DEPOCEN

Working Paper Series No. 2008/18

Foreign Direct Investment in Vietnam: Is There Any Evidence Of Technological Spillover Effects.

Nguyen Ngoc Anh* and Nguyen Thang[†], Le Dang Trung[†]
Pham Quang Ngoc*, Nguyen Dinh Chuc*, and Nguyen Duc Nhat*

* Development and Policies Research Center (DEPOCEN), No. 216 Tran Quang Khai, Hanoi, Vietnam, http://www.depocen.org.

[†] Center for Analysis and Forecasting (CAF), No1 Lieu Giai Street, Hanoi, Vietnam, http://www.caf.org.vn

Development and Policies Research Center (DEPOCEN)

Center for Analysis and Forecasting (CAF)

Comments Are Welcome

FOREIGN DIRECT INVESTMENT IN VIETNAM: IS THERE ANY EVIDENCE OF TECHNOLOGICAL SPILLOVER EFFECTS

Nguyen Ngoc Anh* and Nguyen Thang†, Le Dang Trung† , Pham Quang Ngoc*, Nguyen Dinh Chuc*, and Nguyen Duc Nhat*

This version: 1 January 2008

Correspondence: Nguyen Ngoc Anh, email: anhnguyenlancaster@yahoo.com or ngocanh@depocen.org.
* Development and Policies Research Center (DEPOCEN), No. 216 Tran Quang Khai, Hanoi, Vietnam, http://www.depocen.org.
† Center for Analysis and Forecasting (CAF), No1 Lieu Giai Street, Hanoi, Vietnam, http://www.caf.org.vn

We would like to thank IDRC for financial support. Henrik Hansen (University of Copenhagen), Remco Oostendorp (Free University, Amsterdam), Jim Taylor (Lancaster University), and Getinet Haile (Policy Studies Institute) provided useful comments and suggestions. The authors alone are responsible for all errors and omissions.

Pham Quang Ngoc and Le Dang Trung are responsible for calculating the horizontal, backward and forward linkages from the IO tables and from the Census. A note carefully describing the procedure to calculate these linkages are available from these authors upon request.

FOREIGN DIRECT INVESTMENT IN VIETNAM:

IS THERE ANY EVIDENCE OF TECHNOLOGICAL SPILLOVER EFFECTS

Abstract: In the context of integrating more deeply into the world economy the Vietnamese policy makers have undertaken several measures to attract foreign direct investment to the country, with the culmination of FDI inflows in 2007 reaching over USD 20 billion, an increase of 69% over 2006. The policy has been taken on the ground that the FDI inflows will create employment and bring along the much needed technological advances, which will spill over to domestic firms. In this paper, we use a firm-level panel data constructed from the Census 2000-2005 to investigate not only the horizontal spillovers but also the backward and forward linkages. Adding to the current literature which focused mainly on the spillovers in the manufacturing sector, our paper provide the first estimates of the spillover effects in the service sector (at least in the context of developing countries). We also distinguish between the horizontal output spillovers (which capture demonstration effects and competition effects) and the horizontal employment spillover (which captures the labour mobility effect). The results obtained from our regression models are mixed. Different channels of spillovers are at work for the manufacturing and the service sectors. We find evidence of the positive backward technological spillovers for the manufacturing and positive horizontal spillovers for the service sector.

Keywords: Foreign Direct Investment, Vietnam, technological spillovers,

I. INTRODUCTION

Since its economic reform known as "doi moi" in 1986, the Vietnamese economy have shown a remarkable performance as one of the fastest growing economies in the world with the average growth rate over 7 percent per annum. During its transition to a more market-based economy, rapid economic growth has taken place along side the expansion of FDI inflows and trade. Vietnam has managed to attract a large inflow of inward foreign direct investment (FDI) during the last two decades, which together with trade liberalisation have contributed significantly to the economic growth of Vietnam (Le Dang Doanh 2002, Dollar 1996; Dollar and Kraay 2004). According to official statistics, the contribution of the FDI sector in Vietnam economy is significant and getting more and more important. In 2000, the contribution of the FDI sector to GDP was about 13.2 percent, and increased to 15.9 percent in 2005 (CIEM 2005).

Attracting foreign direct investment (FDI) has become an important element of economic and industrial development strategies for many developing countries, and Vietnam is not an exception. The policy makers have undertaken several measures to attract foreign direct investment to the country, with the culmination of FDI inflows in 2007 reaching over USD 20 billion, an increase of 69% over 2006.[1] The policy has been taken on the ground that the FDI inflows will create employment and bring along the much needed technological advances, which will spill over to domestic firms.

[1] Vietnam Economy Newspaper (2007), http://vneconomy.vn/?home=detail&page=category&cat_name=11&id=24ef384370fe97&pageid=2243

As already pointed out in the literature, when invested in country, multinational corporations bring along capital, technology, managerial and marketing skills and its global network which contribute significantly to a host country's economic growth.[2] These are believed to contribute to the economic growth of the host countries, directly through capital inflow, increased local employment, usage of advanced equipment and technology or indirectly through a number of channels including technological innovation caused by increased domestic competition and technology spillover from subsidiaries of multinational corporations (MNCs) to indigenous firms in the host countries.[3]

Vietnam's recent experience in attracting FDI and in achieving rapid economic growth has generated an increasing body of research literature.[4] Earlier studies have focused mostly on investigating the determinants of FDI in Vietnam (Nguyen and Nguyen 2007), while more recent studies investigated the contribution of FDI to export (Schaumburg-Muller 2003, Parker et al 2005, and Nguyen and Xi 2006) and to economic growth (Nguyen Phuong Hoa 2002, Le Viet Anh 2002, Pham and Ramstetter 2006, Nguyen Phi Lan 2006, and Vu et al. 2006). Several other authors have examined the contribution of FDI to poverty reduction (Nguyen Phuong Hoa 2002), and FDI and job creation (CIEM 2004, Mirza and Giroud 2004).

[2] This is especially true for those FDI in the manufacturing sector which is widely considered a combination of capital, technology, as well as managerial and marketing skills.

[3] Technologies inflows from more developed countries to developing economies associated with FDI by the multinational enterprises (MNCs) are of special importance as developing countries often lack the knowledge, the capacity, and the resources to develop new technologies by themselves. FDI serves as an important channel to reduce the technology gap between developing countries and advanced economies through direct technology transfer and indirect spillovers.

[4] The unavailability of data has long been an obstacle for researcher doing empirical research on the determinants of FDI and its impacts on the economy. More recently, the availability of data recently has allowed researcher to conduct numerous interesting and policy-relevant empirical research on FDI and its consequences. See Nguyen and Nguyen (2007) for futher references.

With the surge of FDI inflow in the last few years, it is now time for policy makers and researchers to pay more attention to the potential spillover effects that FDI brought about rather than focusing almost entirely on determinants of FDI inflows. In tandem with the huge and growing international literature on the spillover effects of FDI to domestic firms, there are more and more studies on the technological spillovers from MNC to Vietnamese domestic enterprises. Although there have been several research in the spillover effects from MNE to Vietnamese firms, these earlier studies suffer from various limitations such as using aggregate industry-level data (Le Thanh Thuy 2005), using only case-studies which are difficult to generalize (Nguyen Thi Phuong Hoa 2005),[5] and focus only on horizontal effects (Nguyen Tue Anh 2006).

In this paper, we use a firm-level panel data constructed from the Census 2000-2005 to investigate not only the horizontal spillovers but also the backward and forward linkages which are calculated using the spillover coefficients from the Input-Output table 2000.[6] Adding to the current literature which focused mainly on the spillovers in the manufacturing sector, our paper provide the first estimates of the spillover effects in the service sector (at least in the context of developing countries). We also distinguish between the horizontal output spillovers (which capture demonstration effects and competition effects) and the horizontal employment spillover (which captures the labour

[5] Nguyen Thi Phuong Hoa (2002) reported evidence that the human capital in Vietnam seems to exceed the threshold necessary to benefit from FDI. Supplemented econometric evidence with her own survey she reports that there is evidence of labour turnover leading to spillover of technology from FDI firms to domestic enterprises.

[6] Ideally, we should have the Input-output table for each year understudy, however, we do not have such a luxury. We instead use the coefficients from the I-O table 2000 for calculating the backward and forward linkages for all the years.

mobility effect). The results obtained from our regression models are mixed. Different channels of spillovers are at work for the manufacturing and the service sectors. We find evidence of the positive backward technological spillover for the manufacturing and positive horizontal spillover for the service sector. The remainder of the paper is organized as follows. After discussing briefly the channel of spillover effects in the next section, we will provide an overview of the empirical literature including studies on Vietnam in Section III. Section IV presents the model, data and estimation methods. Section V discusses the estimation results while section VI concludes.

II. SPILLOVER EFFECTS – AN OVERVIEW

With the characteristic of public goods, knowledge and technologies associated with FDI by MNCs have been considered an important externality with long-run effects in endogenous growth models (Grossman and Helpman 1991, Lucas 1988, Romer 1990). It is commonly recognized that MNCs possess more advanced technology. When MNCs choose to penetrate a foreign market through directly investment, they are likely to bring along more sophisticated technology and superior managerial practices. These give them a competitive advantage over indigenous firms who tend to be more familiar with the consumer preferences, business practices, and government policies in the host country market (Blomstrom and Sjoholm, 1999). It is possible that a portion of the technologies and experiences transported by MNCs will be diffused from their affiliates to the indigenous establishments in the host economy. According to Javorcik (2004, p. 607), *"Spillovers from FDI take place when the entry or presence of multinational corporations increases the productivity of domestic firms in a host country and the multinationals do not fully internalize the value of these benefits"*. Business associations with MNCs provide important learning opportunities for the domestic firms. They could reduce the costs of innovation and imitation for local firms, which will in turn speed up productivity improvement (Helpman, 1999). FDI may raise productivity levels of domestic firms in the industries which they enter by improving the allocation of resources in those industries. The presence of multinationals together with their new products and advanced technologies may force domestic firms to imitate or innovate. The threat of competition may also encourage domestic firms which might otherwise have been

laggards to look for new technology. Another route for the diffusion of technology is the movement of labour from foreign subsidiaries to locally owned firms.

The literature identifies technological spillovers from FDI to domestic firms into two broadly classified groups (i) intra-industry/horizontal spillovers; and (ii) inter-industry/vertical spillovers.

(i) intra-industry/horizontal spillovers:

- *Demonstration* effects: represent the 'imitation' channel of spillover or 'learning-by-watching effect' (Jutta Gunther, 2002). As new technologies are introduced to the host country, domestic firms can observe foreign firm's actions, skills or techniques and 'imitate' them or make efforts to acquire these techniques and apply them, which results in production improvements (Wang and Blomstrom, 1992).
- *Competition* effects: FDI's indirect impact on host country efficiency and innovation through intensified competition is also viewed as a form of spillover effects. MNCs' entry into the host country market will inevitably intensify host country competition. Under increased competition, to stay competitive, domestic firms are forced to operate more efficiently and introduce/adopt new technologies earlier than what would otherwise have been the case (Kokko, 1994, 1996; Wang and Blomstrom, 1992).
- *Labour mobility* effects: This effect occurs when workers and managers employed in foreign affiliates who have been trained with advanced technical

and managerial skills move to other domestic firms or open their own enterprises (Fosfuri, 1996). Theoretical work has generally predicted positive effects of FDI presence on domestic firms' productivity through the labor mobility channel (Kaufmann, 1997; Haaker, 1999; Fosfuri, Motta, and Rønde, 2001; Glass and Saggi, 2002).

(ii) inter-industry/vertical spillovers: Usually, vertical spillovers occur as the results of the interaction between foreign and domestic firms not in the same industry. These linkages effects have been discussed by Lall (1978) and Clare (1996). This is the case when MNCs are suppliers (forward linkages) or buyers (backward linkages) of domestic firms.

- Spillover through backward linkages: FDI can also contribute to technology improvement of their local suppliers or potential suppliers by offering technical assistance and supports to these firms
- Spillover through forward linkages: MNCs may also provide training and other types of technical support to their customers.

On the contrary to positive effects of spillovers discussed above, it is also argued in the literature that FDI may create negative spillovers to domestic firms' productivity and this effect may be large enough to offset the above positive ones. As MNCs enter the market, their advantages on technology and know-how may take in the market of the domestic firms and make them produce in less efficient scales, which leads to less productiveness of domestic firms (so-called 'market stealing effects').

In summary, foreign firms can have productivity "spillover" effects on local competitors (horizontal spillovers) as well as on upstream and downstream domestic firms (vertical spillovers). The transfer of technology (broadly defined as managerial practices, production methods, marketing techniques or any other knowledge embodied in a product or service) can occur through a number of channels. For example, local firms may learn to imitate a new process or improve the quality of their product through observation, interaction with foreign managers in business chambers, and from former employees of foreign multinational corporations (MNEs). Local firms may also benefit from the entry of new professional services or suppliers as a result of the MNE entry. Foreign firms may act as catalyze domestic suppliers to improve the quality or time efficiency of their good or service by demanding higher standards. On the other hand, foreign firms may have a negative effect on domestic firms' output and productivity, especially in the short run, if they compete with domestic firms and "steal" their market or their best human capital. As domestic firms cut back production they may experience a higher average cost as fixed costs are spread over a smaller scale of production (Aitken and Harrison, 1998).

III. LITERATURE REVIEW

There have been an increasing number of research studies that examine whether FDI brings positive spillover effects. Still this body of empirical research produces mixed results. On one hand, many studies find that there exist significant positive spillover effects from foreign direct investment. On the other hand, some find either no or statistically insignificant outcome from technology spillover. Examples of studies

reporting positive spillover effects include earlier studies by Caves (1974) for Australian, Globerman (1979) for Canada, and Blomstrom and Persson (1983) for Mexico and more recent studies by Blomstrom and Sjoholm (1999), Sjoholm (1999) and Takii (2001) for Indonesia, Hirschberg and Lloyd (2000) for China, Kozlov (2001) for Russia, Sinani and Meyer (2002) for Estonia. In contrast, a number of studies either fails to find evidence supporting positive effects or reports evidence of significant negative spillover. Examples include studies by Kokko and Tansini (1996) for Uruguayan, Aslanoglu (2000) for Turkey, Haddad and Harrison (1993) for Morocco, and Aitken and Harrison (1999) for Venezuela, Djankov and Hoekman (1998) for the Czech Republic, Konings (2001) for Bulgaria, Romania and Poland.

The current status of the literature is best described by the meta-analysis conducted by Gorg and Greenaway (2004). For example, among the 42 studies on horizontal productivity spillovers of FDI in developed, developing, and transition economies summarized in Gorg and Greenaway (2004), only 20 studies report unambiguously positive and significant results. Furthermore, 14 out of the 20 studies finding positive effects either use cross–section data at the industry level, which leads to aggregation bias we discuss below, or use cross–section of firm level data without controlling for the endogeneity of FDI presence. Among the 24 studies using firm level panel data, which Gorg and Greenaway (2004) argue to be using the most appropriate estimating framework, only 5 studies obtain positive and significant FDI spillover effects, with 4 from developed countries. For transition economies, only one out of the 8 studies

discussed obtains positive and significant FDI spillover effects, using cross–section data.[7] The results appear more conclusive for vertical spillovers . Among the five studies discussed in G¨org and Greenaway (2004) that focus on vertical FDI spillover effects three find positive backward FDI spillovers, one finds positive forward FDI spillovers. In addition Javorcik (2004) and Blalock and Gertler (2007) find positive vertical FDI spillovers in Latvia and Indonesia, respectively.

Several explanations have been put forward for the contradictory findings in the previous studies.

1. Absorptive capacity/technology gap: In order for the spillover effect to exist, there must be some technology gap between FDI and domestic firms. However, it the gap is too large, it may be impossible for domestic firms to absorb foreign technology. This implies that the larger the technology and human capital gap between the domestic and foreign firms, the less likely the domestic firms will be able to gain from the spillovers and the implication is that positive spillovers should be found in more technologically advanced sectors or in the more industrialized countries[8] Studies show that host economies that have relatively smaller gap tend to benefit more from spillover effects. Konings (2001) find that spillovers are smaller in industries with larger labor productivity gap between local and foreign firms. However, the study of Sjoholm (1999) on Indonesia

[7] Most studies reported in this study focus on the spillover effects of FDI on domestic firms in the same industry.

[8] The negative or insignificant effect of spillover measures found in the less developed countries is usually attributed to the low level of "absorptive capacity" of the domestic firms. There is also a hypothesis that the relation between technology gap and spillovers is not linear.

shows a completely contrast result. This is consistent with the pattern in the literature that most studies on developing countries find that the spillover effect is nill or negative (see for e.g., studies of Morocco by Haddad and Harrison, 1993; Venezuela by Aitken and Harrison, 1999; Bulgaria and Romania by Konings, 2000; the Czech Republic by Kosova, 2004: and Russia by Yudaeva et al., 2003), and that several studies find positive spillovers in the more developed economies such as the UK (e.g., Haskel et al., 2002) and the US (e.g., Keller and Yeaple, 2003).

2. Competition of domestic market: The level of competition in the domestic market may also influence the spillover effects from MNCs to domestic firms. High competition forces MNCs to bring in relatively new and sophisticated technologies from their parent company in order to retain their market shares Wang and Blomstrom (1992). The technology that is transferred to the subsidiaries might leak out to the domestic firms and thereby increase the competition facing subsidiaries even more. The stronger the competition, the more advanced technology brought into the domestic market. Empirical evidence are abound in support of the argument that higher spillovers of FDI are found in industries with higher domestic competition (Sjoholm 1999, Blomstrom et al. 1994 and Kokko 1996).

3. Looking for FDI spillover effects in the wrong place: Earlier studies seem to look for evidence of spillover effects in the wrong place. While there are

numerous studies on horizontal (intra-industry) spillovers, there are relatively few empirical studies on vertical spillovers. This is surprising as vertical spillovers are more likely to be positive than horizontal spillovers since MNEs have an incentive to improve the productivity of their suppliers (and not their competitors). The few empirical papers that have appeared recently report evidence of spillover effects arising from technology transfer through backward linkages (Blalock and Gertler, 2005, Schoors and van der Tol, 2001, and Javorcik, 2004).[9]

4. Differences in methodology and level of data aggregation: One possible reason for the contradictory findings of spillover effects is that the data used in the studies are collected at different levels of aggregation. Some studies employ firm level data while others examine data with more aggregated industry data. Some use cross-sectional data while other use panel data over a period of time. In studies using more aggregated industry data, it is difficult to distinguish between inter-industry effects from intra-industry effects of FDI. As a result, positive inter-industry spillover effect may not present due to strong negative of intro-industry spillover effect. In a meta analysis, Gorg and Strobl (2001) find that "on average, cross-sectional studies report higher coefficients of the effect of foreign presence than panel data studies". In a recent study, Lipsey and Sjoholm (2004) suggest that results of degree of spillovers are different across different definitions of industry level and choices of measuring spillovers on national or regional level.[10]

[9] However, these studies rely only on a variable that is constructed from input-output tables at the industry level, rather than a direct firm-specific variable.

[10] Gorg and Strobl (2001) on the contrary comment that "the definition of the foreign presence variable included in some studies seems to affect the results obtained".

Although there is a very small literature on the FDI spillover effects for Vietnam, the previous studies have produced mixed results. Several authors have acknowledged the potential positive effects of FDI for productivity improvement but argue that the linkage effects are weak at best (Tran 2004, andSchaumburg-Müller 2003) or smaller than what often found for other countries (Mirza and Giroud 2003, 2004). Schaumburg-Müller (2003) examined the development of FDI in Vietnam during the 90s using only macro-level data. An important conclusion from this study is that FDI has not lived up to the expectation regarding linkages and technology spillover although in the longer term there is potential for these, particularly through skill-upgrading of the labour force. Using a recent survey of subsidiaries of TNS, Mirza and Giroud (2003, 2004) report some evidence of spillover effect for Vietnam. About 32 percent of inputs are sourced from locally-based companies (both domestic and foreign). However, the extent of such effect is smaller than that in Thailand and Malaysia as there is no supplier partnership scheme in place in Vietnam. These authors suggest that Vietnam needs to look for lessons from Malaysia and Thailand to engage TNCs.

On the other hand, other authors using econometric techniques have found that there are evidence of spillover effects. Le Thanh Thuy (2005) investigated the technological spillover effects of FDI on labour productivity in 29 sectors for Vietnam using industry level data for two period 1995-1999 and 2000-2002. [11] She found that there is evidence of

[11] To measure the impact of FDI, she used foreign share in labour employment (percentage of foreign sector's employees of total industry's employees) in her regression. She argued that this is a better proxy than share of foreign sector output. However, using this proxy did not allow her to distinguish backward and forward linkages.

spillovers from foreign direct investment on the productivity of domestic industries in Vietnam during 1995-1999 but this effect became weaker during 2000-2002 (possibly due to the market stealing effect). Nguyen Tue Anh et al (2006) is the first to use firm-level data to investigate the FDI spillover effect. Similar to Le Thanh Thuy (2005), Nguyen Tue Anh et al (2006) investigate only the effects of FDI on labour productivity. The general conclusion from this study is that the presence of FDI improves the labour productivity of domestic enterprises.

IV. DATA AND MODEL

Data

The data used in our paper is obtained from the Census database provided by General Statistical Office (GSO). Since 2000, the GSO has annually implemented the survey. We also used the input-output table for the year 1999-2000 provided by the GSO. The number of enterprises being surveyed in the Census by the GSO has increased significantly from 25000 in 2000 to over 111000 in 2005.[12] For the purpose of our study, we investigate data for both the manufacturing and services sectors. The data covers the period from 2000 to 2005. The database contains information on type of enterprises (State owned enterprises, joint stock company, private enterprise, FDI), value of output, value of exports and imports, number of employees, wages, materials costs and fixed assets, R&D activities. A serious limitation of the data is that some of the information

[12] The distribution of firms across years in the Census is provided in Appendix 1.

above are only available for some years, leaving some gap years. Therefore, we are not able to construct a continuous panel dataset for analysis.[13]

Model

Using data at both industry and plant levels, researchers have done a lot of empirical work on a variety of countries of both developed and developing countries in different periods of time. The framework of most of the researches are comparatively similar. Spillover effects are measured by the impact of foreign presence on output level or labor productivity of domestic firms. Together with other factors that are supposed to have influence on productivity of domestic firms or industries such as capital intensity, labor quality, production scales, competitiveness of the market, the foreign presence proxy is included as an independent variable in a linear or log-linear regression with labor productivity of domestic sector being the dependent variable. In the estimation, if the significant positive sign of the foreign presence coefficient is found, a positive spillover is concluded.

To investigate the relationship between firm productivity and FDI in the same industry or other industry, we adopt the approach taken by previous studies (Sasidharan 2006, Javorcick 2004) in specifying and estimating an augmented Cobb-Douglas production function. The basic model can be presented as follows:

[13] For the purpose of our study of value added, those firms that report zero value added are excluded for analysis.

$$\ln Y_{ijt} = \alpha + \beta_1 \ln K_{ijt} + \beta_2 \ln L_{ijt} + \beta_3 M_{ijt} + \beta_4 Horizontal_{jt} + \beta_5 Backward_{jt} + \beta_6 Forward_{jt} + \alpha_j + \alpha_t + \varepsilon_{ijt} \quad (1)$$

Y_{ijt} is the real output of firm *i* at time *t* operating in sector *j*. K_{ijt} is the capital of firm *i* at time *t* in sector *j*, which is defined as the value of assets at the beginning of the year. L_{ijt} is the measure of labour, defined as the number of employees. M_{ijt} are material inputs. As we could not directly measure the potential spillover effects, we have to use a number of proxies. In particular, we follow the approach by Javorcik (2004) in our paper.

$Horizontal_{jt}$ is to measure the presence of foreign firms in sector *j* at time *t*, defined as follows:

$$Horizontal_{i,t} = \frac{\sum_{\forall j \in i} y_{j,t}}{Y_{i,t}} \quad (2)$$

where:

$y_{j,t}$ gross output/labor of foreign invested firm *j* of the sector *i* at time *t*

$Y_{i,t}$ total gross output/labor, of the sector *i* at time *t*.

Usually, the conventional measure of horizontal will be calculated using the output measure of FDI firms within a particular sector at a point of time. However, taking advantage of the data, we calculate both measure of horizontal effects, namely (i) the horizontal output measure of FDI presence; and (ii) the horizontal employment measure of FDI presence. By including the horizontal employment measure of FDI presence in several model together with the horizontal output measure of FDI presence, we hope to disentangled the effect of labour mobility from other spillover effects such as the competition effect or the demonstration effect.

Following Javorcik (2004) and others, we define $Backward_{jt}$ as

$$Backward_{i,t} = \sum_{j \ if \ j \neq i} a_{ij} Horizontal_{j,t} \quad (3)$$

where a_{ij} is taken directly from input-output table.

$Forward_{jt}$ is defined as

$$Forward_{j,t} = \sum_{i \ if \ i \neq j} a_{ij} \frac{\sum_{\forall j \in i} (y_{j,t} - e_{j,t})}{Y_{i,t} - E_{i,t}} \quad (4)$$

where a_{ij} is the direct IO coefficient. Since IO table does not allow us to calculate the value of $e_{j,t}$, we assume that proportion of foreign export within sector is linear correlation with the equity share of foreign firms. Hence use approximation is as follows:

$$\sum_{\forall j \in i} e_{j,t} = \frac{\sum_{\forall j \in i} k_{j,t}}{K_{i,t}} E_{i,t} \quad (5)$$

where $k_{j,t}$ is capital stock of foreign firm of sector *i* at time *t* and $K_{i,t}$ is total sectoral capital stock of sector *i* at time *t*.

The equation (1) above can be estimated using the Ordinary Least Squares Method (OLS). However, the estimation using the OLS method may suffer from the problem of consistency, requiring the strict assumption of exogeneity of the variables. But the recent literature on the estimation of the production function suggests that the assumption of exogeneity may not hold. The argument runs as the firms respond to productivity shocks by adjusting production inputs. As a result, there might be a correlation between the unobserved productivity shock and the inputs. In our case, with the panel data, we could

deal with the issue to some extent by estimating both the random effect and the fixed effect models. Further, Griliches and Mairesse (1998) suggest that first difference form of the model could be used to deal with the issue of exogeneity issue. Following this suggestion, we also specify and estimate a first-differenced model. In the differenced-form the equation (1) can be written as follows:

$$\begin{aligned}\Delta \ln Y_{ijt} = \alpha + \beta_1 \Delta \ln K_{ijt} + \beta_2 \Delta \ln L_{ijt} + \beta_3 \Delta M_{ijt} + \beta_4 \Delta Horizontal_{jt} \\ + \beta_5 \Delta Backward_{jt} + \beta_6 \Delta Forward_{jt} + \alpha_j + \alpha_t + \varepsilon_{ijt}\end{aligned} \quad (6)$$

V. ESTIMATION RESULTS AND DISCUSSION[14]

In this section we discuss about the results of the spillover effects based on different model specifications. We estimate these specifications for the manufacturing and service sectors separately. Equation (1) was first estimated using a pooled OLS method. We treat the results of this exercise as an exploratory analysis. We will then estimate equation (1) using the random effects and fixed effect models. Finally, we estimate a first-differenced specification model of equation (6).

[14] There are arguments about whether spillover effects towards domestic firms differ between *export-oriented* domestic firms and *non-exporting* domestic firms. Export-oriented domestic firms are argued to be more capable of learning or copying technology so the impact on their productivity may be larger than non-exporting ones. On the other hand, Sinani and Meyer(2002) and Barrios (1999) argue that export-oriented firms supply to the international market and so the MNEs' activities in domestic market do not influence their productivity. We do not pursue this line of research because of data unavailability. The Census data do not contain information regarding exporting of firms for all the years under study.

5.1. Exploratory Analysis with the pooled OLS method

Tables 2 and 3 present our estimated results for the manufacturing sector and service sectors respectively using the pooled OLS method. A firm's output is the dependent variable, and explanatory variables include capital, labor, materials, and proxies for FDI spillovers operating through horizontal, backward, and forward channels and regional and sectoral dummies. It is worth noting that in addition to the usual horizontal effect calculated using the industry's output measure, we also include the horizontal effect calculated using employment in the sector. We expect this measure to capture labour mobility between sectors and between FDI and the domestic sectors. As argued by Javorcik (2004), knowledge externalities from FDI enterprises may take time to manifest themselves, we specify two specifications: one with contemporaneous and one with lagged spillover variables. The estimation is performed on the full sample and on the sample of domestic firms only for manufacturing firms and service firms separately.

As indicated in the Table 2, in all models estimated, the measures of FDI forward linkages (both the contemporaneous and the lagged) are found to be statistically significant and negatively related to the output performance of domestic firms. This finding is consistent with previous study by Javorcik (2004) where negative forward spillover is reported. In contrast, the measures of FDI backward linkages are found to be statistically significant and positively related to the output of firms. As argued by Javorcik (2004) and others, backward linkages that is the contact between MNEs and their local partners is the most likely channel through which spillover would manifest themselves. Our estimated results provide supports to this argument and consistent with

results reported by previous studies. Turning to the horizontal effects, we find mixed results of the horizontal spillovers. It seems that there is some evidence of the "market stealing effect". The estimated coefficient of the horizontal output measures of FDI presence is negative and statistically significant. However, at the same time the horizontal employment measure of FDI presence in the industry is positive and also statistically significant indicating some learning of domestic firms through the labour mobility channel.

Table 3 presents the estimation results for the service sector. First, both the backward and forward measures of FDI linkages are found to be statistically significant and negatively related to the performance of domestic service firms. This suggests that on average the domestic service firms do not benefit from their contacts with their FDI partners (both suppliers and customers). However, interestingly there are evidence of "demonstration effects" that domestic service firms can learn from their competitor FDI firms. The coefficient for horizontal output measure of FDI presence is positive and statistically significant. Similar to the manufacturing sector, there is some evidence of a negative spillover effect in terms of labour mobility for Vietnamese domestic service firms.

The emerging picture of FDI spillover effects for Vietnamese domestic industries are mixed.

5.2 Panel estimation and first difference model

In the second stage, in order to strengthen the results and to take advantage of the panel data, we specify and estimate three other models, namely the random effect model, the

fixed effect model and the first difference model for both the manufacturing and the service sector. The estimation results are presented in Tables 4-8.[15]

For the manufacturing sector: In terms of inter-industry (vertical) spillovers, the results seem to indicate the existence of spillover effects through the backward linkage for Vietnamese domestic manufacturing firms. The results are consistent in all models. For the forward linkage, we have a mixed result. While the fixed effect model and the first difference model show an evidence a positive and statistically significant spillover effect, the random effect and the OLS models point to the opposite direction. We do prefer the fixed effect model and the first-differenced model over the random effect model. However, this point should be explored further in the future research and may be supplemented with results from the survey which we are conducting. Turning to the results of the intra-industry (horizontal) spillovers, almost all models point to the same direction that the horizontal output measure of FDI spillover is either negative (significant) or not significant. Our results about the lack of horizontal spillover effects as measured in terms of the FDI output are in concordance with the recent studies (Aiken and Harrison 1999). On the other hand, we find that the horizontal employment measure of FDI presence is positive and statistically significant in both the random effect model and the fixed effect model but not the first-differenced model. Although the evidence is not conclusive, the result is encouraging.

[15] Due to the fact the number of observation for each year in our panel varies, and there is a substantial increase in the number of observations in the final year of 2005 in the panel, for the random effect and fixed effect model, we estimate two versions, which differ from each other with only regarding to the condition imposed on the data, i.e. in the more-balance version, we imposed a condition for a firm to be included in the sample, it must be observed twice.

For the service sector: The estimation results obtained from the random, fixed and first-differenced models are very much consistent with the results obtained using the pooled OLS method. Both the backward and forward measures of FDI linkages are found to be statistically significant and negatively related to the performance of domestic service firms. This can be partly explained by the fact that in the service sector, the FDI firms may not have the incentives to "transfer" their technological capacity to domestic firms as they may consider the domestic firms their potential competitors. Interestingly, there are evidence of some horizontal spillover effects from FDI firms to domestic firms. The estimated coefficients of the horizontal effects are positive and statistically significant in both the random and fixed effect models, although not significant in the first-differenced model.

VI. CONCLUSION

During the last twenty years, Vietnam has made major changes in its economic policy by adopting a more liberal trade and investment regime. The policy has been taken on the ground that the FDI inflows will create employment and bring along the much needed technological advances, which will spill over to domestic firms.

On the background of increased FDI inflows into Vietnam, in this paper, using the data from the Enterprise Census 2000-2005 made available by the Government Statistical Office we have examined the potential benefits of technological spillovers from international MNEs to Vietnamese domestic firms. We investigate both the intraindustry and the interindustry linkages for both the manufacturing and the service sectors. The

results of our study indicate a positive spillovers for those domestic firms supplying to foreign MNEs in the manufacturing sector (i.e. the existence of spillover through the backward linkage). This result is in congruence with recent studies (Javorcik 2004). However, we do not find any evidence of backward and forward spillovers for the service sector. Because there is no previous studies for the service sector, we are not able to compare our results. In terms of horizontal spillover, although we do not find any evidence of technological spillover for domestic firms in terms of the conventional measure of output (demonstration or competition), we do find some evidence of spillovers through labour mobility in the manufacturing sector. However, for the service sector we find evidence of horizontal spillovers both through the output channel and through the labour mobility channel. In general, our findings about both positive and negative spillovers effects as well as different channel of FDI spillovers to domestic firms call for a more elaborate policy gearing toward encouraging FDI into sectors that nurture the technological spillover.

Table 2 OLS with lagged and contemporaneous spillover variables for manufacturing sectors

	All firms	Domestics only	All firms	Domestics only	All firms	Domestics only
Forward	-1.154***	-0.950***	-1.163***	-0.975***		
	(0.118)	(0.124)	(0.118)	(0.124)		
Forward lagged					-0.780***	-0.530***
					(0.131)	(0.138)
Backward	0.663***	0.744***	0.662***	0.740***		
	(0.026)	(0.027)	(0.026)	(0.027)		
Backward lagged					0.793***	0.893***
					(0.029)	(0.031)
Horizontal (output)	-0.492***	-0.434***	-0.557***	-0.573***		
	(0.030)	(0.031)	(0.053)	(0.056)		
Horizontal (output) lagged					-0.085	-0.082
					(0.059)	(0.064)
Horizontal (labour)			0.094	0.198***		
			(0.063)	(0.067)		
Horizontal (labour) lagged					-0.142**	-0.042
					(0.067)	(0.074)
Number of observation	90464	79481	90464	79481	54440	47343
R-squared	0.597	0.575	0.597	0.575	0.673	0.642

Note: ***, **, * denote significance level at 1%, 5% and * 10% respectively. All of the models include other variables such as labour, capital, and regional, year and sectoral dummies.

Table 3 OLS with lagged and contemporaneous spillover variables for service sectors

	All firms	Domestic only	All firms	Domestic only	All firms	Domestic only
Forward	-12.456***	-11.853***	-11.825***	-11.227***		
	(0.361)	(0.362)	(0.393)	(0.396)		
Forward lagged					-8.591***	-7.826***
					(0.547)	(0.552)
Backward	-2.095***	-2.089***	-2.185***	-2.183***		
	(0.203)	(0.207)	(0.207)	(0.211)		
Backward lagged					-0.948***	-1.006***
					(0.169)	(0.170)
Horizontal (output)	0.472***	0.493***	0.965***	0.986***		
	(0.081)	(0.082)	(0.177)	(0.180)		
Horizontal (output) lagged					2.294***	2.354***
					(0.246)	(0.251)
Horizontal (labour)			-0.554***	-0.551**		
			(0.162)	(0.164)		
Horizontal (labour) lagged					-1.957***	-1.939***
					(0.253)	(0.259)
Number of observation	40252	38211	40252	38211	23794	22477
R-squared	0.503	0.478	0.503	0.478	0.610	1.278

Note: ***, **, * denote significance level at 1%, 5% and * 10% respectively. All of the models include other variables such as labour, capital, and regional, year and sectoral dummies.

Table 4a: Random effects manufacturing firms

	All firms	Domestic only	All firms	Domestic only
Forward	-0.450***	-0.337**	-0.497***	-0.390***
	(0.135)	(0.142)	(0.135)	(0.142)
Backward	0.565***	0.601***	0.561***	0.596***
	(0.034)	(0.035)	(0.034)	(0.035)
Horizontal (output)	-0.440***	-0.396***	-0.629***	-0.581***
	(0.036)	(0.038)	(0.053)	(0.055)
Horizontal (labour)			0.288***	0.280***
			(0.060)	(0.062)
Number of observation	90464	79481	90464	79481
R-squared				
Within	0.282	0.244	0.283	0.244
Between	0.569	0.551	0.569	0.551
Overall	0.594	0.573	0.594	0.573

Note: ***, **, * denote significance level at 1%, 5% and * 10% respectively. All of the models include other variables such as labour, capital, and regional, year and sectoral dummies.

Table 4b: Random effect manufacturing more balance panel data

	All firms	Domestic only	All firms	Domestic only
Forward	-0.376***	-0.261	-0.423***	-0.313**
	(0.140)	(0.148)	(0.140)	(0.148)
Backward	0.555***	0.601***	0.550***	0.595***
	(0.035)	(0.036)	(0.035)	(0.036)
Horizontal (output)	-0.348***	-0.294***	-0.537***	-0.479***
	(0.039)	(0.040)	(0.057)	(0.059)
Horizontal (labour)			0.282***	0.275***
			(0.062)	(0.064)
Number of observation	74115	64643	74115	64643
R-squared				
Within	0.284	0.246	0.284	0.246
Between	0.630	0.619	0.629	0.619
Overall	0.612	0.595	0.612	0.595

Note: ***, **, * denote significance level at 1%, 5% and * 10% respectively. All of the models include other variables such as labour, capital, and regional, year and sectoral dummies.

Table 5a: Random effects service sectors

	All firms	Domestic	All firms	Domestic
Forward	-8.161***	-8.224***	-8.108***	-8.137***
	(0.417)	(0.421)	(0.434)	(0.438)
Backward	-1.966***	-2.075***	-1.982***	-2.103***
	(0.250)	(0.256)	(0.253)	(0.259)
Horizontal (output)	0.305***	0.341***	0.371**	0.451***
	(0.078)	(0.080)	(0.165)	(0.167)
Horizontal (labour)			-0.073	-0.121
			(0.147)	(0.146)
Number of observation	40252	38211	40252	38211
R-squared				
Within	0.193	0.190	0.193	0.190
Between	0.427	0.414	0.427	0.414
Overall	0.496	0.472	0.496	0.472

Note: ***, **, * denote significance level at 1%, 5% and * 10% respectively. All of the models include other variables such as labour, capital, and regional, year and sectoral dummies.

Table 5b: Random effect service sector - more balanced panel

	All firms	Domestic	All firms	Domestic
Forward	-7.834***	-7.898***	-7.643***	-7.743***
	(0.425)	(0.426)	(0.458)	(0.461)
Backward	-1.179***	-1.283***	-1.215***	-1.318***
	(0.272)	(0.277)	(0.273)	(0.279)
Horizontal (output)	0.263***	0.308***	0.489**	0.491***
	(0.082)	(0.084)	(0.199)	(0.202)
Horizontal (labour)			-0.255	-0.204
			(0.190)	(0.191)
Number of observation	32486	30708	32486	30708
R-squared				
Within	0.199	0.197	0.199	0.197
Between	0.510	0.503	0.510	0.503
Overall	0.544	0.523	0.544	0.524

Note: ***, **, * denote significance level at 1%, 5% and * 10% respectively. All of the models include other variables such as labour, capital, and regional, year and sectoral dummies.

Table 6a: Fixed effects manufacturing sector

	All firms	Domestic	All firms	Domestic
Forward	1.021***	1.014***	0.918***	0.928***
	(0.235)	(0.240)	(0.235)	(0.239)
Backward	0.267***	0.298***	0.257***	0.289***
	(0.074)	(0.077)	(0.074)	(0.077)
Horizontal (output)	-0.191***	-0.155**	-0.472***	-0.373***
	(0.063)	(0.067)	(0.082)	(0.087)
Horizontal (labour)			0.444***	0.341***
			(0.082)	(0.086)
Number of observation	90464	79481	90464	79481
R-squared				
Within	0.287	0.250	0.287	0.250
Between	0.553	0.526	0.552	0.525
Overall	0.583	0.556	0.583	0.556

Note: ***, **, * denote significance level at 1%, 5% and * 10% respectively. All of the models include other variables such as labour, capital, and regional, year and sectoral dummies.

Table 6b: Fixed effect manufacturing more balance

	All firms	Domestic only	All firm	Domestic only
Forward	1.021***	1.014***	0.918***	0.928***
	(0.213)	(0.216)	(0.212)	(0.216)
Backward	0.267***	0.298***	0.257***	0.289***
	(0.067)	(0.070)	(0.067)	(0.070)
Horizontal (output)	-0.191***	-0.155**	-0.472***	-0.373***
	(0.057)	(0.060)	(0.074)	(0.078)
Horizontal (labour)			0.444***	0.341***
			(0.074)	(0.077)
Number of observation	74115	64643	74115	64643
R-squared				
Within	0.287	0.250	0.287	0.250
Between	0.617	0.602	0.616	0.601
Overall	0.602	0.581	0.602	0.581

Note: ***, **, * denote significance level at 1%, 5% and * 10% respectively. All of the models include other variables such as labour, capital, and regional, year and sectoral dummies.

Table 7a: Fixed effect model service sector

	All firms	Domestic	All firms	Domestic
Forward	-3.991***	-4.434***	-4.110***	-4.581***
	(0.776)	(0.783)	(0.789)	(0.800)
Backward	-0.733	-0.937	-0.742	-0.914
	(0.681)	(0.708)	(0.680)	(0.708)
Horizontal (output)	0.312**	0.351**	-0.034	-0.043
	(0.136)	(0.145)	(0.269)	(0.289)
Horizontal (labour)			0.405	0.444
			(0.252)	(0.258)
Number of observation	40252	38211	40252	38211
R-squared				
Within	0.208	0.205	0.208	0.206
Between	0.349	0.343	0.349	0.345
Overall	0.437	0.424	0.436	0.424

Note: ***, **, * denote significance level at 1%, 5% and * 10% respectively. All of the models include other variables such as labour, capital, and regional, year and sectoral dummies.

Table 7b: Fixed effect service sector more balance panel

	All firms	Domestic	All firms	Domestics
Forward	-3.991***	-4.434***	-4.110***	-4.581
	(0.697)	(0.702)	(0.708)	(0.717)
Backward	-0.733	-0.937	-0.742	-0.914
	(0.612)	(0.635)	(0.611)	(0.634)
Horizontal (output)	0.312***	0.351***	-0.034	-0.043
	(0.122)	(0.130)	(0.241)	(0.259)
Horizontal (labour)			0.405*	0.444*
			(0.226)	(0.231)
Number of observation	32486	30708	32486	30708
R-squared				
Within	0.208	0.205	0.208	0.206
Between	0.452	0.455	0.451	0.456
Overall	0.494	0.486	0.493	0.486

Note: ***, **, * denote significance level at 1%, 5% and * 10% respectively. All of the models include other variables such as labour, capital, and regional, year and sectoral dummies.

Table 8a: First difference model manufacturing sector

	All firms	domestic	All firms	domestic
Δ in backward linkage	0.066	0.138*	0.070	0.144**
	(0.071)	(0.071)	(0.072)	(0.071)
Δ in foreward linkage	0.348	0.483***	0.350*	0.487***
	(0.206)	(0.216)	(0.207)	(0.216)
Δ in horizontal linkage (output)	-0.102**	-0.108*	-0.041	-0.033
	(0.056)	(0.059)	(0.078)	(0.083)
Δ in horizontal linkage (labour)			-0.087	-0.105
			(0.075)	(0.079)
Number of observation	51973	45208	51973	45208
R-squared	0.184	0.167	0.184	0.167

Note: ***, **, * denote significance level at 1%, 5% and * 10% respectively. All of the models include other variables such as labour, capital, and regional, year and sectoral dummies.

Table 8b: First difference model service sector

	All firms	Domestic	All firms	Domestic
Δ in Forward linkages	-3.376***	-3.818***	-3.540***	-4.044***
	(0.732)	(0.722)	(0.754)	(0.750)
Δ in Backward linkages	-0.392	-0.402	-0.424	-0.441
	(0.436)	(0.472)	(0.437)	(0.473)
Δ in Horizontal (output)	0.131	0.159	-0.073	-0.116
	(0.117)	(0.122)	(0.216)	(0.235)
Δ in Horizontal (labour)			0.259	0.342
			(0.200)	(0.216)
Number of observation	21497	20276	21497	20276
R-squared	0.174	0.179	0.174	0.179

Note: ***, **, * denote significance level at 1%, 5% and * 10% respectively. All of the models include other variables such as labour, capital, and regional, year and sectoral dummies.

REFERENCES

Blonigen B., (2005), A Review of the Empirical Literature on FDI Determinants, NEBR Working Paper No. 11299, National Bureau of Economic Research.

Casson M. (1986) 'General Theories of the Multinational Enterprise: Their Relevance to Business History', in Hertner P. and Jones G. (ed.), *Multinationals: Theory and History.* Hants: Gower Publishing Company Limited.

Caves R.E (1982) 'Multinational Enterprise and Economics Analysis', *Cambridge Surveys of Economic Literature.* Cambridge: Cambridge University Press.

CIEM (2004), Globalisation, Employment and Poverty Reduction: Country Study of Vietnam, Report by Central Institute of Economic Management and ILO.

CIEM (2006), Vietnam's Economy in 2005, Central Institute of Economic Management.

Dunning J.H. (1979), 'Explaining Changing Patterns of International Production: In Defense of the Eclectic Theory', *Oxford Bulletin of Economics and Statistics*, 41, 269-93.

Dunning J.H. (1993), *Multinational Enterprises and the Global Economy.* Wokingham: Addison-Wesley.

Dunning J.H. (1988), *Explaining International Production*. London: Unwin Hyman.
Freeman Nick (2002), Foreign Direct Investment in Cambodia, Laos and Vietnam: A Regional View, paper presented at IMF Conference on Foreign Direct Investment, Hanoi.

Görg H., and D., Greenaway (2004), Much Ado about nothing? Do Domestic Firms Really Benefit from Foreign Direct Investment? *The World Bank Research Observer*, vol. 19 (2), pp. 171–197

Greene W. (1997) *Econometric Analysis.* Prentice-Hall International, Inc.
GSO (1995-2006), Vietnam's Statistical Year Book, Statistical Publishing House.

Le Dang Doanh (2002) Foreign Direct Investment in Vietnam: Results, Achievements, Challenges and Prospect, paper presented at IMF Conference on Foreign Direct Investment, Hanoi.

Le Thanh Thuy (2005), Technological spillovers from foreign direct investment: The case of Vietnam, mimeo, Graduate School of Economics, University of Tokyo.

Le Viet Anh (2002), FDI-Growth Nexus in Vietnam, mimeo, Graduate School of International Development, Nagoya University.

Meyer, Klaus and Nguyen, H.V. (2005), Foreign Investment Strategies and Sub-national Institutions in Emerging Markets: Evidence from Vietnam. *Journal of Management Studies*, Vol. 42, No. 1, pp. 63-93

Mirza Hafiz and Axele Giroud (2003), The Impact of Foreign Direct Investment on the Economic Development of ASEAN Economy – A Preliminary Analysis, paper presented at EAMSA 20th Annual Conference, Stockholm School of Business.

Mirza Hafiz and Axele Giroud (2004) Regional Integration and Benefits from Foreign Direct Investment in ASEAN Countries: The Case of Vietnam, *Asian Development Economic Review*, Vol. 21 (1), pp. 66-98.

Nguyen Nhu Binh and Jonathan Haughton, (2002), Trade Liberalisation and Foreign Direct Investment in Vietnam, *ASEAN Economic Bulletin*, Vol. 19(3), pp. 302-318.

Nguyen Phi Lan (2006), Foreign Direct Investment in Vietnam: Impact on Economic Growth and Domestic Investment, mimeo, Centre for Regulation and Market Analysis, University of South Australia.

Nguyen Ha Thanh, Hung Vo Nguyen and Klaus E. Meyer, (2002) Foreign Direct Investment in Vietnam, mimeo, London Business School.

Nguyen Thi Phuong Hoa (2002) Contribution of Foreign Direct Investment to Poverty reduction: The case of Vietnam, mimeo,

Nguyen Thanh Xuan and Yuqing Xing (2006), Foreign Direct Investment and Exports: The Experience of Vietnam, Working Paper No. EDP06-11, Graduate School of International Relations, International University of Japan.

Nguyen, Thang. (2004) 'Vietnam', *Report to Overseas Development Institute*, Accessed at http://www.odi.org.uk/iedg/Projects/Doha/05Poverty_Impact_Doha_Vietnam.pdf

Overseas Development Institute (1997), Foreign Direct Investment Flows to Low-Income Countries: A Review of Evidence, *Briefing Paper*, No. 3.

Pham Hoang Mai (2001), The Export Performance of Foreign-Invested Enterprises in Vietnam, *ASEAN Economic Bulletin*, Vol 18(3), pp. 263-275.

Pham Hoang Mai (2002), Regional Economic Development and Foreign Direct Investment Flows in Vietnam, 1988-98, *Journal of the Asia Pacific Economy*, Vol. 7(2), pp. 182-202.

Pham Hoang Mai (2003), The Economic Impact of Foreign Direct Investment Flows on Vietnam: 1988-98, *Asian Studies Review*, Vol. 2791), pp. 81-98.

Phan Minh Ngoc and Eric Ramstetter (2006), Economic growth, Trade and Multinational Presence in Vietnam's province, mimeo, The International Center for the Study of East Asian Development, Kitakyushu University.

Reid, N. (1990), Spatial patterns of Japanese investment in the US automobile industry', *Industrial Relations Journal*, 48-59.

Smith, D.M. (1991), Neoclassical location theory, in Lever W.F., (ed.) *Industrial change in the United Kingdom*, Longman Scientific & Technical.

Schaumburg-Müller (2003) Rise and Fall of Foreign Direct Investment in Vietnam and its Impact on Local Manufacturing Upgrading, *The European Journal of Development Research*, Vol.15 (2), pp.44–66.

Tran Van Tho (2004), Foreign Direct Investment and Development of Supporting Industries in Vietnam, *Obirin Daigaku Sangyokenkuyui-nenpo (Annual Bulletin of the Institute for Industrial Research of Obirin University)*, No. 22, pp. 173-204.

Vernon R. (1966) 'International Investment and International Trade in the Product Cycle', *Quarterly Journal of Economics*, 80, 190-207.

Vernon R. (1979), 'The Product Cycle Hypothesis in an New International Environment', *Oxford Bulletin of Economics and Statistics*, 41.

Vu Bang Tam, Gangnes Byron and Ilan Noy (2006), Is Foreign Direct Investment Good for Growth? Evidence from Sectoral Analysis of China and Vietnam, mimeo, Department of Economics, University of Hawaii-Manoa.

Winters, A., McCulloch, N. and McKay, A. (2002) 'Trade Liberalisation and Poverty: The Empirical Evidence', *Discussion Paper 88*, School of Social Sciences, University of Sussex.

APPENDIX

Appendix 1. The distibution of firms in the Census 2000-2005

	All firms		Manufacturing firms		Services firms	
Year	**Freq.**	**Percent**	**Freq.**	**Percent**	**Freq.**	**Percent**
2000	25,358	6.09	10,194	10.29	1,809	3.32
2001	55,977	13.43	13,148	13.27	6,858	12.6
2002	62,112	14.91	14,685	14.82	7,777	14.28
2003	71,005	17.04	16,792	16.95	9,258	17
2004	90,640	21.75	20,398	20.59	12,458	22.88
2005	111,581	26.78	23,839	24.07	16,287	29.91
Total	**416,673**	**100%**	**99,056**	**100%**	**54,447**	**100%**