DOCTORAL DISSERTATION

THE IMPACT OF FDI SPILLOVERS ON THE PRODUCTIVITY OF DOMESTICALLY MANUFACTURING FIRMS AND AVERAGE WAGE IN VIETNAM

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ABSTRACT

The dissertation investigates the effects of FDI spillovers on domestic firms’ total factor productivity (period: 2011-2015; 385,976 observations) and recipient country’s average wage (period: 2007-2015; 693,720 observations) using a large unbalanced panel data of Vietnamese manufacturing enterprises. The econometric models are conducted using fixed effect model (FEM) as recommended by Hausman test. The issue relating biased TFP estimation is overcome by the use of the Olley-Pakes (OP) methodology. Further, firm heterogeneities are explored as moderating variables to reflect different level of FDI spillover effects on productivity. First, the results indicate that the horizontal and forward spillovers associated with FDI presence in Vietnam have overwhelming negative impacts on domestic firms’ TFP. In contrast, the greater the effect of backward spillover is, the higher the productivity local firms can reach. Second, human capital is found as a facilitator for productivity spillovers from foreign firms to domestic firms. Third, negative horizontal spillover effect and positive backward spillover effect on domestic firm’s TFP is impressively improved with the movement of technology gap from the bottom 25th percentile to the middle 25th -75th percentile. Fourth, it is found that FDI spillovers in both vertical and horizontal channels do not occur at the bottom 25th percentile of financial development while the effect of backward spillovers on firm productivity is significantly enhanced with higher level of financial development. Fifth, although the relationship between all three FDI spillover channels and TFP vary significantly across regions, it doesn’t mean greater spillover effects as a result of higher FDI concentration. Finally, the overall effect of FDI on the average wage in Vietnam is significantly positive, except for domestic private firms. Besides, this research still has certain limitations such as not controlling the impact of macro factors, unable to access more balanced panel data for better measurements and additional methods with instrument variables.
CHAPTER 1. INTRODUCTION

1.1 Problem statement

The increased foreign presence is expected to boost the productivity because it offers local firms more opportunities for observing and imitating advanced technology in the FDI sector proactively, especially through horizontal spillovers in term of worker mobility, competition and demonstration channels (Hamida and Gugler 2009; Blomstrom and Kokko 1998; Hamida 2013). In addition, positive externalities are generated by vertical integration through the successful upstream and downstream linkages between domestic firms and foreign partners (Behera 2017; Fatima 2016; Havranek and Irsova 2012; Le and Pomfret 2011). Besides, the penetration of MNCs may also generate employment and wage spillovers to domestic workers contributing to restructure the whole economy in a better way (Silajdzic & Mehic, 2016).

Although Vietnam has gradually been narrowing down the gap in the productivity level in the region, the productivity level in 2013 are still less than 1.98 times the average productivity level of ASEAN countries (Nguyen, 2015). Regardless dynamic economic growth, the contribution percentage to GDP growth of total factor productivity (TFP) only accounts for 11.9% in the period 2001-2005, -4.5% in the period 2006-2010 and 23.6 % in the period 2011-2013 (GSO, 2014). Especially, the growth of labor productivity in manufacturing and services sectors are still low compared with other countries in the region; for instance, Vietnam’s labor productivity in textile industry is only equal to 50% of China and 70% of Philippines. Regardless government attempts to attract FDI, the empirical evidences for FDI spillovers in Vietnam, especially the productivity spillover through both horizontal and vertical channel is still rare. In respect to wage spillovers associated with FDI, there are little studies in Vietnam to explore whether FDI spillovers benefit local workers in the host developing country in terms of average wages. It

It is worth to notice that the productivity level of domestic firms under the foreign presence as well as FDI spillover effects on wages is very hard to predict and could be explained by a wide range of contextual factors in the host economy such as FDI type, firm heterogeneities and other macro conditions (Willem, 2019). Under the context of an emerging economy, local firms are even more vulnerable to the market stealing effects or play as the newbies in the competition in the same industry or in vertical linkage relationships with foreign
giants (Newman, Page, Rand, Shimeles, & Söderbom, 2019; Nguyen & Sun, 2012). Therefore, the outcome of inward FDI for Vietnam firm productivity and labor welfare should be measured separately to find out the hidden puzzles with different story-telling as Vietnam’s economy is quite young and has just entered the global market in recent years.

Besides, another major contribution of the thesis relies on the analysis of horizontal spillovers and its impact on wage. It is admitted that FDI presence may enhance the sustainable development in the host economy by their practice of corporate social responsibility as well as their transfer of managerial knowledge, labor training and welfare regime as well as the entrepreneurial spirit (Huang & Zhang, 2017; Zhang & Shang, 2018). As a result, local employees can benefit from labor productivity improvement and capacity building to bargain for higher compensations (Javorcik, 2015; Nguyen & Ramstetter, 2017). In this way, some researchers pay much attention to the wage discrimination between FDI and domestic sector which somehow reflect the wage gap under foreign presence and its determinants (Nguyen, 2015; Nguyen & Ramstetter, 2017; Stoyanov & Zubanov, 2014). This also leaves a gap for researching the horizontal spillover effect on the wage in the host economy where the labor competition and the productivity improvement may occur at the same time.

Therefore, the dissertation aims at answering two big questions: (1) whether FDI spillovers affect domestic manufacturing firms’ productivity? through which channels? any facilitators or barriers? and (2) whether horizontal FDI spillovers affect labor’s average wage in the host economy? The specifications of research objectives will be presented in later section.

1.2 Background to the study - FDI in Vietnam

After more than 30 years of implementing the open-door policy, Vietnam has built a relatively synchronous legal framework, creating a favorable business environment to attract foreign investors. Total registered FDI has significantly increased from 735 million USD in 1990 to 19.9 billion USD in 2010, then reach 24.4 billion USD in 2016 (GSO). The number of registered projects also jumped from 211 projects (1988-1990) to 500 projects in 2000 and 2,500 in 2017. After the world crisis occurred in 2008, FDI inflows into Vietnam in 2009 reduced dramatically, then fluctuated during the period from 2009 to 2016 and slightly recovered in 2017.
In regard to FDI contribution to GDP, FDI investment sector has contributed to total national output increased from 15,000 million USD (around 15.7 percent) in 2011 to 35,000 million USD (over 18 percent) in 2015 (as illustrated in figure 1-3). In this way, FDI has clearly played an important role in boosting Vietnam's economic growth. In 2017, FDI has contributed nearly 20 percent of GDP and is an important additional source of capital for development investment in Vietnam occupied 23.7 percent of the total social investment (VCCI, 2017).

In relation to the changes in labor market, foreign invested enterprises have created jobs for around 500 thousand workers in 2000, up to 2 million workers in 2008 and reached equivalently 2.8 million workers in 2017 (as shown in figure 1-5). Although FDI sector has only occupied a small percentage of less than 5% of total labor use in 2017, their presence also helps create millions of other indirect jobs by their supporting industries and local partners.

1.3 Significance of the study

1.3.1 Research gap

Recent meta-analyses on FDI spillovers have emphasized the importance of separating spillover effects through different transmission channels (Demenia & Bergeijk, 2017; Demena & Bergeijk, 2019; Rojec & Knell, 2017). To further clarify the issue, Rojec & Knell (2017) have recommended that future researches should differentiate between horizontal and vertical spillovers, especially backward and forward spillovers generated by established vertical linkages between local firms and foreign affiliates.

Besides, Behera (2017) and Anwar, Sun, & Anwar (2018) have indicated the lack of recent substantive evidences and no or deficient inclusion of firm heterogeneity in recent studies leads to the bias against no or negative spillovers. In order to overcome this, Rojec & Knell (2017) and (Jacobs et al., 2017) encourage the examination on firm heterogeneity in further researches that may better capture the variability in spillover outcomes.

Although the wage discrimination between foreign and domestic sectors is reflected in recent researches in Vietnam, there is no or deficient researches on whether foreign presence benefit the wages of local workers and whether this kind of wage externalities vary across ownership types (Javorcik, 2015; Nguyen & Ramstetter, 2017).

1.3.2 Practical significance

The findings of the thesis are expected to help the policy makers to review the policies and other institutional factors on national investment and domestic firms, given a backdrop for very open economy of Vietnam and the fast-changing international trade, global investment and economy. In this way, the good practices and timely policies at both authorized and
managerial level may enhance the FDI spillovers and benefit the local stakeholders (Krammer, 2015; Willem, 2019). First, the research results of the thesis, especially on the existence of spillover effects from FDI, provide significant empirical evidences for policy makers and forecasters about FDI’s outcomes, spillover mechanisms as well as its influential factors, facilitators or barriers to better orient their policies. FDI presence along with its intensity and externalities have both temporary and long-term impacts on local productivity and economic growth.

Second, as the research results indicate the importance of firm heterogeneity in determining the magnitude of productivity spillovers and wage spillovers, it is worth for firms in domestically manufacturing industries to implement appropriate strategies and set priorities. It is worth to realize that positive FDI spillover itself does not only occur automatically, but also highly associated with local firms’ absorptive capacities as well as relentless efforts through improving competitiveness and strengthening vertical linkage collaborations with foreign partners, especially for newly global participants from the third world (Anwar et al., 2018; Newman et al., 2019).

Third, the thesis is implemented after Vietnam signed some important free trade agreements with strategic partners such as Russia-Belarus-Kazakhstan Customs Union (December, 2014) and South Korea (May, 2015). Thus, the research results from the latest panel data (2007-2015) will provide the up-to-date empirical findings for FDI spillover effects in Vietnam which is useful for managers, policy-makers and subsequent researchers in the field of international business.

1.4 Research objectives

Based on the above justifications and significance, the dissertation attempts to fulfill the following research objectives by employing a large panel of Vietnamese manufacturing enterprises from 2007 to 2015:

1. First, investigating the effects of FDI spillovers through both vertical and horizontal channels on domestic firms’ productivity.
2. Second, exploring the moderating effects of absorptive capabilities in term of human capital, technology gap and financial development on productivity spillovers from FDI firms to Vietnamese manufacturing firms.
3. Third, examining whether productivity spillovers through vertical and horizontal channels are associated with regional effects.
4. Fourth, examining whether local firms in provinces located within 100 square kilometers (sq. km.) of eight cities/provinces with highest FDI concentration receive greater FDI spillovers than those located outside 100 sq. km of these areas.

5. Fifth, investigating the effect of horizontal (intra-industry) FDI spillover on the average wage of domestic employees.

6. And finally, exploring whether ownership types influence wage spillovers from FDI.

1.5 **Research questions**

Based on the above research objectives, the dissertation aims at answering the following research questions for further hypotheses testing:

1. Whether the productivity of Vietnamese domestic companies is negatively associated with the *horizontal* technology spillovers from FDI firms?

2. Whether the productivity of Vietnamese domestic companies is positively associated with the vertical *backward* spillover from FDI firms?

3. Whether the productivity of Vietnamese domestic companies is positively associated with the vertical *forward* spillover from FDI firms?

4. Whether the relationship between FDI spillovers and productivity of domestic firms is improved with higher level of human capital?

5. Whether the relationship between FDI spillovers and productivity of domestic firms is lower at the top 25th and bottom 25th percentile of technology gap?

6. Whether the relationship between FDI spillovers and productivity of domestic firms is enhanced at the middle 25th-75th percentile of technology gap?

7. Whether the relationship between FDI spillovers and productivity of domestic firms is improved with higher level of financial development?

8. Whether FDI spillover effect on domestic firm productivity vary significantly across geographical regions and higher in more FDI-intensive regions?

9. Whether FDI spillover effect on domestic firm productivity vary significantly across economic regions and higher in more FDI-intensive regions?

10. Whether horizontal FDI spillovers under foreign presence positively affect the average wage of local firms in the same industry with foreign firms?

11. Whether the effects of horizontal FDI spillover on average wages vary across ownership types?
1.6 **Methodology and Data**

1.6.1 **Methodology**

The thesis uses the Cobb-Douglas production function model as a basis to estimate the impact of FDI spillovers of foreign subsidiaries on total factor productivity of domestic enterprises. This approach allows analysis and testing of technology spillover effects from FDI through non-traditional factor, namely the total factor productivity. The proxies for FDI spillovers are established using three indicators of horizontal FDI spillovers, vertically backward spillovers and vertically forward spillovers to investigate the existence of (1) the productivity spillovers and (2) wage spillovers from FDI. In terms of econometric techniques, the model of spillover effects from FDI is estimated using large panel data, including fixed effect model (FEM) and random effect model (REM), then selecting the appropriate model by Hausman test. Additional, the approach of dynamic panel data (GMM) and statistical tests are conducted to check for the result robustness.

1.6.2 **Data**

The thesis uses secondary panel data at the enterprise level for the period from 2007 to 2015. Data is collected from the Enterprise Survey conducted by the General Statistics Office. After the screening and filtering process, the final data set included in the analysis is 385,976 observations (period: 2011-2015) for estimating productivity spillovers from FDI and 693,720 observations (period: 2007-2015) for examining the effect of horizontal FDI spillover on average wage. Besides, the thesis also uses input-output matrices in 2012 and 2015 to estimate vertical FDI spillovers between FDI firms and their locally upstream suppliers or downstream consumers.

1.7 **Thesis organization**

The organization of the thesis is divided into five chapters. Firstly, chapter 1 briefly provides an introduction of the thesis. Secondly, chapter 2 aims at reviewing relevant theoretical and empirical literature of foreign direct investment and spillover effects, thereby developing the conceptual framework, research model and hypotheses. Thirdly, chapter 3 is targeted to identify and present the research methodology with proper justifications. Fourthly, chapter 4 analyzes and discusses research results. Finally, Chapter 5 provides conclusions and implications on the spillover effects of FDI in Vietnam.
CHAPTER 2. LITERATURE REVIEW

2.1 FDI definition

Foreign direct investment (FDI) has become a popular form of investment for decades and has been defined by scholars, international economic organizations as well as national laws of most countries. According to Boddewyn (1985) and Moosa (2002), FDI can be considered as a form of long-term investment of individuals or companies of a country (delivering country) into another country (receiving country) by establishing production and business. On other words, FDI is the transfer of capital, property, technology or any asset from the home country to the host country to establish or control an enterprise for profit-making purposes.

2.2 Multinational corporations (MNCs) definition

There are many different terms mentioned to describe the business activities of a company in many different countries such as 'international', 'multinational' and 'transnational' due to recent changes in the nature of international business operation (Moosa, 2002; Blomstrom & Kokko, 1998; Byun & Wang, 1995). These changes include the establishment of business operations and production in many different countries; cross-border import and export worldwide regardless of where the goods are produced; new forms of transnational buying-selling activities (payment, transportation, etc…) (Chittoor, 2009). Indeed, these terms can be used interchangeably. Thus, in this thesis, the term “multinational corporations (MNCs)” or FDI firms will be used interchangeably to refer the foreign firms implementing FDI in a host economy.

2.3 FDI classifications and its natures

The types of FDI or foreign affiliates are primarily driven by various investors’ motivations and targets (Dunning, 2000). In practice, there are many different ways to classify FDI depending investment motivations, investors’ perspective, host country’s perspective and ownership structure (Moosa, 2002; Denisia, 2010).

2.3.1 Classified by foreign investment motivations

Based on investment motivations, FDI can be categorized by four different types including resource-seeking FDI, market-seeking FDI, efficiency-seeking FDI and strategic-asset-seeking FDI.
2.3.2 *Classified by host country’ orientation*
Based on host country’s perspective and government’ orientation, Moosa (2002) and Li & Rugman (2007) have discussed three primary types of FDI: (1) FDI to substitute import, (2) FDI to enhance export and (3) FDI toward other orientations of the government.

2.3.3 *Classified by FDI ownership*
In practice, foreign direct investors can choose the level of control they wish to maintain in the new establishments (Denisia, 2010; Moosa, 2002). This can be achieved through full or partial ownership. Ownership indicates the level of control over business issues - for example, new product decisions, business expansion and profit sharing (Riahi-Belkaoui, 1996).

2.3.4 *Classified by foreign investors’ orientation and FDI integration level*
Based on investors’ orientation and the degree of FDI integration, FDI can be classified into three types of horizontal FDI, vertical FDI and conglomerate FDI (Caves, 1974; Moosa, 2002).

To sum up, the classification in term of FDI integration provides a comprehensive view on how inward FDI integrates into the host economy that may lead to the tremendous competition, interactions, demonstration, cooperation and linkage relationships between foreign firms and domestic firms (Aitken, Hanson, & Harrison, 1997). Moreover, during this process, the unavoidable externalities from foreign presence can be generated and affect the host economy at both macro and micro level (Blomström & Persson, 1983; Harrison & Aitken, 1999). Therefore, in this dissertation, such types of FDI classification are used to investigate and measure the channels of FDI spillovers from MNCs to domestic owned firms.

2.4 *Effect of FDI on the host economy*

2.4.1 *The effects of FDI on economic growth*
Investment is an extremely important factor affecting economic growth. Investment capital for economic development is mobilized from two main sources, domestic capital and foreign capital. Domestic capital is formed through savings and investment. Foreign capital is formed through commercial loans, indirect investment and foreign direct investment (FDI) activities. In transition economies, it has been revealed that that FDI is a very important factor for economic development, especially in an inefficient domestic credit market (Anwar & Nguyen, 2010; Silajdzic & Mehic, 2016). FDI, by its nature, has created an effective measure is to raise capital for investment, mobilize resources to develop the host country’s economy.
2.4.2 The effect of FDI on employment and wage

Inward FDI will lead to the establishments of new businesses or increase in size/scale of existing firms in the host economy; thereby creating more jobs (Denisia, 2010). This triggers the positive effects on developing countries’ labor market which is characterized by abundant labor resources. Under the emergence and expansion of FDI enterprises, local workers employed and trained by FDI sector also acquire plenty of knowledge to improve their technical skills, working styles (disciplines, work organization) and further bargaining power (Onaran & Stockhammer, 2008). Interestingly, the workforce at management level will acquire a wide range of cross-cultural and regional superior knowledge such as international market access, negotiation, trade promotion and human resource management. However, FDI enterprises have many strategies to prevent the turnover of skilled workers from MNCs to domestic firms (Görg et al., 2007).

2.4.3 The effects of FDI on trade flows

The relationship between FDI and trade are substitutes or complements also depends on host countries and industry specific characteristics (Moosa, 2002). By identifying host countries’ differences, similarities in term of factor endowments, foreign investors may decide to establish vertical FDI or horizontal FDI for implementing their substitute or complement strategies (Trigeorgis & Reuer, 2017). The substituting production of identical products implemented by horizontal FDI refer to a decline in host countries’ imports. On the other hand, complementing production implemented by vertical FDI lead to an increase in host countries’ imports of intermediate inputs and exports of finished goods.

2.4.4 The effect of FDI on productivity

Previous parts discussed the important of export-enhancing FDI on stimulating a positive trade flows, economic growth and productivity spillovers (Blomstrom & Kokko, 1998; Caves, 1974). This part continues to emphasize its power to optimize the economies of scale leading to lower unit cost and higher productivity. In contrast, import-substituting FDI may prevent local firms from reaching optimized production scale and achieving higher level of productivity (Schaumburg-Müller, 2003). In such cases, small market size may be a determinant for production inefficiency.

2.4.5 FDI and technology transfer

FDI is considered as an important source to promote technology development of the country receiving FDI. In practice, new technology is introduced by foreign investors through
the acquisition of patents or innovations and the improvement and customization of imported technology for domestic use (as the cases of Japan and Korea) (Forte & Moura, 2013). When implementing an investment project in a country, foreign investors not only bring capital, machinery, equipment and raw materials, but also the intellectual and intangible assets such as technology, scientific knowledge, management know-how and market access experiences into the host economy (Denisia, 2010).

2.4.6 FDI and inter-industries linkages

Based on their investing purposes, MNCs attempt to establish the inter-linkage relationships with local enterprises in the receiving country to expand and sustain their production network and subsidiaries (Blomström & Sjöholm, 1999). In this way, foreign affiliates may trigger the direct impacts or indirect externalities (spillovers) in term of productivity and employment on domestic firms via such kind of inter-industry linkages. On the one hand, FDI firms are motivated to build upstream linkages with local manufacturers/suppliers to ensure a stable and standardized supply of materials/inputs. On the other hand, in order to expand the market and ensure the consumptions of outputs, foreign subsidiaries also need to establish their links to distributors in downstream sectors and sell its finished goods to domestic enterprises.

2.5 The theories of FDI

Moosa (2002) has synthesized the theories of FDI in a very systematic way to recognize the main assumptions, drawbacks as well as provide empirical evidences for these theories. Three categories of FDI theories mentioned in the book include (1) theories assuming perfect markets, (2) theories assuming imperfect markets and (3) other theories providing different perspectives to explain why firms invest in a foreign country.

2.6 Definition of FDI spillover effect

Spillover effects are defined as foreign influences derived from intentional or unintentional interactions between economic entities over time (David & Rosenbloom, 1990). In this way, FDI spillover effect is a very popular term in the field of international economics describing the effects of MNCs’ economic activities on domestic host firms’ business activities and performances even though these two business activities are not related and integrated to each other (Blomstrom & Kokko, 1998). FDI spillover effect can be understood as the intentional or unintentional externalities on the local firms or the host economy created by the foreign equity presence in the host country (Caves, 1974).
2.6.1 Transmission mechanisms of FDI spillovers

FDI may spill over through four primary channels including imitation/demonstration, labor turnover, competition and inter-linkage relationships with foreign subsidiaries.

2.6.1.1 Imitation/Demonstration

Imitation or demonstration is considered the most obvious spillover channel. When a country that receives a new technology without previous usage experiences and knowledge transfer will incur huge costs and face greater risks in using such technology (Damijan et al., 2013a). If the technology has been successfully applied by an MNC, domestic companies will be more accessible to and use the technology more efficiently (Hamida & Gugler, 2009). Through FDI, these MNCs will bring advanced technology into the host country by the establishment of subsidiaries or branches.

2.6.1.2 Labor turnover

The second spillover channel occurs when domestic firms hire workers who have worked at MNCs (Blomstrom & Kokko, 1998; Fosfuri, Motta, & Rønde, 2001). It is obvious that these workers are knowledgeable about technology and can apply to domestic enterprises. More important, the spillover effect will even be stronger if these qualified workers use their accumulated knowledge from MNCs in their own business/startups (Damijan et al., 2013a). However, it is difficult to assess the impact of these workers on the productivity of domestic companies.

2.6.1.3 Competition

The third spillover channel occurs through competition pressure from foreign presence in the same industry. In order to survive in the fierce competition market, domestic enterprises are required to operate more efficiently by using available resources, applying new technology and improving their productivity (Blomström & Sjöholm, 1999; Malik, Rehman, Ashraf, & Abbas, 2011). However, the competitive process can also lead to negative impacts on domestic enterprises. For example, FDI enterprises bring into the domestic market a new technology and create new products to replace existing products produced by domestic enterprises.

2.6.1.4 Inter-linkage relationships with foreign subsidiaries

Furthermore, the cooperation between FDI enterprises and local businesses in the supply chain can generate the externalities (spillover) effects on host countries’ local firms. Therefore, another spillover channel recognized is through the linkages between domestic companies and foreign subsidiaries in downstream and upstream sectors of the supply chain.
Downstream (forward) linkages relate to domestic enterprises buying production inputs from FDI enterprises, while upstream (backward) linkages take place when domestic enterprises provide intermediate inputs for FDI enterprises. Through backward linkage, domestic enterprises can expand their production scale and improve products’ quality to meet strict standards of foreign subsidiaries (Blomstrom & Kokko, 1998; Javorcik & Spatareanu, 2011).

2.6.2 Horizontal and vertical channel of FDI spillovers

In terms of integration direction in the production supply chain, spillover channels may occur through (1) horizontal interactions between FDI enterprises and domestic enterprises in the same industry; or (2) vertical interactions among upstream and downstream enterprises in the supply chain.

2.6.2.1 Horizontal spillovers

Horizontal spillovers describe the intra-industry externalities generated by MNCs’ presence and activities (Iršová & Havránek, 2013; Wang & Blomström, 2002). These externalities take place within the industry where FDI is involved in the domestic market. It is admitted that the horizontal spillover effects from FDI enterprises may occur through foreign technology imitation/demonstration and labor movement from FDI to domestic enterprises or competition in the same industry (Blomstrom & Kokko, 1998; Carluccio & Fally, 2013; Damijan et al., 2013a; Khachoo & Sharma, 2016). However, it is very difficult to separate those effects. For example, when FDI enterprises participate in the domestic market, increasing competition pressure in the same industry can help domestic enterprises improve their competitiveness or force them to exit the industry.

2.6.2.2 Vertical spillovers

Vertical spillover effects, on the other hand, occur through inter-linkage interactions in the supply chain (Blomstrom & Kokko, 1998; Caves, 1974; Havranek & Irsova, 2011). Domestic enterprises that supply materials/inputs are vertically linked to foreign firms in the upstream sector. In contrast, local firms buying intermediate inputs from MNCs are vertically linked to foreign firms in the downstream sector. As well discussed in the previous part about inter-linkage relationships, local firms in the vertically backward (upstream) linkage with MNCs can increase their competitiveness and gain more market share (Damijan et al., 2013b; Javorcik & Spatareanu, 2011). On the other hand, the vertically forward (downstream) linkage
allows domestic companies to obtain high quality inputs from MNCs to enhance their production efficiency and output quality (Giroud & Scott-Kennel, 2009).

2.7 Theoretical framework

Figure 2-1: A theoretical framework of relevant theories illustrating the presence of FDI spillovers. Source: author
2.8 Productivity spillovers from FDI

Productivity spillover describes the phenomenon that the productivity level of local firms in the FDI receiving country is intentionally or unintentionally affected in both positive and negative way as a result of foreign equity entries and their operations in the host country (Blomstrom & Kokko, 1998).

2.8.1 Channels of productivity spillovers from FDI

Many recent authors investigate the productivity spillovers from FDI by two main spillover channels including horizontal FDI spillover and vertical FDI spillover (Damijan et al., 2013a; Fatima, 2016; Iršová & Havránek, 2013; Le & Pomfret, 2011).

2.8.1.1 Horizontally productivity spillovers

According to Aitken & Harrison (1999) and Blomstrom & Kokko (1998), horizontally productivity spillovers is defined as the changes in productivity levels of local competitors when there are the presences of wholly foreign-owned firms or joint venture subsidiaries operating in the same industry or intra-industry. Besides, the domestic players can also benefit from the movement of labor from FDI sector to domestic sectors because this labor force has received the formal training and experienced an efficient process (Fosfuri et al., 2001; Hübler, 2015). The attraction of these workers can facilitate the technology transfer and enhance the absorptive capabilities of the local firms. In contrast, the foreign presence may cause the higher probability of local firms’ failure and exit due to fierce competition and crowding-out effect (Javorcik & Spatareanu, 2008).

2.8.1.2 Vertically productivity spillovers

Vertical spillover, on other hands, is the result of the backward and forward linkage created by domestic firms under the agreement of MNCs which enable local firms become a stakeholder in the supply or distribution chain with foreign presence firms (Halpern & Muraközy, 2007). Further, such kinds of linkages contribute to build the domestic firm’s capabilities and improve productivity in the long run (Iršová & Havránek, 2013). Firstly, the backward linkage occurs when domestic firms are chosen to be the suppliers of local inputs to foreign companies. Secondly, the forward linkage comes from the use of foreign inputs in the production of local firms. These upstream and downstream business activities are no longer strange to emerging economies where the race to cost minimization is happening lively along with many potential opportunities for maintain the competitive advantages and expanding the market (Merlevede & Purice, 2016).
2.8.2 The effect of absorptive capabilities on productivity spillovers

First of all, technology gaps significantly affect domestic firms’ ability to adopt MNEs’ valuable intangible assets. The majority of studies have provided strong evidence confirming this relationship. Iršová & Havránek (2013), Javorcik & Spatareanu (2008) and Kokko (1994) agree that the technology gap is an important determinant of FDI spillover. However, a recipient country must have a certain level of technology gap in order to benefit from spillover; otherwise, there is no gain from technology spillovers.

Second, human capital is another important channel of spillover absorption as the successful implementation of this transfer definitely requires the involvement of skilled and well-trained labor force (Becker, 1975; Liu, Parker, Vaidya, & Wei, 2001). There is no doubt that firms with experienced managers, experts, qualified technicians and workers have better absorptive capacity and are more ready to receive positive foreign externalities. Furthermore, the mobility of foreign-trained employees to domestic firms may contribute to the knowledge diffusion and increase domestic firm’s absorptive capabilities (Wang, Deng, Kafouros, & Chen, 2012).

Third, financial development reflects the financial health and absorptive capacity of a firms by the availability of organizational slacks for new ventures (Bourgeois, 1981; Nohria & Gulati, 1996). More important, a stable foundation of financial development provides domestic firms more incentives to invest in capacity building and the advanced technology in an effort to imitate and relieve the pressure of the foreign penetration in their host country. Besides, the availability of financial resources allows domestic enterprises proactively to reach and get involved in upstream and downstream linkages with foreign subsidiaries. This brings more chances for positively vertical FDI externalities.

2.8.3 Regional spillover effects and the impact of geographical proximity

The concentration of FDI inflows in different parts of the recipient country can determine the magnitude of technology spillover. FDI spillover has regional effects, meaning that firms located near areas of high FDI concentration are most likely to benefit from the spillover (Aitken & Harrison, 2013). According to Wei & Liu (2006), technology from FDI may transfer to local firms in the same area and then spread to other locations. The magnitude of this spillover, however, depends on the characteristics of each region, such as the availability of natural resources and labor and the business environment (Perri & Peruffo, 2016; Wang & Wu, 2016).
2.8.4 Empirical evidences on productivity spillovers from FDI

Regardless of relentless efforts in clarifying the impact of FDI spillovers, the empirical evidences on productivity spillovers from FDI are still ambiguous with controversial arguments. While many authors indicate the importance of inward capital in raising the stock of financial human capital and improving host country’s productivity through vertical and horizontal spillovers (Aitken et al., 1997; Du et al., 2012; Mariotti et al., 2015; Salim, Razavi, & Afshari-Mofrad, 2017), some argued that competition incurred by FDI outweigh the positive spillovers generated by imitation and labor mobility (Decreuse & Maarek, 2015; Hamida, 2013; Javorcik & Spataraeu, 2008; Le & Pomfret, 2011).

To further complicate the matter, recent studies on emerging economies explore the importance of absorptive capabilities in term of human capital, technology gap and financial development (Anwar & Nguyen, 2014; Behera, 2017; Hamida, 2013); distance (Anwar & Sun, 2016; Thang, Pham, & Barnes, 2016); trade orientation (Anwar & Nguyen, 2011b; Ha & Giroud, 2015; Havranek & Isrova, 2011); firm and industry heterogeneities (Carluccio & Fally, 2013; Damijan et al., 2013b; Fatima, 2016) in determining how these variables influencing the direction and extent of the productivity spillovers. In addition, a possible explanation for mixed findings may come from a variety of methodologies and contexts (as in Appendix 1).

2.9 Wages spillovers from FDI

2.9.1 The effect of FDI horizontal spillovers on wages:

The question of whether horizontal FDI bring benefits to local workers in terms of wages is even more complicated to answer. Javorcik (2015) finds a positive impact of foreign affiliates on both domestic workers’ compensation and the country’s benefits by creating good jobs and improving productivity. The relevant literature has developed two main streams on how horizontal spillovers from foreign presence affect local wages: (1) competition in the labor market between foreign affiliates and domestic firms and (2) aggregate productivity improvement (Aitken & Harrison, 1999; Driffield, 2004; Pittiglio, Reganati, & Sica, 2015).

2.9.2 The relationship between trade openness and wages

The recent literature has reviewed how firm-level trade openness may affect wages in the formal employment sector in the host country. While trade openness negatively affects the real wages of both skilled and unskilled workers in the short run, it appears to generate well-paid jobs for unskilled labor and a decline in wages for skilled labor in developing countries (Onaran & Stockhammer, 2008).
Importing high-quality intermediate goods can benefit firms via efficiency and productivity improvements and generate positive externalities to workers by distributing higher wages (Martins & Opromolla, 2009). However, increasing imports of new machinery and technologies will temporarily trigger negative impacts on real output under the initially imperfect allocation of skilled labor in the short run.

Exporters in developing countries, on the other hand, are often characterized by high-capital-intensity industries and rely on skilled labor. Consequently, workers employed in these industries have strong bargaining power to demand their expected wage (Martins & Opromolla, 2009; Wood et al., 2014).

2.9.3 Firm heterogeneity and wage spillovers

Emerging economies such as Brazil and Indonesia have witnessed similar trends of the size-wage effect in which foreign presence is positive for skilled labor and negative for unskilled labor (Hijzen, Martins, Schank, & Upward, 2013). Therefore, under the common circumstances of developing countries, an increase in firm size may lead to a fall in the average wage, especially for low-skill labor. The gender ratio (GR) is essential for assessing whether enterprises with higher rates of female workers earning the average wage have lower (mainly primary workers) total employment (Nguyen, 2015).

Importantly, the empirical evidence has emphasized the moderating effect of ownership types such as partially foreign invested firms, domestic private firms, joint ventures, SOEs, and wholly foreign-invested firms on the relationship between horizontal spillover and wages (Earle, 2017; Nguyen, 2015; Nguyen & Ramstetter, 2017). The inherent characteristics of each ownership type will determine how firms design their wage patterns, respond to competition in the labor market, and adapt to wage policies and government regulations in the host country.

2.9.4 Ownership structure and FDI spillover:

The level of foreign ownership of affiliates located in the host country is a determinant of FDI spillover (Buckley, Wang, & Clegg, 2007). Foreign shares can confer benefits to the recipient firms through technology and knowledge diffusion. In particular, foreign ownership is considered one of the most important channels of horizontal FDI spillover (Iršová & Havránek, 2013; Lin, Liu, & Zhang, 2009). During cooperation, some of the knowledge-based intangible assets of foreign enterprises may spill over to local companies (Blomström & Sjöholm, 1999; Javorcik & Spatareanu, 2008). To maintain competitive advantage, MNEs may
try to prevent leakage by investing in only fully owned foreign projects to ensure greater control of employee behavior and firm policies (Javorcik & Spatareanu, 2008).

### 2.9.5 Empirical evidences on wage spillovers from FDI

With respect to local workers’ benefit under foreign presence, Pittiglio et al. (2015) used firm-level panel data of Italian manufacturing firms and input-output tables from 2002 to 2007 to examine the effect of foreign presence in term of horizontal and vertical spillovers on domestically – owned firms’ average wage. The authors conducted the fixed effect model (FEM) moderated by technology gap which is measured by difference between firm’s TFP and intra-industry average foreign firms’ TFP. The results show that without controlling for technology gap, wage spillover doesn’t exist.

Nguyen (2015) contributes to the empirical literature by conducting Breusch-Pagan LM test for investigating intra-industry wage differentials using 2000 – 2009 panel data of Vietnamese non-household manufacturing firms. The model used average real wage measured by the logarithm of firm average wage rates as dependent variable. The results are consistent with the findings of Hijzen et al. (2013) and Javorcik (2015) which also indicate that wage premium in foreign firms is greater than that in domestic firms. Besides, wage differentials between foreign firms and domestic firms vary across industries and sectors (Pittiglio et al., 2015). It is worth to note that average wage in capital-intensive industry and import-oriented industries are higher than that in labor-intensive and export-oriented industries. With respect to ownership types, wage differential is highest in joint venture between foreign firms and state owned enterprises.

To further explore the moderating effect of ownership structure, Nguyen & Ramstetter (2017) used firm-level cross-sectional data of Vietnamese large and medium enterprises in 2009 to examine the relationship between foreign presence and real average wage across different ownership types. Similar to Nguyen (2015), the authors found that firm level wage premium in wholly foreign-invested enterprises, joint venture (JV) and state owned enterprises (SOEs) are greater than that in domestic private firms. Besides, positive wage differentials are stable for JV and wholly foreign-owned firms for most sectors, but insignificant for SOEs.

### 2.10 Research model and hypotheses

#### 2.10.1 Firm productivity spillover under FDI presence

**Hypothesis H1:** The productivity of Vietnamese domestic companies is negatively associated with the *horizontal* technology spillovers from FDI firms.
**Hypothesis H2a:** The productivity of Vietnamese domestic companies is positively associated with the vertical *backward* spillover from FDI firms.

**Hypothesis H2b:** The productivity of Vietnamese domestic companies is positively associated with the vertical *forward* spillover from FDI firms.

### 2.10.2 The importance of absorptive capabilities

**Hypothesis H3:** The relationship between FDI spillovers and productivity of domestic firms is improved with higher level of human capital.

**Hypothesis H4a:** The relationship between FDI spillovers and productivity of domestic firms is lower at the top 25th and bottom 25th percentile of technology gap.

**Hypothesis H4b:** The relationship between FDI spillovers and productivity of domestic firms is enhanced at the middle 25th-75th percentile of technology gap.

**Hypothesis H5:** The relationship between FDI spillovers and productivity of domestic firms is improved with higher level of financial development.

### 2.10.3 The effect of regional effects and geographical distance on productivity spillovers

**Hypothesis H6a:** FDI spillover effect on domestic firm productivity vary significantly across geographical regions and higher in more FDI-intensive regions.

**Hypothesis H6b:** FDI spillover effect on domestic firm productivity vary significantly across economic regions and higher in more FDI-intensive regions.

**Hypothesis H7:** Local firms in provinces located within 100 sq. km. of the most FDI-intensive provinces/cities receive greater spillover effects than those located in provinces outside 100 sq. km of these areas.

### 2.10.4 The effect of horizontal spillovers on average wage

**Hypothesis H8:** Horizontal FDI spillovers under foreign presence positively affect the average wage of local firms in the same industry with foreign firms.

**Hypothesis H9:** The effects of horizontal FDI spillover on average wages vary across ownership types.

The main hypotheses have been well illustrated in the figure below.
FOREIGN DIRECT INVESTMENT

SPILLOVER EFFECTS ON DOMESTIC FIRMS

**Spillover channels:**
- Horizontal spillover (H1)
- Vertically Backward spillover (H2a)
- Vertically Forward spillover (H2b)

**Absorptive capabilities:**
- Human capital (H3)
- Technology gap (H4a, H4b)
- Financial development (H5)

Geographical and economic regional effects (H6a, H6b)

Provincial distance from the province firm located to FDI-intensive provinces/cities (H7)

Firm and industry characteristics: firm size, industry concentration

**FIRM PRODUCTIVITY (TFP) Under FDI Presence**

**Spillover channel:**
- Horizontal spillover (H8)

Ownership types (H9)

AVERAGE WAGE Under FDI

**Firm characteristics:** firm size, total sales, capital intensity, net income, market share, export orientation, import orientation, gender ratio

**Figure 2-2: Research model. Source: author**
CHAPTER 3. METHODOLOGY

3.1 Econometric model specifications and estimations

The author first estimates firm-level productivity in terms of total factor productivity by estimating the residual of production function, then regress the TFP on proxies for FDI spillovers. In addition, their interactive terms associated with other control variables are included in the equation to avoid the problem of omitted variable bias and explain the movement of the dependent variable more accurately. This two-stage procedure is widely used to estimate productivity spillovers from FDI (Anwar & Nguyen, 2014; Lin & Kwan, 2016).

3.1.1 Total Factor Productivity Estimation

First, assume that the production function of Vietnamese manufacturing firms is at Cobb-Douglas type, we have:

\[ \ln(Y_{ijt}) = \ln(A_{ijt} L_{ijt}^\beta_l K_{ijt}^\beta_k) \]  

(1)

Based on the first equation, the total factor productivity can be estimated as in equation (2)

\[ \ln(A_{ijt}) = \ln(Y_{ijt}) - \beta_l(L_{ijt}) + \beta_k(K_{ijt}) + \omega_{it} + \epsilon_{it} \]  

(2)

where \(Y\), \(L\), and \(K\) are the logarithm of output, labor, and capital inputs, respectively, \(\omega\) stands for the firm’s input demand that researchers do not know, \(\epsilon\) represents the stochastic disturbance of productivity, and \(i, j,\) and \(t\) denote the firm, industry, and time, respectively.

3.1.2 Establishing key proxies for FDI spillovers

Table 3-1: Variable measurements

<table>
<thead>
<tr>
<th>Variables</th>
<th>Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>The first estimation model on productivity spillovers from FDI</td>
<td>The residual of the Cobb-Douglas production function (TFP) (Anwar &amp; Nguyen, 2014; Damijan et al., 2013a; Sourafel Girma &amp; Wakelin, 2007)</td>
</tr>
<tr>
<td>Horizontal FDI spillover</td>
<td>The proportion of foreign equity presence in industry j, weighted by the proportion of firm i’s output accounted in that industry.</td>
</tr>
<tr>
<td>(H_{FDI_{ij}}) = (\frac{\sum_{l for all i} Foreign Share_{it} \times Y_{it}}{\sum_{l for all i} Y_{it}})</td>
<td></td>
</tr>
<tr>
<td>Term</td>
<td>Description</td>
</tr>
<tr>
<td>-------------------------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Forward FDI spillover (2-digit industry)</td>
<td>The ratio of foreign equity to total firm equity, weighted by the share of sector k’s output used as an intermediate input by sector j - using input-output matrix 2012 and 2015 (Gorodnichenko et al., 2014a; Havranek &amp; Irsova, 2011). $F_{FDI_{it}} = \sum_{k\neq i}B_{ki}H_{FDI_{ki}}$</td>
</tr>
<tr>
<td>Backward FDI spillover (2-digit industry)</td>
<td>The ratio of foreign equity to total firm equity, weighted by the proportion of intermediate inputs provided by industry j to industry k - using input-output matrix 2012 and 2015 (Anwar &amp; Nguyen, 2014) $B_{FDI_{it}} = \sum_{k\neq i}a_{ki}H_{FDI_{ki}}$</td>
</tr>
<tr>
<td>Technology gap</td>
<td>The difference in average productivity of domestic and foreign firms in percentage terms in the same industry (Carluccio &amp; Fally, 2013)</td>
</tr>
<tr>
<td>Human capital</td>
<td>The natural logarithm of the ratio of firm i’s average wage to industry j’s average wage at time t. (Anwar &amp; Nguyen, 2014; Damijan et al., 2013a; Gorodnichenko et al., 2014a) $H = \ln\left(\frac{wage_i}{wage_{mean}}\right)$</td>
</tr>
<tr>
<td>Financial development</td>
<td>The ratio of firm i’s working capital to its total assets in industry j at time t. $F = \frac{Working\ capital_{ijt}}{Total\ assets_{ijt}}$</td>
</tr>
<tr>
<td>Regional classifications</td>
<td>Six geographical regions: Red river delta, North East &amp; North West, North &amp; South Central Coast, Highland, Southeast and Mekong river delta. Four economic regions: North (including Red river delta, North East and North West), Central (North Central Coast, South Central Coast and Highland), South (Southeast) and Mekong River Delta.</td>
</tr>
<tr>
<td>Provincial proximity</td>
<td>Local firms in provinces located within 100 square kilometers (sq. km.) of the most FDI-intensive provinces/cities as Ha Noi, Ho Chi Minh, Bac Ninh, Hai Phong, Thanh Hoa, Binh Duong, Dong Nai, Ba Ria Vung Tau.</td>
</tr>
<tr>
<td>Industry concentration</td>
<td>The Herfindalh (HHI) index, which is calculated as the sum squared of the firm sales as a proportion of total sales in the four-digit industry.</td>
</tr>
<tr>
<td>Firm size</td>
<td>The natural logarithm of total sale</td>
</tr>
</tbody>
</table>

The second model on wage spillovers from FDI

Average wage | The natural logarithm of total wages to number of labor ratio
| **Horizontal spillover**                          | The ratio of foreign share of sales to four-digit industry sales |
| **Firm size**                                    | The natural logarithm of total equity                           |
| **Capital Intensity**                            | The natural logarithm of fixed assets to number of labor ratio  |
| **Ownership types**                              | Dummy variables for ownership identities such as private, joint stock, FDI and SOEs |
| **Total sales**                                  | The natural logarithm of total revenue                          |
| **Firm income**                                  | The natural logarithm of net income                             |
| Market share                                     | The ratio of firm sale to four-digit industry sale              |
| Export orientation                               | = 1 if exporting; = 0 for other                                 |
| Import orientation                               | = 1 if importing; = 0 for other                                 |
| Gender ratio                                     | The number of female divided by the number of male              |

3.2 Data

3.2.1 The use of panel data

Recent meta-analyses on FDI spillovers have figured out the lack of firm-level panel analyses in existing researches to better examine and provide more accurate evidences for the presence of FDI externalities (Jacobs et al., 2017; Rojec & Knell, 2017). The use of panel data is recommended for estimating FDI spillovers as the most appropriate approach because of its superior characteristics and the unexpected overstatement of cross-sectional analysis (Rojec & Knell, 2017).

3.2.2 Data description

The paper uses the latest unbalanced panel data of firm-level surveys in Vietnam from 2007 to 2015. The dataset surveyed annually by General Statistics Office (GSO) includes the useful financial and internal indicators at firm level such as firm’s general information, ownership type, capital structure, balance sheet, income statement, etc for all industries. This secondary data is quite powerful and used popularly for most recent studies in Vietnam related to FDI and firm productivity/ performance (Anwar & Nguyen, 2014; Anwar & Phi, 2011; Le & Pomfret, 2011).
CHAPTER 4.  EMPIRICAL FINDINGS AND DISCUSSIONS

4.1 The effects of inward FDI spillovers on productivity of Vietnamese

4.1.1 FDI spillover effect through vertical and horizontal channels on domestic manufacturing firm productivity

With respect to fixed effect model, the result indicates a significantly negative impact of horizontal spillover from MNCs’ presence in the recipient country to domestic firms’ TFP (β= -2.156***). It is worth to note that the adverse magnitude of horizontal spillover is quite large and appear to overwhelm two remaining channels of spillovers. This interesting finding is supported by the theoretical review of (Blomstrom & Kokko, 1998) and empirical evidences by (Carluccio & Fally, 2013; Damijan et al., 2013b; Javorcik & Spatareanu, 2008) implying the existence of dominant horizontal spillovers in challenging the survival of domestic firms through more fierce competition and stricter intellectual protection. Thus, the first hypothesis (H1) referring a negative impact of horizontal FDI spillover on domestic firm’s productivity is supported.

In regard to backward spillovers, Vietnam witnesses a reverse trend that the greater the effect of backward spillover is, the higher the productivity local firms can reach (β= 0.611***). Despite strong evidences for dominant effects of positive backward spillovers, it can’t offset the negative outcome generated by horizontal spillovers. It is optimistic that the nature of backward spillover allows local firms with certain level of absorptive capacity to benefit from the presence of foreign subsidiaries in the host market (Havranek & Irsova, 2011). When MNCs enter into a host economy, their first attempt is to relieve the foreignness liability by establishing their linkage relationship with local partners. Thus, they have many motivations to transfer their knowledge and premium processes to local suppliers in the backward linkage chain to control better their production (Hamida, 2013). On the other hand, local suppliers have to learn and adapt to higher foreign requirements. This creates chances and rooms for upgrading new technology and innovative process; as a result, improve the overall productivity (Javorcik et al., 2018). Therefore, the hypothesis H2a implying positive backward spillover is supported.

Besides, forward FDI spillover is found as an unfavorable determinant as it negatively affects domestic firms’ TFP growth (β= -1.085***). The finding is different from the common perspective of positive externalities generated by forward FDI spillover. The previous studies discuss that MNCs’ presence may benefit local firms’ productivity in downstream sector by
less expensive and more accessible foreign inputs and premium supplementary services (Blomstrom & Kokko, 1998; Javorcik & Spatareanu, 2011). However, foreign sector may implement their market penetration strategy aiming at increasing the dependences on their intermediate products and services and weakening the embedded industries in domestic host country (Newman et al., 2015; Thang et al., 2016). In this case, the finding **fails to support the hypothesis H2b** implying positive forward FDI spillovers. Furthermore, while human capital, financial development and firm size are positively associated domestic firm’s productivity, technology gap incurs a significantly negative effect on that. The effects of these firm specific characteristics will be discussed deeper in later parts.

**4.1.2 The moderating effect of human capital**

The result indicates that human capital is a facilitator for productivity spillovers from foreign firms to domestic firms. Specifically, less negative horizontal (from $\beta = -3.010^{***}$ to $\beta = -2.100^{***}$) and forward spillover (from $\beta = -1.073^{**}$ to $\beta = -0.993^{***}$) are associated with higher level of human capital (equal or greater than 50th percentile). More important, positive backward spillover is also improved with higher degree of human capital (from $\beta = 0.541^{***}$ to $\beta = 0.613^{***}$). It can be explained that higher quality of human capital results in better absorptive capacity and enables the successful knowledge and technology transfer from foreign firms to local firms in backward and forward linkage chain (Becker, 1975; Liu et al., 2001; Wang et al., 2012).

Thus, **the hypothesis H3** referring positive moderating effects of human capital on the FDI spillover-productivity relationship is supported.

**4.1.3 The moderating effect of technology gap**

The results indicate that negative horizontal FDI spillover on firm’s TFP is impressively improved with the movement of technology gap from the bottom 25th percentile to the middle 25th - 75th percentile (from $\beta = -1.594^{***}$ to $\beta = -0.818^{***}$). At upper percentile, there is no signal for the moderating effect of technology gap. Productivity associated with forward FDI spillovers also witness the similar trend (from $\beta = -0.845^{***}$ at bottom 25th to $\beta = -0.244^{***}$ at the middle one, and insignificant coefficient at the top 25th). While the small gap generates less motivation for local firms to imitate, the large gap prevents for low-technological-frontier firms from reaching more advanced technology (Sourafel Girma & Wakelin, 2007; Jacobs et al., 2017; Kounetas, 2015). Thus, many previous studies appreciate the catch-up (middle) technology gap that is in favor of technology transfer and matches domestic firm’s absorptive capacity. The findings support **hypothesis H4a and H4b** in the case of horizontal and forward
FDI spillovers. Meanwhile, with respect to backward FDI spillover, these hypotheses are partially supported.

4.1.4 The moderating effect of financial development

The table below indicates the moderating effect of three different levels of financial development on productivity spillovers from FDI. It is worth to note that FDI spillovers in both vertical and horizontal channels do not occur at the bottom 25\textsuperscript{th} percentile of financial development. In regard to backward FDI spillover, its effect on firm productivity are significantly enhanced with higher level of financial development (from $\beta = 0.298^{***}$ at the middle 25\textsuperscript{th} – 75\textsuperscript{th} to $\beta = 0.737^{***}$ at the upper one). On contrast, horizontal FDI spillover witnesses a reverse trend when its effect on firm’s TFP is more negative at upper level of financial development (from $\beta = -1.273^{***}$ to $\beta = -2.015^{***}$ at the upper one). Meanwhile, forward FDI spillover only occurs in the middle 25\textsuperscript{th} to 75\textsuperscript{th} segment of financial development ($\beta = -1.093^{***}$). The hypothesis H5 implying positive moderating effect of financial development is in favor of backward FDI spillovers. Meanwhile, the findings fail to support the hypothesis H5 in the case of horizontal and forward spillover.

4.1.5 Productivity spillovers from FDI firms to domestic manufacturing firms across six geographical regions and four economic regions in Vietnam from 2010 to 2015

The relationship between horizontal spillover and TFP from 2011 to 2015 is significantly negative across six geographical regions with robust large magnitudes, except for North East & North West and Mekong River Delta. This outcome is predictable, as it is supported by fresh evidence from similar economies (Gorodnichenko, Svejnar, and Terrell 2014; Javorcik and Spatareanu 2008; Zanello et al. 2016). The significantly negative magnitudes of forward spillover in Red River Delta ($\beta = -0.956^{***}$), South East ($\beta = -1.359^{***}$) and Mekong River Delta ($\beta = -0.801^{***}$) have proven its existence as an important channel of FDI spillovers in Vietnam. The finding is in contrast to observations by Anwar and Phi (2011) and Anwar and Nguyen (2014), who investigate the insignificant forward effect in 2000-2005, when inward foreign equity is limited to some extent.

Remarkably, the study finds the significantly positive effects of vertically backward spillover on promoting firms’ productivity in the host country across all six regions, except for North East & North West. The backward FDI spillover is unexpectedly highest at Highlands ($\beta = 0.913^{**}$) where the region receives a lowest share of inward FDI. It is followed by the most FDI-intensive region - South East ($\beta = 0.628^{***}$). The results support the hypothesis H6a partly implying the spillover variation across geographical regions is supported. However, the
findings fail to support the remaining hypothesis statement mentioning larger spillover magnitude associated with high FDI concentration.

Despite lower share of inward FDI compared to other economic regions, Central region holds the first position both in receiving the most negative horizontal FDI spillover ($\beta = -2.553^{***}$) and highest positive backward spillover ($\beta = 0.543^{**}$). It is followed by South region ($\beta_H = -1.974^{***}$, $\beta_B = 0.428^{***}$, $\beta_F = -1.359^{***}$) and North region ($\beta_H = -1.948^{***}$, $\beta_B = 0.406^{***}$, $\beta_F = -0.761^{***}$) which are characterized by highest FDI concentration and human capital accumulation. Mekong River Delta, on the other hand, does not receive any horizontal spillover. Similarly, the finding supports the first half of hypothesis H6b referring spillover variation across four economic regions. Nevertheless, it fails to support the second half of the hypothesis relating to greater spillover effects on more FDI-intensive regions.

4.1.6 The role of provincial proximity in FDI productivity spillovers

In regard to backward spillover, the positive backward externalities occur in most sub-areas, except “within Bac Giang 100 km$^2$” and “within Hai Phong 100 km$^2$”. Regardless the highest negative horizontal spillover, sub-area “within Thanh Hoa 100 km$^2$” continues to absorb the largest positive backward spillover for enhancing firm’s TFP. It is interesting to note that the outside sub-area ($\beta=0.754^{***}$) outperforms than the most FDI-intensive sub-areas such as within Ho Chi Minh 100 km$^2$, within Ho Chi Minh 100 km$^2$, within Binh Duong 100 km$^2$, within Dong Nai 100 km$^2$ and within Ha Noi 100 km$^2$ in term of positive backward FDI absorption. On the other hand, forward FDI spillovers negatively affect firm productivity in most sub-areas with nearby provincial proximity, except within Hai Phong 100 km$^2$, within Thanh Hoa 100 km$^2$ and the outside region. Negative forward externalities are more likely occurs in the South economic regions within 100 sq. km of the FDI-intensive provinces as Binh Duong ($\beta = -1.625^{***}$), Dong Nai ($\beta = -1.368^{***}$) and Ba Ria-Vung Tau ($\beta = -1.631^{***}$). Based on the findings above, the hypothesis H7 is not supported as the provincial proximity from the province local firms located to the province with high FDI concentration matters for productivity spillovers in a more complicated way.

4.1.7 Robustness check

The dynamic panel data (DPD) approach was developed to overcome the obstacle in fixed-effect models with datasets that contain a relatively small number of observed time periods compared to the number of individual units (small T and large N) (Holtz-Eakin et al., 2006).
The results of our robustness check are consistent with those in the fixed-effects model (see more in Appendix 4).

4.2 The effect of horizontal spillovers from FDI on average wages

4.2.1 Time trends of average wage, horizontal spillover, import and export orientation across different ownership types

The average wage varied among the different types of ownership in the period 2007 to 2015. The average wages of FDI firms and SOEs were highest during the observed period. In contrast to the average wage in SOEs, which steadily increased every year, the average wages in the other sectors fluctuated dramatically in the period 2011 to 2015, with an obvious sudden drop in all sectors except FDI firms in 2014.

4.2.2 Empirical findings on wage spillovers from FDI

Horizontal spillover appears to have a positive effect on the wages of firms in the Vietnamese economy ($\beta = 0.0237; p < 0.05$). Because of the boost to productivity spillover through human capital, foreign enterprises must pay higher wages than domestic enterprises in the host country to avoid labor turnover (Blomström & Sjöholm, 1999; Figini & Görg, 2011; Girma & Greenaway, 2013; Görg et al., 2007; Wood et al., 2014). Access to the advanced technology and equipment of foreign enterprises as well as their specific knowledge in management, production and operation create horizontal spillover in parallel with wage spillover in the same sector. Based on the findings above, **hypothesis 8 and hypothesis 9** implying positive effect of horizontal spillovers on average wage and its variation across ownership types are supported.

Foreign-invested enterprises have a positive effect on wages ($\beta = 0.1161; p < 0.01$). In Vietnam, in addition to the relationships of net income, horizontal spillover, capital intensity, and firm size with the average wage, foreign-invested enterprises appear to have a strongly positive effect on wages. According to Fukase (2014), due to financial and managerial advantages, foreign-owned enterprises tend to pay a higher wage than local enterprises to attract highly skilled workers.
Table 4-1: Summary of results on hypotheses testing

<table>
<thead>
<tr>
<th>Hypothesis</th>
<th>Statement</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>H1</strong></td>
<td>The productivity of Vietnamese domestic companies is negatively associated with the horizontal technology spillovers from FDI firms.</td>
<td>Supported</td>
</tr>
<tr>
<td><strong>H2a</strong></td>
<td>The productivity of Vietnamese domestic companies is positively associated with the vertical backward spillover from FDI firms.</td>
<td>Supported</td>
</tr>
<tr>
<td><strong>H2b</strong></td>
<td>The productivity of Vietnamese domestic companies is positively associated with the vertical forward spillover from FDI firms.</td>
<td>Rejected</td>
</tr>
<tr>
<td><strong>H3</strong></td>
<td>The relationship between FDI spillovers and productivity of domestic firms is improved with higher level of human capital.</td>
<td>Supported</td>
</tr>
<tr>
<td><strong>H4a</strong></td>
<td>The relationship between FDI spillovers and productivity of domestic firms is lower at the top 25th and bottom 25th percentile of technology gap.</td>
<td>Partially supported</td>
</tr>
<tr>
<td><strong>H4b</strong></td>
<td>The relationship between FDI spillovers and productivity of domestic firms is enhanced at the middle 25th-75th percentile of technology gap.</td>
<td>Partially supported</td>
</tr>
<tr>
<td><strong>H5</strong></td>
<td>The relationship between FDI spillovers and productivity of domestic firms is improved with higher level of financial development.</td>
<td>Partially supported</td>
</tr>
<tr>
<td><strong>H6a</strong></td>
<td>FDI spillover effect on domestic firm productivity vary significantly across geographical regions and higher in more FDI-intensive regions.</td>
<td>Partially supported</td>
</tr>
<tr>
<td><strong>H6b</strong></td>
<td>FDI spillover effect on domestic firm productivity vary significantly across economic regions and higher in more FDI-intensive regions.</td>
<td>Partially supported</td>
</tr>
<tr>
<td><strong>H7</strong></td>
<td>Local firms in provinces located within 100 sq. km. of the most FDI-intensive provinces/cities receive greater</td>
<td>Partially supported</td>
</tr>
</tbody>
</table>
Horizontal FDI spillovers under foreign presence positively affect the average wage of local firms in the same industry with foreign firms.

The effects of horizontal FDI spillover on average wages vary across ownership types.

## CHAPTER 5. CONCLUSION AND IMPLICATIONS

### 5.1 Conclusion

#### 5.1.1 Productivity spillovers from FDI in Vietnam

The author examines unbalanced panel data on 385,976 manufacturing firms in Vietnam from 2011 to 2015 to find fresh evidences on FDI productivity spillover effects on Vietnamese manufacturing firms. First, the results indicate that the horizontal and forward spillovers associated with FDI presence in Vietnam has a negative impact on domestic firms’ TFP. It is worth to note that the adverse magnitude of horizontal spillover is quite large and overwhelm two remaining channels of spillovers. In regard to backward spillovers, Vietnam witnesses a reverse trend that the greater the effect of backward spillover is, the higher the productivity local firms can reach. Despite strong evidences for dominant effects of positive backward spillovers, it can’t offset the negative outcome generated by horizontal spillovers.

Second, human capital is found as a facilitator for productivity spillovers from foreign firms to domestic firms. Specifically, less negative horizontal spillover and more positive backward spillover are associated with higher level of human capital. On other words, the acquisition of more qualified labor in local firms is a facilitator to better absorb FDI spillovers and help domestic firms reach higher level of productivity.

Third, another finding reveals that the level of technology gap really matters for the productivity spillovers from foreign firms to domestic firms. Specifically, negative horizontal spillover effect on domestic firm’s TFP is impressively improved with the movement of technology gap from the bottom 25th percentile to the middle 25th -75th percentile. On the other hand, the relationship between backward FDI spillover and firm productivity is diminished
when the technology gap turns from the bottom 25th segment to the middle one. At upper percentile, there is no signal for the moderating effect of technology gap.

Fourth, it is found that FDI spillovers in both vertical and horizontal channels do not occur at the bottom 25th percentile of financial development. In regard to backward FDI spillover, its effect on firm productivity are significantly enhanced with higher level of financial development. In contrast, horizontal FDI spillover witnesses a reverse trend when its effect on firm’s TFP is more negative at upper level of financial development. Meanwhile, forward FDI spillover only occurs in the middle 25th to 75th segment.

Fifth, in respect to specific regional effects, the relationship between horizontal spillover and TFP from 2011 to 2015 is significantly negative across six geographical regions with robust large magnitudes, except for North East & North West and Mekong River Delta. The significantly negative magnitudes of forward spillover in Red River Delta, South East and Mekong River Delta have proven its existence as an important channel of FDI spillovers in Vietnam. Remarkably, the study finds the significantly positive effects of vertically backward spillover on promoting firms’ productivity in the host country across all six regions, except for North East & North West. The backward FDI spillover is unexpectedly highest at Highlands where the region receives a lowest share of inward FDI. It is followed by the most FDI-intensive region - South East. However, the findings indicate that despite the existence of positive backward FDI spillover, it is still small to offset unfavorable horizontal and forward FDI spillover. In regard to economic regions, central region holds the first position both in receiving the most negative horizontal FDI spillover and highest positive backward spillover. It is followed by South region and North region which are characterized by highest FDI concentration and human capital accumulation. Mekong River Delta, on the other hand, does not receive any horizontal spillover.

Sixth, with respect to provincial proximity, the effect of horizontal FDI spillover on TFP is negatively robust across nine sub-areas, except the insignificant impacts in two sub-areas “Within Ha Noi 100 km²” and “Within Hai Phong 100 km²”. The most negative horizontal spillover occurs within Thanh Hoa 100 km², followed by within Binh Duong 100 and within BR-VT 100 km². The situation is not better for firms located in the provinces outside 100 km² of these sub-areas. In regard to backward spillover, the positive backward externalities occur in most sub-areas, except “within Bac Giang 100 km²” and “within Hai Phong 100 km²”. On the other hand, forward FDI spillovers negatively affect firm productivity in most sub-areas.
with nearby provincial proximity, except within Hai Phong 100 km², within Thanh Hoa 100 km² and the outside region.

5.1.2 The effect of horizontal spillovers from FDI on average wage

This study aims to investigate the effect of horizontal spillover from FDI and trade openness on the average wage in Vietnam using 2007-2015 unbalanced panel data from 693,720 observations. Ownership type is also added to the econometric model as a moderating variable to examine whether ownership types and their inherent characteristics influence wage spillovers from foreign presence. Finally, independent variables such as firm size, real output, net income, capital intensity, gender ratio and market share are included as important predictors of the average wage.

The findings indicate that the overall effect of FDI on the average wage in Vietnam is significantly positive, except for domestic private firms. These results are supported by both theoretical and empirical evidence of the two mechanisms of wage spillovers from FDI: labor market competition and productivity improvement. In addition, private firms in Vietnam often employ unskilled workers. Thus, wage policies for unskilled workers in this sector may be negatively affected by foreign presence and government regulations on wages.

5.2 Academic contributions

In regard to theoretical contributions, the theoretical reviews in influential research works by (Aitken et al., 1997; Blomstrom & Kokko, 1998; Caves, 1974; Wang et al., 2012) figure out two main streams of FDI spillover occurring through productivity spillovers and market access spillovers. While productivity spillovers are very important for emerging economies to stimulate the economic growth and national better-off, market access spillovers appear to be highly attached to developed or relatively powerful economies. Some authors also argue that market access spillovers; for example, export spillovers may almost be absorbed and revealed in better economies of scale and productivity improvement (Anwar & Sun, 2016; Suyanto, Bloch, & Salim, 2012).

With respect to methodological contribution, the thesis firstly builds a research model for estimating productivity spillovers and wage spillovers from FDI. Besides, instead of using only one indicator as in most of previous studies, the thesis further complicates the FDI presence by measuring three dimensions of spillovers. The use of multi-dimensional indicators can help to compare and have a more comprehensive assessment of the FDI spillover effects. Besides, the combination uses of FEM, REM and GMM approaches help reinforce the
robustness of research findings. Secondly, the dissertation explores moderating variables related to firm absorptive capacity, heterogeneity and geographical proximity that interact with FDI spillovers to consider whether these variables matter for the different outcomes of productivity spillovers from foreign firms to domestic firms. Finally, the research results from the latest panel data (2007-2015) will provide the up-to-date empirical findings and implications for FDI spillover effects in Vietnam which is useful for managers, policy-makers and further researchers concerning inward FDI spillovers.

5.3 Implications
5.3.1 Implications at policy-maker level

Firstly, instead of the attempts to increase the volume of FDI inflows, the government should have proper policies aiming at enhancing the absorptive capacity of local firms. This may provide an effective tool to protect the new domestically emerging industries in Vietnam from fierce competition as a result of foreign presence.

In addition, as foreign investors are often motivated by low labor cost and preferential policies and not every MNCs are sources of knowledge spillovers, Vietnam needs to implement procedure reforms to compete for higher quality FDI flows with more potentials for managerial and technological transfer.

Furthermore, it is necessary to create a truly fair business environment for both domestic and foreign enterprises to compete healthily and cooperate based on a mutual beneficial relationship. In order to achieve this goal, the government needs to support domestic enterprises to increase their capabilities and their scale to reinforce their readiness to participate in the linkage chain with foreign partners with diversified local advantages in different regions.

Respect to wage spillovers from FDI, wage development is sustainable if it is based on productivity improvement and cost efficiency rather than temporary labor demand. Increasing inward foreign equity and international trade may have different or even strongly negative impacts on wages in the short and long run depending on the movement from labor-intensive production to capital and technology-intensive production. In this context, the abundant resources of unskilled labor in Vietnam are no longer an advantage but a threat to the survival of local firms and worker benefits. Therefore, policymakers need to take advantage of foreign presence and trade to create favorable conditions for preparing and training the existing labor
force in Vietnam. In this way, local workers are proactive and ready in absorbing knowledge and productivity spillovers as well as improving their income and bargaining power.

5.3.2 Implications at managerial level

From the managerial perspectives, the study raises some practical implications for local firms’ top management in Vietnam. First, firms operating in upstream sectors (input supply) need to improve the quality of their products, standardize their supply chain to meet the requirements of foreign firms, and gradually increase their competitiveness from the local scale to a world scale.

5.4 Limitations and Future Research

Although the author has made plenty of efforts in the thesis implementation process to achieve the research objectives, this research still has certain limitations. Later studies can inherit and expand this study by overcoming some of the following limitations. Firstly, due to data limitations, the econometric model in this thesis does not control the impact of host macro factors (such as exchange rate, growth, inflation), explore whether the level of these macro factors affecting productivity and wage spillovers from FDI as well as the subsidiaries’ heterogeneities and origins of inward FDI volumes. This generates rooms for further researches in addressing the impact of host country’s macro factors and foreign affiliates’ characteristics to enrich the literature of FDI spillovers.

Secondly, subsequent studies can access and use longer panel data sets to control late impacts and provide more comprehensive assessments of spillover effects from FDI over time. The study also has several limitations in estimation capacity and access to a larger dataset. Although STATA software and proper data treatment syntaxes can handle large unbalanced dataset with no problem, some proxies cannot be calculated as initial expectations due to insufficient observations. The proxy for absorptive capacity could be improved with the inclusion of R&D expenditures. Furthermore, data on the physical distance between foreign firms’ locations and local firms are not available. Thus, the scale “within 100 sq. km.” is to some extent inadequate for capturing geographical proximity.

Finally, although the model of FEM with the robustness check by GMM has many advantages in estimating panel data, especially in studying the productivity diffusion from FDI, there are still some limitations in overcoming endogenous issue. Therefore, subsequent studies may employ additional methods with instrument variables such as 3SLS to more effectively control the possibility of endogenous problems. /.