

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

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Abstract

The paper empirically investigates the impact of host countries' GVC participation on the local sourcing of intermediate inputs by foreign investors. 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. The model estimated is a standard model for the determinants of local sourcing at the firm level added 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. Our findings show that GVC participation and an upstream specialization have a positive and significant impact on the share of inputs locally sourced by foreign investors.

1. Introduction

In the last fifteen years, developing countries have been interested by two phenomena remarkably signing their process of globalization: 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 (FDIs) 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, FDIs going to developing countries have grown yearly by 18.6 per cent, while the flows to the developed world 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, 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 in a specific segment of the value chain is of particular relevance for countries with a limited existing 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, positively impacting on FDI spillovers, investigated in the existing literature there are certain characteristics of the foreign firms (e.g. size, technological capabilities, motivations for investing and mode of entry), the absorptive capacity of the 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, which has not been empirically studied so far: the association between a country's participation and position in GVCs and the extent and modalities of local sourcing by foreign investors. First, 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 second 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 in the GVC 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 backward linkages between domestic suppliers and foreign investors.

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. As shown in Figure 1, both SSA economies and Vietnam have recorded an unprecedented increase in the stock of inward FDIs over the period from 2005 to 2015: respectively 9.6 times, on average in SSA and 4.6 times in Vietnam (from 22,400 million US\$ to 102,790 million US\$) (UNCTAD, 2016).

A joint analysis of Vietnam and SSA countries is particularly relevant in the context of our research, since it allows comparing 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, given its position in East Asia on the border with China. Since its access to the World Trade Organization (WTO) in 2006, as seen above Vietnam has received massive amounts of FDIs, mainly attracted by efficiency seeking motivations. As a matter of fact,

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). Differently, and albeit growing, the contribution of FDIs to African development remains marginal. Factors as the underdevelopment of infrastructures, the high political instability and the low levels of industrialization and economic diversification in the region still represent a deterrent to FDIs (World Bank, 2015) and to the region's participation in GVCs (AfDB & OECD, 2014; IMF, 2015).

In this paper, we augment a standard model for the determinants of local sourcing at the firm level 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

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. We start by looking at local sourcing intensity, measured by the share of inputs locally sourced by foreign investors. Then, we consider the specific linkages established between the foreign investors and their domestic providers — such as assistance for improving the quality of products, technological support, access to credit and training.

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 the discussion of the main results. Section 5 concludes, drawing some policy implications.

2. FDI, local sourcing and GVC involvement

Notwithstanding the general interest in the development literature about FDIs, the existing empirical studies have hardly reached a consensus about how exactly foreign firms contribute to local development, and what are the net effects that can be attributed to their presence. One of the reasons for this empirical indeterminacy is that many studies have tried to measure the impact of

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

aggregate spillovers, finding very mixed results. In general, it can be concluded that the theoretical spillover effects identified in the literature do not automatically materialize in the real world and for overcoming this ambiguity, the empirical literature has recently 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 has indicated that backward linkages with local suppliers are among the main transmission channels through which spillovers may happen and have a positive and significant effect 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 effects*. The first effect 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 evidence that multinationals are significantly more supportive than Mexican 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 of foreign investors, there are some characteristics of the foreign firms. Some 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 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 of foreign investors (Jordaan, 2011). The motivation for investing is another mediating factor empirically investigated in the literature. In the manufacturing

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).

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 investors do choose to vertically internalize their production or prefer to source globally from the same established suppliers there may be limited space for local providers (Paus and Gallagher, 2008). This global sourcing strategy, penalizing the local suppliers, is 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 when for instance, 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). The level of local of human capital in the host country also plays a role in shaping the absorptive capacity of domestic companies and therefore their capacity to satisfy the more sophisticated demand of foreign investors (Borensztein et al., 1998).

Among the host country dimensions impacting on local sourcing there is the involvement into global value chains, which is a key ingredient in most of the countries' development strategies (Taglioni and Winkler, 2016). FDI's 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 FDI's 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 play

an important role in explaining foreign investors linkages and spillovers. Specifically, host countries and industries exposed to the process of the 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 (AIS) on foreign investors in 19 Sub-Saharan countries and the Vietnam Industrial Survey (VIS).³ The surveys provide detailed information on the general characteristics of the foreign firms, 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 works on local sourcing by foreign investors (Belberdos et al, 2001; Kiyota et al, 2008; Gorg et al, 2011; Giroud et al, 2012; Amendolagine et al, 2013) the focus of our empirical analysis is on the manufacturing industry (ISIC revision 3 categories C).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 in the sample (Table 1).

In the sample, 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

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 The collection of both datasets followed a rigorous survey 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; for instance, questions about investment motivations have required the harmonization of the adopted scales.

⁵ From the manufacturing industry we 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 not included in the VIS, but it is available only in AIS.

⁶ Vietnam is overrepresented in the dataset because of the merging of a multi-country survey in SSA with a survey specifically on Vietnam. In our empirical analysis we have taken this problem into consideration adding destination-country fixed effects in the econometric tests. In addition, results are 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,

higher diversification, Vietnam attracts a large number of foreign investments in sectors that are underrepresented in most SSA countries, such as 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 of the 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 IO database providing

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).

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

⁹ See Footnote 7.

information about sub-Saharan African countries and therefore, notwithstanding some well known concerns about missing data filled through optimization procedures¹⁰, following AfDB & OECD (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 3 shows the average level of GVC participation for the countries included in our sample.¹¹ The countries with the largest degree of participation in GVCs 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 to GVCs, the

¹⁰ IMF (2014) 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.*" (60).

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.

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

[FIGURE 3 HERE]

Figure 4 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 a stronger GVC participation and finally Chemicals with Niger as the country with highest GVC participation in the sample.

[FIGURE 4 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 5 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 5 HERE]

For each sector, Figure 6 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 the country exploits its local cotton supply as an input for production in GVCs (AfDB and OECD, 2014).

[FIGURE 6 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 is the share of inputs locally sourced by foreign investors, which is a standard measure of local sourcing intensity. In a second step, to shed more light on the mechanisms behind the relationships between GVC involvement and local sourcing, we also look at the specific linkages established between the foreign investors and their domestic providers – such as assistance for improving the quality of products, technological support, access to credit and training — which can be taken as a proxy for the *intentional* transfer of resources (Giroud and Scott-Kennel, 2009; Giroud et al., 2012).

More formally, we estimate the following model:

$$Y_{ijn} = \sum GVC_{jn} + \sum X_i + \sum Z_n + \delta_x + \lambda_n + \gamma_j + \varepsilon_i \quad (5)$$

where Y_i is the outcome of interest for the foreign investor i in country n and sector j . Three main sets of factors affect the dependent variables. First, and key for our empirical analysis, there are the indexes of GVC participation and position in country n and sector j . Second, we consider the characteristics of the investors and of the investments (X_i); and the characteristics of the host countries (Z_n). Finally, 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 sector j (γ_j) to absorb unobserved heterogeneity which could affect the firm propensity to undertake local sourcing. In Table A2 we provide all the information about the variables included in our empirical analysis, which are introduced below.

As explained in 3.2, the *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. Our expectation is that GVC participation may positively influence 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 therefore more able to offer intermediate products satisfying the needs of foreign investors.

The *GVC position* (*GVC_POS*) informs about the upstream or downstream specialisation of GVC exporters in a country (sector). Our hypothesis is that 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 positively impact on the domestic sourcing of foreign investors. Rather, in developing countries, such those included in our sample, a downstream specialization is likely to correspond to a concentration in the assembly phase of imported inputs with less opportunities for the local sourcing of intermediate products to 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 first set of controls includes some characteristics of the investors and of their investments. Firms specific characteristics comprise the *local experience of foreign firms* (*LINV_AGE*), measured as the log of the years since the first investment; the *size of investors* (*LEMP*), measured by the log number of employees; the *status of exporter* (*EXPORT*) measured by a dummy variable (1 if the foreign investor exports and 0 otherwise) and the *foreign share in the ownership of investors* (*FOREIGN_SHARE*). 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 the greenfield type (*GREENFIELD*) and if the main reason to invest is market-seeking (*MKT_SEEK*).

As far as country level characteristics are concerned, we follow the existing literature considering some variables that have been previously found to significantly affect the size and effects of FDI in developing countries (Nunnenkamp and Spatz, 2003). These include the level of the GDP per capita (*GDP_PC*), the expenditure on education as percentage of total government expenditure (*EDU_GOV*); the institutional quality, measured by the World Governance Indicators' Rule of Law Index (*RULE_LAW*) and the structure of the economic system, proxy with the *share of the manufacturing value added in GDP* (*MAN_GDP*).

5. Discussion of the main findings

Table 4 reports the results of the Tobit model with the share of inputs locally sourced by foreign investors as dependent variable and the coefficients transformed into marginal effects. In the base model (Column 1) we introduce the control variables considering the characteristics of the foreign investors and of the investments, then adding country level controls (Columns 2-3) and finally, the GVC variables (Columns 4-5) and some interactions (Columns 6-11).

[TABLE 4 ABOUT HERE]

5.1. GVC involvement and local sourcing

In Columns 4-5 we find evidence of a positive and statistically significant relation between the two GVC indicators and the extent of local sourcing from foreign investors. Participation to GVCs has been identified as a source of economic upgrading and productivity gains, including in less developed African countries (AfDB and OECD, 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 (Del Prete et al., 2016). 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).

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 and reminding that the marginal coefficients should not be taken as exact and precise measures, we can conclude that moving from a level of GVC participation of a country like Mali (0.004) to that of

Vietnam (0.057) can lead to an increase in the share of local sourcing from foreign investors, which is estimated as large as 0.7 percentage points.

Besides GVC participation, we also explore the position hold by each country and sector in GVCs. 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).

Once we have identified a positive relation between involvement in GVCs and sourcing from FDIs, it is interesting to investigate whether there are other factors mediating this relation and how. In Columns 6-11 of Table 4, we interact the coefficients of GVC_PAR and GVC-POS with some characteristics of the host countries and of the foreign investors with the aim of understanding whether their impact on local sourcing.

Considering the role of institutions and the level of human capital in host countries, both interactions with the two GVC indicators report a positive and significant coefficient. This means that the quality of local institutions and the levels of human capital magnify the effects of GVC participation on local sourcing. Besides, this seems true especially in countries with an upstream position in GVCs, meaning that when they have a good investment climate and human capital they are able to attract foreign investors buying local intermediates.

Finally, we interact the GVC indicators with a dummy for the exporting status of foreign investors finding significant and negative coefficients. This implies that when foreign investors are dedicated to export, local sourcing of intermediates is lower. This could well represent the case of export platform type of investments that are typical in sectors highly integrated in GVCs, such as apparel, in which foreign firms sets in locations from where it is easier (due, for instance, to trade agreements such as AGOA) to import and re-export parts and components to third markets. Such

types of investments are often footloose and 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 who source their inputs (including fabrics) from the the home country or globally, resulting in very little integration with local firms (Morris and Staritz, 2016). Vietnam¹² has also been able to take advantage of trade agreements (such as ASEAN) and rapidly increase its involvement in value chains mostly as an assembler of low value added outputs, then re-exported by foreign investors based in the country. Our findings confirm Hollweg et al. (2017), who criticise GVCs as hampering upgrading and diversification from low value added tasks (such as assembling) and limiting the opportunities for linkages between domestic and foreign firms.

5.2. Controls

Our results for the control variables, presented in Column 1, are generally in line with the existing literature (Giroud et al., 2012; Winkler, 2013) and confirm the importance of the characteristics of foreign firms as mediating factors of the amount of local sourcing. We do find that higher local sourcing is positively correlated to the local experience of the foreign investors (*LINV_AGE*) as in Amendolagine et al. (2013), and consistently with the view that it takes time to search and find reliable local sources of inputs and to establish local linkages with domestic firms.

As expected the foreign share in the ownership of investors (*FOREIGN_SHARE*) has a negative impact on the local sourcing because foreign investors with a strong domestic participation in their capital are more inclined to source intermediates locally, better knowing the context and being more embedded (Sanchez-Martin et al., 2015).

Also, the size of the investor (*LEMP*) is negatively related with local sourcing. This finding confirms previous empirical analyses (Joordan, 2011; Giroud et al., 2012) and it can be explained by the tendency of larger firms to establish a global network of suppliers or to produce internally their intermediate products (Winkler, 2013).

The coefficient for the entry mode of the investment (*GREENFIELD*) is positive (and significant only in Column 3) indicating that newly established plants are in strong need for buying local inputs, as also found in Amendolagine et al (2013).

A negative relation is found between the market seeking motive (*MKT_SEEK*) and local sourcing. This result sets in contrast with some previous works (Amendolagine et al., 2013; Giroud et al., 2012). In the estimation, we do find that there is a positive association between efficiency-seeking

¹² In our sample, about 90% of foreign investors based in Vietnam are exporters (51% in the case of SSA).

type of investments¹³ and local sourcing. This result is confirmed by Winkler (2013), who finds that efficiency seeking labour-intensive investments are more likely to result in higher demand for local inputs.

Finally, we find a positive and significant association between the status of exporter of foreign firms (*EXPORT*) and the extent of local sourcing, suggesting that foreign investors utilise more local inputs even if they do not target the domestic market.

In Columns 2 and 3, we include the host country specific variables that could influence the sourcing strategies of foreign investors.¹⁴ As expected, Column 2 shows that there is a positive correlation between the local sourcing and the level of per capita income of the host country (*GDP_PC*), since higher levels of income could also be interpreted as proxy for higher levels of productivity.

Then in Column 3, we find a positive relation between local sourcing and the share of manufacturing on the total value added (*MAN_GDP*). Clearly, the level of industrialization matters since countries with a more developed manufacturing sector are likely to provide foreign firms with more opportunities for buying local inputs. This is an interesting finding, considering that in our sample there are many SSA countries recording low levels of industrialization and rather dependent on natural resources (Amendolagine et al., 2013). In our analysis and with the usual caveats about data, we show that moving from low levels of manufacturing industry on the total value added, such as those experienced by SSA countries (e.g. 4.3 per cent in Ethiopia) to the level recorded by a more industrialized country such as Vietnam (17.9 per cent) it could raise the share of local sourcing by 2.7 percentage points.

Better institutions (*RULE_LAW*) are also a factor of attraction for foreign investors with higher sourcing potential. This is not surprising, since good institutions are a proxy for the quality of the investment climate, which is important to understand the spillover potential of foreign investors (Xu, 2010; Farole and Winkler, 2014). Specific to local sourcing, it is worth noticing that improving the rule of law is especially needed since this institutional dimension is crucial in order to guarantee foreign investors about the enforceability of contracts with their local partners (Defever et al., 2015).

¹³ As shown in Table A1, the two dominant motivations for manufacturing investments are market seeking and efficiency seeking.

¹⁴ Given the high correlation between *GDP_PC* and *MAN_GDP* (66%) (Table A3), these controls are estimated in different models.

Finally, investments in education¹⁵ (*EDU_GOV*) positively matters, which is again consistent with the previous literature showing the importance of building up the necessary absorptive capacities to offer intermediates satisfying the more sophisticated needs of foreign investors (Borenztein et al., 1998).

5.3. Support from foreign investors and GVC involvement

To extend our findings we estimate Equation (1) introducing a new set of dependent variables taking advantage of the information available in the AIS and VIS surveys about the assistance that foreign investors provide to their local suppliers in the six following areas:

- Upgrading the quality of products (*Quality_Upgrade*);
- Improving the access to working capital/finance/equity (*Access to Capital*);
- Upgrading the skills of the workforce (*Training*);
- Transferring technology or know-how (*Tech_Transfer*);
- Collaborating on joint product design or product development (*Collaboration*);
- Upgrading the efficiency of production processes (*Efficiency_Upgrade*).

Since all the dependent variables are dummies, we opt for a standard probit regression, including the same set of independent variables than in the previous econometric test. Following Giroud et al. (2012), we add 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.

The results of the tests are reported in Table 4. Considering our variables of interest, only the coefficients for *Access to Capital* and *Technology_Transfer* are statistically significant. Considering GVC participation, it has a positive sign for *Technology_Transfer* and a negative one for *Access to Capital*. This implies that when participation in GVC is relatively high foreign investors do provide technological assistance to their local suppliers, further strengthening the spillover impact of FDIs. Nevertheless, it appears that foreign investors do not assist their local suppliers in accessing working capital. Taking into account the coefficient of GVC position, this is positive and significant meaning that foreign investors are more likely to support their local partners if they are involved in sectors more upstream in the value chains. This result is confirmed by cross-country evidence on local suppliers based in low income countries showing that those producing key inputs in agro-food or textile value chains receive more assistance by their foreign buyers (Farole and Winkler, 2014).

¹⁵ We have used an indicator of educational expenditure, rather than of educational attainments due to the lack of the latter for a number of SSA countries. As a robustness check, we have run the same model introducing the indicator of human capital provided by the Penn World Tables (based on Barro-Lee data) finding consistent results, both for the single coefficient (Column 3) and for the interactions (Columns 8-9 in Table 4).

Considering the controls, our results support the claim by Giroud et al. (2012) about the decreasing returns in terms of resources transfer to the size of the domestic supply. 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. Also the market-seeking motive has a positive effect on assistance, which can be due to the need to tailor goods on the basis of specific markets needs.

6.Preliminary conclusions

The paper has empirically investigated the impact of host countries' GVC participation on the local sourcing of intermediate inputs by foreign investors with a standard model for the determinants of local sourcing including two measures of involvement in GVCs: an index of GVC participation and an index of GVC position, assessing the international specialization of countries in more upstream or downstream stages of the GVC.

The empirical analysis combines two firm-level data sets on 19 Sub-Saharan African and Vietnam providing a useful mixture of a region which is still at the start of its integration process in GVC with a country at the core of the global fragmentation of the production process like Vietnam. Our findings show that GVC participation and an upstream specialization have a positive and significant impact on the share of inputs locally sourced by foreign investors. Through their GVC involvement, local suppliers learn how to produce intermediates satisfying the quality and the standards of the international market, which can be also bought by foreign investors. Therefore, GVC involvement does facilitate the establishment of direct backward linkages between foreign and domestic firms, consisting in local sourcing of different inputs and intermediate products, which is considered as one the main channels, significantly raising the spillover potential of FDIs.

Sub-Saharan African countries are still at the very beginning of their integration in GVCs and our empirical findings show that from a stronger GVC involvement the region could also gain in terms of increasing and improving its manufacturing supply satisfying the requests of foreign investors. We have also found that the quality of local institutions and the levels of human capital magnify the effects of GVC participation on local sourcing and therefore investments in improving the business environment and education will support a better insertion in GVCs and facilitate a positive impact of FDIs.

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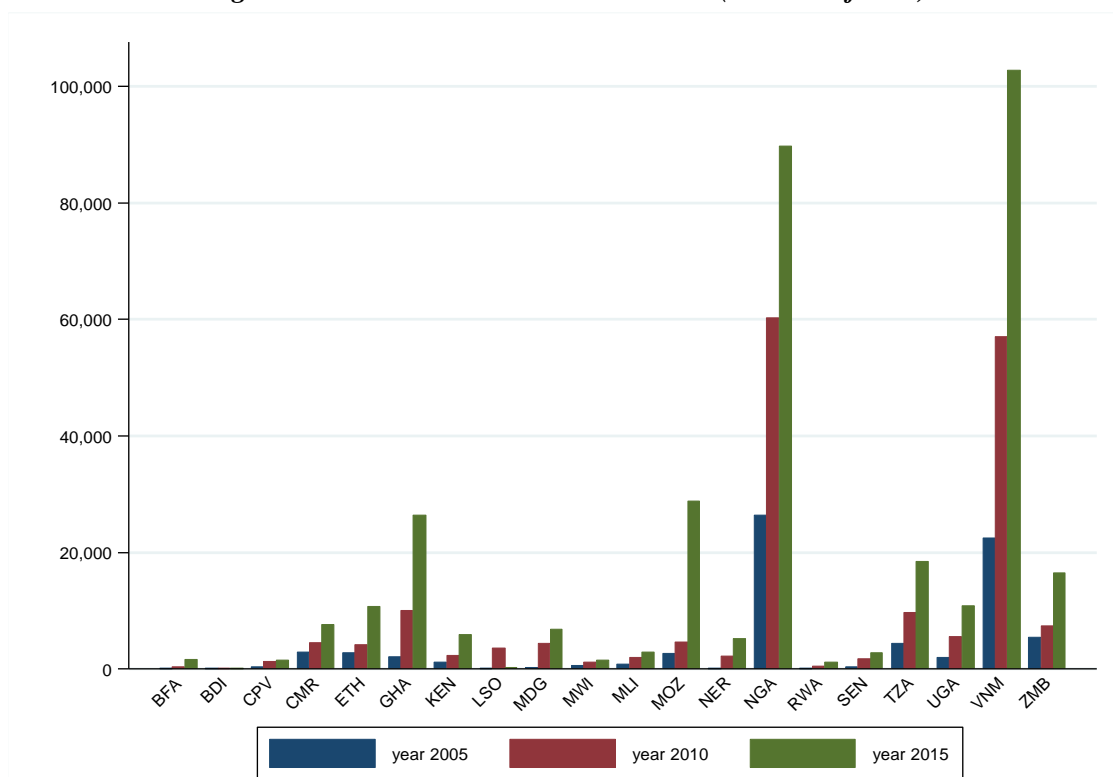
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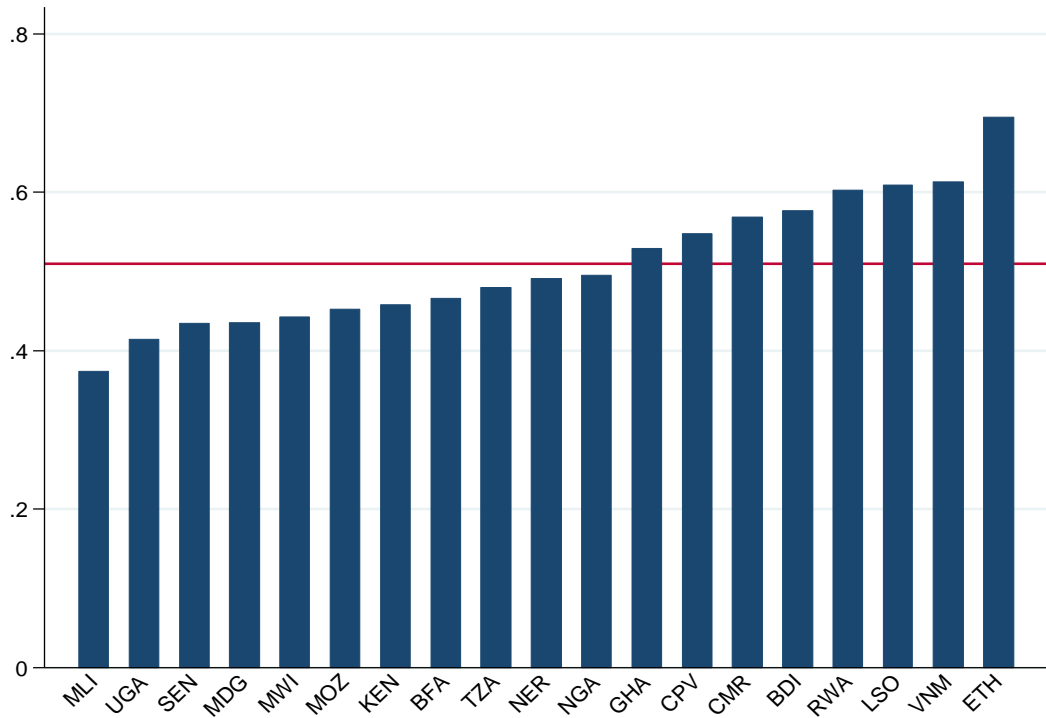
Tables and Figures

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



Source: our elaborations on UNCTAD FDI statistics

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



*Red line represents the average value

Source: our elaborations on Eora

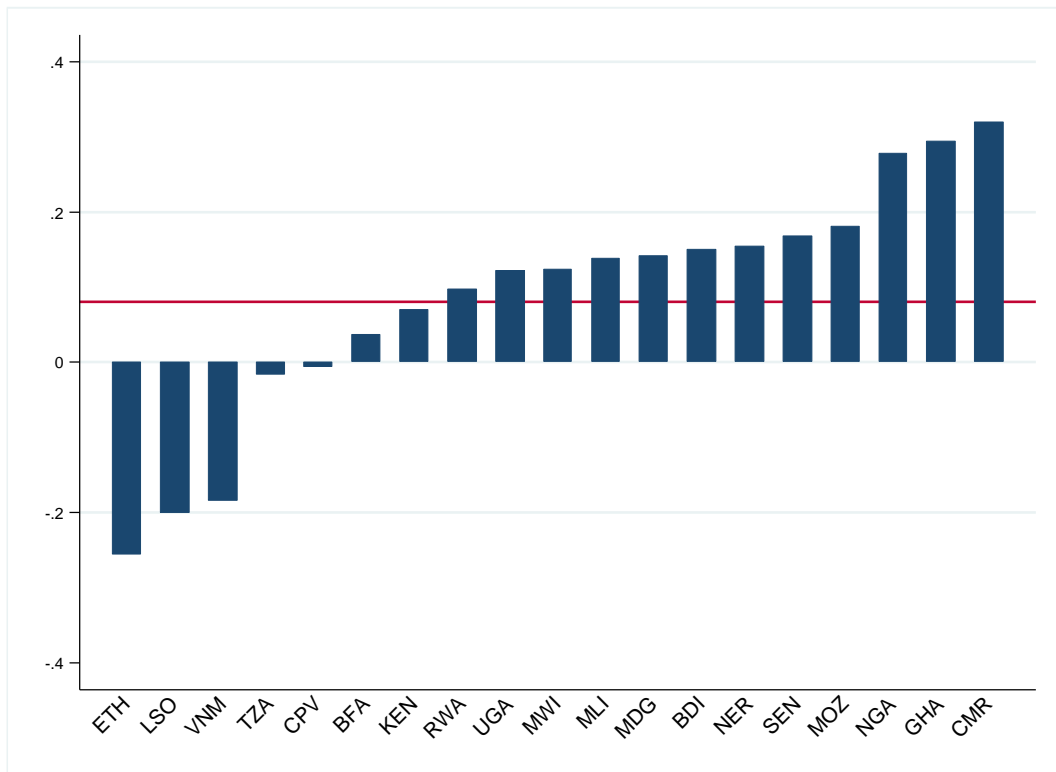
Figure 4. GVC participation at sector level (2010)*



*Red lines represent the average sectorial value

Source: our elaborations on Eora

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



*Red line represents the average value

Source: our elaborations on Eora

Figure 6. 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 |
| Burkina 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 Chains and local sourcing by foreign investors

| | BASE MODEL | | | GVC | | INTERACTIONS | | | | | |
|------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| | (1) | (2) | (3) | PAR (5) | POS (4) | (6) | (7) | (8) | (9) | (10) | (11) |
| LINV_AGE | 0.006*** [0.002] | 0.006*** [0.002] | -0.002 [0.001] | 0.006*** [0.002] | 0.007*** [0.002] | 0.007*** [0.002] | 0.007*** [0.002] | -0.003** [0.001] | -0.003*** [0.001] | 0.007*** [0.002] | 0.007*** [0.002] |
| FOREIGN_SHARE | -0.078*** [0.001] | -0.078*** [0.002] | -0.116*** [0.006] | -0.072*** [0.002] | -0.074*** [0.002] | -0.074*** [0.002] | -0.071*** [0.002] | -0.106*** [0.004] | -0.106*** [0.004] | -0.074*** [0.002] | -0.072*** [0.002] |
| LEMPL | -0.018*** [0.001] | -0.018*** [0.001] | -0.015*** [0.001] | -0.017*** [0.001] | -0.017*** [0.001] | -0.017*** [0.001] | -0.017*** [0.001] | -0.014*** [0.000] | -0.015*** [0.001] | -0.017*** [0.001] | -0.017*** [0.001] |
| GREENFIELD | 0.002 [0.003] | 0.002 [0.003] | 0.011*** [0.004] | 0.003 [0.004] | 0.003 [0.003] | 0.002 [0.004] | 0.003 [0.004] | 0.012*** [0.004] | 0.014*** [0.004] | 0.002 [0.003] | 0.004 [0.004] |
| MKT_SEEK | -0.018*** [0.002] | -0.018*** [0.002] | -0.015*** [0.002] | -0.019*** [0.002] | -0.018*** [0.002] | -0.018*** [0.002] | -0.019*** [0.002] | -0.014*** [0.002] | -0.015*** [0.002] | -0.018*** [0.002] | -0.019*** [0.002] |
| EXPORT | 0.014*** [0.003] | 0.014*** [0.004] | 0.024*** [0.004] | 0.016*** [0.004] | 0.015*** [0.004] | 0.015*** [0.004] | 0.016*** [0.004] | 0.024*** [0.004] | 0.024*** [0.004] | 0.011*** [0.003] | 0.037*** [0.005] |
| GDP_PC | | 0.192*** [0.014] | | 0.190*** [0.014] | 0.199*** [0.015] | | | | | 0.199*** [0.015] | 0.191*** [0.015] |
| MAN_GDP | | | 0.002*** [0.000] | | | | | | | | |
| RULE_LAW | | | 0.465*** [0.031] | | | 0.576*** [0.036] | 0.548*** [0.037] | | | | |
| EDU_GOV | | | 0.010*** [0.001] | | | | | 0.081*** [0.006] | 0.083*** [0.006] | | |
| GVC_PAR | | | | 0.132*** [0.049] | | 0.460*** [0.039] | | -5.665*** [0.417] | | 0.661*** [0.043] | |
| GVC_POS | | | | | 0.367*** [0.032] | | 0.291*** [0.067] | | -4.166*** [0.259] | | 0.856*** [0.107] |
| RULE_LAW*GVC_PAR | | | | | | 0.304*** [0.068] | | | | | |
| RULE_LAW*GVC_POS | | | | | | | 0.175* [0.098] | | | | |
| EDU_GOV*GVC_PAR | | | | | | | | 0.205*** [0.016] | | | |
| EDU*GVC_POS | | | | | | | | | 0.273*** [0.017] | | |
| EXPORT*GVC_PAR | | | | | | | | | | -0.810*** [0,040] | |
| EXPORT*GVC_POS | | | | | | | | | | | -0.324*** [0.060] |
| Observations | 1689 | 1689 | 1592 | 1676 | 1676 | 1676 | 1676 | 1607 | 1607 | 1676 | 1676 |

Models are estimated using Tobit estimator. Robust standard errors, clustered by investment origin-destination country pair, are reported in brackets. All the models include fixed effects for investor country, recipient country, and investor industry. *<0.1, **<0.05, ***<0.01.

Table 4 Global Value Chains and Support from Foreign Investors

| | Quality Upgrade | | Access to Capital | | Training | | Tech Transfer | | Collaboration | | Efficiency Upgrade | |
|-----------------|-----------------|-----------|-------------------|----------|----------|----------|---------------|---------|---------------|-----------|--------------------|-----------|
| | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) | (13) | (14) |
| LOCAL_SOURCING | 0.911** | 0.912** | -1.196* | -1.195* | -0.953 | -0.962 | 0.333 | 0.344 | -0.291 | -0.294 | -0.315 | -0.192 |
| | [0.462] | [0.459] | [0.722] | [0.724] | [0.637] | [0.641] | [0.989] | [0.974] | [0.636] | [0.635] | [0.596] | [0.537] |
| LOCAL_SOURCING2 | -0.798 | -0.803 | 1.687** | 1.678** | 1.001 | 1.008 | -0.572 | -0.601 | -0.147 | -0.142 | 0.136 | 0.033 |
| | [0.533] | [0.529] | [0.703] | [0.705] | [0.644] | [0.647] | [0.922] | [0.909] | [0.651] | [0.646] | [0.598] | [0.564] |
| LINV_AGE | -0.059 | -0.057 | -0.032 | -0.028 | -0.032 | -0.028 | 0.073 | 0.063 | 0.046 | 0.048 | 0.162*** | 0.162** |
| | [0.073] | [0.073] | [0.102] | [0.100] | [0.117] | [0.117] | [0.083] | [0.083] | [0.075] | [0.074] | [0.063] | [0.065] |
| LEMPL | 0.105** | 0.104** | 0.161*** | 0.157*** | 0.129*** | 0.126*** | -0.002 | 0.009 | 0.028 | 0.027 | 0.002 | -0.002 |
| | [0.044] | [0.044] | [0.049] | [0.048] | [0.041] | [0.042] | [0.042] | [0.041] | [0.043] | [0.042] | [0.043] | [0.049] |
| FOREIGN_SHARE | -0.016 | -0.029 | 0.214 | 0.215 | 0.539* | 0.532* | 0.280 | 0.280 | 0.256 | 0.246 | 0.346 | 0.300 |
| | [0.235] | [0.235] | [0.335] | [0.337] | [0.319] | [0.320] | [0.379] | [0.364] | [0.239] | [0.239] | [0.218] | [0.233] |
| GREENFIELD | 0.007 | 0.009 | -0.224 | -0.222 | 0.101 | 0.099 | 0.082 | 0.094 | 0.263* | 0.262* | 0.146 | 0.138 |
| | [0.131] | [0.129] | [0.188] | [0.188] | [0.176] | [0.176] | [0.204] | [0.204] | [0.155] | [0.156] | [0.138] | [0.125] |
| MKT_SEEK | 0.214* | 0.216* | 0.269** | 0.275** | 0.219** | 0.218** | 0.123 | 0.131 | 0.193 | 0.193 | 0.162 | 0.152 |
| | [0.123] | [0.122] | [0.128] | [0.128] | [0.107] | [0.107] | [0.129] | [0.128] | [0.120] | [0.120] | [0.105] | [0.106] |
| EXPORT | 0.259* | 0.255* | 0.011 | -0.005 | -0.041 | -0.043 | -0.179 | -0.197 | -0.035 | -0.038 | | 0.084 |
| | [0.136] | [0.136] | [0.158] | [0.158] | [0.117] | [0.116] | [0.137] | [0.138] | [0.124] | [0.124] | | [0.158] |
| GDP_PC | -2.028*** | -2.001*** | -0.551* | -0.493 | 1.281*** | 1.219*** | 0.647** | 0.707** | 2.553*** | 2.565*** | 2.378*** | 2.385*** |
| | [0.374] | [0.368] | [0.314] | [0.312] | [0.270] | [0.279] | [0.329] | [0.347] | [0.531] | [0.530] | [0.376] | [0.379] |
| GVC_PAR | -1.100 | | -4.918* | | 0.795 | | 8.609** | | 0.285 | | 0.151 | |
| | [2.355] | | [2.779] | | [2.298] | | [3.477] | | [2.731] | | [2.599] | |
| GVC_POS | | 2.267 | | 5.672* | | 0.786 | | 6.518* | | 0.794 | | -0.788 |
| | | [2.436] | | [3.077] | | [3.064] | | [3.631] | | [2.226] | | [2.965] |
| Constant | 19.820*** | 19.669*** | 9.259*** | 8.831*** | 8.871*** | 8.486*** | 4.697* | 4.890* | -21.216*** | 21.230*** | 20.534*** | 20.560*** |
| | [3.111] | [3.077] | [2.500] | [2.416] | [2.253] | [2.298] | [2.581] | [2.701] | [4.384] | [4.373] | [3.128] | [3.148] |
| Observations | 985 | 985 | 874 | 874 | 942 | 942 | 843 | 843 | 945 | 945 | 1021 | 981 |

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 | 1689 |
| LINV_AGE | Log # of years since the first investment | AIS and VIS | 2.43 | 0.74 | 0.00 | 4.72 | 1689 |
| LEMP_L | Log # of employees | AIS and VIS | 5.08 | 1.40 | 0.00 | 9.83 | 1689 |
| FOREIGN_SHARE | Foreign % in the ownership of investors | AIS and VIS | 0.89 | 0.23 | 0.00 | 1.00 | 1689 |
| GDP_PC | GDP per capita | Penn World Table | 7.54 | 0.55 | 6.15 | 8.31 | 1689 |
| MAN_GDP | % of the manufacturing value added in GDP | World Bank | 13.72 | 4.63 | 4.29 | 17.95 | 1592 |
| RULE_LAW | World Governance Indicators' Rule of Law Index | World Bank | -0.55 | 0.26 | -1.19 | 0.42 | 1592 |
| EDU_GOV | Education expenditures as % of total government expenditure | World Bank | 19.95 | 3.75 | 9.38 | 26.30 | 1592 |
| GVC_POS | GVC position index | Eora MRIO | -0.02 | 0.03 | -0.11 | 0.03 | 1676 |
| GVC_PAR | GVC participation index | Eora MRIO | 0.04 | 0.04 | 0.01 | 0.13 | 1676 |
| GREENFIELD | Dummy (1 for greenfield investments and 0 for the other entry modes) | AIS and VIS | | | | | 1689 |
| MKT_SEEK | Dummy (1 if it is a market seeking investment and 0 otherwise) | AIS and VIS | | 87 % | | | 1689 |
| EXPORT | Dummy (1 if the foreign investor exports and 0 otherwise) | AIS and VIS | | 58 % | | | 1689 |
| | | | | 68 % | | | 1689 |

Table A3 - Correlation Table

| | LINV_AGE | LEMP | FOREIGN_SHARE | GREENFIELD | MKT_SEEK | EXPORT | GDP_PC | MAN_GDP | RULE_LAW | EDU_GOV | GVC_POS | GVC_PAR |
|---------------|----------|-------|---------------|------------|----------|--------|--------|---------|----------|---------|---------|---------|
| LINV_AGE | 1.00 | | | | | | | | | | | |
| LEMP | 0.06 | 1.00 | | | | | | | | | | |
| FOREIGN_SHARE | -0.20 | 0.12 | 1.00 | | | | | | | | | |
| GREENFIELD | -0.01 | -0.03 | 0.12 | 1.00 | | | | | | | | |
| MKT_SEEK | 0.19 | -0.21 | -0.05 | 0.03 | 1.00 | | | | | | | |
| EXPORT | -0.01 | 0.43 | 0.19 | -0.02 | -0.21 | 1.00 | | | | | | |
| GDP_PC | -0.18 | 0.43 | 0.20 | 0.00 | -0.22 | 0.35 | 1.00 | | | | | |
| MAN_GDP | -0.17 | 0.49 | 0.27 | 0.04 | -0.26 | 0.47 | 0.66 | 1.00 | | | | |
| RULE_LAW | -0.23 | -0.07 | 0.22 | -0.06 | -0.07 | 0.04 | 0.22 | 0.01 | 1.00 | | | |
| EDU_GOV | -0.15 | 0.29 | 0.02 | 0.07 | -0.11 | 0.09 | 0.15 | 0.27 | -0.25 | 1.00 | | |
| GVC_POS | 0.10 | -0.10 | -0.09 | 0.08 | 0.08 | -0.09 | -0.12 | -0.11 | -0.04 | 0.03 | 1.00 | |
| GVC_PAR | 0.02 | -0.07 | 0.03 | -0.03 | 0.04 | -0.08 | 0.01 | -0.09 | 0.03 | -0.32 | -0.06 | 1.00 |