Export Spillovers from FDI Companies in Manufacturing Sector in Vietnam

NGUYỄN THỊ HỒNG ĐÀO & PHẠM THẾ ANH

Masters of Arts, University of Nha Trang

hongdaontu@yahoo.com.vn

theanh_dhts@yahoo.com

ABSTRACT

The paper examines effects of export spillovers by FDI companies on Vietnamese manufacturing companies. Heckman's sampling model is estimated according to dataset of WB survey of companies. The results show that characteristics of each company play an important role in two export decisions: (1) whether to take part in export or not, and (2) how large the export share is. FDI companies produce export spillover effects on local companies, and moreover, FDI export spillovers are not identical and they depend on characteristics of local companies.

Keywords: FDI, export spillovers

1. INTRODUCTION

In recent years, many researches have analyzed effects of FDI on host countries in various aspects. A much- interested topic id spillover from FDI companies. Spillovers or externalities can be materialized through horizontal or vertical linkages, circulation of labor, competition effects, demonstration and imitation between local and foreign firms (Blomstrom & Kokko, 1998). Most researches analyze effects of spillovers of productivity and technology while export spillovers (effects of FDI companies on export behavior of local firms) attract little attention (Kneller & Pisu, 2007; Sun, 2009).

To contribute to research on spillover effects, this paper examines export spillovers from FDI companies to local manufacturing ones. Vietnam is considered as an attractive destination for FDI and an evidence of success in export growth in Southeast Asia, especially in the early 1990s. Nonetheless, researches on this topic are very limited, which comes from lack of data (Anwar & Nguyễn Phi Lân, 2011). Research by Anwar and Nguyễn Phi Lân (2011) has been the only study of export spillovers from FDI companies in Vietnam employing data from local manufacturing firms in 2000. The results show that FDI produces positive effects on export behavior of local firms through horizontal and vertical forward linkages. However, backward vertical linkage produces negative effects on export decisions by local firms.

Past researches mainly analyze channels of spillovers and only pay little attention to diversity and factors affecting scope of export spillovers. This paper tries to examine diversity of export spillovers by analyzing effects of FDI companies on export behavior of local firms, especially in two decisions: (i) whether to take part in export or not, and (ii) how large the export share is. Central objective of the paper, therefore, is to answer three questions: (1) Which individual characteristic determines export behavior of the firm? (2) Are export spillovers materialized? and (3) Which characteristics of the firm do export spillover depend on?

2. THEORETICAL BASIS AND METHODOLOGY

a. Theoretical Basis:

Aitken et al. (1997) are pioneers in quantitative study of the role of foreign firms in export by local ones with their research on Mexican manufacturing industry in 1980-1990. Their research shows that ability of Mexican firms to take part in export has a

positive relation with proximity to multinational enterprises (MNEs) while no relation exists between decisions to take part in export by local firms and concentration of all exporters in the same industry. The paper, therefore, advises the government to encourage potential exporters to build their factory buildings near foreign firms to learn from them and reduce cost of export market entry.

In a similar research, Kokko et al (2001) examine export externalities caused by foreign firm on local ones in Uruguay. While Aitken et al. (1997) measure foreign factor with export share held by MNEs, Kokko et al use sales share of MNEs in the same industry. This scale is widely employed in recent researches on export spillovers from FDI companies (Kneller & Pisu, 2007; Sun, 2009). The results from Probit model also show that presence of foreign firms improves ability to take part in export for Uruguayan firms.

Two aforementioned researches focus on decisions to take part in export while their decisions on export share are not examined properly. Recent researches analyze those two decisions through sampling model by Heckman (1979) (Greenaway et al., 2004; Kneller & Pisu, 2007; Sun, 2009; and Anwar & Nguyễn Phi Lân, 2011). This quantitative technique can measure those two decisions and remove sampling bias because in fact, if participation in export does not occur, export behavior of the firm cannot be observed. If such sampling bias cannot be removed, results of estimation are inexact (Heckman, 1979).

Greenaway et al. (2004) are the first authors who employed Heckman model to examine export externalities. Three following scales were used for measuring spillover effects from MNEs on British firms in the years 1992-96: expenditures on R & D, relative importance of MNEs in total employment and export value of the industry. Their results show that the export spillovers did exist and competition effect was the most important channel. Kneller and Pisu (2007) developed these results by analyzing vertical and horizontal channels of spillovers and found that decisions on export participation by British firms were not affected by interactions with MNEs while decisions on export share seemed to be affected by MNEs in the vertical market.

Using the similar approach, Sun (2009) examined export spillovers from FDI to Chinese firms and expanded the model by adding interaction between FDI and corporate characteristics as a new variable to identify the determinant of export spillovers. The results showed that there were positive spillovers from FDI to export shares of local firms.

Additionally, spillover range has a positive relation with location in central provinces and a negative relation with the cost-revenue ratio, ownership form, and location in western provinces

All aforementioned researches imply positive spillovers from foreign-invested companies but some others offer reverse results. Barrios et al. (2001) investigated export behavior by Spanish firms and export spillovers from MNEs in 1990-1998. Foreign factor is measured by export share and expenses on R&D by MNEs. Their estimation shows that local firms benefited nothing from MNE export spillovers. Similarly, Phillips and Ahmadi-Esfahani (2010), after examining export spillovers from MNEs to Australian manufacturing companies, found that foreign factor only plays a minor role in ability to export of local firms.

Ruane and Sutherland (2005) analyzed export externalities from FDI to Irish manufacturing firms. The results show that decisions on export by Irish firms have a positive relation with FDI. But decisions on participation in export and export shares have negative relations with export shares held by foreign companies. The authors maintained that negative effects were determined by huge export shares held by American-invested companies in traditional industries.

b. Methodology:

Using the same approach as past researches (Greenaway et al., 2004; Kneller & Pisu, 2007; and Sun, 2009), this paper employs the Heckman sampling model to analyze export behavior of local firms when examining effects of corporate characteristics and export spillovers from FDI. The export behavior by firms is about two interrelated decisions: (1) whether to take part in export or not, and (2) how large the export volume is. The Heckman model can describe this decision-making process (Greenaway et al., 2004). Moreover, many local firms do not take part in export business and their behavior cannot be observed. Estimation of the model without considering this aspect may lead to mistakes or wrong results. Heckman sampling model may include effects of unobserved export behavior. The research model is as follows:

$$EXPAR_{ijt} = \alpha + \beta_1 Age_{ijt} + \beta_2 Size_{ijt} + \beta_3 Own_{jti} + \beta_4 CapInt_{jti} + \beta_5 Wage_{ijt} + \beta_6 Import_{ijt} + \beta_7 dCompete_{ijt} + \beta_8 dRegion_{ijt} + \beta_9 Exper_{ijt} + \beta_{10} fdi_{ijt} + \beta_{11} fdi_{ijt} * Age_{ijt} + \beta_{12} fdi_{ijt} * Size_{jti} + \beta_{13} fdi_{ijt} * Own_{ijt} + \beta_{14} fdi_{ijt} * CapInt_{jti} + \beta_{15} fdi_{ijt} * Wage_{ijt} + \beta_{16} fdi_{ijt} * Import_{ijt} + \beta_{17} fdi_{ijt} * Compete_{ijt} + \beta_{18} fdi_{ijt} * Exper_{jti} + \beta_{19} Indexint_{jt} + \beta_{20} dIndustry_{jt} + \beta_{21} dYear_{ijt} + \varepsilon_i \quad (1)$$

$$EXINT_{ijt} = \alpha + \beta_1 Age_{ijt} + \beta_2 Size_{ijt} + \beta_3 Own_{ijt} + \beta_4 CapInt_{ijt} + \beta_5 Wage_{ijt} + \beta_6 Import_{ijt} + \beta_7 dCompete_{ijt} + \beta_8 dRegion_{ijt} + \beta_9 fdi_{ijt} + \beta_{10} fdi_{ijt} * Age_{ijt} + \beta_{11} fdi_{ijt} * Size_{ijt} + \beta_{12} fdi_{ijt} * Own_{ijt} + \beta_{13} fdi_{ijt} * CapInt_{ijt} + \beta_{14} fdi_{ijt} * Wage_{ijt} + \beta_{15} fdi_{ijt} * Import_{ijt} + \beta_{16} fdi_{ijt} * Compete_{ijt} + \beta_{17} Indexint_{jt} + \beta_{18} dIndustry_{jt} + \beta_{19} dYear_{ijt} + \eta_i \quad (2)$$

where (1) is export participation equation and $EXPAR_{ijt}$ is a dichotomous variable that equals 1 if the local firm *i* in industry *j* exports its goods at time *t*, and equals 0 otherwise; and (2) is equation of export share ($EXINT_{ijt}$) measured by ratio of export to revenue ; two errors (ε_i, η_i) has normal distribution and correlation coefficient equalling ρ. If $\rho \neq 0$, standard regression technique estimated for equation (2) will produce biased results. Explanatory variables in the two equations are defined in Table 1. Share of the industry in export (*Indexint*) measures importance of each industry in total export from the manufacturing sector (Kneller & Pisu, 2007; Franco & Sasidharan, 2009). This variable helps control the assumption that companies in industries with high export ratios have propensity for export and export larger quantities while foreign-invested firms tend to penetrate into industries with high export ratios. If such possibilities are not under control, FDI endogenous problems may occur.

In the research model, export spillover effect from FDI is measured by introducing variables of interaction between variables *fdi* and *firm characteristics*. These interaction variables allow us to understand what types of firms can benefit, or suffer, from foreign firms. Performing differentiation of equation (2), we have marginal effect of variable *fdi*:

$$\frac{\partial EXINT_{ijt}}{\partial fdi_{ijt}} = \beta_9 + \beta_{10} Age_{ijt} + \beta_{11} Size_{ijt} + \beta_{12} Own_{ijt} + \beta_{13} CapInt_{ijt} + \beta_{14} Wage_{ijt} + \beta_{15} Import_{ijt} + \beta_{16} Compete_{ijt} \quad (3)$$

It is worth noting that in equation (3), positive and significant estimation of parameters shows that firm characteristics affect positively the range of export spillovers and vice versa.

Table 1: Definition of independent variables in the model

Variable	Definition
Age	Number of operating years of the firm
Size)	Labor force of the firm
Own (Ownership)	Ownership: equaling 1 if the firm is privately owned, and 0 if publicly owned.
Capitalization ratio (*CaptInt*)	Value of fixed assets per worker
Average wage (*Wage*)	Labor cost (wage, bonus, allowance, etc.) per worker
Import share (*Import*)	Proportion of input directly imported
Domestic competition (*dCompete*)	Awareness of the firm of competition in domestic market equaling 1 if competition is keen and 0 otherwise.
dRegion	Dummy variables for four regions: Hồng Delta, Coastal Central Vietnam, Eastern South Vietnam, and Mekong Delta.
Export experience (*Exper*)	Dummy variable representing export experience, equaling 1 if the firm takes part in export and 0 otherwise.
Foreign presence (*fdi)*	Share of FDI companies in total revenue of the industry
Export share of the industry (*Indexint*)	Share of industry j in total export value made by manufacturing sector
dIndustry	Dummy variable for "industry"
dYear	Dummy variable for "year"

The data are from Productivity and the Investment Climate Enterprise Survey in Vietnam conducted by WB (2005). By direct interviews with owners and directors of 1,150 local and foreign-invested firms in the manufacturing sector in Vietnam, the survey provides numerical data about various aspects of these firms. After cleaning the data and removing firms that lack necessary parameters, the author establishes the panel data comprising 2,139 observations for two years 2003 and 2004. All monetary data are expressed in Vietnamese đồng (VND) and converted into 2000 price level.

3. RESULTS AND DISCUSSIONS

a. Results:

Two export equations are estimated simultaneously by ML method and the results are presented in Table 3. The Wald test results of overall significance of the model show that all regression coefficients are significant at 1% level. Additionally, the hypothesis of correlation between errors (H_0: $\rho = 0$) is rejected at significant level of 1%. This implies the independence between the two export equations (1) and (2), and thus confirms the suitability of the Heckman sampling model for data of this research.

b. Discussions:

- *Firm characteristics and export behavior:*

The results in Table 3 show that firm characteristics affect considerably, but to different extents, both export decisions. Decision on export participation relies on export experience of the firm with positive and significant coefficient (*Exper*). This result is consistent with the observation that firms that have taken part in export incur fixed costs to enter the market, and it is possible that they will continue to export (Kneller & Pisu, 2007; Sun, 2009).

Table 3: Results of model estimation

Variable	Export participation (1)		Export share (2)	
	Coefficient	**Standard error**	**Coefficient**	**Standard error**
Export experience (Exper)	3.875566***	0.2195642	*N/i*	*N/i*
Age (Age)	0.0022741	0.0054894	– 0.0070328***	0.0014424
Size (Size)	0.0003795	0.0002882	0.0000638***	0.0000157
Ownership (Own)	– 0.3735735**	0.1898252	0.0011566	0.0423849
Capitalization ratio (CapInt)	– 0.0008724*	0.0004979	– 0.0004581*	0.0002484
Average wage (Wage)	– 0.0012172	0.0030793	– 0.0010546*	0.0005937
Import share (Import)	1.063214***	0.2589811	0.0592712	0.0490947

Domestic competition (dCompete)	– 0.0103503	0.1707289	– 0.0281782	0.0359805
Foreign presence (fdi)	– 0.7102619	0.8038337	– 0.7546467**	0.302049
fdi*age	0.0004022	0.0180621	0.0253916***	0.0080227
fdi*size	– 0.0009514	0.001215	– 0.0003394***	0.0001148
fdi*own	0.4171947	0.6414195	0.4007911*	0.2384282
fdi*capint	0.0011737	0.001007	– 0.0001116	0.0009667
fdi*wage	0.0174186	0.0181759	0.0107437**	0.0054387
fdi*import	– 0.2779798	0.9489568	0.7781413**	0.308444
fdi*compete	0.2304573	0.5103444	– 0.492716***	0.1747176
fdi*exper	– 1.023491	0.7977026	*N/i*	*N/i*
Export share of industry (Indexint)	1.302861***	0.3279242	0.4929772***	0.0997234
Industry (dummy variable)	exists		exists	
Region (dummy variable)	exists		exists	
Year (dummy variable)	exists		exists	
Constant	– 1.700203***	0.2617868	0.6703348***	0.0678052
Obs.	1,774			
Log pseudo-likelihood	– 458.068			
Wald test for significance of the whole model $\chi^2(19)$	206.24***	(0.00)		
Wald test for independence between equation (1) and (2) (ρ = 0) $\chi^2(1)$	7.81***	(0.00)		

Note: ***, ** and * denote significance levels of 1%, 5% and 10% respectively; p-values of Wald test are in parentheses ().

Age and firm size also have positive effects but they are not statistically significant to export decisions by the firm. Similarly, average wage does not affect export decision while type of ownership produces a negative and significant impact on decision on export participation where export propensity of private firms is weaker than that of state-owned companies. It may be because state-owned companies have larger sources of finance and benefit directly from export promotion programs of the government. Anwar and Nguyễn Phi Lân (2011) also find similar evidence of advantages in market entry for state-owned companies in Vietnam.

Negative and significant coefficient of *CapInt* implies that firms with financial strength may fail to make the best use of their export advantage in an economy with cheap labor as Vietnam. This result is consistent with findings by Franco and Sasidharan (2009) and Sun (2009). Meanwhile, high import ratio facilitates export by the firm because estimation of variable Import is positive and significant at 1% level. This is understandable because import business helps local firms accumulate knowledge and experience about foreign markets, which helps reduce cost of market entry (Phillips & Ahmadi-Esfahani, 2010).

Although age and size of the firm do not affect decision on whether or not to export, they are important to decisions on sizes of export volume. Older firms seem less dependent on export market and their export volume is usually smaller than those of younger firms (Fryges, 2006; Sun, 2009). Meanwhile, firm size has a positive relation with export share because big firms have financial strength and better competitiveness on international market (Wakelin, 1998). Capitalization ratio (*CapInt*) is the only variable that has a consistent effect on two export decisions and this effect seems free from FDI impact because estimation of parameters of variables of interaction between *CapInt* and *fdi* is not significant. Like equation (1) negative effect of capitalization ratio on export share can be explained by Vietnam's advantage of cheap labor.

Despite having no effect on export decision, *Wage* has a negative and significant coefficient while coefficient of this variable interacting with *fdi* is positive and significant. Impact of this variable on export share, therefore, depends on FDI. In an industry where foreign presence is at a moderate level, impact of Wage is positive and significant. This result reveals that a high average wage – reflecting quality of human resource – can increase export by the firms (Greenaway et al., 2004; and Sun, 2009). Meanwhile, impacts of type of ownership, export share and domestic competition are all dependent on FDI. With foreign

presence at a moderate level, private ownership and import share produce positive effects on export share while domestic competition produces a negative impact.

At industry level, firms in an industry with high export share may participate in export easily and export larger quantities than other firms. This result reflects in a positive and significant estimation for parameters of *Indexint* in both equations. Accordingly, an increase of 1% in export share of the industry will make possibility of export participation rise by 1.3% and export share of the firm rise by 0.49%.

- Export spillover effects from FDI:

In equation (1), estimation results show that FDI has almost no impact on possibility of export participation by the firm. Contrarily, in equation (2), the significance of *fdi* and most interacting variables, except *CapInt*, implies that FDI has important impact on export share of the firm; and the impacts of FDI are diverse and dependent on firm characteristics. Range of export spillovers from FDI is expressed in the following equation:

$$\frac{\partial EXINT_{ijt}}{\partial fdi_{ijt}} = -0.7546 + 0.0254Age_{ijt} - 0.0003Size_{ijt} + 0.4008Own_{ijt} + 0.0107Wage_{ijt} + 0.7781Import_{ijt} - 0.4927Compete_{ijt}$$

The above equation reveals that age, average wage and import share have positive effects on the range of export spillovers. Old firms usually gain much experience and have ability to absorb positive export spillovers from FDI. Private firms are more active and flexible in adjusting themselves to foreign presence and in investing resources in learning from other firms. Similarly, firms offering high average wages usually own high-quality labor force, which improves their ability to learn about export business from FDI companies. Import share is also an important factor that affects the range of export spillovers from FDI by the fact that an increase of 1% in import share will make export share of the local firm rise by some 0.79%. Firms actively participating in exports may enjoy more opportunities to learn new knowledge and gain experience, thereby improving their ability to absorb and benefit from FDI companies.

Meanwhile, firm size and domestic competition negatively affect range of export spillovers. Major firms can be directly affected by competition for market share from FDI companies while firms facing keen competition in the domestic market have almost no ability to learn export knowledge and experience from FDI companies.

Marginal effect of FDI on export share of the firm can be evaluated at level of sample mean. Generally, state-owned firms suffer bad effects from foreign presence. Accordingly, when competition pressure, either keen or slight, increases by 1%, it reduces firm export share by 0.71% and 0.24% respectively. Contrarily, private firms seem to benefit from FDI if competition is slight (0.1609) and suffer unfavorable effects if competition in the domestic market is fierce (-0.2399).

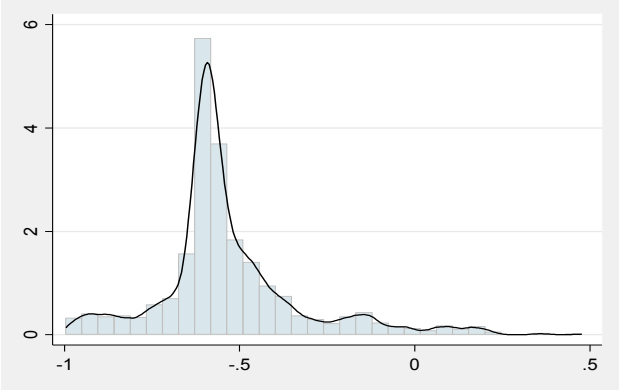

Figure 1: Distribution of marginal effect of FDI on export share

Source: Author's calculations

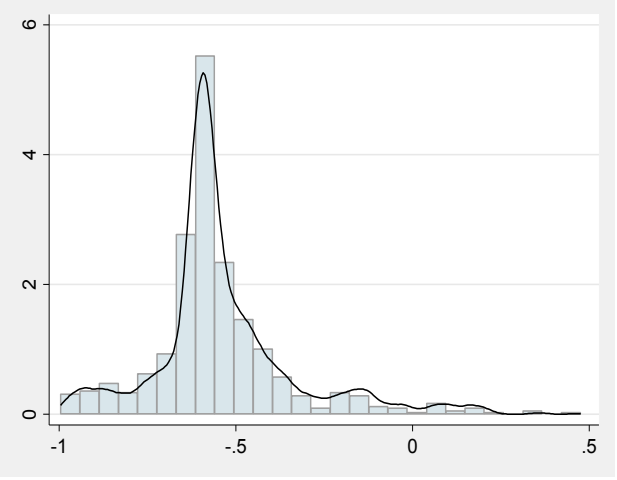

Figure 2: Industries with low technological level

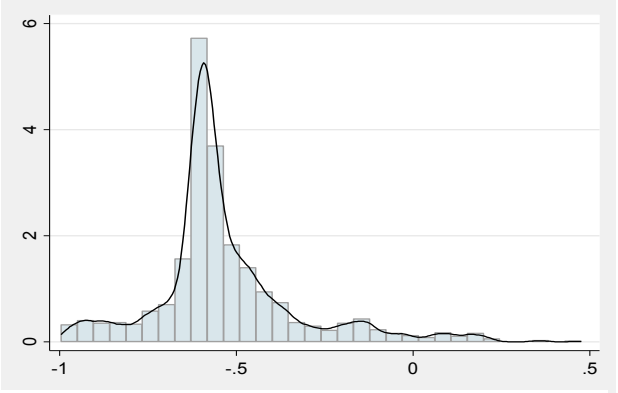

Figure 3: Industries with medium technological level

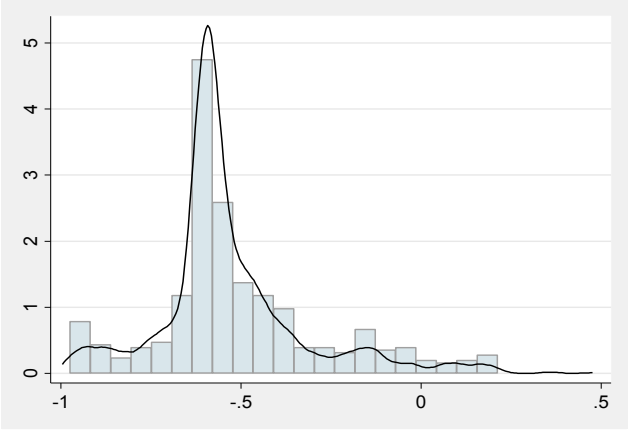

Figure 4: Industries with high technological level

The author also evaluates marginal effect employing values of each firm to build population distribution of export spillovers (Figure 1). While some firms benefit from FDI, most local firms suffer unfavorable effects of a ratio varying from -0.75 to -0.25. Finally, the author estimates the range of export spillovers at industry level by dividing industries into three groups (Figures 2, 3, and 4). Industries with higher technological level seem to absorb smoothly positive export spillovers, but a great number of local firms still suffer unfavorable effects from FDI companies.

There are many factors that cause local firms to suffer unfavorable effects on the export shares. Firstly, FDI companies in the manufacturing sector tend to sell their goods in domestic market. Unlike export-oriented FDI companies, domestic-oriented

FDI ones have less ability to produce positive export spillovers and in many cases they may affect badly export business of local firms (Kneller & Pisu, 2007; Anwar & Nguyễn Phi Lân, 2011) [1].

Secondly, competition pressure in the domestic market is also an influential factor shown by the negative and significant coefficient of *fdi*compete* [2]. Local firms facing keen competition in the domestic market usually suffer unfavorable effects from FDI presence. Some past research has found that competition from foreign companies could make production cost rise and productivity fall, thereby reducing export shares of local firms (Aitken & Harrison, 1999; Hu & Jefferson, 2002).

4. CONCLUSION AND POLICY RECOMMENDATIONS

Employing the Heckman sampling model to examine export behavior of Vietnamese manufacturing firms, the author finds that: (1) Firm characteristics affect significantly the export behavior; (2) FDI presence produces spillover effects on export shares of local firms; and (3) Export spillovers are diverse and dependent on export share of the firm. Research results show that age of the firm, type of ownership, average wage and export share have positive effects on range of spillovers, while firm size and competition in domestic market produce negative effects.

Results of the research allow for the following policy recommendations that aim at helping local firms learn and benefit from FDI export spillovers. Firstly, because concentration of FDI companies that sell their goods to the domestic market seems to reduce positive spillover effects, a policy to attract export-oriented FDI companies may create more positive effects on export from local firms. Past researches point out that FDI export-oriented companies usually possess valuable experience and knowledge of export business, and therefore they can produce more positive spillover effects on local firms (Kneller & Pisu, 2007; Grima et al., 2008).

Secondly, positive and significant effects of average wage (*Wage*) – scale for quality of human resource – on the range of spillovers implies that investment in human resource can help local firms gain more benefits from FDI activities.

Thirdly, because private firms seem to learn and absorb more positive export spillovers from FDI, policy makers should encourage linkages between private and FDI companies by building IPs and EPZs, and holding forums and trade fairs to facilitate exchange of experience and information about export markets.

Finally, FDI companies may produce unfavorable competition against local firms, especially in a short term. Abundant sources of finance and technology of foreign-invested companies may force local firms to cut their output and export shares. Future researches, however, should examine in more details competition from FDI companies because in a long term, increased competition may become a force driving local firm to technical innovation and improvement in competitiveness, thereby promoting their export activities (Wang & Blomstrom, 1992; Cantwell, 1989; Kneller & Pisu, 2007)■

Notes

[1] Domestic-oriented FDI companies are defined as companies whose export shares are smaller than, or equal to, 50%. They account for some 54% of sales and 60% of fixed assets of FDI companies included in the sample.

[2] More than 73% of local firms affirm that they are facing fierce competition from one or more competitors

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