

Global Value Chains and Local Sourcing:
An empirical analysis on Sub-Saharan Africa and Vietnam

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Abstract

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1. Introduction

In the last fifteen years, developing countries have been interested by two outstanding phenomena: the upsurge of foreign capital inflows and their increasing participation in the process of production fragmentation. Developing economies have been the main beneficiaries of the global rise of Foreign Direct Investments (FDI) reaching US\$765 billion in 2015, which represents 43 per cent of the world total FDIs, up from 32 per cent in 2001. On average, FDI going to developing countries have grown yearly by 18.6 per cent, while the flows to advanced economies have only increased by 7.8 per cent (UNCTAD, 2016). At the same time, through their participation in Global Value Chains (GVCs), firms in developing countries have become fully qualified participants in the global market, joining the production chain in specific stages of the production process, being able of better exploiting their comparative advantages, without having to develop all the capabilities along the whole chain (IMF, 2013; Kowalsky et al, 2015; Taglioni and Winkler, 2016). The possibility of specializing just in one or few specific segments of the value chain is of particular relevance for countries with a poor manufacturing base, such as many in sub-Saharan Africa, where this strategy of participation in the global market can represent a "*golden opportunity*" (IMF, 2015: 56).

In developing economies, the main motivation for attracting FDIs is the possibility to take advantage of spillovers, due to the superior technology, defined in a broad sense, owned by foreign enterprises which can be transmitted to local firms, arising their productivity levels (Rodriguez-Clare, 1996). Since the pioneering work by Caves (1974), the incidence of spillovers on local economic development in recipient countries has been widely investigated, finding mixed results (for reviews see Crespo and Fontoura, 2007 and Görg and Greenway, 2004). More recent works have focused on the channels through which domestic firms may benefit from FDI spillovers as well as on the factors that determine their existence, sign and magnitude (Farole and Winkler, 2014).

The establishment of direct backward linkages between foreign and domestic firms, consisting in local sourcing of different inputs and intermediate products, is considered as one the main channels, significantly raising the spillover potential of FDIs (Gorodnichenko et al., 2015; Newman et al., 2015). The generation of spillover depends on the qualified demand to local suppliers for more and better inputs and in some cases, even on the assistance that foreign firms may offer to their local providers, aimed at improving and adapting the domestic supply to the requirements of the global market (Rodriguez-Clare, 1996; Farole and Winkler, 2014).

Among the mediating factors that affect FDI spillovers, the existing literature identifies specific characteristics of foreign firms (e.g. size, technological capabilities, motivations for investing and

mode of entry), the absorptive capacity of domestic suppliers, and the host country institutional quality, resource endowments and economic fundamentals (Jordaan, 2011; Giroud et al., 2012; Amendolagine et al., 2013; Farole and Winkler, 2014).

Our analysis adds an important dimension to the empirical analysis of the determinants of local sourcing by foreign investors: the host country's involvement in GVCs. An intensive participation to GVCs exposes domestic firms to international markets, to a more sophisticated demand, and to learning opportunities — thanks to knowledge and technology transfer happening within the value chain from the global leader to domestic suppliers. A further element is the country's position in the GVC, defined in terms of its specialization in more upstream (i.e. far from the final demand) rather than downstream (i.e. close to the final demand) stages of the production process. An upstream position implies a specialization in the manufacturing of intermediate products, which can be expected to positively impact on the domestic sourcing of foreign investors. Conversely, in developing countries a downstream specialization likely corresponds to a concentration in the assembly phase of imported inputs, mainly exploiting the low-cost local labor force. Thus, a strong upstream participation in GVCs should be associated with the establishment of stronger backward linkages between domestic suppliers and foreign investors.

In our analysis, we augment a standard model for the determinants of local sourcing, measured by the share of inputs locally sourced by foreign investors, with two measures of involvement in GVCs, computed at the country-sector pair: (a) an index of GVC participation, summarizing the importance of global production chains in country (and sector) exports; and b) an index of GVC position, which assesses the international specialization of countries (and sectors) in more upstream (i.e. production of intermediates used by other countries) or downstream (i.e. use of intermediates produced by other countries to manufacture final goods for exports) stages of the GVC. These are calculated from internationally comparable I/O tables at the sector/country level, retrieved by the EoRA database.¹

In the empirical analysis, we combine two firm-level data sets—the Africa Investor Survey (AIS) on 19 Sub-Saharan African (SSA) countries and the Vietnam Investor Survey (VIS)—which have been administrated by UNIDO and collect unique detailed information about foreign investors' choices in terms of local sourcing and transfer of knowledge and other key resources to local suppliers. Because of the cross-sectional nature of the data, we try to control for confounding factors using a large set of firm-level characteristics and including a rich set of fixed effects to absorb unobserved heterogeneity at the country and sector level. In our preferred specification we

¹ See Section 3 for some important caveats concerning Eora database.

control for more granular host country-industry fixed effects and estimate the differential effect of GVC involvement across firm country characteristics.

A joint analysis of Vietnam and SSA countries is particularly pertinent in the context of our research, since it allows the comparison of a region relatively less attractive to foreign manufacturing investments with a country, which has recently been central in the rapid expansion of the global fragmentation of production. Since its access to the World Trade Organization (WTO) in 2006, Vietnam has received large FDI inflows, mainly attracted by efficiency seeking motivations; over the period from 2005 to 2015, the stock of inward FDI in Vietnam increased from 22,400 million US\$ to 102,790 million US\$ (Figure 1). Foreign investments have played a key role in the economic transformation of the country, representing a large share of output and employment and contributing to roughly 20% of GDP and half of the total exports (UNIDO, 2012b). Thanks to a strong GVC involvement, Vietnam has emerged as one of the main Asian manufacturing powerhouses (Hollweg et al., 2017). Differently, the contribution of FDI to African development remains marginal, albeit growing (it increased by 9.6 times between 2005 and 2015 Figure 1). Infrastructural gaps, political instability and relatively low levels of industrialization and economic diversification still represent a deterrent to FDIs (World Bank, 2015) and to the region's participation in GVCs (OECD and AfDB, 2014; IMF, 2015).

Our results show that the degree and the modalities of involvement in GVCs matter for the creation of local linkages. Foreign firms based in countries and sectors most involved in GVCs are more likely to locally source their inputs. This is the case also for those firms active in more upstream stages of production, where higher local sourcing is generally accompanied also by a greater likelihood for domestic suppliers to receive support from their foreign buyers. While these findings are not driven by Vietnam, we still find that in SSA countries the effect of GVC participation is weaker. Overall, if we compare countries or sectors at the 90th percentile of the distribution of GVC participation (position) with those at the 10th percentile, we see that the share of intermediate products bought locally increases by 15 percentage points. These effects are even stronger in countries with better institutions and higher level of education spending. Finally, the relationship between GVC involvement and local sourcing is weaker for larger and export-oriented foreign firms, as they are better positioned to import their inputs.

The paper proceeds as follows. Section 2 briefly presents the literature on FDI spillovers and on GVCs. Section 3 introduces some descriptive evidence about the different countries' involvement in GVC and the characteristics of the investors. Section 4 is dedicated to the empirical framework and Section 5 discusses the main results. Section 6 concludes, drawing some policy implications.

2. FDI, local sourcing and GVC involvement

Notwithstanding the general interest in the development literature about FDI, the existing empirical studies have hardly reached a consensus about the channels through which foreign firms contribute to local development, and what are the net effects that can be attributed to their presence. One reason is that many studies have tried to measure the impact of aggregate spillovers, finding mixed results. More recently, the empirical literature has devoted more attention to investigate the channels and the determinants through which spillovers occur rather than trying to measure their impact at the aggregate level (Crespo and Fontoura, 2007).

The literature indicates that backward linkages with local suppliers are among the main transmission channels through which spillovers may happen and have a positive and significant impact on the host countries (Blomstrom and Kokko, 1998). Farole et al. (2014) identify two possible connected effects of backward linkages: the *demand* and the *assistance effect*. The first one is explained by multinationals demanding for better inputs because they require local suppliers to respect product quality, delivery time and technological efficiency and besides, they could also intensify the demand for specific intermediate products, therefore increasing the variety of the local supply. The *assistance effect* is the result of the intentional transfer of knowledge, technological and managerial capacity happening when multinationals are willing to help their local suppliers in order to be assured that their requirements are met.² Multinationals may also contribute to the training of the local labour force, to offer advance payment to their domestic suppliers and in some cases assisting them to obtain international certifications. There is some empirical evidence confirming the relevance of direct linkages between multinationals and suppliers. In Mexico, Jordaan (2011) has found that multinationals are significantly more supportive than domestic firms with their suppliers because they provide key assistance for improving their production process. Also in the case of Vietnam, a recent work by Newman et al. (2015) has confirmed the existence of spillover effects when local firms are directly connected with foreign investors.

Among the determinants explaining the decisions of buying inputs and intermediates products from domestic companies, there are some characteristics of the foreign investors. The degree of domestic participation in the foreign investing company is likely to positively impact on backward linkages with local companies because through their domestic partners foreign firms can have easier access to information about what is locally available, the quality of domestic inputs and the reliability of

² This is consistent with the GVC literature also stressing the role played by the leading firms in the GVC in transferring knowledge and offering different learning opportunities to their suppliers (Gereffi, 1994).

their local suppliers (Amendolagine et al, 2013). Also the past experience in the host country can improve the accumulated knowledge and information about the local context, therefore increasing the capacity to buy local inputs (Jordaan, 2011). The motivation for investing is another mediating factor empirically investigated in the literature. In the manufacturing industry of developing countries, efficiency seeking and market seeking motivations are dominant and they are supposed to offer more opportunity for local sourcing than resource-seeking investments in the primary industry, which are often concentrate in enclaves, isolated from the domestic economy (Nunnekamp and Spatz, 2004). Moreover, the intensity of local sourcing depends on the way in which foreign investors organize their global production strategy (Farole et al, 2014). If foreign companies do choose to vertically internalize their production or prefer to source globally from the same network of established suppliers there may be limited space for local providers (Paus and Gallagher, 2008). This global sourcing strategy, penalizing local suppliers, is more common in industries where inputs are technologically complex such as electronics, automotive and pharmaceutical.

Some characteristics of the host countries may also influence the local sourcing strategies of foreign investors. Among others, local sourcing is more likely when the quality of local institutions is good because if corruption and red tape are high, difficulties in contract enforceability and cumbersome regulations may discourage foreign investors to buy local intermediate products (Alfaro et al., 2004; Hsiao and Shen, 2003). Moreover, the level of the local human capital determines the absorptive capacity of domestic companies and therefore their ability to satisfy the more sophisticated demand of foreign investors (Borensztein et al., 1998).

The involvement into global value chains, which is a key ingredient in the recent development strategies in many developing countries, is a host country dimension also impacting on local sourcing (Taglioni and Winkler, 2016). FDIs have been identified as the most common way to connect developing countries into GVCs (Taglioni and Winkler, 2016). This is due to the fact that multinational corporations are, directly (i.e. intra-firm) or indirectly (through contracts), responsible for the largest share of trade in value added, as shown by UNCTAD (2013), which provides robust evidence at the cross-country level on the positive relation between the stock of inward FDIs and different indicators of GVC participation. A few studies have also highlighted the importance that integration in global value chains can play to shape the potential spillover effects of FDI, including those connected to local sourcing (Paus and Gallagher, 2008; Farole and Winkler, 2014). These studies argue that the degree and mode of participation of a country into GVCs may affect the local pattern of production and the absorptive capacities of domestic firms (Farole and Winkler, 2014). For instance, a higher involvement into global value chains (both through higher import and export of intermediaries) could improve the capabilities of domestic firms, since it exposes them to higher

competition, stronger information flows and a greater complexity of production. The nexus between GVCs participation and domestic productivity has also been investigated in some recent studies, looking at both the macro (industry) and the micro levels. At the macro level, both the works by Formai and Vergara Cifarelli (2016) and Constantinescu et al. (2017), using different samples including advanced and developing countries, show that industries recording higher levels of GVC participation report higher levels of productivity. This is most likely to happen for those countries and industries with a higher backward integration, i.e. those using more intensively imported inputs. Conversely, the empirical study by Kummritz (2016) find evidence of a positive relation between participation in GVC and the size of the domestic value added, the effect being greater for countries with higher forward integration. At the firm level with data from the World Bank Enterprise Survey for a group of North African countries, Del Prete et al. (2016) establish a positive nexus between GVC participation and domestic firms' productivity. They argue that participation in GVCs implies fulfilling international quality standards to trade customized inputs and this imposes a selection of high-productivity producers as candidates to join GVCs. Similarly focusing on a sample of domestic companies in Latin America and the Caribbean countries, Montalbano et al (2016), find a positive effect of firms' upstream involvement in GVCs on their productivity. They show that firms operating in industries exporting intermediates used in other countries' exports outperform those importing foreign value added primarily through inputs.

GVC involvement can also bring constraints to spillovers when countries involvement in GVCs is mostly based on the exploitation of unskilled, low-cost labor, natural resources, or because their access to preferential treatment in international trade agreements. For instance, countries involved in the apparel global value chains, such as Lesotho, have attracted foreign investors (mostly from Asia), establishing assembly plants for manufacturing imported inputs and take advantage of the African Growth and Opportunity Act (AGOA) securing preferential access in the US market. This type of GVC involvement has resulted into low levels of upgrading and linkages with local actors, as compared with the opportunities offered by the emergence of a South African based value chain (Morris and Staritz, 2016). Also, even if it is true that the compliance with international standards may foster the performance of domestic firms, in some industries, such as food, the proliferation of private standards and certifications has resulted in high barriers faced by domestic suppliers, due to high costs of adaptation, and forced foreign investors to source most the inputs from abroad therefore limiting the opportunities for local sourcing (Farole and Winkler, 2014).

Based on the above discussion, the main hypothesis that we are going to test with the following empirical analysis is whether and how the involvement of a country in global value chains can impact on foreign investors linkages and spillovers. Specifically, host countries and industries

exposed to the process of international fragmentation of production may offer foreign investors a stronger local productive capacity, positively affecting the propensity of foreign firms to establish linkages with domestic firms and to generate spillovers through the transfer of resources and knowledge.

3. Data and descriptive analysis

3.1 *Foreign investments in Sub-Saharan Africa and Vietnam*

We use firm-level data from two original surveys collected by UNIDO: the African Investor Survey undertaken in 19 Sub-Saharan countries and the Vietnam Industrial Survey.³ They provide detailed information on the general characteristics of the foreign investors, including their ownership structure, country of origin, motivation for investing, location factors, linkages to the local producers, support received by institutions in the host countries.⁴

Similar to other empirical studies on local sourcing by foreign investors (Belberbos et al., 2001; Kiyota et al, 2008; Gorg et al, 2011; Giroud et al, 2012; Amendolagine et al, 2013) we focus on the manufacturing industry.⁵ The total sample includes 1,915 foreign investors, 42 per cent of which based in Vietnam.⁶ Among SSA countries, Kenya (10.13 per cent), Uganda (7.15 per cent), Nigeria (5.64 per cent) and Ghana (4.86 per cent) are the most represented countries in the sample (Table 1).

The majority of foreign investments are concentrated in three sectors: Petroleum and Chemical (24.5 per cent), Textiles and Wearing Apparel (16.5 per cent), and Food and Beverage (14.7 per cent) (Table 1).⁷ Consistently with its more advanced pattern of industrialization and higher diversification, Vietnam attracts a large number of foreign investments in sectors that are

³ For a detailed description of the two surveys, see respectively Africa Investor Report (UNIDO, 2012a) and Vietnam Industrial Investment Report 2011 (UNIDO 2012b). Additional information on both surveys is also available through the UNIDO Investment Monitoring Platform at <http://investment.unido.org/imp/>

⁴ Both surveys followed a rigorous methodology in terms of stratified sampling (on three dimensions: sector, size and ownership) and interview techniques (face-to-face interviews with top-level managers of foreign- and domestic-owned firms). Notwithstanding the similarities existing between the two surveys, the merging has required some manual harmonization.

⁵ We include ISIC revision 3 categories C and exclude industries, such as construction and utilities (representing together 40 per cent of the observations), which are less likely to participate to GVCs. In addition, we exclude the service sector since it is only available in AIS, but not included in VIS.

⁶ Vietnam is overrepresented in the dataset since this is obtained from the merge of a multi-country survey in SSA with a survey specifically on Vietnam. We deal with overrepresentation through adding destination-country fixed effects in the econometric tests. In addition, our results remain robust to the exclusion of Vietnam (see Section 4).

⁷ The sectorial classification has been adapted to that used in the Eora MRIO database. It includes 26 sectors, matched with the ISIC Rev. 3 classification (2-digit) of the UNIDO surveys as follows (ISIC codes in parentheses): Food & Beverages (15 and 16); Textiles and Wearing Apparel (17, 18, 19); Wood and Paper (20, 21, 22); Petroleum, Chemical, and Non-Metallic Mineral Products (23, 24, 25, 26); Metal Products (27 and 28); Electrical and Machinery (29, 30, 31); Transport Equipment (34 and 35); Other Manufacturing (36 and 38).

underrepresented in most SSA countries, such Electrical and Machinery and Transport Equipment. Textile and Apparel attracts FDIs in Vietnam as well in several SSA countries, including Lesotho and Madagascar, where it represents the large majority of the investments (respectively 72.9 and 57.4 per cent of total investment). Food and Beverage is not surprisingly a relevant sector in some SSA countries, especially Kenya, Rwanda, Uganda and Zambia. Petroleum and Chemicals is also attracting a high share of investments, particularly in Ghana (43.0 per cent of total investments), Mali (43.3 per cent), Malawi (40.0 per cent) and Nigeria (39.8 per cent). In the Appendix, Table A1 presents some characteristics of foreign investors.

[TABLE 1 HERE]

The average share of inputs that are sourced locally by foreign investors — which is our main dependent variable— is highly heterogeneous across countries and sectors. The countries with more linkages are Kenya (43 per cent), Zambia (25 per cent), Tanzania and Ethiopia (23 per cent), Uganda and Nigeria (both 21 per cent). In Vietnam, the average share of local sourcing is 18 per cent. Considering the average values in different industries, there are not large differences, except for Food and Beverage and Wood and Papers, which are those displaying larger levels of linkages. However, aggregate statistics disguise significant heterogeneities across countries. For instance, in Ethiopia, foreign investors buy 62 per cent of their inputs in the local market in labour intensive industries such as Food and Beverage and 32 per cent in Textile and Apparel. High shares of local sourcing in Textiles are also found in Kenya (39 per cent) and Uganda (38 per cent). By contrast, Lesotho and Madagascar report shares of local sourcing below 10 per cent, as they are assembling platforms for Asian multinationals exporting to the US market, taking advantage of the AGOA preferential treatments (Morris and Staritz, 2016).

[TABLE 2 HERE]

3. 2. *Measuring the participation and the position in the GVCs*

We calculate two indicators that measure the participation and the position of host countries and sectors in the Global Value Chains, based on the Eora Multi Region Input-Output (MRIO) database⁸, which provides information on value added trade for a large number of countries (189) from 1990 to 2012 and 26 sectors⁹ (Lenzen et al. 2012). Eora is the only Input-Output (IO) database offering information about sub-Saharan African countries and therefore, notwithstanding some

⁸ Eora MRIO database is available at <http://www.worldmrio.com>.

⁹ See Footnote 7.

well-known concerns about missing data filled through optimization procedures¹⁰, following OECD and AfDB (2014) and IMF (2014 and 2016) we use it to measure GVC involvement in the region.

The two GVC indicators are constructed at the country-sector pair following the approach suggested by Koopman et al. (2011), who decomposes gross exports into two main components:

- *Foreign value added* that has been imported from foreign suppliers upstream in the GVC and it is referred as backward integration, reflecting the extent to which a country is integrated relatively *downstream* in the value chain;
- *Domestic value added* that is the value of exports created domestically.

The domestic value added is further decomposed into three parts: 1) *direct domestic value added* — that is the value added embodied in exports of final goods and intermediates absorbed by direct importers; 2) *indirect domestic value added* — that is value added embodied in intermediates re-exported to third countries, which indicates forward integration and reflects the extent to which a country is integrated relatively *upstream* in GVCs; and 3) *re-imported domestic value added* — that is the value added of exported intermediates that return home.

Our first GVC indicator measures the participation of each sector j in a given country n in the cross-national trade of intermediate goods defined as:

$$GVC_PARTICIPATION_{jn} = FVA_{jn} + IVA_{jn} , \quad (1)$$

where FVA_{jn} is the foreign value added and IVA_{jn} is the indirect domestic value added, both in sector j and country n and divided by the total country-level exports.

Figure 2 shows the average level of GVC participation for the countries included in our sample.¹¹ The countries with the largest degree of participation are Rwanda, Lesotho, Vietnam and Ethiopia, where 60 per cent or more of the value added exported is represented by intermediates either imported by other countries or employed by foreign countries in their exports. Importantly and confirming IMF (2016), which concludes that SSA countries are still generally at the beginning of their integration process into GVCs, if we consider the absolute values of both foreign and indirect value added, they are much smaller in the SSA countries compared to Vietnam. For instance, while Ethiopia and Vietnam report similar relative levels of participation, the total valued added of the

¹⁰ IMF (2014: 60) introduces the following caveat: "While this extended coverage makes the database invaluable for the analysis conducted here, it should be remembered that some missing data in the IO tables are filled through optimization procedures using as a basis existing national and global statistics; this means that our results should not be taken as exact and precise measures, although we believe the gist of the results to be robust."

¹¹ Due to data reliability, we could not calculate GVC participation and position index for Zambia, which is therefore excluded in the following econometric analysis.

intermediates exported from Vietnam (equal to 14.6 billion US\$) is about 16.3 times that of Ethiopia (900 million US\$).

[FIGURE 2 HERE]

Figure 3 reports the level of the GVC participation in the six countries with the largest GVC involvement in each sector (with the red line representing the average level of participation in each sector). Textile and Apparel is the industry with the highest GVC participation, which is recorded by Lesotho, Vietnam and Ethiopia. Other industries with an important GVC participation are Food and Beverage with Senegal, Vietnam and Kenya as the main participants; Wood and Paper where Ghana and Cameroon have the strongest GVC participation and finally Chemicals with Niger as the country with highest GVC participation in the sample.

[FIGURE 3 HERE]

The second indicator measures the relative position of sector j in country n within the GVCs, calculated as the log-difference between the upstream and the downstream component of the GVC participation index (Koopman et al. 2011):

$$GVC_POSITION_{jn} = Ln(1 + IVA_{jn}) - Ln(1 + FVA_{jn}) \quad (2)$$

Thus, positive values indicate an upstream specialisation in GVC phases of the production process far from the final demand (e.g. production of intermediates products used by other countries in their exports) and negative ones are an indication of downstream specialisation in phases close to the final demand (e.g. use of intermediates to produce final good for exports). Figure 4 shows the values of the GVC position index across countries and confirm that also when considering manufacturing only, most SSA countries are concentrated in upstream activities, which is likely to be related to their specialization in manufacturing activities linked to the primary sector (Foster-McGregor et al., 2015). Furthermore, several SSA countries have an upstream specialisation and relatively low levels of GVC participation, since they undertake the very initial stages of the manufacturing transformation of inputs that are exported for further processing. Differently, countries with a relatively high participation in GVCs (e.g. Ethiopia, Lesotho and Vietnam) are generally characterised by a downstream position.

[FIGURE 4 HERE]

For each sector, Figure 5 reports the GVC position of the three most downstream (on the left side) and upstream (on the right side) countries (the red line represents the average value for each sector). Overall, the sectors characterized by an upstream GVC position involve some initial processing of raw materials (e.g. Wood and Paper, Chemicals, and Metal Products). In Wood and Paper, Ghana and Cameroon are ranked among the top three countries in terms of GVC position, thanks to their

rich resource endowments. Textile and Apparel and Food and Beverages, two industries characterised by long chains including transformation and assembling of intermediate products, are more downstream in terms of GVC participation. Vietnam has a strong downstream involvement in the GVC in both industries. Interestingly, Ethiopia is downstream in Food and Beverages, Wood and Paper and Metal Products, which is consistent with some existing evidence showing high shares of imported inputs by manufacturing firms in the country. Instead in Textiles and Apparel, the country has an upstream position, confirming that its exploitation of the local cotton supply as an input for production in GVCs (OECD and AfDB, 2014).

[FIGURE 5 HERE]

4. The empirical analysis

To investigate whether and how the relative GVC participation and position impact on the amount of intermediate products bought locally, we augment a model widely used to investigate the determinants of local sourcing of foreign investors, with the two GVC indicators introduced above. Our key dependent variable Y_{ijn} is the share of inputs locally sourced by foreign investors i in industry j and country n , which is a standard measure of local sourcing intensity.

More formally, we estimate the following model:

$$Y_{ijn} = \sum GVC_{jn} + \sum X_{ijn} + \delta_x + \lambda_n + \gamma_j + \varepsilon_i \quad (3).$$

The sets of factors affecting the dependent variables are a) the two indexes of GVC participation and position in industry j and country n and b) the characteristics of the investor and the investment (X_{ijn}). Besides, we add fixed effects for the origin and destination countries of the foreign investor i (δ_x and λ_n , respectively) and for the destination industry j (γ_j) to absorb unobserved heterogeneity, which could jointly affect the degree of GVC participation and the firm propensity to undertake local sourcing. In Table A2, we provide all the information about the variables included in the empirical analysis, briefly described below.

GVC participation (GVC_PAR) measures the share of a country's exports that is part of a multi-stage trade process, i.e. both as a buyer of foreign intermediates and as a supplier of domestic intermediates to foreign countries. We expect GVC participation to increase the opportunities for domestic linkages with foreign investors since, through their GVC involvement, local producers are directly or indirectly exposed to the requirements of the international markets, and more able to offer intermediate products satisfying the needs of foreign investors.

GVC position (GVC_POS) informs about the upstream or downstream specialisation of GVC exporters in a country (industry). An upstream position in the value chain implies a specialization in

the manufacturing of intermediate products exported to other countries and therefore it can be expected to expand domestic sourcing by foreign investors. By contrast, in developing countries, a downstream specialization is likely to correspond to a concentration in the assembly phase of imported inputs with fewer opportunities for the local sourcing of intermediate products by foreign investors.

Following other studies on the determinants of linkages (Amendolagine et al. 2013; Belderbos et al., 2001; Kiyota et al., 2007, 2008; Giroud et al., 2012), the set of controls includes some characteristics of the investors and investments. Firms specific characteristics comprise *local experience of foreign firms* (*LINV_AGE*), measured as the log of the years since the first investment; *foreign share in the ownership of investors* (*FOREIGN_SHARE*); *size of investors* (*LEMPL*), measured by the log number of employees; *labour productivity* (*LAB_PROD*), measured as the log of the sales on employees ratio; the *status of exporter* (*EXPORT*), measured by a dummy variable identifying foreign investor that exports. In addition, we control for the entry mode and the motivation of the investment, introducing two dummy variables taking the value of 1 if the investment is of a greenfield (*GREENFIELD*) and if the main reason to invest is market-seeking (*MKT_SEEK*).

5. Discussion of the main findings

Table 3 reports the results of the Tobit model with the share of inputs locally sourced by foreign investors as dependent variable and the coefficients. Our results show a positive and statistically significant relation between participation to GVCs and the extent of local sourcing from foreign investors (Column 1). GVC involvement has been identified as a source of economic upgrading and productivity gains, including in SSA countries (OECD and AfDB, 2014). Higher participation to GVCs allows gains from specialization thanks to a finer division of labour, and can translate into higher productivity of the domestic economy due to increases in competition and access to higher and better varieties of imported inputs and to learning externalities (Constantinescu et al., 2017). One of the mechanisms of learning and upgrading that is often discussed in the literature is the pressure to satisfy strict international requirements in terms of quality and technology imposed by the involvement in GVC-related trade activities, which forces domestic firms to raise their efficiency for responding to higher standards and to international competition (Giuliani et al, 2005; Del Prete et al., 2016; Pietrobelli and Rabellotti, 2011). It is worth noticing that the positive impact on productivity of GVC participation can be extended to domestic firms independently on their

direct GVC involvement through a pro-competitive effect and a market-restructuring process (i.e. through the selection of more competitive suppliers in the market) (Taglioni and Winkler, 2016).

[TABLE 3 ABOUT HERE]

Considering the local sourcing undertaken by foreign firms, higher GVC participation contributes to improve and enlarge the domestic supply of local inputs meeting the requirements of foreign investors. The existing evidence from SSA countries and Vietnam (Farole and Winkler, 2014) shows that GVC involvement has fostered the development of a local supply base, as for instance in the mining industry (e.g. in Ghana) or in the agro-food buyer driven chain (e.g. in Vietnam, Kenya and Mozambique). The case of Vietnam can represent a benchmark for many SSA countries. Not only Vietnam experiences a higher level of GVC involvement compared to most of the SSA countries in our sample (except Ethiopia and Lesotho), but it is also more diversified in terms of backward and forward integration. With all the caveats about data introduced in Section 3.2, our marginal effect implies that moving from a very low level of GVC participation of a country such as Mali (0.004) to that of Vietnam (0.057) is associated with an increase in the share of local sourcing from foreign investors of 6.4 percentage points. This is an economically relevant effect, as the average share of local sourcing is around 20 per cent.

Besides GVC participation, also the position of each country and industry in GVCs matters (Column 2). Our results show that countries and industries with an upstream specialisation in GVCs, in phases of the production process far from the final demand such as the production of intermediate products used in exports by other countries, are those reporting higher shares of local sourcing from foreign investors. This is, to some extent, an obvious result. The more upstream is an industry, the more it produces intermediate goods, which can be bought by foreign investors. This result is however of particular interest for SSA countries, whose involvement in GVCs has so far been confined to the exporting of primary inputs or basic manufacturing products that are transformed elsewhere (Foster McGregor et al., 2015). While the literature on GVCs usually associates a more upstream specialization to lower value added and less structural transformation, we show that this pattern of integration in value chains may offer opportunities for attracting FDIs with a strong local content. Some empirical evidence seems consistent with such finding in upstream sectors such as agro products or mining where both FDIs and the recourse to local sourcing of inputs by foreign firms are on the rise (e.g. Ghana as reported in Farole and Winkler, 2014).

These results hold when controlling for both measures of GVC (Column 3) and are robust to the exclusion of Vietnam from the sample (Column 4), showing that they are not entirely driven by the

relatively higher participation of Vietnam in GVCs. It worth noting that the coefficient of GVC participation is smaller in size and less precisely estimated. A weaker – but still positive – correlation with the share of local sourcing could be explained by the relatively small levels of GVC participation in several SSA countries.

To investigate the channels through which GVC participation is related to the degree of local sourcing, in Columns 5-9, we interact the coefficients of GVC_PAR and GVC_POS with some characteristics of the host countries and of the foreign investors. We start by including a measure of rule of law (*RULE_LAW*), as a proxy for the quality of local institutions. A good institutional environment is an important factor to attract foreign investors, especially if the aim is to create local linkages with domestic suppliers, since sound institutions are key to guarantee foreign investors about the enforceability of contracts with local partners (Xu, 2010; Farole and Winkler, 2014; Defever et al., 2015). Then, we consider expenditures in education as a share of GDP (*EDU_GOV*)¹², as a proxy for the level of absorptive capacity needed to satisfy the sophisticated demand of foreign investors for intermediates (Borenztein et al., 1998). The coefficients on the interaction terms between these macro variables and the two GVC indicators are positive and significant, indicating that sound local institutions and high education spending amplify the effects of GVC participation and upstream position on local sourcing.

Then, we interact the GVC indicators with some investor characteristics to account for the potential role of firms' heterogeneity in the relation between GVC involvement and local sourcing. This strategy also allows us to include more granular country-industry fixed effects to account for unobserved factors at the host country-sector level (including for instance industrial policies; trade agreements; technological changes), which could shape the relationship between GVC and local sourcing.¹³ In this case, we cannot estimate the level effect of the GVC variables, but only the differential effects across firm characteristics.

First, we introduce a dummy identifying exporting firms and we find that the coefficients on both interaction terms are significant and negative, indicating that export oriented foreign investors are relatively less likely to buy locally their inputs than domestic investors when their country/industry is more involved in GVCs. This result is consistent with the case of export platform type of

¹² We use an indicator of educational expenditure rather than of educational attainments due to the lack of the latter for several SSA countries. As a robustness check, we have also run the same model introducing the indicator of human capital provided by the Penn World Tables (based on Barro-Lee data) finding consistent results.

¹³ Our approach does not have a specific strategy to tackle reverse causality, given it is often claimed that local firms might step in GVCs thanks to their role as MNEs suppliers in the domestic market (IMF, 2015; Taglioni and Winkler, 2016). Yet, since our GVC variables are calculated at the country-industry level, they could be considered exogenous, as long as we assume that foreign investors are not responsible for large shares of exports with the rest of the world in their sector. As a robustness check, using lagged (at t-5) indicators of GVC involvement does not affect our main findings (results are available upon request).

investments that are typical in sectors highly integrated in GVCs, such as the clothing industry, in which foreign firms set in locations from where it is easier (due, for instance, to trade agreements) to import and re-export parts and components to third markets. Such types of investments are often footloose, i.e. characterised by low levels of local linkages (Farole and Winkler, 2014). A case in point is that of SSA countries, such as Madagascar and Lesotho that have benefitted from trade facilitations, such as AGOA, attracting export oriented investors from Asia sourcing most of the inputs (including fabrics) from their home country or globally, therefore resulting in very little integration with local firms (Morris and Staritz, 2016).¹⁴ Vietnam has also recently signed preferential trade agreements with EU and Japan¹⁵ as well as a number of agreements within ASEAN, and also rapidly increased its involvement in GVCs mostly as an assembler of low value added outputs, then re-exported by foreign investors based in the country.¹⁶ This finding is also in line with evidence discussed by Hollweg et al. (2017), showing that the involvement of Vietnam in some GVCs (as in electronics) hampered upgrading and diversification from low value added tasks (such as assembling) and limited the opportunities for linkages between domestic and foreign firms.

We also include interaction terms with firms' size (*LEMPL*) finding a negative (and significant) coefficient for both coefficients. This result indicates that the pattern of sourcing by larger firms, i.e. one including a network of foreign and domestic suppliers, is not affected even in sectors more integrated into GVCs. It shows however that larger firms might increase their local sourcing should local production be concentrated in more downstream activities. In this case, one could argue that larger foreign investors find in countries and industries more specialized in downstream stages of the chain a larger variety of good quality inputs, including those imported (and locally processed), to satisfy their needs.

5.2 Control variables

Our results for the control variables are generally in line with the existing literature and confirm the importance of the characteristics of foreign firms as mediating factors of the amount of local sourcing (Giroud et al., 2012; Winkler, 2013). Higher sourcing is positively correlated to the experience of the foreign investors in the local market and with their export status, consistent with the view that searching and finding reliable local sources of inputs, and establishing local linkages with domestic firms takes time (Amendolagine et al. 2013), and with the idea that foreign investors

¹⁴ Lesotho is a case in point. In 2016 the country was at risk of losing its eligibility for AGOA benefits due to political reasons with the consequence of immediately strongly reducing its GVC involvement as an export platform for Asian investments.

¹⁵ A preferential trade agreement was also negotiated with the USA, from which the United States have withdrawn in January 2017.

¹⁶ In our sample, about 90% of foreign investors based in Vietnam are exporters (51% in the case of SSA).

use more local inputs even if they do not target the domestic market. Foreign ownership, firm size, and labour productivity are negatively associated with local sourcing. The first result suggests that foreign investors with a strong domestic participation in their capital—knowing better the context and being more embedded—are more inclined to source locally (Sánchez-Martin et al., 2015), while the other two are in line with the tendency of larger and more productive firms to establish a global network of suppliers or to produce internally their intermediate products (Winkler, 2013). Finally, the negative relation between the market seeking motive (*MKT_SEEK*) and local sourcing is in contrast with some previous works (Amendolagine et al., 2013; Giroud et al., 2012), but in line with what found by Winkler (2013), who shows that efficiency seeking labour-intensive investments are more likely to result in higher demand for local inputs.

5.3. Support from foreign investors and GVC involvement

To extend our findings we estimate Equation (3) introducing a new dependent variable based on the information available in the AIS and VIS surveys about the assistance that foreign investors provide to their local suppliers, which can be taken as a proxy for *intentional* transfer of resources (Giroud and Scott-Kennel, 2009; Giroud et al., 2012). Before proceeding with the analysis, it is important to remark that the number of observations falls (to about 61.3% of total sample) when using this information since it is only available for foreign investors buying some of their intermediates from domestic suppliers.

The survey includes information about six different forms of assistance: a) upgrading the quality of products; b) improving the access to working capital/finance/equity; c) upgrading the skills of the workforce; d) transferring technology or know-how; e) collaborating on joint product design or product development; and f) upgrading the efficiency of production processes. Among them, the provision of support for upgrading the quality of product and the efficiency of the production process are by far the most frequently observed (respectively in 46.6 per cent and 30.7 per cent of the cases), followed by collaboration (22.8 per cent). The other forms of assistance are much less frequent (training: 15.7 per cent; access to capital: 12.7 per cent; technology transfer: 11.6 per cent).

Considering that some forms of assistance are rarer than others, we construct a synthetic indicator taking the value of 1 if the foreign investor has provided at least one form of support to their supplier, and zero otherwise (*ANY_SUPPORT*). 57 per cent of the foreign investors in our sample have offered at least one form of assistance after having established a linkage with a local supplier.

Since the dependent variable is a dummy, we run a standard probit regression, including the same set of independent variables than in the previous econometric baseline test (Column 3).¹⁷ In addition, and following Giroud et al. (2012), we include the share of local linkages (*LOCAL_SOURCING*) and its square (*LOCAL_SOURCING2*) to check for the potential non-linear relation between the size of linkages and the provision of assistance. As in the previous set of regressions, estimates include a full set of home and host country as well as industry fixed effects.

The results of the tests are reported in Column 9 in Table 3. Considering GVC participation and position, the coefficients are both positive, confirming that GVC involvement enhances the attraction of FDI with higher spillover potential through an assistance effect. Still, only the coefficient of the GVC position is statistically significant (at 10%). This means that foreign investors are more likely to support their local partners if they are involved in sectors more upstream in the value chains, i.e. producing inputs that are relatively unprocessed but necessary to kick start the production process. Foreign investors might therefore be incentivized to assist their suppliers in the early phases of the production process, so that they would manufacture intermediates, which satisfy their demand specifications. A related explanation offered by Costinot et al. (2013) is that more upstream stages of production are those at higher risks of failure along the production chains and therefore when they are performed in less advanced countries, there is more need of providing assistance compared to more downstream activities. This seems confirmed by cross-country evidence on local suppliers based in low income countries, showing that those producing basic inputs in agro-food or textile value chains receive more assistance by their foreign buyers (Farole and Winkler, 2014).

Taking into account the controls, our results are consistent with the hypothesis by Giroud et al. (2012) about the decreasing returns in terms of transfer of resources to the size of the domestic supply. The probability to provide assistance increases starting from low levels of local procurement and reduces once higher levels are reached. Moreover, the size of the investor matters, consistently with what found by Joordan (2011) on a sample of firms in Mexico. Larger firms are likely to handle more resources and therefore to invest more in the development of their suppliers. Similarly, investors' heterogeneity, proxied by productivity, has a positive effect. This confirms the hypothesis that firms with higher resource endowments and technological advantages have higher probability to transfer resources and to provide assistance to their local partners (Giroud et al., 2012). Finally, also the market-seeking motive has a positive effect on the probability to provide

¹⁷ All the results remain robust when we introduce a different definition of the dependent variable accounting for only the more technical forms of assistance (upgrading of quality of products and efficiency of the production process, technology transfer and training).

assistance, which can be due to the firms', need to adapt their products on the basis of specific market's needs.

6. Preliminary conclusions

GVC involvement of developing countries has recently sparked and it is therefore worth investigating its potential impact on FDI spillover via an increase in the demand of local inputs (the so-called demand effect) and the transfer of knowledge that foreign investors offer to their local suppliers (assistance effect). We have studied this by combining two surveys documenting the role of foreign investors in 19 SSA countries and in Vietnam with data on internationally comparable I/O tables to calculate indicators of GVC involvement for the countries and industries included in our sample.

Our results show that countries and industries more involved in GVCs are those where foreign firms generally report higher levels of local sourcing. We motivate this finding as a possible effect of the participation to GVC on the capacity of the domestic sector to provide inputs that are better tailored to international demand, embodying more advanced technical and quality standards. Moreover, we show that the GVC position also matters, and those countries specializing in more upstream stages of production not only attracts foreign investors with higher sourcing potential, but also those more willing to offer support to their local suppliers.

An additional finding is that the relation between GVC involvement and FDI is mediated by some characteristics of the host country and of the investor. On the macro level, we show that the positive correlation between GVC indicators and local sourcing gets stronger in countries reporting higher spending in education and in those with better institutions. On the micro level, we show that the relation between GVC and sourcing could get reversed depending on some characteristics of the foreign investors. We find that more export-oriented investors might mainly invest in assembly platforms, resulting in little local content.

Our results do not come without some limitations. A major one is given by the cross-sectional nature of the data, which prevents the possibility to infer causality to the relation under exam. While it is reasonable to assume – as we do in this paper – that a greater involvement in GVCs creates some domestic preconditions that can favour the proliferation of FDI with higher sourcing and spillover potential, the relation could also go the other way around, with FDI leading the way to domestic firms into GVCs. In addition, both the attraction of FDI with high sourcing potential and the involvement in GVC might be stimulated by similar factors.

The study provides support to a growing stream of literature investigating the benefits of GVC involvement, especially in less developed countries (Taglioni and Winkler, 2016; Costantinescu et al., 2017). In our empirical analysis we stress the importance of an additional channel through which GVC participation can benefit the local economy, i.e. the potential to attract foreign investors establishing more linkages with local manufacturers of intermediates and increasing the transmission of positive spillovers to the domestic manufacturing industry.

Purposively, in our work we have compared Vietnam, a country that has developed over time a strong participation into GVC both as a buyer and a seller of intermediate goods, with a group of SSA countries experiencing on average (and with a few exception) lower levels of GVC participation. On this respect, a first implication of our study is that should SSA countries achieve a level of participation similar to a country such as Vietnam, including in particular by adding more FVA to their local productions, they could expect an increase in local sourcing by their foreign investors. Still, the model of involvement of Vietnam into GVCs presents some weaknesses, because in some sectors, its participation into GVC, including in more downstream activities, has been mostly due to the advantage of the low-cost of inputs, together with the easier access to big markets in the rest of Asia due to its participation to regional trade agreements. This has translated, according to observers (Hollweg et al., 2017), to low opportunities to further upgrade into more sophisticated stages of production; remaining stuck into low value added and limited linkages with foreign investors, and especially the more export oriented ones.

An additional implication arising from our work is that countries – like most of SSA ones – still stuck into low-value added phases lying more upstream in GVC can get some advantages from their specialization through a combination of higher demand and assistance from foreign buyers. This is in line with related evidence about the potential to push the industrialization process in the region by exploiting the existing comparative advantage of many SSA countries in resource based manufacturing (e.g. in the agri-food sector) by stimulating further processing activities to be based locally and grasp more value along the chain (OECD and AfDB, 2014);

Overall, policies providing support to the entry and the upgrading of countries in GVCs can give the additional advantage of maximizing the potential spillovers from FDI. In addition, there is policy space to enhance the potential role of GVC in the transmission of FDI spillovers through linkages. Improving the domestic business environment, by providing foreign investors with a better investment climate and, specifically, improving the rule of law and human capital can magnify the positive relation between GVC involvement and FDI spillovers.

Yet, achieving high levels of GVC involvement is not a guarantee for attracting FDI with higher sourcing potential. Countries and sectors with high GVC involvement may still attract footloose investments, should they provide foreign investors with low cost inputs and other facilitations to exploit the export markets. This is a case that has been common in some SSA countries, such as Lesotho, specialized in the textiles industry or even for Vietnam's involvement in labour intensive stages of production in the sectors such as the electronics. Policies supporting stronger interactions with local suppliers and their upgrading are necessary to avoid such occurrences.

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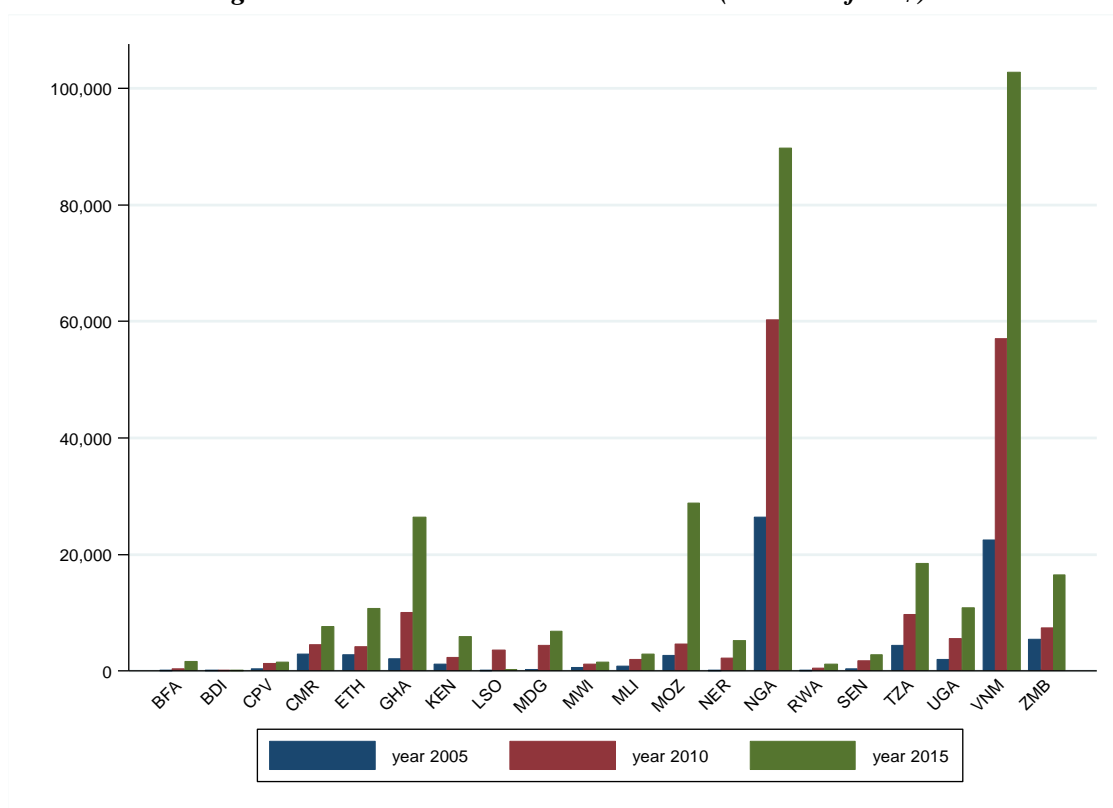
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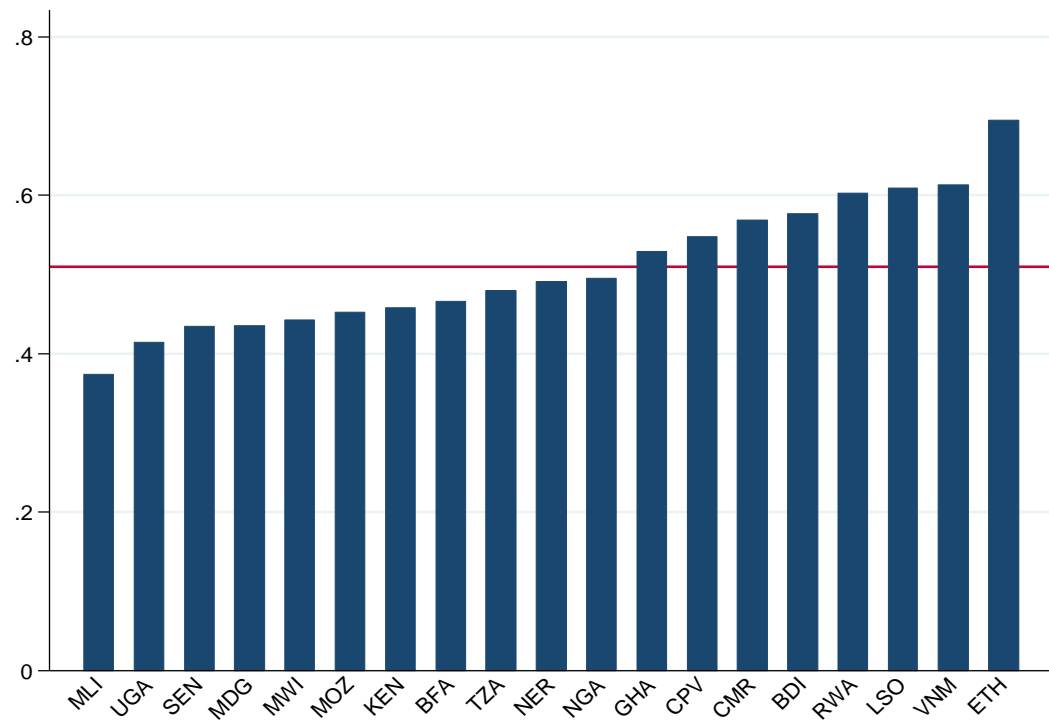
Tables and Figures

Figure 1. FDI stocks in SSA and Vietnam (millions of US\$)



Source: our elaborations on UNCTAD FDI statistics

Figure 2. GVC participation at country level (2010)*



*Red line represents the average value

Source: our elaborations on Eora

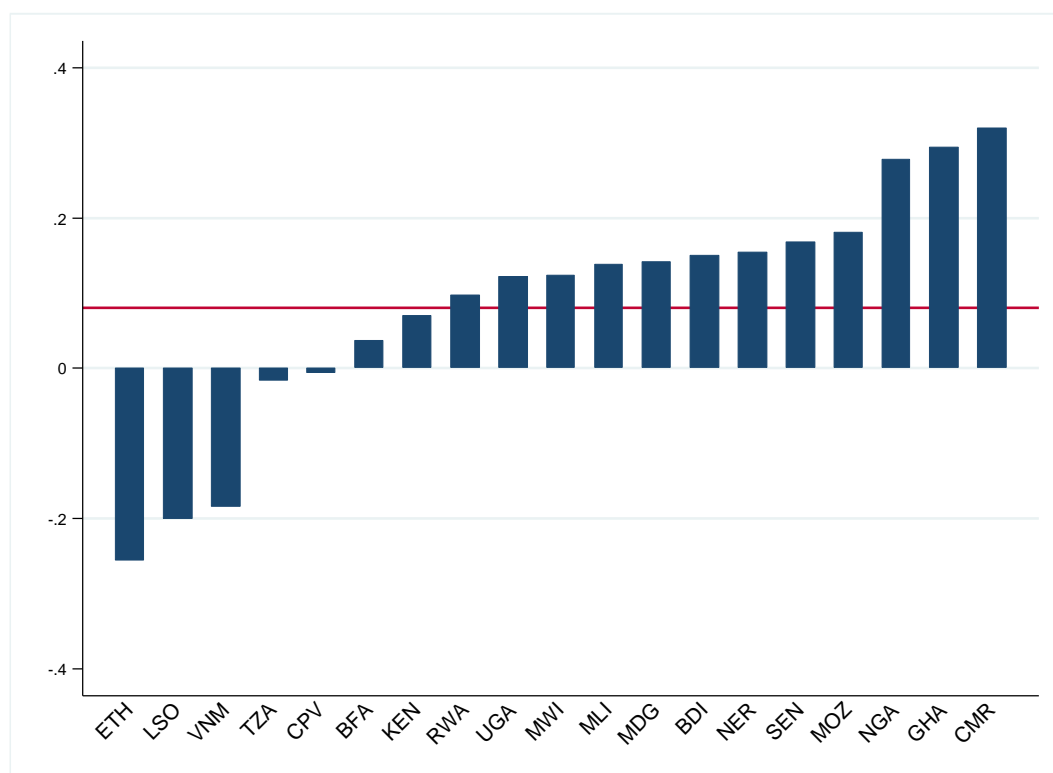
Figure 3. GVC participation at sector level (2010)*



*Red lines represent the average sectorial value

Source: our elaborations on Eora

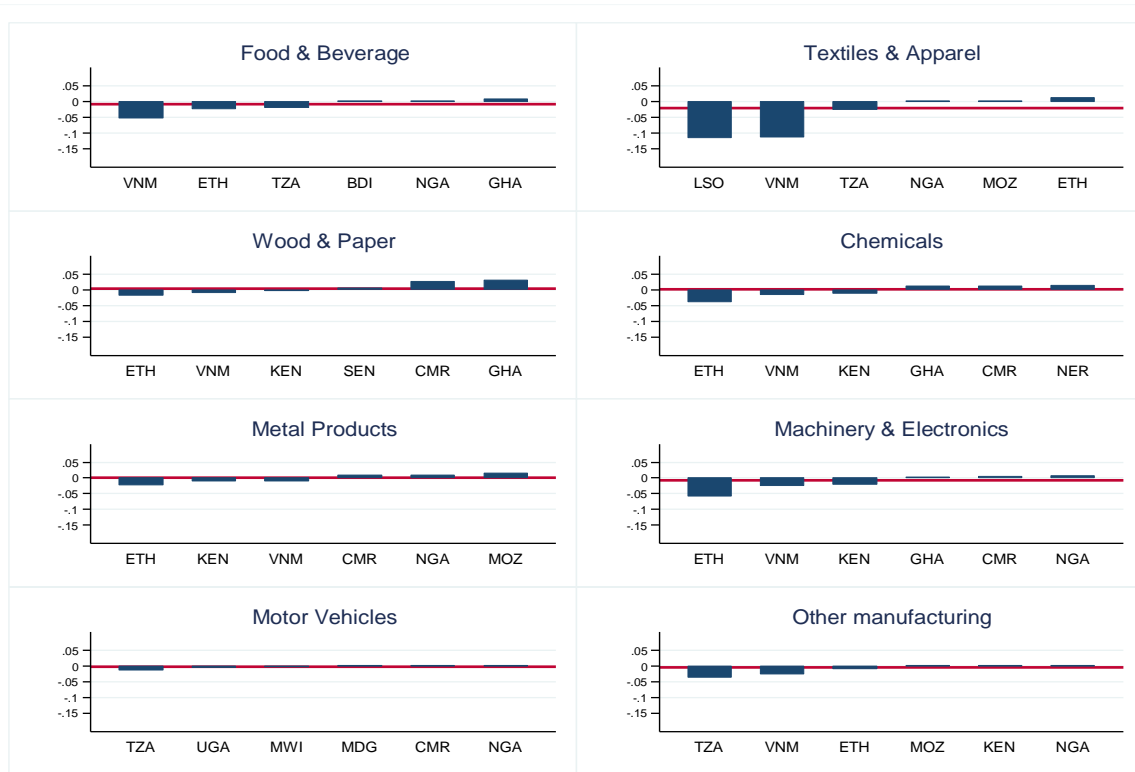
Figure 4. GVC position at country level (2010)*



*Red line represents the average value

Source: our elaborations on Eora

Figure 5. GVC position at sector level (2010)*



*Red lines represent the average sectorial value

Source: our elaborations on Eora

Table 1. Foreign investments by country and sector (# and %)

| | All sectors | Food & Beverage | Textiles & Wearing Apparel | Wood & Paper | Petroleum & Chemicals | Metal products | Electrical & Machinery | Transport Equipment | Other manufacturing |
|---------------------|-------------------|-----------------|----------------------------|--------------|-----------------------|----------------|------------------------|---------------------|---------------------|
| Vietnam | 805 (42.0) | 49 (6.1) | 162 (20.1) | 81 (10.1) | 133 (16.5) | 89 (11.1) | 129 (16.0) | 53 (6.6) | 109 (13.5) |
| Burkina Faso | 15 (0.8) | 4 (26.7) | 1 (6.7) | 1 (6.7) | 3 (20.0) | 4 (26.7) | 0 (0.0) | 0 (0.0) | 2 (13.3) |
| Burundi | 13 (0.7) | 5 (38.5) | 0 (0.0) | 1 (7.7) | 5 (38.5) | 1 (7.7) | 0 (0.0) | 0 (0.0) | 1 (7.7) |
| Cameroon | 39 (2.0) | 10(25.6) | 0 (0.0) | 7 (17.9) | 9 (23.1) | 6 (15.4) | 2 (5.1) | 1 (2.6) | 4 (10.3) |
| Cape Verde | 22 (1.1) | 5 (22.7) | 3 (13.6) | 3 (13.6) | 8 (36.4) | 2 (9.1) | 0 (0.0) | 0 (0.0) | 1 (4.5) |
| Ethiopia | 83 (4.3) | 15 (18.1) | 13 (15.7) | 10 (12.0) | 24 (28.9) | 10 (12.1) | 6 (7.2) | 0 (0.0) | 5 (6.0) |
| Ghana | 93 (4.9) | 11 (11.8) | 3 (3.2) | 12 (12.9) | 40 (43.0) | 19 (20.4) | 4 (4.30) | 0 (0.0) | 4 (4.3) |
| Kenya | 194 (10.1) | 44 (22.7) | 25 (12.9) | 12 (6.2) | 65 (33.5) | 24 (12.4) | 9 (4.6) | 6 (3.1) | 9 (4.6) |
| Lesotho | 48 (2.5) | 3 (6.2) | 35 (72.9) | 2 (4.2) | 5 (10.4) | 0 (0.0) | 2 (4.2) | 0 (0.0) | 1 (2.1) |
| Madagascar | 47 (2.4) | 6 (12.8) | 27 (57.4) | 2 (4.3) | 9 (19.1) | 0 (0.0) | 0 (0.0) | 1 (2.1) | 2 (4.3) |
| Malawi | 20 (1.0) | 1 (5.0) | 1 (5.0) | 1 (5.0) | 8 (40.0) | 5 (25.0) | 1 (5.0) | 1 (5.0) | 2 (10.0) |
| Mali | 30 (1.6) | 4 (13.3) | 3 (10.0) | 0 (0.0) | 13 (43.3) | 5 (16.7) | 4 (13.3) | 0 (0.0) | 1 (3.3) |
| Mozambique | 66 (3.4) | 13 (19.7) | 7 (10.6) | 7 (16.7) | 11 (28.8) | 19 (28.8) | 6 (9.1) | 0 (0.0) | 3 (4.5) |
| Niger | 9 (0.5) | 2 (22.2) | 0 (0.0) | 1 (11.1) | 3 (33.3) | 1 (11.1) | 0 (0.0) | 0 (0.0) | 2 (22.2) |
| Nigeria | 108 (5.6) | 20 (18.5) | 11 (10.2) | 7 (6.5) | 43 (39.8) | 14 (13.0) | 7 (6.5) | 4 (3.7) | 2 (1.8) |
| Rwanda | 24 (1.2) | 10 (41.7) | 2 (8.3) | 0 (0.0) | 6 (25.0) | 3 (12.5) | 1 (4.2) | 0 (0.0) | 2 (8.3) |
| Senegal | 30 (1.6) | 6 (20.0) | 3 (10.0) | 4 (13.3) | 11 (36.7) | 5 (16.7) | 0 (0.0) | 1 (3.3) | 0 (0.0) |
| Tanzania | 91 (4.7) | 19 (20.9) | 9 (9.9) | 15 (16.5) | 16 (17.6) | 13 (14.3) | 7 (7.7) | 2 (2.2) | 10 (11.0) |
| Uganda | 137 (7.1) | 43 (31.4) | 8 (5.8) | 14 (10.2) | 46 (33.6) | 13 (9.5) | 5 (3.6) | 3 (2.2) | 5 (3.6) |
| Zambia | 41 (2.1) | 12 (29.3) | 2 (4.9) | 4 (9.7) | 11 (26.8) | 9 (21.9) | 1 (2.4) | 0 (0.0) | 2 (4.9) |
| Total | 1915 (100) | 282 (14.7) | 315 (16.4) | 184 (9.6) | 469 (24.5) | 242 (12.6) | 184 (9.6) | 72 (3.8) | 167 (8.7) |

In parenthesis in the first column % of investments received by each country; in the other columns % of investments received by each sector in the country.

Sources: AIS and VIS

Table 2 Share of local inputs sourced by foreign investors

| | All sectors | Food & Beverage | Textiles & Wearing Apparel | Wood & Paper | Petroleum & Chemicals | Metal products | Electrical & Machinery | Transport Equipment | Other manufacturing |
|-------------------|-------------|-----------------|----------------------------|--------------|-----------------------|----------------|------------------------|---------------------|---------------------|
| Vietnam | 0.18 | 0.25 | 0.18 | 0.24 | 0.19 | 0.13 | 0.11 | 0.17 | 0.22 |
| Burk. Faso | 0.11 | 0.33 | 0.00 | No obs. | 0.00 | 0.07 | No obs. | No obs. | 0.00 |
| Burundi | 0.11 | 0.20 | No obs. | 0.00 | 0.00 | 0.20 | No obs. | No obs. | No obs. |
| Cameroon | 0.21 | 0.15 | No obs. | 0.25 | 0.27 | 0.33 | 0.00 | 0.30 | 0.11 |
| Cape Verde | 0.13 | 0.06 | 0.00 | 0.33 | 0.18 | 0.00 | No obs. | No obs. | 0.00 |
| Ethiopia | 0.23 | 0.62 | 0.32 | 0.12 | 0.11 | 0.04 | 0.00 | No obs. | 0.24 |
| Ghana | 0.09 | 0.08 | 0.03 | 0.29 | 0.02 | 0.11 | 0.00 | No obs. | 0.23 |
| Kenya | 0.43 | 0.40 | 0.39 | 0.60 | 0.41 | 0.64 | 0.46 | 0.30 | 0.39 |
| Lesotho | 0.07 | 0.00 | 0.04 | 0.50 | 0.14 | No obs. | 0.05 | No obs. | 0.00 |
| Madagascar | 0.17 | 0.54 | 0.09 | 0.30 | 0.20 | No obs. | No obs. | 0.00 | 0.00 |
| Malawi | 0.14 | 0.02 | 0.00 | 0.10 | 0.14 | 0.25 | 0.00 | 0.30 | 0.00 |
| Mali | 0.07 | 0.00 | 0.17 | No obs. | 0.10 | 0.00 | 0.07 | No obs. | 0.00 |
| Mozambique | 0.12 | 0.12 | 0.15 | 0.34 | 0.04 | 0.02 | 0.12 | No obs. | 0.50 |
| Niger | 0.12 | 0.00 | No obs. | 0.05 | 0.20 | 0.30 | No obs. | No obs. | 0.00 |
| Nigeria | 0.21 | 0.28 | 0.38 | 0.39 | 0.19 | 0.15 | 0.08 | 0.03 | 0.05 |
| Rwanda | 0.04 | 0.01 | 0.00 | No obs. | 0.00 | 0.25 | 0.00 | No obs. | 0.00 |
| Senegal | 0.12 | 0.15 | 0.00 | 0.35 | 0.11 | 0.00 | No obs. | 0.00 | No obs. |
| Tanzania | 0.23 | 0.28 | 0.21 | 0.25 | 0.23 | 0.17 | 0.32 | 0.00 | 0.20 |
| Uganda | 0.21 | 0.23 | 0.29 | 0.21 | 0.17 | 0.36 | 0.18 | 0.13 | 0.04 |
| Zambia | 0.25 | 0.30 | 0.00 | 0.23 | 0.24 | 0.30 | 0.00 | No obs. | 0.33 |

Data sources: AIS and VIS

Table 3 Global Value Chain, Local Sourcing and Support to Local Suppliers

| | % of inputs locally sourced by foreign investors | | | | | | | | ANY_SUPPORT |
|------------------|--|----------------------|----------------------|----------------------|----------------------|-----------------------|----------------------|----------------------|---------------------|
| | Base Models | | | SSA | Interactions | | | | |
| | RULE_LAW | EDU_GOV | EXPORT | LEMPL | | | | | |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| LINV_AGE | 0.015*** (0.002) | 0.017*** (0.002) | 0.017*** (0.002) | 0.043*** (0.005) | 0.017*** (0.002) | 0.003 (0.002) | 0.012*** (0.002) | 0.012*** (0.002) | -0.111 (0.096) |
| FOREIGN_SHARE | -0.124*** (0.006) | -0.128*** (0.006) | -0.130*** (0.006) | -0.160*** (0.015) | -0.129*** (0.006) | -0.179*** (0.005) | -0.068*** (0.006) | -0.071*** (0.005) | 0.360 (0.229) |
| LEMPL | -0.031*** (0.001) | -0.031*** (0.001) | -0.031*** (0.001) | -0.061*** (0.003) | -0.031*** (0.001) | -0.024*** (0.001) | -0.027*** (0.001) | -0.014*** (0.001) | 0.137** (0.067) |
| LAB_PROD | -0.014*** (0.001) | -0.014*** (0.001) | -0.013*** (0.001) | -0.027*** (0.001) | -0.013*** (0.001) | -0.012*** (0.001) | -0.008*** (0.001) | -0.009*** (0.001) | 0.078** (0.035) |
| EXPORT | 0.034*** (0.004) | 0.033*** (0.005) | 0.027*** (0.004) | 0.105*** (0.012) | 0.027*** (0.005) | 0.037*** (0.004) | 0.041*** (0.004) | 0.012*** (0.004) | 0.195 (0.151) |
| GREENFIELD | 0.006 (0.006) | 0.006 (0.006) | 0.009 (0.006) | -0.030** (0.014) | 0.008 (0.006) | 0.024*** (0.005) | 0.003 (0.005) | -0.000 (0.005) | 0.040 (0.134) |
| MKT_SEEK | -0.025*** (0.006) | -0.024*** (0.006) | -0.022*** (0.006) | -0.082*** (0.012) | -0.022*** (0.006) | -0.020*** (0.005) | -0.029*** (0.005) | -0.028*** (0.005) | 0.277*** (0.077) |
| GVC_PAR | 0.415*** (0.069) | | 2.049*** (0.074) | 0.697** (0.327) | 2.549*** (0.085) | -14.409*** (0.079) | | | 2.295 (3.020) |
| GVC_POS | | 0.473*** (0.067) | 2.191*** (0.074) | 2.501*** (0.398) | 2.670*** (0.089) | -18.834*** (0.087) | | | 5.585* (2.930) |
| RULE_LAW*GVC_PAR | | | | | 0.852*** (0.158) | | | | |
| RULE_LAW*GVC_POS | | | | | 0.767*** (0.171) | | | | |
| EDU_GOV*GVC_PAR | | | | | | 0.719*** (0.004) | | | |
| EDU_GOV*GVC_POS | | | | | | 0.901*** (0.004) | | | |
| EXPORT*GVC_PAR | | | | | | | -1.754*** (0.069) | | |
| EXPORT*GVC_POS | | | | | | | -1.317*** (0.070) | | |
| LEMPL*GVC_PAR | | | | | | | | -0.958*** (0.011) | |

| | | | | | | | | | |
|--------------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|---------------------|
| LEMPL*GVC_POS | | | | | | | | -1.062*** (0.011) | |
| LOCAL_SOURCING | | | | | | | | | 1.047** (0.531) |
| LOCAL_SOURCING_SQ | | | | | | | | | -1.139** (0.566) |
| Constant | -0.098*** (0.006) | -0.071*** (0.006) | -0.133*** (0.006) | -0.150*** (0.015) | -0.126*** (0.006) | -0.198*** (0.005) | -2.370*** (0.006) | -2.365*** (0.006) | 5.319*** (0.893) |
| Origin Country FE | YES | YES | YES | YES | YES | YES | YES | YES | YES |
| Host Country FE | YES | YES | YES | YES | YES | YES | NO | NO | YES |
| Industry FE | YES | YES | YES | YES | YES | YES | NO | NO | YES |
| Host Country-Industry FE | NO | NO | NO | NO | NO | NO | YES | YES | NO |
| Observations | 1655 | 1655 | 1655 | 923 | 1655 | 1593 | 1655 | 1655 | 978 |

Models 1-8 are estimated using Tobit Estimator

Model 9 is estimated using Probit estimator

Robust standard errors, clustered by investment destination country-industry pair, are reported in brackets.

*<0.1, **<0.05, ***<0.01.

Appendix

Table A1 - Main characteristics of foreign investors

| Host country | % of foreign ownership | Top countries of origin (# of investments) | Market seeking (%)* | Efficiency seeking (%)* | Natural resource seeking (%)* | Greenfield (%) | # Years since the first investment |
|---------------------|-------------------------------|---|--------------------------------|------------------------------------|--|---------------------------|---|
| Vietnam | 96.5 | China (162), Japan (150) | 41.7 | 43.8 | 2.4 | 87.3 | 9.0 |
| Burkina Faso | 68.7 | Lebanon (3) | 63.6 | 18.2 | 0.0 | 70.0 | 19.6 |
| Burundi | 82.8 | Belgium, Rwanda, Netherlands (2) | 53.8 | 7.7 | 15.4 | 84.6 | 28.9 |
| Cameroon | 69.3 | France (16), Switzerland (5) | 67.5 | 10.0 | 10.0 | 87.5 | 26.6 |
| Cape Verde | 85.1 | Portugal (12), Spain (4) | 59.1 | 13.6 | 0.0 | 71.4 | 9.7 |
| Ethiopia | 82.2 | India (11), China (9) | 66.3 | 3.6 | 12.0 | 89.2 | 9.0 |
| Ghana | 85.0 | India (18), UK (14) | 75.3 | 6.4 | 6.4 | 87.2 | 16.9 |
| Kenya | 77.4 | UK (60), India (46) | 80.1 | 3.0 | 4.0 | 92.5 | 24.1 |
| Lesotho | 98.0 | South Africa (17), China (14) | 33.3 | 33.3 | 2.1 | 91.7 | 9.4 |
| Madagascar | 89.7 | France (18), Mauritius (16) | 33.3 | 27.1 | 6.2 | 83.0 | 15.8 |
| Malawi | 63.3 | India & South Africa (3) | 73.7 | 0.0 | 5.3 | 73.7 | 19.0 |
| Mali | 86.7 | France (7), Senegal (6) | 80.0 | 3.3 | 3.3 | 82.8 | 13.7 |
| Mozambique | 86.1 | Portugal (27), South Africa (17) | 90.8 | 1.5 | 0.0 | 90.6 | 18.4 |
| Niger | 78.7 | Ghana (2) | 50.0 | 0.0 | 0.0 | 88.9 | 14.7 |
| Nigeria | 60.6 | India (20), Lebanon (14) | 71.6 | 2.7 | 0.9 | 88.7 | 29.3 |
| Rwanda | 86.6 | Kenya (6), Belgium (3) | 83.3 | 4.2 | 0.0 | 91.7 | 11.1 |
| Senegal | 72.5 | France (8), Lebanon, Cote d'Ivoire (3) | 66.7 | 8.3 | 4.2 | 92.3 | 33.0 |
| Tanzania | 81.8 | India (25), Kenya (10) | 72.5 | 7.7 | 4.4 | 72.5 | 12.7 |
| Uganda | 93.8 | India (48), Kenya (37) | 64.2 | 10.2 | 14.6 | 86.1 | 16.1 |
| Zambia | 86.1 | South Africa, India (6) | 76.3 | 7.9 | 10.5 | 68.4 | 14.8 |

* The total share of the three motivations does not sum to 100%, because in the questionnaire other motivations are also included. All these remaining motivations are marginal and therefore they have not been reported in the table.

Source: AIS and VIS

Table A2 - Variables

| | | Source | MEAN | SD | MIN | MAX | # OBS |
|--------------------------|---|-------------|-------|--------|-------|-------|-------|
| LOCAL_SOURCING | % Intermediates locally sourced | AIS and VIS | 0.20 | 0.27 | 0.00 | 1.00 | 1655 |
| LOCAL_SOURCING_SQ | Square of LOCAL_SOURCING | AIS and VIS | 0.11 | 0.22 | 0.00 | 1.00 | 1655 |
| LINV_AGE | Log # of years since the first investment | AIS and VIS | 2.43 | 0.74 | 0.00 | 4.72 | 1655 |
| FOREIGN_SHARE | Foreign % in the ownership of investors | AIS and VIS | 0.89 | 0.23 | 0.00 | 1.00 | 1655 |
| LEMP | Log # of employees | AIS and VIS | 5.09 | 1.40 | 0.00 | 9.83 | 1655 |
| RULE_LAW | World Governance Indicators' Rule of Law Index | World Bank | -0.57 | 0.28 | -1.19 | 0.42 | 1655 |
| EDU_GOV | Education expenditures as % of total government expenditure | World Bank | 19.88 | 3.75 | 9.38 | 26.30 | 1593 |
| GREENFIELD | Dummy (1 for greenfield investments and 0 for the other entry modes) | AIS and VIS | | 87 % | | | 1655 |
| MKT_SEEK | Dummy (1 if it is a market seeking investment and 0 otherwise) | AIS and VIS | | 58 % | | | 1655 |
| EXPORT | Dummy (1 if the foreign investor exports and 0 otherwise) | AIS and VIS | | 68 % | | | 1655 |
| SUPPORT | Dummy (1 if the foreign investor provided any form of support to local suppliers and 0 otherwise) | AIS and VIS | | 58.08% | | | 978 |

Table A3. Correlation Table

| | LOCAL_SOURCING | LINV_AGE | FOREIGN_SHARE | LEMP | LAB_PROD | EXPORT | GREENFIELD | MKT_SEEK | GVC_PAR | GVC_POS | RULE_LAW | EDU_GOV |
|----------------|----------------|----------|---------------|---------|----------|---------|------------|----------|---------|---------|----------|---------|
| LOCAL_SOURCING | 1 | | | | | | | | | | | |
| LINV_AGE | 0.0702 | 1 | | | | | | | | | | |
| FOREIGN_SHARE | -0.0915 | -0.2011 | 1 | | | | | | | | | |
| LEMP | -0.0912 | 0.0613 | 0.1197 | 1 | | | | | | | | |
| LAB_PROD | -0.009 | 0.2364 | -0.1128 | -0.1332 | 1 | | | | | | | |
| EXPORT | -0.0301 | -0.0149 | 0.1916 | 0.4333 | -0.0404 | 1 | | | | | | |
| GREENFIELD | -0.0097 | -0.0107 | 0.1245 | -0.0313 | -0.0951 | -0.0152 | 1 | | | | | |
| MKT_SEEK | 0.0247 | 0.1913 | -0.0474 | -0.2083 | 0.1802 | -0.2119 | 0.0262 | 1 | | | | |
| GVC_PAR | 0.026 | 0.0227 | 0.026 | -0.0735 | 0.0201 | -0.0779 | -0.0297 | 0.0379 | 1 | | | |
| GVC_POS | 0.0018 | 0.0986 | -0.0865 | -0.098 | 0.0394 | -0.0931 | 0.0826 | 0.0837 | -0.0615 | 1 | | |
| RULE_LAW | -0.2152 | -0.2292 | 0.2244 | -0.069 | -0.0597 | 0.0443 | -0.0582 | -0.0661 | 0.0258 | -0.0398 | 1 | |
| EDU_GOV | -0.0131 | -0.152 | 0.0226 | 0.2929 | -0.1058 | 0.094 | 0.0723 | -0.106 | -0.3178 | 0.0301 | -0.25 | 1 |