

<sup>16</sup> Since we only have two years of data, it is impossible to implement a GMM approach as applied in Table 3.

<sup>17</sup> Girma, Gong, and Görg (2008) found that access to finance play no role in generating FDI spillovers to Chinese SOEs as these enterprises are largely inefficient but enjoy preferential access to domestic financial resources.

|                                   |           |           |           |          |           |           |           |
|-----------------------------------|-----------|-----------|-----------|----------|-----------|-----------|-----------|
|                                   | (0.0142)  | (0.0142)  | (0.0142)  | (0.0101) | (0.0100)  | (0.0114)  | (0.0154)  |
| Log labor                         | 0.0878*** | 0.0876*** | 0.0874*** | 0.128*** | 0.128***  | 0.132***  | 0.0549    |
|                                   | (0.0155)  | (0.0154)  | (0.0154)  | (0.0199) | (0.0199)  | (0.0209)  | (0.0417)  |
| Log materials                     | 0.655***  | 0.655***  | 0.655***  | 0.600*** | 0.600***  | 0.595***  | 0.650***  |
|                                   | (0.0189)  | (0.0190)  | (0.0190)  | (0.0222) | (0.0222)  | (0.0235)  | (0.0653)  |
| Horizontal                        | 0.379     | 0.199     | 0.178     | 0.497*** | 0.499***  | 0.473***  | 0.280     |
|                                   | (0.251)   | (0.260)   | (0.261)   | (0.150)  | (0.154)   | (0.180)   | (0.271)   |
| Backward                          | -2.369*** |           |           | -1.245** |           |           |           |
|                                   | (0.578)   |           |           | (0.512)  |           |           |           |
| Forward                           | -2.828*** |           |           | -0.268   |           |           |           |
|                                   | (0.471)   |           |           | (0.297)  |           |           |           |
| Backward_<br><i>Manufacturing</i> |           | -2.709*** | -2.721*** |          | -0.465    | -0.802    | 2.392**   |
|                                   |           | (0.635)   | (0.636)   |          | (0.544)   | (0.600)   | (0.983)   |
| Backward_<br><i>Service</i>       |           | -1.721    | -1.834    |          | -6.942*** | -8.327*** | -6.481*** |
|                                   |           | (3.557)   | (3.563)   |          | (1.709)   | (2.446)   | (2.034)   |
| Forward_<br><i>manufacturing</i>  |           | -3.109*** | -3.118*** |          | -0.0770   | 0.156     | -0.843    |
|                                   |           | (0.502)   | (0.504)   |          | (0.316)   | (0.369)   | (0.707)   |
| Forward_<br><i>Service</i>        |           | 28.32     | 29.77     |          | 28.87     | 22.21     | 98.82     |
|                                   |           | (24.73)   | (24.84)   |          | (20.48)   | (22.09)   | (63.12)   |
| Log demand                        | 0.103     | 0.224     | 0.214     | -0.138   | -0.698*** | -1.010*** | 0.0732    |
|                                   | (0.153)   | (0.439)   | (0.439)   | (0.137)  | (0.221)   | (0.322)   | (0.219)   |
| Concentration                     | -5.082**  | -4.726*   | -4.471*   | -1.669   | -0.437    | 0.436     | 0.133     |
|                                   | (2.218)   | (2.526)   | (2.558)   | (1.022)  | (1.055)   | (1.486)   | (1.224)   |
| Constant                          | 0.125     | -2.325    | -2.119    | 5.746**  | 15.67***  | 21.57***  | 1.598     |
|                                   | (2.792)   | (7.934)   | (7.931)   | (2.481)  | (4.053)   | (5.909)   | (3.865)   |
| <i>R-squared</i>                  | 0.777     | 0.777     | 0.777     | 0.746    | 0.747     | 0.739     | 0.801     |
| <i>Observations</i>               | 5,388     | 5,388     | 5,370     | 6,016    | 6,016     | 5,191     | 825       |

- (i) Robust standard errors are given in parentheses.
- (ii) (\*\*\*), (\*\*), and (\*) denote significance at 1%, 5%, and 10%, respectively.
- (iii) All estimates include sector, year, and province dummies.
- (iv) Columns (1) through (3) are for firms with low managerial skill, in which SOEs are excluded due to small number of observations
- (v) Columns (4) through (7) are for firms with high managerial skill.



Domestic firms with high managerial skill including privates and SOEs still experience negative backward spillovers. However, a higher foreign presence in manufacturing downstream industries raises output of SOE. It is possible that SOEs, which are on average larger than private firms wield higher bargaining power when selling products to foreign customers or they can set up a special relationship with foreign affiliates.

## **2.7. Conclusion**

As a developing country, Vietnam has made changes to its trade and investment policies to attract FDI, hoping that this would create employment and lead to spillovers of the foreign firms' advanced technologies to the domestic economy. This study investigates productivity spillovers from FDI to domestic firms in manufacturing sectors in the period 2007-2009. We show that, overall, there are negative horizontal and forward technological spillovers but positive backward spillovers. Hence, compared to the findings of Lan (2008), we find that Vietnam, at the beginning of its integration process in the world trade by completing AFTA commitments in 2006 and participating in the WTO in 2007, has not benefitted from FDI inflows in term of productivity improvement through intra-industry linkages.

When analyzing spillovers by firm ownership and managerial skill level, this study provides evidence of positive horizontal spillovers for private firms with skilled managers and also positive backward spillovers for SOEs with skilled managers through manufacturing-to-manufacturing linkages. Meanwhile, firms with low skilled managers do not benefit from FDI through either of the spillover channels. Thus, these findings leave two messages: (1) private enterprises should aim at raising skill levels of managers in order to exploit the FDI spillovers, and (2) even with the same high managerial level, private firms are found to be more dynamic than SOEs. Therefore, privatizing SOEs is a good policy of the Vietnamese government so as to upgrade the spillover absorptive capacity.

Furthermore, we make a contribution to the existing literature by taking into consideration the *intra-sector* and *inter-sector* linkages in investigating vertical spillovers. Different types of spillovers are explained based on characteristics of manufacturing production and the bargaining power between sellers and buyers. With a rough estimate for

FDI spillovers, we find that although the productivity of an average Vietnamese manufacturing firm suffers a 1.02% productivity loss due to the negative effect of intra-industry linkages, it gains circa 8.3% on the basis of inter-industry linkages. This means that, overall, domestic firms actively exploit vertical linkages to improve their productivity by the way that they limit buying inputs or selling outputs to foreign affiliates who wield the potential of negative spillovers, and increase buying inputs or selling outputs to those who can bring positive spillovers.

### **3. TRADE LIBERALIZATION AND BACKWARD LINKAGES FROM FOREIGN DIRECT INVESTMENT: THE ROLE OF INVESTORS' ORIGINS**

Pham Thi Bich Ngoc

---

*One of the earlier versions of this paper is publicized in the Journal of International Business Research (Volume XI, Special Issue 3, p.71-88) in December, 2012. This study was presented at the International Conference on Business, Economics and Information Technology (Ho Chi Minh City, Vietnam, 19-20 March 2012) and the Lunchtime Seminar on International Economics (the Kiel Institute for the World Economy, 10 October 2012)*

---

#### **3.1. Introduction**

Foreign Direct Investment (FDI) is attracted by developing countries in hope for more capital for their economic development and stimulating the technological progress in the host countries. FDI may be used as a vehicle for increasing productivity growth (Bitzer and Görg, 2009). FDI can bring newer technology transfer to developing countries than licensing (Mansfield and Romeo, 1980). In addition, it possibly improves the knowledge and skills of managers or workers, and enhances efficiency and productivity in production and performance. However, by possessing better production technology, managerial skills, export contacts, reputation and good will, FDI is able to force local enterprises to strive in a strong competitive environment and can draw demand from domestic firms (Aitken and Harrison, 1999).

There has been a well-developed theoretical literature related to FDI spillovers into domestic firms. Once a multinational enterprise (MNE) has established a subsidiary, they are likely to bring along more sophisticated technology, marketing and managerial practices which are possibly spilled over to the domestic firms through the channels: imitation, skills acquisition, competition and exports (Wang and Blomström, 1992; Aitken and Harrison, 1999). Spillovers possibly derive from MNEs which enter in the same industry (*horizontal/ intra-industry spillovers*) or in a different industry (*vertical/ inter-industry spillovers*). The latter covers *forward spillovers* from MNEs in upstream/supplying industries or *backward linkages* from those in downstream/buying industries. Horizontal productivity spillovers can occur through the channels: demonstration, competition, labor mobility, and market stealing effects (Wang and Blomström, 1992, Kokko, 1996, Glass and Saggi, 2002).

In nature, spillovers from FDI are more likely to be vertical than horizontal because MNEs can use ways of protection such as intellectual property, trade secrecy, paying higher wages to prevent labor turnover or locating in countries or industries where domestic firms have limited imitative capacities to begin with (Görg and Greenaway, 2004; Javorcik, 2004). For backward linkages<sup>18</sup>, MNEs play two roles to domestic firms: (1) They typically produce more complex products, acting as a spur to local suppliers to upgrade their own technology base (Rodríguez-Clare, 1996), and; (2) Their increased demand for inputs induces employment and growth in domestic upstream firms (Markusen and Venables, 1999). However, backward spillovers can work on condition that local suppliers have to be technologically advanced to absorb knowledge spillovers and deal with the demand for specialized inputs (Kwon and Chun, 2009). Low level of local linkages could be due to the incapacity of local firms to meet appropriate quality standards, and to compete with global components prices (Athukorala and Menon, 1996; Hobday, 1996).

In fact, a wide range of empirical works have investigated the technological spillovers of inward FDI. Görg and Greenaway (2004) review findings of 45 cases on

---

<sup>18</sup> We aim at input linkages in order to analyze backward spillovers. Also, there is no information of exports in data to measure forward linkages.

horizontal and/or vertical productivity spillovers of FDI into host developed, transition, and developing economies in the period 1966-2000. Nevertheless, there were still very few evidences of vertical spillovers. Since the approach of Javorcik (2004) which applied Input-Output Tables in calculating vertical foreign presence through backward and forward linkages, a large number of papers have deeply analyzed spillover effect of FDI presence in upstream and downstream industries.<sup>19</sup>

This study uses the case study of Vietnam in the period 2007-2010 after WTO accession in order to examine backward spillovers of foreign enterprises which are multiple shareholders or from the main traditional investors (China, Japan, South Korea, Taiwan, the United States) and associations (ASEAN, Europe), following the approach of the pioneering research of Javorcik and Spatareanu (2011).<sup>20</sup> It does not stop at finding backward productivity spillovers but investigates further the role of investors' origins.

Javorcik and Spatareanu (2011) use firm level data for the case of Romania to investigate whether there existed a difference in the magnitude of vertical (backward) spillovers associated with MNEs from three regions, European Union (EU), America, and Asia. They found evidence of larger positive knowledge transfer from American investors than from EU investors. Their findings strongly support the hypothesis that the share of intermediate inputs sourced locally by MNEs from a host country is likely to increase with the distance between the host and the source economy (Rodrigues-Clare, 1996). In addition, they confirmed the role of regional preferential trade agreements which can possibly cause different spillovers of MNEs sourcing from a country in or out of the agreement association. Romania signed the Association Agreement with the EU, implying that inputs sourced from the EU are subject to a lower tariff than inputs sourced from America. Also, EU investors can export to the EU on preferential terms but American

---

<sup>19</sup> For example, Javorcik (2004), Kim, H. H. and Kim, J. D. (2010) find positive backward productivity spillover for the case of Lithuania, Korea, respectively but Bwalya (2006) finds negative productivity spillover in Zambia.

<sup>20</sup> Some other studies which dealt with spillovers from different origins measure spillovers from one origin as the employment share of firms from this origin in total employment of the industry or the region ( see Huang, 2004 for the case of China; Takii, 2011 for the case of Indonesia)

investors cannot. Asian investors were not evidenced to generate spillovers to Romanian supplying sectors as they come from developing countries which are unlikely to be a source of technology transfer.

Lin, Liu and Zhang (2009) partly refer to the origin of FDI and found positive horizontal spillovers from OECD investors but negative effects from Hong Kong, Macau, and Taiwanese investors (HTM), as in Abraham, Konings, and Sloomackers (2006). The results are interpreted that HTM firms in China are mostly export-oriented while Non-HTM firms engage in head-to-head competition with domestic firms. In addition, technology gap between Chinese firms and HMT firms is not as large as that with firms from OECD countries, resulting in more intense competition between Chinese firms and HMT firms. Backward spillovers from Non-HTM countries are positive while those from HTM are insignificant.

In order to explain which factors can drive the degree of technology transfer from different sourcing origins, to some extent, some models could be related. Findlay (1978) proposes a simple dynamic model to clarify the speed of technological diffusion from FDI. The author assumes that the greater the relative disparity in development levels between advanced and backward countries, the greater pressure for change within the backward country, leading to the more rapidly new technology is imitated. Glass and Saggi (1998) use a model to examine the dynamics of FDI and the interplay between FDI, imitation and technology transfer from developed to less developed countries. They conclude that with a reduction of the technology gap, low quality level of technology is likely to be successfully imitated. In other words, the potential for technology transferred could be higher. Standing on another view point, the model developed by Rodrigues-Clare (1998) implies that the linkage effect of multinationals on the host country is stronger when they come from regions that are farther away and more different in terms of their cultural, social and legal structures as communication costs between the headquarters and the production plant is higher, providing a stronger incentive to buy specialized inputs in the host country. However, Görg and Greenaway (2004) points to the absorptive capacity where the spillovers have the potential to raise productivity and exploitation which might be related to the structural characteristics of the host economy.

From the above theoretical framework, we can see that previous scholars were based on the relation between the source and host countries instead of considering the background and motivations of investors from different origins when they decide to invest in a host economy. As this is expected to form special characteristics of FDI from one source country, we pursue the hypotheses as follows.

*H1: FDI from one source economy could be low-tech or high-tech intensive. Their demands on domestic products are possible to be replaced by imports in order to minimize production costs.*

First, we look at the background of MNEs which source spillovers to domestic suppliers. The comparative advantage of a source country can result in strong MNEs in certain industries in their own economy, implying that MNEs from an origin can concentrate on some certain industries in the host economy. Second, based on motivations and behaviors of investors when deciding to enter an economy, we argue that the demonstration effects can impact their industry selection. The “demonstration effects” is firstly defined by Barry, Görg, and Strobl (2003) whereby existing firms send signals to new investors as to the reliability and attractiveness of the host country.<sup>21</sup> Hence, once an MNE operates successfully in an economy, the other investors from the same home country may be stimulated to enter in the same industry in the host country. Especially, the effects would be stronger when investors foresee a business opportunity<sup>22</sup>. This also leads to that FDI from one country is associated with some certain industries in the host economy.

If we consider two types of developing and developed source countries, FDI from one origin could be low-tech or high-tech intensive. The demand of investors on domestic products could be different, causing possibility of different backward spillovers to local suppliers in upstream industries. However, their demand on domestic inputs may be replaced by imports in order to minimize production costs.

---

<sup>21</sup> Barry, Görg, and Strobl (2003) found that both efficiency agglomeration and demonstration effects appear to be important factors of entry of US firms in Irelands.

<sup>22</sup> For example, right after Vietnam became a member of the WTO in 2007, inward FDI increased quickly by 236 % in the next year while the annual growth rate in the period 2005-2007 is 68%.

*H2: For a developing economy in which low-tech industries prevail due to the comparative advantage, it is estimated that the potential for spillovers received by domestic firms in low-tech industries are higher than those in high-tech industries.*

This hypothesis is based on the assumptions of technology gap (Glass and Saggi, 1998) and absorptive capacity of the host economies (Görg and Greenaway, 2004). Type of industries that may potentially be entered by MNEs would be also restricted by the background of the host economy such as the development level of industries, the availability of materials and human resources. Productivity spillovers might be related to the structural characteristics of the host economy and absorptive capacity of domestic firms. In a developing country, domestic firms are expected to have comparative advantage on producing low-tech products. Hence, it is estimated that the potential for spillovers received by domestic firms in low-tech industries are higher than those in high-tech industries.

*H3: FDI from origins that the investors demand more low-tech products possibly bring higher potential of backward spillovers to local suppliers.*

This hypothesis derives from two hypotheses above in order to prove that investors' nationality does matter in transferring technology and knowledge to domestic suppliers in the host economy. FDI from one origin could be low-tech or high-tech intensive. Meanwhile domestic firms in a developing country are expected to be stronger in supplying low-tech products than high-tech products. Thus, high-tech investments could prefer imports instead of using domestic high-tech products. Demand on low-tech domestic products can be larger than that on high-tech domestic products. As a result, low-tech intensive investments in downstream sectors possibly cause better knowledge transfer to local suppliers.

The findings in this study show that FDI from origins where the investors demand more low-tech products can bring higher backward spillovers to local firms in upstream industries. The result could be also driven by the hypothesis of Javorcik and Spatareanu (2011) as we found negative spillovers from the investors in the Association of Southeast



Asian Nations (ASEAN)<sup>23</sup>. The assumption of Rodrigues-Clare (1996) further helps to explain the case that backward spillovers from Chinese, ASEAN investors are much lower than from other sources and those from Taiwanese investors are lower than being expected. We also conclude that trade liberalization for the case of Vietnam is one necessary condition to form different spillovers by investors' nationality.

The rest of the study is organized as follows. Section 2 provides background on the presence of MNEs from different nationalities in the Vietnamese manufacturing and the role of foreign linkages. Section 3 introduces data, research methodology, and some summary statistics. Empirical results are introduced in the next section. Section 5 finally presents conclusion and some discussion.

### **3.2. FDI in the Vietnamese Process Manufacturing**

Vietnam has changed to a market oriented economy since 1986. It joined the ASEAN in July 1995 and completed the trade liberalization program under ASEAN Free Trade Area (AFTA) in January 1, 2006. In addition, after 16 years since applying to participate in the World Trade Organization (WTO) in 1991, Vietnam was accepted to be a full official WTO member in 2007. After WTO accession, the GDP increased with the growth rate 6.7% annually, which is 1% lower than that in the period 2001-2006. The decrease in GDP growth rate is affected by the world financial crisis and the macroeconomic problems in this economy including inflation and asset market instability. However, FDI inflows in the period 2007-2010 are much higher than those in the previous years when Vietnam was not engaged more deeply in trade liberalization. FDI increased with an average rate at 76 % in the period 2006-2007, but enormously bumped to 236 % in 2008 to reach the top at 71.7 billion dollars, but then reduced strongly (*Table 3.1*).

The most recent Investment Law and Enterprise Law in 2005, which came into effect on July 1st 2006, have been a significant progress in creating an attractive environment. Foreign investors now can invest in any area not prohibited by laws, instead of areas allowed by state agencies. The 2005 Enterprise Law, which was applied to both

---

<sup>23</sup> ASEAN was established in 1967 by Indonesia, Malaysia, the Philippines, Singapore, and Thailand, then expanded to include Brunei (1984), Vietnam (1995), Myanmar (1997), Laos (1997), and Cambodia (1999).

domestic and foreign invested enterprises, provides more encouragement through equal rights and obligations of enterprises for all ownership forms (MUTRAP, 2011).

**Table 3.1: Inward FDI in the Vietnamese Economy, 2006-2010**

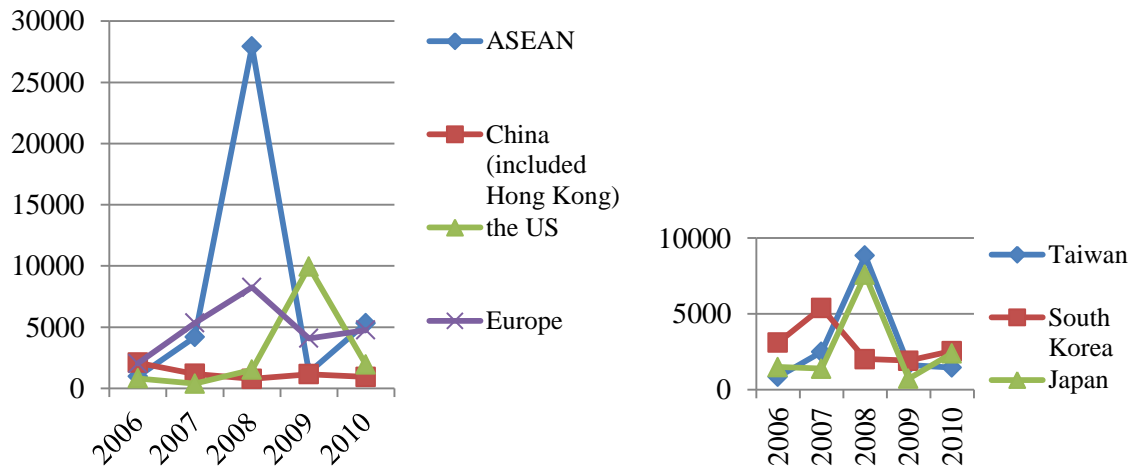
|  | 2006  | 2007    | 2008   | 2009    | 2010    |
|--|-------|---------|--------|---------|---------|
| <b>Inward FDI:</b>                                 |       |         |        |         |         |
| - Number of projects                               | 987   | 1544    | 1557   | 1208    | 1237    |
| - Registered capital (Mill. USD)                   | 12004 | 21347.8 | 71726  | 23107.3 | 19886.1 |
| - FDI growth rate                                  | 75.5% | 77.8%   | 236.0% | -67.8%  | -13.9%  |
| + Percentage of total FDI to process manufacturing | 68.9% | -       | 45.2%  | 17.1%   | 30.1%   |
| + Manufacturing products in GDP                    | 34.9% | 35.0%   | 33.9%  | 34.1%   | 34.6%   |
| *Process manufacturing products in GDP             | 21.3% | 21.1%   | 20.2%  | 20.0%   | 19.6%   |

*Source:* Author's calculations based on the GSO's data.

According to the Vietnamese General Statistics Office (GSO)<sup>24</sup>, the products of 23 process manufacturing sectors occupy two third in total manufacturing sectors' products and contribute 20.5 % in GDP annually. However, the proportion of total FDI inflow to the process manufacturing sectors seriously reduced from 70.5% in 2005 to 17% in 2009, then recovered in 2010. The strong reduction is due to a strong movement of inward FDI into service sectors, especially in Real Estate and Tourism. Registered capital in manufacturing increased from 8.4 trillion dollars in 2006 to 35.7 trillion dollars in 2008, but then fell down nearly 8 times in 2009, against 1.5 times for the inward capital in service. Confronting the global financial crisis which was forming a grey picture to the economy, the inward FDI had a tendency to pour more in the service sectors that still brought back more profits in this period.

<sup>24</sup> [www.gso.org.vn](http://www.gso.org.vn)

**Figure 3.1: Inward FDI in Manufacturing by Nationality, 2006-2010**



Source: Author's calculations based on the GSO's data.

During these years Vietnam's manufacturing sectors attracted foreign investors from around 70 countries and territories. Accounting for total aggregate FDI of member countries in two groups ASEAN<sup>25</sup> and Europe<sup>26</sup>, Figure 3.1 presents FDI inflows by nationality and association in the period 2006-2010. There was a strong wave of inward foreign capital from ASEAN, Europe, Japan, and Taiwan in 2008. The wave happened a year earlier for the case of South Korea and a year later for the case of the US. Especially, the US invested 8.4 billion dollars to occupy 43% of total inward FDI in the year 2009.<sup>27</sup> Foreign investors entered in this market in belief that Vietnam owned the most favorable assets as market growth, access to regional markets, cheap labor, and incentives (UNCTAD, 2009).

The Vietnamese government has objectives to attract capital from high technology intensive countries such as the US, EU, Japan in hope for better technology transfer to

<sup>25</sup> ASEAN includes Singapore, Thailand, Malaysia, Indonesia, the Philippines, Brunei, Laos, and Cambodia who directly invest in Vietnam.

<sup>26</sup> Europe comprises of Cayman Islands, British Virgin Islands, France, Germany, Luxembourg, Netherlands, Italy, United Kingdom, Switzerland and Denmark.

<sup>27</sup> The author's calculation based on statistical data of the GSO.

domestic firms. FDI is encouraged to flow in manufactures of informatics, electrical machinery and equipments, biotechnology, and food products (FTA<sup>28</sup>, 2008).

### **3.3. Data and Methodology**

#### **3.3.1. Data source**

The data used in this study is from the annual enterprise censuses conducted by the GSO. They started from 2000 to survey on 100 % of state-owned enterprises and non-state owned firms in service sectors and 29 manufacturing sectors which are divided into 3 industrial groups: 4 industries in Mining and Quarrying; 2 industries in Electricity, Gas and Water Supply; and 23 industries in process manufacturing (VSIC-1993)<sup>29</sup>. The questionnaires reflect rich information on domestic and foreign ownership, output, sales, assets, employment, location, products, etc. but no direct information of material inputs, except the years 2000 through 2006. Number of enterprises increases from a low of 42,307 enterprises in 2000 to a high of 286,541 enterprises in 2010, reflecting the development of this country and the success of the policy whereby private sectors freely develop in a market economy.

This study uses a firm-level data set from the GSO for 23 process manufacturing industries in the Vietnamese economy covering the period 2007-2010 after Vietnam joined the WTO. Based on the Standard Industrial Technological Classification Revision 2 (Hatzichronoglou, 1997), the industries are divided into 15 low-tech sectors and 8 high-tech sectors (*see Appendix B.1*). The data set is unbalanced, including 129,413 observations in the period 2007-2010 of which 11.34% (14,680 observations) are foreign owned. The sample accounts 72.3% of the whole number of enterprises in the process manufacturing sectors so it is expected that this data set can reflect the true economic situation in this country. A firm with the foreign equity share larger than 10% is considered foreign owned. To form the data, we deal with some issues: (1) controlling zero and missing values of sales, capital, labor, materials; (2) dropping observations of which the

---

<sup>28</sup> The Vietnamese Foreign Trade Association ([www.fia.mpi.gov.vn](http://www.fia.mpi.gov.vn))

<sup>29</sup> The Vietnamese Standard Industrial Classification, 1993.

foreign share is higher than 1; and (3) For the foreign firms, missing values of equity shares are replaced by the values of the previous year.

We apply input-output (I/O) tables provided by the GSO (2007) which are the most recent and comprise 138 product categories in order to calculate the backward linkages from 2007 to 2010. The I/O table gives input coefficients in aspect of production technology applied to create products, gross capital formation, final consumptions and exports, and some other indicators. By using one I/O table for the whole period, we assume that the input coefficients are constant over time by nationality of the investors.

### 3.3.2. The model and calculation strategy

We apply an augmented Cobb Douglas production function.

$$\ln Y_{ijt} = \alpha + \beta_1 \ln K_{ijt} + \beta_2 \ln L_{ijt} + \beta_3 \ln M_{ijt} + \beta_4 \text{Horizontal}_{jt} + \beta_5 \text{Backward}_{mjt} + \varepsilon_{ijt}$$

As an alternative, we also use the Levinson and Petrin (2003) method to calculate total factor productivity (TFP). TFP is then modeled as a function of foreign presence in the same industries and in downstream industries by origin.

$$\ln TFP_{ijt} = \alpha + \beta_1 \text{Horizontal}_{jt} + \beta_2 \text{Backward}_{mjt} + \varepsilon_{ijt}$$

- **Variables:**

$Y_{ijt}$  is the output which is represented by the sales from the main industry of firm  $i$  operating in sector  $j$  at time  $t$ .<sup>30</sup>  $K_{ijt}$  stands for the capital, defined as the value of fixed assets at the beginning of the year.  $M_{ijt}$ , material inputs, are calculated by total expenditure of firm  $i$ , which are equal to total sales minus total profit, minus by total wage. We assumed total expenditure is mostly for materials and labor payments.<sup>31</sup> Sales, capital,

---

<sup>30</sup> Previous studies using the same data source (Le and Pomfret, 2008; Nguyen, P. L., 2008) used output but firms are asked to directly give output at the base year 1994 so the given data could be not correct. Besides, there are much more missing values of output compared to sales. Moreover, different from some other studies (Nguyen, D. C. et al., 2008) using total sales, this measure is better to treat the case when the total sales of a firm can come from doing business on other industries, or investing in financial market.

<sup>31</sup> Bitzer and Görg (2009) measured materials as the difference between gross output and value added.

and materials are all deflated by the Producer Price Index for 23 appropriate two-digit manufacturing sectors to get the resulting values at the base year 2007. Labor  $L_{ijt}$  is defined by the number of employees working in the main industry of a firm<sup>32</sup>.

We apply the approach of Javorcik (2004) in order to calculate backward spillovers for different FDI sourcing origins and horizontal spillovers.

**Horizontal** $_{jt}$  captures the presence of foreign firms in sector  $j$  at time  $t$ , defined by the foreign equity participation (*foreign share*) averaged over all firms in the sector, weighted by each firm's share in sectoral sales. For those foreign firms that the information of foreign equity is missing, we set *foreign share* equal to 100%.

$$H_{jt} = \frac{\sum_{\forall i \in j} \text{Foreignshare}_{it} * Y_{it}}{\sum_{\forall i \in j} Y_{it}}$$

**Backward** $_{mjt}$  is proxy for the presence of the investors from country or association  $m$  (ASEAN, Taiwan, South Korea, Japan, China, the US, Europe, and Multiple holders) in downstream industries which are being supplied by sector  $j$  at time  $t$ .  $a_{jk}$  is the proportion of sector  $j$ 's output supplied to sector  $k$ , calculated from the I/O table 2007. The higher appearance of foreign buyers might result in a negative or positive productivity effect on local firms.

$$B_{mjt} = \sum_{k \text{ if } k \neq j} a_{jk} \text{Horizontal}_{mkt}$$

where:

$$H_{mjt} = \frac{\sum_{\forall i \in j} \text{Foreignshare}_{it} * D_m * Y_{imt}}{\sum_{\forall i \in j} Y_{it}}$$

$D_m$  is equal to 1 if foreign firms in sector  $j$  come from country or association  $m$ , or zero otherwise.

Based on the calculation strategy above, we have Basean, Bamerica, Bchina,

---

<sup>32</sup> Due to lack of data, we cannot apply labor as efficiency units so we accept the same efficiency for a labor working in every enterprise. Javorcik (2004) divided the wage bill by the minimum wage.

Beurope, Bjapan, Bsouthkorea, Btaiwan, and Bmulti by year and industry. The latter stands for the presence of foreign multiple shareholder firms in downstream industries.

- ***Low-tech Intensity Indicator (LTI):***

We set up this indicator in order to examine whether the demands of foreign buyers concentrate more on low-tech or high-tech products. Therefore, we separate ***Backward<sub>mt</sub>*** into  $B_{mt\_lowtech}$  and  $B_{mt\_hightech}$  which represent the presence of foreign buyers from country or association  $m$  in downstream industries which are being supplied by domestic firms in 15 low-tech or 8 high-tech industries respectively.

If  $j = 15$  low-tech industries:

$$B_{m\_lowtech} = 100 * \frac{\sum_j B_{mjt}}{15}$$

If  $j = 8$  high-tech industries:

$$B_{m\_hightech} = 100 * \frac{\sum_j B_{mjt}}{8}$$

Then,

$$LTI = 100 * \frac{B_{m\_lowtech}}{B_{m\_hightech}}$$

If LTI for backward linkages is higher than 100%, the buyers from country or association  $m$  purchase more local low-tech products. If LTI is equal or lower than 100%, the buyers from country or association  $m$  purchase more local high-tech products.

We can apply the same way to calculate  $H_{m\_lowtech}$  and  $H_{m\_hightech}$  in order to estimate LTI for horizontal linkages ( $LTI=100*H_{m\_lowtech}/ H_{m\_hightech}$ ) with which we are able to examine whether the investors from country or association  $m$  appear more in low-tech or high-tech industries.

### **3.3.3. The Levinson and Petrin method**

From the production function above, many econometric methods could be applied. In order to obtain robust and consistent coefficients, we must solve the nature problem of error terms. The results from fixed effects estimator will be consistent but those from OLS estimator are both consistent and efficient when the error term is independently and

identically distributed. However, we are still faced with the problem of input endogeneity in a production function. Hence, we also use the methodology described in Levinsohn and Petrin (2003) and Petrin, Poi, and Levinsohn (2004) which uses intermediate inputs as a proxy to control for unobservable productivity shocks (*LP hereafter*).<sup>33</sup>

Consider the following Cobb-Douglas production function model:

$$y_t = \alpha + \beta_1 k_t + \beta_2 l_t + \beta_3 m_t + \omega_t + \varepsilon_t$$

where  $\omega_t$  denotes productivity, a state variable which can impact the choices of inputs; and  $\varepsilon_t$  stands for an error term that is uncorrelated with input choices. Both  $\omega_t$  and  $\varepsilon_t$  are unobserved. Firms' decision in inputs could give rise to simultaneity bias. The positive correlation between  $\omega_t$  and inputs used in period  $s$  will yield inconsistent results.

Olley and Pakes (1996) develop an estimator that uses investment as a proxy for these unobservable shocks. The LP method highlighted that intermediates may respond more smoothly to productivity shocks. Accordingly, demand for the intermediate inputs  $m_t$  is assumed to depend on capital stock  $k_t$  and state variable  $\omega_t$ .

$$m_t = m_t(k_t, \omega_t)$$

Since the demand function is monotonically increasing in  $\omega_t$  (Levinsohn and Petrin, 2003), we have the inversion of the intermediate demand function:

$$\omega_t = \omega_t(k_t, m_t)$$

Assumed that productivity is governed by a first-order Markov process:

$$\omega_t = E[\omega_t | \omega_{t-1}] + \xi_t$$

where  $\xi_t$  denotes a productivity innovation term.

If we use revenues as the dependent variable in the model, then the production function is given as:

---

<sup>33</sup> The LP method is preferred to the Olley and Pakes (1996) method which used investment as a proxy for productivity shocks for two reasons: (1) the investment proxy may not smoothly respond to the productivity shock, violating the consistency condition, and (2) using intermediate input proxies avoids truncating all the zero investment firms.



$$y_t = \beta_l l_t + \varphi_t(k_t, m_t) + \varepsilon_t$$

where now:  $\varphi_t(k_t, m_t) = \alpha + \beta_k k_t + \beta_m m_t + \omega_t(k_t, m_t)$

The function  $\varphi_t$  can be estimated with a third-order polynomial approximation in  $m_t$  and  $k_t$ , and thus this first stage of the estimation yields the estimation  $\widehat{\beta}_l$  of  $\beta_l$

The coefficients on capital and intermediate inputs are obtained in the second stage. For any candidate values  $\beta_k^*$  and  $\beta_m^*$ , we estimate  $\widehat{\omega}_t$  by using:

$$\widehat{\omega}_t = \widehat{\varphi}_t - \beta_k^* k_t - \beta_m^* m_t$$

Then the residual of the production function is computed as:

$$\varepsilon_t + \xi_t = y_t - \widehat{\beta}_l l_t - \beta_k^* k_t - \beta_m^* m_t - E[\omega_t | \omega_{t-1}]$$

where a consistent approximation of the expected value of  $\omega_t$  is given as:

$$\widehat{\omega}_t = \gamma_0 + \gamma_1 \omega_{t-1} + \gamma_2 \omega_{t-1}^2 + \gamma_3 \omega_{t-1}^3 + \mu_t$$

The residual must interact with at least two instruments to identify both  $\beta_k$  and  $\beta_m$ . The estimations  $\widehat{\beta}_k$  of  $\beta_k$  and  $\widehat{\beta}_m$  of  $\beta_m$  are found as the solution by minimizing the sample residual of the production function with respect to  $\beta_k^*$  and  $\beta_m^*$ . The LP method applies the GMM estimator using lag values of inputs as instruments. A bootstrapping procedure is also used to construct the standard errors for  $\widehat{\beta}_l$ ,  $\widehat{\beta}_k$ , and  $\widehat{\beta}_m$ .

TFP is then measured as the difference between the actual and predicted output.

$$\text{tfp}_t = y_t - \beta_k k_t - \beta_l l_t - \beta_m m_t$$

### 3.3.4. Summary statistics

As can be seen from *Table 3.2*, a foreign enterprise is, on average, 50% larger than a local firm in terms of sales, capital, and employment. Particularly, the firms owned by the Japanese, ASEAN countries, or multiple holders are larger than those from other sources. For all backward linkages by nationality, the means are lower than the standard deviation, revealing the high dispersion of the foreign buyers' presence in 23 industries. This could be a signal expressing that the investors focus on buying products of some certain industries. Japanese and Taiwanese investors are the largest customers of the domestic firms as *Backwards* from these sources are the highest at 2.9% and 2.6% in an

industry respectively.

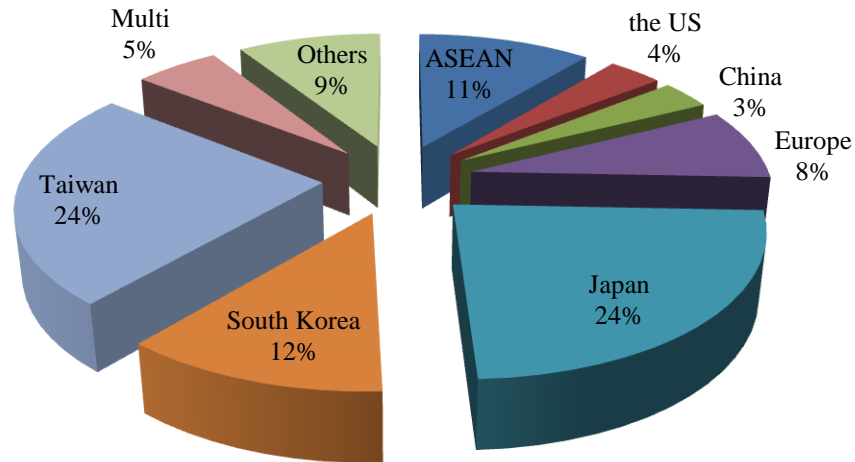
**Table 3.2: Summary Statistics**

| <b>Variables</b>                | <b>Obs.</b> | <b>Mean</b> | <b>Std. Dev.</b> | <b>Obs.</b>                  | <b>Mean</b> | <b>Std. Dev.</b> | <b>Obs.</b>                 | <b>Mean</b> | <b>Std. Dev.</b> |
|---------------------------------|-------------|-------------|------------------|------------------------------|-------------|------------------|-----------------------------|-------------|------------------|
| <b>Domestic firms:</b>          |             |             |                  | <b>Foreign firms:</b>        |             |                  |                             |             |                  |
| Log sales                       | 114,733     | 7.63        | 1.84             | 14,680                       | 10.03       | 1.87             |                             |             |                  |
| Log capital                     | 114,733     | 6.27        | 1.85             | 14,680                       | 9.03        | 1.86             |                             |             |                  |
| Log labor                       | 114,733     | 2.92        | 1.36             | 14,680                       | 4.81        | 1.52             |                             |             |                  |
| Log materials                   | 114,733     | 7.31        | 2.08             | 14,680                       | 9.73        | 1.91             |                             |             |                  |
| <b>European affiliates:</b>     |             |             |                  | <b>ASEAN affiliates:</b>     |             |                  |                             |             |                  |
| Log sales                       | 943         | 10.43       | 2.11             | 1,197                        | 10.67       | 1.83             |                             |             |                  |
| Log capital                     | 943         | 8.88        | 2.23             | 1,197                        | 9.39        | 1.81             |                             |             |                  |
| Log labor                       | 943         | 4.83        | 1.49             | 1,197                        | 4.76        | 1.38             |                             |             |                  |
| Log materials                   | 943         | 10.97       | 2.25             | 1,197                        | 10.42       | 1.86             |                             |             |                  |
| <b>American affiliates:</b>     |             |             |                  | <b>Chinese affiliates:</b>   |             |                  | <b>Japanese affiliates:</b> |             |                  |
| Log sales                       | 392         | 9.78        | 2.11             | 863                          | 9.56        | 1.92             | 1,739                       | 10.56       | 1.85             |
| Log capital                     | 392         | 8.75        | 2.06             | 863                          | 8.37        | 1.78             | 1,739                       | 9.65        | 1.91             |
| Log labor                       | 392         | 4.48        | 1.39             | 863                          | 4.41        | 1.45             | 1,739                       | 5.05        | 1.44             |
| Log materials                   | 392         | 9.44        | 2.17             | 863                          | 9.33        | 1.89             | 1,739                       | 10.33       | 1.88             |
| <b>South Korean affiliates:</b> |             |             |                  | <b>Taiwanese affiliates:</b> |             |                  | <b>Multinationals:</b>      |             |                  |
| Log sales                       | 2,856       | 9.84        | 1.70             | 4,767                        | 9.77        | 1.71             | 475                         | 11.20       | 1.93             |
| Log capital                     | 2,856       | 8.74        | 1.75             | 4,767                        | 8.98        | 1.67             | 475                         | 9.97        | 1.92             |
| Log labor                       | 2,856       | 4.95        | 1.58             | 4,767                        | 4.77        | 1.50             | 475                         | 5.35        | 1.51             |
| Log materials                   | 2,856       | 9.45        | 1.73             | 4,767                        | 9.51        | 1.73             | 475                         | 10.96       | 2.04             |
| horizontal                      | 129,413     | 37.7%       | 16.1%            |                              |             |                  |                             |             |                  |
| B_America                       | 129,413     | 0.22%       | 0.23%            | B_Japan                      | 129,413     | 2.90%            | 5.02%                       |             |                  |
| B_ASEAN                         | 129,413     | 0.95%       | 1.23%            | B_Southkorea                 | 129,413     | 1.22%            | 1.42%                       |             |                  |
| B_China                         | 129,413     | 0.38%       | 0.62%            | B_Taiwan                     | 129,413     | 2.58%            | 3.53%                       |             |                  |
| B_Europe                        | 129,413     | 1.17%       | 1.29%            | B_Multi                      | 129,413     | 1.35%            | 1.51%                       |             |                  |

Investors from 70 countries and territories have invested in Vietnamese manufacturing in the period 2007-2010, but Asian economies account for the major part of these capital flows. *Figure 3.2* introduce the shares of MNEs and the investors from ASEAN, Europe, the US, China, Japan, Taiwan, South Korea in the manufacturing sector.

Taiwanese and the Japanese are the principle investors with the equal shares at 24% in the period 2007-2010. Following are the investors from South Korea, ASEAN, and Europe.

**Figure 3.2: The Investors' Shares in Manufacturing by Nationality, 2007 - 2010**



Inward FDI from different origins focuses on some certain industries (*see Appendix B.2*). For instance, US investments concentrate more on manufactures of motor vehicles but investment from the EU focuses more on manufactures of coke, refined petroleum products or chemical products. While the investors from ASEAN focus on manufactures of food products and beverages, those from China are interested in manufactures of transport equipment and wearing apparel. Korean FDI focuses on manufacture of radio, telecommunication, and communication equipment. Japanese and Taiwanese FDI respectively participate more in manufactures of computing machinery, machinery and medical instruments; and manufactures of tanning and dressing of leather, textiles, and furniture.

Therefore, investors from different origins might have their own motivations and behaviors when investing in a host economy. Probably, the demonstration effects and the comparative advantage of a source economy affect the decisions of the investors to choose one industry to entry. When classifying industries based on the technology level, we consider the results in *Table 3.3* which presents LTI by origin for *Backwards* and *Horizontal*s in the period 2007-2010. The calculation method of LTI is given in part 3.2. LTI for *Backwards* represents if foreign buyers from one origin demand more low-tech or

high-tech products. Meanwhile, LTI for *Horizontals* stands for whether investments from this origin focus more on low-tech or high-tech industries.

**Table 3.3: Low-tech Intensity Indicator of FDI by Nationality, 2007-2010**

| <b>%</b>       | <b><i>LTI_backward</i></b> |             |             |             |                | <b><i>LTI_</i></b>       |
|----------------|----------------------------|-------------|-------------|-------------|----------------|--------------------------|
|                | <i>2007</i>                | <i>2008</i> | <i>2009</i> | <i>2010</i> | <i>Average</i> | <b><i>horizontal</i></b> |
| Taiwan         | 242.3                      | 241.3       | 232.4       | 242.5       | <b>239.6</b>   | <b>192.9</b>             |
| China          | 217.3                      | 292.6       | 301.3       | 319.5       | <b>282.7</b>   | <b>218.6</b>             |
| The US         | 258.9                      | 200.5       | 235.6       | 202.6       | <b>224.4</b>   | <b>99.3</b>              |
| ASEAN          | 268.2                      | 194.2       | 190.6       | 183.2       | <b>209.1</b>   | <b>108.9</b>             |
| Europe         | 201.8                      | 193.8       | 192.5       | 158.9       | <b>186.8</b>   | <b>83.2</b>              |
| South Korea    | 110.1                      | 112.9       | 111.7       | 150.2       | <b>121.3</b>   | <b>105.7</b>             |
| Multinationals | 117.9                      | 121.5       | 104.3       | 131.4       | <b>118.8</b>   | <b>13.6</b>              |
| Japan          | 63.1                       | 60.3        | 63.2        | 57.6        | <b>61.1</b>    | <b>9.0</b>               |

Accordingly, foreign firms buy more products of the local firms in low-tech industries than in high-tech industries since *LTI\_backward* are on average, higher than 100% except the case of Japan. American and European investments, and Multinational enterprises appear more in high-tech industries (*LTI\_horizontal* > 100%), while ASEAN, Chinese, and South Korean investments are more in low-tech industries (*LTI\_horizontal* < 100%). Particularly, Japanese investment concentrates more on high-tech industries (*LTI\_horizontal* = 9%) and purchase more high-tech products (*LTI\_backward* = 61.1%).

If it is assumed that a firm working in high-tech or low-tech industries will use more high-tech and low-tech inputs respectively, the US, Europe and MNEs are special cases when using more low-tech inputs. It is possible that these investors demand fewer inputs from local firms in high-tech downstream industries since they use high propensity of imports in production. Or with a lower probability, most firms from these source countries have special production processes which require more inputs from low-tech upstream industries.

### 3.4. Spillovers through Backward Linkages by Nationality

#### 3.4.1. Backward spillovers by investors' nationality

Table 3.4 shows the results for the estimations of the baseline specification to find productivity spillovers to domestic firms through backward linkages by sourcing origin. First, the OLS estimation is applied in column 1. The results seem to be partly consistent with our expectations. We find that American, Chinese and Taiwanese investors who demand more low-tech products (LTI > 200%) bring higher spillovers to domestic suppliers than those investors from other sources (LTI < 200%). Productivity of domestic firms is negatively correlated with the presence of ASEAN investors in downstream sectors although the ASEAN firms demand more low-tech products than high-tech products.

*Table 3.4: Backward Spillovers by Nationality, 2007-2010*

| Variables  | (1)                        | (2)                    | (3)                          | (4)                  | (5)                 |
|------------|----------------------------|------------------------|------------------------------|----------------------|---------------------|
|            | <i>Dependent Var._ lnY</i> |                        | <i>Dependent Var._ lnTFP</i> |                      |                     |
|            | <i>OLS</i>                 | <i>FE</i>              | <i>OLS</i>                   | <i>FE</i>            | <i>FE</i>           |
| lnK        | 0.0141***<br>(0.00147)     | 0.0155***<br>(0.00213) |                              |                      |                     |
| lnL        | 0.240***<br>(0.00263)      | 0.217***<br>(0.00473)  |                              |                      |                     |
| lnM        | 0.744***<br>(0.00222)      | 0.697***<br>(0.00360)  |                              |                      |                     |
| horizontal | 0.123***<br>(0.0455)       | 0.0790*<br>(0.0472)    | 0.135***<br>(0.0465)         | 0.0273<br>(0.0333)   | 0.0197<br>(0.0324)  |
| Btaiwan    | 2.175***<br>(0.424)        | 1.074**<br>(0.470)     | 2.139***<br>(0.429)          | 1.866***<br>(0.315)  | 2.276***<br>(0.321) |
| Bchina     | 3.173***<br>(1.025)        | -2.368**<br>(1.073)    | 3.014***<br>(1.036)          | -1.901***<br>(0.714) | -1.678**<br>(0.740) |
| Bamerica   | 10.87***<br>(2.080)        | 4.605**<br>(2.303)     | 9.481***<br>(2.080)          | 2.565*<br>(1.504)    | 4.230**<br>(1.692)  |
| Basean     | -6.339***                  | -5.555***              | -6.802***                    | -8.226***            | -8.510***           |

|                       |                |                |                |                |                |
|-----------------------|----------------|----------------|----------------|----------------|----------------|
|                       | (1.409)        | (1.517)        | (1.422)        | (1.202)        | (1.135)        |
| Beurope               | 1.985***       | 1.847**        | 2.677***       | 2.591***       | 1.221*         |
|                       | (0.699)        | (0.783)        | (0.701)        | (0.712)        | (0.635)        |
| Bsouthkorea           | -0.0558        | -0.192         | 0.203          | 0.200          | -0.186         |
|                       | (0.856)        | (0.904)        | (0.882)        | (0.350)        | (0.363)        |
| Bmulti                | -0.429         | 0.0224         | -0.246         | 0.343          | 0.203          |
|                       | (0.358)        | (0.374)        | (0.371)        | (0.325)        | (0.326)        |
| Bjapan                | 1.469***       | 0.186          | 1.356***       | -0.402***      | -0.323***      |
|                       | (0.344)        | (0.369)        | (0.350)        | (0.112)        | (0.108)        |
| <i>Year dummies</i>   | <i>Y</i>       | <i>Y</i>       | <i>Y</i>       | <i>Y</i>       | <i>Y</i>       |
| <i>Sector dummies</i> | <i>Y</i>       | <i>Y</i>       | <i>Y</i>       | <i>N</i>       | <i>N</i>       |
| <i>Observations</i>   | <i>114,733</i> | <i>114,733</i> | <i>114,733</i> | <i>114,733</i> | <i>114,733</i> |
| <i>R-squared</i>      | <i>0.950</i>   | <i>0.808</i>   | <i>0.076</i>   | <i>0.085</i>   | <i>0.086</i>   |
| <i>Groups</i>         |                | <i>55,229</i>  |                | <i>55,229</i>  | <i>55,229</i>  |

- (i) Robust standard errors are given in parentheses.
- (ii) (\*\*\*), (\*\*), and (\*) denote significance at 1%, 5%, and 10%, respectively.
- (iii) The results in Columns 3 through 5 are corrected by the LP method.
- (iv) For the results in column 4, P\_values of F\_tests for the hypotheses: 0.000 (Btaiwan=0, Basean=0, Beurope=0, Bjapan=0), 0.007 (Bchina=0), 0.088 (Bamerica=0), 0.568 (Bsouthkorea=0), 0.291 (Bmulti=0).

However, the results from the OLS estimator could be biased if the error term is not independently and identically distributed. Next, we use the fixed effects estimator in order to purge the firm specific time invariant effects (Column 2). By using year and industrial dummies, this estimator can control time-series and sector variation in the data. Generally, solving individual effects lowers coefficients and even reverses the sign of backward spillovers for the case of China. Meanwhile, the presence of multinational firms and investors from South Korean do not affect the productivity of local firms in both OLS and within estimations.

After dealing with input endogeneity by the LP method, we apply the OLS estimator (Column 3) and the FE estimator (Column 4) for regressing *lnTFP* in response to *horizontal* and *backwards* by origin. As can be seen from Column 4, while foreign firms from ASEAN, China and Japan cause negative effects to the productivity of local suppliers

in upstream industries, those from Taiwan, the US, and Europe bring positive impacts. We do not find significant results for the presence of South Korean investment and MNEs.

ASEAN and China are located nearby Vietnam (*Appendix B.3*). Significantly negative spillovers from these origins are in line with Lin, Liu and Zhang (2009) for the case of China. They find that FDI from OECD generated positive horizontal and backward spillovers to China while FDI from Hong Kong, Macau, and Taiwan (nearby China) brought negative horizontal and irrelevant backward spillovers. The results are also supported by Giround and Mirza (2006) which conclude that transnational companies originating from ASEAN have a negative relationship with the level of local supply linkages in ASEAN members as these companies are strongly reliant on intra-firm imports of materials.

The highest spillovers come from American investors with a significant coefficient at the 10% level. If US firms increase their presence in downstream industries by 1%, total factor productivity (TFP) of domestic suppliers will go up by nearly 2.5%. This evidence is in line with Driffield and Mohd Noor (1999) that US firms are more embedded in Malaysia through input linkages than Japanese, EU or other Southeast Asian firms, which possibly due to distance between Malaysia and home countries.<sup>34</sup>

In order to check robustness, we investigate how the presence of wholly foreign owned firms impacts productivity of domestic suppliers (Column 5)<sup>35</sup>. In this case, backward spillovers from Taiwanese and American investors are much improved by 22% and 64.9% respectively but those from European investors are much reduced by 52.9%. Again, the presence of South Korean investors and MNEs has no effects on productivity of domestic firms in upstream sectors.

---

<sup>34</sup> Driffield and Mohd Noor (1999) examined local input linkages on inward investors in the Malaysian electronics and electrical industry. The study accounts input linkages as proportion of non-labor and labor local inputs in total inputs of a foreign investor.

<sup>35</sup> A wholly foreign owned firm from one country is a firm with 100% foreign share from this origin.

### 3.4.2. The relation between backward spillover and LTI

The evidence from LP-Within estimator lends support to our hypothesis. *Figure 3.3* shows the relation between *LTI\_backward* and backward spillovers by origin withdrawn from the results in Columns 4 and 5 of *Table 3.4*. If we ignore the spillovers from ASEAN, Chinese, and Taiwanese investors, we see that FDI from an origin which has higher *LTI\_backward*, representing higher propensity of buying more low-tech products, can cause higher backward spillovers onto indigenous firms (*see the left graph*). This is consistent to hypothesis 3. The trend is stronger when we account for only wholly foreign capital from one origin (*see the right graph*). Spillovers are increasing for investments from Japan, Multinational enterprises, South Korea, the EU, and the US.

We argue that the results derive from 2 channels. First, although the demonstration effect and the comparative advantage of a source country can result in industry allocation, leading to different domestic demand on inputs of investors, their domestic demand is driven by import decisions with the objective to minimize production costs<sup>36</sup> (hypothesis 1). As a result, our hypotheses are affected by the hypotheses of Javorcik and Spatareanu (2011) and Rodrigues-Clare (1996) (for the cases of ASEAN, China, and Taiwan).

ASEAN and China are not only neighbor countries of Vietnam but also sign free trade agreements with these countries.<sup>37</sup> Vietnam has trade relations with 168 countries during the period 2007-2009, but imports from ASEAN and China accounted for 24.3% and 23.8% of total imports respectively. Investors from these origins are expected to have high possibility of using cheaper imports from home countries due to the rules of origin, which could lead to lower tariff and transportation costs. These put domestic suppliers in a weaker position which can lessen their bargaining power when making contracts with these investors, resulting in negative spillovers from these origins.

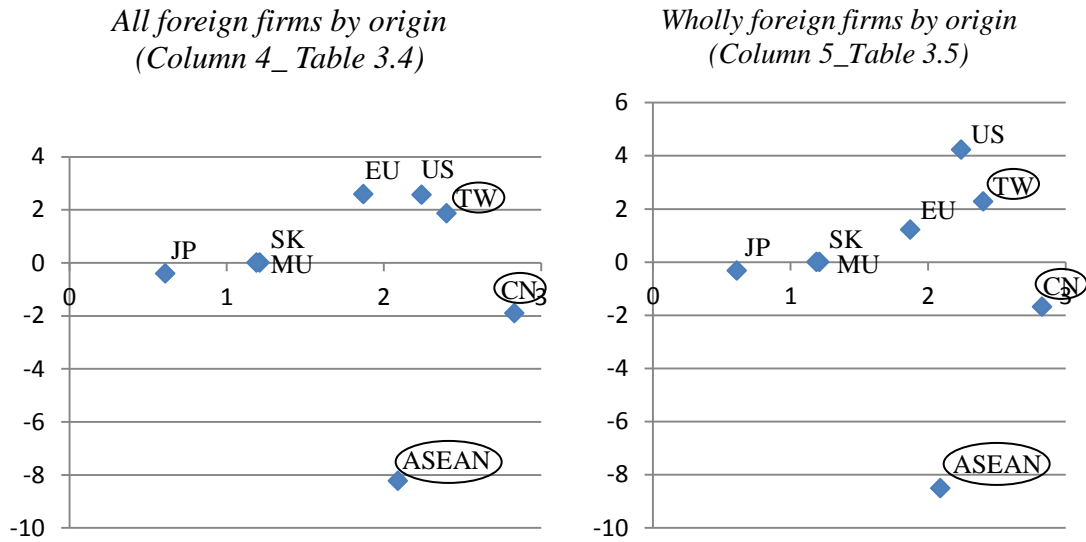
---

<sup>36</sup> Barry, Görg, and Strobl (2003) found out that US firms are highly concentrated in modern high-tech sectors such as office machinery, electrical engineering, other machinery and chemicals (including pharmaceuticals).

<sup>37</sup> Under the Common Effective Preferential Tariff (CEPT) of the AFTA, Vietnam is committed to reducing tariff on all but few sensitive items from AFTA member countries to less than 5% by the year 2006. It also has agreements under ASEAN auspices with China in 2002.



**Figure 3.3: The Relation between Backward Spillover and LTI, 2007 - 2010**



Taiwan is also located near Vietnam. Their investment focuses on tanning and dressing of leather, garment and textiles. Backward spillovers from Taiwanese FDI are positive but lower than being expected, as Taiwan has the highest *LTI\_backward*. The result could also depend on the nature of their industry allocation. Garment manufacturers may relocate in Vietnam to take advantage of the availability of cheap labor but still rely on existing suppliers, including their own factories in the home country, as highlighted in Giround and Mirza (2006).

Second, as a developing country, Vietnam has the comparative advantage to produce low-tech products. Thus, Vietnamese firms in low-tech industries can absorb backward spillovers better than those in high-tech industries as they are expected to meet appropriate quality standards of products in order to compete with global components prices, as highlighted by Athukorala and Menon (1996).<sup>38</sup>

### 3.4.3. An extension: in relation to the crowding effect

As being referred to in hypothesis 1, backward spillovers by origin for the case of Vietnam are influenced by the possibility that foreign firms from one origin could import

<sup>38</sup> Javorcik and Spatareanu (2011) produced evidence of no significant spillovers from Asian investors to Romanian suppliers as they came from developing countries which are impossible to be a source of technology transfer.

inputs instead of using domestic products. The lack of local linkages could be due to MNE's sourcing practices that gave preference to home country firms (Guyton, 1995).

The crowding-out effect is another channel to affect FDI spillovers. Foreign firms in intra-industries can play two roles. On the one hand, their increased presence can crowd out domestic firms in the same industries, imposing a demand reduction on products supplied by domestic firms in upstream industries. Thus, this is possible to lower productivity of domestic suppliers. On the other hand, they may use supplying network or subcontract with local firms, which can encourage them to push up their production, which can strengthen productivity of domestic suppliers. In order to check the crowding effects, we estimate the possibility of domestic firm exit when appearing foreign firms from different origins in the same industries (*Appendix B.4*).<sup>39</sup>

The presence of American firms appears to have the highest impact on domestic firm exit. They are very competitive to attract higher preference of consumers on their high-quality products. Investors from most of source countries and associations crowd out domestic firms except those from ASEAN and multiple holders. For the case of ASEAN, it is possible that products from this origin do not prevail compared to domestic firms. Meanwhile, multiple holders are normally larger than domestic firms. They are expected to use more domestic supplying network so they do not harm the survival of domestic firms in intra-industries.

Based on the summary in *Table 3.5*, different spillovers by origin through backward linkages could be explained as follows. For the case of ASEAN investors, although their appearance fosters the survival of domestic firms in the same industry which can increase their domestic demand on domestic products, a very high possibility of using imports prevail. These could lessen productivity of domestic suppliers. Negative spillovers from Chinese investors are due to high import propensity and positive crowding-out effects, which surpass knowledge transfer to local firms. Despite Taiwan is likely to have lower import possibility and crowding-out effects than China, they are possible to transfer

---

<sup>39</sup> The 'exit' variable is set equal to 1 at the year domestic firms exit the market, and zero otherwise.

more knowledge to domestic firms. Therefore, the backward spillovers are positive but lower than being expected.

For the other sources including Europe, the United States, South Korea, Japan and multiple enterprises, the findings show that FDI from origins where the investors demand more low-tech products can bring higher backward spillovers to local firms in upstream industries despite positive crowding-out effects from these origins (except the case of multiple enterprises). Low possibility of imports may entail stronger bargaining power of domestic suppliers when dealing business with these origins.

**Table 3.5: Factors Impact Backward Spillovers**

| <i>Origin</i>               | <i>ASEAN</i>   | <i>China</i>  | <i>Taiwan</i> | <i>US</i>   | <i>EU</i>    | <i>South Korea</i> | <i>Multi.</i> | <i>Japan</i>  |
|-----------------------------|--|---------------|---------------|---|--------------|--------------------|---------------|---------------|
| <i>Imports possibility</i>  | +  | +             | +             | -   | -            | -                  | -             | -             |
| <i>Crowding-out effects</i> | -1.337   | 2.292         | 0.456         | 9.442   | 0.513        | 1.278              | -0.898        | 1.001         |
| <i>B. Spillover</i>         | <b>-8.226</b>  | <b>-1.901</b> | <b>1.866</b>  | <b>2.565</b>  | <b>2.591</b> | <b>0</b>           | <b>0</b>      | <b>-0.402</b> |
| <i>B_LTI</i>                | 209.1  | 282.7         | 239.6         | 224.4   | 186.8        | 121.3              | 118.8         | 61.1          |
| <b>Results</b>              | <i>Backward spillovers are distorted by hypothesis of Javorcik and Spatareanu (2011) and Rodrigues-Clare (1996).</i> |               |               | <i>As estimated: the higher LTI, the higher backward spillover.</i> |              |                    |               |               |

However, Japanese investments cause negative spillovers through backward linkages although they are the largest customers of domestic firms and their crowding effects are much smaller than the US. The only reason lies on low absorptive capacity of local suppliers in high-tech industries. We argue that Vietnam has no comparative advantage on producing high-tech products in this period. Furthermore, Japanese investors possibly have higher incentives to protect technology and know-how linkages. Older

technology or knowledge is transferred more readily to the domestic sector (Driffield and Mohd Noor, 1999).<sup>40</sup>

### **3.5. Conclusion**

Using a firm level data set for the case of Vietnamese manufacturing in the period post WTO-accession from 2007 to 2010, this study examines whether origins of investors influence sign and magnitude of backward productivity spillovers to domestic firms in upstream sectors. The results show that backward spillovers can occur in two ways for the case of Vietnam.

First, we take origin heterogeneity into consideration by separating investments into high-tech and low-tech industries, which can form individual characteristics of investments from one origin. The investment can appear more in high-tech/low-tech industries and demand more high-tech/low-tech products. When Vietnam is involved more in trade liberalization, the origins of which foreign firms demand more low-tech products (higher LTI) cause higher spillovers to domestic firms through backward linkages. We find evidence of the highest backward linkages from US investments and low backward linkages from Japanese investments.

Second, the spillovers are distorted strongly for the case of ASEAN, China, and Taiwan due to 2 factors: (1) The preferential trade agreement between Vietnam and other ASEAN countries are likely to lower the spillovers from affiliates in this region, and (2) These three origins are nearby Vietnam. Hence, share of intermediate inputs sourced locally by foreign firms from these origins is likely to be higher than foreign firms from other origins. The results are in line with Javorcik and Spatareanu (2011) and Lin, Liu and Zhang (2009).

This study makes some contribution into existing literature by offering the roles of the comparative advantage and the demonstration effects. Being affected by demonstration effects and comparative advantage of a source country, investments from this origin and

---

<sup>40</sup> Driffield and Mohd Noor (1999) found that Japanese transnational companies are the least likely to foster local input linkages with Malaysian firms since they prefer to use inputs from other home firms with whom they have vertical relations elsewhere.

their demand can be low-tech/high-tech intensive. By contrast, the comparative advantage of a host country, for example a developing country, can help local firms to be strong at low-tech products.<sup>41</sup> Hence, foreign invested firms are expected to buy more low-tech products in a developing country. As a result, indigenous firms in low-tech industries could absorb backward spillovers better than firms in high-tech industries.

After WTO accession, the Vietnamese government has the policy to encourage investments more in high-tech industries in hope for better technology transfer to domestic firms<sup>42</sup>. In sum, our findings highlight a clear message that in order to take advantages of backward linkage, local suppliers have to be technologically advanced to absorb knowledge spillovers and deal with the demand for high-tech inputs.

---

<sup>41</sup> As indicated in the World Investment Prospects survey for the period 2008-2010 by UNCTAD, Vietnam is ranked 6<sup>th</sup> on top destinations for FDI. According to the respondents, the major asset of this country is the availability of low-cost skilled labor, followed by market growth, the size of the regional and local markets, and the desire to follow competitors and availability of incentives.

<sup>42</sup> Vietnam has focused on growing high tech parks where infrastructures are better to support high-tech enterprises. For example: Hoa Lac High Tech Park (1,586 hectares, Hanoi Capital), Saigon Hi-tech Park (913 hectares, Ho Chi Minh City), and QuangTrung Software City (43 hectares, Ho Chi Minh City).

## **4. TRADE LIBERALIZATION AND LABOR MARKET ADJUSTMENTS IN VIETNAMESE MANUFACTURING**

Pham Dinh Long, Pham Thi Bich Ngoc, and Holger Görg

---

### **4.1. Introduction**

Trade openness has historically gone hand in hand with better economic performance, in both developed and developing economies, creating new opportunities for workers, consumers and firms around the globe through a positive business climate, flexible labor markets, high-quality education and skill training systems (OECD, 2012). Still, once a developing country has opened up to international markets, concerns over employment and wage decline have been posed.

Trade particularly affects employment and wages in several ways. First, trade can increase per capita incomes through output growth, resulting in real average wage increases.<sup>43</sup> Second, increased exports and imports can raise productivity growth, creating higher skill and higher wage jobs.<sup>44</sup> However, trade liberalization may, at least in the short term, put pressure on less competitive industries, triggering unemployment and downward wage trends. Third, skill-biased technological change may increase demand for skilled labor, leading to wage inequality (Feenstra and Hanson, 1997). Fourth, the impact of trade liberalization possibly increases industry wage premium, which reflects industry rents.

---

<sup>43</sup> The OECD Growth Study estimated that a 10 percentage point increase in trade openness translates over time into an increase of around 4% in per capita income in the OECD area. China and India demonstrate how policies that liberalize trade and investment can contribute to raising incomes in developing countries (OECD, 2012).

<sup>44</sup> Exporters in the United States on average pay wages that are about 6% higher than non-exporters (Bernard et al., 2007)

Furthermore, due to imperfect competition, different levels of rent sharing between firms and workers among industries can cause wage differentials (Ghazali, 2011).

Previous empirical studies have found conflicting results about labor market adjustment to trade liberalization which could manifest itself through increasing imports, exports, and offshoring, or decreasing tariffs and non-tariffs barriers, leading to changes in the effective rate of protection (ERP). For instance, Stone and Cepeda (2011) find that imports have a strong and positive effect on wages in 55 OECD and non-OECD countries, but Ravenga (1997) produces evidence of negative effects of trade reforms on employment and wages in Mexican manufacturing. Goldberg and Pavcnik (2005) find a positive relationship between tariffs and the industry wage premium. Focusing on the impact on employment, Sakurai (2004) concludes that increased trade negatively impacts employment for the case of Japan. By contrast, Sen (2002) points out that international trade caused positive employment growth in Bangladesh and Kenya. Currie and Harrison (1997) find no impact of trade openness on employment in Morocco.

The specific objective of this study is to investigate how labor markets respond to trade liberalization in Vietnam over the period 2003-2008. We follow and build upon the approach by Revenga (1997) and analyze the link between trade liberalization, employment and wages using empirical models at both industry and firm levels. As in Revenga (1997) we allow trade protection (measured as effective rate of protection, ERP) to affect wages and employment directly at industry level and indirectly at firm level through changes in output and quasi rents. More specifically, in the firm level analysis, we use trade policy variables, i.e. ERP and import penetration, as instruments for the endogenous independent variables, i.e. output and quasi rents. We use panel datasets at industry and firm levels for manufacturing sectors which come from the Vietnamese General Statistics Office (GSO) and the Danish International Development Agency (DANIDA)'s small and medium enterprise (SME) surveys.

Since opening up to the world economy in 1986, Vietnam has strongly embarked on the trade liberalization process by being involved in many bilateral and multilateral agreements (Japan, China, US, ASEAN, APEC, EU, WTO), reflecting decreasing ERP and increasing import penetration due to tariff reductions. Based on this background, we show

a negative impact of trade reforms on firm-level wages and employment at both industry and firm levels in Vietnamese manufacturing over the period 2003-2008. Additionally, the paper improves our understanding of trade liberalization effects by taking into account the rent sharing<sup>45</sup> between firms and employees as an adjustment mechanism to face trade policy changes. We find trade-induced decreases in quasi rents which represent a decline in wages.

The approach on quasi rents further allows us to identify heterogeneity in bargaining power across firms by gender and skill composition. A firm with a greater fraction of unskilled (production) or female workers shows a lower ability of workers to capture part of the quasi rents. This finding provides evidence for gender and skill earning differentials in Vietnamese manufacturing. However, trade liberalization can moderate these gaps, as in line with Ghazali (2011) for the case of Tunisia.<sup>46</sup> In addition, trade unions and collective agreements seem to have a role in reducing the skill earning inequality. To the best of our knowledge, these relationships have not been comprehensively investigated for the case of Vietnam.

The structure of this paper is as follows. Section 2 and 3 respectively provide the literature and some facts on trade liberalization and labor markets. Section 4 presents the data and some preliminary evidence. Section 5 discusses the industry level analysis, while Section 6 presents the firm level results. The final section produces some conclusions.

## **4.2. Literature on Trade Liberalization and Labor Markets**

The Heckscher-Ohlin model and its companion Stolper-Samuelson theorem (HO/SS) set up a theoretical background on the labor market effects of trade liberalization whereby trade openness increases the relative returns to abundant factor and lowers that of the scarce factor, expecting increases in wages and reduction in wage inequality. Some recent studies provide support for a HO/SS view of trade (see Friedman et al., 2012; Stone

---

<sup>45</sup> Martins (2007) define rent sharing as “referring to a situation in which rents are shared by the firm, at least in some part, with the employees of that firm”.

<sup>46</sup> Ghazali (2011) indicates that trade reforms appear to have reduce inequality between skilled and unskilled labor in Tunisia.



and Cepeda, 2011; Bernard et al., 2007) in contrast to the others which find rising wage gaps in both developed and developing countries (see Gottschalk and Smeeding, 1997; Berman, Bound, and Machin, 1998; Pavcnik, 2003). Growing wage inequality can be explained in part by the change in the structure of labor demand in favor of skilled workers, resulting from skill-biased technological change induced or accelerated by trade liberalization (Acemoglu, 2003). Particularly, the underlying causes of changes in labor demand in developing countries are based on the increase of capital flows and capital assets from developed to developing countries in the era of globalization (Feenstra and Hanson, 1997).

Referring to employment adjustments, existing literature have found mixed results.<sup>47</sup> Difference in employment response to trade liberalization possibly depends on firm behavior in lower/higher profit periods or whether labor markets are in short run or long run. Firms can reduce their profit margins rather than adjusted employment or instead, they raise productivity of the existing workforce and efficiency gains can be achieved without firing labor (see Currie and Harrison, 1997; Tybout and Westbrook, 1995). Unemployment could increase in the short run due to external or domestic shocks but decline in the long run with permanent changes in trade liberalization when labor market returns to long-run employment equilibrium (Dutt, Mitra and Ranjan, 2009; Stone and Cepeda, 2011).

From another perspective, trade liberalization can impact wages and employment directly at industry level but indirectly at firm level. A reduction in trade protection that shifts industry product demand will tend to move employment in the same direction (Revenga, 1997). Industry wage response in turn depends on wage-setting mechanism. With a competitive setting, wages react to market-clearing rates of labor supply and demand. In contrast, under imperfect competition, because of the presence of unions for

---

<sup>47</sup> For example, McMillan and Verduzco(2011) show that employment in manufacturing fell in Latin America, the Middle East and North Africa and in Sub-Saharan Africa but increased in East Asia and Eastern Europe. Exports can contribute to job creation (Heo and Park, 2008; Milner and Wright, 1998; Fu and Balasubramanyam, 2004). Gaston (1998) also shows that exports positively affect employment, but imports cause a negative impact in Australia.

instance, wage and employment adjustments could be based on industry wage premium.<sup>48</sup> Industry wage premium channel should be considered in short to medium term horizons where prevent free movements of workers across sectors. The premiums can take the form of industry rents in the trade models that introduce imperfect competition and rent sharing.

Although trade reforms are usually implemented at the industry level, firm-level wage and employment adjustments are expected to vary depending on firm characteristics, for example market power level, capital or labor intensity, or workforce composition. Also, the responses are based on a wage-setting mechanism which presents the bargaining power of workers with the presence of unions or collective agreements. Revenga (1997) produces the results that many of the rents generated by trade protection were absorbed by workers in the form of a wage premium in Mexican manufacturing. Trade liberalization reduced the rents available to be captured by firms and workers. Ghazali (2011), following the approach of Revenga (1997) for the case of Tunisia, documents that the quasi rents reduction, which is one of the adjustment mechanisms used by Tunisian firms to face trade openness, reduces wage inequality as skilled labor was more able than unskilled labor to capture rents before trade reforms.

In regards to the role of union in dealing with the rent sharing, higher rates of unionization as well as higher coverage and coordination of collective bargaining have been found to be associated with higher wages, lower levels of income inequality and wage disparity, a lower gap between the wages of skilled and unskilled workers as well as a lower gap between men and women (Friedman et al. 2012; Aidt and Tzannatos, 2002; Hayter and Weinberg, 2011). On the contrary, Reinecke and Valenzuela (2011) argue that the potential role of unions and collective bargaining in improving the distribution of wages has been used in a very limited manner in Chile.

Meanwhile, rent sharing can reduce employment fluctuations to trade openness due to the presence of unions. Revenga (1997) shows that organized labor is important in Mexico. The restrictive labor market regulations in this country make it difficult and expensive to fire a worker. The author confirms that if wages contain a rent component,

---

<sup>48</sup> Goldberg and Pavcnik (2005) define it as the portion of individual wages that cannot explained by worker, firm, or job characteristics, but can be explained by the worker's industry affiliation.

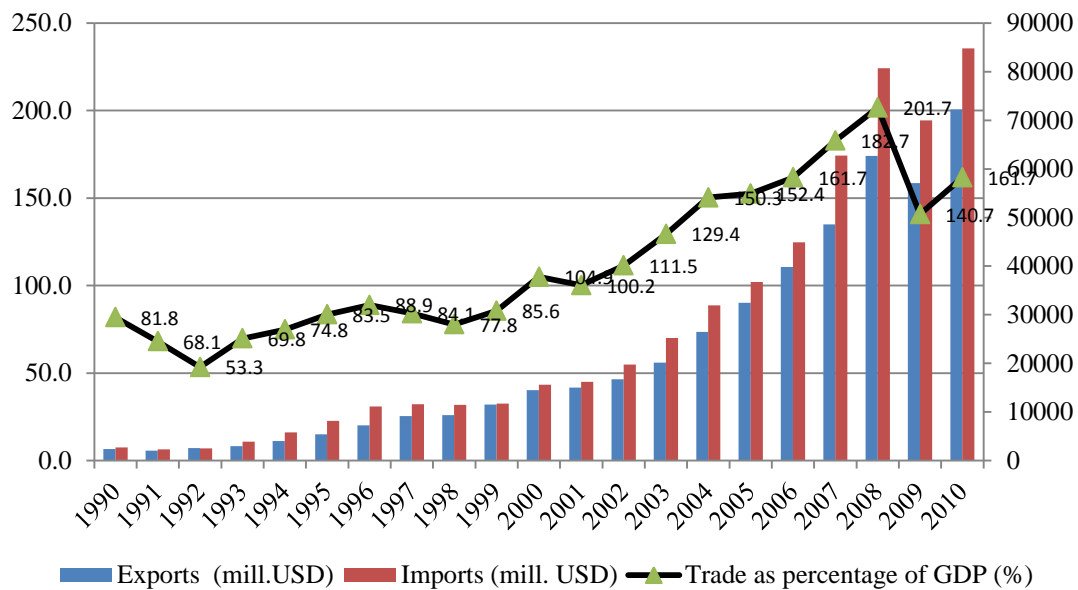
workers can be willing to trade off wages to preserve jobs. In contrast, Krugman (1996) argues that in countries with rigid wage setting institutions, trade may perhaps have larger effects on employment than wages. Görg and Görlich (2011) point out adjustments through employment levels in Germany as wage setting arrangements in this country was a high degree of inflexibility, which is done by large unions at the sectoral level.

### 4.3. Labor Markets in Vietnam under Trade Liberalization

#### 4.3.1. Trade liberalization and some facts

The economic restructuring process (called DoiMoi) started in 1986 when Vietnam transformed from a centrally-planned economy to a market-oriented economy. GDP growth accelerated to 9.8% annually from the early 1990s to 1998 then fell to 7.3% from 2000 to 2009 (GSO). The economic structure has changed with the tendency towards industrialization. During the period 1990 to 2010, the contribution of the agriculture sector dropped from 38.7% to 20.9% while that of industry and construction, and service sectors changed from 22.7% and 38.6% to 40.2% and 38.9% respectively.

*Figure 4.1: Vietnam's Imports and Exports, 1990-2010*



Source: GSO (2006, 2011)

Vietnam's total export volume grew from around US\$ half a million to reach US\$ 71.6 billion in 2010, which is equivalent to an annual growth rate of 20% (GSO, 2006,

2011). Imports are generally higher than exports but trade deficits are not very large. Trade liberalization contributed to a growing intensity in terms of exports and imports relative to GDP (*Figure 4.1*).

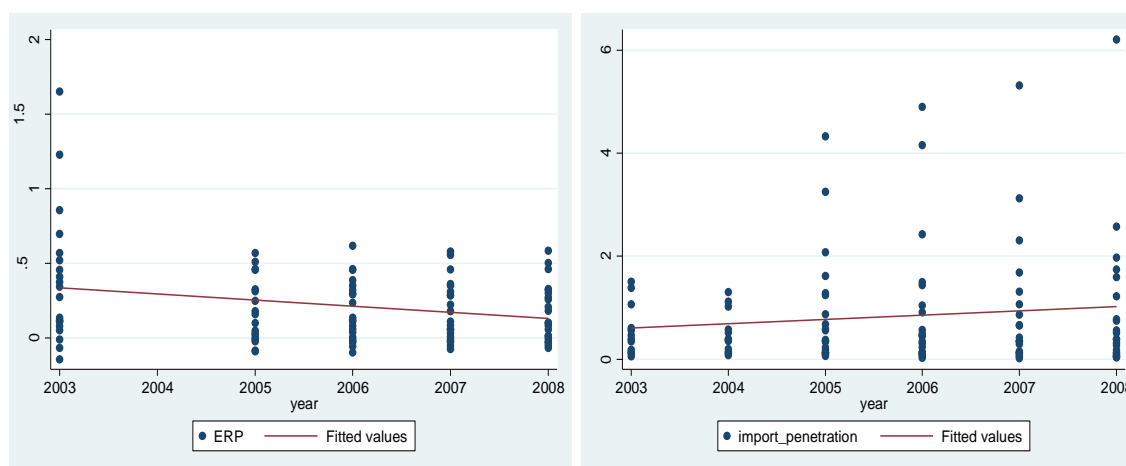
Since opening up the economy, Vietnam has been party to multilateral and bilateral trade agreements and MFN agreements with over 80 nations (MUTRAP, 2011). For example, bilateral trade agreements with the European Union and the United States were signed in 1992 and 2000 respectively. Joining ASEAN in 1995, Vietnam started implementing tariff reductions under the Common Effective Preferential Tariff of the ASEAN Free Trade Area (CEPT/AFTA) which began in 2001 and was completed by the beginning of 2006. Agreements under ASEAN auspices with China and Japan came into effect in 2002 and 2003 respectively. The country joined APEC in 1998 and signed an MFN agreement with Japan a year later. In addition, as a member of the WTO since 2007, it is bound to many MFN agreements. Each time such a major agreement was reached, Vietnam's trade with that region expanded, and these trade agreements were clearly an impetus to ongoing domestic economic reforms (Abbott, Bentzen and Tarp, 2009). In the period 1997-2003, average tariffs on merchandise were reduced slowly from 21% to 20.3% while ERP decreased quickly from 121% to 46% (Athukorala, 2004).

*Figure 4.2* shows the trends in ERP and import penetration in the following years from 2003 to 2008, using the industry level data used in this study. As we can see, ERP continued a downward trend with values lower than 50%. Labor intensive sectors such as Wearing Apparel, Tanning and Dressing of Leather are more highly protected than others. ERP are positive for most industries; reflecting that returns to capital and labor are higher in these industries than they would have been in the absence of tariff protection. However, negative ERP shows that firms in these industries can be harmed by intervention, i.e. Manufacture of Refined Petroleum Products, or they would be worse off under free trade because of being highly supported by state intervention (*Appendix C.1*).

Under CEPT/AFTA, Vietnam is committed to reducing tariffs on all but few sensitive items from AFTA member countries to less than 5% by the year 2006. Within the WTO accession framework, the 2006 average tariff levels will be reduced from 17.4% to 13.4% after the implementation period, generally from 5 to 7 years. The average

reduction of tariffs for industrial products is from 16.3% to 12.2% over 12 years. Vietnam's participation in the Information and Technology Agreement was the most significant, by which about 330 tariff lines for information technology products will be reduced to 0% over a period of 3-5 years. Its participation in the Textile and Clothing Agreement leads to a significant tariff reduction for these items, in particular textiles from 40% to 12%, and clothing from 50% to 20% (MUTRAP, 2008).

**Figure 4.2: Tendency of ERP and Import Penetration at Industry Level, 2003-2008**



### 4.3.2. Labor market in Vietnam: An overview

Vietnam's population is estimated at approximately 89 million in 2010, of which over 61.6% is under 25 years of age. Approximately 15.5% of the population are considered to be trained or skilled workers (with elementary qualifications or higher) (MUTRAP, 2011). The labor force increased by 2.4 million to a total of 49.3 million persons from 2007 to 2009, together with an increase in the labor force participation rate of 2.1% to 76.5% in 2009. Labor has a tendency to move from the countryside to large cities like Hanoi, Ho Chi Minh city (HCMC), leading to continuous increases in the proportion of the urban population of working age. For example, 1.8 million people moved during 2007-2009 (MOLISA<sup>49</sup>, 2010). The restructuring of state owned enterprises and opening up to foreign direct investment has led to a redistribution of the labor force, with workers moving from the state sector to private enterprises.

<sup>49</sup> Ministry of Labor, Invalids and Social Affairs

After WTO accession, employment continues to undergo structural changes with a decreasing share in the agriculture sector but increasing shares in the industry and service sectors. During the period 1999-2009, the percentage of workers in agriculture, forestry and fishing sectors reduced from 64.1% to 51.9%, while that in industry and construction and service sectors increased from 12.4% and 23.4% to 21.4% and 26.7% respectively. The unemployment and underemployment rates in urban areas are 4.6% and 3.3% in 2009 (GSO, 2000, 2010<sup>50</sup>).

Only 23.1% of the labor force are contracted employees, while the majority of workers are self-employed (38.47%) or work in a family business (38.43%). However, demand for skilled labor in Vietnam has increased. The rapid development of the private sector in Vietnam is the key cause behind the growing demand for labor (VCCI, 2008). In the period 2006-2008, 54% of employees were based in the private sector, 22.2% in the foreign invested sector, and 23.8% in the state sector. Taking into consideration the gender composition, female workers accounted for circa 44% of the total workforce. A larger proportion of female workers are present in industries such as manufactures of Wearing apparel, Dressing, or Leather Tanning and Dressing (82%-83%) while male workers tend to work in manufactures of Coke, Petroleum, Metal products or Transport Equipment (80%). Interestingly, more female than male workers appear in high-tech manufactures which produce office machinery, communication equipment, or medical instruments (70-75%) (GSOa, 2010).

Wages of employees are subject to minimum rates determined by MOLISA at district levels and by enterprise ownership (e.g. VND 1.2 million per month, app. US\$ 70-75, in Hanoi 2008, for employees in foreign enterprises; and VND 0.8 million for those in domestic enterprise).<sup>51</sup> Average salary levels were highest in state enterprises, followed by FDI firms and non-state enterprises. For instance, the values are 4.067; 3.005; and 2.273 million dongs per month in 2008 respectively. A worker in the manufacturing sector can, on average, earn VND 2.342 million per month in 2008 (GSOa, 2010).

---

<sup>50</sup> Statistical Year Book 2000, 2010 (GSO)

<sup>51</sup> The minimum wage in 2012 in Hanoi is VND 1.550 million for foreign enterprises, or VND 1.350 million for domestic enterprises.

### 4.3.3. Overview on SMEs

An enterprise is small or medium when its number of employees is lower than 300 or its registered capital is less than VND 10 billion (nearly 500, 000 US\$). According to the GSO from 2001 to 2009, SMEs in the whole economy, on average, accounted for 96% of total enterprises in terms of employee size or 86% in terms of registered capital. The growth rate of SMEs in terms of number of employees or registered capital is around 22% annually (*Table 4.1*). Also, SMEs in the manufacturing sector accounted circa 87% of total manufacturing enterprises in terms of employee size in the period 2005-2009.

**Table 4.1: Number and Share of SMEs by Size of Capital and Employees**

|  | 2000        | 2001            | 2002            | 2003            | 2004            | 2005             | 2006             | 2007             | 2008             |
|--|-------------|-----------------|-----------------|-----------------|-----------------|------------------|------------------|------------------|------------------|
| Total No. of enterprises   | 42,297      | 51,680          | 62,908          | 72,012          | 91,756          | 112,950          | 131,318          | 155,771          | 205,689          |
| No. of SMEs and growth rates<br>(No. of employees <300)              | 39,897<br>- | 49,062<br>23.0% | 59,831<br>21.9% | 69,697<br>16.5% | 88,222<br>26.6% | 109,338<br>23.9% | 127,593<br>16.7% | 151,780<br>19.0% | 201,580<br>32.8% |
| Shares of SMEs in total  | 94.3%       | 94.9%           | 95.1%           | 96.8%           | 96.1%           | 96.8%            | 97.2%            | 97.4%            | 98.0%            |
| No. of SMEs and growth rates<br>(Registered capital <10 VND billion) | 36,306<br>- | 44,670<br>23.0% | 54,217<br>21.4% | 61,977<br>14.3% | 79,420<br>28.1% | 98,232<br>23.7%  | 114,341<br>16.4% | 131,888<br>15.3% | 171,231<br>29.8% |
| Shares of SMEs in total  | 85.8%       | 86.4%           | 86.2%           | 86.1%           | 86.6%           | 87.0%            | 87.1%            | 84.7%            | 83.2%            |

*Source:* Authors' calculations based on many versions of Statistical Year Books (GSO, 2001-2009)

## 4.4. Data Description

The industry level data used in this study come from the GSO, which is an institution directly under Ministry of Investment and Planning, conducting statistical operations and providing socio-economic statistical information at both micro- and macro-levels in Vietnam. The firm level data is obtained from the DANIDA's SME surveys collected in 2005, 2007 and 2009. The sample sizes are 2,603 in 2005 (representing 13.2%

of total manufacturing enterprises), 2,492 in 2007 (8.8%) and 2,492 in 2009 (5.1%). The SME surveys are funded by DANIDA and conducted by the Department of Economics, University of Copenhagen in collaboration with the Vietnamese Institute of Labor Science and Social Affairs (ILSSA) and Central Institute for Economic Management (CIEM). Although they are implemented in 10 selected provinces (Ha Noi, Phu Tho, Ha Tay, Hai Phong, Nghe An, Quang Nam, Khanh Hoa, Lam Dong, Ho Chi Minh City, and Long An), a stratified random sample was chosen such that the data set is representative at the provincial level. A rich and intensive range of questionnaires cover many modules such as general characteristics, enterprise history, production characteristics, employment, investments, etc.<sup>52</sup> Each survey in a year collects information for two previous years (e.g. the survey in 2005 aims to obtain data in the years 2003 and 2004).

Especially, the surveys are suitable for studies in labor markets. For example, the employment module produces information on employment by gender, full-time/ part-time status, occupation, workers' training, labor union, workers' benefit, recruiting and firing process, and wage setting process. Unfortunately, the survey does not specifically ask about educational or skill levels of the employees, only their occupation, i.e., managers, professionals, sales, service or production workers. Professionals are defined as those having university/college degree (Phan, 2009). Since the information on educational or skill levels of the employees are not given, we proxy for the skill composition of employment by using the share of production workers in total firm employment, as in Revenga (1997).<sup>53</sup>

Panel data sets are used for the empirical analysis, comprising 93 industry observations and 8,849 firm observations from 19 manufacturing sectors in the period 2003-2008. The firm-level data set retrieved from DANIDA is merged with the industry-

---

<sup>52</sup> For instance, some studies, using the same source of data, investigate the role of unions (Torm, 2012), or the informal sector wage gap among Vietnamese micro-firms in Vietnam (Rand and Torm, 2012). Torm, Larsen, and Rand (2011) examine the impact of recruitment ties on wages in Vietnam.

<sup>53</sup> Skilled labor activities include engineering, management, administration, and general office tasks while the activities of unskilled workers include machine operation, production supervision, repair, maintenance and cleaning (Hanson and Harrison, 1995).



level data, i.e. ERP and import penetration. ERP are collected from MUTRAP II (2008), MUTRAP III (2010) for the years 2005-2008 and Chu and Kalirajan (2011) for the year 2003.<sup>54</sup> ERP in 2004 are assumed equal to the indicator in 2003 due to lack of data. Import penetration ratios are calculated based on data collected from the GSO's reports on International Merchandise trade of Vietnam in several years.<sup>55</sup>

*Table 4.2* presents means and standard deviations of key variables, separated into two periods 2003-05 and 2006-08 at industry and firm levels. The calculation strategy and explanations for these variables are introduced in *Appendix C.3*. Vietnam is involved more in trade liberalization in the latter period when completing the AFTA agreement in 2006 and joining the WTO in 2007. Thus ERP reduced to 17.7% in this period as tariff barriers were gradually lifted. The average import penetration ratio increased over this period, as would be expected.

Since liberalizing the economy, average industry employment increased, accompanied by a higher proportion of female workers. Average SME firm size was smaller in terms of employment, together with a reduction in the presence of male and production workers.<sup>56</sup> An SME's real output increased by 9.6% over the two periods. Wages cost of capital and log capital stock/value added also increased. Real quasi rents per worker increased from 13.4 million VND to 20.5 million VND. Furthermore, the decreased share of production workers, representing a higher proportion of skilled workers in a firm, may strengthen the bargaining power.

---

<sup>54</sup> ERP of an industry is measured by industry value added at domestic price, divided by that at world price, then minus 100%. This approach is applied by Trinh and Kobayashi (2012) for the Vietnamese manufacturing industries.

<sup>55</sup> Theoretically, import penetration ratios should be measured as the share of imports in domestic demand (imports/[production + import - exports]); however, there are problems with measuring domestic demand in some industries, which give rise to inconsistencies such as negative domestic demand (Jenkins, 2004).

<sup>56</sup> Shares of female and production workers are only available for the years 2004, 2006, and 2008. We assumed these indicators in the previous years are the same as at the current years.

**Table 4.2: Summary Statistics, 2003-2008**

| <b>Variables</b><br><i>(Mean and Standard Deviations)</i>                                 | <b>Industry-level data</b> |               | <b>Firm-level data</b> |               |
|---|----------------------------|---------------|------------------------|---------------|
|   | <i>2003-5</i>              | <i>2006-8</i> | <i>2003-5</i>          | <i>2006-8</i> |
| Total employment  | 123,911                    | 161,136       | 18.99                  | 15.46         |
|   | [148,278]                  | [188,384]     | [128.59]               | [34.74]       |
| - <i>Share of female workers (%)</i>  | 44.9                       | 48.6          | 33.8                   | 35.1          |
|   | [18.9]                     | [19.6]        | [27.1]                 | [26.5]        |
| - <i>Share of production workers (%)</i>  |                            |               | 78.5                   | 65.7          |
|   |                            |               | [18.7]                 | [19.8]        |
| Real output (bill.VND)  | 25,500                     | 41,300        | 2.5                    | 2.74          |
|   | [28,500]                   | [45,300]      | [17.5]                 | [12.3]        |
| Real annual earnings per worker (mill. VND)   | 17.9                       | 20.6          | 7.51                   | 10.8          |
|   | [8.7]                      | [7.8]         | [10.5]                 | [11.5]        |
| ERP (%)   | 28.97                      | 17.70         |                        |               |
|   | [36.90]                    | [19.55]       |                        |               |
| Import penetration ratio (%)<br><i>(Except Manufacture of Coke and Refined Petroleum)</i> | 70.3                       | 94.0          |                        |               |
|   | [84.3]                     | [132.5]       |                        |               |
| Cost of capital (mill. VND)   |                            |               | 29.5                   | 62.2          |
|   |                            |               | [377]                  | [526]         |
| Price raw materials (mill. VND)   |                            |               | 1,810                  | 1,910         |
|   |                            |               | [14,700]               | [9,210]       |
| Real quasi rents per worker (mill. VND)   |                            |               | 13.4                   | 20.5          |
|   |                            |               | [103]                  | [82.8]        |
| Log Capital stock/Value Added   |                            |               | 1.134                  | 1.160         |
|   |                            |               | [1.326]                | [1.230]       |

\* *Standard deviations are in parentheses.*

## 4.5. Employment and Wage Effects of Trade Liberalization at the Industry-Level

We start off by investigating the impact of trade liberalization on employment and wages using industry level data. To do so, we follow Milner and Wright (1998) and Revenga (1997) and estimate simple reduced form employment and wage equations in the following form,

$$\ln L_{jt} = \sigma_0 + \sigma_1 \ln W_{jt} + \sigma_2 \ln Q_{jt} + \sigma_3 TL_{jt} + d_j + d_t + \varepsilon_{it} \quad (1)$$

and

$$\ln W_{jt} = \omega_0 + \omega_1 \ln L_{jt} + \omega_2 \ln Q_{jt} + \omega_3 TL_{jt} + d_j + d_t + v_{it} \quad (2)$$

where  $L_{jt}$ ,  $W_{jt}$ ,  $Q_{jt}$  is respectively total employment, the average real wage measured in terms of annual earnings, and total output, in industry  $j$  at time  $t$ .<sup>57</sup>  $TL_{jt}$  is a vector of trade liberalization variables, including ERP and import penetration. The equations also include time ( $t$ ) and industry ( $j$ ) specific effects. All nominal variables are deflated by producer price index.

The results in *Table 4.3* present the industry-level employment and wage responses to trade liberalization. For the purpose of estimations, equations (1) and (2) are differenced in order to transform out the specific effects, then the OLS and within estimates are applied. Unlike time specific effects, industry specific effects are eliminated by the difference transformation of variables.

Columns 1 and 2 provide the results for the estimated employment equation. Increases in average wage rates cause a fall in employment, whereas changes in industry output and ERP appear to have no impact on demand for labor. Furthermore, the results indicate the negative and significant impact of rising imports on employment. An increase in import penetration from 57% to 95% is associated with a mere 0.76% ( $=0.38 \times 0.02$ ) decline in labor demand. Alternatively, we only find evidence for a modest impact of the increasing import penetration on industry-level employment. This finding could potentially

---

<sup>57</sup> This labor demand equation can be derived based on a Cobb-Douglas production function, assuming that the cost of capital is captured by time dummies (Milner and Wright, 1998).

reflect the existence of rent sharing agreements between firms and workers in Vietnam. As explained by Revenga (1997) “to the extent that the dissipation of rents is fully absorbed through lower industry wages there need not be any effect on employment”.

Columns 3 and 4 present the similar findings for the estimated wage equation in the same period. The results for the wage effect of trade liberalization are more statistically significant compared to those obtained for employment. The coefficient on import penetration is negative and statistically significant, indicating that an increase in imports reduced real wage. However, the implied wage responses are minor: an increase in import penetration from 57% to 95% is associated only with a 0.49% ( $=0.38 \times 0.013$ ) decline in real wages. Furthermore, the coefficient on ERP is significant in OLS or closes to being significant in within estimates implies that reduction in ERP is associated with decreasing industry wages. A decline in ERP from 39% to 17% reduced real industry wages by 2.4% - 3.5%.

**Table 4.3: Industry Employment and Wage Equations with OLS and Within Estimations**

|                    | Employment       |                  | Wages            |                  |
|--------------------|------------------|------------------|------------------|------------------|
|                    | <i>OLS</i>       | <i>Within</i>    | <i>OLS</i>       | <i>Within</i>    |
|                    | (1)              | (2)              | (3)              | (4)              |
| Employment         |                  |                  | -0.523***(0.112) | -0.657***(0.057) |
| Average real wage  | -0.639***(0.123) | -0.829*(0.445)   |                  |                  |
| Output             | 0.101 (0.168)    | -0.050 (0.195)   | 0.026 (0.174)    | -0.097 (0.278)   |
| ERP                | 0.061 (0.213)    | 0.045 (0.162)    | 0.110*(0.063)    | 0.166 (0.114)    |
| Import penetration | -0.016**(0.006)  | -0.020***(0.004) | -0.006*(0.003)   | -0.013*(0.006)   |
| Year dummies       | Yes              | Yes              | Yes              | Yes              |
| R-squared          | 0.52             | 0.69             | 0.38             | 0.58             |
| Observations       | 60               | 60               | 60               | 60               |

(i) (\*\*\*), \*\*, and \* denote significance level of 1%, 5%, and 10% respectively.

(ii) Robust standard errors in parentheses.

In sum, the existence of a minor negative employment effect of trade liberalization seems to support the rent sharing model. Furthermore, as proposed by Feliciano (1994) and Currie and Harrison (1997), we can also link this phenomena to the existence of restrictions to the firing of workers and the imperfections of product market in Vietnam.

By contrast, the industry regression reveals a bigger negative association between trade reform and wages. Unfortunately, the industry-level analysis cannot go further in explaining what causes the trade-induced decline in wages and employment in Vietnam. Hence, we now turn to a firm-level analysis in order to look more closely at possible channels.

#### 4.6. Employment and Wage Effects of Trade Liberalization at the Firm-Level

Our analysis at the firm level follows closely Revenga (1997), Ghazali (2011) and Abowd and Lemieux (1993). We adopt a wage-setting model allowing for the presence of rent-sharing behavior under union influence, and competitive wage determination. Accordingly, firms and the union bargain only over wages, and then employment is set unilaterally by the firm at the level that maximize its profit.

$$w_{it} = \delta_i w_{it}^U + (1 - \delta_i) w_{it}^A = \delta_i (w_{it}^U - w_{it}^A) + w_{it}^A \quad (3)$$

where  $\delta_i$  reflects the bargaining power of worker in firm  $i$ ,  $w_{it}^U$  is the union's preferred wage outcome, and  $w_{it}^A$  is the alternative/outside wage, representing comparative wage (assumed to be the wage in the corresponding industry).

As the union's preferred wage outcome is not observed,  $(w_{it}^U - w_{it}^A)$  could represent product market competition, namely the quasi rents per worker. Equation (3) can be rearranged as:

$$w_{it} = \alpha \delta_i QR(w_{it}) + w_{it}^A \quad \text{with } \alpha \leq 1 \quad (4)$$

Where  $\alpha \delta_i$  is considered as a quasi-rent-splitting parameter, reflecting how much of the quasi rents is captured by the union.<sup>58</sup>

If there is heterogeneity in workers' bargaining power, we can rewrite equation (4) as follows:

---

<sup>58</sup> As in Revenga (1997), quasi rents per worker are constructed as  $QR_{it} = (Y_{it} - M_{it} - r_{it}K_{it} - w_{it}^A N_{it}) / N_{it}$  where  $Y_{it}$  is sales,  $M_{it}$  is the cost of material inputs,  $r_{it}K_{it}$  is the cost of capital inputs,  $N_{it}$  is total employment in firm  $i$  at time  $t$ .

$$w_{it} = \alpha \bar{\delta}_i QR(w_{it}) + w_{it}^A + \epsilon_i QR(w_{it}) \quad (5)$$

The error component in this equation is correlated with the regressor  $QR(w_{it})$ . Thus, we need to use instrumental variables estimation. As shocks to quasi rents per worker are likely to result from shocks to product demand or shocks to the costs of production, trade policy changes would be relevant instruments, which can influence the behavior of both firms and unions.<sup>59</sup>

For the empirical implementation, we apply the following equation for firm wage determination:

$$\ln W_{it} = \varphi_i + \tau_t + \delta_1 \ln QR_{it} + \delta_2 \ln W_t^A + \delta_3 \ln K\_VA_{it} + v_{it} \quad (6)$$

where  $W_{it}, W_t^A, QR_{it}$  are as above. All nominal variables are deflated by the producer price index.  $\varphi_i, \tau_t$  are firm and time fixed effects. We include the ratio of capital to value added  $K\_VA_{it}$  that shows the firm efficiency in using capital stock and, hence, can determine wages (Ghazali, 2011).

Through the rent sharing approach, trade policy changes can affect firm-level wages through two different channels: (1) Changes in industry-level trade barriers should have a direct impact on the outside wage by shifting the total industry labor demand; and (2) Trade liberalization is able to reduce the sector rents and, hence, to reduce the rent component of wages in the firms where rent-sharing exists. We use two trade policy instruments for quasi rents per worker, namely, the ERP (e.g., Ghazali, 2011; Krishna, Poole, and Senses, 2012)<sup>60</sup> and import penetration (e.g., Feliciano, 2001; Kien and Heo, 2009).

---

<sup>59</sup> Abowd and Lemieux (1993) rely on export and import price indexes as the instruments for quasi rents in the case of Canadian firms. Alternatively, Revenga (1997) uses industry-level tariffs and quotas for the case of Mexican manufacturing.

<sup>60</sup> Goldberg and Pavcnik (2004, 2005) and Ghazali (2011) emphasize that ERP changes during trade reform episodes are not sector-uniform. ERP movements in many developing countries result from government decisions to fulfill the GATT and WTO directives that bound the behavior of firms or unions in influencing trade policy changes. Hence, this would minimize the endogeneity risk.

In the empirical analysis we also augment equation (6) by adding some more independent variables and instruments depending on our purposes in investigating skilled-unskilled and male-female wage gaps under the impacts of trade liberalization and the role of unions.

As regards a firm's employment response to trade liberalization, changes in trade policy can influence employment through their effect on wage setting. If workers are willing to trade off wages (e.g., by giving away rents), they may be able to preserve jobs. In the case workers prefer to maintain the level of wages, a larger employment effect may be observed. Furthermore, trade policy changes directly affect employment by shifting firm's output. As a result, output is endogenously determined in the firm-level employment equation. Therefore, we also use ERP and import penetration as instrumental variables.

$$\ln L_{it} = \varphi_i + \tau_t + \phi_1 \ln W_{it} + \phi_2 \ln W_{it}^A + \phi_3 \ln Q_{it} + \phi_4 \ln C_{it} + \phi_5 \ln K\_VA_{it} + u_{it} \quad (7)$$

where  $L_{it}$ ,  $W_{it}$ ,  $W_{it}^A$ ,  $Q_{it}$ ,  $C_{it}$ ,  $K\_VA_{it}$  are respectively the number of workers, annual average real wage, annual industry real wage, real output, the cost of capital, and the ratio of capital to value added in firm  $i$  at time  $t$ .  $u_{it}$  is the disturbance term.

We begin the empirical analysis with the firm-level employment equation to observe the magnitude of the implied employment response to trade policy changes. We then identify the effect of trade liberalization on firm wages in several steps. First, we explore the importance of rent sharing in firm-level wage determination. Second, we measure the size of firm quasi rents that are affected by trade policy variables and their interactions with the gender composition of a firm's labor force. For further analyses and robustness checks, we also consider heterogeneity in bargaining power depending on the skill composition of the workforce and the role of trade union location. Apart from firm fixed effects and year effects, we also add industry fixed effects to control for unobserved time-invariant industry characteristics.<sup>61</sup>

---

<sup>61</sup> Goldberg and Pavcnik (2005) find that workers in protected sectors earn less than workers with similar observable characteristics in unprotected sectors when they do not control for unobserved time-invariant industry characteristics. With industry fixed effects, the result reverses: trade protection increases relative wages.

**Table 4.4: Results of 2SLS Firm Employment Equations**

|   | 2SLS (First stage)                     | 2SLS (Second stage)                        |
|---|--|--|
|   | <i>Dependent variable: real output</i> | <i>Dependent variable: firm employment</i> |
| Real output                               |  | 1.193** (0.465)                            |
| Firm real wage                            | 0.525*** (0.020)                       | -0.858*** (0.245)                          |
| Industry real wage                        | 0.051 (0.051)                          | -0.005 (0.054)                             |
| Cost of capital                           | 0.138*** (0.009)                       | -0.084 (0.065)                             |
| Capital stock/Value added                 | -0.149*** (0.017)                      | 0.052 (0.071)                              |
| ERP                                       | 0.056 (0.071)                          |  |
| Import penetration                        | -0.004* (0.002)                        |  |
| Firm fixed effects                        | Yes                                    | Yes  |
| Year effects                              | Yes                                    | Yes  |
| Instruments                               |  | ERP<br>Import penetration                  |
| <i>F</i> -test ( <i>p</i> -value)         | 0.077                                  |  |
| Sargan test ( <i>p</i> -value)            |  | 0.697                                      |
| Durbin-Wu-Hausman test ( <i>p</i> -value) |  | 0.001                                      |
| Observations                              | 3907                                   | 3907                                       |

(i) (\*\*\*), (\*\*), and (\*) denote significance level of 1%, 5%, and 10% respectively.

(ii) Standard errors in parentheses.

The two stage least squares (2SLS) estimation of equation (7) is reported in *Table 4.4*. The dependent variable is the log of total employment. The independent variables are the firm and industry real annual average wage, the price raw materials, and real output. Instruments used for the endogenous real output variable are ERP and import penetration.

We report the *F*-statistic for the relevance of excluded instruments (associated *p*-value) from the first-stage regression. When the *F*-statistic is small (or the corresponding *p*-value is large), the instrumental variable estimates and confidence intervals would be unreliable. We find that our instruments are appropriate on this criterion. Furthermore, the instruments are valid as indicated by the Sargan test for overidentifying restrictions, which cannot reject the hypothesis of the instrument validity. Additionally, the Durbin-Wu-



Hausman test rejects the null hypothesis that the specified endogenous regressor (real output variable) can be treated as exogenous.

The first stage estimates reveal a negative and significant effect of increased imports on firm real output, though the point estimate is small (-0.004). The coefficient on ERP gets the expected sign but is statistically insignificant. The second stage estimates indicate statistically significant parameters for the firm real output and average wage. By contrast, the coefficients on the industry real wage, the cost of capital, and the capital stock to value added are insignificant.

Empirically, the findings give evidence that increases in import penetration that reduce firm output have a negative effect on employment. Based on the first stage estimates, an increase in import penetration from 57% to 95% reduces firm output by 0.15% ( $=0.38*0.004$ ). This in turn is associated with a decline in employment by only 0.18% ( $=0.15%*1.193%$ ). In addition, reductions in ERP do not have any significant effect on output and therefore have no impact on employment. Combining these results with those obtained from the industry-level equation, we can argue that there is minor impact of trade liberalization on employment in Vietnamese manufacturing, as in line with Currie and Harrison (1997) and Feliciano (2001).

We now turn to estimating wage effects. In the industry level analysis we found that there is a negative relationship between trade reforms and wages. In the firm-level analysis, it is possible to explore the mechanisms for that adjustment.

*Table 4.5* gives results from estimating equation (6) using a within estimator. We find evidence for a positive and statistically significant coefficient on quasi rents across all specifications. Hence, rent sharing appears an important component of wage determination in Vietnam. Technically, the quasi-rent-splitting parameter determines how much of the quasi rents is captured by the union. In the case these rents are completely transferred to union members, we can have a simple figure from the coefficient on the quasi rents per worker in column 1 that, on average, union members get earnings that are about 16% higher than non-union members. This finding to some extent is in line with the results by Torm (2012). Using matched employer-employee panel data, she empirically indicates an average union wage gap of about 13% in Vietnam's SMEs over the 2007-2009 period.

**Table 4.5: Within Estimates of Firm Wage Equations**

| <i>Dependent variable: Firm real average wage</i> |                   |                  |                   |
|---|-------------------|------------------|-------------------|
|   | (1)               | (2)              | (3)               |
| Quasi rents per worker (QR)                       | 0.165*** (0.005)  | 0.218*** (0.038) | 0.226*** (0.016)  |
| QR*[QR-avg(QR)]                                   |                   | 0.007 (0.012)    |                   |
| QR*female share                                   |                   |                  | -0.055*** (0.015) |
| Industry real wage                                | 0.380*** (0.055)  | 0.227*** (0.083) | 0.396*** (0.060)  |
| Capital stock/Value added                         | -0.052*** (0.006) | -0.042*** (.010) | -0.057*** (0.007) |
| Firm fixed effects                                | Yes               | Yes              | Yes               |
| Year dummies                                      | Yes               | Yes              | Yes               |
| Industry dummies                                  | Yes               | Yes              | Yes               |
| R-squared   | 0.39              | 0.34             | 0.42              |
| Observations                                      | 8849              | 3969             | 7072              |

(i) (\*\*\*) , (\*\*), and (\*) denote significance level of 1%, 5%, and 10% respectively.

(ii) Standard errors in parentheses.

The coefficients on the industry real wage and the capital stock to value added have expected signs and are highly significant across specifications. This indicates that firm wages are also affected by industry labor market conditions and the efficiency in using capital input. Following Abowd and Lemieux (1993), Revenga (1997), and Ghazali (2011), we also include a term  $QR*[QR-avg(QR)]$  that measures the deviation of firm-level quasi rents from the sample average. Similar to Revenga (1997), however, we do not find evidence for heterogeneity in bargaining power for firms in the same sector, as indicated by the statistically insignificant coefficient on this variable.

In column 3, we incorporate an interaction variable that allows the quasi-rent-splitting parameter to vary systematically with the proportion of female workers in the firm workforce. The coefficient on this interaction variable is negative and significant, which shows that the quasi-rent-splitting parameter is inversely correlated with the proportion of female workers in total firm employment. The point estimate is small (-0.055), but gives evidence of male-female earnings inequality in Vietnam.<sup>62</sup> The negative interaction term

<sup>62</sup> Torm (2012) finds evidence that there is a substantial gender wage gap with male earnings being between 14% - 18% higher than for women.

suggests that the positive effect of QR on firm real wage is lower for firm with high female share. The higher the proportion of female workers, the lower the ability of workers to capture part of the quasi rents.

In case that quasi rents per worker variable is endogenous, the within estimates above might be biased and inconsistent. To deal with this problem, an instrumental variables approach will be used for the endogenous quasi rents per worker. Instruments for QR are ERP and import penetration.

The 2SLS regressions are presented in *Table 6*. The result in column 2 supports the flexible model of wage setting that captures both the existence of rent sharing behavior and competitive wage determination. However, the first estimates result in column 1 does not show any statistically significant impact of ERP and import penetration on QR. It might be due to the fact that these chosen instruments are weak as the *F*-test point shows ( $p$ -value = 0.179).

In order to attain relevant instruments, the existence of gender earnings differentials in the trade liberalization episode suggests to further include interaction variables that permit trade policy changes to vary with the proportion of the female workers in the firm labor force. Therefore, besides trade policy variables, we also add their interactions with the gender composition of the firm workforce as instruments for QR. *F*-test and Sargan test now indicate the relevance and validity of the chosen instruments. The Durbin-Wu-Hausman test rejects the null hypothesis of exogeneity of the endogenous variable.

Columns 3 and 4 present the 2SLS estimation results with the interaction variables. The first estimates show a positive and significant effect of ERP on quasi rents per worker. Furthermore, the results point out the gender composition of the workforce appears to be highly relevant. The higher the proportion of female workers in the firm, the less trade liberalization decreases the quasi rents per worker. Hence, these findings indicate that trade liberalization may reduce the gender earnings gap in Vietnam.

**Table 4.6: Results of 2SLS Firm Wage Equations Regarding Gender Composition**

|   | 2SLS (First stage)  | 2SLS (Second stage)   | 2SLS (First stage)  | 2SLS (Second stage)   |
|---|---|---|---|---|
|   | <i>Dependent variable:</i><br><i>quasi rents per worker</i> | <i>Dependent variable:</i><br><i>firm average real wage</i> | <i>Dependent variable:</i><br><i>quasi rents per worker</i> | <i>Dependent variable:</i><br><i>firm average real wage</i> |
|   | (1)   | (2)   | (3)   | (4)   |
| Quasi rents per worker                    |   | 0.549* (0.291)  |   | 0.487*** (0.112)  |
| Industry real wage                        | -0.501*** (0.079)   | 0.374*** (0.141)  | -0.529*** (0.079)   | 0.340*** (0.067)  |
| Capital stock/Value added                 | -0.309*** (0.019)   | 0.074 (0.091)   | -0.304*** (0.019)   | 0.054 (0.036)   |
| ERP                                       | -0.103 (0.088)  |   | 0.246* (0.140)  |   |
| ERP*female share                          |   |   | -0.650*** (0.196)   |   |
| Import penetration                        | 0.005 (0.004)   |   | -0.003 (.006)   |   |
| Import penetration*female share           |   |   | 0.031** (0.015)   |   |
| Firm fixed effects                        | Yes   | Yes   | Yes   | Yes   |
| Year effects                              | Yes   | Yes   | Yes   | Yes   |
| Instruments                               | ERP   |   |   | ERP   |
|   | Import penetration  |   |   | ERP*female share  |
|   |   |   |   | Import penetration  |
|   |   |   |   | Importpenet*femaleshare                                     |
| <i>F</i> -test ( <i>p</i> -value)         | 0.179   |   | 0.000   |   |
| Sargan test ( <i>p</i> -value)            |   | 0.853   |   | 0.891   |
| Durbin-Wu-Hausman test ( <i>p</i> -value) |   | 0.052   |   | 0.000   |
| Observations                              | 6564  | 6564  | 6549  | 6549  |

(i) (\*\*\*) , (\*\*), and (\*) denote significance level of 1%, 5%, and 10% respectively

(ii) Standard errors in parentheses.

The second stage estimates also show a positive and highly significant coefficient on quasi rents per worker. This indicates that decreases in ERP that reduce quasi rents have a negative effect on wages. This is not the case for the import ratio, however. A decrease in ERP from 39% to 17% reduces quasi rents by a 5.4%. This in turn is associated with a 2.6% decline in firm wages. Combining this finding with the industry-level wage estimates, we find wage declines in an interval of 2.4%-3.5% in Vietnamese manufacturing over the 2003-2008 period that is due to trade liberalization.

### **Further analyses and robustness checks**

The potential heterogeneity in bargaining power and the existence of union wage gaps suggest that workers do vary in their ability to extract rents across firms and regions. Determinants of this differential ability might come from the influence of unions in the local market and the skill composition of the firm workforce.

We reestimate equation (5) now allowing for interactions of the trade policy variables and the skill composition of a firm's workforce in the first stage estimation. To further check robustness, we add two cost variables in real terms (cost of capital and price raw materials) and one interaction variable that allows the quasi-rent-splitting parameter to vary systematically with the fraction of unskilled workers in the second step. Furthermore, we also add industry fixed effects to control for unobserved time-invariant industry characteristics to the specification.

Results are reported in *Table 4.7*. The estimated coefficient on quasi rents per worker is consistent across various specifications and highly significant in both sign and magnitude. The quasi-rent-splitting parameter gets the similar value of about 0.34 across specifications, implying that 34% of quasi rents is captured by the union when skill composition of the firm workforce and industry fixed effects are taken into account.

**Table 4.7: Results of 2SLS Firm Wage Equations Regarding Skill Composition**

|   | All observations  |                       | Obs. in the Centre and North |                       | All observations  |                       |
|---|-------------------|-----------------------|------------------------------|-----------------------|-------------------|-----------------------|
|   | First stage       | Second stage          | First stage                  | Second stage          | First stage       | Second stage          |
|   | <i>QR</i>         | <i>Firm real wage</i> | <i>QR</i>                    | <i>Firm real wage</i> | <i>QR</i>         | <i>Firm real wage</i> |
|   | (1)               | (2)                   | (3)                          | (4)                   | (5)               | (6)                   |
| QR  |                   | 0.342*** (0.097)      |                              | 0.344*** (0.117)      |                   | 0.338*** (0.092)      |
| QR*unskilled share                        |                   | -0.372** (0.146)      |                              | -0.404*** (0.155)     |                   | -0.263 (0.174)        |
| Industry real wage                        | -0.593*** (0.112) | 0.115 (0.077)         | -0.692*** (0.152)            | 0.152 (0.095)         | -0.888** (0.290)  | 0.358* (0.199)        |
| Capital stock/Value added                 | -0.465*** (0.034) | -0.133** (0.054)      | -0.462*** (0.052)            | -0.144*** (0.053)     | -0.478*** (0.034) | -0.087 (0.074)        |
| Cost of capital                           | -0.002 (0.019)    | -0.011 (0.008)        | -0.035 (0.026)               | -0.012 (0.013)        | -0.009 (0.019)    | -0.013 (0.008)        |
| Price raw materials                       | 0.186*** (0.030)  | 0.001 (0.024)         | 0.149*** (0.045)             | -0.025 (0.024)        | 0.178*** (0.031)  | -0.017 (0.030)        |
| ERP                                       | 2.375*** (0.433)  |                       | 2.765*** (0.580)             |                       | 2.464*** (0.465)  |                       |
| ERP*unskilled share                       | -2.788*** (0.539) |                       | -3.209*** (0.705)            |                       | -2.821*** (0.556) |                       |
| Import penetration                        | -0.016 (0.022)    |                       | -0.018 (0.027)               |                       | -0.044 (0.033)    |                       |
| Import penet*unskilled share              | 0.046 (0.030)     |                       | 0.060* (0.035)               |                       | 0.027 (0.031)     |                       |
| Firm fixed effects                        | Yes               | Yes                   | Yes                          | Yes                   | Yes               | Yes                   |
| Year effects                              | Yes               | Yes                   | Yes                          | Yes                   | Yes               | Yes                   |
| Industry fixed effects                    | No                | No                    | No                           | No                    | Yes               | Yes                   |
| <i>F</i> -test ( <i>p</i> -value)         | 0.000             |                       | 0.000                        |                       | 0.000             |                       |
| Sargan test ( <i>p</i> -value)            |                   | 0.282                 |                              | 0.409                 |                   | 0.567                 |
| Durbin-Wu-Hausman test ( <i>p</i> -value) |                   | 0.020                 |                              | 0.006                 |                   | 0.113                 |
| Observations                              | 3023              | 3023                  | 1889                         | 1889                  | 3023              | 3023                  |

(i) (\*\*\*), (\*\*), and (\*) denote significance level of 1%, 5%, and 10% respectively

(ii) Standard errors in parentheses.

For all specifications, the coefficients on the interaction variable  $QR*unskilled$  share are negative and statistically significant (or close to being significant once industry dummies are included) thus, confirming the evidence of skill earnings inequality in Vietnam.<sup>1</sup>

The significant and negative coefficient of  $ERP*unskilled$  share, furthermore, reveals that the higher the proportion of unskilled workers in the firm, the less trade liberalization decreases the quasi rents per worker. This suggests that the bargaining power of unskilled workers may increase following trade liberalization, as in line with a simple HO/SS story. Vietnam specializes in unskilled intensive goods, so trade liberalization means they expand in those goods, giving more power to the unskilled workers.

In columns 3 and 4 we do a similar exercise but only include firms located in the North and Centre of Vietnam. Given the historical and institutional context combined with the higher concentration of collective agreements in HCMC, south vs rest of country split may reveal interesting results relating to bargaining power of workers and skill earnings gap across regions.<sup>2</sup>

---

<sup>1</sup> Torm (2012) indicates that a worker with education beyond secondary school has a wage that is about 12% higher than a worker with only basic education.

<sup>2</sup> Before the reunification in 1975, southern trade unions were more independent toward the government than northern trade unions which were under the oversight of the Communist Party (Edwards and Phan, 2008). Despite the reunification, some of the ideological and institutional differences between the two parts of the country are long lasting through today (see Kim, 2008). Zhu et al. (2008) find that firms in Hanoi (the Vietnam's capital in the North) remain more oriented towards traditional personnel practices, including government wage scales and unions' involvement as government agents, whereas firms in HCMC (the biggest city in the South) have a higher rate of adoption of modern human resource management. It is estimated that only 20% of unionized private sector firms have collective agreements, although in HCMC, the figure is around 65% (Clarke, Lee, and Chi, 2007). Torm (2012) also documents that trade unions in southern firms might be more accountable to their members than the rest of the country.

Column 4 shows that the size of the quasi-rent-splitting parameter is statistically unchanged. However, the coefficients on the interaction variable  $QR*unskilled\ share$ , trade policy variables and their interactions with the skill composition of the firm workforce are significantly larger in absolute value compared to those attained for all observations. They suggest that firm wages in the North and Centre are more influenced by the decline in ERP and the increase in imports. Also they reveal that earnings differential between skilled and unskilled labor is more serious in these regions than elsewhere.

In columns 5 and 6, industry fixed effects are added to the specification to control for unobserved time-invariant industry characteristics. The estimated coefficients on quasi rents per workers, the interaction variable, trade policy variables and their interactions with the skill composition of the firm workforce are in line with priors in terms of sign and statistical significance.

To sum up, the firm-level study provides evidence on negative effects of trade liberalization on employment and wages with similar magnitudes as industry-level analysis. The firm-level analysis also indicates that reductions in quasi rents and firm output in the period of trade reforms are channels for those adjustment mechanisms. Interestingly, increased imports play a minor part in reducing employment, while decreased ERP is responsible for a larger decline in wages.

#### **4.7. Conclusion**

The vulnerability of wages and employment to trade liberalization is always concerned in developing countries, including Vietnam where has been strongly involved in trade openness in the recent years. Vietnam is characterized by the large proportion of SMEs and high rates of unskilled workers. Trade liberalization in this economy goes hand in hand with commitments to cut down tariffs when joining the AFTA and the WTO. Although trade affects labor market in different ways, the economic model in this study analyzes the response to trade liberalization through the industry wage premium, which in turn, represents rent sharing. By this approach, given trade policy variables such as ERP and import penetration could stimulate a direct effect on wages and employment at



industry level but an indirect impact at firm level. Therefore, they are treated as instruments in order to deal with endogeneity in the firm-level analysis. Furthermore, this approach permits us to investigate factors such as worker gender or skill in capturing part of quasi rents.

Our econometric analysis suggests that there is a negative effect of trade liberalization through decreased ERP on wages in Vietnamese manufacturing, although the impact is moderate. As regarding import penetration, we find a negatively significant but minor impact on firm employment. That means imports might not be a cause for rising anxiety over increasing unemployment.

In addition, we find evidence of gender and skill earning inequalities in Vietnamese manufacturing, and these gaps decrease under trade liberalization. Furthermore, when taking into account the influence of unions by region, trade unions and collective agreements seem to reduce the skill earnings differentials in Vietnamese manufacturing.

In conclusion, we should not have a negative look on the response of labor market to trade openness for the case of Vietnam. Instead of fearing trade liberalization, Vietnam should enhance domestic policies to protect unskilled or female workers by upgrading education and training level, strengthening the role of trade unions in firms, or launching policies to help enterprises improve their productivity in order to ensure greater fairness in the allocation of rents to workers and create more jobs.

## **5. CONCLUSION**

---

This dissertation consists of three empirical works, focusing on the case of Vietnam to deal with “old” topics in international trade: trade liberalization, FDI, and labor market. However, it contributes “new” approaches and findings compared to previous studies within the same fields.

### **5.1. FDI and Productivity Spillovers**

In the first two papers related to FDI and its spillovers to domestic firms, we apply the method of Javorcik (2004) to calculate horizontal, backward and forward spillovers. Chapter 2 expands this calculation strategy separately for the service and manufacturing sectors, which is applied for firms with different managerial skills and ownership. Overall, we find that although domestic firms after WTO accession did not benefit from FDI inflows in through intra-industry linkages, they can take advantages of inter-industry linkages to improve their productivity.

Spillovers differ through intra-linkages or inter-linkages. We argue that spillovers are driven by the bargaining power of firms, which is based on the nature of input linkages of a manufacturing firm with a supplier or a customer in intra-sectors or inter-sectors. With the role as a supplier of a domestic manufacturing firm, foreign firms in manufacturing can bring a worse spillover than those in manufacturing firms, since their products are essential while firms in service sectors find themselves in a very competitive environment, in the case of Vietnam. By contrast, with the role as a customer of a domestic manufacturing firm, the appearance of foreign firms in downstream manufacturing can better stimulate the productivity of domestic firms than those in service sectors.

The main findings of this study lie in the role of managerial skill. The educational level of a director is particularly meaningful for a local enterprise in improving its spillover absorptive capacity. A firm having a director with higher managerial skill can strongly stimulate the ‘demonstration’, ‘competition’ and ‘labor mobility’ channels in order to improve its productivity. We also find that a private indigenous firm is always more dynamic than an SOE in absorbing productivity spillovers.

Chapter 3 also adopts the approach of Javorcik (2004), but focuses on calculating backward spillovers for different origins of investors. This paper is the first to find specific characteristics of investments from one origin rather than focusing on bilateral relationships between the source and host countries (Rodriguez-Clare, 1996) and multilateral relationships (Javorcik and Spatareanu, 2011). By calculating LTI by origins, we find that investments from one origin could be high-tech or low-tech intensive. In order to explain this argument, it is based on the assumptions of ‘demonstration effects’ and ‘comparative advantage’. Given this background, our striking findings are that, ‘for a developing country like Vietnam, the origins of which foreign firms demand more low-tech products, i.e. with higher LTI, can cause higher spillovers to domestic firms through backward linkages’. Nonetheless, the spillovers are strongly distorted by the regional preferential trade agreement and foreign affiliates’ import capacity from neighbor countries.

*What could be further exploited in these topics?* In order to draw a general picture of FDI spillovers in the case of Vietnam, we could analyze this problem over a longer period, namely since Vietnam has been strongly involved in trade liberalization. The endogeneity issue of a production function has not been completely dealt with, particularly for the role of managerial skill, as we only have 2 years of data. Additionally, our findings for the role of investors’ nationalities are still driven by stronger hypotheses that refer to the relationship between Vietnam and neighboring countries. Therefore, our hypothesis is only fully checked whenever these factors are excluded. These are our tasks to work on in the future. These papers would also be more interesting if we had data for other countries in the Southeast Asian region, for the purpose of comparison. A further research direction

is that we could replace the role of foreign affiliates with domestic firms in Javorcik's methodology in order to investigate the response of foreign enterprises' productivity to domestic supplying industries or market access. This research direction would provide some reasons for foreign affiliates to enter or exit an economy.

## **5.2. Trade Liberalization and Labor Market**

Chapter 4 has attempted to analyze the extent to which the increasing international integration of the Vietnamese economy affected employment and wages between 2003 and 2008. The degree of international openness of this country has risen in the past decade, together with the decreasing trends of tariffs and ERPs yet the increasing trend of imports and exports. The labor market is associated with the growth of labor supply, which is mostly unskilled from agriculture sectors. Meanwhile, increasing FDI inflows and new firm entrants have triggered labor demand for skilled workers.

In this study, we examine the changes in wages and employment at industry and firm levels through the channel 'industry wage premium', which is affected by trade policy such as EPR and import penetration in Vietnamese manufacturing (as in Revenga, 1997; Ghazali, 2011). The analysis provides evidence that industries' and firms' average wages are negatively associated with trade liberalization, however the impact is moderate. Additionally, we find a minor negative impact of trade liberalization on industry-level and firm-level employment.

Using the quasi-rent approach, as similar to Revenga (1997) and Ghazali (2011), we can further analyze gender and skill earnings inequality. We find that a larger proportion of female or unskilled workers cause the lower ability of workers to capture part of quasi rents. Nevertheless, trade reforms can lessen the quasi rents per worker for firms with higher presence of female or unskilled workers. This could disclose an insightful result that trade liberalization moderates wage gaps between male-female and unskilled-skilled workers. Furthermore, trade unions and collective agreements can help to reduce the skill earnings differentials in Vietnamese manufacturing. Therefore, efficient education and training systems, plus social security systems are necessary to reduce wage inequality,

as referred to in OECD Employment Outlook (2007) that good domestic policies can assure workers receive their fair share of gains from globalization.

*This paper could be complemented in several ways in considering availability of data.* First, we can take characteristics of firms into account, for example, non-exporters and exporters (as in Bernard et al., 2007), high/low levels of outsourcing, or large/small firms. Due to self-selection effects, it is expected that the response of wage and employment to trade openness differs by type of firms. Second, if we approach trade liberalization through increasing imports and exports and use new data sources from the GSO's enterprise surveys, we can analyze the different results of trade effects on labor market between the manufacturing and service sectors. Finally, an open direction is to further examine changes in wage and employment to FDI inflows, as trade liberalization is usually combined with increasing capital influx. Through this approach, we can gain insight into how competition between domestic firms and foreign affiliate impacts changes in average wages and employment in Vietnam.

# Appendix

## A. APPENDIX TO CHAPTER 2

### Appendix A.1: Means of Horizontal, Backward, and Forward by Industrial Sector

| Sectors | Horizontal | Backward | Backward_<br><i>Manuf.g</i> | Backward_<br><i>service</i> | Forward | Forward_<br><i>Manuf.g</i> | Forward_<br><i>service</i> |
|---------|------------|----------|-----------------------------|-----------------------------|---------|----------------------------|----------------------------|
| 1. D15  | .3567      | .0106    | .0020                       | .0085                       | .0503   | .0406                      | .0097                      |
| 2. D16  | .0059      | .0019    | .0001                       | .0018                       | .0925   | .0865                      | .0059                      |
| 3. D17  | .5833      | .1684    | .1665                       | .0019                       | .1514   | .1452                      | .0061                      |
| 4. D18  | .4314      | .0549    | .0529                       | .0020                       | .2881   | .2808                      | .0073                      |
| 5. D19  | .7286      | .0051    | .0032                       | .0018                       | .1666   | .1629                      | .0037                      |
| 6. D20  | .2463      | .3381    | .3297                       | .0084                       | .0740   | .0681                      | .0058                      |
| 7. D21  | .3314      | .1282    | .1096                       | .0185                       | .1216   | .1133                      | .0082                      |
| 8. D22  | .0319      | .1173    | .0442                       | .0731                       | .2174   | .2106                      | .0067                      |
| 9. D23  | .4221      | .1146    | .0748                       | .0397                       | .0980   | .0944                      | .0036                      |
| 10.D24  | .4489      | .1222    | .1038                       | .0184                       | .1232   | .1059                      | .0172                      |
| 11.D25  | .3623      | .2781    | .2725                       | .0056                       | .1483   | .1442                      | .0041                      |
| 12.D26  | .2343      | .0982    | .0579                       | .0402                       | .1021   | .0942                      | .0079                      |
| 13.D27  | .2364      | .2208    | .2078                       | .0130                       | .0415   | .0381                      | .0033                      |
| 14.D28  | .4479      | .1606    | .1561                       | .0044                       | .1723   | .1653                      | .0070                      |
| 15.D29  | .3801      | .0870    | .0805                       | .0064                       | .1785   | .1687                      | .0097                      |
| 16.D30  | .8346      | .1017    | .0955                       | .0061                       | .1876   | .1775                      | .0100                      |
| 17.D31  | .4378      | .0984    | .0892                       | .0092                       | .0699   | .0670                      | .0029                      |
| 18.D32  | .7049      | .0145    | .0099                       | .0046                       | .0561   | .0473                      | .0088                      |
| 19.D33  | .7331      | .4102    | .3756                       | .0346                       | .0954   | .0918                      | .0036                      |
| 20.D34  | .6526      | .0053    | .0048                       | .0004                       | .1795   | .1698                      | .0096                      |
| 21.D35  | .5836      | .0064    | .0051                       | .0012                       | .2187   | .2124                      | .0063                      |
| 22.D36  | .4921      | .1534    | .1402                       | .0132                       | .1249   | .1197                      | .0051                      |

## Appendix A.2: Manufacturing Industries, 2 digits (VSIC, 1993)

|     | <b>D. Manufacturing</b>   |
|-----|---|
| 1.  | D15. Manufacture Of Food Products And Beverages                       |
| 2.  | D16. Manufacture Of Tobacco Products                                  |
| 3.  | D17. Manufacture Of Textiles  |
| 4.  | D18. Manufacture Of Wearing Apparel; Dressing And Dyeing Of Fur       |
| 5.  | D19. Tanning And Dressing Of Leather ...                              |
| 6.  | D20. Manufacture Of Wood And Products Of Wood ...                     |
| 7.  | D21. Manufacture Of Paper And Paper Products                          |
| 8.  | D22. Publishing, Printing And Reproduction Of Recorded Media          |
| 9.  | D23. Manufacture Of Coke, Refined Petroleum Products And Nuclear Fuel |
| 10. | D24. Manufacture Of Chemicals And Chemical Products                   |
| 11. | D25. Manufacture Of Rubber And Plastics Products                      |
| 12. | D26. Manufacture Of Other Non - metallic Mineral Products             |
| 13. | D27. Manufacture Of Basic Metals                                      |
| 14. | D28. Manufacture Of Fabricated Metal Products ...                     |
| 15. | D29. Manufacture Of Machinery And Equipment &etc.                     |
| 16. | D30. Manufacture Of Office, Accounting And Computing Machinery        |
| 17. | D31. Manufacture Of Electrical Machinery And Apparatus & etc.         |
| 18. | D32. Manufacture Of Radio, Television And Communication Equipment     |
| 19. | D33. Manufacture Of Medical, Precision And Optical Instruments ...    |
| 20. | D34. Manufacture Of Motor Vehicles, Trailers And Semi - trailers      |
| 21. | D35. Manufacture Of Other Transport Equipment                         |
| 22. | D36. Manufacture Of Furniture; Manufacturing & etc.                   |
| 23. | <i>D37. Recycling</i>   |

*Source:* the GSO

## B. APPENDIX TO CHAPTER 3

### Appendix B.1: Manufacturing Industries, 2 digits (VSIC, 1993), by Technology Level

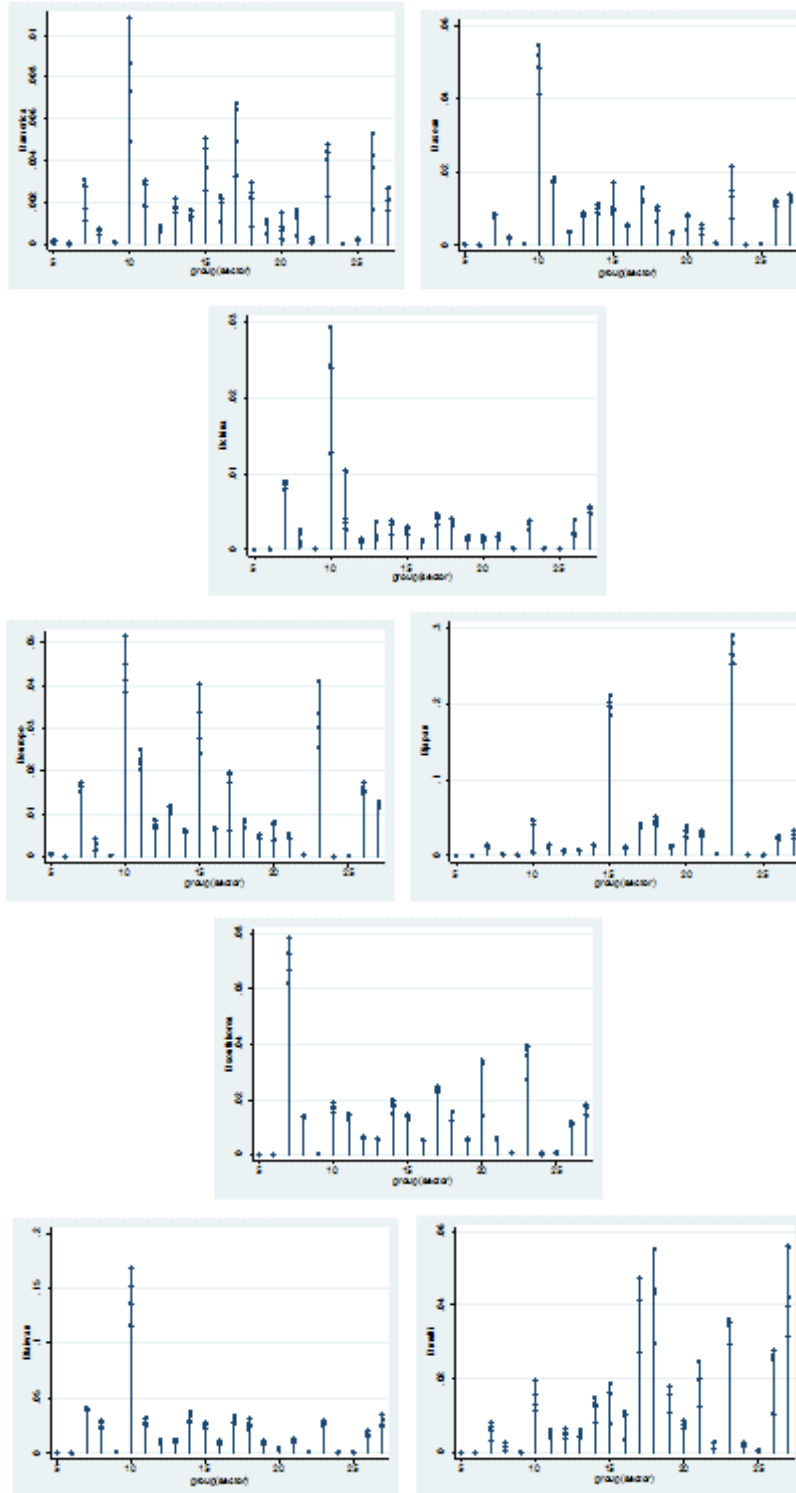
|     | Low_<br>tech | High_<br>tech | D. Manufacturing  |
|-----|--------------|---------------|---|
| 1.  | X            |               | D15. Manufacture Of Food Products And Beverages                       |
| 2.  | X            |               | D16. Manufacture Of Tobacco Products                                  |
| 3.  | X            |               | D17. Manufacture Of Textiles  |
| 4.  | X            |               | D18. Manufacture Of Wearing Apparel; Dressing And Dyeing Of Fur       |
| 5.  | X            |               | D19. Tanning And Dressing Of Leather ...                              |
| 6.  | X            |               | D20. Manufacture Of Wood And Products Of Wood ...                     |
| 7.  | X            |               | D21. Manufacture Of Paper And Paper Products                          |
| 8.  | X            |               | D22. Publishing, Printing And Reproduction Of Recorded Media          |
| 9.  | X            |               | D23. Manufacture Of Coke, Refined Petroleum Products And Nuclear Fuel |
| 10. |              | X             | D24. Manufacture Of Chemicals And Chemical Products                   |
| 11. | X            |               | D25. Manufacture Of Rubber And Plastics Products                      |
| 12. | X            |               | D26. Manufacture Of Other Non - metallic Mineral Products             |
| 13. | X            |               | D27. Manufacture Of Basic Metals                                      |
| 14. | X            |               | D28. Manufacture Of Fabricated Metal Products ...                     |
| 15. |              | X             | D29. Manufacture Of Machinery And Equipment and etc.                  |
| 16. |              | X             | D30. Manufacture Of Office, Accounting And Computing Machinery        |
| 17. |              | X             | D31. Manufacture Of Electrical Machinery And Apparatus and etc.       |
| 18. |              | X             | D32. Manufacture Of Radio, Television And Communication Equipment     |
| 19. |              | X             | D33. Manufacture Of Medical, Precision And Optical Instruments ...    |
| 20. |              | X             | D34. Manufacture Of Motor Vehicles, Trailers And Semi - trailers      |
| 21. |              | X             | D35. Manufacture Of Other Transport Equipment                         |
| 22. | X            |               | D36. Manufacture Of Furniture; Manufacturing and etc.                 |
| 23. | X            |               | D37. Recycling  |

\*Notes: Manufacturing industries classified according their global technological intensity (OECD, 1993, ISIC Revision 2)

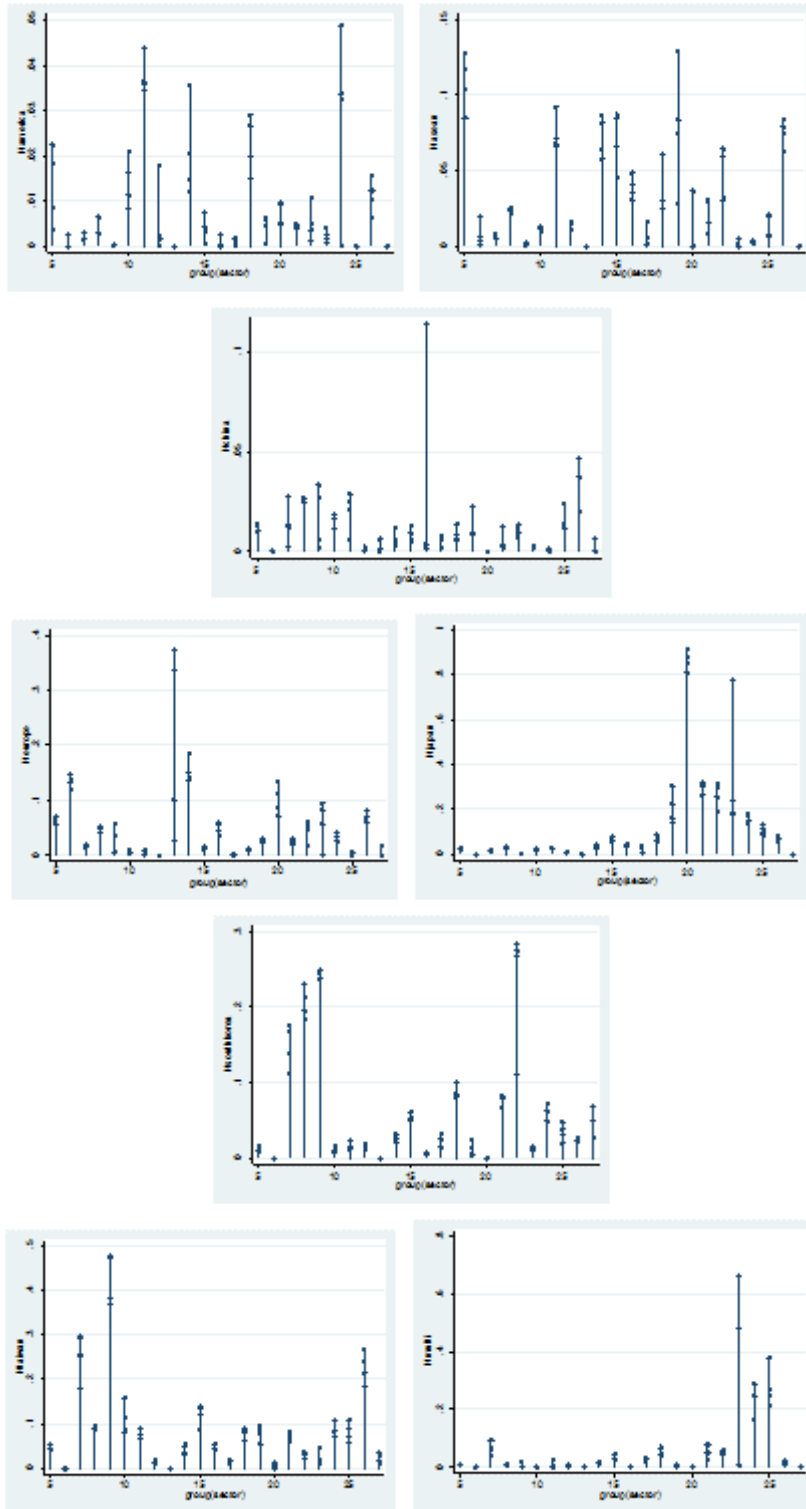


## Appendix B.2: Distribution of Backwards and Horizontals by Origin

### *Backwards by Origin*



## Horizontals by Origin



Appendix B.3: Map of Southeast Asia (www.asean.org)



## Appendix B.4: Domestic Firms' Exit and Foreign Firms' Presence by Origin

```
. cloglog exit Hasean Hamerica Hchina Heurope Hjapan Hsouthkorea Htaiwan Hmulti,
vce(robust)
```

```
Iteration 0: log pseudolikelihood= -58202.26
Iteration 1: log pseudolikelihood = -58020.538
Iteration 2: log pseudolikelihood = -58019.944
Iteration 3: log pseudolikelihood = -58019.944
```

```
Complementary log-log regression          Number of obs    =    114733
                                           Zero outcomes    =     91125
                                           Nonzero outcomes =    23608

                                           Wald chi2(8)     =     605.48
Log pseudolikelihood = -58019.944        Prob> chi2       =     0.0000
```

| exit        | Coef.     | Std. Err. | z      | P> z  | [95% Conf. Interval] | Robust |
|-------------|-----------|-----------|--------|-------|----------------------|--------|
| Hasean      | -1.336842 | .2152006  | -6.21  | 0.000 | -1.758628 - .9150568 |        |
| Hamerica    | 9.441873  | .5931252  | 15.92  | 0.000 | 8.279369 10.60438    |        |
| Hchina      | 2.292388  | .4044771  | 5.67   | 0.000 | 1.499628 3.085149    |        |
| Heurope     | .5128116  | .1857903  | 2.76   | 0.006 | .1486693 .876954     |        |
| Hjapan      | 1.001466  | .1006913  | 9.95   | 0.000 | .8041151 1.198818    |        |
| Hsouthkorea | 1.277942  | .1252088  | 10.21  | 0.000 | 1.032537 1.523347    |        |
| Htaiwan     | .4557845  | .0971485  | 4.69   | 0.000 | .2653769 .6461922    |        |
| Hmulti      | -.897728  | .1606302  | -5.59  | 0.000 | -1.212557 -.5828987  |        |
| _cons       | -1.710897 | .0209211  | -81.78 | 0.000 | -1.751902 -1.669893  |        |

### C. APPENDIX TO CHAPTER 3

#### Appendix C.1: Effective Rate of Protection in Vietnam by Industry

| INDUSTRY   | 2003  | 2004 | 2005  | 2006   | 2007   | 2008   |
|--|-------|------|-------|--------|--------|--------|
| Food Products And Beverages                                | .522  | -    | .313  | .299   | .288   | .273   |
| Tobacco Products   | .857  | -    | .457  | .457   | .46    | .463   |
| Textiles   | 1.23  | -    | .51   | .618   | .179   | .183   |
| Wearing Apparel; Dressing And Dyeing<br>Of Fur             | 1.651 | -    |       | .136   | .58    | .584   |
| Tanning And Dressing Of Leather ...                        | .698  | -    | .463  | .463   | .558   | .503   |
| Wood And Products Of Wood ...                              | .112  | -    | -.023 | -.023  | -.022  | -.026  |
| Paper And Paper Products                                   | .412  | -    | .18   | .236   | .224   | .208   |
| Publishing, Printing And Reproduction Of<br>Recorded Media | .137  | -    | .1    | .12    | .06    | .1     |
| Coke, Refined Petroleum Products And<br>Nuclear Fuel       |       | -    | .05   | -.0097 | -.0094 | -.0056 |
| Chemicals And Chemical Products                            | .079  | -    | .022  | .111   | .11    | .102   |
| Rubber And Plastics Products                               | .345  | -    |       | .353   | .351   | .322   |
| Other Non - metallic Mineral Products                      | .376  | -    | .25   | .294   | .284   | .26    |
| Basic Metals   | -.067 | -    | -.01  | -.096  | -.074  | -.067  |
| Fabricated Metal Products ...                              | .053  | -    | .03   | .0056  | .0085  | .012   |
| Machinery And Equipment and etc.                           | -.142 | -    | -.085 | -.057  | -.051  | -.048  |
| Electrical Machinery And Apparatus and<br>etc.             | .12   | -    | .16   | .059   | .058   | .058   |
| Radio, Television And Communication<br>Equipment           | .11   | -    |       | .039   | .032   | .016   |
| Medical, Precision And Optical<br>Instruments ...          | -.009 | -    | 0     | -.028  | -.028  | -.029  |
| Motor Vehicles, Trailers And Semi -<br>trailers            | .571  | -    | .326  | .32    | .31    | .3     |
| Other transport equipment                                  | .274  | -    | -.09  | .083   | .084   | .083   |
| Furniture; Manufacturing and etc.                          | .457  | -    | .57   | .387   | .361   | .328   |

Source: MUTRAP II (2008), MUTRAP III (2010) for the years 2005-2008 and Chu and Kalirajan (2011) for the year 2003

## Appendix C.2: Import Penetration in Vietnam by Industry

| INDUSTRY   | 2003   | 2004   | 2005   | 2006   | 2007   | 2008   |
|--|--------|--------|--------|--------|--------|--------|
| Food Products And Beverages                                | .135   | .135   | .129   | .129   | .154   | .175   |
| Tobacco Products   | .18    | .196   | .064   | .027   | .017   | .033   |
| Textiles   | 1.506  | 1.121  | 1.285  | 1.041  | 1.065  | 1.223  |
| Wearing Apparel; Dressing And Dyeing<br>Of Fur             | .345   | .35    | .116   | .066   | .052   | .052   |
| Tanning And Dressing Of Leather ...                        | .468   | .386   | .357   | .307   | .068   | .071   |
| Wood And Products Of Wood ...                              | -      | -      | .375   | .45    | .417   | .386   |
| Paper And Paper Products                                   | .389   | .393   | .564   | .572   | .346   | .561   |
| Publishing, Printing And Reproduction Of<br>Recorded Media | .058   | .081   | .091   | .093   | .112   | .063   |
| Coke, Refined Petroleum Products And<br>Nuclear Fuel       | 36.107 | 35.483 | 38.626 | 33.057 | 56.571 | 30.624 |
| Chemicals And Chemical Products                            | .607   | .518   | 1.615  | 1.498  | 1.685  | 1.591  |
| Rubber And Plastics Products                               | .562   | .578   | .339   | .346   | .357   | .393   |
| Other Non - metallic Mineral Products                      | .114   | .112   | .118   | .102   | .112   | .119   |
| Basic Metals   | 1.386  | 1.305  | 2.074  | 2.429  | 2.306  | 2.578  |
| Fabricated Metal Products ...                              | -      | -      | .228   | .234   | .291   | .275   |
| Machinery And Equipment and etc.                           | -      | -      | 4.329  | 4.901  | 5.315  | 6.204  |
| Office, Accounting And Computing<br>Machinery              | -      | -      | .87    | .909   | .863   | .511   |
| Electrical Machinery And Apparatus and<br>etc.             | -      | -      | .588   | .496   | .655   | .749   |
| Radio, Television And Communication<br>Equipment           | -      | -      | 1.244  | 1.435  | 1.315  | 1.972  |
| Medical, Precision And Optical<br>Instruments ...          | -      | -      | 3.248  | 4.154  | 3.124  | 1.746  |
| Motor Vehicles, Trailers And Semi -<br>trailers            | 1.064  | 1.02   | .684   | .468   | .659   | .78    |
| Other transport equipment                                  | -      | -      | .176   | .13    | .346   | .314   |
| Furniture; Manufacturing and etc.                          | -      | -      | .135   | .131   | .134   | .126   |

*Source:* Authors' calculations based on the GSO's reports on International Merchandise trade of Vietnam in several years

### Appendix C.3: Calculation Strategy and Explanations for Key Variables

|                             |   |
|-----------------------------|---|
| Real output                 | Industry or firm output, deflated by the Producer Price Index (year 2000=100; unit: bill.VND).  |
| Employment                  | - Total number of worker in an industry; or,<br>- Total number of full-time workers in firms at the year-end.   |
| Real wage                   | - Average industry wage; or,<br>- Total payments for employees divided by total firm employment, then deflated by the Producer Price Index (year 2000=100; unit: mill. VND).  |
| Cost of capital             | Total interest payment of firms in a year, deflated by the Producer Price Index (year 2000=100; unit: mill. VND).   |
| Price raw materials         | Value of raw materials used, deflated by the Producer Price Index (year 2000=100; unit: mill. VND).   |
| Real quasi rents per worker | $QR = (Y - M - r \cdot K - w^A \cdot N) / N$ , deflated by the Producer Price Index (year 2000=100; unit: mill. VND), where Y, M, r.K, N respectively denote firm sales, the cost of material inputs, the cost of capital inputs, and total firm employment(Revenga, 1997). |
| Capital stock/Value Added   | Total physical assets at the year-end, divided by total value added, then deflated by the Producer Price Index (year 2000=100)  |
| ERP                         | Effective rate of protection, as in percentage, collected from MUTRAP II (2008), MUTRAP III (2010), and Chu and Kalirajan (2011).   |
| Import penetration ratio    | Percentage of imports in total output.  |

## Bibliography

- Abbott, P., Bentzen, J. and Tarp, F. (2009). Trade and Development: Lessons from Vietnam's Past Trade Agreements. *World Development*, 37(2), 341-53.
- Abowd, J. and Lemieux, T. (1993). The Effects of Product Market Competition on Collective Bargaining Agreements: The Case of Foreign Competition in Canada. *Quarterly Journal of Economics*, 108, 983-1014.
- Abraham, F., Konings, J., and Sloomakers, V.(2010). FDI Spillovers in the Chinese Manufacturing Sector: Evidence of Firm Heterogeneity. *Economics of Transition*, 18(1), 143-82.
- Acemoglu, D. (2003). Patterns of Skill Premia. *Review of Economic Studies*, 70, 199 – 230.
- Aidt, T. S. and Tzannatos, Z. (2002). *Union and Collective Bargaining: Economic Effects in a Global Environment. Direction in Development*. Washington DC, World Bank.
- Aitken, B., and Harrison, A. (1999). Do Domestic Firms Benefit from Direct Foreign Investment? Evidence from Venezuela. *American Economic Review*, 89(3), 605-18.
- Anh, N. N., et al. (2008). *Foreign Direct Investment in Vietnam: Is There any Evidence of Technological Spillover Effects*. Retrieved from Development and Policies Research Center (Depocen). <http://www.depocenwp.org>.
- Angel, D. (1994). Tighter Bonds? Customer-Supplier Linkages in Semiconductors. *Regional Studies*, 28(2), 187-200.
- Arbache, J.S. and Menezes-Filho, N. (2000). Rent-sharing in Brazil: Using Trade Liberalization as a Natural Experiment. *Rio de Janeiro: Annals of the V Annual Meeting of the Latin American and Caribbean Economic Association*.



- Athukorala, P. and Menon, J. (1996). Foreign Investment and Industrialization in Malaysia: Exports, Employment and Spillovers. *Asian Economic Journal*, 10(1), 29-44.
- Athukorala, P. (2006). Trade Policy Reforms and the Structure of Protection in Vietnam. *The World Economy*, 29(2), 161-87.
- Attanasio, O., Goldberg, P. K. and Pavcnik, N. (2004). Trade Reforms and Wage Inequality in Colombia. *Journal of Development Economics*, 74, 331-66.
- Barrios, S. and Strobl, E. (2002). Foreign Direct Investment and Productivity Spillovers: Evidence from the Spanish experience. *Welwirtschaftliches Archiv*, 138, 459-81.
- Barrios, S., Görg, H. and Strobl, E. (2003). Explaining Firms' Export Behaviour: R&D, Spillovers and the Destination Market. *Oxford Bulletin of Economics and Statistics*, 65(4), 475-96.
- Barry, F., Görg, H., and Strobl E. (2003). Foreign Direct Investment, Agglomerations, and Demonstration Effects: An Empirical Investigation. *Review of World Economics*, 239 (4).
- Ben Hamida, L. (2006). Multinational Firms, Spillovers, and Productivity Growth: An Evolutionary Model, In Proceeding of EcoMod International Conference, Regional and Urban Modeling, June 1-3, Brussels.
- Bernard, A. B. et al. (2007). Firms in International Trade. *Journal of Economic Perspectives*, American Economic Association, 21(3), 105-30.
- Berman, E., Bound, J., and Machin, S. (1998) Implications of Skill-biased Technological Change: International Evidence. *Quarterly Journal of Economics*, 113, 1245-79.
- Bitzer, J., and Görg, H. (2009). Foreign Direct Investment, Competition and Industry Performance. *The World Economy*.
- Blanchflower, D., Oswald, A. and Sanfey, P. (1996). Wages, Profits and Rent-Sharing. *Quarterly Journal of Economics*, 111, 227-51.

- Blundell, R. and Bond, S. (1998). Initial Conditions and Moment Restrictions in Dynamic Panel Data Models. *Journal of Econometrics*, 87(1), 115–43.
- Bwalya, S. M. (2006). Foreign Direct Investment and Technology Spillovers: Evidence from Panel Data Analysis of Manufacturing Firms in Zambia. *Journal of Development Economics*, 81, 514-26.
- Cameron, A. C., and Trivedi, P. K. (2009). *Microeconometrics using Stata*. USA, Texas: Stata Press.
- Cantwell, J.A. (1999). Innovation as the Principal Source of Growth in the Global Economy. In D. Archibugi, J. Howells and J. Michie (eds.). *Innovation Policy in a Global Economy*. Cambridge: Cambridge University Press.
- Caves, R. (1996). *Multinational Enterprise and Economic Analysis*. Cambridge: Cambridge University Press.
- Chu, S. N. and Kalirajan, K. (2011). Impact of Trade Liberalization on Technical Efficiency of Vietnamese Manufacturing Firms. *Science Technology and Society*, 16(3), 265-84.
- Chuc, N. D. (2008). *FDI Horizontal and Vertical Effects on Local Firm Technical Efficiency*. Retrieved from Development and Policies Research Center (Depocen). <http://www.depocenwp.org>.
- Clarke, S., Lee, C-H., and Chi, D. Q. (2007). From Rights to Interests: The Challenge of Industrial Relations in Vietnam. *Journal of Industrial Relations*, 49(4), 545–68.
- Cling, J. P. et al. (2009). The Distributive Impact of Vietnam’s Accession to the WTO. *Économie internationale*, 118, 43-71.
- Corden, W. M. (1966). The Structure of a Tariff System and the Effective Protection Rate. *Journal of Political Economy*, 74, 221-37.
- Currie, J., and Harrison, A. (1997). Sharing the Costs: The Impact of Trade Reform on Capital and Labour in Morocco. *Journal of Labour Economics*, 15(3), 44-72.

- Driffield, N. L. (2001a). The Impact on Domestic Productivity of Inward Investment in the UK. *The Manchester School*, 69(1), 103-19.
- Driffield, N. and Girma, S. (2003). Regional FDI and Wages Spillovers: Evidence from the UK Electronics Industry. *Oxford Bulletin of Economics and Statistics*, 65, 453-74.
- Driffield, N. and Love, J. H. (2006). Does the Motivation for Foreign Direct Investment Affect Productivity Spillovers to the Domestic Sector? *Applied Economics Quarterly*, 52(1), 3-28.
- Driffield, N. and Mohd Noor, A. H. (1999). Foreign Direct Investment and Local Input Linkages in Malaysia. *Transnational Corporations*, 8(3).
- Driffield, N., Munday, M., and Roberts, A. (2002). Foreign Direct Investment, Transactions Linkages, and the Performance of the Domestic Sector. *International Journal of the Economics of Business*, 9(3), 335-51.
- Dunning, J. (1993). *Multinational Enterprises and the Global Economy*. Reading: Addison Wesley.
- Dutt, P., Mitra, D. and Ranjan, P. (2009). International Trade and Unemployment: Theory and Cross-national Evidence. *Journal of International Economics*, 78(1), 32-44.
- Edwards, V., and Phan, A. (2008). Trade Unions in Vietnam: from Socialism to Market Socialism. In *Trade Unions in Asia: An Economic and Sociological Analysis*, Benson J, Zhu Y (eds). Routledge: New York.
- Feenstra, R. C. and Hanson, G. (1997). Globalization, Outsourcing, and Wage Inequality. *American Economic Review*, 86, 240-5.
- Feenstra, R. and Hanson, G. (2001). Global Production Sharing and Rising Inequality: A Survey of Trade and Wages. *NBER Working Paper 8372*, July.
- Feliciano, Z. M. (2001). Workers and Trade Liberalization: The Impact of Trade Reforms in Mexico on Wages and Employment. *Industrial and Labor Relations Review*, 55(1), 95-115.

- Findlay, R. (1978). Relative Backwardness, Direct Foreign Investment, and the Transfer of Technology: A Simple Dynamic Model. *Quarterly Journal of Economics*, 92, 1 - 16.
- Friedman, J. *et al.* (2012). Openness, Wage Gaps and Unions in Chile: A Micro Econometric Analysis, in OECD (2012), *Policy Priorities for International Trade and Jobs*, Douglas Lippoldt (ed.), OECD, Paris.
- Fosfuri, A., Motta, M., and Ronde, T. (2001). Foreign Direct Investment and Spillovers through Workers' Mobility. *Journal of International Economics* 53 (1), 205-22.
- FTA (2008). *Foreign Direct Investment in Vietnam in 20 Years, 1988-2007 (20 Nam Dau Tu Nuoc Ngoai Tai Vietnam, 1988-2007)*. Retrieved from Ministry of Planning and Investment (MPI). <http://fia.mpi.gov.vn/News.aspx?ctl=newsdetail&p=2.44&aID=507>
- Fu, X. and Balasubramanyam, V. N. (2004). Exports, FDI, Growth of Small Rural Enterprises and Employment in China. *ESRC Centre for Business Research Working Paper no. 286. Cambridge: University of Cambridge.*
- Gaston, N. (1998). The Impact of International Trade and Protection on Australian Manufacturing Employment. *Australian Economic Papers*, 37(2), 119-36.
- Ghazali, M. (2011). Trade Liberalization, Rent Sharing and Wage Inequality in Tunisia, 1998-2002. *International Economics*, 125, 5-40.
- Girma, S., Gong, Y., and Görg, H. (2008). Foreign Direct Investment, Access to Finance, and Innovation Activity in Chinese Enterprises. *World Bank Economic Review*, 22 (2), 367-82.
- Girma, S., Görg, H., and Pisu, M. (2008). Exporting, Linkages and Productivity Spillovers from Foreign Direct Investment. *Canadian Journal of Economics, Canadian Economics Association*, 41(1), 320-40.
- Giround, A. and Mirza, H. (2006). Factors determining supply linkages between transnational corporations and local suppliers in ASEAN. *Transnational Corporations*, 15(3).

- Glass, A., and Saggi, K. (1998). International Technology Transfer and the Technology Gap. *Journal of Development Economics*, 55, 369 - 98.
- Glass, A. and Saggi, K (2002). Multinational Firms and Technology Transfer. *Scandinavian Journal of Economics*, 104, 495-514.
- Goldberg, P., and Pavcnik, N. (2004). Trade, Inequality and Poverty: What Do We Know? *NBER Working Paper 10593*, National Bureau of Economic Research, Inc.
- Goldberg, P., and Pavcnik, N. (2005). Trade, Wages and the Political Economy of Trade Protection: Evidence from the Colombian Trade Reforms. *Journal of International Economics*, 66, 75-105.
- Goldsmith, P. and Sporleder, T. (1998). Analyzing Foreign Direct Investment Decisions by Food and Beverage Firms: An Empirical Model of Transaction Theory. *Canadian Journal of Agricultural Economics*, 46(3), 329-46.
- Gottschalk, P. and Smeeding, T. M. (1997). Cross-national Comparisons of Earnings and Income Inequality. *Journal of Economic Literature*, 35, 633-87.
- Görg, H. and Görlich, D. (2011). Trade and Labor Market Outcomes in Germany. *OECD Trade Policy Working Papers*, No. 125, OECD Publishing.
- Görg, H., and Greenaway, D. (2004). Much Ado about Nothing? Do Domestic Firms Really Benefit from Foreign Direct Investment? In D. Greenaway, H. Görg, and R. Kneller, *Globalization and Productivity* (Vol. II, 108-34). UK: Edward Elgar Publishing Limited.
- Görg, H., and Strobl, E. (2005). Spillovers from Foreign Firms through Worker Mobility: An Empirical Investigation. *Scandinavian Journal of Economics*, Wiley Blackwell, 107(4), 693-709.
- Grossman, G. and Helpman, E. (1994). Protection for Sale. *American Economic Review*, 84 (4), 833-50.
- GSO (2006). *The Vietnamese International Merchandise Trade for Twenty Years Renovation, 1986-2005*. Hanoi: Statistical Publishing House.

- GSO (2010a). *The Situation of Enterprises through the Results of Surveys Conducted in 2007, 2008, 2009*. Hanoi: Statistical Publishing House.
- GSO (2010b). *The Input–Output Table for Vietnam in 2007*. Hanoi: Statistical Publishing House.
- GSO (2011). *International Merchandise Trade in Vietnam in 2009*. Hanoi: Statistical Publishing House.
- Guyton, L. E. (1995). Japanese FDI and the Transfer of Japanese Consumer Electronics Production to Malaysia. *Journal of Far Eastern Business*, 1(1), 63-97.
- Hanson, G. and Harrison, A. (1995). Trade, Technology and Wage Inequality. *NBER Working Paper no. 5110*.
- Hanson, G. and Harrison, A. (1999). Trade Liberalization and Wage Inequality in Mexico. *Industrial and Labor Relations Review*, 52(2), 271-88.
- Hatzichronoglou, T. (1997). *Revision of the High-Technology Sector and Product Classification*. OECD Publishing.
- Hayter, S. and Weinberg, B. (2011). Mind the Gap: Collective Bargaining and Wage Inequality. In S. Hayter (ed.): *The Role of Collective Bargaining in the Global Economy, negotiating for Social Justice*. Edward Elgar/ILO, Cheltenham/Geneva.
- Heo, Y. and Park, M. (2008). Import Competition and Job Displacement: A Case Study of Korean Manufacturing Industries. *Social Science Journal*, 45 (1), 182-93.
- Hobday, M. (1996). Innovation in South-East Asia: Lessons for Europe?. *Management Decision*, 34(9), 74-85.
- Huang, T. (2004). Spillovers from Taiwan, Hong Kong, and Macau Investment and from Other Foreign Investment in Chinese Industries. *Contemporary Economic Policy*, 22(1), 13-25.
- Imrie, R. and Morris, J. (1992). A Review of Recent Changes in Buyer-Supplier Relations. *Omega*, 20(5), 641-52.

- Javorcik, B. S. (2004). Does Foreign Direct Investment Increase the Productivity of Domestic Firms? In Search of Spillovers through Backward Linkages. *American Economic Review*, 94(3), 605-27.
- Javorcik, B. S., and Spatareanu, M. (2011). Does It Matter Where You Come From? Vertical Spillovers from Foreign Direct Investment and the Origin of Investor. *Journal of Development Economics*, 96, 126-38.
- Jenkins, R. (2004). Vietnam in the Global Economy: Trade, Employment and Poverty. *Journal of International Development*, 16(1), 13–28.
- Kien, T. N. and Heo, Y. (2009). Impacts of Trade Liberalization of Employment in Vietnam: A System Generalized Method of Moments Estimation. *The Developing Economies*, 47(1), 81-103.
- Kim, A. M. (2008). *Learning to Be Capitalists: Entrepreneurs in Vietnam's Transition Economy*. Oxford University Press: Oxford.
- Kim, H. H. and Kim, J. D. (2010). Productivity Spillover Effect of Foreign Direct Investment into Korea. *Journal of East Asian Economic Integration*, 14(2), 21-48.
- Kinoshita, Y. (2001). R&D and Technology Spillovers through FDI: Innovation and Absorptive Capacity". CEPR Discussion Paper DP2775.
- Kneller, R. and Pisu, M. (2007). Industrial Linkages and Export Spillovers from FDI. *The World Economy*, 30(1), 105-134.
- Kokko, A. (1996). Productivity Spillovers from Competition between Local Firms and Foreign Affiliates. *Journal of International Development*, 8, 517-30.
- Krishna, K., Poole, J. P., and Senses, M. Z. (2012). Trade, Labor Market Frictions, and Residual Wage Inequality across Worker Groups. *American Economic Review: Papers & Proceedings*, 102(3), 1–8.
- Krugman, P.R. (1996). Growing World Trade: Causes and Consequences. *Brookings Papers on Economic Activity, Volume 1*, 327-77.

- Kwon, C. W. and Chun, B. (2009). Local Content Requirement under Vertical Technology Diffusion. *Review of Development Economics*, 13, 111-24.
- Lan, N. P. (2008). *Productivity Spillovers from Foreign Direct Investment: Evidence from Vietnamese Firm Data*. Retrieved from School of Commerce, University of South Australia. <http://papers.ssrn.com>.
- Le, Q. H. and Pomfret, R. (2008). *Technology Spillovers from Foreign Direct Investment in Vietnam: Horizontal or Vertical Spillovers*. VDF Working Paper No. 085. Retrieved from <http://www.vdf.rg.vn/workingpapers/vdfwp0815>.
- Levinsohn, J. and Petrin, A. (2003). Estimating Production Functions Using Inputs to Control for Unobservables. *Review of Economic Studies*, 70, 317-42.
- Lin, P., Liu, Z. and Zhang, Y. (2009). Do Chinese Domestic Firms Benefit from FDI inflow? Evidence of Horizontal and Vertical Spillovers. *Chinese Economic Review*, 20(4), 677-91.
- Lipsey, R. E. and Sjöholm (2001). Foreign Direct Investment and Wages in Indonesian Manufacturing. NBER Working Paper No 8299 (May).
- Mansfield, E., and Romeo, A. (1980). Technology Transfer to Overseas Subsidiaries by US Based Firms. *Quarterly Journal of Economics*, 737-50.
- Markusen, J. and Venables, A. (1999). Foreign Direct Investment as a Catalyst for Industrial Development. *European Economic Review*, 43(2), 335-56.
- Martins, P. S. (2007) Rent Sharing and Wages. *Reflets et Perspectives*, XLVI, 2007/2-3, 23-31.
- McMillan, M. and Verduzco, I. (2011). *New Evidence on Trade and Employment: An Overview*. in ILO (2011a), 23-60.
- Milner, C. and Wright, P. (1998). Modelling Labour Market Adjustment to Trade Liberalisation in an Industrialising Economy. *The Economic Journal*, 108(447), 509-28.



- MPI (2006). *SME Development Plan 2006-2010*. Hanoi: Agency for SME Development, Ministry of Planning and Investment (MPI).
- MPI (2008). *Annual Report: Small & Medium Enterprises in Vietnam 2008*. Hanoi: Agency for SME Development, Ministry of Planning and Investment (MPI).
- MOLISA (2010). *Vietnam Employment Trends 2010*. Hanoi: International Labor Organization Publishing.
- Munday, M., Morris, J. and Wilkinson, B. (1995). Factories or Warehouses – A Welsh Perspective on Japanese Transplant Manufacturing. *Regional Studies*, 29, 1–17.
- MUTRAP II (2008). *Comprehensive Evaluation of the Impact of Increased Key Imports-Exports and Regulatory Changes Resulting from Vietnam's WTO Membership*. Project of the Vietnamese Ministry of Industry and Trade in Partnership with the European Commission. Activity Hor\_9.
- MUTRAP III (2010). *Qualitative and Quantitative Analysis and Impact Assessment of the ASEAN-China FTA: A Critical Review of the Agreement and Issues for Further Reflection and Future Negotiation*. Final Report, Activity Code FTA\_01.
- MUTRAP (2011). *Doing Business in Vietnam*. Roma: Information and Communication Publishing House.
- Narjoko, D. (2009). *Policy Reforms, Firm Entry, and Labor Productivity Change: Learning from the Example of Vietnamese Manufacturing*. ERIA Research Project .
- Navaretti, G. B. and Venables, A. J. (2004). *Multinational Firms in the World Economy*. New Jersey: Princeton University Press.
- Nickell, S. (1981). Biases in Dynamic Models with Fixed Effects. *Econometrica*, 49(6), 1417–26.
- OECD (2008). *OECD Benchmark Definition of Foreign Direct Investment*. OECD Publishing, Paris.
- OECD (2012). *Trade, Growth and Jobs*. OECD Trade and Agriculture Directorate, May 2012.

- Pavcnik, N. (2003). What Explains Skill Upgrading in Less Developed Countries? *Journal of Development Economics*, 71, 311-28.
- Pavcnik, N., Blom, A., Goldberg, P., and Schady, N. (2004). Liberalization and Industry Wage Structure: Evidence from Brazil, *The World Bank Economic Review*, 18(3).
- Petrin, A., Poi, B. P., and Levinsohn, J. (2004). Production Function Estimation in STATA Using Inputs to Control for Unobservables. *Stata Journal* 4(2), 113-23.
- Phan, D. N. (2009). A Report on Vietnam's Labor Market. CIEM-DANIDA Project: Poverty Reduction Grant (PRG).
- Rand J. and Torm, N. (2012). The Informal Sector Wage Gap Among Vietnamese Micro-firms. *Journal of the Asia Pacific Economy*, 17(4), 560-77.
- Reinecke, G. and Valenzuela, M. E. (2011). Illustrating the Gap: Collective Bargaining and Income Distribution in Chile. In S. Hayter (ed.): *The Role of Collective Bargaining in the Global Economy. Negotiating for Social Justice*. Edward Elgar/ILO, Cheltenham/Geneva.
- Revenge, A. (1997). Employment and Wage Effects of Trade Liberalization: The Case of Mexican Manufacturing. *Journal of Labor Economics*, 15(3), S20-S43.
- Rodriguez-Clare, A. (1996). *Multinationals, Linkages and Economic Development*. *American Economic Review*, 86(4), 852-73.
- Roodman, D. (2006). How To Do xtabond2: An Introduction to "Difference" and "System" GMM in Stata. *Center for Global Development. Working Paper Number 103*.
- Roodman, D. M. (2009). A Note on the Theme of Too Many Instruments. *Oxford Bulletin of Economics and Statistics*, 135 - 58.
- Ruane, F. and Sutherland, J. (2005). Foreign Direct Investment and Export Spillovers: How Do Export Platforms Fare?. Institute for International Integration Studies (IIIS) Discussion Paper No. 58.
- Sakurai, K. (2004). How Does Trade Affect the Labor Market? Evidence from Japanese Manufacturing. *Japan and the World Economy*, 16 (2), 139-61.

- Sen, K. (2002). Globalisation and Employment in Bangladesh and Kenya. *Globalization, Production and Poverty Discussion Paper no. 7*. Norwich: School of Development Studies. University of East Anglia.
- Sjöholm, F. (1999). Exports, Imports and Productivity: Results from Indonesian Establishment Data. *World Development, Elsevier*, 27(4), 705-15.
- Söderbom, M. (2009). *ERSA Training Workshop: Economic Methods for Panel Data*. Retrieved from [http://www.nuff.ox.ac.uk/users/bond/prodfuncs\\_final.pdf](http://www.nuff.ox.ac.uk/users/bond/prodfuncs_final.pdf).
- Stone, S. F. and Cepeda, R. H. C. (2011). Wage Implications of Trade Liberalization: Evidence for Effective Policy Formation. *OECD Trade Policy Working Papers*, No. 125, OECD Publishing.
- Takii, S. (2011). Do FDI Spillovers Vary Among Home Economies?: Evidence from Indonesian Manufacturing. *Journal of Asian Economics*, 22 (2), 152-63.
- Thuy, L. T. (2007). *Does Foreign Direct Investment Have an Impact on the Growth in Labor Productivity of Vietnamese Domestic Firms?* Retrieved from <http://www.rieti.go.jp/jp/publications/dp/07e021.pdf>.
- Tien, T. Q. (2008). Reforms in FDI Policy and the Investment Climate in Vietnam. *Journal of World Trade* 42(6), 1179-202.
- Torm, N. (2012). The Role of Trade Unions in Vietnam: A Case Study of Small and Medium Enterprises. *Journal of International Development*. DOI: 10.1002/jid.2881
- Torm, N., Larsen, A. F., and Rand, J. (2011). Do Recruitment Ties Affect Wages? An Analysis Using Matched Employer-Employee Data from Vietnam. *Review of Development Economics*, 15(3), 541-55.
- Trinh, B and Kobayashi, K. (2012). Measuring the Effective Rate of Protection in Vietnam's Economy with Emphasis on the Manufacturing Industry: An Input-Output Approach. *European Journal of Economics, Finance and Administrative Sciences*, 44.

- Trinh, B. and Thanh, L. H. (2005). Measuring the Level of Protection for Manufacturing Industry in Vietnam: the Effective Rate of Protection Approach. *Vietnam's Socioeconomic Development*, 44, 30-43.
- Tybout, J., De Melo, J., and Corbo, V. (1991). The Effects of Trade Reforms on Scale and Technical Efficiency: New Evidence from Chile. *Journal of International Economics*, 31, 231–50.
- Tybout, J., and Westbrook, D. (1994). Trade Liberalization and the Dynamics of Efficiency change in Mexican Manufacturing Industries. *Journal of International Economics*, 39, 53-78.
- UNCTAD (2008). *World Investment Prospects Survey, 2008-2010*. New York and Geneva. United Nations.
- UNCTAD (2009). *World Investment Prospects Survey, 2009-2011*. New York and Geneva. United Nations.
- Wang, J. and Blomström, M. (1992). Foreign Investment and Technology Transfer: A Simple Model. *European Economic Review*, 36, 137-55.
- Windmeijer, F. (2005). A Finite Sample Correction for the Variance of Linear Efficient Two - step GMM Estimators. *Journals of Econometrics*.
- VCCI (2008). *Vietnam Business Annual Report 2007- Labor and Human Resource Development*. Hanoi: National Political Publishing House.
- Zhu, Y., Collins, N., Webber, M., and Benson, J. (2008). New Forms of Ownership and Human Resource Practices in Vietnam. *Human Resource Management*, 47(1), 157–75.

## **Eidesstattliche Erklärung**

Ich erkläre hiermit an Eides Statt, dass ich meine Doktorarbeit mit dem Titel „*Foreign Direct Investment, Trade Liberalization, and Labor Market: Evidence from Vietnamese Manufacturing*“ selbständig und ohne fremde Hilfe angefertigt habe und dass ich alle von anderen Autoren wörtlich übernommenen Stellen, wie auch die sich an die Gedanken anderer Autoren enganehnenden Ausführungen meiner Arbeit, besonders gekennzeichnet und die Quellen nachden mir angegebenen Richtlinien zitiert habe.

Kiel, 15.November 2012

Pham, Thi Bich Ngoc

# CURRICULUM VITAE

---

## PHAM, THI BICH NGOC

*Date of Birth:* 07 July 1978, in Ha Tinh, Vietnam

*Address:* Amrumring 111, 24107, Kiel

*Email:* pham\_thi@economics.uni-kiel.de, ngoc.phamthibich@hoasen.edu.vn

---

*2004 – present:*        **Lecturer**  
Department of Industrial Economics  
HoaSen University, Ho Chi Minh City, Vietnam.

---

## EDUCATION

*10/2009 –01/2013:*    **Doctoral Degree in Economics**  
University of Kiel, Germany

*05/2012:*                **Advanced Studies Certificate in International Economic Policy  
Research**  
Kiel Institute for the World Economy, Germany

*2001 - 2003:*         **Master of Arts in Development Economics**  
Joint Vietnam-Netherlands Program  
University of Economics, Ho Chi Minh City, Vietnam

*1996 - 2001:*         **Bachelor of Arts in International Trade**  
University of Economics, Ho Chi Minh City, Vietnam

---

*Kiel, January 2013*

Pham, Thi Bich Ngoc