Chapter 13

Assessment of FDI Spillover Effects for the Case of Vietnam: A Survey of Micro-data Analyses

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CHAPTER 13

Assessment of FDI Spillover Effects for the Case of Vietnam: A Survey of Micro-data Analyses

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This paper surveys the growing body of literature on the impact of globalization on local businesses in Vietnam. A special focus of the paper is the analysis of findings of empirical studies on spillovers of foreign direct investment (FDI) from foreign firms to domestic firms in Vietnam, thus showing what aspects are missing in the existing literature as well as suggesting potential topics for future research.

A major data source for empirical studies relating to FDI spillovers in Vietnam was the panel dataset of the annual enterprise survey covering a five-year period from 2000 to 2005. With the analysis of FDI spillovers from different angles, the existing papers yielded a variety of interesting findings that strongly support the hypothesis of positive impacts of FDI on local firms in Vietnam.

The diversity in findings, however, raises the need for more comprehensive research to deepen understanding of the process and mechanism of FDI spillovers. Suggested future research topics include more analysis on the underlying causes for both potential negative and positive impacts of FDI on production and productivity of domestic firms, more research on the relationship between the scope of foreign presence and spillovers as well as possible effects on the market share, and analysis of FDI-induced crowding-out/crowding-in effects with regard to domestic investment.

1. Introduction

Thanks to the introduction of economic reform known as "doi moi" in 1986, Vietnam's economy has enjoyed an impressive performance as one of the world's fastest growing economies with an average growth rate of over 7% annually. The achievements of the Vietnamese economy so far have been matched by sustained efforts in macroeconomic stabilization, an improved investment climate, and outward orientation. In particular, economic growth has been widely recognized as having been closely associated with an expansion of trade and large external capital inflows - mostly in the form of foreign direct investment (FDI). There is a common consensus that the achievements of the economy have been facilitated by an increasing globalization of corporate activities, trade liberalization, and technological advances in conjunction with a rapid increase in cross-border investment globally. In this regard, the FDI sector has occupied a significant share of the Vietnamese economy and its role is becoming increasingly important over time. FDI, as a share of Vietnam's GDP, rose from 13.2% in 2000 to 15.9% in 2006 and to 21.2% in 2007 (CIEM 2007 and CIEM 2008).

Attracting FDI is and continues to be a vital component of the reform policy of Vietnam. Vietnam has become a leading recipient of FDI flows – in relation to the size of its economy. With the adoption of a series of measures to attract FDI, triggered by a belief that foreign presence is connected to advanced technology and stimulates export-led orientation together with more employment created, FDI inflow has rapidly increased over the time particularly in recent years, from a small pledge of about 342 million USD in 1988 to 21.3 billion USD in 2007 and 60.3 billion USD in 2008[1], turning Vietnam into one of the most attractive investment destinations in the world in general and in the region in particular.

In East Asia in general and in ASEAN in particular, Vietnam is considered as a typical case to study the impacts of FDI on a host country. It can be seen that Vietnam's experience in attracting FDI in association with its rapid economic growth over time, has attracted increasing attention and a growing body of written research on FDI and its impacts on domestic sectors.

[1] According to data provided by the General Statistical Office of Vietnam (GSO)

This paper surveys the growing body of literature on the effects of multinational corporations' activities on Vietnam's local firms, which typically focuses on the survey of expanding literature of FDI and its spillover effects on Vietnamese domestic enterprises. The objective of the paper is to analyze major findings from the previous studies, thereby detecting what aspects are missing in the existing literature as well as recommending potential elements that could be considered for future research.

The paper is organized as follows: following an introductory note, the analysis begins with a brief examination of the general analytical framework on spillover effects of FDI from foreign firms to domestic ones. Section 3 reviews in detail empirical studies on FDI spillover effects in Vietnam. Finally, some concluding remarks and suggestions for future research are provided in Section 4.

2. Analytical Framework on FDI Spillover Effects: A Brief Note

The purpose of this section is to take a snap-shot in order to get an overview understanding of the possible channels of spreading out FDI spillover effects found in related empirical studies as well as fundamental modeling notes of analyzing FDI spillover effects. A possible reason for spillover effects to occur is the existence of a gap between foreign and domestic firms, with the former dominating in term of capital intensity and technological advances. In fact, subsidiaries or joint ventures set up by MNCs normally have competitive advantages over domestic firms; this is especially true in developing economies. With the presence of multinational corporations (MNCs), particularly with regard to their powerful participation in the market, domestic firms normally have to adjust their behavior in an effort to maintain market share. In this connection, spillover effects may be considered as the consequence of the performance of foreign firms and the resulting adjustment of behavior of domestic firms.

2.1. Possible Channels of Spreading Out FDI Spillover Effects

As analyzed by Nguyen Thi Tue Anh *et al.* (2006), spillover effects can be divided into the four major groups of effects, including: (i) backward-forward effects, i.e., effects associated with input-output structure of the firms; (ii) demonstration effects, i.e., effects associated with technology diffusion and transfer; (iii) competition effects, i.e., effects associated with domestic market shares; and (iv) effects associated with labor skills or human capital.

The occurrence of the spillover effects of the first category (backward-forward effects) can be observed when there is an exchange of business relationship relating to materials/inputs or intermediate products between foreign invested firms and domestic ones. Depending on whether local firms act as distributors or suppliers, the effects are forward or backward respectively. Particularly when acting as suppliers of inputs for FDI enterprises, the latter is likely to induce the former to enlarge their production capability and reduce average total costs upon recognition of the result of economies of scale. At the same time, in order to ensure a long-term working relationship, domestic firms see the need for and seek to satisfy requirements imposed by foreign firms, thus their competitiveness will eventually improve, particularly in medium and long-term perspectives. To some extent, domestic suppliers may face difficulty in meeting demanding requirements of FDI firms, in a majority of cases, domestic firms become more competitive in the product market, implying that the backward effect is thus highly expected in the developing economies.

The demonstration effects, which are related to technology diffusion and transfer, play an important role, which are particularly desirable for poor and developing nations. For these types of effects, domestic firms can also imitate and adopt products and production techniques of MNCs. In practice, domestic firms expect to benefit from opportunities to approach technological advances brought in by foreign- invested enterprises, mainly through know-how leakage, which result from the cooperation between foreign firms and domestic ones through a popular form of joint ventures. A significant issue here is whether the poor economies have adequate capability to absorb technology diffusion and transfer or not. In this aspect, as indicated in a number of theoretical studies conducted by Blomstroem and Sjoholm (1999); Haddad and

Harrisons (1993), the scope of technology diffusion and transfer depends on the absorptive capability of domestic enterprises.

The third category of spillover effects (competition effect) is subject to the market structure and technology level in the host country. The impacts of these types of spillovers are mixed. On the one hand, the presence of foreign firms may lead to more severe competition in the receiving country market, thus forcing domestic firms to manage the use of existing resources more efficiently or to search for new technologies. On the other hand, in a number of cases, these kinds of effects are found to be undesirable. A simple example is that the launch of new products developed by FDI firms may potentially affect the existence of domestic firms that previously produced these kinds of products. The presence of FDI in this case may lead to a drop in production output of domestic enterprises in the short and medium term. In this circumstance, if pressures on domestic firms are high enough, the overall effects of FDI on the productivity of domestic firms become negative as a result.

Last but not least, the fourth important channel of spillover effects is that it creates more employment, together with the diffusion of managerial knowledge and labor skills to a host country. It can be seen clearly in such popular cases when foreign invested enterprises hire local people to be in charge of management, professional duties, research and development. Knowledge spillovers also occur when technical workers receive training in local and at parent companies. In this regard, it is seen that relatively skilled employees in the recipient economies are normally required by MNCs, thus stimulating the need to organize training courses to strengthen skills of employees. Training can take many forms such as on-the-job training, seminars, schooling, overseas training or R&D activities in domestic firms. For type of spillover effects, it is noted that spillovers normally happen in case of the mobility of employees trained by MNCs from FDI enterprises to domestic ones or run their own businesses. Then these trained employees will bring with them managerial and technological skills and knowledge that help to spread out spillover effects. In reality, it is challenging to quantify spillover effects associated with labor mobility (Nguyen Thi Tue Anh *et al.* 2006). For instance, domestic firms that receive labor mobility may be unable or reluctant to provide appropriate working conditions for those workers, thus their abilities are unable to be fully utilized.

Empirical studies show mixed evidence on FDI effects through horizontal, forward and backward linkages, thus direct comparison of results between one economy and another is not appropriate to solve the issues facing developing economies. This is particularly true because developing nations vary enormously in terms of characteristics such as economic conditions, traditional and political aspects that in turn affect estimation results.

2.2. Analytical Modeling Notes in Association with Empirical Studies

With the use of micro-data, researchers have conducted a large number of empirical studies aiming to assess the impacts of MNCs presence on the host countries in different periods of time. It is noted that the analytical framework of the majority of researchers are relatively similar. Spillover effects are analyzed through a measurement of impacts of foreign presence on the output level or labor productivity of domestic enterprises. In this connection, in addition to factors that are assumed to have influence on productivity of domestic firms or industries including capital intensity, labor quality, production scales, competitiveness of the market, the proxy for foreign presence is normally included as an independent variable in a linear or log-linear regression, where labor productivity of the domestic sector is treated as a dependent variable. Upon estimation results, a positive spillover is stated following the finding of a significant positive sign of the coefficient of the foreign presence and vice versa.

Empirical studies on FDI spillover effects can be divided into the two major groups: (i) Empirical studies in support of the spillover effects; and (ii) Empirical studies in opposition to the spillover effects

2.2.1. Empirical Studies in Support of the Spillover Effects

As one of earliest quantitative analyses, Caves (1971) tested the spillover benefits of FDI in the manufacturing sectors of Canada and Australia. The hypothesis for Canada was that if FDI is capable of increasing allocation efficiency, the profit rate of domestic firms should react inversely to the competitive pressure caused by the presence of foreign firms. The results indicated that profit in Canadian manufacturing industries had a weak tendency to vary inversely with the foreign share. Using foreign firms' share of industry employment as a proxy for foreign presence, the paper shows

that the higher the subsidiary share, the higher the productivity level in competing domestic firms. The estimated results indicate strong evidence of the presence of spillovers.

Using data for 230 Mexican manufacturing industries at four-digit level in 1970 and 1975, Blomstrom (1986) examined spillovers of foreign presence on the roductivity of local firms. The independent variables included the Herfindahl index, market growth variables, defined as the relative growth of employment of each industry within the 1970-1975 periods, the rate of technological progress, defined as the changes in labor productivity in the plants within each industry, and foreign share, defined as the share of employees in foreign plants. Blomstrom (1986) found that foreign presence had a significant effect on the average productivity of each industry. It is noted that although the presence of MNCs in Mexico did not promote the transfer of technology FDI speeded up efficiency with increased competition.

As a replication of the aforementioned approach of Caves (1971), Globerman (1979) conducted a study that used annual census data for four digit Canadian manufacturing industries in 1972. In terms of model specification, the dependent variable was defined as the ratio of total value added per employee in locally- owned manufacturing plants. Explanatory variables include factors that may influence labor productivity such as the foreign share of the industry, differences in the capital labor ratio between Canadian and comparable US industries, differences in labor quality measured by wage per worker in the affiliates, etc. The FDI variable was defined by the gross book value of assets depreciated at the end of 1971, divided by the total employees in 1972, in US industries. The results also strongly supported the hypothesis that spillover effects benefit domestic firms.

Differences in term of productivity growth between domestic and foreign firms in Mexican manufacturing industries from 1965 to 1984 were analyzed by Blomstrom and Wolff (1989). The paper examined the degree to which the presence of foreign-owned firms in a sector influences the productivity of local firms in that sector, and whether there is any possibility of convergence between that industry's productivity level and that of the US. The results show a convergence of productivity levels between local firms in Mexico and foreign-owned firms. Furthermore, both the rate of productivity growth of local firms and the rate of catch-up of these firms to MNCs are positively

related to the degree of foreign ownership of an industry. The results thus provide a firm support for positive spillover effects.

2.2.2. Empirical Studies in Opposition to the Spillover Effects

It is noted that existing empirical studies differ in their ways of estimating the magnitude and significance of spillovers. Most studies indicate that foreign presence will generate spillover effects. Nevertheless, some studies have found that FDI inflows result in no productivity growth or even have a negative effect on output growth of domestic firms.

Using firm-level data for Japanese investment in the industry of US auto parts during the period from 1982 to 1992, Okamoto (1999) examined whether the spillover effects were positive or negative. The study discovered two major important findings. Firstly, in contrast to expectations, Japanese-owned firms were found to be less productive than their US counterparts, at least in 1992. Secondly, it seemed that Japanese assemblers contributed only slightly to the improvement in performance of the US-owned suppliers. Accordingly, the improvement in productivity in the 1980s and in the early 1990s seemingly did not result from technology transfer but from increasing competitive pressure.

In an attempt to find evidence of spillovers from foreign firms to local firms in the case of Venezuela, Aitken and Harrison (1999) estimated the production function of a group of Venezuelan plants with the use of panel data on Venezuelan plants. The paper found that the level of foreign presence as a share of equity is positively correlated with plants' productivity; this relationship is, however, only robust for small firms. It is noted that FDI had a dominant negative effect on productivity growth of domestic firms when examining spillovers from joint ventures to plants without foreign investment. Accordingly, joint ventures seem to hold all benefits from foreign investment, thereby suggesting that less emphasis should be paid to spillover effects of FDI.

3. Empirical Studies on FDI Spillovers in Vietnam

3.1. Data Set: The Annual Enterprise Survey

Empirical studies on possible impacts of FDI in Vietnam are heavily reliant on the enterprise survey conducted annually by the General Statistics Office of Vietnam (GSO) for analysis. It is noted that since 2000, the enterprise survey has followed a new and consistent approach so that the quality of data is much higher than before. Before 2000, the data of enterprises was mainly collected by the so-called statistical reporting system. The main feature of the survey at that time was aimed to take full enumeration of State-Owned Enterprises (SOEs). Enterprises filled in standardized data sheets issued by GSO and forwarded them to statistical offices according to identified reporting data . Nevertheless the response rate was quite low and there was an absence of basis to ensure data comparability.

Since 2000, the enterprise survey has been conducted using a new approach in which enterprise data are collected annually for all sectors and industries started at the date of 1st March. Accordingly, the coverage of the survey includes almost all enterprises in 29 sectors and industries in three industrial groups (4 sectors in mining and quarrying, 23 in manufacturing, and 2 in electricity, gas and water supply), providing a wide range of information on the property structure of enterprises, output, capital stock, investment, employment, location, wages, sales, etc. The general objectives of the survey are to: (i) collect business information needed to compile national accounts; (ii) to gather up-to-date information for business register and sample frame for other business sample surveys; and (iii) to update the statistical database of enterprises.

In terms of questionnaires, in spite of some adjustments over the period, the enterprise survey is characterized by the two basic types of questionnaires. The first type of questionnaire is for full enumeration to provide major information of enterprises. Each enterprise is surveyed with this type of questionnaire either in long form or in short form depending on the ownership structure and the size in terms of number of employees. Accordingly, the long form is applied to all FDI enterprises, all SOEs, all non-state enterprises with 10 or more employees and 20% of non-state

enterprises with fewer than 10 employees. The shorter form is applied to the remaining non-state enterprises with less than 10 employees not to be surveyed with the use of the long form.

The second basis type of questionnaire is the questionnaire for sample survey on business costs, aiming to provide information for compiling indicators on outputs, intermediate consumption and value added of enterprises. The sample size of enterprises to be surveyed with this type of questionnaire accounts for about 10-15% of total enterprises.

Access to the full data set of the enterprise survey is generally neither too difficult nor too costly.

3.2. Review of Empirical Studies on FDI Spillovers

In Vietnam, a majority of the current literature on FDI and its impacts employs a qualitative approach based on statistical data, the number of empirical quantitative studies using micro-data has been on the rise in recent years.

With the use of panel data at firm level for Vietnamese industries from 2000 to 2004 provided by the General Statistical Office of Vietnam (GSO)[2], Le Quoc Hoi (2007) examined wage spillovers from foreign firms to local enterprises both horizontally (intra-industry) and vertically (inter-industry). In this paper, he estimates wage spillovers through a semi-log linear regression[3] with the dependent variable being

[2] The data sets cover an increasing number of firms from 10945 firms in 2000 to 23121 firms in 2004. Taking out firms with missing values, the author found a usable unbalanced panel of 7140 domestic firms and 1461 foreign firms. In the estimation model of the author, all variables are deflated to 1994 fixed prices. The data sets provide information on the property structure of enterprises, output, capital stock, investment, employment, location, wages, sales, etc. Sectoral classification of firms is applied at the two-digit level of Vietnamese Standard Industrial Classification (VSIC), covering 29 sectors in three industrial groups with 4 sectors in mining and quarrying, 23 in manufacturing, and 2 in electricity, gas and water supply. High-wage industries are considered to include chemicals, television and telecommunication devices, computer and office equipment and low-wage industries are regarded to consist of food and beverages, and textiles.

[3] $\ln W_{ijt} = \beta_1 HS_{jt} + \beta_2 VS_{jt} + \beta_3 X_{ijt} + S_j + D_t + L_i + \varepsilon_{ijt}$, where i, j and t denote firm, industry and year respectively. W_{ijt} represents average wage of firm i in sector j in year t. HS_{jt} is the horizontal wage spillover measured as the share of employment accounted by all foreign firms in industry j where the firm operates, indicating the extent of foreign penetration in each industry and competitive pressures from foreign firms that motivates local firms to increase wages so as to be able to attract workers. VS_{jt} measures the level of contacts between foreign and domestic firms between different industries. X_{ijt} denotes the vector of firm i's characteristics, S_j denotes the dummy for industry fixed effects, D_t denotes time dummies, L_i dummy for regional fixed effects., and ε_{ijt} is a random noise term.

the natural logarithm of wage while independent variables including horizontal spillover effect, vertical spillover effect, vector of firms' characteristics which possibly influence the level of wages with the control for capital intensity, technology, scale and concentration, and skill levels, dummy for industry fixed effects, time dummies to account for aggregate shocks and dummy for regional fixed effect.

Empirical results strongly support the presence of wage spillovers from foreign firm to domestic firms in Vietnam. Sectors with a higher presence of foreign firms witnessed higher wage levels whereas domestic firms with backward linkages with foreign firms can benefit from productivity spillovers and pay higher wages to their employees. The paper indicate that horizontal wage spillovers have impacts on firms by all ownership types in both medium and low- technology industries, while vertical spillovers only affects private firms in low- technology industries. While firms of all size groups are affected by horizontal spillovers effects, only small and medium firms are impacted by vertical wage spillovers. Horizontal spillovers affect firms regardless of their training provision, while vertical wage spillovers only impact local firms with training. In this regard, horizontal and vertical wage spillovers are both present when the foreign firm has training activity, however, not in the absence of training by the foreign firm. It is noted that the vertical wage spillovers are of no significance when the local firm has no training activity.

In another research, with the same data set at firm level from 2000 to 2004, Le Quoc Hoi (2008) uses an estimation model derived from the Cobb-Douglas production function and homogeneous of degree one to explore technology spillover effects of FDI from foreign firms to domestic firms in Vietnam through horizontal and backward linkages and at the same time to analyze the impact of the characteristics of industries, foreign and domestic firms on the occurrence and scope of such spillovers.

Estimated results indicate that backward linkage is the most important mechanism for technology transfer from foreign firms to local ones. Le Quoc Hoi (2008) shows that domestic firms in industries with a high level of foreign presence enjoy higher productivity than other firms. In this connection, it is noted that the backward spillover is affected by the size of the domestic firms, quality of the labor force and technology gap. The paper reveals a negative impact of the horizontal presence of foreign firms on domestic productivity. This finding suggests that the competition effect induced by

foreign presence is stronger than the potential technology transfer between foreign firms and their domestic rivals. The emergence of this competition effect is subject to characteristics of the firm and industry. In addition, Le Quoc Hoi (2008) also indicates that domestic productivity is negatively affected by the presence of fully-owned foreign firms, but not with the presence of partially-owned foreign firms. Estimated results show that while domestic-oriented foreign firms produce negative impacts on the productivity of domestic firms, export-oriented foreign firms do not generate significant impacts.

Le Thanh Thuy (2007) attempted to determine major channels and estimate to what extent spillover effects occur in Vietnam using industry- level data for the two sub periods of 1995-1999 and 2000-2002 provided by the General Statistical Office of Vietnam. The paper aims to define factors affecting the magnitude of spillovers of MNCs presence on domestic productivity, thereby drawing policy implications to strengthen FDI spillovers effects in Vietnam. More concretely, the paper measures the impacts of the size of the technology gap between foreign and domestic firms, industry features such as capital-intensive or labor-intensive and the linkage role of the domestic private firms with the use of an industry-level panel data set[4] that includes a total of 29 sectors from three industrial groups of mining and quarrying, manufacturing & electricity, gas and water supply (see appendix 1).

Derived from the production function of Cobb-Douglas form, the labor productivity of the domestic sector is estimated through a log-linear regression[5]. In addition, by adding interaction terms between foreign presence with proxies for technology gap,

[4] Data sets cover information on gross output, fixed assets and employment. In this connection, it is noted that data on gross output and employment are of availability separately for all given economic sectors, whereas data on fixed assets are of availability only for foreign sector and total domestic sector, with an absence of further division inside domestic sector

[5] $\ln (Y_{it}^{d}/L_{it}^{d}) = \mu + \alpha \ln (K_{it}^{d}/L_{it}^{d}) + \beta\, GOV + \gamma\, FOR_{it} + \varepsilon_{it}$, where *d* denotes domestic, *i* denotes industrial sector, *t* denotes time, (Y_{it}^{d}/L_{it}^{d}) denotes average labor productivity of the domestic sector *i* at time *t*, measured by the ratio of gross output to total employees in the domestic sector; (K_{it}^{d}/L_{it}^{d}) is the capital-labor ratio of the domestic sector *i* at time *t,* measured by the ratio of total fixed assets to total employees in the domestic sector; *GOV* is used as a proxy for concentration of industry, measured by the share of SOEs in total output of each industry, taking into account a particular feature of Vietnam that industries with higher presence of SOEs are probably more concentrated; *FOR* is the proxy to measure the degree of foreign presence in each industry, measured by the percentage of the foreign sector's employees of overall industry's employees.

capital intensity and domestic private activities, the paper measures the magnitude of factors affecting spillovers of foreign presence on domestic productivity[6].

It is noted that the technology gap is one of the important factors leading to spillover effects; however, if the gap is too large, negative impacts may occur with respect to domestic firms because of the emergence of the crowding-out effects. The paper finds that given the export-oriented features of the labor-intensive industrial sectors of Vietnam's industry, these export-oriented sectors are quite efficient and highly technological compared to other sectors, implying that spillover effects of MNC presence are more favorable to labor-intensive industries compared to capital-intensive industries. Results of regressions show strong support for the hypothesis of "absorptive capability" of the host country. As a developing country with backward technologies, only Vietnam's industries or firms with quite advanced technologies are able to absorb advanced technologies associated with the presence of MNCs. This impact, however, will disappear with the passage of time when technology gaps are negligible across industrial sectors. By analyzing FDI effects through two sub-periods of 1995-1999 and 2000-2002, this study indicates that FDI spillover effects are much larger in the period of 1995-1999 than in the period of 2000-2002. The paper also confirms the important role of the private domestic sector in expanding FDI spillover effects, thus suggesting that policies enhancing the development of the private sector should be encouraged.

Impacts of FDI on technical efficiency of local firms are analyzed by Nguyen Dinh Chuc *et al.* (2008), where horizontal spillovers are evaluated through imitation, competition and labor mobility and horizontal spillovers are evaluated through backward and forward linkages on technical efficiency. The authors use panel data from 2002 and 2004 combined from the productivity and the investment climate enterprises survey conducted by the World Bank[7] in 2005 and Vietnam IO table in

[6] Estimation equation is now as follows: $\ln (Y_{it}^{d}/L_{it}^{d}) = \mu + \alpha \ln (K_{it}^{d}/L_{it}^{d}) + \beta\, GOV + \gamma\, FOR_{it} + \lambda\, FOR_{it}{*}proxy_{it} + \varepsilon_{it}$, where *proxy* = technology gap (PRG), which is productivity gap, defined by the ratio of gross output per employee in the foreign sector to that of the whole industrial sector; capital intensity (CAI), defined as the capital-labor ratio of foreign sector in each industry, showing that whether a industrial sector is labor-intensive or capital-intensive; domestic private activities (PRI), defined as the percentage of domestic private sector's output in the whole industrial sector's output.

[7] Data set is freely accessible at http://www.enterprisesurveys.org/. The fundamental objective of this firm survey level is to deepen understanding of Vietnam's investment climate. The survey was conducted in 2005 covering more than 1000 manufacturing firms in Vietnam. In relation to the paper by Nguyen Dinh Chuc *et al.* (2008), a 3-year panel data from 2002 to 2004 was formed using

2000. Estimation strategy of technical efficiency of the paper involves the stochastic frontier analysis (SFA) approach[8], which is justified by the argument that real production output of firms is only on or under the optimal production frontier. Accordingly, the empirical frontier model[9] used in the paper is in the form of a Cobb-Douglas production function, where appropriate specification[10] is made to detect FDI spillover effects on technical efficiency of local firms.

The paper investigates possible channels of spillover impacts from FDI on the performance of local manufacturing firms as well as delving into the analysis of the labor mobility effects of foreign invested enterprises to local enterprises in the same industry. Though in term of horizontal spillovers, the labor mobility effects of the technical efficiency from foreign invested enterprises to domestic ones are not seen as theoretically expected but the competition and demonstration effects are recognized in the relationship between foreign- invested and local manufacturing firms. Accordingly, the paper concludes that FDI presence measured in output help to improve production efficiency of domestic manufacturing firms. In this connection, the paper shows that the production efficiency of domestic firms is improved through their increased access to new, improved or less costly intermediate inputs supplied by foreign invested firms. The paper also indicates an upward trend in production efficiency of local manufacturing firms over time.

Nguyen Ngoc Anh *et al.* (2008), using firm-level panel data formed from the enterprise surveys 2000-2005 conducted by GSO, has conducted an empirical research aiming to find evidence of technological spillover effects of MNCs presence in Vietnam. Inheriting and advancing from previous FDI-related studies, this paper

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information from the labor relations and productivity sections of the survey. As indicated in the dataset, there are a total of 17 different manufacturing sectors.

[8] The stochastic production frontier model is as follows: $\ln y_i = \beta_0 + \Sigma_n \beta_n \ln x_{ni} + v_i - u_i$, where y_i: the scalar output of producer i; x_i: the vector of n inputs used by producer i; v_i: the two-sided noise component of the error term; u_i: the nonnegative technical inefficiency component of the error term.

[9] $\ln Y_{ijt} = \alpha + \beta_1 \ln K_{ijt} + \beta_2 \ln L_{ijt} + \beta_3 Year_{it} + v_{ijt} - u_{ijt}$, where Y_{ijt}: total revenues of firm i in sector j at time t; K: total assets of firm; L: the measure of labor, defined as the total permanent employees at year end; *Year*: indicates the year of observation to account for Hicks neutral technological progress over the year.

[10] $u_{ijt} = \delta_0 + \delta_1 Horizontal_{jt} + \delta_2 Forward_{jt} + \delta_3 Backward_{jt} + \delta_4 Year_{it} + w_{jt}$, where *Horizontal, Forward* and *Backward* are used as proxies for the horizontal and vertical effects of FDI on local enterprises; w_{jt} is the random variable, defined by the truncation of the normal distribution with zero and variance σ^2; *Year* is to account for linear change of inefficiency over time.

explores not only horizontal spillover effects but also the backward and forward linkages, which covers not only the manufacturing sector as seen previously but also expands to the service sector. In term of horizontal spillover effects of FDI, the paper also attempts to make a distinction between the horizontal output spillovers, which capture demonstration effects and competition effects, and the horizontal employment spillovers, which capture the labor mobility effects. The econometric model used in the paper is in the form of an augmented Cobb-Douglas production function. The basic model[11] is first estimated using a pooled OLS method to obtain the results to be used as an exploratory analysis. Taking advantage of a panel data set, the paper deals with the issue of a possible correlation between the unobserved productivity shock and the inputs by estimating the basic model using the random effects and fixed effects models. Finally, the first difference form of the model is developed[12] and estimated to deal with the issue of exogeneity.

It is noted that the two sectors of manufacturing and services experience different channels of spillovers. The authors find the presence of positive spillovers through the backward linkages in the manufacturing sector while the backward and forward spillovers seem not to exist in the service sector. Regarding horizontal spillover effects, the paper recognizes the existence of spillovers through labor mobility in the manufacturing sectors, though the horizontal output spillovers are not found in this sector. For the service sector, nevertheless, authors recognize the evidence of horizontal spillovers through both the output channel and through the labor mobility channel. Accordingly, the paper suggests a more detailed policy that encourages FDI into sectors associated with expanded technological spillovers.

Nguyen Phi Lan (2008) conducted a study on FDI technology spillover effects to domestic firms' productivity through both horizontal and vertical linkages, at the same time examining the degree of variance of FDI across regions of Vietnam in Vietnamese manufacturing firms. The paper uses data from the annual enterprise survey conducted

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[11] The basic model is as follows. $\ln Y_{ijt} = \alpha + \beta_1 \ln K_{ijt} + \beta_2 \ln L_{ijt} + \beta_3 \ln M_{ijt} + \beta_4 Horizontal_{jt} + \beta_5 Backward_{jt} + \beta_6 Forward_{jt} + \alpha_i + \alpha_t + \varepsilon_{ijt}$, where Y_{ijt}: real output of firm i in sector j at time t; K: capital of a firm, defined as the value of assets at the beginning of the year; L: the measure of labor, defined as the number of employees; M: material inputs; $Horizontal_{jt}$: the presence of foreign firm in sector j at time t.

[12] The first differenced model is as follows. $\Delta \ln Y_{ijt} = \alpha + \beta_1 \Delta \ln K_{ijt} + \beta_2 \Delta \ln L_{ijt} + \beta_3 \Delta \ln M_{ijt} + \beta_4 \Delta Horizontal_{jt} + \beta_5 \Delta Backward_{jt} + \beta_6 \Delta Forward_{jt} + \alpha_i + \alpha_t + \varepsilon_{ijt}$.

by GSO from 2000 to 2005 with the focus on manufacturing firms. In terms of modelling, the author assumes a Cobb-Douglas production function[13] for both the industry and firm level data estimations. The specific estimated equation[14] is as follows:

$$Y_{ijt} = f\begin{pmatrix} K_{ijt}, L_{ijt}, Humancapital_{ijt}, Scale_{ijt}, Concentration_{jt}, \\ Technologygap_{ijt}, FinancialDevelopment_{ijt}, FDISpillover_{ijt} \end{pmatrix}$$

The model is estimated with the two stage least squares technique with the correction for heteroskedasticity. At the same time, dummy variables for industry, region and time are included in the model, together with lagged values of relevant variables of horizontal, backward and forward linkages, to avoid endogeneity that may result from FDI presence and characteristics of industries.

Different from some other previous empirical studies, the most noticeable finding of the paper study is that the whole period 2000-2005 witnessed positive impacts of horizontal and backward linkages of FDI on productivity of the Vietnamese manufacturing firms, while negative impacts are only seen with regard to forward linkage effects on domestic productivity. This critical finding implies that horizontal and backward linkages act as important channels of technology transfer from foreign firms to domestic firms.

As mentioned above, some previous empirical studies of developing countries show that domestic productivity may be negatively impacted because of horizontal linkage effect due to effective competition of foreign firms with advanced technology compared to domestic ones, forcing domestic firms to reduce their productivity. However, the paper by Nguyen Phi Lan (2008) finds that Vietnam's domestic firms may benefit from the technology leakage of foreign firms through observing and imitating behaviors. The

[13] $Y_{ijt} = A_{ijt}f(K_{ijt}, L_{ijt})$, where Y_{ijt}, K_{ijt}, and L_{ijt} denote output capital, human capital, and employment of domestic firm i in industry j at time t, respectively. A_{ijt} represents the total factor productivity (TFP) of firm i in industry j at time t

[14] Where Y_{ijt}, K_{ijt}, and L_{ijt} are in log form; $Humancapital_{ijt}$: total wages and training costs in log form; $Scale_{ijt}$: firm sales relative to the average firm sales in the same sector; $Concentration_{jt}$: the level of concentration in industry j at time t, applying the Herfindahl index for domestic firms; $Technologygap_{ijt}$: the percentage difference between the percentage productivity of foreign firm and that of domestic firm in the same industry; $FinancialDevelopment_{ijt}$: the financial development variable measured as working capital over total assets; $FDISpillover_{ijt}$: FDI spillovers via horizontal, backward and forward spillovers.

horizontal and backward linkage effects on the domestic productivity are also reliant on the absorptive capacity of Vietnamese firms. Firms with higher human capital stock, better financial development and lower technology gap will benefit from technology spillovers of FDI and consequently they will have higher productivity. However, the paper also indicates that technology spillovers vary from firm to firm, from industry to industry, and from region to region. In terms of technological structure, the presence of FDI produces negative effects on the productivity of domestic firms in industries with low technologies.

Additionally, Nguyen Phi Lan (2008) notes that the main concentration of FDI in industries of both low and high technologies generates benefits for domestic firms from backward linkages with foreign firms. However, only industries of medium technologies benefit from forward linkages with foreign firms. This reflects the fact that domestic firms in industries of medium technology can have intermediate goods of better quality and lower cost. As a result, they can increase their productivity and generate greater economies of scale.

Another important finding of this paper lies in its realization that private firms are very active in looking for technical assistance and technology transfer from foreign firms through the provision of intermediate goods to foreign firms and in turn foreign firms help domestic ones to improve the quality of their products through training courses, technical assistance and technology transfer. Moreover, large firms with high technology have greater opportunities to receive more technology spillovers from foreign firms than small and medium firms.

Another finding of the study is that all regions of Vietnam benefit from the technology spillovers of FDI. However the spillover effects vary enormously across regions. As Nguyen Phi Lan pointed out, the estimation results indicate that backward spillovers occur mainly in four regions namely the Red River Delta, the North East, the South Central Coast, and the South East which have advanced conditions of infrastructure, human capital stock and technology, and in which most of Vietnam's imports and export activities take place. However, they do not benefit from horizontal linkages because of the high concentration of nearly 80 percent of FDI in these regions. As a result, the crowded presence of foreign firms generally brings competition effects to their local rival firms in the three regions. In contrast, domestic firms in remote

regions do not have any backward linkages but benefit from horizontal linkages with foreign firms. Domestic firms in the remote regions may reform their own production methods, learn from foreign firms and improve their technological levels, thus helping them to increase their productivity.

Pham Xuan Kien (2008) uses the data of Enterprise Survey 2005 by the General Statistics Office of Vietnam to test possible impacts of FDI on labor productivity in Vietnam as a whole. The paper focuses on the data at the firm level in four sub-industries: food processing, textile, garment and footwear, electronics and mechanics with a total of 441 enterprises including domestic and FDI firms located over the country. The author has attempted to answer four main question: (i) Does the FDI have positive effects on the labor productivity in Vietnam?; (ii) Does the impact depend on the skills, scale and capital intensity gaps between the domestic and FDI firms?; (iii) Does the impact vary across locations?; and (iv) Is there any different effect of FDI on the labor productivity due to different types of FDI?.

The paper finds that the spillovers of FDI to the overall labor productivity in Vietnam are unambiguous and strongly positive. This, once again, stresses the crucial role of foreign capital in economic development of developing economies like Vietnam. Through Foreign Direct Investment, the host countries obtain not only the necessary capital, but also obtain modern technology, management skills, and marketing skills. The author agrees with the view that the presence of FDI firms facilitates competition between enterprises in the host countries, which induces them to use resources more efficiently, improve technology as well as management and in turn improve labor productivity as a whole.

As analyzed by the author, the spillovers of FDI in Vietnam are reliant on the skills, scale, and capital intensity gaps between FDI and domestic firms. The negative impacts of skills and capital intensity gaps on the overall labor productivity suggest that Vietnam may stimulate FDI firms that tend to apply labor-intensive technologies to employ the labor force, which is abundant and relatively cheap in the short run. However, in the long run, it should focus on narrowing the technology gap between domestic and foreign firms.

Furthermore, the author recognizes that improving the skills of local workers is crucial because it seems that relatively cheap labor will no longer be a competitive

factor to attract FDI in the near future. Thus, the Vietnamese government should pay attention to improving skills for labor through vocational colleges and training programs. The government should also develop domestic enterprises, particularly small and medium enterprises by providing them with more training on new technologies. The government should help these firms to renew their technologies, machines and so on to catch up and compete with FDI firms in domestic markets as well as to compete with foreign firms in the international markets.

To some extent, the author shares a common view with Nguyen Phi Lan (2008) that spillovers of FDI in Vietnam are found to be different across locations. The regression results illustrate that FDI flows tend to concentrate on the two biggest cities, Hanoi, the capital in the North and HoChiMinh city in the South as well as their surrounding cities such as HaiDuong, BacNinh or BaRia-VungTau, BinhDuong, DongNai. This implies that to assure equitable development among the regions in order to achieve sustainable economic development, the government should encourage investors, including domestic and foreign firms, to invest in the relatively less developed regions such as mountainous provinces in the North or remote areas in the middle of Vietnam through policies such as tax and investment incentives. The government, besides proving tax incentives, could spend the national budget on infrastructure systems including roads, markets and schools to improve comparative advantages of these areas in order to attract more investment.

In addition, Pham Xuan Kien (2008) also finds that there are some differences in the spillovers of FDI in Vietnam due to different types of FDI. Joint ventures and other types of FDI, excluding 100% foreign-owned capital, were found to have a very strongly positive impact on the labor productivity as a whole. This finding suggests that in developing countries such as Vietnam, working in joint ventures as well as other FDI contacts enables local workers to learn more about knowledge, management, and marketing skills than working in 100% foreign- owned capital firms where most of the high positions might be hold by foreign experts.

The critical review of literature on FDI spillovers in the case of Vietnam strongly shows that foreign presence is predominantly positive to Vietnam's economic development in various aspects, ranging from the promotion of transfer of technology and managerial skills from foreign firms to local ones, particularly with regard to those

which act as suppliers to MNCs, to the strengthening of total- factor productivity. In this connection, as concluded by Giroud (2007) the level of linkages as well as knowledge sharing between foreign firms and local suppliers in Vietnam, however, remain small. Moreover, it is noted that FDI spillovers would also benefit workers not directly employed by the multinational operation with the creation of positive externality when workers could get higher wages than they would otherwise received.

4. Concluding Remarks and Suggestions for Future Research

This paper reviews micro-data analyses of FDI spillovers in Vietnam. Recent years have witnessed a growing number of econometric studies at micro-level using the panel dataset constructed from the annual enterprise survey, particularly during the five-year period from 2000 to 2005.

Existing empirical studies under review in this paper strongly agree that FDI spillovers from foreign firms to local firms of Vietnam are overwhelmingly positive in various aspects. As analyzed, there are multiple channels through which local firms in Vietnam can benefit from the presence of foreign firms. Nevertheless, the magnitude of spillovers varies across regions, industries and firms; cases spillovers are even negative in some cases and aspects. The diversity in findings could be due to various causes, particularly with regard to methods of estimation and data quality, triggering the need for more research work in this area.

In the current literature, there remains a lack of analysis on the underlying causes for the potential negative or positive impacts of FDI on production and productivity of domestic firms. In this connection, it is noted that some empirical studies state that spillovers are more pronounced in low-tech industries that have a low level of technology gap between domestic and foreign firms. The implications of these studies should be further considered and verified, particularly with regard to the design of FDI-related policies, given the current context of increasing FDI inflows in Vietnam and the wishes to encourage the inflow of FDI in high- tech industries.

Another area of concern is the need to consider more analysis of the relationship

between the scope of foreign presence and spillovers as well as possible effects on the market share so as to be able to define suitable policy suggestions to minimize negative effects in association with the growing volume of FDI over time.

Also, given the importance of an appropriate investment strategy for rapid and sustainable development, there should be more research to explore the relationship between FDI and domestic investment, to identify whether FDI substitutes or complements domestic investment.

In term of data for future research, the dataset constructed from the annual enterprise survey is believed to continue being the primary source of micro-data for empirical quantitative studies, given its wide range of coverage and reliability and accessibility.

Appendix 1. Industrial Sectors

C	**Mining and Quarrying**
C10	Mining of coal and lignite; extraction of peat
C11	Extraction of crude petroleum and natural gas
C12	Mining of metal ores
C13	Other mining and quarrying
D	**Manufacturing**
D15	Food and beverage
D16	Cigarettes and tobacco
D17	Textile Products
D18	Wearing Apparel, dressing and Dying of Fur
D19	Leather Tanning and Dressing
D20	Wood and Wood Products
D21	Paper and Paper Products
D22	Printing, Publishing and Reproduction of Recorded Media
D23	Coke and Refined petroleum products and Nuclear fuel
D24	Chemicals and Chemical products
D25	Rubber and Plastic products
D26	Other Nonmetallic Mineral products
D27	Basic Metals
D28	Fabricated metal products
D29	Machinery and Equipment, n.e.c.
D30	Office, accounting and computing machinery
D31	Electrical machinery and apparatus, n.e.c.
D32	Radio, TV, communication equipment
D33	Medical and precision and optical instruments
D34	Motor vehicles trailers and semi-trailers
D35	Other transport equipment
D36	Furniture, N.e.c
D37	Recycling
E	**Electricity, gas and water supply**
E40	Electricity, gas steam and hot water supply
E41	Collection, purification and distribution of Water

Source: *Le Thanh Thuy* (2007).

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