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Impacts of Export-platform FDI on the production of upstream industries - Do third country size, trade agreements and local content requirement matter? Evidence from the Vietnamese supporting industries

Thanh Tam Nguyen-Huu and Minh Nguyen-Khac

Abstract

This paper investigates the impacts of Export-platform foreign direct investment on the production of upstream industries through backward linkages. First, in a three-country model, these impacts are explained through a competition effect and a demand effect. Otherwise, such production is also affected by third country size, local content requirement, and power of trade agreements between the host and the third countries. Second, in the case of the Vietnamese supporting industries between 2000 and 2012, Export-platform FDI generates a negative effect. Moreover, local content requirement, and trade agreements between Vietnam and other countries positively impacts the production level of these industries whereas third countries size has an ambiguous impact.

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Keywords Export-platform FDI; production of upstream industries; local content requirement; third country size; power of trade agreements; Vietnam

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1 Introduction

Over the last two decades, the number of trade agreements has grown at a particular rate. About 85 per cent of the 210 notifications in force today were concluded during this period.¹ This increase in trade agreements has a significant impact on overseas operations of multinational firms (MNFs) leading to the appearance of a new foreign investment, namely Export-platform foreign direct investment (Export-platform FDI). It is defined as a foreign investment in a host country in order to export most of output to third countries. In 2000, exports to third countries as shares in total sales by American manufacturing affiliates accounted for 28 per cent. Particularly, for affiliates located in Ireland, Holland, and Belgium, those shares are respectively accounted for 71 per cent, 60 per cent, and 57 per cent (Ekholm et al., 2007). According to Ito (2013), American firms in countries such as Luxembourg, Hong Kong, Singapore, Netherlands, and Switzerland have high ratios of exports to third countries over the total sales in 2008, ranging from approximately 40 per cent to 70 per cent.

Export-platform FDI differs from traditional foreign investments of MNFs (that is vertical and horizontal FDI) by some important criteria. On the one hand, the final destination of the goods produced is different from horizontal FDI. The output of Export-platform FDI mainly serves third countries, whereas the host country market is the target of horizontal FDI. On the other hand, Export-platform FDI differs from vertical FDI in terms of goods produced. By using vertical FDI, MNFs produce intermediate goods to export back to the home country or other countries for the assembly of final goods. Differently, by developing Export-platform FDI, MNFs produce final goods to serve the final customers in third countries.²

There is a rich literature examining Export-platform FDI as a strategic behavior of MNFs. In order to serve a free trade area (FTA), outsider MNFs may have three entry modes: exporting, tariff jumping, or Export-platform FDI. The last strategy is used when intra-regional costs are low and the common market size is sufficiently large (Motta and Norman, 1996; Montout and Zitouna, 2005; Ekholm et al., 2007; Nguyen-Huu and Minda, 2012 among others). Consequently, some MNFs particularly those from the United States (US) and Japan have located subsidiaries in a country of the European Union (EU) to export the output to other member countries (Kumar, 1998; Blonigen et al., 2007; Neary, 2008). The American MNFs also use their subsidiaries in Singapore to export to other ASEAN countries and in Brazil to export to other MERCOSUR countries (Ito, 2013). Likewise, some outsider MNFs are implemented in Mexico to export production to the North American market after the formation of NAFTA (Hanson et al., 2001; Markusen, 2004). Other factors

¹ Source: WTO, Statistics Database (www.wto.org)

² See Antras and Yeaple (2014) for a detail review about horizontal and vertical FDI by MNFs.

influencing the location of Export-platform FDI are the similarities between the host and the third countries, skilled and unskilled labor endowments of the third countries, and the low labor cost of the host countries (Ekholm et al., 2007; Baltagi et al., 2007).

While Export-platform FDI is widely studied as a strategic behavior of MNEs in the literature, its impacts on the host country are little studied, particularly in the case of developing countries. For instance, Geishecker et al. (2008) and Omelanczuk (2013), by using the Polish manufacturing industries data, argue a significant effect of Export-platform FDI on export performance of local firms. Similarly, Ruane and Ugur (2006) also state the existence of that relationship in Singapore and Ireland. However, the impact is higher for the Singaporean firms. The purpose of this research is to fill this gap by investigating impacts of Export-platform FDI on the production of upstream industries through backward linkages. We are particularly interested in such relationship, because it is one of the main channels through which foreign firms may affect the host country (UNCTAD, 2001; Carluccio and Fally, 2013). More precisely, we search evidence for two following questions:

- (i) How does Export-platform FDI affect the production of upstream industries through backward linkages?
- (ii) What are the determinant factors of such impacts?

To answer these questions, we first develop a three-country model including a host country, a home country, and a third country. The host country is less developed than the two other countries. Moreover, the host and the third countries may sign a bilateral trade agreement (BTA) or a FTA. We focus on the consumption of a final good in the third country that can be produced either by a representative domestic firm in the host country or a representative MNE, also called foreign firm, in the home country. These firms compete with each other in a Cournot fashion (that is, each firm chooses her output level by taking that of her rival as given). For each unit of the final good produced, we assume that one unit of inputs and one unit of labor are required. However, inputs produced in the home country are cheaper than those produced in the host country. By contrast, labor is cheaper in the host country than in the home country.

Our framework examines two time periods. In the first period, there is no trade agreement between the host and the third countries. We call it an Export economy in which both domestic and foreign firms use export as their entry mode into the third country. Furthermore, inputs produced in the host country (also called local inputs) are only used by the domestic firm. In the second period, the host and the third countries sign a trade agreement (either a BTA or a FTA), reducing the export cost between them. This is an Export-platform economy where the domestic firm

continues to export while the foreign firm develops an Export-platform FDI in the host country. We assume that while producing in the host country, the foreign firm sources some local inputs as a result of local content requirement (LCR) and the remainder is imported from abroad.

Impacts of Export-platform FDI on the production of local inputs can be studied through the existence of competition, direct and indirect demand effects. While producing in the host country, the foreign firm uses local inputs and creates direct effect demand for these goods. At the same time, the foreign production may replace or stimulate the domestic firm's output level leading respectively a competition or an indirect demand effect. Consequently, the net impact of Export-platform FDI on the production of local inputs is ambiguous. Such production is also affected by other factors as the power of trade agreement, the third market size as well as the LCR.

Our framework is then examined in the case of the Vietnamese supporting industries during the period 2000-2012. Export-platform FDI is proxied to foreign investments in export-oriented industries. The estimates show a negative impact of such investment on the production level of supporting industries. However, such production is positively impacted by trade agreements between Vietnam with other countries while impacts of third market size are ambiguous.

The paper is organized as follows. In Section 2, we develop the three-country model to examine the different impacts of Export-platform FDI on the production of local inputs. In Section 3, we test the model in the Vietnamese supporting industries. Section 4 summarizes the main findings and provides further lines of research.

2 The three-country model

We consider a three-country model including a host developing country L , a home country M and a third country A . Country L is less developed than the two other countries. Furthermore, countries L and A may sign a BTA, or particularly create a FTA.³ We are interested in the consumption of a final good in country A . This good can be produced either by a representative domestic firm in country L (denoted by l) or by a representative MNF in country M (also called foreign firm and denoted by firm m). Firms l and m compete with other one in a Cournot fashion, that is each firm chooses her output level by taking that of her competitor as given.

There are two main reasons inciting us to use a Cournot model. On the one hand, such model is much developed and becomes an interesting way to analyze the

³ The literature on Export-platform FDI is based on the assumption of a FTA created by the host and the third countries. We extend this assumption by referring to a BTA. Consequently, the model can apply in a more general case and not uniquely in a FTA.

competition between firms in the FDI topic. This framework is initially used to study strategic behaviors of MNFs between export and horizontal FDI, as in the seminal work by Smith (1987) and a series of subsequent papers (Motta, 1992; Belderbos and Sleuwaegen, 1997; Qiu and Tao, 2001; Lahiri and Mesa, 2009 among others). It is then developed to study MNFs' strategies in a regional integration context in which Export-platform FDI appears (see for example Motta and Norman, 1996; Montout and Zitouna, 2005; Nguyen-Huu and Minda, 2012). On the other hand, using a Cournot model is helpful to study impacts of MNFs on the production of local inputs through backward linkages (production of local inputs for short), as it is shown in Belderbos and Sleuwaegen (1997); Lin and Saggi (2007) or Kadochnikov and Drapkin (2008).⁴

We assume that for each unit of the final good produced, one unit of intermediate goods (also called inputs) and one unit of labor are required. Nevertheless, inputs produced in country L (also called local inputs) is more expensive than those produced in country M . By contrast, labor is cheaper in country L than in country M . Let c_l be the price of inputs in country L and w_m be the labor cost in country M . The price of inputs in country M and the labor cost in country L are respectively represented as γc_l , δw_m ($0 < \delta, \gamma < 1$). Hence, δ (γ) can be considered as the comparative advantage of country L (M).

The model takes place in two periods. First, in an *Export economy*, there is no trade agreement between country L and country A . Firms l and m enter the third country by exporting. Second, in an *Export-platform economy*, a BTA (or particularly a FTA) is created by the two considered countries, following a lower intra-regional export cost. Firm l continues to export while firm m uses an Export-platform FDI as her entry mode into the third country.

The inverse demand function for final good in the third country is given by:

$$p_A^R = S_A - b(q_l^R + q_m^R) \quad (1)$$

where

- S_A : third country size.
- R : Export economy (*Exp*) or Export-platform economy (*Ep*).
- p_A^R : price of final good in economy R .
- q_l^R (q_m^R): output level of firm l (m) in economy R

In what follows, we study the equilibria of the final good market in the third country (Section 2.1). Then, we investigate impacts of Export-platform FDI on the production of local inputs and the role of different structural variables (Section 2.2).

⁴ In what follows, the three terms "production of local inputs", "production of upstream industries" or "production of supporting industries" are equivalently used.

2.1 Third market equilibria

Export economy

In the Export economy, there is no trade agreement between L and A . Firm m exports from country M and firm l exports from country L to serve country A . Let denote τ_l and τ_m the intra- and the extra-regional export costs, respectively. The profit function of each firm is expressed by:

$$\pi_m^{Exp} = \max_{q_m^{Exp} \geq 0} \left[p_A^{Exp} q_m^{Exp} - (w_m + \gamma c_l + \tau_m) q_m^{Exp} \right] \quad (2)$$

$$\pi_l^{Exp} = \max_{q_l^{Exp} \geq 0} \left[p_A^{Exp} q_l^{Exp} - (c_l + \delta w_m + \tau_l) q_l^{Exp} \right] \quad (3)$$

where π_l^{Exp} and π_m^{Exp} are profit of firm l and firm m , respectively.

Each firm takes the output level of her rival as given, and maximizes her profit by choosing the quantity of final good to produce. The Cournot-Nash equilibrium under the Export economy is computed as:

$$q_m^{Exp} = \frac{1}{3b} [S_A - 2(w_m + \gamma c_l + \tau_m) + (\delta w_m + c_l + \tau_l)] \quad (4)$$

$$q_l^{Exp} = \frac{1}{3b} [S_A - 2(\delta w_m + c_l + \tau_l) + (w_m + \gamma c_l + \tau_m)] \quad (5)$$

See Appendix A.1.

In this economy, local inputs are only required by firm l . Hence, the production level of upstream industries is determined as:

$$BK^{Exp} = q_l^{Exp} = \frac{1}{3b} [S_A - 2(\delta w_m + c_l + \tau_l) + (w_m + \gamma c_l + \tau_m)] \quad (6)$$

Export-platform economy

Under the Export-platform economy, the host country and the third country sign a BTA (or a FTA), followed by smaller intra-regional export cost. Let denote τ the new intra-regional cost, hence $\tau < \tau_l$. As aforementioned, firm m now applies an Export-platform FDI as her entry mode to country A while firm l continues to export.

An interesting discussion in the literature about the MNF location is the existence of local content requirement (LCR) imposed by the host countries, particularly the developing ones (Belderbos and Sleuwaegen, 1997; Qiu and Tao, 2001; Lahiri and Mesa, 2009). Indeed, to increase the local added value in the Global Value Chain, the government of those countries can impose such requirement on the production process of MNF as a condition allowing the latter to produce in their countries. However, to compensate eventually the high local inputs' cost, MNF can

benefit from low and/or zero tariff duty of imported inputs. In our model, LCR is measured by the degree of local inputs used by firm m . Let assume that for each unit of final good produced in country L , firm m uses λ unit of local inputs ($0 \leq \lambda \leq 1$), the resting $(1 - \lambda)$ unit of inputs is imported abroad and/or from the home country (λ is given for the foreign firm). We suppose that the imported inputs' cost remains γc_l .

Another important aspect in the FDI's topic is associated with FDI spillovers generated by the MNF. Those spillovers can be positive or negative depending on the development level of the host country.⁵ We suppose that the foreign production in country L generates some positive (negative) FDI spillovers reducing (increasing) the production costs of domestic firm. Let denote θ , the degree of FDI spillovers associated with the unit production costs of firm l . Hence, her unit access costs to country A becomes $c_l + \delta w_m - \theta + \tau$.

When $\theta > 0$, FDI spillovers are positive and conversely while once $\theta < 0$, those spillovers become negative.

Given the demand function in the third country (cf. Equation 1), the profit function of each firm can be represented as:

$$\pi_m^{Ep} = \max_{q_m^{Exp} \geq 0} \left[p_A^{Ep} q_m^{Ep} - [\lambda c_l + (1 - \lambda) \gamma c_l + \delta w_m + \tau] q_m^{Ep} \right] \quad (7)$$

$$\pi_l^{Ep} = \max_{q_l^{Exp} \geq 0} \left[p_A^{Ep} q_l^{Ep} - (c_l + \delta w_m - \theta + \tau) q_l^{Ep} \right] \quad (8)$$

where π_m^{Ep} is the profit of firm m and π_l^{Ep} is the profit of firm l .

The Cournot-Nash equilibrium in the third country under the Export-platform economy is determined by:

$$q_m^{Ep} = \frac{1}{3b} [S_A - 2(\delta w_m + \lambda c_l + (1 - \lambda) \gamma c_l - \theta + \tau) + (\delta w_m + c_l + \tau)] \quad (9)$$

$$q_l^{Ep} = \frac{1}{3b} [S_A - 2(\delta w_m + c_l - \theta + \tau) + (\delta w_m + \lambda c_l + (1 - \lambda) \gamma c_l + \tau)] \quad (10)$$

See Appendix A.1.

Under this economy, local inputs are used by both firms l and m . Therefore, the production level of upstream industries is computed as:

$$BK^{Ep} = q_l^{Ep} + \lambda q_m^{Ep} \quad (11)$$

$$= \frac{1}{3b} [(1 + \lambda) S_A - (2 - \lambda) (\delta w_m + c_l - \theta + \tau) \quad (12)$$

$$+ (1 - 2\lambda) (\delta w_m + \lambda c_l + (1 - \lambda) \gamma c_l + \tau)] \quad (13)$$

⁵ See for example Blomstrom and Kokko (1998); Greenaway and Gorg (2004); Crespo and Fontoura (2007) for a detail review about FDI spillovers.

One can wonder about the reason preventing firm m from investing in country L under the Export economy. Likewise, what is the reason that force this firm to do not export under the Export-platform economy. Proposition 2.1 gives us the answer.

The foreign firm exports in the Export economy, and invests in the host country in the Export-platform economy if and only if the following condition is satisfied:

$$\tau_l - \tau_m > (1 - \delta)w_m - (1 - \gamma)\lambda c_l > \tau - \tau_m \quad (14)$$

See Appendix A.2.

It is noted that the term $(1 - \delta)w_m$ in Condition (14) represents the gain (due to low labor cost) for firm m from producing in country L while $(1 - \gamma)\lambda c_l$ measures the loss of this production, due to the existence of LCR. Furthermore, $\tau_l - \tau_m$ (respectively, $\tau - \tau_m$) indicates the difference in export cost of country L and country M before the BTA/FTA (respectively, after the BTA/FTA). Hence, Proposition 2.1 implies that in the Export economy (i.e., before the BTA/FTA), high export cost from country L to country A discourages firm m to invest in country L . Exporting (from the home country M) is therefore her entry mode to the third country A . By contrast, in the Export-platform economy (i.e., after the BTA/FTA), export cost between the two countries considerably falls inciting the foreign firm to use an Export-platform FDI in the host country L .

We now consider the case where Condition (14) is fulfilled and interior solution exists.⁶

2.2 Impacts of Export-platform FDI on backward linkages

The foreign production in the host country may have opposite impacts on the production of upstream industries. On the one hand, firm m sources inputs locally, and thereby creating supplemental demand for inputs and increasing the production level of those goods (a direct demand effect). Moreover, firm m may even increase output level of firm l leading to higher demand for local inputs (indirect demand effect). On the other hand, the foreign firm may lower output level of firm l through competition effect that in turn conducts to smaller demand for local inputs.

Let denote $\Delta q_l = q_l^{Ep} - q_l^{Exp}$. Hence, there is a competition effect when $\Delta q_l < 0$ and inversely, an indirect demand occurs when $\Delta q_l > 0$. We state that: There exists a threshold $\underline{\theta}$ such that $\Delta q_l > 0$ if and only if $\theta > \underline{\theta}$ where

$$\underline{\theta} := \frac{1}{2} [(1 - \delta)w_m - (1 - \gamma)\lambda c_l - (\tau_l - \tau) - (\tau_l - \tau_m)]$$

Replacing θ by $\underline{\theta}$, we have $\Delta q_l = 0$.

Given Condition (14) and $\tau < \tau_l$, we have $\underline{\theta} < 0$. It follows that the foreign production in the host country can generate negative spillovers and once the latter

⁶ See Appendix A.1 for a discussion about the existence of interior solution.

are high enough, a competition occurs reducing the domestic firm's output level. An implication of Proposition 2.2 is that although there are some negative spillovers, an indirect demand effect can still be generated (i.e., $\Delta q_l > 0$) if the condition $\underline{\theta} < \theta < 0$ is fulfilled. In this case, this effect is only associated with the fall in export costs after the creation of BTA/FTA. We have the following corollary:

Without FDI spillovers, there is no competition but an direct demand effect.

Let denote $\Delta BK = BK^{Ep} - BK^{Exp}$, the difference in production of local inputs between the Export-platform economy and the Export economy. Given Equations (6) and (11), we have:

$$\Delta BK = \Delta q_l + \lambda q_m^{Ep} \quad (15)$$

We note that in Equation (15), λq_m^{Ep} indicates the direct demand effect while Δq_l represents a competition or an indirect demand effect. It is straightforward that when $\Delta BK > 0$, Export-platform FDI has a positive impact on the production level of local inputs. This happens when there is (i) a high direct demand effect that dominates a low competition one, or (ii) no competition effect, but a direct and an indirect demand one. In the opposite case ($\Delta BK < 0$), the impact becomes negative, owing to a strong competition effect that dominates a direct demand one.

Since the competition effect is generated through negative FDI spillovers, we have the following proposition:

There exists a threshold $\bar{\theta}$ such that

(i) $\Delta BK > 0$ if and only if $\theta > \bar{\theta}$ where

$$\bar{\theta} := \frac{2\lambda^2(1-\gamma)c_l - \lambda(S_A + (2-3\gamma)c_l - \delta w_m - \tau) + [(1-\delta)w_m - (\tau_l - \tau) - (\tau_l - \tau_m)]}{2-\lambda}.$$

(ii) $\bar{\theta}$ decreases in S_A and $\Delta\tau$ where $\Delta\tau := \tau_l - \tau$.

(iii) $\bar{\theta} < \underline{\theta}$.

Point (i): Replacing θ by $\bar{\theta}$, we have $\Delta BK = 0$. Hence we have $\Delta BK > 0$ if and only if $\theta > \bar{\theta}$.

Point (ii): We have $\frac{\partial \bar{\theta}}{\partial S_A} < 0$ and $\frac{\partial \bar{\theta}}{\partial \Delta\tau} < 0$.

Point (iii): It is straightforward.

Proposition 2.2 shows that Export-platform FDI increases the production level of local inputs if and only if FDI spillovers exceed a threshold. Below it, the foreign production creates high negative FDI spillovers and the competition effect becomes stronger than the direct demand one, followed by a smaller production level of those goods.

However, it should be noted that such a threshold decreases with the third market size or the power of the BTA/FTA measured by $\Delta\tau$. Indeed, a higher the

third market size leads to a higher foreign firm's output level, and thereby a stronger direct demand effect. Therefore, the production level of local inputs can suffer a higher competition effect. Likewise, the higher value of parameter $\Delta\tau$, the more export cost between the host and the third counties falls under the Export-platform economy, leading to higher output level of the foreign firm. In addition, the higher $\Delta\tau$, the lower firm l 's access costs to country A . As a result, the competition effect becomes weaker.

From Proposition 2.2, we have two consequences which can be formulated in the following corollary: $\Delta BK > 0$ if and only if

(i) $S_A > \bar{S}_A$ where

$$\bar{S}_A := 2\lambda(1-\gamma)c_l + (\delta w_m + \theta + \tau) - (2-3\gamma)c_l + \frac{(1-\delta)w_m + (\tau + \tau_m - 2\tau_l - 2\theta)}{\lambda}.$$

(ii) or $\Delta\tau > \Delta\bar{\tau}$ where

$$\Delta\bar{\tau} := 2\lambda^2(1-\gamma)c_l - \lambda[S_A + (2-3\gamma)c_l - (\delta w_m + \theta + \tau)] + [(1-\delta)w_m - 2\theta - (\tau_l - \tau_m)].$$

Hence, Corollary 2.2 implies that Export-platform FDI improves the production level of upstream industries if only if the third market size is high enough, or the power of BTA/FTA measured by parameter $\Delta\tau$ is strong enough.

Using Proposition 2.2 and Proposition 2.2, $\underline{\theta}$ and $\bar{\theta}$ can be rewritten as:

$$\underline{\theta} = \frac{1}{2}\Delta Z \tag{16}$$

$$\bar{\theta} = \frac{2\lambda^2(1-\gamma)c_l - \lambda(S_A + (1-2\gamma)c_l - \delta w_m - \tau)}{2-\lambda} + \frac{\Delta Z}{2-\lambda} \tag{17}$$

where $\Delta Z := (1-\delta)w_m - (1-\gamma)\lambda c_l - \Delta\tau - (\tau_l - \tau_m)$.

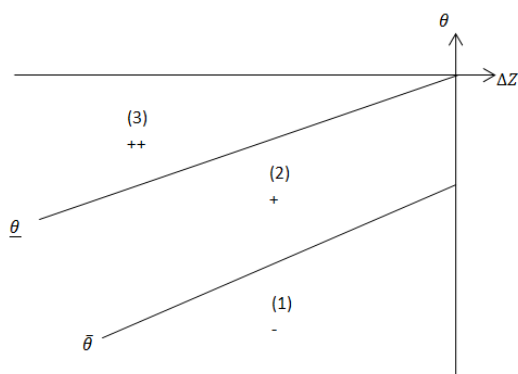
Hence, $\underline{\theta}$ and $\bar{\theta}$ can be represented in Figure 1, which allows us to examine different impacts of Export-platform FDI on the production level of upstream industries.

Export-platform FDI has no impact on the production of upstream industries.

We are in a situation in which the foreign production in the host country replaces some parts of the domestic counterpart, driving to a decline in the demand for local inputs. However, this fall is fully offset by the direct demand effect. Consequently, the total demand for local inputs remains the same as that of the Export economy. As a result, Export-platform FDI causes no impact on the production of upstream industries. Hence, we are in the line $\bar{\theta}$ of Figure 1.

This is the so-called *100% crowding-out effect* discussed by Markusen and Venables (1999). In their framework, the authors mention that the multinational production in the host country may replace that of domestic firms in an exactly

Figure 1: Impacts of Export-platform FDI on the production of upstream industries



offsetting way. Consequently, there is no effect of FDI on the industries producing intermediate goods.

If $\theta \leq \underline{\theta}$, Export-platform FDI creates an ambiguous impact on the production of upstream industries.

In this case, there is no indirect demand effect, but a competition effect. If the latter is stronger than the direct demand effect (that is $\theta \leq \bar{\theta}$), Export-platform FDI lowers the production level of local inputs (Area 1 of Figure 1). This is the situation where the foreign production in the developing country generates strong negative FDI spillovers such that the domestic firm's output level highly decreases. As a consequence, the decline in demand for inputs by firm l is high and cannot be covered by the direct demand by firm m . In addition, such negative impact on the production of upstream industries can be also due to a weak power of BTA/FTA and/or a small third market size.

On the other hand, if the direct demand effect becomes stronger than the competition effect (that is $\underline{\theta} \leq \theta \leq \bar{\theta}$), Export-platform FDI improves the production level of local inputs (Area 2 of Figure 1). Negative FDI spillovers are indeed at an intermediate level. Hence, the decline in demand for inputs by firm l is low and dominated by the direct demand effect.

If $\theta > \bar{\theta}$, Export-platform FDI highly increases the production level of local inputs.

In this case, the foreign production in country L creates no competition effect, but an indirect demand one (Area 3 of Figure 1). Indeed, under the Export-platform economy, the domestic firm gains from low export costs and/or strong positive FDI spillovers. As a consequence, the output level of this firm considerably increases,

followed by a high demand for inputs. Given the existence of the direct demand effect by the foreign firm, the production level of local inputs significantly increases.

This case is related to the host countries in which the output level of the domestic firm is small under the Export economy, owing to high entry costs to the third country (caused either by a high production cost or by a high export cost). Therefore, the demand for local inputs is small and so a small production level of upstream industries. Nevertheless, the domestic firm's entry cost significantly decreases under the Export-platform economy, thanks to the existence of positive FDI spillovers and/or low export cost. That in turn leads to a high output level of the domestic firm and so high demand for inputs. Given the demand for inputs by firm m , the production level of upstream industries significantly increases.

Our result appears to be consistent with Markusen and Venables (1999). In their framework, the authors also state the case where foreign production in the host country significantly increases the production level of local inputs. Consequently, FDI may be considered as a catalyst for industrial development.

We now examine how the LCR (measured by λ) can affect the production of local inputs:

There exists an optimal level of λ maximizing ΔBK if the following conditions are satisfied:

- (i) $\delta w_m + \theta + \tau < S_A + (2 - 3\gamma)c_l$
- (ii) $S_A < (2 - \gamma)c_l + \delta w_m + \theta + \tau$
- (iii) $\tau - \tau_m < (1 - \delta)w_m - \frac{S_A + (2 - 3\gamma)c_l - (\delta w_m + \theta + \tau)}{4} < \tau_l - \tau_m$

In this case, the optimal level of λ is:

$$\lambda^* = \frac{S_A + (2 - 3\gamma)c_l - (\delta w_m + \theta + \tau)}{4(1 - \gamma)c_l}$$

See Appendix A.3.

Proposition 2.2 implies that an increase in λ has an ambiguous impact on ΔBK and so on the production level of upstream industries under the Export-platform economy. Indeed, this increase influences such production through two opposite ways. On the one hand, it leads to a greater output level of firm l and so, demand for inputs. On the other hand, it shrinks the output level of firm m and thereby lowers the demand for inputs. If the three conditions mentioned in Proposition 2.2 are fulfilled, we have $0 < \lambda^* < 1$ and consequently there exists an optimal level of LCR maximizing the production level of local inputs. In this case, two important implications can be driven:

- (i) When the LCR is smaller than the threshold λ^* , a higher level of LCR will improve the production level of upstream industries

- (ii) When the LCR becomes higher than the threshold λ^* , the host country should propose a lower level of LCR because this proposition is likely to improve the production level of upstream industries.

It should be noteworthy that the optimal level of LCR may do not exist. It is the cases where third market size is relatively very large ($\lambda^* < 0$) or wage in the home or the third country is high ($\lambda^* > 1$).

In summary, the aforementioned framework shows an ambiguous impact of Export-platform FDI on the production level of local inputs. A positive impact occurs when FDI spillovers exceed a critical threshold. Otherwise, a beneficial impact can be associated with a large third market size and/or a strong power of the BTA/FTA. Besides, there may be an optimal level of LCR maximizing the production level of upstream industries. In Section 3 following, we examine our framework in the case of Vietnamese supporting industries.

3 Evidence from Vietnamese supporting industries

Building on the aforementioned framework, we develop an empirical study in the case of Vietnam between 2000-2012 to search for any impacts of Export-platform FDI on the production of local inputs. The country is a very interesting case-study because during the analyzed period, the Vietnamese government signed different trade agreements with its trade partners. First, it is the BTA with the United States in 2001 from which Vietnam faces non-tariff barriers or gets tariff reductions for its exporting goods to American market.⁷ Second, there are several economic and trade agreements between Vietnam and the European Community, particularly the Agreement on market access in 2005 and the new Partnership and Cooperation Agreement in 2007 replacing the 1995 Cooperation Agreement.⁸ Moreover, Vietnam and its European partners are undergoing negotiations for free trade agreements. Most importantly, Vietnam became the 150th member of WTO in 2007 and thereby received the most favored nation status with the other members. Last but not least, Vietnam is considered as one of the ten most attractive countries for FDI worldwide according to UNCTAD (2007, 2008, 2009). Particularly in this country, FDI is mainly driven by non-FTA or non member of Vietnam-U.S. trade agreement or Vietnam-EU Corporation Agreement countries as South Korea, Japan, Taiwan, Virgin Island or Hong Kong. During the period 1989-2015, the investment level of these countries counted about 54.8% of total FDI in Vietnam. Among the top five foreign investors in Vietnam during this period, Singapore (third investor

⁷ Source: <http://www.usvtc.org/trade/bta/text/>

⁸ Source: <http://wtocenter.vn>

with 12.8% of total FDI after South Korea and Japan) is the sole country which belongs to a FTA with Vietnam

3.1 The data collection

There is no official data on Export-platform FDI in Vietnam. However, it should be noted that such data is not always available even in developed countries because we must have panel data including at least information about firm ownership status (foreign or domestic firms), origin of foreign firms, firm's export value and firm's output level, sale level in each foreign countries. In such circumstance, we should assimilate Export-platform FDI to FDI in export-oriented industries (Export FDI for short). However, this assimilation seems to be relevant since the foreign production in these industries is likely to export to other countries rather than to serve the Vietnamese market. For example Samsung Vietnam is the biggest exporter of the country with value of 30 billions US dollars, accounted for 18% of Vietnam export. Likewise, Intel Vietnam provides up to 80% of the semiconductor chip to the world.⁹ Hence, export FDI is different to other types of FDI (that is vertical or horizontal FDI).

The database used in this study is identified, checked and matched from two major sources: the Vietnamese enterprises' surveys and the World Bank database.

The Vietnamese enterprises' surveys began in 2000 and are conducted annually by the General Statistics Office (GSO), with technical assistance from the World Bank. The surveys refer to all business entities existing at the end of surveyed year and cover annual data on their commercial activities (for example, standard industrial classification, labor, capital, wage, asset, debt, production value, profit, investment, corporate tax, and so forth). Until 2013, 13 surveys were conducted covering firm-level annual data from 2000 to 2012.

Based on these surveys, we first select the export-oriented industries in which foreign investments are used to identify Export-platform FDI. According to the Foreign Investment Law (Decree No. 24 of July 31, 2000)¹⁰, an industry is considered as export-oriented whenever most of its production (that is, more than 50%) is for exporting (see Appendix B.2 for the list of export-oriented industries).¹¹ We match all domestic firms (foreign firms) to calculate domestic production value (foreign

⁹ Source: <http://www.dreamincubator.com.vn/best-10-companies-to-work-in-vietnam/>

¹⁰ Detail of this decree can be consulted through the following link:

http://www.moj.gov.vn/vbpq/en/lists/vn%20bn%20php%20lut/view_detail.aspx?itemid=8907

¹¹ Indeed, the list of exported-oriented industries in this research is selected by combining the list of industries displaying in the decree with the Vietnam Standard Industry Classification (VSIC). For more detail about FDI and export-oriented industrialization strategy in Vietnam, please see Lim (2011).

production value). Then, we obtain the total domestic and foreign demands for a given input by using the 2007 Input-Output Matrix.

The 2007 Input-Output Matrix is also used to select the supporting (or equivalently upstream) industries (see Appendix B.3 for the list of these industries). At the first step, any industry which supplies the export-oriented industries is chosen. At the second step, we exclude all industries which supply themselves or are figured in the list of export-oriented industries. After examining the raw data and deleting firms with missing key information, we have a database including 382 year-industry observations. The database covers different variables at sectoral level such as the number of foreign firms, labor force, capital stock, production value, investment, wage, and so forth.

To search for the role of third country size, we use the GDP of principal trade partners of Vietnam. According to GSO statistics, these countries include the members of the APEC and the EU. During the period studied, the export value of Vietnamese manufacturing products to these countries always covers more than 80 per cent of the total export value of the country.¹² Using the World Bank database, we obtain the GDP of those countries (at US 2005 constant price) from 2000 to 2012. Then, we match them with the initial database.¹³

3.2 Empirical strategy

Impacts of FDI in export-oriented industries

The dependent variable, denoted by $Y_{i,t}$, is the production value of a typical supporting industry i in year t . This variable is calculated by $Y_{i,t} = \sum y_{ik,t}$ where $y_{ik,t}$ represents the production value of a typical firm k located in industry i during year t .

Our benchmark regression is given by:

$$\ln Y_{it} = \alpha + \beta'_1 \ln DBL_{it} + \gamma X_{it} + \varepsilon_{it} \quad (18)$$

and to examine the impacts of Export FDI, we have the following regression:

$$\ln Y_{it} = \alpha + \beta_1 \ln DBL_{it} + \beta_2 \ln FBL_{it} + \gamma X_{it} + \varepsilon_{it} \quad (19)$$

The index it represents supporting industry i in year t and $\varepsilon_{i,t}$ is the error term. The vector $X_{i,t}$ regroups control variables, including industrial investment level (denoted by $indus_invest_{i,t}$), industry size (denoted by $indus_size_{i,t}$) and labor

Lim D., 2011. Export and FDI-driven industrialization strategy and employment in Vietnam. Hanoi: ILO Country Office for Viet Nam. (http://www.ilo.org/wcmsp5/groups/public/---asia/---ro-bangkok/---ilo-hanoi/documents/publication/wcms_171372.pdf)

¹² Source: <http://www.gso.gov.vn/>

¹³ See Appendix B.1 for a descriptive analysis of different variables used in this study.

qualification (denoted by $w_{i,t}$). These covariates are calculated as:

$$\begin{aligned} \text{indus_invest}_{it} &= \sum_{k=1} \text{inves}_{kit} \\ \text{indus_size}_{it} &= \frac{\sum_{k=1} L_{kit}}{\sum_{i=1} \sum_{k=1} L_{kit}} \\ w_{it} &= \frac{\sum \text{wage}_{kit}}{\sum L_{kit}} \end{aligned}$$

where the indices kit respectively represent firm k located in supporting industry i during year t . The investment level and labor force of a given firm are denoted by invest_{kit} and L_{kit} , respectively. In our study, wage is used as a proxy to indicate labor qualification. All things being equal, an increase in wage can be considered as an improvement in labor qualification (Liu et al., 2000; Todo et al., 2009; Nguyen Huu, 2016).

The domestic and foreign demand (respectively denoted by DBL_{it} et FBL_{it}) are calculated as:

$$\begin{aligned} DBL_{it} &= \sum_{j=1} a_{ij} DP_{jt} \\ FBL_{it} &= \sum_{j=1} a_{ij} FP_{jt} \end{aligned}$$

where

- $DP_{j,t}$ ($FP_{j,t}$): the total domestic (foreign) production of a typical export-oriented industry j throughout year t .
- a_{ij} : the proportion of output level of a typical supporting industry i 's that supplies an export-oriented industry j . The parameter a_{ij} is taken from the 2007 Input - Output Matrix by excluding all export-oriented industries which supply themselves or supply other export-oriented industries.

The estimate of β_2 identifies the power of direct demand effect. Hence, the parameter is estimated to be positive ($\beta_2 > 0$). Otherwise, parameters β_1 and β'_1 represent the extent of domestic demand for inputs. By comparing β'_1 to $\beta_1 + \beta_2$, we can detect the net effect of FDI in export-oriented industries on the production of upstream industries.¹⁴ More precisely, we distinguish three cases:

¹⁴ Comparing the extent of different coefficients could be used to detect the net effect of an interested variable. For example, to investigate the role of language skills on international trade, Melitz and Toubal (2014) construct different measures of common languages (native language, spoken language, official language, and language proximity). They first introduce these variables separately and then all of them into the regression and by comparing the extent of related coefficients, they obtain the net impact of language skills on trade.

- (i) $\beta_1 > \beta'_1$. There exists an indirect demand and no competition effect. Export FDI significantly increases the production of supporting industries (Area 3 of Figure 1).
- (ii) $\beta_1 < \beta'_1 < \beta_1 + \beta_2$. There is a competition effect. However, its extent is weak and dominated by the direct demand effect. The net impact of Export FDI on the production of upstream industries is positive (Area 2 of Figure 1).
- (iii) $\beta_1 + \beta_2 < \beta'_1$. There exists a strong competition effect such that it dominates the direct demand effect. Export FDI has a net negative impact on the production of local inputs (Area 1 of Figure 1).

Role of structural variables

To search evidence for the role of different structural variables, we use the following regression:

$$\ln Y_{it} = \alpha + \beta SV_t + \gamma X_{it} + \varepsilon_{it} \quad (20)$$

where SV_t is a vector of structural variables. It first includes trade agreements signed between Vietnam and other countries during the period studied. These agreements include the BTA with the United States (denoted by usa_t , $usa_t = 0$ if $t < 2001$ and $usa_t = 1$ otherwise), and the entry of Vietnam into the WTO (denoted by wto_t , $wto_t = 0$ if $t < 2007$ and $wto_t = 1$ otherwise). Second, parameter $DBF2$ ($DBF2 := \log FBL * \log FBL$) is used to identify impacts of LCR. Indeed, information about LCR is not available in the database. Therefore, the 2007 Input-Output matrix can be useful because the parameter a_{ij} in this matrix reports the proportion of output level of a given supporting industry i that supplies an export-oriented industry j including foreign production.¹⁵ Third, SV_t also contains the size of the United States, the APEC countries and the EU (respectively denoted by $ussize_t$, $apecsize_t$ and $eusize_t$). These variables are measured as:

$$\begin{aligned} ussize_t &= usa_t * \log gdpus_t \\ apecsize_t &= wto_t * \log gdpapec_t \\ eusize_t &= wto_t * \log gdpeu_t \end{aligned}$$

The estimate of β in Equation (20) is interpreted as the impact of the above structural variables mentioned above on the production value of a typical supporting industry.

It should be noted that over the role of Export-platform FDI and structural variables (as the third market size, the power of BTA, or the LCR), the production

¹⁵ We state that the parameter $a_{i,j}$ taken from the 2007 Input-Output Matrix strictly belongs to the interval (0,1). Then the critical threshold λ^* mentioned in Proposition 2.2 exists.

value of a typical supporting industry (the dependent variable) can be affected by different observed characteristics which can create endogeneity if they are not controlled for. Hence, to deal with this problem, labor qualification, industry investment, and industrial size are added in Regressions (18), (19), and (20). In addition, there might exist unobserved factors being different across industries, but time-invariant within industries such as sophistic, nature of the produced inputs, etc. If these factors are correlated with the regressors, the fixed effects model capturing industrial unobserved effects is used to estimate the above-mentioned three regressions. Hence, the problem with omitted variables' bias is solved. However, once industrial characteristics are not corrected with the regressors, the fixed-effects model become unsuitable. In this case, random effects may become relevant.¹⁶

3.3 Empirical results

Export FDI and production of supporting industries

We rely on Regressions (18) and (19) to investigate the impacts of export FDI on the production of supporting industries. The estimates for these regressions are represented in Table 1. Columns 1 and 2 show the estimations for Regression (18) using the RE and the FE models, respectively. Those of Equation (19) are in columns 3 and 4, using the RE and FE models, respectively.

Table 1: Export FDI and production of supporting industries

Variable	Label	(1) RE	(2) FE	(3) RE	(4) FE	(5) RE	(6) FE
		Coefficient Std. Err.	Coefficient Std. Err.	Coefficient Std. Err.	Coefficient Std. Err.	Coefficient Std. Err.	Coefficient Std. Err.
Domestic demand	DBL	0.24*** 0.05	0.35*** 0.09	0.0003 ^{ns} 0.09	0.041 ^{ns} 0.13		
Foreign demand	FBL			0.22** 0.07	0.24** 0.07	0.22*** 0.05	0.24*** 0.07
Industry size	indus_size	0.17*** 0.04	0.14** 0.05	0.17*** 0.04	0.13** 0.05	0.18*** 0.04	0.14*** 0.05
Industrial investment	indus_inves	0.27*** 0.03	0.24*** 0.03	0.25*** 0.03	0.24*** 0.03	0.26*** 0.03	0.24*** 0.03
Labor qualification	w	0.15*** 0.02	0.13*** 0.02	0.13*** 0.02	0.12*** 0.02	0.13*** 0.02	0.12*** 0.02
Constant		5.55*** 0.76	4.51*** 1.05	6.14*** 0.81	5.68*** 1.15	6.14*** 0.63	5.6*** 1.2
Observations	N		382		382		382
Number of industries	n		33		33		33
R ^{2a}		0.7921	0.7649	0.799	0.7754	0.7986	0.7699
Breusch et Pagan' test	LM	415.9***		430.26***		423.57***	
Ficher's test	F		92.38***		75.36***		73.31***
Hausman's test	χ^2		95.8***		106.9***		97.2***

Significant levels : * : $p < 0.05$ ** : $p < 0.01$ *** : $p < 0.001$ ^{ns} : not significant + : $p < 0.1$
Standard errors are robust.

^a: R² within for fixed effects model and R² between for random effects model

¹⁶ See (Green, 2012, Chapter 11) for a detail discussion about Models for Panel Data.

The table gives ratios F statistically significant to the threshold of 0.1 per cent. Hence, the individual effects are justified and the FE model is more efficient than the grouped regression model. Similarly, the Lagrange multipliers (LM), being higher than the chi-square of 3.84 ($\chi^2(1) = 3.84$) justifies the relevance of the RE model over the OLS model. Otherwise, the χ^2 statistics of the Hausman's tests are highly significant implying the relevance of the FE estimator over the RE estimator. Overall, it appears that the FE model is the most suitable to our sample.

We state that over the period 2000-2012, all control variables are significant and have a positive influence on the production of supporting industries. Using the FE model (RE model) if the size of a given industry increases by 10%, its production will grow by 1.4 per cent (1.7%). The same 10% increase in investment of the considered industry leads to an increase of 2.5 per cent in its production.

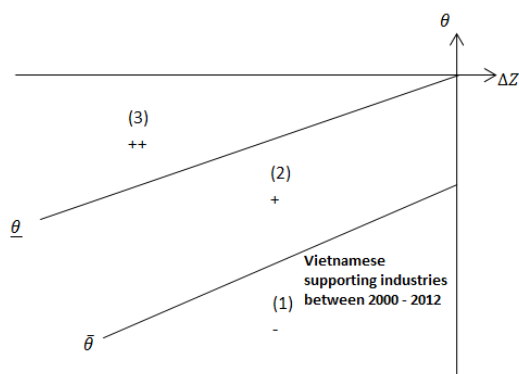
Table 1 also shows that estimated coefficient of FBL (presented in columns 3 and 4), considered as a direct demand effect, is positive and statistically significant in both modules. Using the FE method (RE method), if foreign firms in export-oriented industries increase their demand for a given input by one per cent, the production of this input will increase up to 0.24 per cent (0.22%). However, variable DBL is statically non significant. On the other hand, in the absence of foreign production, the domestic demand for inputs becomes statically significant for both the FE and RE models (cf. estimates in column 1 and 2). It follows that one per cent increase of domestic demand for a given input leads to an increase of 0.25 per cent (by the RE model) or 0.37 per cent (by the FE model) in the production of this input. Such increase is even higher than that generated by foreign demand (cf. 0.21% for the RE model and 0.24% for the FE model). To have a closer look at the role of foreign demand for inputs, variable FBL is separately estimated together with the three control covariates. The estimations are reported in the two last columns of Table 1. Hence, the associated coefficients appear to be similar as those observed in columns 3 and 4.

The aforementioned results are likely to imply that:

- (i) During the period 2000-2012, the presence of foreign firms in export-oriented creates a strong competition effect such that it highly dominates the direct demand one.
- (ii) Consequently, the demand for inputs is created by foreign firms rather than by domestic ones.

Hence, export FDI negatively affects the production level of local inputs. Given our analysis in Section 2, Vietnamese supporting industries should be located in Area 1 of Figure 1 (Figure 2 below).

Figure 2: Impacts of Export FDI on the production of Vietnamese supporting industries



More precisely, the foreign production in export-oriented industries creates strong negative FDI spillovers. As a consequence, the competition effect becomes very strong and dominates the direct demand effect, that reduces the production level of supporting industries.

Impacts of trade agreements, LCR and third country size

We now examine the impacts of trade agreements, LCR and third country size on the production of supporting industries, by relying Regression (20). The estimated results are shown in Table 2 below.

Let's start with the role of LCR. The estimation is represented in columns 1 and 2. We state that the associated coefficient of this variable is positive and statistically significant at 0.1 per cent level in both RE and FE models. Given our analysis associated with Proposition 2.2, it is likely that the LCR required by the Vietnamese government is smaller than the optimal threshold λ^* . Hence, it follows that the higher the LCR, the greater the production level of Vietnamese supporting industries.

As for the impact of trade agreements, the estimates of the RE and the FE methods are respectively reported in column 3 and 4 of Table 2. We observe that the coefficients associated with variables *wto* and *usa* are all positive and statistically significant. Following Corollary 2.2, it appears that the two aforementioned trade agreements is sufficiently powerful to drive a positive impact on the production of local inputs.

Last, we investigate impacts of third countries size. The associated estimates, using the RE and the FE methods, are respectively displayed in columns 5 and 6 of Table 2. The estimated coefficient for U.S. market size appears to be positive

Table 2: Impacts of trade agreements, local inputs intensity and third country size

Variable	Label	Local inputs intensity		Trade agreements		Third countries size	
		(1)	(2)	(3)	(4)	(5)	(6)
		RE Coeffi. Std. Err.	FE Coeffi. Std. Err.	RE Coeffi. Std. Err.	FE Coeffi. Std. Err.	RE Coeffi. Std. Err.	FE Coeffi. Std. Err.
Local inputs intensity	FBL2	0.009*** 0.002	0.011*** 0.002				
Membership of WTO	wto			0.49*** 0.10	0.56*** 0.10		
BTA with United States	usa			0.24*** 0.10	0.32** 0.09		
Size of United States	ussize					0.009** 0.003	0.011*** 0.003
Size of APEC	apecsize					2.11 ^{ns} 1.38	2.61 ⁺ 1.36
Size of EU	eusize					-2.14 ^{ns} 1.41	-2.66 ⁺ 1.39
Industry size	indus_size	0.17*** 0.04	0.14** 0.05	0.17*** 0.03	0.12** 0.04	0.17*** 0.04	0.12** 0.04
Industrial investment	indus_inves	0.25*** 0.03	0.24*** 0.03	0.24*** 0.03	0.22*** 0.03	0.24*** 0.03	0.23*** 0.03
Labor qualification	w	0.13*** 0.02	0.12*** 0.03	0.12*** 0.02	0.10*** 0.02	0.11*** 0.02	0.08** 0.02
Constant		7.46*** 0.37	7.51*** 0.35	8.9*** 0.36	9.35*** 0.35	8.96*** 0.38	9.45 0.37
Observations	N	382	382	382	382	382	382
Number of industries	n	33	33	33	33	33	33
R ^{2a}		0.794	0.7791	0.865	0.7641	0.8651	0.7687
Breusch et Pagan' test	LM	440.79***		428.81***		429.74***	
Ficher's test	F		97.74***		83.34***		74.91***
Hausman's test	χ^2		100.3***		69***		90.5***

Significant levels : * : $p < 0.05$ ** : $p < 0.01$ *** : $p < 0.001$ ^{ns} : not significant ⁺ : $p < 0.1$

Standard errors are robust.

^a: R² within for fixed effects model and R² between for random effects model

and significant in both columns. Hence, according to our analysis in Corollary 2.2, it follows that given the BTA signed with the United States in 2001, the size of this country positively affects the production value of supporting industries. Interestingly, Table 2 reports a positive coefficient associated with variable *apecsize* while that of variable *eusize* is negative. However, these impacts are all statistically non significant at 5% level in both estimators. Consequently, it seems that given the entry of Vietnam to the WTO, the size of APEC and EU countries is not high enough to support a positive impact on the production of supporting industries. However, this *surprising* finding can be explained by the appearance of *subprime crisis*. It is likely that that crisis and its persistence strongly hurts the GDP of the underlined regions.

Discussion and policy recommendations

The presence of the above mixed findings requires different policy recommendations. First, the negative impact of export FDI on the production of supporting industries is likely to be a result of the low performance of domestic producers compared to their foreign competitors. Indeed, Vietnamese firms seem to do not benefit from the presence of foreign firms in the same industry since the horizontal FDI spillovers appear to be negative (Le and Promfret, 2011) and the picture remains the same in export-oriented industries (Nguyen-Huu et al., 2010). Hence, some supporting policies should be implemented to improve competition ability of domestic firms in those industries. First actions might focus on providing funding supports for labor training or firm's investment in technology. Those actions can be reached with free loans, low interest rate or tax credit once the related firms either provide training for their labor or invest in new technology.

Second, policies conducting foreign firms to increase the local content in their supply chain are also necessary. This can be done by introducing some conditions on using local inputs in the negotiation stage of a new foreign investment. However, it should be noted that one of the main obstacles preventing foreign producers from using local inputs is the low quality of the latter. Hence actions should be handed in the supply side rather than in the demand side. Once again, we find the important role of training and investment in new technology, but now in the supporting industries.

Last, since Vietnam is likely to be benefited from the US BTA and being membership of WTO, other trade agreements should be developed by the country. Interestingly, the Vietnamese government competed or is actually negotiating different trade agreements: Vietnam-EU FTA, Trans-Pacific Partnership (PPT) agreement, FTA with EFTA countries (Norway, Iceland, Liechtenstein, and Switzerland), Vietnam-Japan Economic Partnership.

4 Conclusion

The rising in the number of trade agreements over the world leads to the appearance of Export-platform FDI. While there is an abundant literature on this type of investment as a strategic behavior of MNFs, its impacts on the host country are little studied and hence this is the purpose of this research.

We have developed a three-country framework allowing to examine impacts of such investment through a competition and a demand effects. The competition effect is generated when foreign production generates negative FDI spillovers and consequently replaces some domestic production whereas the demand effect can be directly or indirectly created. We have shown that Export-platform FDI has

ambiguous effects on the production of local inputs. We have also studied the role of different structural variables of the economy as the third country size, the power of trade agreements and the LCR. In the case of Vietnamese supporting industries over the period 2000-2012, a negative impact of this investment has been found. However, trade agreements between Vietnam and other countries, and the LCR have a positive impact while impacts of third market size appears to be ambiguous.

Our research is in line with the literature concerning the relationship between FDI and backward linkages by examining the existence of the competition effect and the demand for inputs as shown in Rodriguez-Clare (1996); Markusen and Venables (1999); Lin and Saggi (2007). In their framework, the authors only consider the existence of the demand effect created by MNFs while in our model, the demand for inputs effect can be generated by both foreign and domestic firms. Moreover, we develop a three-country model concept instead of a two-country model. Given the rising in trade agreements, the two-country standard models on FDI become irrelevant to study the complex strategies including Export-platform FDI used by MNFs Yeaple (2003); Baltagi et al. (2007). Consequently, we cannot use a two-country framework to examine the impacts of this investment. Our framework is also different from that of (Rodriguez-Clare, 1996; Markusen and Venables, 1999; Lin and Saggi, 2007) by taking into account the impacts of third country size, trade agreement, and LCR on the production level of local inputs.

This paper leaves open some lines for further research. First, we have worked entirely in a partial equilibrium framework. As a consequence, sole the final good's price is endogenous while wage and inputs' price are taken as given. Developing a three-country general equilibrium framework would be helpful to study the impacts of Export-platform FDI on wage, inputs' price as well as the welfare of the host country. Second, the paper only considers the existence of a representative MNF and a representative domestic firm. By endogenizing the entry of firms, we can study how this investment impacts the market structure. This is also interesting to examine whether the domestic firms can become more competitive than their foreign counterparts.

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Appendix

A Third-country model

A.1 Equilibrium in the third market

Let AC_m^R, AC_l^R respectively be the access cost to the third market in the Economy R . The problem of each firm is given as

$$\max_{q_l^R \geq 0} \pi_l^R = p_A^R q_l^R - AC_l^R q_l^R \quad (21)$$

$$\max_{q_m^R \geq 0} \pi_m^R = p_A^R q_m^R - AC_m^R q_m^R \quad (22)$$

In our model, firms compete in a Cournot fashion. In other words, each firm determine her output level by taking given that of her competitor. Hence, the best response strategies of firm m and firm l are represented as

$$q_l^R(q_m^R) = \frac{2b}{S_A - AC_l^R} - \frac{q_m^R}{2} \quad (23)$$

$$q_m^R(q_l^R) = \frac{2b}{S_A - AC_m^R} - \frac{q_l^R}{2} \quad (24)$$

Solving Equations (23) and (24) yields the market equilibrium in the Economy R

$$q_l^R = \frac{S_A - 2AC_l^R + AC_m^R}{3b} \quad (25)$$

$$q_m^R = \frac{S_A - 2AC_m^R + AC_l^R}{3b} \quad (26)$$

$$p_A^R = \frac{S_A + AC_m^R + AC_l^R}{3} \quad (27)$$

from where the profit of each firm is computed as

$$\pi_l^R = \left(\frac{S_A - 2AC_l^R + AC_m^R}{3b} \right)^2 \quad (28)$$

$$\pi_m^R = \left(\frac{S_A - 2AC_m^R + AC_l^R}{3b} \right)^2 \quad (29)$$

It should be noted that Equations (23) and (24) have a unique interior solution ($q_l^R, q_m^R > 0$) only if the third market size (S_A) is high enough. In order to investigate impacts of Export-platform FDI on backward linkages, we only consider the case where interior solution exists ($q_l^R, q_m^R > 0$). The situation according to which firms are inactive (i.e., $q_l^R, q_m^R = 0$) is widely analyzed in the literature.

A.2 Strategy choice of the foreign firm

Let $\pi_m^{Exp}(Expfdi)$ be the profit of firm m when using an Export-platform FDI in the Export economy. This firm finally exports instead of using an Export-platform FDI in the Export economy if and only if $\pi_m^{Exp} > \pi_m^{Exp}(Expfdi)$. The equivalent condition is

$$\frac{S_A - 2(w_m + \gamma c_l + \tau_m) + (\delta w_m + c_l - \theta + \tau_l)}{3b} > \quad (30)$$

$$\frac{S_A - 2(\delta w_m + \lambda c_l + (1 - \lambda)\gamma c_l + \tau_m) + (\delta w_m + c_l - \theta + \tau_l)}{3b} \quad (31)$$

or

$$\tau_l - \tau_m > (1 - \delta)w_m - (1 - \gamma)\lambda c_l \quad (32)$$

Likewise, let $\pi_m^{Ep}(Exp)$ be the profit of firm m when using an Export strategy in the Export-platform economy. An Export-platform FDI is used instead of Exporting if and only if $\pi_m^{Ep} > \pi_m^{Ep}(Exp)$. This implies that the following condition must be fulfilled

$$(1 - \delta)w_m - (1 - \gamma)\lambda c_l > \tau - \tau_m \quad (33)$$

Using Equations (32) and (33) yields the condition given in Proposition 2.1.

A.3 Role of local content requirement

Equation (15) can be rewritten as

$$\Delta BK = \frac{1}{3b}[-2\lambda^2(1-\gamma)c_l + (S_A + (2-3\gamma)c_l - \delta w_m - \theta - \tau)\lambda + (2\theta + 2\tau_l - \tau - \tau_m) - (1-\delta)w_m] \quad (34)$$

Since $(1-\gamma)c_l > 0$, the function $f(\lambda) := -2\lambda^2(1-\gamma)c_l + (S_A + (2-3\gamma)c_l - \delta w_m - \theta - \tau)\lambda + (2\theta + 2\tau_l - \tau - \tau_m) - (1-\delta)w_m$ has a maximum value at

$$\lambda^* = \frac{S_A + (2-3\gamma)c_l - (\delta w_m + \theta + \tau)}{4(1-\gamma)c_l},$$

However, λ^* exists if and only if $0 \leq \lambda^* \leq 1$ that is equivalent to conditions (i) and (ii) given in Proposition 2.2.

In addition, replacing λ in Condition (14) by λ^* yields condition (iii) of Proposition 2.2.

B Evidence from Vietnam

B.1 Data description

Table 3: Descriptive analysis for supporting industries

VARIABLES	(1) N	(2) mean	(3) sd	(4) min	(5) max
gdpus	382	1.302e+13	8.416e+11	1.156e+13	1.423e+13
gdpapac	382	2.633e+13	2.685e+12	2.210e+13	3.069e+13
gdpeu	382	1.375e+13	6.935e+11	1.243e+13	1.457e+13
lnindus_prod	382	13.85	1.766	4.120	17.27
lnindus_invest	382	11.33	2.718	-12.05	15.55
qualif	382	9.989	3.467	1.991	23.20
indussize	382	3.224	3.479	0.00696	17.73
Number of industries	33	33	33	33	33

B.2 List of Vietnamese export-oriented industries

1500 - Food products and beverages

- 1511 - Animal food manufacturing
- 1512 - Seafood product preparation and packaging
- 1514 - Grain and oilseed milling
- 1520 - Dairy product manufacturing
- 1532 - Bakeries and Tortilla manufacturing
- 1542 - Sugar and Confectionery product manufacturing

1700 - Textile products manufacturing

- 1711 - Fiber, yarn and thread mills
- 1712 - Textile ennoblement
- 1721 - Textile and Fabric
- 1722 - Carpet and Rug mills
- 1723 - Net and String products
- 1729 - Other textiles products
- 1730 - Knitting products

1800 - Clothing manufacturing

- 1810 - Garment products manufacturing

1900 - Leather, leather products and shoes

- 1920 - Shoes manufacturing

2500 - Plastics and Rubber products manufacturing

- 2520 - Plastics products manufacturing

2690 - Non-metallic mineral products

- 2691 - Pottery, Ceramics and Plumbing fixture manufacturing
- 2692 - Clay building material and Refractory manufacturing
- 2693 - Brick and construction products

3000 - Computer and Peripheral equipment manufacturing

3100 - Electrical equipment manufacturing

3130 - Electrical cables manufacturing

3200 - Radio, television and communication equipments manufacturing

3210 - Electronic components

3220, 3230 - Communication equipment

B.3 List of supporting industries

1500 - Food products and beverages

1533 - Prepared feeds for farm animals

1549 - Other Foods manufacturing

1910 - Leather and related products

1911 - Tanning and dressing of leather, dressing and dyeing of fur

1912 - Luggage, handbags and like, saddler and harness

2000 - Wood and wood products and cork (except furniture) manufacturing, Articles of straw and plaiting materials

2010 - Saw-milling and planing of wood, excluding impregnation

2100 - Paper products manufacturing

2101 - Pulp, paper and paper-board manufacturing

2102 - Corrugated paper and paper-board, containers of paper and paper-board manufacturing

2109 - Other articles of paper and paper-board

2400 - Chemical industries

2411 - Other organic basic chemicals manufacturing

2413 - Plastics, synthetic rubber in primary forms manufacturing

2422 - Paints, varnishes and similar coatings, printing ink and mastics manufacturing

2429 - Other chemical products

2430 - Man-made fibers manufacturing

2500 - Plastic and rubber products manufacturing

2511 - Rubber tires and tubes, retreading and rebuilding of rubber tires manufacturing

2519 - Other rubber products manufacturing

2690 - Non-metallic mineral products

2694 - Cement, lime and plaster manufacturing

2695 - Other articles of concrete, cement and plaster manufacturing

2696 - Cutting, shaping and finishing of stone

2699 - Other non-metallic mineral products

2700 - Basic metals manufacturing

2720 - Precious and light metals production

2732 - Casting of light metals

2900 - Machinery and equipment manufacturing

2911 - Engines and turbines (except aircraft), vehicle and cycle engine manufacturing

2912 - Fluid power equipment, other pumps and compressors manufacturing

2913 - Bearings, gears, gearing and driving elements manufacturing

2914 - Ovens, furnaces and furnaces burners manufacturing

2915 - Packing, packaging and weighing equipment manufacturing

2919 - Other general purpose machinery manufacturing

3100 - Electrical equipment manufacturing

3120 - Electricity distribution and control apparatus manufacturing

3140 - Batteries and accumulators manufacturing

3150 - Electric lighting equipment manufacturing

3190 - Other Electrical equipment manufacturing

3500 - Other transport equipment manufacturing

3591 - Motorcycles manufacturing

3700 - Collection, treatment and recovery

3710 - Collection, treatment and recovery of metallic waste

3710 - Collection, treatment and recovery of non-metallic waste

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