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Abstract

We explore the impact of FDI and imports, disaggregated at the sectorial level, on the upgrading of African exports. We distinguish flows from other developing countries (South-South) and developed countries (North-South), and find that they impact differently on the ability of recipients to absorb the positive spillovers. Results support the view that South-South integration holds a strong potential for African economies. South-South FDI foster diversification of low-tech industries and raise the average quality of manufacturing exports, while importing from the South increases the ability to expand the variety of manufactured exports and to introduce more advanced goods in less-diversified economies.

Keywords

South-South FDI, South-South trade, export diversification, export upgrading, Africa.

JEL Classification: F14; F21

1. Introduction[*]

Over the last decade, the increasing share of large emerging economies in international trade and investment revived academic and policy interests for South-South integration and inspired a debate on the growth implications for the less developed recipient countries, particularly in Africa (Kaplinsky and Messner, 2008; Kaplinsky and Farooki, 2009). As a matter of fact, economic growth in Africa between the mid-1990s and the beginning of the recent recession in 2008 has gone along with a sharp increase in trade and inward investment flows, especially from other developing countries.

It is widely recognised that external flows in the form of trade and capital inflows are one of the main vehicles of knowledge acquisition in developing countries. Greater openness to external flows allows importing technology, which can lead to faster accumulation of knowledge and higher total factor productivity, due to resource allocation from lower to higher productive activities (Grossman and Helpman, 1991; Gao, 2004; Schiff and Wang, 2006). Foreign trade exposes domestic firms to international competition and provides an additional incentive for them to improve efficiency and adopt more advanced technology. Foreign direct investment is also an important vehicle for technology transfer; along with capital, foreign companies bring in advanced production technology and management capabilities, which are potential sources of technological spillovers (Crespo and Fontoura, 2007; Narula and Driffield, 2012). The presence of foreign companies also increases local competition and forces domestic firms to improve their efficiency. Overall, knowledge spillovers arising from external flows are a major channel to promote export upgrading.

Within this literature the idea has been put forward that not just external flows per se would be beneficial, but specifically South-South flows would bring more benefits than North-South ones to developing countries (Greenaway and Milner, 1990; Mlachila and Takebe, 2011). The development literature has repeatedly suggested that the composition of partner countries also matters as regards the ability to benefit from the knowledge spillovers arising from the use of imported goods. Southern countries' imports and inward direct investments from the North and from the South differ as regards the technological distance from domestic products and capital investment, and such "technology gap" (Gelb, 2005) affects the capacity of recipient countries to internalise external knowledge flows. However, the literature has not yet specifically explored whether South-South integration through trade and FDI is superior to North-South one as regards its impact on export upgrading by recipient economies.

The aim of this paper is to analyse the differential impact of imports and FDI from the North and from the South on the export performance of African countries over the last decade. We test the impact of external flows on two different measures of export performance: an index of export diversification (in terms of product variety) and the unit value of exports (a proxy for the quality level of exported goods). We match sector-level bilateral data on both trade and investment flows in order to be able to assess whether external flows going into a sector impact on export upgrading in that sector, and whether different forms of export upgrading (i.e. product diversification and quality improvement) are affected differently by different external flows and by the origin – South vs North – of those flows. To the best of our knowledge this is the first study that explores the impact of different types of external flows – i.e. trade and investment – on different forms of export upgrading – i.e. product diversification and quality increase - by sector and origin of partner countries.

[*] We are grateful to Andrea Fracasso, Giorgia Giovannetti, Bernard Hoekman, Peter Quartey and participants to the "L2C – Learning to Compete: Industrial Development and Policy in Africa" conference at UNU-WIDER, June 2013, and to the "Economics of Global Interactions" conference in Bari, September 2013, for their useful suggestions on early draft versions of this paper.

We find that the conjecture that African economies might benefit more from integrating with other Southern countries finds some support in the data, with regards to both investment and trade. Specifically, our results show that importing Southern products - which are not technologically distant from domestic production - can translate into significant improvements for less diversified African countries and sectors, while hosting FDI – which usually bring advanced productive capacities in the recipient economies – tend to stimulate the ability to introduce new product varieties only in more diversified countries.

The remainder of the paper is organised as follows. Section 2 reviews the literature on the importance of external knowledge flows on export upgrading. Section 3 presents data, descriptive statistics and the empirical methodology. Section 4 discusses the results and Section 5 concludes.

2. Literature Review

2.1 Trade and export upgrading

The link between a country's trade flows and its ability to upgrade its export structure has long been analysed by the international trade literature. Most of the studies dealt with the impact of exports on export upgrading, mainly the link between origin country characteristics and export diversification (Evenett and Venables, 2002; Hummels and Klenow, 2005; Foster et al, 2010; Dutt et al, 2011) or on destination characteristics and export diversification (Baliamoune-Lutz, 2010; Baldwin and Harrigan, 2011).

The regional development literature has long promoted the idea that imports also matter for export upgrading. The variety and characteristics of imported goods is a measure of the kind of knowledge variety that flows into a region from abroad, based on the assumption that there is a certain degree of knowledge "embedded" in imported goods – i.e. in terms of learning opportunities involved in the use of new products. Therefore, by allowing for an easier access to intermediate inputs and machineries, openness to trade represents the most traditional channel for knowledge and technology acquisition (Grossman and Helpman, 1991; Dollar, 1992; Schiff and Wang, 2006). According to Romer (1994), the costs of restrictions on trade are extremely high since they do not consider the efficiency loss due to the foregone introduction of new activities (including new production techniques, capital and intermediary goods) within the local economy.

Moreover, the benefits from imports are likely to vary according to the relatedness between imported goods and goods produced locally. Importing goods that are very similar to one's own exports is likely to create little flow of new knowledge compared to the existing knowledge base at home. In contrast, importing goods that are different from one's own exports is likely to generate higher variety in the flows of external knowledge (Frenken et al, 2007) and to induce incremental innovation as the production process is standardized to the low-wage setting, which in turn should allow developing countries to produce more sophisticated goods (Puga and Trefler, 2010).

An assumption has been advanced that imports from the North embed – at least on average – more or higher technology compared to imports from the South, and therefore they might contribute less to local knowledge and to the export upgrading of developing countries (Greenaway and Milner, 1990). However, previous empirical analyses aimed at comparing the effects of North-South vs. South-South trade on the diffusion of technology at the local level have shown that trading with developed countries generally gives rise to stronger spillovers (Schiff and Wang, 2006). This result could depend on the existence of non-linear effects of technological distance on knowledge spillovers and export upgrading as well as on the fact that they do not take into account the more recent surge in South-South trade.

2.2 FDI and export upgrading

There is a large literature emphasizing the role of FDI in promoting development, which can occur through a range of different channels including the creation of forward and backward linkages; the existence of competitive and demonstration effects; the possibility for domestic firms to hire more experienced and skilled workforce; and more generally with the transfer of (pecuniary and non-pecuniary) externalities to local firms (Lall and Narula, 2004; Gorg and Greenaway, 2004). In addition, multinational firms are considered as channels of breakthrough transformation of the local economies as they not only can contribute to increase the productivity in existing industries, but, most importantly, they bring new "ideas" and best practices to start exploring new production activities (Moran, 2010).

Specifically on trade performance, external capital flows are important to foster a process of diversification and upgrading in the host economies, increasing export volume (intensive margin effect), the number of exported products (extensive margin effect or export diversification), and the quality of exported products, given that foreign multinationals can engage in the production of new and more sophisticated goods that are re-exported on the one side and can contribute to positive spillovers on local firms on the other, reducing for instance their entry costs in foreign markets (Crespo and Fontoura, 2007; Harding and Javorcik, 2011).

The effective occurrence of such spillovers is nonetheless affected by the nature of the investment, depending on a range of factors, including for instance the motivations or the mode of entry (Crespo and Fontoura, 2007; Narula and Driffield, 2012). Even in presence of the most favourable conditions, the literature has repeatedly stressed on the fact that spillovers need the recipient country to be endowed with a certain level of absorptive capacities, i.e. the capacity to internalize external knowledge flows (Crespo and Fontoura, 2007).

In the case of Africa, Morrisey (2012) has recently pointed out that the sectoral distribution of FDI, mostly concentrated in the primary industry, and the low levels of absorptive capacities at both the firm- and the country- level, often translates in few benefits from local linkages rather than true positive spillover effects as intended by the extant literature.

Whether the investment originates from a developed or another developing country also matters in terms of the potential impact on growth and exports. Despite FDI from traditional sources are still prevalent, the emergence of a new wave of investors from the South has increased the relative size of South-South flows, especially at the intra-regional level (UNCTAD, 2006)[1]. Compared to North-South FDI, South-South FDI can bring much more positive effects to the host economies given that developing country firms are likely to provide goods and services that are more accessible to other developing countries (Lipsey and Sjoholm, 2011). Similarly, they can more easily build-up networks and promote forward and backward linkages with domestic firms, providing at the same time more effective technological spillovers due to a smaller "technology gap"[2] (Gelb, 2005). FDI from other developing countries can directly supplement low savings and contribute to capital accumulation in low-income countries more than elsewhere, as traditional investors are often unwilling to invest in such countries, especially those considered institutionally weaker (Dixit, 2012). This is particularly important if FDI are accompanied by improvements in infrastructure, as is often the case of FDI from other Southern countries, especially from the so-called BRICs (Mlachila and Takebe, 2011).

Recently, a new strand of research has highlighted the positive impact of inward FDI on export upgrading. Based on different samples of countries, research by Iwamoto and Nabeshima (2012) and

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1 Developed countries are the major investors in the continent, though their investments in some African countries have recently reduced in favour of new investors from developing countries, including many Asian countries (UNCTAD, 2007).

2 So far, however, the only work that has explicitly tested for the impact of south-south FDI found lower linkages with domestic firms compared to other investors (Amendolagine et al., 2013).

Tadesse and Shkralla (2013) find strong evidence of a positive impact of FDI on the capacity of the host country to horizontally diversify its exports. Banga (2006), based on a firms' level analysis on FDI from the US and Japan to India, finds similar results adding that this has mostly happened in non-traditional sectors, a results depending on the fact that foreign firms in such sectors are more export oriented than domestic ones. Finally, Harding and Javorcik (2011) explore whether attracting inflows of FDI offers potential for raising the quality of exports in 105 countries over the period 1984-2000, by comparing unit values of exports in priority sectors before and after targeting starts to unit values in non-targeted sectors during the same time period. Their results suggest that FDI inflows offer potential for raising the quality of exports in developing countries.

3. Data and Descriptive Analysis

3.1 Dependent variables

We rely on trade data at a large level of disaggregation (up to 6 digit of the harmonised system – HS) taken from the BACI dataset published by CEPII (Gaulier and Zignano, 2010)[3] to build two measures of export upgrading:

An index of export diversification (at the extensive margin) is constructed at the sectoral level in order to make it consistent with sectoral trade and FDI data from external sources according to the following approach:

$$ED_{i,x,t} = {}^{1}/_{Herfindal_{i,x,t}} \quad (1)$$

where ED, the diversification index for country i, in sector x (each division at the 2 digit level of the ISIC classification, revision 3) at time t, is calculated as the inverse of the Herfindal index, which has been computed as the square of the sectoral share of each 6-digit product exported:

$$Herfindal_{i,x,t} = \sum_{p=1}^{np} \left(\frac{X_{i,p,t}}{X_{i,x,t}}\right)^2 \quad (2)$$

where $X_{i,p,t}$ is country i export of product p (at the 6 digit level of the HS classification) at time t, while $X_{i,x,t}$ is the total export of country i in sector x. The higher the value of ED, the most diversified is the sector at the extensive margin.

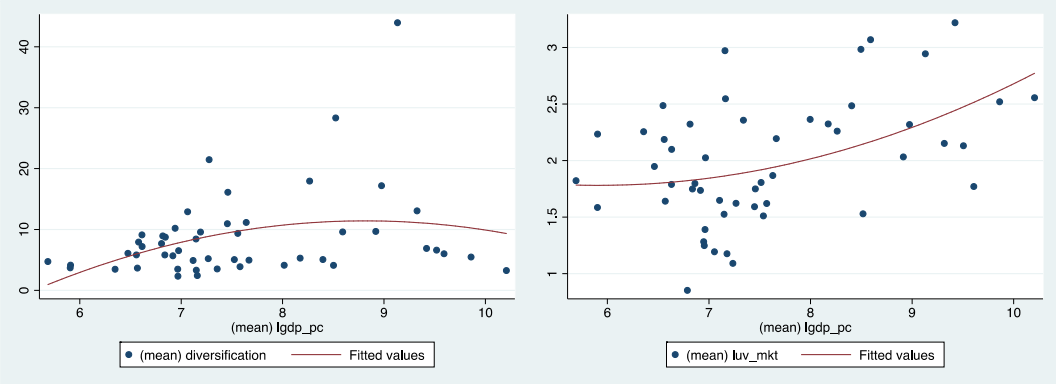
Export unit values, computed as the ratio between the value and the quantity exported, are another commonly adopted measure of export quality upgrading (Baldwin and Harrigan, 2011; Harding and Javorcik, 2011). In order to account for the relative importance of each products in a country export bundle, the unit value is computed as a weighted average, the weights being the market shares of each product *p* for any market *j* where country *i* has a positive export value. The unit value is usually considered a good indicator the more disaggregated the data are. It nonetheless suffers from some limitations as it does not account for other factors, such as fragmentation of production, that can influence the quality of products exported (Hallak and Schott, 2011). Export relative sophistication in low-income countries is strictly linked to productivity, and can be interpreted as the capacity of a given country to master capacities to produce goods at an earlier level of development (Page, 2012).

[3] BACI includes data on practically all countries in the world, including all the main African countries. A notable exception is represented by the countries belonging to the Southern African Custom Union (SACU), Botswana, Lesotho, Namibia, South Africa and Swaziland, whose data are aggregated. For these five countries, thus, equivalent data have been added from the Comtrade dataset accessed via WITS.

3.2 Model specification

The set of independent variables has been chosen taking into account their capacity to influence the supply capacity of a country[4]. Starting with economic factors, income per capita (GDP_PC) is included as a proxy for the level of development and is expected to positively influence both the composition and the product-specific level of sophistication (Osakwe, 2007; Ito, 2011; Tadesse and Shukralla, 2013). Most literature on export sophistication is based on the assumption that the richer the country, the more sophisticated its export structure (Hausmann et al., 2007). However, there is evidence of a non-linear relation between per capita income and diversification, with countries at earlier stages of development (including most of the African countries in our sample) experiencing concentration in their production structures that should decline as they become richer (Imbs and Wacziarg, 2003), but should tend to increase again after a certain per-capita income threshold. A similar pattern holds for export diversification, with countries at the beginning of their development process diversifying mostly by increasing the number of exported items (extensive margin) and only afterwards by increasing the scale (intensive margin) (Cadot et al. 2011). Such trends suggested by the literature are partially reflected also by our sample of African countries, as reported in Figure 1, which plots the average values of our two indicators of export upgrading against the levels of per capita income of the exporting countries.

Figure 1. Export upgrading and per capita income, average values 2003-2010



(a) Export diversification (b) Export unit value

Source: Authors' elaboration on CEPII data

Similarly, higher shares of domestic investment on GDP (INV_GDP) should promote diversification and upgrading provided that they are targeted to the industrial sector (Ben Hammouda et al., 2006). Exchange rate (XRATE) policies also matter, considering for instance that an overvaluation of the local currency can reduce the profitability of exporting, with negative consequences on export upgrading (Dollar, 1992; Agosin et al., 2012). Finally, we control for the effects of economic instability, and more specifically on changes in the price levels of exporters measured by the inflation rate (INFL), with the idea that more stable countries could upgrade their export structure more easily compared to more unstable ones (Osakwe, 2007; Harding and Javorcick, 2011).

Another relevant aspect affecting upgrading is the commodity composition of exports. High dependence on natural resources (RES), a common feature of many African countries, may limit the scope for export diversification, fostering on the other hand concentration and volatility of export earnings (Cabral and Veiga, 2010; Osakwe, 2007), thus limiting the extent of future growth and the

[4] Other potentially relevant independent variables, including for instance those measuring human capital or infrastructural endowments (Agosin et al., 2012; Tadesse and Shukralla, 2013) of African countries, have not been included because of the scarcity of data for many of the countries and years covered by the analysis.

diversification of activities, especially within the manufacturing sector (Sachs and Warner, 1999). Moreover, and related to this, an improvement in a country's terms of trade (ToT) generally contributes to a reallocation of resources towards export sectors, thus worsening concentration (Agosin et al., 2012). Since geography has an important role in a country's pattern of specialization, we take into account specific variables, such as the lack of access to the sea (LLOCK), as a proxy for trade costs (Cabral and Veiga, 2010).

Following the extant literature, we also consider the role of institutional variables, such as government effectiveness (POL_STAB), assuming that countries with a more stable political environment have less obstacles to upgrade their export structures (Osakwe, 2007; Cabral and Veiga, 2010). Rodrik (2008) has identified a range of market failures due to the presence of weak institutions that are particularly strong for tradable goods and for hampering the process of diversification in the local economies.

Finally, with respect to our variables of interest, we include the import flows (M) of each African country matching the sectoral classification adopted for the analysis (i.e., 2 digits ISIC rev. 3 for the analysis on diversification index and 6 digits HS for the analysis on the unit value of exports). We also include the total number of FDI deals received by each African country i[5]. Data on FDI come from the *FDIMarkets.com* database and provide information on investment deals (greenfield only) at the sectoral level[6]. Considering that the specific objective of our analysis is to compare the effect of external flows from different sources, in both (1) and (3) we consider import and FDI originating by a group of traditional partners of African economies, the high income OECD countries (M_North and FDI_North), and a group of "Southern" partners, including all the remaining (M_South and FDI_South). Table 1 below reports the description of the variables, together with the summary statistics.

Based on such indicators, in what follows we estimate the determinants of export diversification and export sophistication according to the following functional relation:

$$Export\ Upgrade = f(GDP\_PC;\ INV\_GDP;\ XRATE;\ INFL;\ LLOCK;\ POL\_STAB;\ ToT;\ RES;\ M;\ FDI) \quad (3)$$

Table 1. Summary Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
ED	12902	1.5460	1.0548	0	5.8972
GDP_PC	12068	7.5798	1.0880	5.4837	10.4659
XRATE	12496	1033.81	2674.88	0.8673	17706.08
INV_GDP	11892	22.7151	9.3927	1.3720	75.6340
POL_STAB	12592	-0.7131	0.6393	-2.4950	0.8019
INFL	12186	7.8886	8.4850	-7.44	98.342
LLOCK	12903	0.2685	0.4432	0	1

[5] We have computed this measure of FDI as a stock, starting with the number (N) of investments received by each country *i* in each sector *x* in 2003. The variable for the successive years has been constructed as: $FDI_{i,x,t}=N_{i,x,t}+N_{i,x,t-1}$. The choice of the number of investments instead of the value is related with the reliability of data on capital investment in the *FDImarkets* database. Data on capital investment is in fact econometrically estimated for the majority of projects, based on announced job and capital investments figures in investments of similar size, sector and destinations.

[6] Sectors have been classified taking into account both the sector and the business activity of any investment according to the ISIC revision 3 classification. Given the difficulties of building a complete sectoral correspondence at a more disaggregated level, in the analysis of the unit values, matching between sector is made grouping products according to the first two digits of the ISIC classification.

ToT	12784	114.81	38.22	21.27	251.02
RES	12784	0.6886	0.2455	0.0013	0.9918
M_North	12903	2.6647	8.7061	-8.3774	15.8317
M_South	12903	3.8801	8.3869	-8.3774	15.7661
FDI_North	12903	0.2273	1.6706	0	46
FDI_South	12903	0.0380	0.3215	0	12

3.3 Methodology

We employ different empirical specifications for the functional relation in (3) to estimate the determinants of export diversification. In our basic model, in line with the extant literature (Osakwe, 2007; Agosin et al., 2012), we consider export diversification as a function – among other variables in (3) – also of its lagged levels. This influences the estimation methods, preventing the adoption of methodologies that do not account for the so-called dynamic panel bias. In order to overcome such issues, we then estimate our model by adopting a GMM estimator based on Arellano and Bond (1991)[7], which resolves serial correlations due to the inclusion of a lagged dependent variable instrumenting it with its further lags and with the lagged levels of all the variables considered as strictly exogenous (Greene, 2003). To do this, we adapt the structure of the data allowing panels to vary as a combination of countries and sectors. We perform the Arellano-Bond test in order to control for the exclusion of second order correlation and the Hansen test to check for overidentifying restrictions. In addition, we include year dummies (δ_t) in order to control for time specific effects as well as to avoid contemporaneous correlation among individuals across time (Roodman, 2006).

$$ED_{i,x,t} = ED_{i,x,t-1} + GDP\_PC_{i,t} + INV\_GDP_{i,t} + INFL_{i,t} + XRATE_{i,t} + RES_{i,t} + ToT_{i,t} + POL\_STAB_{i,t} + LLOCK_i + M_{i,x,t} + FDI_{i,x,t} + \theta_{i,x} + \delta_t + \varepsilon_{i,x,t} \quad (4)$$

where ED, our dependent variable, is the log of the diversification index for African country i for sector x in year t.

Considering that our sample is quite heterogeneous in terms of either country and sector specific levels of export diversification, besides accurately control for them as we do in (4), we are also interested in looking at the partial effect of our explanatory variables across different segments of the distribution. To do this, we employ a quantile regression approach to examine our relation by simultaneously minimizing the sum of the squared deviation of the dependent variable series from the respective mean of the deciles of the series[8]. This would enrich our analysis in two ways. Under a methodological point of view, it provides a richer picture on the relation between ED and our dependent variables, given that the method is robust to the presence of outliers and to sample heterogeneity being also more flexible on assumptions about the parametric distribution of the errors (Greene, 2003). Concerning our research question, on the other hand, allowing the parameters to vary as we analyse different parts of the conditional distribution helps to better understand whether the impact of trade and FDI from different sources affects the host countries at different stages of the diversification process.

Within a panel structure of the data, quantile regression analysis can be performed either by pooling the data or by allowing for unobserved effects to be estimated (Wooldridge, 2010). While the former approach does not present particular drawbacks in its implementation, the latter is more attractive but is subject to the incidental parameter problem, especially when – as in our case – N is

[7] We implement the Arellano-Bond estimator by means of the user written command xtabond2 (Roodman, 2006).

[8] See the recent paper by Tadesse and Shukralla (2013) for an application of quantile regression analysis to export diversification.

large and T is small (Wooldridge, 2010). Within a panel context, the general form for a quantile regression can be written as follows:

$$Quant(y_{it}|X_{it}) = \beta_\theta X_{it} + \varepsilon_{it} \quad (5)$$

where X_{it} is the vector of exogenous variables affecting the distribution of the dependent variable, and β the parameter to be estimated corresponding to the θ^{th} conditional decile of ED. In the end, we adopt a pooled estimator, which solves:

$$min_{\theta \epsilon \Theta} \sum_{i=1}^{n} \sum_{i=1}^{t} c_\tau \ (y_{it} - x_{it}\theta) \quad (6)$$

with c_τ being the check function. According to Wooldridge (2010), using an outer product of the score function takes into account for any neglected dynamics, including autocorrelation in the scores, in (6).

Moving to the analysis of the unit values, we face a different set of issues, the major being having to deal with the dimension of the sample, which includes more than 500 thousand observations, and with the presence of country and product specific sources of heterogeneity. In order to solve both issues, we could either adopt fixed-effects model to control for all the possible unobservable time invariant characteristics specific to each observation[9] or first-differencing our data to get rid of fixed effects. Considering that our model includes several sources of heterogeneity that needs to be taken into account, we adopt the former model including country-products fixed effects to take into account for any time invariant characteristic (e.g. climatic shocks) that may affect the unit values as well as to control for differences in unit values between products and to account for unobserved factors that may influence the relative quality of products (as in Harding and Javorcik, 2011). Our final specification is therefore the following:

$$UV_{i,p,t} = GDP\_PC_{i,t} + INV\_GDP_{i,t} + INFL_{i,t} + XRATE_{i,t} + RES_{i,t} + ToT_{i,t} + POL\_STAB_{i,t} + LLOCK_i + M_{i,p,t} + FDI_{i,x,t} + \delta_{i,p} + \varepsilon_{i,p,t} \quad (7)$$

Having controlled for the existence of groupwise heteroskedasticity with a modified Wald test[10], we compute robust standard errors to obtain more precise estimates.

4. Econometric Results

4.1 Model of export diversification

Estimates of the determinants of export diversification - model (4) - are reported in Table 2 both for the whole sample (all sectors) and for broad sectors. Overall, export diversification significantly depends on its lagged value, even if coefficients are generally smaller than those found in previous analyses (Agosin et al., 2012)[11]. Looking at the sector level, it is interesting to notice that path-dependence is stronger in primary sectors, characterized by a smaller range of activities, compared to more dynamic sectors such as manufacturing and services.

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[9] One drawback of fixed effects models is that they drop out time invariant variables, such as the dummy LLOCK in our case, from the estimation. The alternative is to include manually fixed effects, but due to the high number of countries-products combinations this becomes computationally unfeasible.

[10] By means of the user written STATA command xttest3 after having run the fixed effects model.

[11] Besides the differences in the group of countries and the sample, this can also been due to the higher degree of disaggregation adopted in this paper.

Moving on to other traditional determinants of export diversification, our analysis confirms that there is a strong positive relation between the degree of diversification and the level of development of a country, as represented by the significant positive coefficient of per capita GDP. This result is consistent with some recent empirical studies (Agosin et al., 2012; Tadesse and Shukralla, 2013), including those specific to African countries (Osakwe, 2007; Cabral and Veiga, 2010), and confirms that countries at an early stage of development have larger opportunities to diversity. Again, however, such results mask heterogeneity across sectors; this relation seems to hold only for the manufacturing sector.

Similarly, we find a positive although small impact of exchange rate depreciation on the whole sample and for the manufacturing sector, in line with the extant literature pointing out that depreciation makes exports more profitable. A more competitive exchange rate allows the entry of new exporters, thereby increasing the scope for price competitiveness of exports (Melitz, 2003). In addition, the more competitive the exchange rate, the more rapid the drop in the share of agriculture in favour of manufacturing on total employment (OECD, 2013).

The share of domestic investment over GDP has a negative and significant impact on export diversification both on the whole sample and for the manufacturing sector, which can be interpreted as a signal of inefficient allocation of resources within the manufacturing sector, with an impact on the whole economy. This seems to be consistent with the evidence pointing to an overall negative contribution to structural change of the productivity increases that were realised in the manufacturing sector in Africa during the 1990s (McMillan and Rodrik, 2011).

It is worth noticing that, as repeatedly pointed out in the literature on African economies, countries with more stable and effective governance are also those with the greatest chances to diversify their exports (Osakwe, 2007). This is consistent with the more recent evidence on good governance being one the major drivers of positive structural change in Africa (OECD, 2013). In our dataset, this finding holds for all macro sectors but mining, which is often the most relevant sector in politically weaker countries.

We find also that higher levels of macroeconomic instability, proxied by the inflation rate, have a significant, though very small, negative effect on the diversification index on the whole sample, as well as for manufacturing and service sectors.

Table 2. Determinants of export diversification by major sector

ED	All sectors	Agriculture	Mining	Manufacturing	Services
lED	0.153***	0.286***	0.361***	0.154***	0.145**
	(0.0363)	(0.0738)	(0.0614)	(0.0342)	(0.0626)
GDP_PC	0.240***	-0.0922	-0.0402	0.201***	-0.0774
	(0.0827)	(0.0615)	(0.0562)	(0.0713)	(0.0796)
XRATe	6.46e-05***	-7.16e-06	1.71e-05	5.08e-05**	2.01e-05
	(2.33e-05)	(1.89e-05)	(2.94e-05)	(1.99e-05)	(3.02e-05)
INV_GDP	-0.0141***	-0.00591	0.00540	-0.0152***	-0.0116*
	(0.00481)	(0.00492)	(0.00579)	(0.00405)	(0.00682)
POL_STAB	0.291***	0.384***	0.0819	0.382***	0.388***
	(0.0907)	(0.105)	(0.0710)	(0.0801)	(0.112)
IFL	-0.0119*	0.00840*	-0.00408	-0.0111**	-0.0105*
	(0.00693)	(0.00488)	(0.00445)	(0.00565)	(0.00544)
LLOCK	0.124	-0.0866	-0.404**	0.0732	0.0482
	(0.175)	(0.140)	(0.158)	(0.153)	(0.138)
ToT	-0.000336	0.00307**	0.00272**	0.000443	-0.00269**
	(0.00103)	(0.00122)	(0.00127)	(0.00101)	(0.00136)
RES	-0.958***	-0.293	-0.0661	-0.925***	0.624**
	(0.251)	(0.188)	(0.215)	(0.226)	(0.259)
M_NORTH	0.00229	0.0120	-0.0273	0.00511	0.0131
	(0.0392)	(0.0178)	(0.0231)	(0.0304)	(0.0151)
M_South	0.142***	0.0270	-0.0121	0.112***	0.0119
	(0.0404)	(0.0171)	(0.0201)	(0.0316)	(0.0235)
FDI_NORTH	0.0154		0.0163	0.0423*	-0.00308
	(0.0198)		(0.0197)	(0.0223)	(0.00707)
FDI_South	-0.0205		0.0656	0.00981	0.0912
	(0.0662)		(0.0759)	(0.0826)	(0.094)
Constant	0.127	1.979***	0.717*	0.587	1.745***
	(0.583)	(0.469)	(0.422)	(0.515)	(0.553)
Observations	9,980	983	910	7,498	589
Number of panel	1,570	150	164	1,137	119
Time effects	Yes	Yes	Yes	Yes	Yes
hansenp	0.591	0.771	0.325	0.258	0.128
ar2p	0.364	0.836	0.819	0.271	0.0742

Standard errors in parentheses

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

Moreover, there is no evidence of an adverse effect of geographical remoteness, with the exception of the mining sector, where we find that countries with no access to the sea have fewer opportunities to diversify their exports. Also, there is no evidence of an adverse impact of terms of trade on export diversification, except for services. An improvement in the terms of trade only slightly promotes diversification in the primary sector, this being probably a consequence of the larger resources accruing to the sector.

In addition, countries whose export structures are dominated by natural resources show lower levels of diversification. This suggests that countries with a higher natural-resource abundance face lower opportunities to diversify within the manufacturing sector as originally suggested in influential work by Sachs and Warner (1999) and confirmed by successive studies (Hausmann et al, 2007).

Moving to the impact of South-South flows on export upgrading - our variables of interest - we find that the stronger impact on export diversification comes definitely from importing from other developing countries rather than from OECD countries (whose effect is irrelevant across all specifications). Our result show that importing from other developing countries gives rise to an increasing number of products exported within the same product lines, and this is especially true for manufacturing sectors.

As regards the impact of inward FDI, we do not find widespread evidence of a diversification-enhancing effect neither from investment by OECD nor by non-OECD countries, only a slightly positive impact on export diversification on manufacturing sectors when FDI originates from OECD countries.

This first set of results gives prima facie evidence on the determinants of export diversification by African economies as a whole and disaggregated by main sectors. In what follows we try to enrich our analysis by making a specific focus on the manufacturing sector, which is the one where we find a significant positive impact of external flows on export diversification and also probably the one where diversification can give rise to the most significant growth enhancing effects (due to the higher learning-by-importing effects and to the higher productivity compared to primary and services sectors).

The aim of the following analysis on more disaggregated data is to understand how the external effects observed in Table 2 for the manufacturing sector as a whole reflect the dynamics of the major groups of products within that sector. To do this, in Table 3 we run model (4) on (i) the main two-digit level classification of manufacturing sectors, grouped according to the product similarity (columns 1 to 6); and (ii) on the same two digit level classification grouped according to the OECD definition of technology intensity (columns 7 to 10). Table 3 reports the results, showing similar determinants of export diversification as those observed in Table 2. Two interesting exceptions are given by the impact of the lagged dependent variable, which suggests a stronger persistence in lower technology industries, including in particular the processing of agricultural products and textiles, and by per capita GDP, which does not affect significantly any of the manufacturing subsectors.

Turning to our research question, the impact of external flows originating from different source countries is quite different according to the different manufacturing subsectors. External flows coming from other developing countries have a diversification-enhancing impact on almost all the groups except the one including the manufacturing of natural resources, and that their combined effect is particularly strong in lower technology industries. More specifically, southern FDI have a significant impact on the export diversification of industries such as the processing of agricultural products and the textiles-apparel sector. This result can be interpreted as a positive spillover effect accruing to local firms as a consequence of local linkages with foreign firms adopting similar (but presumably applying higher standard) technology levels. However, it can also be a consequence of new products exported directly by the same foreign investors with a production base in the African continent. There is indeed evidence showing that many firms from other developing countries have settled up their production plants with the aim of taking advantage of the special provisions guaranteed by developed countries to African less developed ones (Kaplinsky and Morris, 2009). The literature shows that this has been particularly true for investments in the textiles and garment sectors directed to AGOA member countries, especially from Eastern Asian investors (UNCTAD, 2007). Similarly, medium- and high-technology products such as those included in the machinery and equipment and the motor vehicles – together with the lower tech wood processing industries – seem to benefit more from importing from similar countries.

Table 3. Determinants of Export diversification for disaggregated manufacturing sectors

ED	(1) Man. of agricultural products (ISIC 15-16)	(2) Textiles, apparel, leather (ISIC 17-19)	(3) Wood, paper, printing (ISIC 20-22)	(4) Man. of natural resources (ISIC 23-28)	(5) Machinery & equipment (ISIC 29-33)	(6) Motor vehicles and transport eq. (ISIC 34-35)	(7) Low-tech industries	(8) Medium-Low tech industries	(9) Medium-High tech industries	(10) High tech industries
lED	0.546***	0.335***	0.146*	0.212***	0.136***	0.181***	0.253***	0.191***	0.133**	0.158***
	(0.0824)	(0.0637)	(0.0749)	(0.0471)	(0.0465)	(0.0628)	(0.0503)	(0.0508)	(0.0578)	(0.0488)
GDP_PC	-0.0922	-0.0417	-0.000438	0.0645	0.139	0.0840	0.0411	0.120	0.0980	0.0598
	(0.0584)	(0.0899)	(0.0796)	(0.0710)	(0.0857)	(0.120)	(0.0615)	(0.0741)	(0.120)	(0.0930)
XRATe	2.27e-05*	6.88e-07	1.69e-05	-3.14e-07	9.45e-06	1.97e-05	2.24e-05	8.03e-06	2.30e-05	-9.62e-06
	(1.30e-05)	(2.80e-05)	(2.42e-05)	(2.23e-05)	(2.17e-05)	(2.91e-05)	(1.50e-05)	(2.41e-05)	(2.44e-05)	(2.56e-05)
INV_GDP	-0.00173	-0.0102*	-0.0147**	-0.0158***	-0.0146***	-0.00569	-0.0110**	-0.0169***	-0.00831*	-0.0106*
	(0.00617)	(0.00543)	(0.00705)	(0.00479)	(0.00540)	(0.00742)	(0.00503)	(0.00513)	(0.00497)	(0.00597)
POL_STAB	0.303**	0.454***	0.384***	0.539***	0.452***	0.347**	0.344***	0.540***	0.421***	0.376***
	(0.125)	(0.124)	(0.128)	(0.0924)	(0.112)	(0.144)	(0.0840)	(0.103)	(0.127)	(0.103)
IFL	-0.00779	-0.00948*	-0.0243***	0.00120	0.00367	0.00275	-0.0100*	-0.000266	-0.00525	0.00364
	(0.00612)	(0.00558)	(0.00808)	(0.00574)	(0.00477)	(0.00580)	(0.00576)	(0.00627)	(0.00576)	(0.00396)
LLOCK	0.0381	-0.266	-0.662***	-0.0840	0.0519	0.262	0.00526	-0.105	-0.0196	0.00801
	(0.171)	(0.213)	(0.235)	(0.148)	(0.150)	(0.224)	(0.205)	(0.161)	(0.192)	(0.135)
ToT	0.000581	0.00280	0.00352**	0.00192	0.00115	-0.00403*	0.000457	0.00212	-0.000207	0.00183
	(0.00116)	(0.00186)	(0.00169)	(0.00136)	(0.00133)	(0.00229)	(0.000986)	(0.00145)	(0.00171)	(0.00161)
RES	0.0184	-0.332	-0.491	-0.351	-0.524*	-0.328	-0.515**	-0.527**	-0.536*	-0.304
	(0.228)	(0.260)	(0.339)	(0.232)	(0.268)	(0.321)	(0.220)	(0.236)	(0.320)	(0.279)
M_North	0.0168	-0.0308	-0.0593	0.0357*	0.0181	0.0213	0.00940	0.0306	0.00120	0.00104
	(0.0197)	(0.0361)	(0.0361)	(0.0203)	(0.0280)	(0.0283)	(0.0379)	(0.0221)	(0.0250)	(0.0249)
M_South	0.0135	0.0153	0.0517*	0.0118	0.0530*	0.0561**	0.0568**	0.0301	0.0652	0.0379
	(0.0164)	(0.0292)	(0.0273)	(0.0244)	(0.0311)	(0.0284)	(0.0226)	(0.0249)	(0.0413)	(0.0344)
FDI_North	0.0851***	0.0899	0.0409	0.0772*	0.0246	0.0246	0.0496	0.0976*	0.0208	0.440
	(0.0255)	(0.0547)	(0.189)	(0.0412)	(0.0338)	(0.0199)	(0.0478)	(0.0520)	(0.0150)	(0.378)
FDI_South	0.189***	1.032***	-0.499	0.199	0.0348	0.0175	0.264***	0.214	0.00705	
	(0.0686)	(0.243)	(1.833)	(0.156)	(0.230)	(0.0705)	(0.0974)	(0.172)	(0.0627)	
Constant	1.556***	2.276***	2.193***	1.458***	1.035*	1.522*	1.504***	1.087**	1.596*	1.327**
	(0.476)	(0.718)	(0.633)	(0.525)	(0.624)	(0.847)	(0.441)	(0.550)	(0.873)	(0.625)
Observations	579	1,008	993	2,001	1,690	673	3,134	1,663	1,687	1,014
Number of panel	93	150	150	300	250	100	487	250	250	150
Time effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
hansenp	0.192	0.893	0.884	0.148	0.729	0.354	0.0725	0.268	0.115	0.585
ar2p	0.737	0.236	0.362	0.167	0.821	0.760	0.0467	0.508	0.682	0.551

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Finally, our results show that external flows coming from OECD countries exert a positive influence on export diversification for medium technology industries such as the processing of natural resources, and this positive effect is enhanced both by trade and investment channels. Such result suggests that – when it comes to the manufacturing sector and to more traditional specializations related to natural resources – there is little or no interaction nor spillover arising from external flows from countries vis-à-vis whom Africa has a greater technology gap.

4.1.1 A quantile analysis of export diversification

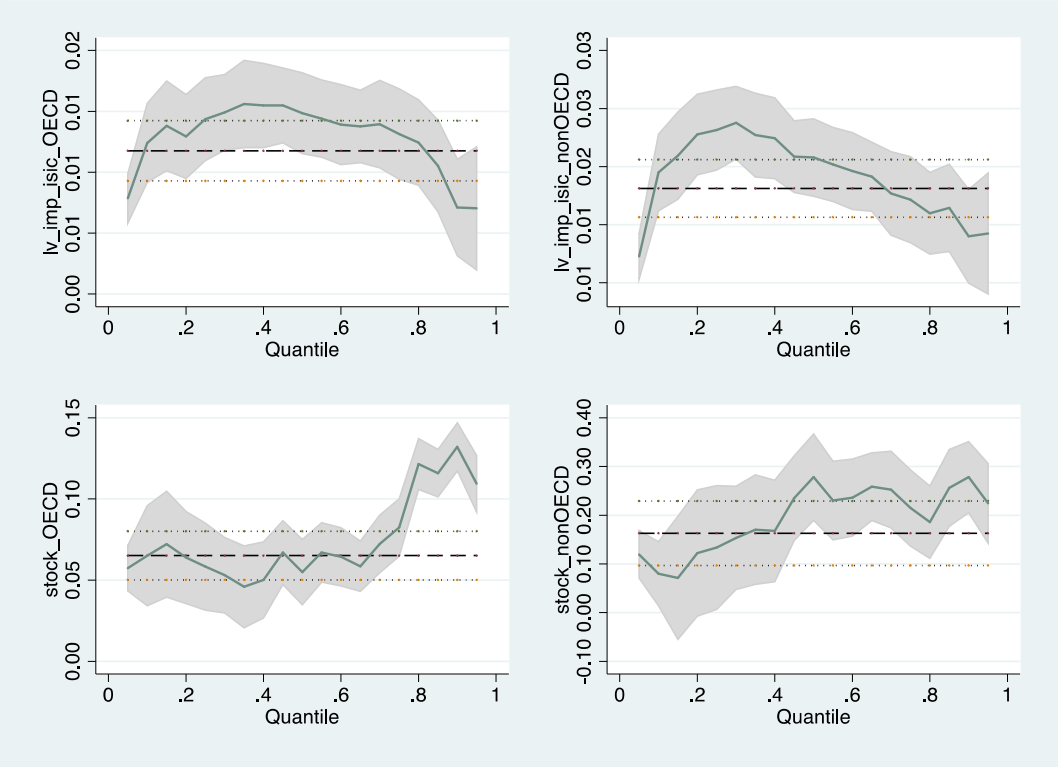
Following our discussion about methodology, this section runs a quantile regression estimation of model (4) in order to test for the existence of nonlinear effects. We only present and discuss results on the manufacturing sector, which is the most interesting case for our analysis.

Overall, results (reported in Table A1 in the appendix) are similar to those in Table 2. Interesting nonlinear effects arise for per capita income, which positively affects export diversification in countries at the bottom end of the distribution, but whose sign turns negative and significant in the

upper part of the distribution. This confirms that low-income countries have the larger potential for grasping the benefits of external flows. Other interesting results relate to the institutional quality variable: we find that good governance has a larger impact in countries at the higher end of the diversification spectrum. Conversely, we find that being landlocked represents a stronger obstacle for countries with higher levels of diversification. Finally, our results seem to show that high dependence on natural resources has a stronger negative impact on diversification especially for countries located around the median values of the distribution.

Estimates of the effects of our variables of interest (and their intervals of confidence) on export diversification across different deciles of the distribution are plotted in Figure 2 together with the estimated coefficient from the OLS equivalent. Despite the different methodology adopted, which does not account for the complex panel structure of our data, coefficients are more or less in line with those reported in Table 2. However, the impact of imports presents a higher variability along the distribution of the diversification index and follows an inverse U-shaped pattern. Interestingly, imports from other developing countries have an above-average impact on the lower bound of the distribution and tend to decrease thereafter, whereas imports from OECD countries exert a stronger impact for a larger part of the distribution, with the exception of the extreme tails. FDI, on the other hand, tend to impact differently on export diversification; they seem to affect diversification strongly at more advanced stages, especially when coming from the North. This result which suggests that this type of flow seems to require stronger absorptive capactities by recipient economies and therefore benefit more those countries which already exhibit a sufficient degree of export diversification.

Figure 2. Impact of external flows on export diversification



Source: Authors' elaboration using the STATA command grqreg

The main consideration that can be drawn from these results is that different types of flows influence export diversification in different ways at different stages. Importing Southern products - which are not technologically distant from domestic production - can translate into significant improvements for less diversified African countries and sectors, whereas hosting FDI – which usually bring advanced

productive capacities in the recipient economies - tend to stimulate the ability to introduce new product varieties only in more diversified countries.

4.2 Model of export quality

Results of the model measuring the determinants of unit values are reported in Table 4. In line with the extant literature (Harding and Javorcik, 2011), we find a highly significant and positive relationship between the quality of exports and the level of per capita income of the exporting country across all sectors (more so for services and less so for agriculture). This result confirms that higher per capita income is associated – on the supply side - with more advanced productive capabilities that enables countries to produce more advanced goods, and – on the demand side – with more sophisticated demand and consumption patterns at home, which contribute to promote higher quality of domestic production. Similarly, the ratio of investment on GDP also positively affects export quality. As one could expect, a favourable trend in the terms of trade as well as stronger inflation positively affect export unit values, given that in both cases they translate into increases in the price levels. More surprisingly, countries with a weaker level of governance are those who have experienced higher growth in export quality.

Looking at the impact of external flows on export unit values, we notice that importing from either the South or the North translates into a slight improvement in the quality of exports, this being especially true for the manufacturing sector, with a higher positive impact of imports from developed compared to developing countries. On the other hand, we find evidence of positive spillover effects from Southern FDI in all sectors on the whole sample and in the manufacturing sector, while no impact from Northern FDI (and actually a negative impact from Northern FDI in the manufacturing sector).

As in our analysis on the determinants of export diversification, we again explore our results more in detail by disaggregating the data on the manufacturing sector at 6-digit level (Table A2 in appendix). Based on such higher disaggregation, we find that imports from OECD countries have a positive spillover on the quality level of exports in sectors such as the processing of natural resources, machinery and equipment, motor vehicles and transport equipment. On the latter group, we also find a positive effect from imports originating from other developing countries.

As regards FDI, an increase in the number of investments from both developed and developing countries helps raising the unit values of exports related to the processing of agricultural products. In addition, FDI from developing countries have a positive spillover effect on the export quality of African products within the machinery and equipment group. Interestingly, we also find a negative impact of FDI from OECD countries on the quality upgrading of products in the manufacturing of natural resources, which could suggest that the benefits for African economies of inward direct investment by developed countries in this sector is limited.

Table 4. Determinants of export quality, panel fixed effects estimator

UV	All sectors	Agriculture	Mining	Manufacturing	Services
GDP_PC	1.243***	1.100***	1.194***	1.237***	4.325***
	(0.0222)	(0.0829)	(0.237)	(0.0256)	(0.685)
XRATE	1.51e-05	-2.94e-05	0.000174	1.48e-05	0.000214
	(1.05e-05)	(3.26e-05)	(0.000117)	(1.13e-05)	(0.000313)
INV_GDP	0.00553***	0.00874***	0.0112	0.00713***	0.0593***
	(0.000651)	(0.00229)	(0.00687)	(0.000747)	(0.0208)
POL_STAB	-0.0556***	-0.143**	0.196	-0.0905***	-0.925*
	(0.0191)	(0.0687)	(0.197)	(0.0218)	(0.528)
INFL	0.00214***	-0.00112	-0.00122	0.00349***	0.0235*
	(0.000484)	(0.00179)	(0.00458)	(0.000527)	(0.0136)
ToT	0.00127***	0.00168***	0.00541***	0.00148***	0.0107***
	(0.000149)	(0.000549)	(0.00142)	(0.000165)	(0.00403)
RES	-0.0197	0.225	0.149	0.0257	0.518
	(0.0376)	(0.139)	(0.420)	(0.0440)	(1.064)
M_NORTH	0.00983***	0.0117*	0.00842	0.0188***	-0.00999
	(0.00157)	(0.00663)	(0.0183)	(0.00229)	(0.0409)
M_South	0.00157*	-0.00251	0.00178	0.00171*	-0.00596
	(0.000831)	(0.00241)	(0.00642)	(0.00101)	(0.0187)
FDI_NORTH	-0.00334		-0.0364	-0.00520**	-0.0268
	(0.00207)		(0.0338)	(0.00214)	(0.0265)
FDI_South	0.0184**		0.0687	0.0147*	0.138
	(0.00767)		(0.110)	(0.00783)	(0.232)
Constant	-8.123***	-8.329***	-10.40***	-8.071***	-33.55***
	(0.162)	(0.594)	(1.710)	(0.185)	(4.912)
Observations	544,399	29,854	7,118	412,566	1,763
R-squared	0.723	0.646	0.710	0.652	0.501

Robust standard errors in parentheses

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

5. Conclusions

In this paper, we contribute to the extant literature by exploring the impact of external flows – imports and inward FDI – on the upgrading of African exports measured both as export diversification (i.e. increase in the variety of exports) and increasing export unit values (a proxy for the quality level of exports). We distinguish flows originating from other developing countries (i.e. South-South flows) from those originating from developed countries (i.e. North-South flows), with the aim to test the assumption that they might impact differently on the ability of recipient economies to absorb the positive knowledge spillovers embedded in imported goods and inward investment flows.

Our main results suggest that external flows do matter for export upgrading in Africa: both imported goods and inflows of foreign direct investments positively impact on the ability of African economies to upgrade their export baskets. This supports the arguments as well as policy measures in favour of openness to external flows as a vehicle of export upgrading. However, the origin of external flows also matters: greater integration with other developing countries can contribute more to African countries' export upgrading compared to North-South integration. In particular:

- Importing from Southern countries raise the ability to expand the variety of manufactured exports and to introduce more advanced goods in less diversified economies;
- FDI from the South foster diversification of low-tech industries (such as the processing of agricultural products and the textiles-apparel sector), only if and when they already exhibit an advanced stage of diversification, and only limited quality upgrading in manufacturing sectors;
- FDI from the North promote diversification within primary goods industries, but have no impact on quality upgrading;

- Importing from the North, on the other hand, improves productive capacities in higher-tech and more capital-intensive sectors.

Therefore, our results support the need for new efforts to achieve a more refined way of dealing with specific features of international trade cooperation to promote African export upgrading. As a matter of fact, integration and openness to external flows could be too generic policy recommendations, without taking into account the potentially different impact of diverse types of external flows on the different dimensions of export upgrading, which depend on the stage of diversification of recipient economies as well as on the domestic sectors involved.

According to our analysis, in order to achieve such objectives, an important role can be played by FDI, also in view of their rising role all over the continent. FDI from the South, in particular, affects the ability of African countries to diversity their export baskets and to raise their quality, especially within manufacturing, and more significantly when compared to the same flows originating from the North, particularly in those low-tech industries such as the manufacturing of agricultural products or the textiles-apparel cluster where African countries enjoy some forms of specialization.

Two final implications can be drawn from our findings. First, given that Southern FDI seem to have a stronger impact on countries and sectors which are *not* at the bottom of the (export diversification) distribution, such investment inflows should be considered an opportunity for many African middle income countries to diversify out of their traditional exports. Second, if it is true that more diversification and higher unit values are related to higher productive capacities (Page, 2012), our results suggest that the recent upgrading experienced by some African economies (McMillan and Rodrik, 2011) not only can be partially explained by the foreign ownership of firms (as in Harrison et al., 2013), but that the Southern origin of many of those investments matters in terms of the contribution of foreign investments to the export upgrading of African countries.

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Appendix

Table A1. Quantile Regression Analysis, Manufacturing sector

ED	q10	q20	q30	q40	q50	q60	q70	q80	q90
GDP_PC	0.0324***	0.0322***	0.0259	0.0271**	0.00647	-0.0193*	-0.0323***	-0.0299*	-0.0286
	(0.00703)	(0.0124)	(0.0181)	(0.0117)	(0.0122)	(0.0116)	(0.0103)	(0.0163)	(0.0220)
XRATE	6.23e-06	7.86e-06	2.88e-06	8.58e-06	5.05e-06	-8.19e-07	-5.86e-07	1.06e-06	-1.86e-06
	(5.82e-06)	(4.95e-06)	(7.49e-06)	(6.58e-06)	(6.82e-06)	(5.69e-06)	(6.66e-06)	(6.56e-06)	(6.60e-06)
INV_GDP	-0.00466***	-0.00656***	-0.00622***	-0.00782***	-0.00967***	-0.0110***	-0.0130***	-0.0170***	-0.0209***
	(0.000681)	(0.00100)	(0.00151)	(0.00102)	(0.00114)	(0.00115)	(0.00118)	(0.00143)	(0.00193)
POL_STAB	0.127***	0.294***	0.349***	0.405***	0.479***	0.570***	0.630***	0.681***	0.779***
	(0.0144)	(0.0196)	(0.0339)	(0.0193)	(0.0206)	(0.0221)	(0.0172)	(0.0273)	(0.0346)
INFL	-0.00190**	-0.00221	-0.000413	-0.000777	-0.00173	-0.00140	-0.00255*	-0.00375***	-0.00511***
	(0.000869)	(0.00199)	(0.00126)	(0.00111)	(0.00164)	(0.00146)	(0.00149)	(0.00134)	(0.00183)
LLOCK	0.0295	0.00702	-0.00341	0.0230	-0.0419	-0.0570*	-0.132***	-0.194***	-0.289***
	(0.0202)	(0.0375)	(0.0390)	(0.0384)	(0.0376)	(0.0335)	(0.0309)	(0.0306)	(0.0365)
ToT	0.000275	0.000497	0.00116***	0.00120***	0.00138***	0.00202***	0.00204***	0.00149***	0.00143***
	(0.000318)	(0.000385)	(0.000404)	(0.000408)	(0.000361)	(0.000318)	(0.000380)	(0.000380)	(0.000459)
RES	-0.186***	-0.153***	-0.277***	-0.327***	-0.298***	-0.266***	-0.294***	-0.212***	-0.207***
	(0.0274)	(0.0412)	(0.0553)	(0.0546)	(0.0495)	(0.0645)	(0.0427)	(0.0592)	(0.0800)
M_NORTH	0.0166***	0.0244***	0.0262***	0.0275***	0.0269***	0.0256***	0.0242***	0.0221***	0.0169***
	(0.00143)	(0.00180)	(0.00210)	(0.00182)	(0.00175)	(0.00179)	(0.00155)	(0.00175)	(0.00128)
M_South	0.0192***	0.0294***	0.0330***	0.0346***	0.0336***	0.0313***	0.0284***	0.0257***	0.0227***
	(0.000947)	(0.00139)	(0.00180)	(0.00186)	(0.00127)	(0.00134)	(0.00136)	(0.00139)	(0.00201)
FDI_NORTH	-0.00176	-0.0110	0.0101	0.0226	0.0150***	0.0122	0.0174*	0.0203	0.0762***
	(0.00444)	(0.0176)	(0.0191)	(0.0160)	(0.00526)	(0.00840)	(0.00953)	(0.0145)	(0.0290)
FDI_South	0.0437	0.0823*	0.108**	0.0703	0.0567*	0.0765	0.110	0.179**	0.168*
	(0.0388)	(0.0454)	(0.0520)	(0.0497)	(0.0345)	(0.0704)	(0.0873)	(0.0857)	(0.0972)
Constant	0.202***	0.615***	1.008***	1.370***	1.894***	2.383***	2.914***	3.397***	4.029***
	(0.0422)	(0.0855)	(0.149)	(0.0919)	(0.105)	(0.114)	(0.101)	(0.136)	(0.157)
Observations	11,837	11,837	11,837	11,837	11,837	11,837	11,837	11,837	11,837

Standard errors in parentheses

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

Table A2. Determinants of export upgrading, industries within Manufacturing sector

	Man. of agricultural products	Textiles, apparel, leather	Wood, paper, printing	Man. of natural resources	Machinery & equipment	Motor vehicles and transport eq.
GDP_PC	1.037***	1.124***	1.320***	1.307***	1.278***	1.258***
	(0.0665)	(0.0501)	(0.106)	(0.0469)	(0.0564)	(0.133)
XRATE	-5.83e-05**	5.41e-06	-1.63e-05	1.88e-05	1.79e-05	0.000129***
	(2.46e-05)	(3.11e-05)	(4.52e-05)	(2.21e-05)	(2.23e-05)	(4.36e-05)
INV_GDP	0.00818***	0.00689***	0.00133	0.00723***	0.00718***	0.0102***
	(0.00174)	(0.00156)	(0.00316)	(0.00147)	(0.00156)	(0.00337)
POL_STAB	-0.159***	-0.109**	-0.0422	-0.0586	-0.114**	-0.0881
	(0.0519)	(0.0454)	(0.0902)	(0.0402)	(0.0476)	(0.105)
INFL	-0.00132	0.00168	-0.00209	0.00482***	0.00613***	0.00288
	(0.00132)	(0.00121)	(0.00226)	(0.00102)	(0.00105)	(0.00224)
ToT	0.00140***	0.000954***	0.00116*	0.00242***	0.000850**	0.000987
	(0.000426)	(0.000361)	(0.000666)	(0.000295)	(0.000354)	(0.000789)
RES	0.324***	0.199**	-0.201	0.187**	-0.211**	-0.187
	(0.110)	(0.0993)	(0.183)	(0.0828)	(0.0924)	(0.174)
M_NORTH	0.00436	0.00198	0.00882	0.0258***	0.0322***	0.0395***
	(0.00508)	(0.00437)	(0.00931)	(0.00404)	(0.00568)	(0.0109)
M_South	0.00153	-0.00192	-0.000990	0.00201	0.000649	0.0115**
	(0.00198)	(0.00197)	(0.00384)	(0.00185)	(0.00258)	(0.00452)
FDI_NORTH	0.0103**	-0.00687	-0.0667	-0.0239***	0.000950	-0.00221
	(0.00503)	(0.00467)	(0.0567)	(0.00411)	(0.00418)	(0.00873)
FDI_South	0.0252**	0.0160	-0.165	0.0292	0.0556**	-0.0214
	(0.0105)	(0.0608)	(0.127)	(0.0205)	(0.0225)	(0.0177)
Constant	-7.932***	-6.814***	-9.078***	-9.504***	-7.189***	-8.053***
	(0.476)	(0.362)	(0.759)	(0.339)	(0.406)	(0.936)
Observations	40,632	72,324	22,706	128,868	110,160	17,713
R-squared	0.582	0.598	0.579	0.641	0.538	0.551

Robust standard errors in parentheses

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

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