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Evidence from sub-Saharan Africa

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FDI and local linkages in developing countries: Evidence from sub-Saharan Africa

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Abstract

This paper investigates the determinants of backward linkages of foreign manufacturing investors in 19 Sub-Saharan African countries. We shed lights on the micro and macro level factors which lead to a higher degree of interactions between foreign subsidiaries and local firms. Our results suggests that the time of entry of foreign firms is an important determinant of local linkages and, hence, the low degree of linkages associated to FDI in the African economy observed in previous literature might be, at least partly, explained by the relatively recent nature of these investments. The presence of a local partner in the ownership structure and a final-market orientation are associated with higher local linkages. Interestingly, investments which originate from diaspora members generate, *ceteris paribus*, more linkages. Our results also highlight the importance of attracting foreign firms that have a real potential of 'fertilizing' already existing domestic capacities rather than attracting highly sophisticated firms with the hope of observing an unrealistic leapfrogging of the domestic economy. Finally, we lend further support to the idea that good institutions and in particular a reliable legal system are pre-conditions for boosting the linkages generated by foreign firms.

Keyword: Foreign direct investment, local procurement, backward linkages, Africa
JEL Code: F23, F63, O14, O55

1. Introduction

The attraction of foreign investors is a fundamental goal of policymakers all over the globe but especially in developing countries where the lack of capital is one of the key constraint to economic prosperity. The experience of many countries shows that the inflows of foreign investments are very often a necessary but not a sufficient condition for a sustainable growth and pro-poor development. The benefits stemming from FDI crucially depend on density, depth and nature of supplying/buying linkages between foreign investors and local firms. For a host country, it is therefore fundamental (i) to focus the scarce resources aimed at attracting foreign business toward those firms that are more likely to produce large spillovers and linkages to the local economy; (ii) to remove the obstacles which limit the interaction of foreign firms with local suppliers/buyers.

The aim of this paper is to investigate the type of FDI that maximizes the likelihood of creating local linkages between MNEs and domestic suppliers within the context of the Sub-Saharan Africa (henceforth SSA) countries. As argued in Javorcik (2004), backward linkages can be a powerful channel through which spillovers can take place. Besides, the economic importance of linkages goes beyond their role as 'facilitator' of spillovers since the host economy gains from linkages even in the absence of learning (Morrissey 2012).

In order to examine this research question, we use original firm-level data collected through the UNIDO Africa Investor Survey 2010 across 19 different countries.[1] The database contains a rich set of information on a large sample of domestic, foreign and diaspora firms including investors characteristics, linkages with global and local markets, interactions with Investment Promotion Agencies (IPAs) of the host country, organizational structure, main factors driving location decision, amongst others.

This paper is the first study, to our knowledge, that shed lights on the intensity and the determinants of linkages in SSA. In doing so, we investigate the relevance of foreign firms' characteristics and of the macroeconomic environment of the host country. With respect to the first set of controls, we consider the sector, mode of entry, motives of investment, firm age, skill composition of the foreign affiliates' workforce, country of origin, size, degree of local management autonomy, the ownership of the firm by a member of the diaspora.[2] With respect to host countries characteristics, we control

[1] Burkina Faso, Burundi, Cameroon, Cape Verde, Ethiopia, Ghana, Kenya, Lesotho, Madagascar, Malawi, Mali, Mozambique, Niger, Nigeria, Rwanda, Senegal, Tanzania, Uganda, Zambia.

[2] Diasporas have recently received a great deal of attention from policymakers around the globe and have been the explicit target of FDI attraction initiatives both in developed and developing countries. Diaspora members can be seen as bridge

for GDP size, the importance of natural resources and the quality of legal system. Furthermore, we also focus on the role of Investment Promotion Agencies and Regional Trade Agreements in promoting connections between foreign investors and local producers.

We find that foreign subsidiaries in Africa increase their linkages with local firms over-time. This implies that the actual low level of linkages might, at least partly, be explained by the relatively recent history of FDI in the continent. A higher degree of interactions with local firms is generated by foreign subsidiaries with a local partner, a final-market orientation and by brownfield rather than greenfield investments. Interestingly, investments made by members of the diaspora are associated with more linkages with domestic firms. Our analysis shows also that foreign firms with a knowledge base which is too advanced with respect to the absorptive capacity of the domestic economy are less conducive to interactions with domestic economic agents. The latter finding emphasize the importance of attracting foreign firms that have a real potential of 'fertilizing' already existing domestic capacities rather than attracting highly sophisticated firms with the hope of observing an unrealistic leapfrogging of the domestic economy.

We also confirm the importance of good institutions and in particular a reliable legal system as pre-conditions for boosting the linkages generated by foreign subsidiaries with domestic firms.

Interestingly, we find that even controlling for these firm characteristics, Chinese investments – which are of growing importance in SSA – produce a lower impact in terms of creation of backward linkages with the host economy. This latter result seems to suggest that other factors – such as language barriers or the possibility of access to cheap intermediate inputs from the origin country – are behind this China effect which has been often documented in descriptive and qualitative analysis.[3]

The paper is organised as follows. In *Section 2* we present a brief overview of the theoretical and empirical literature on the effects of FDI in developing countries and in particular in SSA. In *Section 3* we firstly report some preliminary descriptive statistics on the demand of domestic inputs in the 19 SSA countries included in the analysis followed by the presentation of the empirical

between their country of origin and the countries where they migrated; they hence possess relevant skills and information that might contribute to an upgrading of the production capacities across borders. With respect to linkages we expect that diaspora investment, given their knowledge of the local economy, will have a higher propensity to generate linkages with local suppliers.

[3] For an interesting discussion on Chinese FDI in Africa see Ozawa and Bellak (2011).

methodology and a discussion of the main results. Concluding remarks and policy implications are presented in *Section 4*.

2. Literature Review

The role of backward/forward linkages relative to foreign direct investments in developing countries is theoretically addressed in seminal paper by Rodriguez-Clare (1996). In his model, the beneficial impact of a multinational in the host economy depends on its relative propensity to generate backward linkages compared to domestic firms. The author defines the backward linkage coefficient of a firm (domestic or foreign) as the ratio of employment generated in upstream industries (i.e. suppliers of specialized inputs) to the labour directly employed by the firm. The benefits from a multinational depend on the activation of two main channels. Firstly, if the linkage coefficient is larger for a multinational than for a domestic producer, then this leads to larger variety of specialized inputs in the country, larger productivity of domestic firms – as a consequence of the assumption of love of variety in intermediate specialized inputs - and, in turn, higher wages. Indeed, the fraction of inputs of the host country demanded by a multinational is found to be the larger, the larger the communication costs between the headquarters of the multinational and the host economy and the lower the gap in variety of inputs between the two countries. Secondly, if backward linkages are strong enough, they can also improve the productivity of domestic firms via forward linkages, i.e. purchase of specialized inputs by leading domestic firms – which will allow them to produce more sophisticated final goods. One further theoretical work on the relationship between FDI and linkages is Markusen and Venables (1999) which argues that the entry of a multinational firm in the host economy can lead to two different effects: competition effect and linkage effect. At a first stage, FDI can yield tougher competition and damage local industries by displacing domestic final-good producers; however, at a second stage, more competition in one sector can benefit other sectors through, for instance, price reductions or forward linkages. In particular, FDI might increase the demand for local output and generate complementarities that can be beneficial for domestic final-good producers. Furthermore, the possibility for domestic suppliers to interact with more multinationals companies increases domestic welfare (Ping and Saggi 2007).

Turning to a brief analysis of the empirical literature on this issue, one of the first contributions is Hobday (1995) which finds several cases of backward linkage effects to local suppliers driven by multinationals in East-Asia. FDI created demand for local suppliers and enhanced quality, productivity and variety. In turn, the development of intermediate-goods supply and productivity

led to forward linkages to final-good producers, increasing the number of both multinationals and domestic producers. Thus, a second-round backward linkage effect followed.[4] Alfaro and Rodriguez-Clare (2004) test the theoretical predictions of Rodriguez-Clare (1996) using plant-level data from several Latin America countries and provide evidence that multinationals' linkage potential is higher than that of domestic firms in Brazil, Chile and Venezuela.

A large number of papers have focussed on spillovers effects due to the presence of foreign affiliates. Javorcik (2004) finds evidence on firm-level data from Lithuania of positive productivity spillovers from FDI through contracts between foreign affiliates and their local suppliers. More specifically, such effects occur when the ownership of investment projects is shared between domestic and foreign firms; in that case multinationals do not prevent technology leakages, as they can gain from performance improvements of intermediate input suppliers. Nunnekamp and Spatz (2004) distinguish three main types of FDI and observe their different spillover effects in a large panel of developing countries. Resource-seeking FDI in the primary sector are often concentrated in enclaves dominated by foreign affiliates with few linkages to the local product and labour market. Indeed, in some cases, this type of foreign investments turns out to benefit corrupt local elites rather than economic growth. Efficiency-seeking FDI are more likely to introduce technology and know-how that is compatible with the level of development of the host country through adaption and imitation of local suppliers. Finally, market-seeking FDI in services and manufacturing can bring new products and modernize local production in host economies. From their estimates, it turns out that the link between FDI and growth depends on some host country characteristics, such as GDP per capita, schooling, institutional development and openness to trade, and is stronger in the service sector than in the manufacturing sector. Furthermore, positive growth effects are more likely to happen when the technological gap is small, i.e. when host countries have the 'absorptive capacity' needed to facilitate the transmission of positive effects. Along with the financial system (Hermes and Lensink 2003; Alfaro, Chanda and Sayek 2004), other important determinants of absorptive capacity of the host country are the institutional quality (Buchanan, Le and Rishi 2012) and the affiliation with the WTO and Preferential Trade Agreements (Buthe and Milner 2008).

On the contrary, only few studies have investigated the determinants of backward linkages of foreign firms as in the present paper. Belderbos et al. (2001) study the determinants of backward linkages created by 272 Japanese electronics manufacturing affiliates in 24 countries. Those

[4] In some cases (such as bicycles and computers), local firms displaced the original foreign entrants.

linkages could be achieved either by sourcing materials from local suppliers or vertically integrating manufacturing operations. In both cases, they led to benefits in terms of domestic employment and know-how transfers. The authors suggest that a good quality of infrastructures and a large size of inputs supply industry positively affect the creation of local linkages while restrictive trade policies turn out to have negative effects. Using an alternative empirical methodology based on a translog cost function, Kiyota et al. (2008) reconsider the findings of Belderbos et al. (2001) on the determinants of domestic linkages of Japanese subsidiaries. The authors employ affiliates-level panel data and show that a large part of variation in the observed differences in backward linkages generation is explained by unobservable firm-specific characteristics. They also show that time since entry of foreign affiliates is an important determinant of the density of local linkages.

With regards to FDI in Sub-Saharan Africa, the empirical literature is still rather limited. Asiedu (2002) is among the few studies with a focus on the African continent investigating the reasons behind the poor attractiveness of the area to foreign investors compared to other developing countries. The author points to explanations such as the high risk of policy reversal and the consequent low risk-adjusted results from FDI. The marginal benefit from trade liberalization, often implemented as conditionality on aids from donors, is dampened by the low credibility these reforms. According to the author infrastructure development does not turn out, *ceteris paribus*, to have a positive impact on SSA countries, because of the resource-based nature of most of the foreign investments. Asiedu (2006), through a panel data analysis over 22 SSA countries, finds that large local markets, natural resource endowments, low inflation and an efficient legal system enhance FDI, whereas corruption and political instability deter them.

The effects of FDI on SSA economic growth are highly heterogeneous across countries. Gohou and Soumaré (2012) find evidence of positive and significant effect of per capita FDI inflows on poverty reduction in Africa but emphasize the existence of large cross-country differences. Boly et al. (2012), using the UNIDO Africa Investor Survey 2010 as the present study, suggest that net effects of FDI presence on domestic firms is strongly heterogeneous in SSA. The authors show that the number of domestic firms experiencing gains from interactions from foreign affiliates ranges from a minimum of 7,8% domestic firms in Lesotho to a maximum of 82,5% in Mozambique. The existing empirical literature also suggests that FDI have positive effects on firms' export decisions (see Abor, Adjasi and Hayford (2008) on Ghanaian firms) and total factor productivity, despite of the crowding out effect on domestic investments (see Adams 2009). Bwalya (2006), using firm-level data from Zambia, finds weak evidence of inter-industry knowledge spillovers occurring

through linkages. Managi and Bwalya (2010) find evidence of both intra-industry and inter-industry productivity spillovers from FDI for Kenya and Zimbabwe. Studies on specific sectors, such as Stillwell, Wanjiru and Phelps (2009) on clothing in Kenya and Ouma and Whitfiled (2012) on horticulture sector, underline the importance of enhancing the absorptive capacity of local economies as a fundamental pre-condition for benefiting from FDI inflows.

Finally, some authors analyse the phenomenon of South-South FDI flows, particularly those arising from multinational corporations from China and India. Indeed, these countries represent two of the major foreign investors in SSA economy. Morrisey (2010) describes and compares Chinese and Indian investments in SSA countries: the former are more concentrated in mineral rich SSA countries, while the latter are more oriented to manufacturing, retail and services. The author claims that Chinese FDI play a marginal role in the development of local suppliers and domestic labour demand through linkages. Sanfilippo (2010) empirically finds a close similarity between the factors which determine FDI and official aid flows toward SSA countries. This seems to suggest a strong active role of the Chinese central government in channelling FDI in strategic area and sectors both directly, through State-Owned-Enterprises, or indirectly by accompanying Chinese corporation abroad and assuring political backing. Ozawa and Bellak (2011) point out to the necessity for SSA countries to attract multinationals that are more likely to delocalize labour-intensive tasks in Africa. The authors suggest that this is unlikely to happen for Chinese investors who can benefit from an almost horizontal supply of unskilled and semi-skilled labour in rural China or in its low-cost neighbours at productivity-adjusted wages that are inferior to those currently observed in most African countries.

3. The data and some descriptive analysis

In the present study we use the Africa Investor Survey 2010 (AIS 2010, henceforth), a firm-level database on approximately 6,500 domestic and foreign firms collected by UNIDO in 19 Sub-Saharan African countries. In this work, we focus on foreign investors in the manufacturing sectors for which we have about 1,400 observations.[5] The database contains detailed information on the characteristics of foreign firms (organizational structure, country of origin, market orientation, relationship with local producers, output and production factors prices and quantities, etc.). The questionnaire administered covers also questions related to international trade activities of the firms and to linkages to domestic and foreign producers. With respect to most of previous studies, our

[5] We do not consider service firms, because of missing data on locally sourced inputs.

dataset is not restricted to foreign subsidiaries of MNEs but contains also information on standing alone foreign companies that are not affiliate of an enterprise based in another country.

Some preliminary descriptive analysis are reported in *Table 1* and *Table 2* on, respectively, the frequency of foreign investments by origin and destination country and some key characteristics of the SSA countries considered in our analysis.

Most of the foreign investors come from Europe/Central Asia (517), SSA countries (270), South and East Asia (217 and 163, respectively). Instead, very few investments originate from Latin America (7) and North America (69). In more general terms, the investors coming from high-income countries represent about 70% of the totality.

Table 1. Number of foreign investors by origin and destination country

Origin Destination	***East Asia/Pacific (not China)***	***China***	***Europe/ Central Asia***	***Latin America/ the Caribbean***	***Middle East/ North Africa***	***South Asia***	***SSA***	***North America***	***High income***	***Low income***
Burundi	0	0	9	0	1	1	3	0	10	4
Burkina F.	1	0	3	0	3	0	2	0	7	2
Cameroon	1	4	43	1	4	0	1	3	55	2
Cape V.	0	1	35	0	0	0	1	0	36	1
Ethiopia	4	13	37	0	16	16	14	5	72	33
Ghana	7	12	42	0	17	20	4	8	82	28
Kenya	8	17	102	0	9	53	20	24	165	68
Lesotho	0	28	2	0	0	1	22	0	50	3
Madagascar	1	5	29	0	2	1	20	1	55	4
Mali	1	4	11	0	9	0	11	2	31	7
Mozambique	1	1	44	2	4	0	27	0	71	8
Malawi	0	0	11	0	0	3	8	2	18	6
Niger	0	0	4	0	0	0	5	0	4	5
Nigeria	2	14	31	1	17	20	8	6	69	30
Rwanda	0	2	7	0	2	2	12	6	18	13
Senegal	1	0	27	0	3	1	5	3	34	6
Tanzania	12	0	23	0	7	31	28	3	52	52
Uganda	9	8	40	2	3	61	64	3	69	121
Zambia	1	5	17	1	6	7	15	3	43	12
sub-tot.	49	114	517	7	103	217	270	69	941	405
tot.	1346								1346	

Source: AIS 2010 (UNIDO).

Table 2 Host countries characteristics (year 2009)*

Country	Population (thousands)	GDP/Pop. (US$)	Natural Resources (%GDP)	FDI (%GDP)	Manufacturing (%GDP)	Telephone (per 100 people)	Legal Enforcement contracts index	Property rights protection index
Burundi	8382	192.08	13.29	5.9	8.83	10.6	2.7	3.2
Burkina F.	16468	535.58	7.064	1.4	14.57	21.7	2.1	4.3
Cameroon	19599	1148.02	9.28	17.7	17.71	40.3	2.2	3.5
Cape V.	496	3326.61	0.11	39	n.a.	94.4	n.a.	n.a.
Ethiopia	82950	358.05	4.7	22.9	4.78	6.1	4.9	5
Ghana	24392	1324.2	10.45	20.3	9.46	64.5	5.4	5.4
Kenya	40513	794.81	1.33	5.9	11.82	50.8	4.1	4.6
Lesotho	2171	1004.14	1.25	39.2	19.38	32.6	4	4.6
Madagas.	20714	420.97	3.09	5	13.99	30.7	2.4	3.4
Mali	15370	601.82	15.05	16.4	3.19	25.6	2.6	4.5
Mozamb.	23390	410	8.48	40	15.47	26.5	0	4
Malawi	14901	338.9	4.08	27.8	9.18	17.8	2.2	5.4
Niger	15512	357.79	3.32	2.9	6.35	17.8	2.7	4.2
Nigeria	158000	1281.38	32.56	23.5	2.83	48.2	5.1	4.2
Rwanda	10624	529.93	3.41	3	7.03	23.9	3.7	5.8
Senegal	12434	1037.48	2.38	4.1	15.18	59.3	3.4	3.8
Tanzania	44841	510.69	6.78	31.4	8.69	40.5	6.1	6
Uganda	33424	508.62	4.93	21.98	7.46	29.7	3.9	4.7
Zambia	12927	1253.19	28.12	75.3	11.90	35.3	4.6	5.9

* Data on FDI relative to GDP are drawn from the UNCTAD database (year 2008).

With respect to the destinations countries, the largest number of foreign investors in our dataset are in Kenya (233), Uganda (190), Ghana (110), Ethiopia (105) and Tanzania (104). Madagascar and Niger (9), Burundi (14), Malawi (24) and Rwanda (31) host the lowest numbers of foreign investors. Chinese investments are directed mainly to Lesotho (28), Kenya (17), Nigeria (14), Ethiopia (13) and Ghana (12). The top five host countries of foreign investments (*Table 2*) are the largest in size (proxied by population), have a higher GDP per capita and better infrastructure quality (measured as the number of telephone lines per 100 people). In addition, the most preferred destinations have a more reliable legal system while there is not a clear difference in terms of size of manufacturing and natural resources sectors (measured as percentages of GDP).

The demand for local intermediates, measured as the value of locally purchased inputs over the total costs of production, considerably varies across investors on the basis of their modes of entries (*Table 3*). In particular, investments started as joint-venture turn out to lead to local content shares that are above the whole sample average, while the opposite happens when a foreign firm enters by either acquisition or greenfield. Moreover, focusing on the effects of institutional support to foreign firm, the data show that both IPA support and grant provision to foreign firms is associated to a lower average demand for local inputs.

It is interesting to note that diaspora investments are associated to large average local content shares. Finally, local content shares are rather heterogeneous across different origin and destination countries. The origin countries associated to the largest (average) demand of local intermediates are Latin America (25% of the total demand of inputs), South Asia (19%) and Europe/Central Asia (18%), while the lowest local content shares are recorded in investments coming from Middle East (7%) and China (8%). The share of intermediates purchased by foreign firm in the hosting economy is larger in Kenya (31%), Ethiopia (16%) and Uganda (14.5%). In contrast, countries with the lowest levels of local intermediate inputs in production include Burkina Faso (0.02%), Rwanda (3%), Ghana and Lesotho (4%).

Table 3 Local content share of foreign firm in Sub-Saharan Africa

	Mean	s.d.	10th percentile	90th percentile
ALL SAMPLE	0.1556494	0.241055	0	0.564516
MODE OF ENTRY				
Greenfield	0.1376896	0.228109	0	0.517434
Joint Venture	0.2485696	0.293468	0	0.665701
Acquisition	0.1410138	0.21278	0	0.552366
INSTITUTIONAL SUPPORT				
IPA (Investment Promotion Agency)	0.1211505	0.216022	0	0.459808
Grant	0.1336354	0.225935	0	0.532919
DIASPORA	0.19652	0.25742	0	0.611289
ORIGIN COUNTRY				
High income countries	0.1512443	0.240724	0	0.558275
Low income countries	0.1737044	0.247297	0	0.590116
East Asia and Pacific	0.1281651	0.235634	0	0.549392
Europe /Central Asia	0.1793957	0.253122	0	0.586382
Latin America	0.2526006	0.368717	0	0.942577
Middle East	0.0763264	0.161697	0	0.283272
South Asia	0.1946148	0.260406	0	0.627448
Sub-Saharan Africa	0.1305957	0.217893	0	0.504522
North America	0.1374168	0.247812	0	0.657081
China	0.082171	0.164364	0	0.287817
DESTINATION COUNTRY				
Burundi	0.0687363	0.204415	0	0.613826
Burkina Faso	0.0022669	0.005998	0	0.015868
Cameroon	0.1155237	0.191542	0	0.375565
Cape Verde	0.0526156	0.104351	0	0.219774
Ethiopia	0.167697	0.266155	0	0.629821
Ghana	0.0404482	0.103236	0	0.162198
Kenya	0.3184781	0.302285	0	0.731406
Lesotho	0.046573	0.156134	0	0.154462
Madagascar	0.1270706	0.181361	0	0.391293
Mali	0.0353728	0.143709	0	0.066667
Mozambique	0.1310889	0.192871	0	0.399593
Malawi	0.1011791	0.172201	0	0.373531
Niger	0.1127022	0.249093	0	0.558275
Nigeria	0.1405472	0.238647	0	0.550116
Rwanda	0.0329831	0.123117	0	0.040236
Senegal	0.0635861	0.099699	0	0.201617
Tanzania	0.1666116	0.220353	0	0.478162
Uganda	0.1450538	0.236434	0	0.515022
Zambia	0.1264438	0.190923	0	0.484885
N. obs. =1144				

Source: AIS, 2010.

4. Research design and data description

4.1 The empirical model

The aim of the empirical analysis is to estimate the determinants of vertical linkages to local suppliers that foreign investors generate in Sub-Saharan Africa countries. As in Belderdos et al. (2001), we employ foreign-affiliate cross-sectional data for a single year, 2009, since we lack a panel dimension. However, as in Kiyota et al. (2006, 2007 and 2008) and Gorg et al. (2011), we measure the demand for local inputs through a more refined approach, that relies on a translog cost function (see Hanson et al. 2005). In addition, the richness of information in our database allows us, with respect to the former studies, to further explore the black-box of affiliate heterogeneity. As in Gorg et al. (2011), we empirically test whether the origin country of foreign investments matters in terms of linkage creation.

The definition of our econometric model is based on a the total cost faced by a foreign affiliate *i,* from country *s*, operating in industry *j* and country *c*, $C(p_{ijsc}, y_{ijsc})$. Total costs is a function of input prices (p_{ijsc} is a vector of factor prices) and gross output of the affiliate (y_{ijsc}). In particular, production of y_{ijsc} requires four different inputs: labor (*L*), capital stock (*K*), local intermediate inputs (*D*) and imported intermediate inputs (*M*). Differentiating the second-order Taylor's series approximation in logarithms of the cost function with respect to the local intermediate input price and, using the Shephard's lemma, yields to the following equation:

$$s_{ijsc}^{D} = \frac{\partial \ln C_{ijsc}}{\partial \ln p_{ijsc}^{D}} = \frac{p_{ijsc}^{D}}{C_{ijsc}} \frac{\partial C_{ijsc}}{\partial p_{ijsc}^{D}} = \frac{p_{ijsc}^{D} x_{ijsc}^{D}}{C_{ijsc}} =$$

$$= \ln \alpha_D + \beta_{DL} \ln p_{ijsc}^{L} + \beta_{DK} \ln p_{ijsc}^{K} + \beta_{DD} \ln p_{ijsc}^{D} + \beta_{DM} \ln p_{ijsc}^{M} + \beta_{Dy} \ln y_{ijsc} \qquad (1)$$

where s_{ijsc}^{D} is the cost share of local intermediate inputs; p_{ijsc}^{n}, with $n \in (L, K, D, M)$ is the price of input *n*. Indeed, the larger the value of s_{ijsc}^{D}, the larger the employment of host country's intermediate inputs by the foreign affiliates. Adding further control variables, Z_{ijsc}, and an error term, ε_{ijsc}^{D}, leads to the following equation for the (long-run) demand of local intermediates:

$$s_{ijsc}^{D} = \ln \alpha_D + \beta_{DL} \ln p_{ijsc}^{L} + \beta_{DK} \ln p_{ijsc}^{K} + \beta_{DD} \ln p_{ijsc}^{D} + \beta_{DM} \ln p_{ijsc}^{M} + \beta_{Dy} \ln y_{ijsc} + \gamma Z_{ijsc} + \varepsilon_{ijsc}^{D} \qquad (2)$$

where $\ln \alpha_D = \beta_0$. In equation (2), the local content share of output – our dependent variable – is a function of output, factors' prices and other country and firms specific covariates.

Following Kiyota et al. (2007) we also estimate a *short-run version* of the demand for local intermediates. In the short-term, the substitution of local intermediate inputs with imported intermediate inputs is assumed to be easier than with other production inputs, i.e. labor and capital. Both capital and labor can be taken as fixed factors, as long as it is hard to dismiss capital stock, such as plants and machines, and fire workers in the very short-run. In this case, our dependent variable is the ratio of local inputs to total intermediate inputs, that is, given by the sum of local and imported intermediates. Among the covariates, with respect to equation (2), we use the stock of capital and labor at the affiliate level (K_{ijc} and L_{ijc}) in place of, respectively, the prices of capital and labor. The *short-run version* demand for local intermediates employed in our analysis is:

$$s_{ijsc}^{Dsr} = \beta_0 + \beta_{DL} \ln L_{ijsc} + \beta_{DK} \ln K_{ijsc} + \beta_{DD} \ln p_{ijsc}^{D} + \beta_{DM} \ln p_{ijsc}^{M} + \beta_{Dy} \ln y_{ijsc} + \gamma Z_{ijsc} + \varepsilon_{ijsc}^{D} \qquad (3)$$

Finally note that given that the dependent variables, both the long-run and the short run versions, take on values between 0 and 1, we perform a two-limit Tobit analysis, such as in Belderbos et al. (2001) and Gorg et al. (2011).

(i) Dependent variables and baseline control variables

Our dependent variable, the cost share of local inputs, s_{ijsc}^{D}, is measured as the share of the cost of locally manufactured inputs in total costs. Total costs are given by the sum of costs of capital, labour, local intermediate inputs and imported intermediate inputs. As a measure of the price of capital, p_{ijsc}^{K}, we use the interest rate paid on (long-term) credit by foreign firm *i*, hence we rely on firm specific information instead of using highly aggregate measures as done in other studies[6]. The cost of labour, p_{ijsc}^{K}, is obtained by dividing the total wage bills by the number of employees. Prices of both local and imported intermediate inputs, p_{ijsc}^{M} and p_{ijsc}^{D}, are not observed in our data. As in

[6] Note that using country-level proxies for the cost of capital is rather unsatisfactory when dealing with foreign-owned firms since firms might borrow both from host and home countries financial intermediaries (or even from other firms within the transnational group).

Gorg et al (2011) we control for intermediate prices by using industry-specific dummies.[7] Finally, we introduce the value of total turnover as a measure of the scale of production or total output, y_{ijc}.

In the short-run model, our dependent variable s_{ijsc}^{Dsr}, is defined as the ratio of local intermediate inputs to total intermediates, including both imported and local ones.

(ii) Foreign firms characteristics

The first set of controls included in our analysis are related to the characteristics of the foreign investment. As in former studies (Belberdos et al. 2001; Kiyota et al. 2007, 2008), we include in our analysis: 2-digit industry dummies ($Industry_{j}$), the time since entry of the foreign plant ($Exper_{ijsc}$, and its squared values), the importance of local market in the decision to invest ($Local\ Market_{ijsc}$), the foreign plant-level capital/labour ratio (K/L_{ijsc})[8], a dummy variable equal to 1 when the investment is Greenfield ($Green_{ijsc}$) and a dummy variable equal to 1 when the foreign investor has a local partner ($Local\ Partner_{ijsc}$).

The remaining firm-specific control variables are, as far as we know, an original contribution of our work to the former literature. In more detail, we consider the autonomy of the local management of the foreign firm in capital expenditure ($Management\ Autonomy_{ijsc}$), whether it is a diaspora investment ($Diaspora_{ijc}$), the origin country area of the foreign investor (China, Europe, Latin America, Middle East/North Africa, South Asia, Sub-Saharan Africa, North America) and the ratio of white collars to total employment ($Skill\text{-}Mix_{ijsc}$) as a measure of the skill intensity of the foreign firm. In particular, we expect a positive effect of the diaspora investor status on the generation of linkages, because of higher quality of information about local market with respect to purely foreign investors. Moreover, considering the origin country of investment allows us to take into account firms behaviors that are country-specific. Given the empirical observations illustrated above on Chinese FDI in Africa we are particularly interested in exploring the persistence of the China effect on the creation of vertical linkages – i.e. the empirical observation that Chinese-owned subsidiaries tend to generate few interactions with domestic firms - even after controlling for a rich set of firm-level characteristics.

[7] Gorg et al. (2011) use a 3-digit industries classification, while we rely on 2-digit classification because of the smaller size of our sample. Kyota et al. (2008) assume prices of domestic intermediate inputs to be unobserved and affiliate-specific. Furthermore, they use data from Bank of Japan and IMF to measure prices of imported intermediate inputs; however, neither IMF nor World Bank provide the same data (i.e. c.i.f./f.o.b. imports ratio) for most of the Sub-Saharan African countries in our database.

[8] The ratio is expressed in terms of 10000 US dollars.

(iii) Destination country characteristics

The second set of control variables aims at controlling for some characteristics of the destination countries that might affect the demand of local intermediates from foreign investors. In particular, we control for GDP size (GDP_c), the size of natural resources sector as a percentage of GDP ($Natural\ Resources_c$), the institutional quality ($Contract\ Enforc_c$) and the provision of support to investors through Investment Promotion Agencies (IPA_{ijc}). IPAs have the purpose of reducing transaction costs that are faced by foreign investors by easing their access to information about bureaucratic procedures, business opportunities and factors' costs. The support granted by these agencies vary across countries in SSA. We distinguish between the IPA support at the pre-investment stage ($IPA\_Pre\text{-}entry_{ijc}$), that consists of providing information about the domestic market, availability of supporting infrastructure, corporate taxation and incentives, potential strategic partners, and IPA support at other subsequent stages of the investment process (IPA_Other_{ijc}), such as implementation and aftercare.[9] Furthermore, we also control for the quality of IPA support through the variable $IPA\_Quality_{ijc}$.

It should be noted that although one might expect that IPA assistance might boost the linkages with the local economy, on the other hand foreign firms looking for such assistance – in particular in the pre-enty phase – are more likely to have a reduced knowledge on the local economy and might suffer more that non-assisted foreign firms from strong information asymmetries (and in turn generate less linkages). This implies that the expected sign of these variables might be ambiguous.

4. Econometric results

In *Table 4* we report the results from the estimation of the long-run demand for local linkages where we focus on firm-level characteristics and include country of origin fixed effects. Starting with the main variables included in the cost function (prices of labour and capital, and total sales), we observe that the larger the cost of capital the larger the demand for local inputs. The intuition follows from the fact that capital, at least in the long-run, is a substitute of the other inputs. No significant effects are found for unit wages and total sales.

The length of operation in the host country, i.e. years since entry, significantly affects the demand of local intermediates in a non-linear fashion. Firms with a longer experience in the local market tend to rely more on locally sourced intermediate inputs. Foreign investors might rely more and

[9] Notice that the survey records the IPA support for a firm only if it is rated as important by the interviewee.

more on local inputs over time as they increase their direct knowledge of them and try to reduce the risk from international transactions. Recent evidence from Romania by Melverde et al. (2011) confirms the nonlinearity of the effects of FDI time of entry on spillovers to domestic firms. The authors find the exhaustion of the spillover effect after some years since the entry of the foreign firm. The finding is important in the context of SSA since the low observed propensity of foreign firms to generate local linkages might partly be explained by the relatively recent vintage of FDI in the African continent.

We find that the skill mix of the foreign subsidiary negatively affects the demand of local intermediates. A higher skill mix might signal a larger importance of firm-specific intangible assets; the negative sign might be related to a lower likelihood/ability of foreign firm to outsource production phases to local producers, in particular in developing countries with a relatively low human capital endowment (see Irsova and Havranek 2013).[10]

FDI motivated by the entry in the local market – horizontal FDI – positively affect the demand for local intermediate inputs. Indeed, employing local inputs is an efficient choice for foreign companies targeting the local market for final goods.

The mode of entry of investors in SSA is also a fundamental determinant of local sourcing of inputs; as in the former literature (Belberdos et al. 2001 and Kiyota et al. 2007, 2008) the results show that greenfield investments are less likely to generate backward linkages compared to mergers and acquisitions (Balsvick and Haller 2010). We also find that local partnership enhances production connections between foreign investors and local input suppliers.

[10] Kiyota et al. (2008) use a similar argument when they explain the expected negative sign of the capital-labour ratio of the MNE headquarters. We also use as a control variable the capital-labour ratio but measured at the foreign plant level. Since our measure might be strongly affected by local economic conditions, we think that skill mix ratio can be a better proxy for intangible assets of the parent company.

Table 4 The demand for local inputs (Long-Run version)

Dependent variables: share of local inputs costs over total costs

	Mod (1)	*Mod (2)*	*Mod (3)*	*Mod (4)*	*Mod (5)*
p^L	-0.0002	-0.010	-0.011	-0.007	-0.012
	0.014	0.014	0.014	0.015	0.015
p^K	0.075**	0.068**	0.076**	0.063**	0.009
	0.030	0.031	0.031	0.031	0.036
Y	0.005	0.010	0.005	0.003	-0.001
	0.009	0.009	0.009	0.009	0.090
Exper	0.005***	0.005**	0.005**	0.004**	0.003*
	0.002	0.002	0.002	0.002	0.002
Exper2	-0.00006**	-0.00006**	-0.00005**	-0.00005**	-0.00005**
	0.00002	0.00002	0.00002	0.00002	0.00002
KL	0.024**	0.024***	0.023**	0.021**	0.005
	0.009	0.009	0.009	0.009	0.009
Management Autonomy	0.079**	0.081**	0.050	0.053	0.048
	0.035	0.035	0.036	0.036	0.035
Diaspora		0.101**	0.113**	0.114**	0.067
		0.047	0.047	0.047	0.045
China		-0.223**	-0.183*	-0.189**	-0.197**
		0.095	0.095	0.094	0.090
Europe		-0.057	-0.030	-0.026	-0.021
		0.081	0.081	0.080	0.076
Latin America		0.141	0.147	0.151	0.220
		0.202	0.199	0.200	0.186
MENA		-0.298***	-0.256***	-0.243**	-0.202**
		0.097	0.096	0.096	0.092
South Asia		-0.082	-0.060	-0.074	-0.125
		0.085	0.085	0.084	0.079
SSA		-0.143*	-0.115	-0.107	-0.097
		0.085	0.084	0.084	0.080
North America		-0.175*	-0.136	-0.146	-0.173*
		0.102	0.102	0.101	0.096
Green			-0.066**	-0.074**	-0.054*
			0.033	0.034	0.032
Local Partner			0.103***	0.097***	0.068*
			0.036	0.037	0.036
Skill Mix				-0.229**	-0.216**
				0.102	0.100
Local Market				0.102***	0.065**
				0.031	0.030
Pseudo R2	0.041	0.064	0.082	0.098	0.180
N° obs.	1070	1046	1040	1017	1017
Industry dummy	YES	YES	YES	YES	YES
Destionation country dummy	NO	NO	NO	NO	YES

Note: Tobit estimation. Standard errors are reported below coefficients. *,**,*** mean significant at, respectively, 10%, 5%, 1% level.

With respect to the origin countries of investors, we find that, *ceteris paribus*, investors from China and from the Middle East and North Africa (MENA) are associated with a reduced share of intermediates sourced from local suppliers. In the case of MENA countries the result could be driven by the short distance between the origin and the destination of the investment that reduces

the advantage of purchasing intermediate inputs from the local market rather than to import them from abroad (Rodriguez-Clare 1996). The negative linkage effect associated with China should be explained on different premises. In our estimation we control for the sector of the investment and other feature of the foreign subsidiary as local management autonomy. Hence the finding of a low propensity to generate local linkages of Chinese investors is not due to the extractive nature of a large part of Chinese investments in SSA as highlighted by Morrisey (2010). One potential candidate for explaining this finding is cultural and language distance which are likely to play in the opposite direction of geographical distance; higher language barriers imply higher transaction costs involved in foreign subsidiary – domestic firms relationship compared to those with the headquarters or other input providers in China.

Interestingly, we find that diaspora investments tend to generate larger backward linkages. This finding seems to confirm the important role of return migrants and diaspora members for development of their origin countries as they enjoy a particularly favourable position which allows them to be bridges between the economies of their origin and the destination countries.

Finally, we find some weak evidence on a positive effect of the degree of autonomy of local management.[11]

In the last specification shown in *Table 4* we introduce destination countries fixed effects. Most of the results highlighted above are confirmed.

The results of the estimation of the short-run version of the demand of local inputs are reported in *Table 5*. In the short-run, capital and labour are assumed to be fixed so that their prices do not affect the decision on intermediate inputs sourcing. Thus, capital rental rate and average unit wage are replaced by the stocks of, respectively, capital and labour.[12] The main effects found in the long-run specifications are confirmed in the short-run specifications. The only exceptions are firm's years since entry and the China dummy which preserve the signs but are weakly significant. Note that the effects of capital and labour stocks, that are, respectively, positive and negative, confirm what found in the long-run models: the larger the capital intensity, the larger the reliance on local suppliers of intermediates. On the contrary the larger the labour intensity - aspects which characterize several Chinese investments in light manufacturing in SSA - the lower the share of inputs sourced locally.

[11] The sign of this coefficient is positive but not statistically significant once we introduce more controls on the mode of entry and other characteristics of the foreign investor.
[12] By analogy we exclude the capital- labour ratio from the short-run specifications.

Table 5 The demand for local inputs (Short-Run version)

Dependent variables: share of local inputs costs over total costs of intermediate inputs

	Mod (1)	*Mod (2)*	*Mod (3)*	*Mod (4)*	*Mod (5)*
L	-0.042*	-0.038	-0.043*	-0.061**	-0.069***
	0.023	0.023	0.023	0.026	0.025
K	0.039**	0.037***	0.033**	0.027*	-0.002
	0.014	0.0142	0.014	0.014	0.014
Y	-0.008	-0.007	-0.010	-0.003	0.010
	0.017	0.017	0.017	0.017	0.017
Exper	0.008***	0.008***	0.008**	0.007**	0.005
	0.003	0.003	0.003	0.003	0.003
Exper2	-0.00007*	-0.00007**	-0.00007*	-0.00006	-0.00004
	0.00004	0.00004	0.00004	0.00004	0.00003
Management Autonomy	0.122**	0.115**	0.066	0.072	0.063
	0.052	0.052	0.053	0.0530	0.051
Diaspora		0.141**	0.159**	0.155**	0.080
		0.070	0.070	0.070	0.067
China		-0.257*	-0.204	-0.203	-0.185
		0.141	0.139	0.138	0.131
Europe		-0.010	-0.073	-0.064	-0.056
		0.122	0.120	0.119	0.113
Latin America		0.217	0.216	0.223	0.300
		0.317	0.313	0.306	0.291
MENA		-0.373***	-0.320**	-0.298**	-0.258**
		0.143	0.141	0.139	0.133
South Asia		-0.104	-0.074	-0.102	-0.183
		0.127	0.126	0.124	0.117
SSA		-0.231*	-0.199	-0.185	-0.171
		0.127	0.126	0.124	0.118
North America		-0.233	-0.173	-0.171	-0.208
		0.152	0.152	0.150	0.141
Green			-0.114**	-0.131***	-0.100**
			0.049	0.050	0.047
Local Partner			0.155***	0.159***	0.132**
			0.053	0.054	0.052
Skill-Mix				-0.472***	-0.626***
				0.164	0.162
Local Market				0.141***	0.101**
				0.045	0.044
Pseudo R2	0.029	0.040	0.053	0.066	0.123
N° obs.	1183	1155	1147	1115	1115
Industry dummy	YES	YES	YES	YES	YES
Destination country dummy	NO	NO	NO	NO	YES

Note: Tobit estimation. Standard errors are reported below coefficients. *,**,*** mean significant at, respectively, 10%, 5%, 1% level.

Table 6 shows the results from specifications which include destination-country control variables[13]. GDP size significantly and positively affects linkages to local suppliers. Larger economies have a larger number of potential suppliers for foreign enterprises and, then, a larger probability for

[13] In what follows we will comment only the new covariates included; firm-level co-variates employed in previous specifications retain the sign and the statistical significance highlighted above.

linkages to materialize. Moreover, we find that the larger the reliance of the economy on natural resources the lower the likelihood of sourcing from local suppliers by foreign investors. The latter result is consistent with what found in Nunnekamp and Spatz (2004) and, indirectly, in Kiyota et al. (2007, 2008): economies relying more on natural resources are more likely to attract resource-seeking FDI which, in turn, generate few linkages to local firms and labour market. We include in column (3), a variable which captures the ability of the host-country legal system to guarantee the enforcement of contracts and we find a positive and significant coefficient. An efficient legal system is crucial in generating a good environment for foreign investors (as emphasized by Asiedu 2006) and at the same time for enhancing the absorptive capacity of the host country (Buchanan et al. 2012). The finding is also related to recent theoretical contributions on incomplete contracts applied to international sourcing (see Antràs 2003, 2005): if contracts are more likely to be enforced by an efficient legal system, then, ceteris paribus, foreign investors will prefer forms of out-sourcing to those of in-sourcing. In terms of our model, this would mean that intermediates are more likely to be out-sourced by local suppliers than in-sourced through imports from the parent company.

Interestingly we find that the support received by IPAs (Investment Promotion Agencies) of the SSA countries considered in our study, in particular during the pre-entry phase of the investment, is negatively associated to local sourcing strategies. This result could be driven by information asymmetry problems: foreign firms with a limited knowledge of the host country economy might be more likely to seek assistance from IPAs. Hence the result might be due to self-selection of less-domestically-connected firms into IPAs assistance. The result is robust to the inclusion of foreign firms assessment of the quality of IPA service ($IPA\_Quality_{ijc}$).

Table 6 The demand for local inputs: the role of host-country characteristics (Long-Run version)

Dependent variables: share of local inputs costs over total costs

	Mod (1)	Mod (2)	Mod (3)	Mod (4)	Mod (5)	Mod (6)
p^L	-0.002	-0.010	0.001	0.014	-0.011	-0.010
	0.015	0.014	0.015	-0.37	0.015	0.015
p^K	0.043	0.071**	0.059*	0.063**	0.061*	0.064**
	0.031	0.031	0.032	0.031	0.031	0.031
Y	0.002	0.004	0.001	0.007	0.002	0.007
	0.009	0.009	0.009	0.009	0.009	0.009
Experience	0.004*	0.005**	0.004**	0.003*	0.004**	0.003
	0.002	0.002	0.002	0.002	0.002	0.002
Exper2	-0.00005*	-0.00005**	-0.00005**	-0.00004*	-0.00005**	-0.00004
	0.00002	0.00002	0.00002	0.00002	0.00002	0.00002
KL ratio	0.014	0.021**	0.019**	0.018*	0.021**	0.015*
	0.010	0.009	0.010	0.009	0.009	0.009
Management Autonomy	0.042	0.062*	0.049	0.057	0.056	0.065*
	0.036	0.036	0.037	0.035	0.036	0.035
Diaspora	0.111**	0.105**	0.122**	0.118**	0.116**	0.115**
	0.047	0.047	0.047	0.047	0.047	0.046
China	-0.173*	-0.188**	-0.193**	-0.179*	-0.184**	-0.183**
	0.093	0.093	0.095	0.093	0.094	0.092
MENA	-0.257***	-0.222**	-0.257***	-0.215**	-0.244**	-0.220**
	0.095	0.095	0.097	0.095	0.095	0.094
Green	-0.067**	-0.075**	-0.070**	-0.079**	-0.076**	-0.070**
	0.033	0.033	0.034	0.033	0.033	0.033
Local partner	0.084**	0.092**	0.091**	0.084**	0.090**	0.087**
	0.037	0.037	0.038	0.037	0.037	0.036
Skill-Mix	-0.243**	-0.216**	-0.210**	-0.254**	-0.214**	-0.252**
	0.102	0.101	0.104	0.103	0.102	0.102
Local market	0.010***	0.101***	0.105***	0.112**	0.101***	0.114***
	0.031	0.031	0.032	0.031	0.031	0.030
IPA_Pre-entry				-0.099***		-0.075**
				0.033		0.034
IPA_Other					-0.060*	
					0.032	
IPA_Quality						-0.072**
						0.032
GDP	0.069***					
	0.018					
Natural Resources		-0.005***				
		0.002				
Contract Enforcement			0.0219**			
			0.011			
Pseudo R2	0.1095	0.1041	0.1009	0.1082	0.1005	0.1133
N° .obs.	1017	1017	989	998	1010	994
Industry dummy	YES	YES	YES	YES	YES	YES

Note: Tobit estimation. Standard errors are reported below coefficients. *,**,*** mean significant at, respectively, 10%, 5%, 1% level.

5. Conclusions

The promotion of linkages between foreign firms and domestic ones is very high on the policy agenda of many countries across the globe. In fact foreign investors that generate substantial linkages with domestic firms are more likely to create extensive benefits to the host country economy, in particular in developing countries.

This paper contributes to the empirical literature on the determinants of backward linkages, i.e. foreign investors' choice of sourcing (intermediate) inputs from local suppliers. We employ data from the Africa Investor Survey (2010), provided by UNIDO on a large sample of foreign investors in 19 Sub-Saharan Africa countries. Our empirical strategy follows that proposed by Kiyota et al. (2007, 2008) and is based on the estimation of a trans-log cost function.

To our knowledge this is the first study on the determinants of backward linkages between foreign and domestic firms which focus on a large sample of developing countries and does not focus on a single origin country (like Kiyota et al. (2007, 2008) and Belberdos et al. (2001) which focus on Japanese multinational) or destination country (Gorg et al. 2011). The richness of the information contained in the dataset allows us to analyze the importance of a wide set of covariates at the firm-level and to test the importance of host-country characteristics.

Our study suggests some policy actions that Sub-Saharan African governments, and more in general developing countries, might implement in order to maximize linkages creation. First, FDI attraction measures should give priority to foreign investors operating in sectors where the 'technological gap' with domestic firms is not too high. The attraction of high-tech foreign firms is often the utmost 'dream' of IPAs around the globe, but this enthusiasm should be weighted against the high likelihood that these firms will generate little and very unsophisticated linkages with domestic firms in a developing country. Priority should be given to foreign firms operating in sectors where there are already 'seeds of potential development'.

Second, the attraction policies should prioritize firms, like diasporas investors and market-seeking investors, which are more likely to generate substantial linkages and promote the internationalization of the host economy.

A second line of intervention is that of implementing policies aimed at facilitating partnership between domestic and foreign firms since the entry phase. IPAs might play a fundamental role by

providing assistance and information to both potential investors and domestic suppliers/buyers. In this regard, our analysis suggests that it is likely that foreign firms which demand (pre-entry) assistance from IPAs are those endowed with limited information on the host-economy and might, at least initially, generate limited linkages.

Finally, policymakers should not disregard the importance of building effective markets and institutions. An efficient legal system and, more in general, a good environment for private business are crucial in promoting foreign investments as well as in boosting the likelihood of linkages with domestic firms.

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Appendix

In our empirical analysis we consider local intermediate inputs as substitute of imported intermediates (and, further, of capital and labour). In our data, as shown in Table A.1 in this Appendix, on average, 49.20% of intermediates are imported, while 21.8 % are locally manufactured.

Table A.1 Supplying channels of inputs (%)

	mean	sd	10th perc.	90th perc.
Imported through the foreign Parent company	14.48	31.27	0	80
Imported directly by this company	49.20	41.98	0	100
Imported by local importer	10.56	22.76	0	35
Locally manufactured input	21.84	32.41	0	80
other	1.99	12.86	0	0

Table A.2. Variable employed in the empirical analysis			
Variable	*Definition*	*Expected sign*	*Source*
Baseline variables			
s_{ijsc}^{D}	Share of the cost of local intermediate inputs in total costs.		AIS 2010
s_{ijsc}^{Dsr}	Share of local intermediate inputs in total intermediates		AIS 2010
p_{ijsc}^{K}	Log of interest rate paid on long-term credit	?	AIS 2010
p_{ijsc}^{L}	Log of total wage bills divided by the number of employees	?	AIS 2010
y_{ijsc}	Log of sales/turnover over the last financial year	?	AIS 2010
K_{ijsc}	Log of the value of fixed assets at the end of the last financial year	?	AIS 2010
L_{ijsc}	Log of the number of full time employees in the last financial year	?	AIS 2010
Controls for the origin of the investment			
$Industry_j$	2-digit industry dummy	?	AIS 2010
$Exper_{ijsc}$	Year of the survey (2010) minus year of the original investment	+	AIS 2010
$Exper2_{ijsc}$	$EXPER_{ijsc}$ squared	-	AIS 2010
KL_{ijsc}	Log of capital-labour ratio	-	AIS 2010
$Management\ Autonomy_{ijsc}$	1-0 dummy variable taking on value 1 if the local management is strongly autonomous in capital expenditure and 0 otherwise	+	AIS 2010
$Diaspora_{ijsc}$	1-0 dummy variable taking on value 1 either if the foreign investment is a diaspora investment or if the main source of awareness for opportunity to invest is a diaspora community	+	AIS 2010
$Green_{ijsc}$	1-0 dummy variable taking on value 1 if the initial investment took place as a new operation by a wholly owned enterprise and 0 otherwise	-	AIS 2010
$LocalPartner_{ijsc}$	1-0 dummy variable taking on value 1 if the foreign company has a local partner and 0 otherwise	+	AIS 2010
$Skill\text{-}Mix_{ijsc}$	Log of the ratio of white collars to total employment	-	AIS 2010
$LocalMarket_{ijsc}$	1-0 dummy variable taking on value 1 if local market is very important or crucial in the company's decision to invest and 0 otherwise	+	AIS 2010
$Origin_s$	Dummy variable indicating the country origin of the investment: *China*, *Europe*, Latin America and Caribbean (*Latin America*), Middle East and North Africa (*MENA*), *South Asia*, Sub-Saharan Africa (*SSA*), *North America*	?	AIS 2010
Controls for the destination of the investment			
GDP_s	Log of GDP size (in US dollars)	+	World Bank (2010)
$Nat\ Resources_s$	Total natural resources rents (%GDP).	-	World Bank (2010)
$Contract\ Enforcement_s$	Legal enforcement of contracts index	+	Economic Freedom of the World (2008)
$IPA\_Pre\text{-}entry_{ijs}$	1-0 dummy taking on value 1 in case of IPA support at the pre-entry stage and 0 otherwise	?	AIS 2010
IPA_Other_{ijs}	1-0 dummy taking on value 1 in case of IPA support at the entry, implementation, operation/aftercare stages.	?	AIS 2010
$IPA\_Quality_{ijs}$	1-0 dummy taking on value 1 if IPA support is evaluated as useful (at least) from the company	?	AIS 2010
RTA_{ijs}	1-0 dummy taking on value 1 if the most important aspect of regional trade agreement for the company's business is increased regional investment opportunities	+	AIS 2010

Table A.3. Descriptive statistics of the main covariates					
	mean	***s.d.***	***min***	***max***	***n.obs.***
LCS – local content share	0.1556494	0.2410552	0	0.9947794	1144
Y – output	1.07E+08	3.18E+09	0	1.17E+11	1.34E+03
Exper	18.10712	16.73628	0	141	1391
*KL(*10000$)*	105.416	3344.297	0	119338.8	1274
Skill-Mix	0.3124404	0.2593223	0	5.882353	1318
	% in the sample				
IPA	50.07%				1380
IPA_Pre-entry	29.11%				1309
Green	66.88%				1377
Local Partner	25.50%				1392
Local Market	59.46%				1332
Diaspora	11.17%				1363
Management Autonomy	73.88%				1359

Table A.4.
Correlation matrix

	pL	pK	Y	Exper	KL	Manage-ment Autonomy	Diaspora	Green	Local Partner	Skill Mix	Local Market
pL	1										
pK	0.0021	1									
Y	0.0001	0.0072	1								
Exper	0.0052	0.0608	0.0159	1							
KL	-0.0026	0.017	0.015	-0.0074	1						
Manage-ment Autonomy	-0.05	0.0671	-0.0552	-0.0914	0.0162	1					
Diaspora	-0.0186	0.0541	-0.0106	0.0206	-0.0102	0.0102	1				
Green	0.0237	0.0043	0.0212	0.0292	0.0215	-0.0786	0.06	1			
Local partner	-0.0231	0.0067	-0.0174	0.038	-0.0176	0.1937	-0.0505	-0.4596	1		
Skill-Mix	0.0358	0.0195	0	0.0984	-0.0222	-0.0251	-0.0249	-0.048	0.085	1	
Local Market	0.0357	0.1073	0.0248	0.0563	0.0251	0.0979	0.0141	-0.0389	0.107	0.076	1

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