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Investors' characteristics and the business climate as drivers of backward linkages in Vietnam

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Abstract

This paper analyses the factors determining the establishment of backward linkages and their key features once established. To carry out our analysis, we exploit an original survey conducted in 2011 on roughly 1,500 investors based in Vietnam. We show that some characteristics of the investor firm, including size, productivity, experience and autonomy in decision-making, affect the capacity of linkages to create a larger network of local suppliers. In addition, we show that it is the provision of a good investment climate, and more importantly of key business support services, that mainly influences the capacity of investors to trigger knowledge and other key resources' transfer to their local suppliers.

JEL Classification: F23;M21;O19

Keywords: Linkages; MNEs; Business Climate

1. Introduction

In both developing and transition economies Foreign Direct Investments (FDI) are a major source of development finance. Arguably, FDI can be growth enhancing through their direct effect on the amount of domestic investment and can also be potentially positive for local firms through indirect effects and knowledge transfer (Alguacil et al. 2011). However, a large literature has emphasized how FDI do not end up automatically into positive spillovers, but this rather depends on their quality and motivations as well as on other mediating factors such as the type of policy put in place by the government and the incentives to establish mutual cooperation between foreign and local firms (Adams, 2009; Farole and Winkler, 2014; Irsova and Havranek, 2013).

The literature on FDI has so far mainly found ambiguous results with respect to horizontal spillovers (see Irsova and Havranek, 2013, for a review), while more often positive effects are found for vertical spillovers through backward and forward linkages established between MNEs and local firms. Due to these potential benefits, the issues related to linkages have been scrutinized thoroughly by most recent research (see, for instance, Giroud and Scott-Kennel, 2009; Giroud et al., 2012; Newman et al., 2015). Yet, a drawback of research on this topic is that it often analyses only the final outcome generated on local firms; only a few works, instead, focus on what factors may favour or discourage the establishment of the linkages. This research question is particularly relevant to address, especially from a policy point of view, since it is crucial to identify the right type of policies supporting those linkages that can be more conducive to higher amount of knowledge transferred from foreign to local firms.

Still, the studies carried out so far share two main limitations. The first is that through the measure generally adopted, i.e. the share of local supply on total, they provide only an incomplete information on the size of linkages, not accounting, for instance, for the size of the network of domestic suppliers created by foreign firms. Rather, focusing on the number of relations established by foreign affiliates and local firms, as we do to measure the size of linkages in this paper, may help to better identifying which foreign firms generate the higher local spillover potential (Blalock and Gentler, 2008). Although this may seem only a methodological issue, it can be an important piece of information to guide policy, i.e. in view of understanding which kind of firm characteristics should be prioritized by a pro-FDI policy.

A second empirical and theoretical limitation of the previous studies is that in the existing literature the mere existence of a linkage and its level is considered itself a way to generate spillovers. However, not all linkages have the same spillover potential and, as a consequence, the ability to foster positive effects for the host country. The spillover potential of a linkage depends on the direct and intentional transfer of resources from the investing firm (Giroud and Scott-Kennell, 2009), which can be in turn correlated to some characteristics of the firm (e.g. the stock of knowledge; motivations, etc) and of the host country (Farole and Winkler, 2014). Knowing this becomes crucial because it helps to understand which policy instrument to implement – for instance by understanding whether it is better to work on the empowerment of institutional context to favor FDI and/or on the improvement of the absorptive capacities of the local firms. So far, only a few studies have closely looked at the content of linkages (Giroud et al., 2012; Joordan, 2011; Jindra et al., 2011; Perri et al., 2013) without considering the institutional environment and the provision of business support services as potential factors shaping the decision of foreign firms to create linkages and to provide support to their local suppliers.

In light of the above discussion, our study can be considered as a way to provide guidelines for policy makers on FDI policies that need to be implemented to enhance their effectiveness for sustained growth. We do so by looking at the factors affecting the establishment of backward linkages, their key features once

established and the role of institutions in favouring knowledge transfer between foreign and local firms. To carry out our empirical analysis, we exploit an original survey conducted in 2011 on roughly 1,500 investors based in Vietnam. The survey provides an ideal setting for our work, considering that it has been designed specifically to understand the pattern of local integration of investors through backward and forward linkages with local firms. To the best of our knowledge, this is the first work using the survey and the first analysing the determinants of linkages in Vietnam, a country that since mid '80s (with the Doi Moi reforms) has started to implement pro-market reforms and become highly open to FDI. Through this empirical study on the Vietnamese case, we contribute to the existing literature in different ways.

Our first contribution is that of providing a more complete picture of the characteristics of backward linkages. To do this, we closely follow the framework developed by Giroud and Scott-Kennel (2009), arguing that it is necessary to disentangle the "quantity", i.e. the extent of linkages, and the "quality" of linkages, i.e. the intentional transfer of resources to local suppliers. This framework has been adopted by Giroud et al.'s (2012) analysis on the determinants of the quantity and quality of linkages in Eastern European countries. Differently from their study, however, we consider an alternative measure for the quantity of linkages, i.e. the one considering the number of domestic suppliers. While this measure has rarely been considered in the literature (an exception is the paper by Chen et al., 2004), on the ground of some work exploring the supply chain effect of FDI (e.g. Blalock and Gertler, 2008; Lin and Saggi, 2007), we claim that the process of creating more linkages, that is a larger size of the network of supplier, is not necessarily driven by the same firm- and host country- characteristics as the traditional value based measures of linkages. Furthermore, we also adopt a more comprehensive definition of the quality of linkages than the one adopted by Giroud et al. (2012), which covers the technological dimension only. Exploiting a specific question of the survey, we are able to include other dimensions of foreign support to domestic firms such as, for example, the degree of training offered, the upgrade of the quality of product and the collaboration in design. In this way we provide a complete description of the content of linkage. Consequently, we can offer policy makers specific guidelines to understand which kind of support can result more effective for local suppliers.

Secondly, we pay specific attention to one policy instrument which is functional to attract quality FDI with high spillover potential, i.e. the presence of a good investment climate and the provision of different types of business support services. In the specific case of Vietnam, Athukorala and Tien (2012) have provided descriptive evidence that a good investment climate can be a suitable attractor for FDI, but no analyses have been conducted to see whether a good investment climate can be conducive to the establishment of linkages. While there is already a large literature linking the overall business environment to investors' performance (see Xu, 2010, for a review, and Alguacil et al., 2011, for macro-economic evidence on developing countries) as well as studies about the effects of good institutions on FDI attraction (e.g. Globerman and Shapiro, 2003; Benassy and Quere, 2007; Lee et al., 2018) in our paper we move somewhat further by

investigating also which kind of specialized business-services can improve the size and the content of the linkages established.

The remaining of the paper is structured as follows. Section 2 discusses the literature dealing with linkages. Section 3 introduces the original survey data and describes the models adopted. Results are presented in section 4, while Section 5 concludes.

2. Linkages and FDI

The results coming from the microeconomic evidence are quite mixed when considering the effect of FDI on different dimensions of local firms performance (see Crespo and Fontoura, 2007, for a review), but tend to confirm that FDI have positive benefits when vertical linkages (backward and forward) are established between foreign and local firms (e.g. Javorcik, 2004; Javorcik, and Spatareanu, 2011; Gorodnichenko et al., 2015). The case of Vietnam has been also analysed in this respect. One of the first study on this country is by Giroud (2007), who compared the effects of FDI through vertical linkages with the Malaysian case. She finds that MNEs and the local business environment in Vietnam were quite different from the Malaysian case, considered at a higher level of development. In particular, the study claims that the Vietnamese business environment needs to be improved in its effectiveness to favour the establishment of linkages and to increase the spillover potential of FDI. More recently, Newman et al. (2015), considering the period 2009-12, are able to separate direct and indirect spillover effects from FDI and find that the productivity of Vietnamese suppliers is more likely to be enhanced only after direct linkages with foreign investors are established.[1] In sum, the empirical evidence gathered so far has emphasized that Vietnamese firms when dealing with foreign firms need to be endowed with greater absorptive capacity but still leave policy makers with little information on which types of linkages can be conducive to higher spillover potential.

In light of this evidence about the importance that linkages can have on local development opportunities and, even though there is an increasing interest on which factors can actually affect the propensity of foreign investors to establish linkages with local firms, only a few empirical studies have been carried out with this purpose. Such limited evidence includes, among others, the papers by Belderbos et al. (2001) on Japanese affiliates; Chen et al. (2004) and Liu (2011) on Taiwanese affiliates as well as the more comprehensive analyses by Amendolagine et al. (2013) or Sánchez-Martín et al. (2015) on a larger number of foreign affiliates from different countries. Common findings from all these studies

[1] A more specific perspective of analysis on vertical linkages in Vietnam is the paper by Kubny and Voss (2014), who examine how Chinese firms establish local linkages with Vietnamese firms through buyer-supplier relationships and on the way Chinese MNEs may contribute to the technological upgrading of local firms through these linkages. They find that Chinese MNEs source more from Vietnamese firms in specific sectors such as electronics and automotive but the gains obtained are limited because of the low value added characterizing the activities carried out by MNEs.

are that linkages are more likely to be established by affiliates characterized by higher autonomy from the headquarters, as well as longer experience in the host country, or those establishing JVs with local firms, among others. Still, this strand of literature has some limitations that we are going to discuss in more details in the next two sections.

2.1 Measuring the quantity of linkages: firms characteristics and the size of the local network

A first limitation of the literature has to do with the measure of linkages adopted. The largest part of the studies uses the share of inputs sourced from local firms on the total to measure the quantity of backward linkages. Though this is a suitable proxy of how much foreign affiliates rely on the domestic economy, it has the drawback of hindering potential multiplier effects of linkages.

As described in the theoretical framework developed by Giroud and Scott-Kennell (2009), the quantity of linkages might be measured not only as the amount of goods and services sourced locally, but also by the number of linkages actually created.

According to the literature on business networks and supply chains, linkages can be considered as relational investments and FDI are an important instrument to allow MNEs to expand their external network in the host country (Ghoshal and Bartlett, 1990; Hansen et al., 2009). As argued by Ghoshal and Bartlett (1990), MNEs are embedded inside an inter-organizational network which is made up of a double level: MNEs are in fact both part of their internal network and of the external network of the host country in which they invest. Each subsidiary may be characterized by different objectives in relation to the environment in which it operates, leading to different levels of engagement with the local actors. Therefore, to effectively gain from the local context the MNEs should balance its effort to be locally integrated, as well as being internally embedded (Santangelo, 2009; Meyer et al. 2011).

To a certain extent, expanding the external network by adding up a larger variety of local firms is a desirable outcome for foreign firms to enhance the complementarity with their production process and to raise the quality of the inputs sourced (Lin and Saggi, 2007). The process of widening the local network, rather than concentrating it among a few suppliers, can, for instance, contribute to raise the quality of inputs due to the competition effect among local firms (Blalock and Gertler, 2008). However, this is likely to increase transaction costs (e.g. those related to search and contractual frictions, Defever et al., 2015) and related risks of managing a large number of relations.

From a policy perspective this could represent an important information given that different characteristics of the firm can play a different role according to the measure of linkage adopted. More specifically, following Chen et al. (2004), we claim that larger and more productive firms are more capable to absorb the risks related to the management of an extended local network. Still, however, since larger firms are more likely to count on a more diversified network, including international suppliers, it is not necessarily true that the value of domestically

sourced inputs relative to the total to be not necessarily that large in their case (Winkler, 2013).

2.2 The quality of linkages

A second limitation of the above-mentioned literature is that a positive spillover is supposed to be generated just by the mere existence of a linkage and its level. However, not all linkages have the potential of becoming sources of positive spillovers (Perri et al., 2013). Following Saggi (2002), linkages need not only to be built and become operative but they have to generate positive benefits to spur economic development.

A crucial issue here is relative to the mechanisms through which MNEs may affect the performance of domestic firms by creating backward linkages. MNEs can positively affect the productivity of domestic suppliers not simply by buying more (and from more suppliers) locally, but by providing knowledge through different types of assistance; such as helping them to comply with higher technological standards or training local workers (Rodriguez-Claire, 1996). In this way, they also set up a learning process and provide incentives to upgrade the production process and the quality of products and services.

It is therefore the quality of the linkage, defined as the "direct and intentional knowledge flow", that determines the effective transfer of resources between the affiliate and the local firms, shaping the developmental potential of the investment (Giroud and Scott-Kennel, 2009; Giroud et al., 2012). A different set of resources, including technology, skills, training and capital, transferred through linkages then used and developed by local firms holds the highest potential to translate into non-pecuniary benefits domestically (Giroud and Scott-Kennel, 2009: 562). Clearly, such transfer of resources or other forms of assistance does not guarantee that linkages as such result in positive spillovers, since this depends also on other factors including, for instance, the duration of the relation and contract specifications (Giroud and Scott-Kennel, 2009), or the absorptive capacity of domestic firms (Winkler, 2013).

In this paper we suggest that the factors affecting the decision to transfer resources might be different than those normally considered when deciding whether to establish a new linkage (Chen et al., 2004), since this has higher costs and implies a stronger commitment by the firm. By doing this, we move within the framework developed by Giroud and Scott-Kennell (2009), assuming both firm and location specific factors to have an influence on the type of linkages being developed.

More specifically, we claim that among the factors that could contribute more to the transfer of knowledge and resources, one that has been relatively under investigated - but that has an immediate policy relevance – is the role of the domestic business environment.

The business climate, and related policies regulating the activities of investors, have a strong potential to shape the quality of FDI received. Though difficult to define, the investment climate can be understood as the institutional, policy and

regulatory environment in which firms operate. While this is clearly linked to the existence and the provision of some key location factors, such as good governance and the quality of institutions (Acemoglu et al., 2001; Giroud and Scott-Kennell, Kinda, 2010; Reyes et al., 2017), it involves also more operational factors and policies likely to reduce the risks and raise the returns of the investments. As recently emphasized by Moran (2014), in fact, providing sound location factors and institutional stability represents a sort of necessary condition to attract FDI, it is not sufficient to raise the quality and the spillover potential of the investments received. Active policies to provide targeted business support services to investors represent an effective way to reduce existing information asymmetries and the related costs for search and discovery (Moran, 2014). As a matter of fact, business support services are theoretically justified on the ground of their potential to give rise to positive externalities and on the idea that firms on their own will invest less than the optimal level, due to the presence of market failures (World Bank, 2016).

Since a good institutional and business climate generally contributes to attract FDI reducing the degree of uncertainty about the local environment as well as affecting the rate of return of local investment, we can expect it to be even more crucial in determining the quantity and, especially, the quality of linkages with local firms. To the best of our knowledge, no studies have analysed the role of the business climate on the type and quality of linkages that foreign firms carry out in host countries, despite research is clear about the capacity of affiliates to react to opportunities and constraints in the host market (Perri et al., 2013)[2].

3. Data and Empirical Analysis

To analyse our research questions we exploit newly released information from the Vietnam Investor Survey (UNIDO, 2012).

Vietnam is an interesting case to analyse: it is embedded in one of the largest and rapidly growing regional supply chains, which represents an appealing reason for investors to set up production facilities. The period that started with the "open door policy" just after the Doi Moi in 1986 has led the country to implement several changes that shaped its industrial structure. In the following year, 1987, the approval of the Law of Foreign Investment, which was amended over the following years (e.g, in 2000 and 2003), fostered the sudden attraction of massive inflows of FDI. However, the capacity to attract FDI did not experience a rising trend since in the first years after the liberalization several planning mechanisms continued to be at work, for example the state sector continued to be one of the main actors in the business sector (Freeman, 2001). Nevertheless, after the accession to WTO in 2007, FDI inflows rose again mainly driven by cost saving considerations and the exploitation of market opportunities[3]. Since then, FDI have

[2] The work by Perri et al. (2013) is conceptually close to ours. They generally pose that an external environment conducive to more competition (as it could be in the case of a good investment climate) raises the probability for foreign affiliates to establish more quality linkages.

[3] The Vietnam case has already been under close scrutiny to account for other phenomenon dealing with the determinant of the shift in the economic structure such as the relationship between poverty and deprivation (e.g. Mahadevan and Hoang, 2016) or the role of monetary policy

played an important role in the economic transformation of Vietnam, where Foreign Invested Enterprises (FIEs) represent nowadays a large share of output and employment, contributing to roughly 20% of GDP and half of export (UNIDO, 2012).

The survey we use provides very detailed information on the operations of 1,493 investors in the country[4]. The sample surveyed is a stratified one based on an original frame drawn from the business register of the statistical office, covering industries including manufacturing, construction and utilities; size (firms over 50 employees); a capital threshold of 5 billion VND and 9 provinces (Ho Chi Min City, Hanoi, Vinh Phuc, Bac Ninh, Hai Phong, Da Nang, Binh Duong, Dong Nai, Ba Ria Vung Tau)[5]. Even though this dataset provides us with very detailed information on both local and foreign firms it has the disadvantage of being cross section. Hence, while we can use the data to unearth and describe some hitherto unknown relationships, we are careful to avoid interpreting these as causal effects. However, we think that the relationships uncovered are sufficiently interesting and with important policy implications to justify our analysis.

3.1 Foreign invested firms and linkages

The database includes a majority of FIEs, which represent 57.2% of the total firms, while the rest are domestic firms, either private (32.9%) or SOEs (9.9%).

Foreign firms in the sample are mainly (about 70%) affiliates of MNEs based abroad, while the remaining are individual investors. The typical firm can be described as one established through a greenfield investment and affirm market- and efficiency-seeking being the main motivations to establish in Vietnam. FIEs are generally spread across industries (but mainly focussed on low-tech activities, see Figure A1 in the Appendix), but very concentrated in terms of geographic origin with three regional partners making the lion's share (see Figure A2 in the Appendix).

The survey includes ad-hoc questions on backward and forward linkages with local firms. Foreign firms generally source a low level of inputs (about 26%, plus an additional 12% sourced locally, but from foreign firms) from local producers, with higher shares recorded by individual investors. This is much lower compared to their domestic counterparts (who source 64.6% of their inputs domestically), but it looks along the lines of existing evidence from other developing countries (Javorcik and Spatareanu, 2009).

Among the main reasons to source from local firms, the most relevant is by far the level of prices (79% of respondents), followed by logistics (10%) and access to

in favouring economic growth (e.g. Anwar and Nguyen, 2018) or the effects that the equitization process had on the industrial sectors (e.g. Le et al. 2014).

[4] A description of the data, including on the collection process, is available from the Vietnam Industrial Investor Report (UNIDO, 2012). Aggregate statistics drawn from the survey are available through accessing UNIDO's Investment Monitoring Platform. Survey data used in this paper are available upon request, but are confidential. In order to gain access to the data, and for replication purposes, a confidentiality agreement with UNIDO will need to be signed.

[5] Detailed information on the survey methodology are provided in Annex II of UNIDO (2012: 180-184).

local raw materials (6%). Interestingly, very few firms (2.5%) report local content to be an explicit requirement. This is due to existing obligations to FIEs (especially in selected industries such as motorbikes) being phased out as a consequence of the country's accession to WTO. On the other hand, issues related to the quality of local products and services, together with uncompetitive price levels and the unreliability of domestic providers are among the main reasons for which FIEs prefer to rely on other channels, especially imports, to acquire their intermediate inputs.

As remarked in the previous Sections, the establishment of a linkage itself does not necessarily imply a transfer of resources to domestic partners. 54.2% of the FIEs affirm that as a result of backward linkages they do interact with local suppliers with the aim of supporting their operations through the provision of some form of assistance, while the corresponding share of domestic firms is 10 percentage points higher. More specifically, such support is most of the time targeted to upgrade local producers' capacities to produce better quality inputs in a more efficient way (Table 1). Perhaps surprisingly, only a marginal share of FIEs report technology transfer to be implemented. This could be due to the prevalence of efficiency-seeking investments demanding lower value added inputs to foreign firms to be further processed in other stages of the value chain (Table 1).

3.2 Empirical specification and variables

This Section introduces the specifications adopted to investigate empirically the factors affecting the size and the quality of linkages.

We first analyse the determinants of the quantity of linkages. Remember that, following the discussion made in Section 2.1 one of our aims is that of enhancing our analysis by capturing the size of the network of local firms generated by investors. Hence, we use the number of domestic suppliers (*n_domestic_suppliers*) as a dependent variable for this first set of regressions. In this case, since the variable is measured as a non-negative integer, we apply a count model that is more apt to account for the Poisson distribution of the dependent variable. We rely on likelihood ratio test that α (the over-dispersion parameter) equals zero to control for the possible overdispersion in the data. As the α parameter results always significantly different from zero we assume that a negative binomial model is more robust than a standard Poisson model.

The second step of the empirical analysis is that of estimating whether linkages can be potential sources of spillover to local firms by being means of likely knowledge transfer or other key resources (e.g. financial) to local firms. The dependent variable used in this case is constructed by building an index (*spillover*) obtained summing the value of six dummy variables that all refer to activities that firms may carry out in favor of local suppliers, as reported in Table 1. This index therefore ranges from 0 to 6 with higher values representing cases in which different forms of support were implemented at the same time. Given the ordinal nature of the data, we estimate this last relation using an ordered Probit specification, assuming that each observation has N-ordered alternatives delimited by a series of cutoff points.

In all the models tested we use a similar set of control variables and the general form of our specification is the following:

$$\square_{\square} = \sum \square_{\square} + \sum \square_{\square} + \square_{\square} + \square_{\square} + \square_{\square} \quad (1)$$

Where Y_i is the outcome of interest (quantity or quality of linkages) for all the *i* firms in the sample. We account for two main sets of factors that can affect the propensity to source from domestic suppliers, namely firm level factors (X_i) and the characteristics of the domestic business climate (Z_i). All models include also industry (δ_j) and province (λ_k) fixed effects to control for common factors not included in the regressions that could influence the respective outcomes.

As far as the firms' characteristics are concerned, we control for age (*lage*), which is a proxy of the experience of the firms in the local context. It is measured as the log of the number of years since the firm first establishment in the country. The ratio of white collars to total employment (*skill_ratio*), the size (*size_class*), measured as an ordinal variable built in terms of number of full-time employees (Small-Medium-Large), and the level of labour productivity (*lab_prod,* computed as the log of total sales on full-time employees) are added to control for potential differences in capabilities with the local suppliers. Another important control variable we use in our benchmark model is the market orientation of the firm (*market_or*), with the assumption that firms mostly oriented towards the local markets will turn to local suppliers to a greater extent.[6]

When we run regressions on the full sample including both domestic and foreign investors, we further control whether the different types of ownership may have any influence on the local sourcing strategies by including two dummy variables: one identifying whether the firm is state owned (*soe*) and the other if the firm is foreign owned (*foreign*). Finally, we also introduce a dummy indicating whether the investor is located within a special economic zone (*SEZ*), which might have important implications to our analysis considering the specific provisions regulating the zones.

This benchmark model is then run on the sample including foreign firms only. When using this sub-sample, we include several other variables related to the investment along the lines of the existing research on this area (Liu, 2011; Giroud et al., 2012). We control for the motivation, including a dummy equal to 1 in case of efficiency-seeking investments (*eff_seeking*); for the mode of entry, with a dummy indicating whether it is a greenfield or not (*greenfield*); and on the type of investor, distinguishing between foreign affiliates and individual investors (*individual_inv*). We also control whether the share of foreign ownership (*share_foreign*) affects local sourcing strategies, as well as for the degree of

[6] The classification is based on export data and firms are divided in three categories: local market-seeking (exports <10%), regional market-seeking (exports >10%, SSA exports>50%), or global market-seeking (exports >10%, exports RoW>50%).

autonomy (using two different variables, *autonomy*[7] and *role_parent*[8]) of the affiliate from the parent, which has been found by previous studies as one of the key factors promoting local sourcing (Jindra et al., 2011; Giroud et al., 2012; Amendolagine et al., 2013)[9].

The final set of variables includes information on the characteristics of the investment climate. Measuring the business climate is a difficult task. Country level indicators usually adopted by the literature have two main drawbacks. The first is that they are hardly available at the subnational level. The second is that they are based on a top-down approach, capturing with some difficulties the real implications of different dimensions of the investment climate for firms. As in Dollar et al. (2005), we try to overcome such limitations by measuring the importance of business environment directly at the firm level, on the basis of specific questions asking firms about the importance of a number of dimensions of the domestic business climate. Furthermore, we try to make the concept of business climate adopted in the paper as much operational as possible by including as well information on the provision of some specialized services, along the lines of the "light-form of industrial policies" to maximize the developmental potential of FDI through backward linkages recently described by Moran (2014). In doing this we use responses to a specific question on whether and which kind of business-support services has been received by the firms before, during or after their investment took place. Figure 1 shows that a large share of firms received business support services, from Government agencies or other local institutions, during the different phases of the investment cycle. Most of these services are more frequently provided to foreign investors, however, including information on incentives, infrastructures or professional services.

4. Results

4.1 The determinants of the number of linkages

Table 2 displays the results obtained using a dependent variable that measures the number of local suppliers by means of a negative binomial model.

Results report evidence that bigger firms, as well as the more productive and skill intensive ones, are those able to manage a larger network of local suppliers, independently on the quantity of inputs being sourced. This result is consistent with our priors. More resources, and greater efficiency, are clearly needed to be able to manage a large number of transactions, especially in a foreign environment (Lin and Saggi, 2007). Importantly, we do not find evidence of a foreign bias, meaning that foreign investors are not necessarily less integrated in local supply chains than domestic ones. Location within SEZs has a strong and negative

[7] This is a dummy variable equal to 1 if all decisions are taken at Parent HQs. The decisions are classified as follows: decision-making power of local management in capital expenditures, in defining marketing strategies, in entering new export markets, in generating new business in Vietnam, in the introduction and modification products, in pricing strategy, in recruitment issues, in selection of suppliers.

[8] This is a dummy variable equal to 1 if the firm replied "Very important" to a question on the role of foreign parent in decisions concerning different operational areas. They are represented by: Use of patents/trademarks/brand names; Technology and knowhow transfer; Development o f human resources; Access to finance; Access to foreign supplier network; Global market access.

[9] Descriptive statistics of the variables used in our models are provided in Tables A1 in the Appendix.

correlation with the number of local linkages, especially for foreign investors, which are more likely to exploit the incentives provided by importing their inputs by foreign suppliers rather than recurring to domestic ones.

The coefficient of age is highly significant when running regressions on the group of foreign firms only (Column 2-5). This result confirms that firms take time to develop their own network, after they have spent some time and resources to understand with which suppliers could establish longer term relations, an equilibrium will be reached. This is consistent with existing models of search and matching looking at input supply relations (Defever et al., 2015).

Clearly, not all the foreign investors are equally capable to create large networks of domestic suppliers. Results show that this is not the case of individual investors, or firms with lower shares of foreign ownership, which can find difficult to coordinate a more extensive network of local relations. Moreover, we can show that the level of autonomy matters in shaping sourcing relations towards a larger number of domestic suppliers. This is consistent with empirical evidence showing that the higher the autonomy of the firms from the parent company, the higher the flexibility to identify and establish long term relations with local suppliers (Giroud et al., 2012).

4.2 The determinants of quality linkages

In this Section we discuss whether the same factors examined so far have an influence on the potential spillover effect, looking specifically at whether they contribute to transfer knowledge and other key resources to domestic suppliers. This aspect is crucial to understand which type of policy is preferable to foster a higher spillover potential of FDI.

In this model we add the number of linkages and its square as an additional control to check if – as suggested by Giroud et al. (2012) – the relation between the quality and quantity of linkages is non-linear. Our results, reported in Table 3, support the view that there are decreasing returns once a certain number of linkages have been established[10]. This is not surprising, considering the high transaction costs and the likely disincentives to transfer resources to a large number of firms. And it is even less surprising to find that this holds true for the sample including foreign investors only (Column 2), considering the higher costs of transferring resources across borders. This is consistent with existing literature showing that investors transfer resources up the extent that their cost advantage is larger than the increase in transaction costs of larger networks (Lin and Saggi, 2007).

[10] We find that this turning point is nonetheless set at very high levels, around 350 suppliers. For a matter of completeness, we tested this hypothesis also using the share of total inputs sourced locally, as in the original model by Giroud et al. (2012) finding a higher threshold level, around 43%.

Moving to the other results, the role of firms' specific factors does not seem to play a strong influence. An exception is the negative coefficient of skill intensity, which looks plausible if this is considered as a potential source of technological gap, in turn hindering the transfer of resources between investors and suppliers (Rodriguez-Clare, 1996; Jindra et al., 2011). Another interesting coefficient is that of age, which is not significant for foreign firms, consistently with the findings of Giroud et al. (2012) on a sample of foreign affiliates in Eastern Europe.

Still, in the case of foreign investors the motivation matters. Efficiency-seeking investments are less likely to result in the provision of support to local suppliers, as one could have expected given that they generally involve low-value added, cost-saving, activities at the bottom of the value chain.

The influence of parent company in decision-making, as well as the degree of an affiliate's autonomy, do not report significant results, although autonomy in the decision making process was found as an important determinant of technology transfer in the empirical work by Giroud et al. (2012).

4.3 Business climate and linkages

In Table 4 we present the results of the models discussed in the previous Sections by adding one by one our set of variables measuring the institutional quality of the country and the provision of business services. In this way, we are able to test whether host environment is a favouring factor with respect to spillover potential.

Some interesting results emerge when testing the different dimensions of business climate and service provision on the capacity of investors to increase the number of linkages (Column 1). We show that foreign firms receiving ad-hoc services related to the information on finding adequate human resources and the matchmaking with local suppliers as well as service providers have higher chances to create a larger local network. This seems extremely relevant, since these are services that can reduce the costs of searching and matching local resources, which could be high for firms interested to widen their own local networks.

In column 2 we analyze whether institutional quality and the provision of business services matter to create an environment conducive to assist local suppliers once a linkage has been established. We find that the external environment matters to shape the content of linkages, thus complementing findings of macroeconomic literature highlighting the crucial role that institutions play to enhance the growth spillover effects of FDI in developing countries (Alguacil et al., 2011). First, foreign investors are more likely to transfer resources to local suppliers if they feel to operate in a good institutional environment, i.e. one where the implementation of contracts is protected by an effective rule of law. Second, the probability of establishing quality linkages increases in presence of strategic location factors, including the availability of an existent suppliers' base; of skilled workers; and the implementation of effective trade policies. Third, the provision of ad-hoc business services can be viewed as a crucial strategy to raise the probability of hosting more

quality investors. Firms that have received support on matchmaking with local providers, partners and human resources; as well as information about the local markets have a larger probability of providing support to their local partners. Taken together, results reported in column 2 (and to some extent in column 1) show that investors' perceptions about the quality of the local investment climate, and especially those that have concretely received ad-hoc business services that have facilitated their local engagement are more prone to deliberately transfer key resources and knowledge to their local suppliers to improve the quality of their production process. This is an important finding of our analysis, which complements pretty well the existing evidence on the role of the domestic policies related to the improvement of the local business environment as a key factor to attract more and more quality FDI (Globerman and Shapiro, 2003; Benassy and Quere, 2007; Moran, 2014).

4.4 Robustness checks: Correcting for potential endogeneity of the Business climate variables

Up to now, we have considered the variables representing the business climate and the provision of services as exogenous. However, such assumption has been questioned by the existing literature for at least two reasons (Dollar et al., 2005; Hallward-Driemeier and Aterido, 2009; Reyes et al., 2017). The first is the risk of not considering variables at the firm level that can affect some of the dimensions of the business climate: this could result in an omitted variable bias. The second is reverse causality, implying the self-selection of firms with a higher potential to create linkages and transferring resources into better investment climate. In our data, this could be the case of local agencies cherry picking foreign firms with higher potential to establish local linkages to be supported by some specific information packages (i.e. through the IPA). Finding a proper strategy to deal with potential endogeneity, on the other hand, has proven challenging so far, considering the cross-sectional nature of most existing studies (Xu, 2010) and the lack of strong external instruments (Reyes et al., 2017).

In the remaining of this section, as a robustness check, we follow a work by Dollar et al. (2005), which runs regressions on a group of so-called "less mobile" firms, i.e. smaller companies that – due to different reasons (e.g. the origin of the founder) – are more likely to select their location independently on location incentives or the business climate; less likely to change their location as a consequence of changes in these variables; as well as to influence the supply of a better investment climate by local institutions.

We have re-run our full model considering (a) small firms only (both domestic and foreign) and (b) small and medium domestic firms[11]. Results, summarized in Table A3 in the Appendix (columns 2-3), are consistent with those discussed in the previous Section (and reported in column 1 for comparison). A similar set of investment climate factors is found to positively affect the probability to transfer

[11] Small size companies are those with less than 200 employees, while medium sized are those with more than 200 but less than 300 employees.

resources through linkages, supporting our original results and discounting the risk of self-selection of better firms into better locations.

Finally, for those variables that measure the receipt of a business service we also apply a matching method to build a control group of firms whose characteristics are as close as possible to those of the firms who received the service, and check whether after this adjustment results remain robust. It is important to notice that given the cross-sectional nature of our data we cannot compare the characteristics of the firms before receiving the treatment. Yet, this approach is largely used in cross-sectional studies like ours to disentangle a potential source of bias which is given by the different characteristics of the groups of observations that are compared. For each of the business services variable we first run a probit model to calculate the predicted probability of receiving the service (using a similar set of firm specific controls, industry and province effects, as in equation (1))[12]. We then construct inverse probability weights (the propensity scores) that we use in our main regressions to provide a better comparison between controls and treated firms. Column 4 in Appendix Table A3 reports the results of the weighted regressions, showing once again not substantive differences with those reported in the second column of Table 4.

5. Conclusions

The likely beneficial effect that FDI can generate in an emerging economy are relative to the fact that they can represent one of the main sources of finance and capital, their role being therefore crucial to spur growth along its various dimensions (UNCTAD, 2015). In addition, linkages between foreign and local firms can favour the transfer of knowledge and other key resources, contributing to the technological and productivity upgrading of local firms, thereby encouraging a sort of multiplier effect.

The role of FDI and linkages in stimulating economic development can therefore be considered as one of the main motivation to call for investment liberalization policies. However, not enough emphasis has been put on the right types of policies needed to get the most from FDI. Policy makers should be aware that targeting some types of FDI, namely those with the higher spillover potential, can be more beneficial than trying to maximize the total amount of FDI received.

In this paper, we focus on the factors determining the quantity and quality of linkages being established between MNEs and domestic firms in Vietnam. From a policy perspective, knowing which factors determine the establishment of linkages and especially of quality linkages is crucial to design and implement investment attraction policies that are more likely to affect local economic development by spurring the growth of domestic firms. With these objectives in mind, we pay specific attention to the role played by the local business climate and the provision of business services. Well functioning institutions, especially in transition countries, are in fact relevant not only to attract more investments, but

[12] Results of the probit selection models, not included for reasons of space, vary according to the different dependent variables used, and are available upon request.

also to provide foreign firms with the right environment to maximize the spillover potential of their investments.

From an empirical point of view, in developing our analysis we closely follow the framework developed by Giroud and Scott-Kennel (2009) to study what differentiates the size of the business network from its scale. Furthermore, we put emphasis on the role played by the institutional and business environment in affecting the spillover potential of linkages through transfer of knowledge and resources.

To do that we take advantage of a recent survey covering around 1,500 investors in Vietnam. Two key sets of findings stand out from our empirical analysis, both leading to some important policy implications.

First, we show what are the characteristics of the investors that affect the size of the network of local suppliers that foreign firms establish through backward linkages. Should policy-makers and practitioners wish to maximize the number of linkages between foreign and local firms they must try to attract bigger, highly productive, more experienced (as well as those with higher autonomy from headquarters) investors. These are, according to our analysis, the type of foreign firms that seems more able to set up and coordinate a complex local supply chain.

Second, with respect to the role and effectiveness of the investment climate, we show that foreign investors are more likely to improve the relations with their suppliers, that is the quality of their linkages, when they perceive to be in an institutionally strong environment, and, in addition, if they receive ad-hoc business services, including information on local markets and potential partners, as well as the matchmaking with workers and suppliers. In the same way, the strength of the local institutional forces, such as the political stability or the quality of infrastructure, does not seem to play a crucial role when considering the quantitative side of linkages. This result therefore highlights the importance for policy-makers of disentangling the different dimensions of the host business environment according to the type of relations established by foreign firms with their domestic suppliers.

Importantly, our results seem to show that –to maximize the developmental potential of linkages – policies supporting the creation of local capabilities for both local workers and producers, works more efficiently when accompanied by the provision of information on local market opportunities and on domestic resources to new investors. In times of high competition to attract investments from abroad, as recently discussed by Moran (2014), this seems to reflect recent view supporting the successful experiences of some developing countries in implementing light forms of industrial policies to maximize the developmental effect of FDI through linkages.

Still, and despite of the policy relevance of our findings, we are also aware that there are some limitations that need to be addressed in future research. One is due to the cross - sectional dimension of the data, which prevents us from addressing the causality of relations examined. In addition, more detailed information on the

investor-suppliers relations, including for instance more insights on the type of knowledge or technology transferred, or on the process to absorb it, would be helpful to make some of the concepts adopted in the paper more straightforward.

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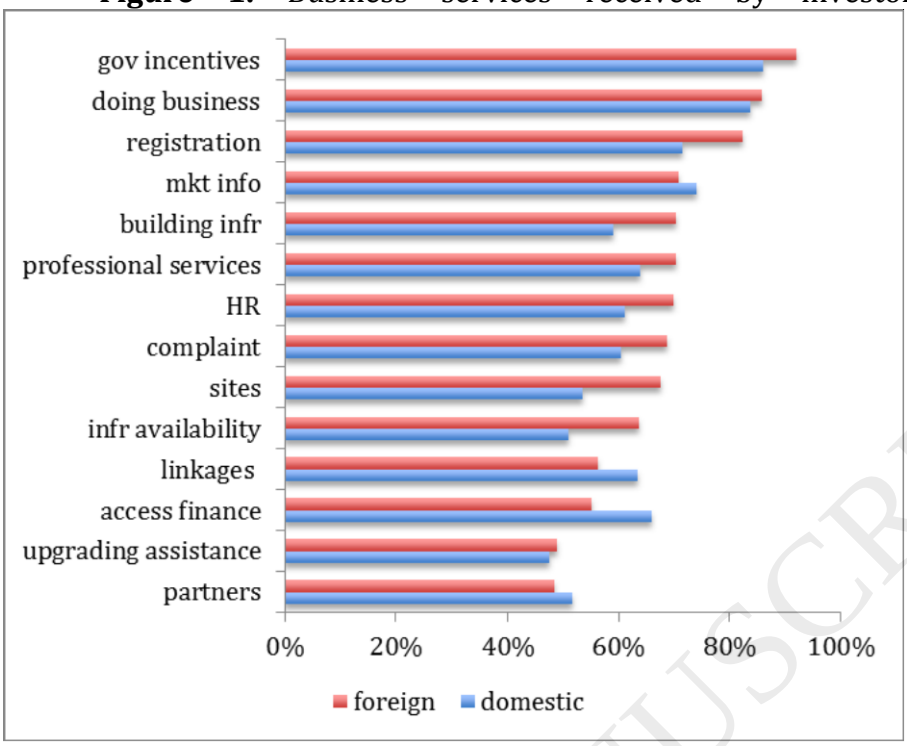
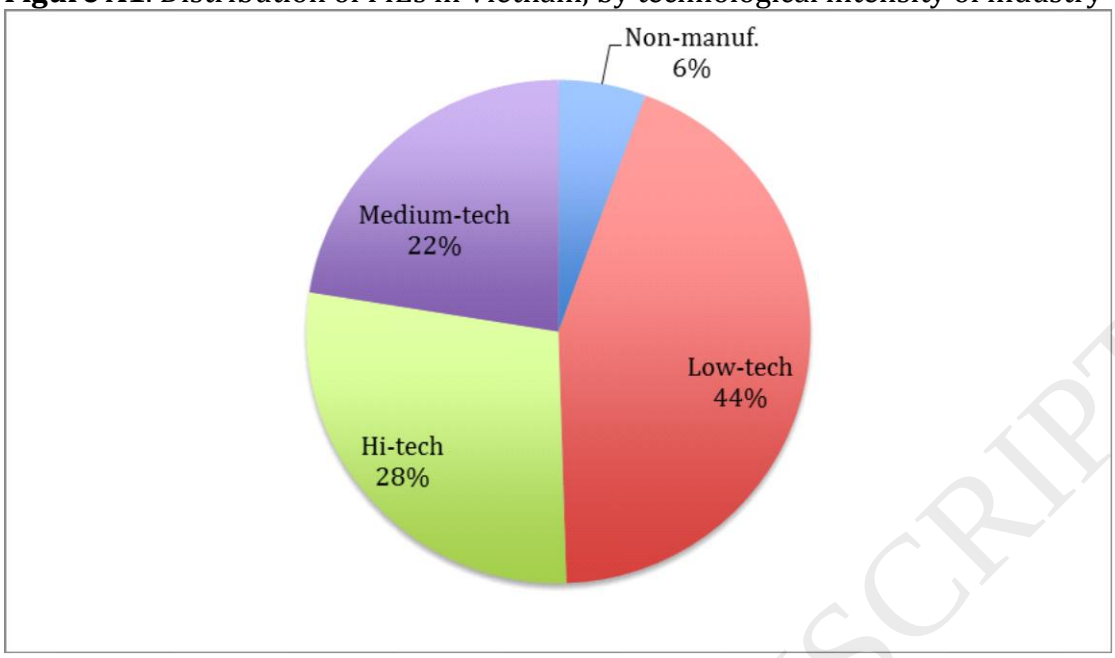
Figure 1. Business services received by investors (%)



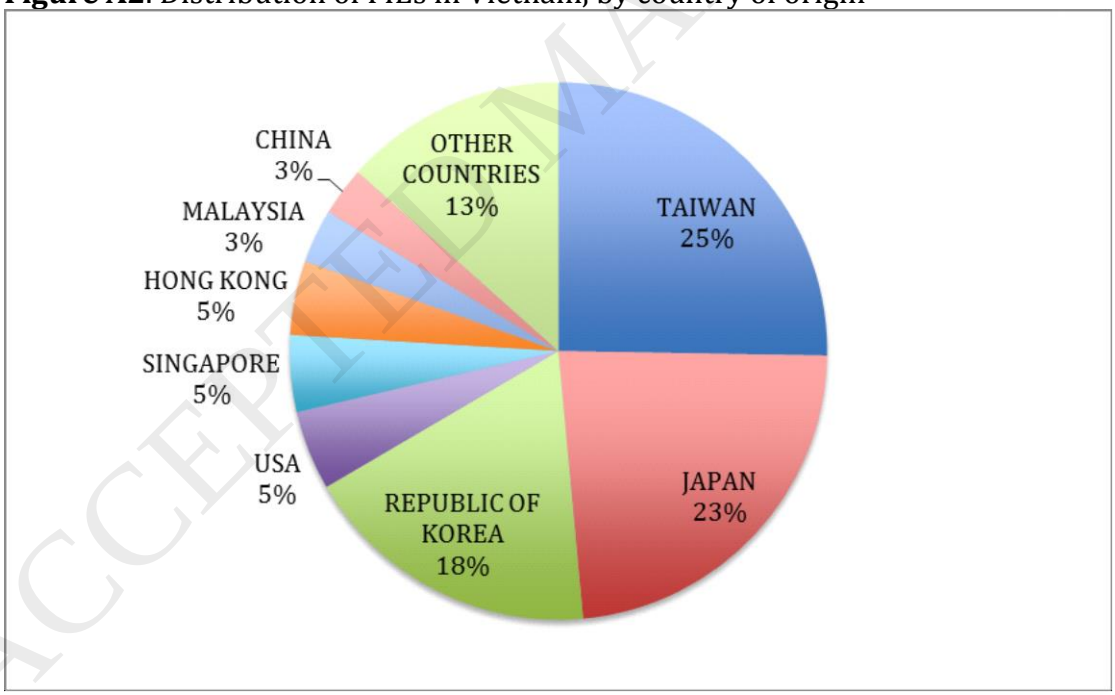
Source: Authors' elaboration on Vietnam Investor Survey
Note: A complete list, together with a short description, of these variables can be found in Table A2 in the Appendix.

Figure A1. Distribution of FIEs in Vietnam, by technological intensity of industry



Source: Authors' elaboration on Vietnam Investor Survey

Figure A2. Distribution of FIEs in Vietnam, by country of origin



Source: Authors' elaboration on Vietnam Investor Survey

Table 1. Support to domestic suppliers

	Foreign (% on total)	Domestic (% on total)
Upgrade quality of products	40.33	48.28
Upgrade production efficiency	25.09	28.21
Joint product design	23.33	30.25
Training	13.3	15.05
Improve access to finance	11.02	16.14
Technology transfer	6.8	9.25

Source: Authors' elaboration on Vietnam Investor Survey

Table 2. Determinants the number of linkages (Marginal effects, NB estimator)

	(1)	(3)	(4)	(5)	(6)
VARIABLES	Full sample	Foreign firms	Foreign firms	Foreign firms	Foreign firms
lab_prod	11.52***	9.085***	8.778***	11.18***	10.63***
	(3.266)	(2.737)	(2.579)	(3.196)	(3.268)
size_class	30.41***	29.24***	28.19***	27.85***	27.91***
	(3.939)	(5.433)	(5.198)	(6.441)	(6.745)
lage	6.309	22.97***	23.04***	31.05***	29.80***
	(4.183)	(8.030)	(7.859)	(9.788)	(10.05)
skill_ratio	1.004***	1.520***	1.451***	0.842**	1.000**
	(0.219)	(0.353)	(0.341)	(0.362)	(0.395)
sez	-15.54**	-15.36**	-14.38*	-15.12	-13.96
	(6.805)	(7.608)	(7.532)	(9.307)	(9.571)
market_or	3.480	4.594	4.256	6.247	5.955
	(3.354)	(4.278)	(4.240)	(5.879)	(6.128)
eff_seeking			4.052	-4.635	-0.597
			(6.784)	(8.057)	(8.046)
share_foreign			-0.130	8.338***	12.69***
			(0.246)	(2.834)	(3.911)
greenfield			-3.396	-17.45	-12.82
			(10.91)	(18.07)	(18.16)
individual_inv			-16.80**	-13.87	-11.02
			(7.300)	(14.13)	(14.95)
soe	2.273				
	(9.301)				
foreign	-0.905				
	(6.987)				
role_parent				-33.20***	
				(11.75)	
autonomy_cat_hq					46.66**
					(22.19)
Province effects	Y	Y	Y	Y	Y
Industry effects	Y	Y	Y	Y	Y
Observations	1,369	758	756	489	489
Robust Standard errors in parentheses ***p<0.01;**p<0.05;*p<0.1					

Table 3. Determinants of the quality of linkages (Ordered Probit estimator)

	(1)	(2)	(3)	(4)	(5)
VARIABLES	Full sample	Foreign firms	Foreign firms	Foreign firms	Foreign firms
n_domestic_suppliers	0.00151***	0.00196***	0.00215***	0.00393***	0.00386***
	(0.000410)	(0.000690)	(0.000757)	(0.00121)	(0.00121)
n_domestic_suppliers_2	-1.08e-06***	-1.45e-06*	-1.59e-06*	-3.88e-06**	-3.72e-06**
	(3.26e-07)	(7.43e-07)	(8.51e-07)	(1.62e-06)	(1.63e-06)
lab_prod	0.0255	0.0173	0.0138	-0.0209	-0.0272
	(0.0249)	(0.0278)	(0.0267)	(0.0340)	(0.0346)
size_class	0.0489	0.0131	0.0159	-0.00549	-0.00347
	(0.0382)	(0.0521)	(0.0528)	(0.0706)	(0.0711)
lage	-0.0623	0.0370	0.0350	0.0480	0.0548
	(0.0499)	(0.0933)	(0.0957)	(0.120)	(0.121)
skill_ratio	-0.00671***	-0.00360	-0.00409	-0.000561	-0.00134
	(0.00239)	(0.00319)	(0.00325)	(0.00460)	(0.00449)
sez	-0.107	-0.0693	-0.0479	-0.0343	-0.0342
	(0.0798)	(0.0902)	(0.0917)	(0.117)	(0.116)
market_or	0.00335	-0.00554	0.0183	0.0106	0.00461
	(0.0380)	(0.0523)	(0.0536)	(0.0745)	(0.0738)
eff_seeking			-0.304***	-0.221**	-0.201*
			(0.0900)	(0.111)	(0.112)
share_foreign			-0.00116	-0.0774**	-0.0900*
			(0.00254)	(0.0361)	(0.0475)
greenfield			0.138	0.0269	0.0404
			(0.129)	(0.181)	(0.176)
individual_inv			0.175*	0.161	0.159
			(0.103)	(0.223)	(0.222)
foreign	-0.146*				
	(0.0819)				
soe	-0.0326				
	(0.107)				
role_parent				-0.224	
				(0.176)	
autonomy_cat_hq					-0.0542
					(0.325)
	(0.339)	(0.470)	(0.498)	(3.623)	(4.736)
Province effects	Y	Y	Y	Y	Y
Industry effects	Y	Y	Y	Y	Y
Observations	1,369	758	756	489	489

Robust Standard errors in parentheses
***p<0.01;**p<0.05;*p<0.1

Table 4. Business climate variables

	(1)	(2)
VARIABLES	Nbreg(foreign)	Oprobit(foreign)
pol_stab	-6.014	-0.0222
	(6.218)	(0.0777)
qual_infr	-6.034	0.0921
	(5.642)	(0.0799)
econ_stab	3.203	-0.0185
	(5.688)	(0.0778)
rule_law	-1.763	0.174**
	(5.956)	(0.0798)
suppliers	9.282	0.188**
	(6.097)	(0.0739)
afta	-1.781	0.196***
	(5.010)	(0.0640)
skill_labour	4.518	0.198***
	(5.873)	(0.0744)
dic_info_linkage	13.38**	0.246***
	(6.717)	(0.0890)
dic_info_market	2.097	0.163*
	(7.558)	(0.0937)
dic_info_gov	1.525	0.171
	(11.88)	(0.150)
dic_info_partner	9.278	0.165*
	(7.005)	(0.0866)
dic_info_doing_business	8.386	0.0820
	(10.17)	(0.123)
dic_info_serv_HR	23.74***	0.249***
	(6.955)	(0.0953)
incentives	-3.064	0.143
	(7.072)	(0.0896)

competitiveness	-1.795	-0.0648
	(4.119)	(0.0500)

Robust Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Note: Control variables are the same used for benchmark models (Tables 2-3) in column 3

APPENDIX

Table A1. Descriptive statistics (Sample of foreign firms)					
Variable	Obs	Mean	Std. Dev.	Min	Max
percentage_inputs_domestic	850	26.16	29.78	0	100
n_domestic_suppliers	772	61.88	164.06	0	2233
spillover	853	1.20	1.46	0	6
l_lab_prod	840	9.91	1.63	-4.82	17.90
size_class	854	2.24	0.86	1	3
lage	854	2.21	0.50	0.69	4.08
skill_ratio	854	19.49	15.58	1.10	100
sez	854	0.53	0.50	0	1
market_or_a	853	2.43	0.86	1	3
share_foreign	854	95.27	15.06	10	100
eff_seeking	854	0.42	0.49	0	1
greenfield	852	0.85	0.35	0	1
individual_inv	854	0.21	0.41	0	1
role_parent	560	0.11	0.32	0	1
autonomy_cat_hq	559	0.04	0.19	0	1

Source: Authors' elaboration on Vietnam Investor Survey

Table A2. Descriptive statistics of the business climate variables

Variable	Description	Obs	Mean	Std. Dev.	Min	Max
pol_stab	Political stability as location factor (1-3)	1493	2.54	0.53	1	3
qual_infr	Importance of quality of infrastructure as location factor (1-3)	1492	2.37	0.54	1	3
econ_stab	Importance of economic stability as location factor (1-3)	1493	2.58	0.52	1	3
rule_law	Importance of rule of law as location factor (1-3)	1493	2.30	0.55	1	3
Suppliers	Importance of Vietnamese suppliers as location factor (1-3)	1493	2.16	0.57	1	3
afta	Importance of profit of AFTA as location factor (1-3)	1493	2.07	0.64	1	3
skill_labour	Importance of skilled labour as location factor (1-3)	1493	2.40	0.56	1	3
info_linkage	Service for linking with providers received	1479	0.59	0.49	0	1
info_mkt	Service for market information received	1485	0.72	0.45	0	1
info_gov	Service for info on gov incentives received	1481	0.90	0.31	0	1
info_partner	Service for information on potential partner received	1479	0.50	0.50	0	1
info_doing	Service for information on procedures for doing business in Vietnam received	1484	0.85	0.36	0	1
info_servHR	Service to find HR received	1480	0.66	0.47	0	1
incentives	Investment Incentives Received	1493	0.44	0.50	0	1
competitiveness	Provincial competitivenness (Vietnam Gov. & USAID, 2011)	1493	62.31	2.76	57.07	67.27

Table A3. Business climate variables, robustness checks

	Main (for comparison)	Small firms	Domestic SMEs	Propensity-score[a]		
pol_stab	-0.0288	0.0635	0.255**			
	(0.0776)	(0.102)	(0.111)			
qual_infr	0.0790	0.148	0.255**			
	(0.0796)	(0.107)	(0.116)			
econ_stab	-0.0252	0.176	0.168			
	(0.0777)	(0.117)	(0.122)			
rule_law	0.163**	0.288***	0.305**			
	(0.0794)	(0.107)	(0.120)			
suppliers	0.182**	0.0673	0.0729			
	(0.0737)	(0.0965)	(0.0962)			
afta	0.193***	0.0851	0.247**			
	(0.0638)	(0.0875)	(0.0986)			
skill_labour	0.192***	0.0389	-0.0736			
	(0.0739)	(0.0941)	(0.120)			
info_linkage	0.244***	0.180	0.142	0.221**		
	(0.0888)	(0.113)	(0.123)	(0.093)		
info_market	0.156*	0.211*	0.303**	0.192*		
	(0.0935)	-0.118	(0.135)	(0.0966)		
info_gov	0.192	0.332**	0.438**	0.337**		
	(0.150)	(0.167)	(0.180)	(0.135)		
info_partner	0.161*	0.280**	0.367***	0.134		
	(0.0864)	(0.111)	(0.121)	(0.0920)		
info_doing_business	0.0903	0.184	0.225	0.0861		
	(0.123)	(0.150)	(0.168)	(0.123)		
info_serv_HR	0.261***	0.246**	0.291**	0.272***		
	(0.0952)	(0.119)	(0.126)	(0.101)		
incentives	0.150*	-0.0530	0.164	0.119		
	(0.0894)	(0.118)	(0.137)	(0.103)		
competitiveness	-0.0685	-0.0262	0.0363			
	(0.0499)	(0.0499)	(0.0507)			

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

[a] Estimates are obtained as in column 2 of Table 5, but using weights generated by the procedures described in Section 4.4 to obtain a more precise comparison between firms receiving and not receiving the business services.