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No. 1893 | January 2014

Web: www.ifw-kiel.de

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Multinationals in Sub-Saharan Africa: Domestic Linkages and Institutional Distance*

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Abstract:
This paper analyzes the role of institutional distance in the establishment of domestic linkages by multinational enterprises in a cross- section of 19 Sub- Saharan countries. Investors' familiarity with formal and informal procedures in the host country lowers uncertainty and facilitates networking with local firms. Hence, a similar degree of institutional development boosts linkages between domestic firms and multinationals. Using a novel dataset from the 2010 Africa Investor Survey by UNIDO we find that institutional distance in terms of contract enforcement deters the domestic linkage in host countries with worse institutions relative to the origin country. Additionally, institutional distance matters more for multinationals from the north. The paper sums to the literature on domestic linkages by including the understudied institutional dimension, to the still scarce literature on South- South FDI in least developed countries and contributes to the definition of clearer targets for foreign investment policies.

Keywords: Multinational Firms, South- South, Backward Linkages, Institutions.

JEL classification: : F14, F23, O19

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*The authors wish to thank Holger Görg, Nicola Coniglio, Giorgia Giovannetti, Peter Nunnenkamp, Anders Isaksson and participants at the 15th ETSG Conference in Birmingham, at the 4th International Conference on Economics of Global Interactions in Bari and at the Lunch Time Seminar in International Economics at the Kiel Institute for the World Economy for helpful comments and suggestions on earlier drafts.

1. Introduction

The establishment of domestic linkages by multinational enterprises (MNE's) and its relevance in promoting industrial development has been the focus of numerous academic studies and a frequent target of investment policies. There is a common consensus that linkages from foreign affiliates to domestic firms can enhance the benefits from FDI (UNCTAD, 2001). In this regard, local sourcing is seen as a win- win process where local firms benefit from higher demand and employment as well as potential technology and know- how transfer while MNE's benefit from lower costs, specialization gains and better adaptation to local market. Literature on FDI spillovers has also identified the vertical backward linkage as the main driver for positive externalities to the local economy[1]. A proper understanding of the factors that drive multinationals to source locally is therefore crucial for the design of adequate investment policies. While literature on the subject has traditionally focused on the analysis of foreign investor characteristics that boost the local linkage, no study has specifically looked at the impact of host country institutions on the domestic linkage. We aim to fill this gap and additionally, expand on this issue by arguing that not all investors care about host country institutions to the same extent since also *home country* institutional background plays a crucial role. Building on the literature on South-South[2] at the macro level, the literature on domestic linkages determinants and transaction costs economics we develop our research hypothesis, namely that larger institutional distance will deter the domestic linkage since unfamiliarity of the foreign investor with informal procedures and the way of doing business in the host country may impede efficient interaction with local suppliers. Therefore, one would expect that institutional distance is negatively related to the size of the domestic linkage. This effect is especially relevant for least developed host countries, as is the case of Sub-Saharan Africa, with relative poor institutional backgrounds and where foreign investors face significant degrees of uncertainty.

Investor's familiarity with the way of doing business at both the formal and informal level in the host country reduces perceived transaction costs and will increase its ability to establish contacts with local suppliers. Indeed when governance is poor, knowledge of informal procedures becomes crucial. Institutional homogeneity facilitates networking with local firms and reduces concerns about reliability of local suppliers.

We look into two institutional aspects that are more likely to have a direct impact on the decision of local supplying, namely *contract enforcement* and *control of corruption*. If the MNE perceives that the system at the host country is not able to guarantee contract enforcement local supplying becomes a more risky activity and therefore the multinational would prefer to internalize production or to import intermediates. In a similar way the level of corruption might discourage investors coming from better institutional backgrounds to interact with local suppliers since they can be relatively more reluctant to engage in practices such as bribery (Lall, 1983; Wells, 1983; Dixit, 2011). We first analyze the effect of institutional distance on the linkage in absolute

[1] See Görg and Strobl (2001) for a review on this literature branch or the seminal paper by Javorcik (2004).

[2] "North" refers to industrialized countries and "South" refers to developing economies as defined in The International Yearbook of Industrial Statistics (UNIDO, 2010).

terms. However as pointed out by Aleksynska and Havrylchyk (2012) the effect of facing better institutions or worse institutions might drive MNE behavior towards local sourcing in opposite ways. Therefore in a further step we disaggregate our main dependent variable into positive and negative institutional distance and address their impact on the domestic linkage separately.

To recapitulate, we explore in this paper the relationship between institutional distance and domestic linkages by multinationals in 19 Sub- Saharan countries aiming to answer the following questions: Does institutional distance deter the domestic linkage? Do southern and northern firms behave differently towards local sourcing? Does institutional distance play a different role for southern and northern firms?

We further develop these ideas in the next section while reviewing the main literature on each topic.

The contribution of the study is substantial and helps the definition of clearer targets for foreign investment policies. Mainly two features of the study highlight its relevance. Firstly, it contributes to and brings together insights from the literature on domestic linkages determinants and analysis of host country effects of South-South FDI by analyzing the effects of institutional distance as a significant domestic linkage determinant. Secondly, it focuses on Sub-Saharan Africa, a region that remains understudied due to scarcity of quality firm level data and where weak institutions have been commonly pointed out as an obstacle to foreign investments. We find that contract enforcement being worse than at home, i.e. negative institutional distance, has a negative impact on the domestic linkage and this effect is larger for northern firms that seem to care more about institutional distance relative to southern firms. Factors like being engaged in a joint venture or sharing a common colonial past seem be more relevant factors for the linkage generation of southern multinationals. Institutional proximity (contract enforcement), cultural proximity (common colonizer) and technological proximity (R&D intensity) seem to play a role for the linkage generation.

The rest of the paper is organized as follows: section two frames the paper into the literature. Section 3 describes the data. Section 4 presents the methodology and discusses the estimation results and section 5 concludes.

2. Literature review

What drives the domestic linkage?

Literature on determinants of backward linkages and FDI has identified a number of drivers behind the local supplying choice by multinationals. A way to think about these factors is to classify them into three main categories, the first one relating to characteristics of the foreign investor, the second regarding domestic firms characteristics and a third one relating to the institutional environment in the host country. While the bulk of the literature on the subject has focused in the first and second type of drivers, little attention has been paid to the host country institutional quality impact in the local sourcing decision by the MNE. However, as it has been traditionally reported by the literature on transaction costs, institutions play a key role in shaping inter-firm relationships (North, 1992 inter alia) and hence, we argue that they necessarily will have an impact on the MNE- local supplier's interaction.

Several foreign *investor characteristics* have been identified as determinants of domestic linkages in the economic development and international management literature. In this sense, evidence has been found on the significant role played by the type of investment where market- seeking FDI tends to benefit from long term and more stable relations with suppliers relative to resource- seeking, efficiency- seeking or asset-seeking FDI (Dunning and Rojec, 1993). MNE's *ownership structure* is also identified as a linkage determinant with joint ventures establishing more linkages than fully owned subsidiaries (Belberdos et al. 2001, Kiyota et al. 2008). The third driving factor is the *autonomy of the subsidiary*, with more independent subsidiaries sourcing more locally (Jindra et al. 2009). An additional factor commonly pointed out as a linkage driver is the geographical distance between home and host economy. In this sense, the larger the distance the higher the trade costs and therefore the more profitable would be for the multinational to source locally (Rodriguez and Clare, 1996). Consistent empirical evidence of the four factors has been found for Sub- Saharan African by Amendolagine et al (2013) using, as we do, the UNIDO Africa Investor dataset. Regarding *domestic firms' characteristics*, Javorcik and Spatareanu (2009) find that suppliers to multinationals are larger, have a higher capital-labor ratio, pay higher wages and exhibit a higher productivity level.

We now turn to the third type of drivers and focus of our analysis, namely the *institutional determinants* of the local sourcing decision by the MNE. As stated by literature on transaction costs (North 1991, 1992), a key function of governance institutions[3] is to allow economic agents to cope with the uncertainties involved in economic exchange as "they provide the rules of how exchanges are to be made and the mechanisms enforcing them". When a foreign investor operates in a new country, she faces higher transaction costs relative to the home country since she lacks information about the local market and supplier networks and she faces higher uncertainty about reliability of local suppliers and quality of inputs. As Dixit (2011) points out "insecurity in economic activity is greater when transactions cross national borders and investors face greater concerns about security of their contracts when enforcement is in hands of foreign governments and courts". Therefore, a good institutional framework that guarantees contracts enforcement and transparency will reduce foreign investor's perceived risk and facilitate linkages with local suppliers. In developing economies, where relative weak institutions, as perceived by the foreign investor, might discourage the domestic linkage (UNCTAD, 2001) this question becomes especially important. So is the case of Sub- Saharan African where corruption and political instability strongly and negatively affect FDI inflows (Asiedu, 2006).

Although the impact of host country institutions on size, composition and type of FDI flows has been largely explored at the empirical macro level[4], their role as domestic linkage driver remains unexplored by the empirical literature. To our knowledge the only study that directly includes an institutional variable as local linkage determinant is the work by Amendolagine et al. (2013) who found evidence that indeed higher host-

[3] Strictly speaking, institutions are the instruments of governance and good institutions support and promote good governance. Although the two terms are not exactly the same, they are often used as synonyms.

[4] See, for example, Zurawicki and Habib (2010), Cuervo- Cazurra (2006), Asediu (2006), Wei (2000), Javorcik and Wei (2001). Broadly speaking, empirical evidence is consistent in showing that poor institutions deter FDI inflows, promote joint ventures over fully owned subsidiaries and attract more resource- seeking relative to market-seeking FDI.

country ability to guarantee contract enforcement promotes the domestic linkage. These authors they find that indeed investor origin matters for linkage generation, arguing that cultural and language distance might be playing a role. However they do not address this question directly and do not account for institutional level in the origin country. We add on their work by including in our analysis a number of bilateral variables accounting for institutional distance and cultural tights between host and home country.

Clearly, when addressing the issue of MNEs behavior and institutions, particularly contract enforcement, there exist an important connection with the theoretical literature on multinational firm boundaries and international organization of production with incomplete contracts as modeled by Antràs (2003, 2005), Antràs and Helpman (2004) and Grosmann and Helpman (2004) inter alia. Although the focus of this paper is on the impact of institutions on firm- firm relationships, more specifically MNE- local supplier relationships, rather than in the integration versus outsourcing decision within a firm, the analysis of arms- length transactions and related problems derived from incomplete contractibility is a common ground with the literature on MNE boundaries. In this regard more effective contract enforcement would encourage outsourcing over production within the firm. The empirical literature that tests predictions of these models, such as Nunn and Treffler (2008) and Corcos et al. (2012), concentrates on analyzing intra- firm import flows rather domestic sourcing of intermediates. Therefore, although in a complementary way we address the institutional impact on MNEs behavior from the host country perspective which allows us to look at the direct connection with domestic producers.

We additionally go one step further in the analysis of the impact of host country institutions on the domestic linkage and argue that, the sensitivity to host- country institutional quality of the local sourcing decision by the foreign investor might not be the same across investor's origins since also *home country* institutional environment plays a crucial role. In this sense, institutional proximity will allow the multinational to better cope with the new environment facilitating labor relationships and networking with local firms; therefore, they will perceive interacting with local manufacturers as less risky. Putting it in terms of transaction costs, a foreign investor would face lower uncertainty if procedures and rules governing economic exchange in the origin country are close to those in the host country. In other words, the larger the *institutional distance* between host and home country, the larger the transaction costs faced by the foreign investor and hence the less likely the interaction with domestic suppliers is expected to be. This statement and the notion of *institutional distance* directly relate to the special features of South- South FDI flows and its effects on the host country that we review in the following subsection.

What is special about southern multinationals?

Outward foreign direct investment (FDI) from developing economies has increased dramatically in the last decade. According to UNCTAD (2013), FDI from developing and transition economies accounted for 31% of the total outflows in 2012. It has also been observed that these new *emerging multinationals* tend to locate their investments in other developing economies, giving rise to the so called South- South FDI flows. Determinants and location patterns of this new investment differ from those traditionally identified by the literature on

North- South flows. Thus, effects for the host country might also differ from the traditional ones. Indeed cultural and institutional proximity have been often pointed out as a comparative advantage specific to South-South investors that can promote linkages and generate positive externalities to the local economy[5].

When analyzing effects of South- South relative to North- South investment flows, the notion of *institutional distance* has remarkable implications. Despite its relevance, the idea of institutional distance is relatively novel and has only been explored at the macroeconomic level. For instance, Cuervo- Cazurra (2006) analyzes bilateral FDI flows from 183 origin countries to 106 host economies and finds out that corruption reduces FDI inflows but also changes the composition in terms of country of origin. He finds two main effects: first, less flows from the countries that have signed the OECD convention against corruption[6] and second, larger flows from countries with higher levels of corruption. These results imply that not all investors care about corruption in the host country to the same extent and suggest a role for institutional distance even though the author does not explicitly introduce the concept until a later study by Cuervo- Cazurra and Genc (2008). The paper focuses on the South- South dimension of FDI and claims that although emerging MNE's face disadvantages in terms of size, technology and management techniques relative to more developed MNE's, the ability to cope with poor institutions might become a source of advantage if the destination of the investment has a similar institutional development degree.

In a similar fashion, Bénassy- Quere et al. (2007) estimate a gravity equation to study the impact of institutional distance on bilateral FDI flows using data for developed and developing countries for the 1985–2000 period. They find that institutions are relevant in determining the size of bilateral FDI flows independently of the level of GDP per capita. Moreover, they claim that institutional distance is more important than the quality of institutions in the host country and point out the relevance of this finding for the rising South- South trend of FDI. Also, Aleksynska and Havrylchyk (2012) analyze the impact of institutional distance and natural resources endowment in South- South FDI flows using data from 60 developing and 22 developed economies between 1996 and 2007. They distinguish between positive and negative institutional distance if the host country has, respectively, better or worse institutions than the origin country. They find that large institutional distance has a negative effect on FDI flows and additionally point out that for the case of resource- seeking FDI, poor institutions are not seen as a problem and they can even be considered as an advantage to obtain special privileges over the natural resource.

Also importantly, earlier literature on international management introduced the concept of *psychic distance* as a bigger impediment to international transactions than physical distance. Mostly applied to the analysis of trade flows, psychic distance (which comprises aspects from cultural and institutional distance) deters

[5] For an overview on South- South FDI particularities see for example UNCTAD (2006), Khana and Palepu (2006), Gammeltoft et al. (2010) and Takii S. (2011).

[6] Organization for Economic Cooperation and Development (OECD) Convention on Combating Bribery of Foreign Public Officials in International Business Transactions

effective firm interactions since different perceptions and relational behavior hinder the development of trust between the counterparts. Habib and Zurawicki (2002), Beugelsdijk et al (2004) and Miura and Takechi (2010) provide interesting evidence and reviews of this branch of literature. International management literature has also been concerned with the concept of liability of foreignness (LOF) which refers to the social costs derived from doing business abroad. For example, Eden and Miller (2004) argued that these social costs are a key strategic issue because in contrast to the economic costs, they cannot be measured and predicted. They state that LOF is driven by the institutional distance between the host and home economies. The authors theoretically explore three types of institutional distance: cognitive, normative and regulatory. They conclude, consistent with other studies that the larger the institutional distance the more likely the firms are to look for a local partner and adopt a joint venture strategy.

More recently and also adopting an investment decision approach, Dixit (2011) provides a good review of literature on the particular ability of southern multinationals in dealing with poor institutional backgrounds. He argues that the capacity of southern multinationals to better cope with bribing and also their technology and managerial skills, more adapted to cope with poor governance, overcomes northern MNEs advantages in terms of modern technology and access to capital. He introduces a simple model of southern FDI combining MNE technology intensity and corruption levels in the host country and their interaction in shaping firms decision of staying away, entering into a joint venture or establishing a wholly owned subsidiary. The model predicts that with high levels of corruption, southern firms are more likely to engage in a joint venture with a local firm since the risk of technology leakage is lower for them, whereas northern firms would prefer to not enter the market.

To summarize, literature on institutional distance has focused so far on its impact on size, composition or ownership structure of FDI and trade flows at the aggregate level. We contribute to the literature branch by arguing that institutional distance has important implications not only as a location or ownership structure determinant of FDI but also as a factor driving domestic linkages by multinationals. As argued above, the larger the *institutional distance* between host and home country, the larger the transaction costs faced by the foreign investor and hence the less likely the interaction with domestic suppliers is expected to be.

3. Data

We analyze the impact of institutional distance in terms of contract enforcement and control of corruption on the size of the domestic linkage by MNE's and control for a number of other possible linkage determinants including multinational firm characteristics (size, time since the investment took place, R&D intensity, ownership structure, main investment location factor, origin of the investor and manufacturing sector), host country GDP per capita and a set of host- origin country bilateral variables (geographical distance, common language and colonial past). Our baseline equation is the following:

$$LINKi_{f(d)} = \alpha + \beta_1 ID_{f(d)} + \beta_2 BILAT_{f(d)} + \beta_3 FIRM_i, + Origin_i + Sector_i + e_i$$

Our dependent variable ($LINK_{if(d)}$) is the **size of domestic backward linkages** defined as the share of domestic inputs over total inputs purchased by the foreign firm[7]. We source from the Africa Investor Survey conducted by UNIDO for the year 2010. The survey provides detailed cross- country firm level information on a number of characteristics of foreign firms (organizational structure, country of origin, market orientation, relationship with local producers, output and production factors prices and quantities, etc.). The survey also covers questions related to international trade activities of the firms and to linkages to domestic and foreign producers. After the data cleaning and removal of outliers we use information on around 1000 foreign companies from 78 different source economies investing in 19 Sub- Saharan African countries.

Table 1 shows the sample distribution regarding the number of firms and the average domestic linkage across sectors, origin countries and host countries. On average, MNEs purchase around 22% of their intermediate inputs in the host country. However average linkages vary considerably across sectors and host and origin countries. Regarding the distribution by sectors, food and beverages processing is the most popular activity accounting for 19% of the foreign investors in the sample. Petroleum products and chemicals and rubber and plastics manufacturing represent respectively 12% and 13% of the sample. When looking at the share of intermediates purchased at the host country, paper and paper products, wood and furniture manufacturing and processing of food and beverages generate the highest domestic linkages with shares of 35%, 26.8% and 26.4% respectively. Looking at investors origins, most of the investors in our sample come from European (UK and France), Asian countries (remarkably India and China) and other Sub Saharan African countries. Regarding the linkages, the highest are generated by investors from Europe (25%) followed by Sub- Saharan investors (17.39%). Regarding host economies, Kenya and Uganda stand out as the most popular destinations in our sample. Kenya appears as the host country with the highest average local linkage of 42% while Rwanda registers the lowest at 0.5%.

Our main explanatory variable is the **institutional distance** ($ID_{f(d)}$) between the origin country of a foreign investor f and a host country d. We define this variable as the absolute difference between contract enforcement in the host and home economy[8], measured through three different indicators: cost of enforcing contracts as a percentage of the claim, and number of days to dispute resolution, from the Doing Business Indicators by the World Bank and the legal enforcement of contracts index provided by the Fraser Institute. Additionally, we include the institutional distance measure in terms of control of corruption which is defined as above and taken from the Worldwide Governance Indicators from the World Bank, defined by Kaufmann et al. (2010). Descriptive statistics of the institutional quality levels are shown in Table 2. Contract enforcement

[7] For robustness and following the literature we include two alternative linkage measures based respectively in long and short run input demand functions. We follow Amendolagine et al. (2013), Görg et al. (2011) and Kiyota et al. (2007). Detail on these functions and the corresponding regression results are provided in the Appendix in tables C1 and C2.

[8] In the main analysis we consider the absolute distance and we distinguish between negative (positive) distance i.e. better (worst) institutions at home than at host in a later step.

cost in the host economies represents on average 44% of the claim. There is however great variation across countries with Tanzania showing the lowest cost of 14.3% and Mozambique accounting for the highest cost of 142%. Average contract enforcement costs are 20% of the claim in northern origin countries and 33% in southern countries. The lowest cost among origin countries is recorded by Norway with 9.9% and the highest by Democratic Republic of Congo with 151.8%. Regarding control of corruption in the host countries, it ranges from a value of -1.06 in Burundi to a maximum of 0.78 in Cape Verde. Among origin of investors Denmark stands as the least corrupt country while Somalia records the lowest control of corruption indicator.

Table 1: Number of firms and Average Linkage by Sector, Host and Origin country

Total no. Firms= 1055	Average Linkage= 21,77		
	No. Firms	**% total**	**Average Linkage**
By Sector			
Food and beverages	202	19.15	26,48
Tobacco products	16	1.52	25,46
Textiles	41	3.89	21,51
Garments	78	7.39	13,92
Leather and footwear	28	2.65	21,07
Wood products and furniture	76	7.20	26,85
Paper and paper products	32	3.03	35,00
Publishing	35	3.32	18,68
Petroleum products and chemicals	133	12.61	17,58
Rubber and plastics	137	12.99	14,63
Non-metallic minerals	46	4.36	41,23
Basic metals	38	3.60	27,92
Fabricated metal products	102	9.67	21,16
Machinery and equipment	67	6.35	15,23
Vehicles and transport equipment	18	1.71	16, 11
Other manufacturing	6	0.57	4,00
Total	1.055	100	21,77
By Investor Origin			
Europe+NA	405	0,38	24,94
China & Easter Asia	111	0,11	13,03
India & Other Asia	205	0,19	26
Mena	88	0,08	14,68
Other (LAC&Oceania)	6	0,01	33,33
SSA	197	0,19	17,39
South	584	0,55	19,55
North	431	0,41	24,78
By Host Country			
Burkina Faso	8	0,76	4,00
Burundi	12	1,14	2,00
Cameroon	33	3,13	20,81
Cape Verde	20	1,9	13,21
Ethiopia	75	7,11	22,86
Ghana	96	9,1	8,90
Kenya	202	19,15	42,80
Lesotho	49	4,64	6,50
Madagascar	48	4,55	16,95
Malawi	17	1,61	15,47
Mali	28	2,65	7,44
Mozambique	63	5,97	11,98
Niger	7	0,66	10,00
Nigeria	87	8,25	22,48
Rwanda	22	2,09	0,52
Senegal	23	2,18	20,67
Tanzania	89	8,44	29,89
Uganda	137	12,99	31,61
Zambia	39	3,7	21,75

Table 2: Institutional quality. Summary Statistics

	Mean	Std. Dev.	Min	Max
Host countries				
Contract enforcement Cost	44,41	31,45	14,30	142,50
Contract enforcement Index	4,02	1,44	0,00	6,11
Contract enforcement Days	543,57	134,38	260	871
Control of Corruption	-0,58	0,44	-1,06	0,78
Origin countries- South				
Contract enforcement Cost	33,20	18,70	11.1	151.8
Contract enforcement Index	3,98	1,51	0,87	7,07
Contract enforcement Days	821,16	416,36	260	1420
Control of Corruption	-0,39	0.596	-1,74	1,94
Origin countries- North				
Contract enforcement Cost	20,06	5,44	9.9	32.2
Contract enforcement Index	5,99	1,12	3,18	8,10
Contract enforcement Days	473,19	225,33	150	1.210
Control of Corruption	1,32	0,60	-1,09	2,37

We additionally include a set of control variables that are likely to affect the size of the linkages referring to **characteristics of the multinational firm** i **(**$FIRM_i$**)**, and host- home **bilateral variables** ($BILAT_{f(d)}$). Multinational firm characteristics are taken from the AIS 2010 and include: ownership structure, time since the initial investment took place, input intensity, measured as the total input purchased over total sales, and size of the company measured as the number of employees. We also include origin dummies to south and north origin of the multinational. The bilateral variables included are geographical distance, common language, common border and common colonial history. These variables are taken from the Gravity Database by CEPII. A detailed description each variable included in the analysis and its data sources and the correlation matrix can be found in the Appendix in tables A1 and A2 respectively.

4. Methodology and Results

We perform our analysis in two steps: first, we conduct the main analysis for the whole sample and second we split the sample by northern and southern multinationals to check if the impact of institutional distance is conditional on the origin of the investor. We present in this section results from the OLS estimation. All results are robust to Tobit estimation. Additionally, we estimate a Probit model to explore the impact of institutional distance on the probability that the foreign investor sources part of her inputs locally. Results for the Probit estimation are aligned with the OLS and Tobit specifications. See tables B1 and B2 in Appendix for detail on Probit and Tobit estimation results.

OLS estimation results are shown in Table 3[9]. Models (1), (2) and (3) present specifications including alternative *contract enforcement distance* variables, respectively, cost of enforcing contracts as a percentage of the claim, number of days to dispute resolution and the enforcing contracts index[10]. In models (4) and (5) we stick to the contract enforcement distance in terms of cost since it offers wider sample coverage. Model (4) adds *control of corruption distance* measure to the baseline model. Finally, model (5) additionally disaggregates the absolute contract enforcement distance into negative and positive institutional distance. *Negative institutional distance* refers to multinationals that are in countries with worse institutions than at home, that is, contract enforcement is more costly while *positive institutional distance* refers to multinationals that are in countries with better institutions than at home.

Our results suggest that institutional distance in terms of contract enforcement is negatively related to the domestic linkage when measured as the cost of enforcing contracts or the enforcing contracts index and it is not statistically significant when measured as the number of days to solve the dispute. In this way, when the difference between the contract enforcement costs increases in one percent unit, MNEs source 0.15% less of their inputs locally. When the enforcing contracts index differences increase in one unit, the local linkage decreases by 3.6%. Institutional distance in terms of control of corruption seems not to have an impact on the domestic linkage. Interestingly, results from model (5) reveal that the negative impact of *contract enforcement distance* on the linkage is due to firms in countries with worse institutions, while being in a host country with better contract enforcement does not seem to have an impact on the linkage.

Robust to the specification model and the estimation technique used, we find interesting and intuitive results for the foreign firm characteristics and the home- host country bilateral variables. Multinationals from countries that speak a common language or that had a common colonizer with the host country establish on average around 5-6 percent more linkages with domestic firms. Geographical distance has the expected positive impact on the domestic linkage since the further away the countries are to each other, the higher the

[9] As a robustness check we repeat our main analysis including for host country average governance (IIAG Index) as a control. Results are robust to the specification and included in Appendix D.

[10] Legal enforcement of contracts index defined by the Fraser institute. See Appendix A for detail.

trade and transport costs are expected to be and hence, local sourcing becomes more relatively more attractive. Regarding foreign firm characteristics, ownership structure matters for the generation of linkages and multinationals engaged in joint ventures source, on average, 6-7 percent more from domestic firms. Experience of the firm in the market is also relevant: the time since the investment took place presents an inverted U- shape relationship with the domestic linkage, being positive until some inflection point where it becomes negative. This result is consistent with other examples in the literature such as Amendolagine et al (2013) and Merlevede et al (2011) who find a similar non- linear effect. An interpretation for this counterintuitive result could be that that older firms prefer to internalize part of the input production and source less from local manufacturing firms.

R&D intensity, measured as R&D expenditures over sales, is negatively associated with the linkage. This result is consistent with the literature on technology transfer and property right protection according to which more technology intensive firms prefer to keep production process internal as a way to prevent imitation and technological leakage to domestic firms. Another plausible interpretation for this negative coefficient is that local offer might not match the requirements of the relatively more sophisticated intermediates that are demanded by more R&D intensive firms. However these results call for careful interpretation since our data regard subsidiaries in SSA and the bulk of R&D activities are expected to be carried out in the parent firms.

Among the factors that were important for the investment decision, if the company found availability of local suppliers to be important or crucial it sources 16% of their inputs locally. Similarly if access to lower labor costs was an important investment factor the local linkage is around 3% larger. However the cost of raw materials as an investment factor does not seem to play a role in determining the size of local linkage. According to our specification southern multinationals do not seem to source more locally than their northern counterparts. The size of the company, measured as (log) the number of employees, does not have any impact on the linkage.

GDP per capita of the host country seems has a negative impact on the linkage. This result might be driven by the fact that higher GDP per capita is often associated with more expensive intermediate inputs that make local sourcing less attractive relative to home sourcing or cheaper imports.

Table 4: Institutional distance and the domestic linkage. Estimation Results OLS.

Dependent Variable: Domestic Linkage					
Model	(1)	(2)	(3)	(4)	(5)
ABSDcontract	-0.158***			-0.152***	
	(0.0366)			(0.0367)	
ABSDcontract_days		-0.00515			
		(0.00420)			
ABSDcontract_index			-3.614***		
			(0.838)		
ABSDcorr				2.592	2.763
				(1.807)	(1.798)
worseDcontract					-0.168***
					(0.0339)
betterDcontract					0.000934
					(0.106)
lgdp_pc	-6.382***	-3.221*	-5.218**	-5.781**	-6.131***
	(2.226)	(1.953)	(2.518)	(2.282)	(2.236)
southMNE	-1.480	-2.479	-2.201	1.657	1.287
	(3.007)	(3.019)	(3.299)	(3.689)	(3.684)
R&Dint	-0.00350***	-0.00310***	-0.00321***	-0.00371***	-0.00362***
	(0.000616)	(0.000599)	(0.000648)	(0.000630)	(0.000632)
lemployees	-0.539	-0.312	-0.519	-0.688	-0.887
	(0.903)	(0.909)	(1.010)	(0.914)	(0.917)
locsupp	15.99***	15.93***	16.61***	15.62***	15.66***
	(2.229)	(2.252)	(2.440)	(2.250)	(2.248)
locraw	-0.823	-1.653	-0.705	-0.766	-0.758
	(2.229)	(2.260)	(2.402)	(2.235)	(2.235)
loclab	3.791*	4.042*	3.862*	3.860*	3.818*
	(2.093)	(2.113)	(2.241)	(2.094)	(2.095)
JV	6.927***	6.274***	5.983**	6.778***	6.912***
	(2.362)	(2.392)	(2.460)	(2.353)	(2.347)
comlang	5.037**	5.838**	5.815**	4.753**	5.667**
	(2.365)	(2.373)	(2.595)	(2.361)	(2.419)
contig	-0.860	-6.162*	-3.452	-0.373	-0.267
	(3.678)	(3.673)	(3.766)	(3.717)	(3.704)
colony	3.920	0.907	4.797	3.893	3.756
	(3.614)	(3.608)	(3.795)	(3.603)	(3.598)
comcol	4.720*	9.127***	5.749*	5.338*	4.521
	(2.821)	(3.128)	(3.028)	(2.860)	(2.852)
exper	0.594***	0.575***	0.498***	0.592***	0.615***
	(0.165)	(0.166)	(0.166)	(0.166)	(0.166)
exper2	-0.00861***	-0.00854***	-0.00783***	-0.00873***	-0.00896***
	(0.00207)	(0.00209)	(0.00209)	(0.00207)	(0.00209)
distance	0.000839**	0.000480	0.00106**	0.000772**	0.000831**
	(0.000393)	(0.000387)	(0.000446)	(0.000390)	(0.000382)
Constant	47.29***	26.34*	43.31**	39.96**	41.82**
	(16.43)	(14.53)	(17.68)	(17.40)	(17.07)
Observations	915	915	833	915	915
R-squared	0.187	0.172	0.188	0.189	0.192

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Industry dummies are included

In the second part of our analysis we split the sample into southern and northern MNEs and repeat our previous analysis from models (4) and (5) in separate regressions. Interestingly, results suggest significantly different local sourcing patterns between southern and northern investors. Results from the separate regressions are shown in Table 5. The first two columns correspond to the southern firm's regression and the last two columns show results from the northern firms subsample.

Absolute institutional distance, in terms of cost of contract enforcement is not significant for southern firms whereas for northern firms it has a significant negative impact on the domestic linkage. An increase of the difference in the cost of enforcing contracts reduces the domestic linkage by northern MNEs by 0.2%. Absolute institutional distance in terms of corruption does not have an impact on the linkage regardless investor´s origin. When we look at the disaggregation by positive and negative institutional distance, worse contract enforcement than at home has a negative impact on the linkage for both origins but the effect is larger are more significant for northern MNEs: if the difference in contract enforcement cost between home and host country increases in one unit, the local linkage by southern investors decreases a less significant proportion of 0.1% while for northern investors the negative impact on the linkage is of 0.16%. Regarding firms that are in host countries with better contract enforcement than at home, the impact is not statistically significant for southern firms while for northern multinationals is positive: an increase in the difference by one unit brings firms from the north to source locally 1,6% more. This is the case of northern MNE´s such as from Italy or United Kingdom with subsidiaries in host countries like Ghana or Ethiopia which have relatively lower contract enforcement costs (measured as percent of the claim). Absolute institutional distance in terms of control of corruption seems to have a positive impact on the linkage for northern firms, meaning that firms tend to source more locally in relatively more corrupt countries. One explanation for this counterintuitive result may be the attractiveness of local suppliers regarding relatively cheaper inputs or specific raw materials that offsets the negative impact of corruption.

Regardless investor´s origin, availability of local suppliers as an important location factor and the time since the investment took place are positively related to the domestic linkage. R&D intensity (negative), to be in a joint venture with a local partner (positive) and to have had a common colonizer (positive) are factors that determine the degree of local linkages for southern firms. For northern multinationals, access to lower labor costs as a location factor (positive), to have had a colonial relationship with the host country (positive) and geographical distance (positive) are relevant factors explaining the local sourcing decision. GDP per capita of the host country has a negative impact for the northern investors that is however not robust to Tobit specification.

Table 5: Institutional distance, domestic Linkage and investor's origin.

Separate Regressions. OLS estimation.

Dependent Variable: Domestic Linkage				
Model	(1.South)	(2.South)	(1.North)	(2.North)
ABSDcontract	-0.0821		-0.245***	
	(0.0537)		(0.0499)	
ABSDcorr	-1.666	-1.241	3.151	5.044**
	(3.476)	(3.515)	(2.547)	(2.476)
worseDcontract		-0.0987**		-0.196***
		(0.0478)		(0.0512)
betterDcontract		-0.0229		1.662***
		(0.109)		(0.616)
lgdp_pc	0.995	0.402	-8.566**	-4.340
	(3.914)	(3.806)	(3.586)	(3.310)
R&Dint	-0.00212***	-0.00210***	-0.0101	0.0895
	(0.000790)	(0.000795)	(0.172)	(0.164)
lemployees	-0.757	-0.876	-1.844	-1.665
	(1.241)	(1.254)	(1.378)	(1.335)
locsupp	12.13***	12.20***	19.96***	21.58***
	(3.025)	(3.033)	(3.347)	(3.249)
locraw	3.101	3.214	-5.692	-6.535*
	(2.899)	(2.916)	(3.739)	(3.673)
loclab	-0.727	-0.804	9.038***	7.884**
	(2.804)	(2.796)	(3.289)	(3.237)
JV	10.35***	10.47***	2.791	2.769
	(3.513)	(3.512)	(3.227)	(3.188)
comlang	2.809	3.393	1.845	4.805
	(3.410)	(3.463)	(5.618)	(5.746)
contig	-5.042	-4.717		
	(4.438)	(4.352)		
colony			8.587	9.551*
			(5.553)	(5.531)
comcol	5.015*	4.418	18.39	19.30
	(2.984)	(2.940)	(21.23)	(20.62)
exper	0.711**	0.740**	0.504**	0.536***
	(0.340)	(0.338)	(0.209)	(0.206)
exper2	-0.00895	-0.00935	-0.00760***	-0.00784***
	(0.00581)	(0.00574)	(0.00247)	(0.00240)
dist	-0.000207	-0.000126	0.00228**	0.00269***
	(0.000638)	(0.000621)	(0.000898)	(0.000865)
Constant	0.874	4.042	64.26**	27.01
	(23.65)	(22.94)	(29.50)	(27.10)
Observations	522	522	393	393
R-squared	0.185	0.186	0.253	0.278

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Industry dummies are included

Summing up, we find that institutional distance has a negative impact on the domestic linkage which is driven by foreign investors that are in countries with worst contract enforcement than at home. Being in a country with better institutions than at home has a positive impact on the linkage for investors from the north while it does not has an impact on the domestic linkage for investors from the south. Institutional distance in terms of control of corruption has a positive impact on the linkage for firms from the north. All other bilateral and firm level variables have the expected effect: to be in a joint venture, to have a common language, to have had a common colonizer, geographical distance and the experience of the firm in the market have a positive effect while R&D intensity of the firm and host country GDP per capita have a negative impact on the linkage.
These results suggest interesting industrial and investment policy implications that we discuss in the following section.

5. Conclusion and policy implications

We study in this paper to what extent differences in the institutional environment between host and source country, i.e. institutional distance, influence the size of the domestic linkage by multinationals operating in Sub- Saharan Africa. We argue that when governance is poor, knowledge of informal procedures becomes crucial. Institutional homogeneity facilitates networking with local firms and might therefore generate positive externalities to the domestic economy. Focusing on a cross-section of manufacturing firms from 19 Sub-Saharan countries, we define the domestic linkage as the share of domestic purchased inputs over total inputs and relate it to two measures of institutional distance between the host and MNE's country of origin regarding contract enforcement and control of corruption.
Our main findings are as follows. Contract enforcement being worse that at home, i.e. negative institutional distance, has a negative impact on the domestic linkage and this effect is larger for northern firms that seem to care more about institutional distance relative to southern firms. Factors like being engaged in a joint venture or sharing a common language or colonial past seem be more relevant factors for the linkage generation of southern multinationals. Institutional proximity (in terms of contract enforcement), cultural proximity (common language and common colonizer) and technological proximity (R&D intensity) seem to play a role for the linkage generation and are aligned with findings on macroeconomic literature on determinants and effects of South- South investments.
Our results suggest that domestic linkages are influenced by a number of factors and hence, there is scope for industrial policy to encourage the domestic linkages by MNEs. Policies that link up local suppliers with multinationals such as matchmaking strategies or provision of information as well as upgrading programs will allow multinationals to take advantage of the benefits of sourcing locally also in countries with poor institutions while local firms will benefit from higher demand and potential transfer of knowledge. Additionally, industrial policies that reduce investor's perceived risk specially in terms of enforcement of contracts and that familiarize her with the formal but also informal ways of doing business in the country might also encourage the linkage. In other words, industrial policies should aim to reduce the transaction costs perceived by the

foreign investor and to enhance the benefits of the local sourcing and the multinational awareness in this respect.

Of course these linkage- enabling policies should be in combination with broader long term policies aiming to improve the institutional background of the host country, such as anti- corruption measures or policies aiming to guarantee contract enforcement, this is however a slower process that often overcomes the means of industrial policy itself.

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Appendix

A. Detail on variables

Table A1. Description of variables

Variable Description

Variable	Variable Name	Definition	Source
Dependent Variables			
LINK	Domestic Linkage	Share of locally manufactured inputs over total inputs	AIS 2010
LINKlr	Domestic Linkage long run	Share of locally manufactured inputs over total costs	AIS 2010
Explanatory Variables			
ABSDcontract	Contract enforcement Institutional Distance	Absolute difference between host and origin country contract enforcement cost	Doing Business Indicators. The World Bank
ABSDcontract_days	Contract enforcement Institutional Distance	Absolute difference between host and origin country number of days to contract enforcement	Doing Business Indicators. The World Bank
ABSDcontract_index	Contract enforcement Institutional Distance	Absolute difference between host and origin country of legal enforcement of contracts index. Based on WB Doing Business estimates for the time and money required to collect a clear-cur debt	Economic Freedom of the World. Fraser Institute
ABSDcorr	Control of corruption Institutional Distance	Control of Corruption Index, which measures the degree to which corruption is perceived to exist among businesses, public officials and politicians	Worldwide Governance Indicators. Kaufmann et. al (2010)
worseDcontract	Positive contract Inst. Distance	Difference between home and host contract enforcement cost when is postive, 0 otherwise.	Doing Business Indicators. The World Bank
betterDcontract	Negative contract Inst. Distance	Difference between home and host contract enforcement cost when is negative, 0 otherwise.	Doing Business Indicators. The World Bank
lgdp_pc	Host country GDP per capita	GDP per capita	World Bank Statistics
IIAG_overall	Host country Ibrahim Index of Average Governance	Host country Ibrahim Index of Average Governance	Mo Ibrahim Foundation
Foreign firm characteristics			
southMNE	Origin dummy	1 if foreign investor comes from developing country	AIS 2010
locsupp	Local Supplier dummy	1 for crucial o very important location factor	AIS 2010
locraw	Raw Mat. Cost dummy	1 for crucial o very important location factor	AIS 2010
loclab	Labor costs dummy	1 for crucial o very important location factor	AIS 2010
lemployees	Firm size	Natural logarithm of number or full time employees	AIS 2010
JV	Joint Venture d.	1 if domestic ownership share is >10%	AIS 2010
exper	Experience in the Market	Years since the investment took place	AIS 2010
R&Dint	R&D Intensity	R&D expenditure over total turnover	AIS 2010
sector	Industry dummy	ISIC 2- digit industry dummy	AIS 2010
Bilateral variables			
contig	Contiguity d.	1 for contiguity	GeoDist database CEPII
comcol	Common col. d.	1 for countries with a common colonizer	GeoDist database CEPII
colony	Colony d.	1 for pair of countries ever in colonial relationship	GeoDist database CEPII
commonlag	Common lang. d.	1 for common language spoken by at least 9% of the pop.	GeoDist database CEPII
dist	Distance	kms between most important cities/agglomerations (in terms of population)	GeoDist database CEPII
Input Demand Function Variables			
lpK	Cost of capital	Log of interest rate paid on long- term credit	AIS 2010
lpL	Cost of labour	Log of total bills divided by number of employees	AIS 2010
lpM	Cost to import	fees levied on a 20-foot container in U.S. dollars. All the fees associated with completing the procedures to export or import the goods are included	World Bank Statistics
lsales	Turnover	Log of sales/ turnover over last financial year	AIS 2010
lKL	capital/ labour ratio	Log of capital/ labour ratio	AIS 2010
lK	capital	Log of the value of fixed assets at the end of last financial year	AIS 2010
lL	labour	Log of full time employees in the last financial year	AIS 2010

Table A2. Correlation matrix

	link	ABSDcontract	lgdp_pc	southMNE	JV	R&Dint	lemployees	locsupp	locraw	loclab	comlang	contig	colony	comcol	age	dist
link	1															
ABSDcontract	-0.0742	1														
lgdp_pc	0.0003	**-0.3685***	1													
southMNE	-0.0808	**-0.1202***	-0.0941	1												
JV	**0.1633***	0.0378	0.0450	**-0.1997***	1											
R&Dint	-0.0219	-0.0011	-0.0726	0.0280	-0.0216	1										
lemployees	0.0149	-0.0654	0.0655	-0.0620	**0.1170***	-0.0431	1									
locsupp	**0.2766***	0.0287	0.0184	-0.0411	**0.1551***	0.0358	0.0451	1								
locraw	**0.1470***	0.0665	-0.0103	-0.0448	0.0545	-0.0440	0.0610	**0.4446***	1							
loclab	**0.1118***	-0.0324	0.0484	0.0206	0.0011	-0.0347	**0.1436***	**0.3283***	**0.3192***	1						
comlang	**0.1119***	-0.0799	**0.1539***	-0.0457	0.0465	-0.0383	-0.0122	0.0293	0.0841	-0.0164	1					
contig	-0.0592	0.0564	**-0.1735***	**0.3104***	-0.0566	-0.0129	-0.0944	-0.0140	-0.0185	0.0104	0.0471	1				
colony	0.0813	**0.1584***	0.0609	**-0.5832***	**0.1235***	-0.0174	0.0259	0.0512	0.0480	0.0134	**0.3782***	**-0.1810***	1			
comcol	0.0846	**-0.2097***	-0.0192	**0.5117***	-0.0329	-0.0198	**-0.1140***	0.0475	0.0262	0.0173	**0.2636***	**0.2567***	**-0.3060***	1		
age	0.0703	0.0329	**0.1131***	**-0.3096***	**0.1974***	-0.0207	**0.2661***	0.0671	0.0564	-0.0035	**0.2019***	**-0.0967**	**0.3013***	-0.0944	1	
dist	0.0430	**0.1082***	**0.1352***	**-0.2720***	-0.0147	-0.0139	**0.1568***	0.0012	0.0377	0.0021	**-0.1239***	**-0.5679***	0.0835	**-0.2456***	0.0895	1

* p< 0,01

B. Probit and Tobit estimations

Table B1. Probit Estimation: probability that the MNE sources at least part of its inputs locally.

Dependent Variable:	Domestic Linkage				
Model	(1)	(2)	(3)	(4)	(5)
ABSDcontract	-0.00172***			-0.00166**	
	(0.000658)			(0.000660)	
ABSDcontract_days		-0.000189**			
		(7.34e-05)			
ABSDcontract_index			-0.0401***		
			(0.0148)		
ABSDcorr				0.0241	0.0259
				(0.0306)	(0.0307)
worseDcontract					-0.00183***
					(0.000673)
betterDcontract					-0.000136
					(0.00148)
lgdp_pc	-0.117***	-0.0877**	-0.103**	-0.111***	-0.114***
	(0.0389)	(0.0362)	(0.0431)	(0.0395)	(0.0395)
southMNE	-0.110**	-0.116**	-0.121**	-0.0799	-0.0824
	(0.0513)	(0.0508)	(0.0548)	(0.0633)	(0.0635)
R&Dint	-0.000109***	-0.000105***	-0.000121***	-0.000111***	-0.000109***
	(2.62e-05)	(2.61e-05)	(3.34e-05)	(2.64e-05)	(2.63e-05)
lemployees	0.00128	0.00347	0.00290	-9.98e-05	-0.00127
	(0.0148)	(0.0147)	(0.0159)	(0.0149)	(0.0150)
locsupp	0.122***	0.123***	0.122***	0.118***	0.118***
	(0.0387)	(0.0387)	(0.0414)	(0.0389)	(0.0390)
locraw	0.0294	0.0142	0.0250	0.0301	0.0302
	(0.0410)	(0.0410)	(0.0434)	(0.0410)	(0.0411)
loclab	0.0352	0.0406	0.0351	0.0358	0.0359
	(0.0375)	(0.0375)	(0.0394)	(0.0375)	(0.0376)
JV	0.149***	0.135***	0.137***	0.148***	0.150***
	(0.0380)	(0.0383)	(0.0392)	(0.0381)	(0.0381)
comlang	0.0534	0.0684	0.0731	0.0505	0.0595
	(0.0435)	(0.0437)	(0.0464)	(0.0436)	(0.0445)
contig	-0.00573	-0.120*	-0.0463	-0.000796	0.00129
	(0.0669)	(0.0705)	(0.0680)	(0.0670)	(0.0671)
colony	0.0391	-0.00476	0.0595	0.0392	0.0381
	(0.0607)	(0.0603)	(0.0637)	(0.0607)	(0.0608)
comcol	0.109**	0.212***	0.119**	0.114**	0.105**
	(0.0496)	(0.0563)	(0.0531)	(0.0501)	(0.0507)
age	0.00799***	0.00772***	0.00753**	0.00801***	0.00824***
	(0.00295)	(0.00296)	(0.00305)	(0.00296)	(0.00298)
age2	-0.000126***	-0.000126***	-0.000130***	-0.000128***	-0.000131***
	(4.11e-05)	(4.15e-05)	(4.26e-05)	(4.14e-05)	(4.19e-05)
dist	1.25e-05*	9.09e-06	1.31e-05	1.20e-05*	1.28e-05*
	(7.18e-06)	(7.00e-06)	(8.04e-06)	(7.24e-06)	(7.28e-06)
Observations	918	918	836	918	918

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Industry dummies are included

Table B2. Tobit Estimation

Dependent Variable:	Domestic Linkage				
Model	(1)	(2)	(3)	(4)	(5)
ABSDcontract	-0.344***			-0.328***	
	(0.0854)			(0.0859)	
ABSDcontract_days		-0.0208**			
		(0.00977)			
ABSDcontract_index			-6.885***		
			(1.847)		
worseDcontract					-0.353***
					(0.0880)
negDcontract					-0.0825
					(0.200)
ABSDcorr				5.698	6.074
				(3.984)	(3.988)
lgdp_host	-15.07***	-8.026*	-10.97**	-13.94***	-14.17***
	(4.910)	(4.600)	(5.426)	(4.972)	(4.962)
southMNE	-8.562	-10.68	-11.73	-1.576	-1.697
	(6.706)	(6.767)	(7.190)	(8.286)	(8.274)
R&Dint	-0.0185	-0.0172	-0.0188	-0.0189	-0.0186
	(0.0331)	(0.0309)	(0.0421)	(0.0325)	(0.0315)
lemployees	-0.797	-0.536	-1.251	-1.105	-1.396
	(2.039)	(2.063)	(2.168)	(2.047)	(2.054)
locsupp	28.14***	28.07***	28.25***	27.38***	27.30***
	(5.139)	(5.197)	(5.387)	(5.154)	(5.148)
locraw	-0.119	-1.681	0.263	0.0263	0.229
	(5.415)	(5.481)	(5.628)	(5.407)	(5.402)
loclab	6.468	7.119	6.205	6.469	6.237
	(4.883)	(4.946)	(5.081)	(4.874)	(4.870)
JV	16.24***	14.57***	13.94***	15.85***	16.11***
	(4.883)	(4.939)	(5.000)	(4.882)	(4.880)
comlang_off	1.921	6.849	8.146	1.372	1.038
	(6.332)	(6.433)	(6.589)	(6.327)	(6.322)
contig	-3.007	-19.54*	-9.700	-1.936	-1.505
	(9.148)	(10.32)	(9.234)	(9.156)	(9.148)
colony	10.70	1.988	9.860	10.39	11.31
	(8.007)	(8.028)	(8.183)	(7.993)	(8.014)
comcol	16.98**	29.42***	17.60**	18.49**	17.94**
	(7.185)	(8.360)	(7.402)	(7.248)	(7.243)
age	1.449***	1.385***	1.225***	1.449***	1.501***
	(0.426)	(0.428)	(0.436)	(0.428)	(0.430)
age2	-0.0219***	-0.0216***	-0.0202***	-0.0223***	-0.0229***
	(0.00637)	(0.00637)	(0.00651)	(0.00642)	(0.00646)
dist	0.00183*	0.00104	0.00198*	0.00168*	0.00178*
	(0.000941)	(0.000926)	(0.00104)	(0.000945)	(0.000947)
Observations	915	915	833	915	915

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Industry dummies are included

C. Relative demand for local inputs

In the main text, we carried out the analysis defining our dependent variable as the share of local purchased input over total inputs purchased. In this appendix following some examples in the literature and as a robustness check, we repeat the analysis using a more sophisticated approach. As in Amendolagine et. al. (2013), Görg et. al. (2011) and Kiyota et. al. (2008) we estimate the MNE's demand for local inputs using a translog cost function. We estimate a long run version and a short run version following Amendolagine et al. (2013) and Kiyota et al. (2013).

Regarding the long- run version, it is defined as follows. A foreign firm i minimizes the costs described in a translog cost function of the general form:

$$C_i = f\left(\log(w_i), \log(r_i), \log(p^d{}_i), \log(p^m{}_i), \log(Y_i)\right)$$

Where C_i is the cost function depending on the prices of the production factors labor (w_i), capital (r_i), local inputs ($p^d{}_i$) and imported inputs ($p^m{}_i$) and output (Y_i). Differentiating with respect to $p^d{}_i$ yields:

$$S^d{}_i = \alpha + \beta 1 \log(w_i) + \beta 2 \log(r_i) + \beta 3 \log(p^d{}_i) + \beta 4 \log(p^m{}_i) + \beta 5 \log(Y_i) + \beta 6 \log(Z_i)$$

Where $\left([(S]]^D_{ijsc}\right)$ $S^d{}_i = (\partial C/\partial\ p^d)*(p^d/C)$ is the cost share of locally sourced inputs over total costs and Z_i accounts for potential control variables. Total costs are measured as the sum of capital, labor and domestic and imported inputs. Detailed description of each variable is presented in Appendix A.

Next, we estimate a short-run version of the demand for local intermediates where both capital and labor are taking as fixed since they are not easily replaceable factors in the short run. The dependent variable ($S^{dsr}{}_i$) is the share of local intermediates over total intermediates. The short run inputs demand equation looks then as follows:

$$S^{dsr}{}_i = \alpha + \beta 1 \log(L_i) + \beta 2 \log(K_i) + \beta 3 \log(p^d{}_i) + \beta 4 \log(p^m{}_i) + \beta 5 \log(Y_i) + \beta 6 \log(Z_i)$$

Estimation results from the long and short- run versions are robust to our main analysis and presented respectively in tables C1 and C2.

Table C1. Relative demand estimation, long run version

Dependent Variable:Domestic Linkage (local inputs cost over total costs)					
Model	(1)	(2)	(3)	(4)	(5)
ABSDcontract	-0.00147***			-0.000844**	
	(0.000480)			(0.000397)	
ABSDcontract_days		-4.82e-05			
		(4.70e-05)			
ABSDcontract_index			-0.0332***		
			(0.0102)		
ABSDcorr				0.0312*	0.0248
				(0.0189)	(0.0189)
worseDcontract					-0.00160***
					(0.000450)
betterDcontract					-9.83e-05
					(0.00111)
lpL	0.0306	0.0136	0.00732	0.0224	0.0349
	(0.0226)	(0.0224)	(0.0261)	(0.0233)	(0.0228)
lpK	-0.00436	-0.0120	-0.00665	-0.0118	-0.00518
	(0.0110)	(0.0108)	(0.0116)	(0.0111)	(0.0110)
lKL	0.00633	0.00771	0.00476	0.00544	0.00482
	(0.00853)	(0.00840)	(0.00934)	(0.00854)	(0.00855)
lsales	-0.0151	-0.0180*	-0.0137	-0.0159	-0.0140
	(0.0101)	(0.00992)	(0.0109)	(0.0101)	(0.00999)
prM	-8.29e-06	5.10e-06	-8.02e-06	8.25e-06	-7.06e-06
	(1.58e-05)	(1.59e-05)	(1.86e-05)	(1.47e-05)	(1.63e-05)
lgdp_host	-0.0734***	-0.0353	-0.0619**	-0.0685**	-0.0703***
	(0.0262)	(0.0227)	(0.0302)	(0.0266)	(0.0259)
southMNE	-0.0256	-0.0340	-0.0325	0.00913	0.000239
	(0.0328)	(0.0329)	(0.0370)	(0.0400)	(0.0396)
rdint	-2.92e-05***	-2.45e-05***	-2.52e-05***	-2.42e-05***	-3.08e-05***
	(7.93e-06)	(7.45e-06)	(8.16e-06)	(7.41e-06)	(7.87e-06)
lemployees	0.00802	0.0108	0.00436	0.00635	0.00375
	(0.0140)	(0.0140)	(0.0155)	(0.0143)	(0.0142)
locsupp	0.158***	0.156***	0.161***	0.152***	0.154***
	(0.0241)	(0.0241)	(0.0262)	(0.0246)	(0.0244)
locraw	-0.00394	-0.00877	0.000197	-0.00231	-0.00311
	(0.0233)	(0.0236)	(0.0254)	(0.0235)	(0.0234)
loclab	0.0498**	0.0541**	0.0553**	0.0524**	0.0496**
	(0.0226)	(0.0225)	(0.0246)	(0.0227)	(0.0226)
JV	0.0730***	0.0734***	0.0647**	0.0751***	0.0739***
	(0.0251)	(0.0253)	(0.0257)	(0.0251)	(0.0251)
comlang_off	0.0408	0.0537*	0.0585*	0.0440	0.0382
	(0.0298)	(0.0301)	(0.0321)	(0.0296)	(0.0298)
contig	0.00820	-0.0397	-0.00842	0.0164	0.0128
	(0.0414)	(0.0412)	(0.0425)	(0.0414)	(0.0414)
colony	0.0333	0.00616	0.0406	0.0247	0.0374
	(0.0389)	(0.0388)	(0.0414)	(0.0387)	(0.0386)
comcol	0.0402	0.0774**	0.0504	0.0496	0.0410
	(0.0329) 2	(0.0357)	(0.0353)	(0.0333)	(0.0331)
age	0.00582***	0.00594***	0.00542***	0.00560***	0.00602***
	(0.00175)	(0.00178)	(0.00178)	(0.00175)	(0.00175)
age2	-8.13e-05***	-8.36e-05***	-7.78e-05***	-8.05e-05***	-8.43e-05***
	(2.12e-05)	(2.17e-05)	(2.18e-05)	(2.13e-05)	(2.13e-05)
dist	7.38e-06*	4.48e-06	1.04e-05**	5.47e-06	7.12e-06*
	(4.26e-06)	(4.21e-06)	(4.95e-06)	(4.26e-06)	(4.15e-06)
Constant	0.625***	0.459**	0.648**	0.158	0.571**
	(0.238)	(0.230)	(0.272)	(0.150)	(0.240)
Observations	797	797	728	797	797
R-squared	0.202	0.192	0.204	0.197	0.206

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table C2. Relative demand estimation, short run version

Dependent Variable:Domestic Linkage (local inputs cost over total inputs cost)					
Model	(1)	(2)	(3)	(4)	(5)
ABSDcontract	-0.137***			-0.133***	
	(0.0395)			(0.0393)	
ABSDcontract_days		-0.00408			
		(0.00445)			
ABSDcontract_index			-3.240***		
			(0.961)		
ABSDcorr				3.321*	3.422*
				(1.891)	(1.887)
posDcontract					-0.142***
					(0.0375)
negDcontract					-0.0482
					(0.104)
lcapital	0.881	1.046	0.790	0.801	0.765
	(0.794)	(0.785)	(0.883)	(0.799)	(0.800)
llabour	-4.418	-4.386	-5.332*	-4.238	-3.941
	(2.924)	(2.938)	(3.136)	(2.950)	(2.926)
lsales	-2.063**	-2.641***	-2.160**	-2.149**	-2.078**
	(0.863)	(0.835)	(0.946)	(0.869)	(0.861)
prM	-0.000269	0.000983	-0.000358	-0.000655	-0.000373
	(0.00139)	(0.00140)	(0.00163)	(0.00141)	(0.00145)
lgdp_host	-5.184**	-1.360	-4.493	-4.776*	-4.765*
	(2.532)	(2.134)	(2.774)	(2.544)	(2.522)
southMNE	-2.106	-3.203	-3.223	1.867	1.752
	(3.109)	(3.113)	(3.458)	(3.882)	(3.881)
R&Dint	-0.00253***	-0.00212***	-0.00204***	-0.00272***	-0.00278***
	(0.000744)	(0.000707)	(0.000761)	(0.000753)	(0.000750)
lemployees	4.480	5.036*	5.541*	4.273	3.850
	(3.012)	(3.011)	(3.245)	(3.045)	(3.021)
locsupp	15.61***	15.49***	16.07***	15.12***	15.12***
	(2.280)	(2.296)	(2.484)	(2.305)	(2.307)
locraw	-0.676	-1.294	-0.311	-0.580	-0.484
	(2.241)	(2.260)	(2.424)	(2.246)	(2.252)
loclab	4.062*	4.470**	4.045*	4.096*	4.064*
	(2.134)	(2.138)	(2.291)	(2.135)	(2.136)
JV	8.019***	7.724***	7.305***	7.837***	7.936***
	(2.435)	(2.459)	(2.499)	(2.425)	(2.430)
comlang_off	3.604	5.016*	5.162*	3.485	3.272
	(2.783)	(2.821)	(2.985)	(2.770)	(2.795)
contig	-0.0822	-4.135	-1.847	0.476	0.541
	(3.870)	(3.911)	(3.994)	(3.898)	(3.898)
colony	3.996	0.999	4.040	3.794	4.184
	(3.784)	(3.757)	(3.973)	(3.766)	(3.767)
comcol	4.966	7.986**	5.594*	5.733*	5.577*
	(3.044)	(3.331)	(3.244)	(3.054)	(3.059)
age	0.702***	0.701***	0.631***	0.704***	0.717***
	(0.171)	(0.172)	(0.173)	(0.172)	(0.172)
age2	-0.00965***	-0.00980***	-0.00909***	-0.00985***	-0.00997***
	(0.00212)	(0.00211)	(0.00215)	(0.00213)	(0.00214)
dist	0.000827**	0.000552	0.00110**	0.000736*	0.000765**
	(0.000398)	(0.000398)	(0.000455)	(0.000393)	(0.000387)
Constant	52.91**	28.46	52.43**	48.49**	47.37**
	(22.02)	(19.91)	(24.27)	(22.22)	(22.14)
Observations	876	876	798	876	876
R-squared	0.203	0.193	0.205	0.206	0.207

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

D. Controlling for host country average governance. OLS estimation

Dependent Variable: Domestic Linkage				
Model	(1)	(2)	(3)	(4)
ABSDcontract	-0.184***			
	(0.0402)			
ABSDcontract_days		-0.00522		
		(0.00418)		
ABSDcontract_index			-3.766***	
			(0.849)	
posDcontract				-0.202***
				(0.0361)
negDcontract				-0.0261
				(0.110)
IIAG_overall	0.436***	0.237	0.592***	0.455***
	(0.160)	(0.148)	(0.187)	(0.156)
lgdp_pc	-4.823**	-2.076	0.0822	-5.162**
	(2.208)	(2.018)	(2.815)	(2.178)
southMNE	-0.941	-2.282	-2.509	-1.519
	(2.990)	(3.001)	(3.299)	(3.026)
JV	6.829***	6.179***	5.455**	6.974***
	(2.344)	(2.384)	(2.438)	(2.338)
R&Dint	-0.00253***	-0.00253***	-0.00160**	-0.00238***
	(0.000695)	(0.000702)	(0.000806)	(0.000699)
lemployees	-0.303	-0.159	-0.568	-0.489
	(0.902)	(0.916)	(1.001)	(0.904)
locsupp	16.05***	15.95***	15.98***	16.12***
	(2.224)	(2.253)	(2.436)	(2.224)
locraw	-1.287	-1.965	-1.411	-1.302
	(2.242)	(2.287)	(2.431)	(2.241)
loclab	3.114	3.687*	3.171	3.037
	(2.094)	(2.109)	(2.250)	(2.091)
comlang	5.937**	6.378***	6.424**	6.947***
	(2.387)	(2.411)	(2.594)	(2.450)
contig	-0.133	-6.073*	-3.755	-0.0243
	(3.713)	(3.677)	(3.755)	(3.685)
colony	2.978	0.164	4.042	2.796
	(3.632)	(3.670)	(3.783)	(3.634)
comcol	4.331	9.146***	5.830*	3.421
	(2.842)	(3.135)	(3.032)	(2.821)
exper	0.646***	0.601***	0.534***	0.672***
	(0.166)	(0.168)	(0.165)	(0.165)
exper2	-0.00909***	-0.00879***	-0.00819***	-0.00934***
	(0.00205)	(0.00209)	(0.00204)	(0.00205)
distance	0.000970**	0.000518	0.000953**	0.00104***
	(0.000401)	(0.000387)	(0.000449)	(0.000388)
Constant	10.13	4.083	-22.84	10.98
	(19.46)	(19.34)	(25.40)	(19.43)
Observations	915	915	833	915
R-squared	0.193	0.174	0.195	0.197

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Industry dummies are included