

Impact of South-South integration on the export upgrading of African economies

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Abstract. FDI to Africa rapidly increased over the past decade and although still lower in absolute value, and relative to GDP, increased more rapidly than those destined to other developing regions. Moreover, high income countries have reduced their importance as investors to the benefit of middle income countries. We explore whether inward FDI from other developing countries have a much higher impact on the capabilities of recipient African economies to upgrade their export baskets, both in terms of export sophistication and of export diversification. Our results suggest that the idea that African economies would benefit more from integrating with other Southern countries finds some support in the data, with regards to both investment and trade, especially when looking at the impact on export diversification.

Keywords: export diversification, export sophistication, South-South trade, South-South FDI, Africa

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1. Introduction

The idea of ‘trade as an engine of growth’ for developing countries dates back at least to the mid-1970s, when the inward orientation policies of the post-war years proved not to be as successful as their proponents had originally thought. The channels through which outward orientation can accelerate industrialization have been extensively investigated in the trade and development literature. In endogenous growth models, a number of channels have been identified through which trade might affect growth in the long run, most importantly technological change. Greater openness to external flows allows the importation of technology which can lead to faster accumulation of knowledge and higher Total Factor Productivity, even more so in countries which are more backward and provide more opportunities to absorb new ideas (Grossman and Helpman, 1991; Schiff and Wang, 2006).

Foreign trade and FDI also have dynamic effects on productivity growth (Gao, 2004). Foreign trade exposes domestic firms to international competition and provides an additional incentive for them to improve efficiency and adopt more advanced technology. FDI is an important vehicle for technology transfer; along with capital, foreign companies bring in advanced production technology and management, 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.

More recently, the trade literature has developed the idea that a country’s trade specialisation is non-neutral on its growth performance, emphasizing the need for developing countries to upgrade their export structures by either diversifying them and increasing their levels sophistication (Hausman et al., 2007; Hidalgo et al., 2007).

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). This idea lies behind the large number of integration arrangements to stimulate South-South cooperation among developing countries over the last couple of decades, especially among African economies, which appear to be among the least integrated within the South.

Over the last decade, the increasing share of large emerging economies in international trade and investment, together with their sustained economic growth, has revived academic and policy interests for South-South integration and inspired a debate on the growth implications for the least developed countries, in particular in Africa (Ajakaiye, 2006; Jobelius, 2007; Kaplinsky and Messner, 2008; Wang and Bio-Tchane, 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, especially with other developing countries as partners. The share of developing countries on total African exports increased by 10 percentage points since 1995 and now accounts for 40% of the total. FDI to Africa also rapidly increased over the past decade and although still lower in absolute value, and relative to GDP, FDI to Africa increased more rapidly than those destined to other developing regions. Inflows increased more than four-fold from around 10,000 million dollars in 2000 to almost 43,000 in 2011, while inflows to other developing regions in Asia and America, although much higher in absolute levels, increased less than three-fold over the same years. In terms of stocks, FDI to developing Africa increased as rapidly as to other developing regions, although in absolute terms are still a long way below those to developing America and Asia. Finally, the importance of FDI over GDP increased for developing Africa, but the same is not true for developing countries in America and Asia, which experienced a decline near one percentage point (Table 1). Such increase went along with a substantial change in the geographic composition of countries investing in Africa: data showing relative decline of high income vs. middle income.

Table 1 FDI to Africa in the 2000s

Inflows	2000*	2011*	2011/2000
Developing Africa	9671	42652	4,4
Developing America	97824	216988	2,2
Developing Asia	147787	423157	2,9
Inward stock	2000*	2011*	2011/2000
Developing Africa	153553	569559	3,7
Developing America	507388	2048101	4,0
Developing Asia	1071917	3990731	3,7
FDI/GDP	2000	2011	2011/2000
Developing Africa	1,6	2,3	0,6
Developing America	4,6	3,9	-0,7
Developing Asia	3,5	2,6	-0,9

*millions US dollars

Source: UNCTADSTAT

Yet, despite its relevant policy implications, the question whether the economic effects of South-South flows systematically differ from North-South ones has not been followed by extensive empirical investigations. This paper aims to fill this gap by exploring the differential impact of FDI and imports from the North and the South on the ability of African countries to diversify their export structures and to improve the quality level of their exports over the last decade. Our results suggest that the idea that African economies would benefit more from integrating with other Southern countries finds some support in the data, with regards to both investment and trade, and especially when looking at the

impact on export diversification. The remainder of the paper is organised as follows. Section 2 reviews the literature on the importance of external knowledge flows – inward FDI and imports – on export upgrading. Section 3 presents data and descriptive statistics. Section 4 describes the empirical methodology. Section 5 discusses the results and Section 6 concludes.

2. Export upgrading, economic growth and the role of external knowledge flows

2.1 Export upgrading and economic growth in developing countries

A variety of indicators of export sophistication have been adopted in a recent strand of research investigates the nexus between structural transformation and economic growth (Lall et al., 2006; Hausman et al., 2007; UNIDO, 2009). The principle here is that the more developing countries diversify upgrade their export structures towards more advanced productions, the more they will be able to enhance their pattern of growth. A major outcome of these works is that of seeing developing countries growth, everything else being equal, as a consequence of shifting resources from lower to higher productive activities that, in turn, are characterized by a more elastic demand. This, however, depends on how distant the structure of a country's comparative advantage is from the set of capabilities needed to produce more advanced products (Hausman and Klinger, 2006). A recent model developed by Hausman and Klinger (2007) tries to map out the product space – i.e. the network of products with varying degrees of linkages between them (Klinger, 2009) – in order to understand why some countries are better off in moving towards more sophisticate exports. Contradicting the provisions of traditional theories, which assume an homogeneous product space, Hausman and Klinger (2007) demonstrate that the pattern of structural transformation at the product level is strictly path-dependent, i.e. changes in comparative advantages over time depend upon the existing relatedness across products exported.

Hidalgo et al. (2007) provide a graphical idea, together with some empirical results, on how this 'distance' can be represented in the product space. As expected, the distance is less relevant for products relatively more capital and skill intensive and more relevant for labour and land intensive ones. At the core of the product space are products in the metal, machinery and chemical sectors, while others lie in the periphery with a heterogeneous distribution in the density of linkages. Product groups such as electronics, garments and, to a lesser extent, textiles, though at the periphery, are characterized by high density and are therefore closer to the group of more sophisticated products at the core. Indeed, when representing the pattern of specialization in the product space for the world's regions, Hidalgo et al. (2007, p. 485) show that the group of industrialized countries occupy the core of the product space,

East Asia the more dense part of the periphery, while SSA exports “..few product types, all of which are in the far periphery of the product space”. Also other studies based on the product-space analysis of African countries find that the largest part of the countries is stuck in a “low-product” trap (Abdon and Felipe, 2011), especially within the agricultural sector (Ulimwengu and Badibanga, 2012).

According to Hausman et al. (2007), countries stuck in primary resources exports have little chances to catching-up more sophisticated and growth-enhancing exports. This seems to give little or no chances of growth for least developed countries, and especially for many African economies. Using disaggregated data at the 6-digit HS, for instance, Amurgo-Pacheco and Pierola (2008) find that African economies have the lowest rates of diversification on a sample including both developing and developed countries, given the concentration of their exports in few primary commodities.

On the other hand, however, Lall et al. (2006) maintain that the nexus between export sophistication and growth is not that straight and that opportunities arising from specialization in more value added activities in global value chains may represent an outstanding occasion for many developing countries, independently from their initial specialization. For such reasons, strategies of export diversification are seen as relevant in the African case.

2.2 The role of external flows to foster export upgrading in developing countries

For many developing countries, the acquisition of knowledge through external flows is one of the main channels to improve their set of productive capabilities and, therefore, their export performance.

2.2.1 Trade

Imports represent the most traditional channel of acquisition of foreign knowledge (Grossman and Helpman, 1991; Schiff and Wang, 2006). On this respect, it is relevant to notice how scholars have promoted the idea that to account for the knowledge variety that flows into a region from abroad, it is important to look at the variety and characteristics of imported goods. This literature is based on the assumption that there is a certain degree of knowledge “embedded” in imported goods – e.g. in terms of learning opportunities involved in the use of new products. On this basis, the benefits connected to the import of goods into a region or country 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).

A further channel through which trade specialisation impacts on economic growth has to be considered: the origin of imported goods. In fact, the kind of imported goods is a measure of the kind of knowledge that flows into a country from abroad. Whether a country imports goods that are different or similar to those produced at home implies different knowledge spillovers from these imports. Importing goods that are very similar to one's own exports is likely to create few if any flow of new knowledge compared to the existing knowledge at home; on the other hand, importing goods that are different from one's own products is likely to generate higher flows of new knowledge from abroad. Southern countries' imports from the North and from the South differ as regards the technological distance from domestic products. Based on the plausible assumption that imports from the North embed – at least on average – more or higher technology compared to imports from the South, it is possible to assume that the former are more distant in terms of technological level and therefore are less likely to contribute to local knowledge and to export upgrading of importing countries, whereas from the same argument imports from the South are more likely to improve local knowledge and export upgrading (Greenaway and Milner, 1990). Empirical analyses aimed at comparing the effects of north-south vs. south-south trade on the diffusion of technology at the local level show however that trading with developed countries give generally rise to stronger spillovers (Schiff and Wang, 2006; Coe et al., 1997). It has to be noted however that such analyses do not take into account for the recent increase in south-south trade.

2.2.2 FDI and export upgrading

There is a large literature emphasizing the role of FDI in promoting development, which can materialize 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) externalities to local firms (Lall and Narula, 2004; Crespo and Fontoura, 2007; Zhan and Mirza, 2012). 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 widely 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 realization of such spillovers is nonetheless affected by the “quality” 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 favorable conditions, the literature has much stressed on the fact that, to materialize, spillovers need the recipient to be endowed with a certain level of absorptive capacities, consisting in the capacity to internalize external knowledge flows (Crespo and Fontoura, 2007). Looking at the specific case of Africa, a recent work by Morrissey (2012) has pointed out that considering 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, this translates often in few benefits from local linkages rather than true positive spillover effects as intended from the existing literature.

Whether the investment originates from a developed or another developing country 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)³. Compared to North-South investments, 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 Sjöholm, 2011). Similarly, they can build-up more easily 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” (Gelb, 2005). FDI from other developing countries can directly supplement low savings and contribute to capital accumulation in LICs, more than elsewhere, as traditional investors are often unwilling to invest in some LICs due to sometimes still difficult working environments (QUOTE). This is particularly important if FDI is accompanied by improvements in infrastructure, as is often the case of FDI from other Southern countries, especially the 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, the papers by Iwamoto and Nabeshima (2012) and 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. Also the paper by Banga (2006), based on a firms’ level analysis on FDI from the US and Japan to India, find similar results adding that this has mostly happened in non traditional sectors, a results depending on the fact that in such sectors foreign firms have more capacity to export compared to 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

³ Developed countries are the major investors in the African continent, though their investments in some African countries have recently reduced in favour of new investors from developing countries, including many Asian (UNCTAD, 2007; UNIDO, 2007).

that that attracting inflows of FDI offers potential for raising the quality of exports in developing countries.

3. Data and empirical analysis

In this paper, we estimate the impact of external flows on two different measures of export performance: an index of export diversification and the unit value of export, both considered in the literature as good proxies for export upgrading.

In order to construct our reference indicators, we use 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)⁴.

The index of export diversification has been constructed at the sectoral level in order to make it comparable with sectoral trade and FDI data from external sources according to the following approach:

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

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 product exported:

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

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.

The unit value of export, on the other hand, is computed as the ratio between the value and the quantity exported and represents a commonly adopted measure of export quality upgrading (Baldwin and Harrigan, 2011; Harding and Javorcik, 2011). In order to take into account for the relative importance of each products in a country export bundle, the unit value has been computed as a weighted average, the weights being the market shares of product p for any market j where country i has a positive export value. The unit value is normally considered a good indicator the more disaggregated are the data. It nonetheless suffers of some limitations given that it does not take into

⁴ 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.

account for other factors, such as fragmentation of production, that can influence quality upgrading of products exported (Hallack and Schott, 2010).

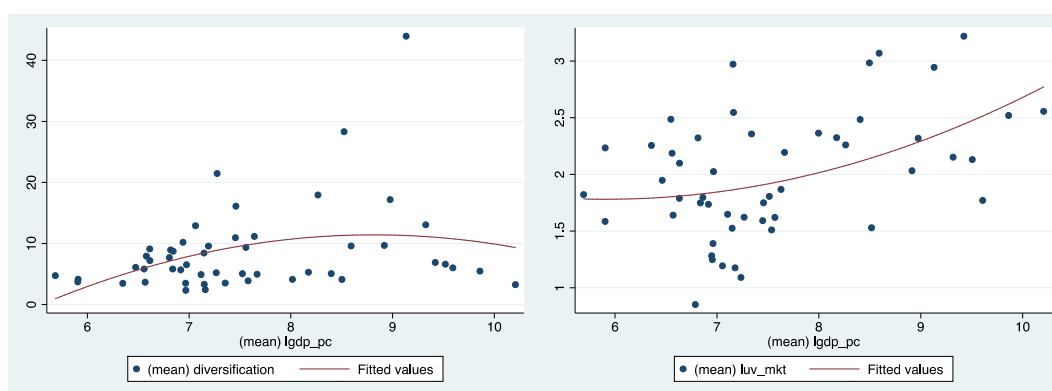
Based on such indicators, in what follows we estimate the determinants of export diversification and export sophistication according to the following functional relation:

$$(3) \text{Export Upgrade} = f(\text{GDP_PC}; \text{INV_GDP}; \text{XRATE}; \text{INFL}; \text{LLOCK}; \text{GOV_EFF}; \text{TOT}; \text{RES}; \text{M}; \text{FDI})$$

The set of independent variables has been chosen taking into account their capacity to influence the supply capacity of a country⁵.

Starting with economic factors, income per capita (GDP_PC) is included as a control for the level of development of a country and it is expected to positively influence both diversification and export sophistication (Tadesse and Shukralla, 2013; Osakwe, 2007; Ito, 2011). Existing literature has pointed out the existence of a non-linear relation between per capita income and diversification, with countries at early stage of development (such as most of the African) experiencing concentration of their export structure that should reduce as they become richer (Imbs and Wacziarg, 2003). Additionally, most literature on export sophistication is based on the assumption that the richer the country, the more sophisticated the export structure (Hausmann et al., 2007; Schott, 2008). Such trends suggested by the literature are reflected also by the data from 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 exporters.

Figure 1. Nexus between per capita income and export upgrading, average values 2003-2010



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).

⁵ Other theoretically relevant independent variables, including for instance those measuring the human capital or the 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 years covered by the analysis.

Exchange rate (XRATE) policies could be relevant for both indicators. An overvaluation of the local currency can, in fact, reduce the profitability of exporting, making upgrading less profitable (Agosin et al., 2012; Schott, 2008). Finally, we control for the effects of economic instability, 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).

Another relevant dimension affecting upgrading is the structural composition of exports. High dependence on natural resources (RES), a common feature of many African countries, limits the scope of export diversification and sophistication, fostering on the other hand concentration and volatility (Caldeira and Veiga, 2010; Osakwe, 2007). Moreover, and related to this, an improvement in a country's terms of trade (ToT) generally contributes to a reallocation of exports towards the dominant sectors, thus enhancing 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 an access to the sea (LLOCK), as proxy for trade costs (Caldeira and Veiga, 2010).

Following the extant literature, we also consider the role of institutional variables, assuming that countries with a more stable political environment have less obstacles to upgrade their export structures (Osakwe, 2007; Caldeira and Veiga, 2010).

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 include also the cumulate number of FDI projects received by the African country i ⁶. Data on FDI come from the *FDIMarkets.com* database and provide information investment projects (greenfield only) at the sectoral level⁷. 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_OECD and FDI_OECD), and a group of "southern" partners, including all the remaining (M_nonOECD and FDI_nonOECD). Table 2 below reports the description of the variables, together with the summary statistics.

Table 2 about here

⁶ We have computed this cumulate 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: $FDI_{i,x,t} = N_{i,x,t} + N_{i,x,t-1}$.

⁷ Sectors have been classified taking into account both the sector and the business activity of any project 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.

4. Methodology

When estimating the determinants of export diversification, we formalize the functional relation in (1) as follows:

(4)

$$ED_{i,x,t} = ED_{i,x,t-1} + GDP_PC_{i,t} + INV_GDP_{i,t} + INFL_{i,t} + XRATE_{i,t} + RES_{i,t} + ToT_{i,t} + POL_STAB_{i,t} + LLOCK_i + M_{i,x,t} + FDI_{i,x,t} + \theta_{i,x} + \delta_t + \varepsilon_{i,x,t}$$

where ED , our dependent variable, is the log of the diversification index for African country i for sector x in year t . We consider export diversification as being function of its lagged levels as well as by country-sector fixed effects (as in Osakwe, 2007 and Agosin et al., 2012). This influences the estimation methods, preventing the adoption of methodologies not accounting for the dynamic panel bias. In order to overcome such issues, we then estimate (4) by adopting a GMM estimator based on Arellano and Bond (1991)⁸, 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 endogenous (Greene, 2003). 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, 2009).

Moving on the analysis of the unit values, the model adopted is the following:

$$UV_{i,p,t} = GDP_PC_{i,t} + INV_GDP_{i,t} + INFL_{i,t} + XRATE_{i,t} + RES_{i,t} + ToT_{i,t} + POL_STAB_{i,t} + LLOCK_i + M_{i,p,t} + FDI_{i,x,t} + \delta_{i,p} + \varepsilon_{i,p,t}$$

where $UV_{i,p,t}$ is the log of the average unit value of each country i exports of product p (at the 6 digits of the HS classification) in year t . With regard to the methodology, the main issues in such case are related to 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 adopt a panel fixed effects model which takes into account for country-products effects ($\delta_{i,p}$) to control for all the possible unobservable time invariant characteristics specific to each observation⁹. To check for the consistency of such model, we confront it with a random panel effects estimator by a standard Hausman test (Baltagi, 2005), whose results confirm the gains in efficiency with the adoption of a fixed effects estimator.

⁸ We implement the Arellano-Bond estimator by means of the user written command `xtabond2` (Roodman, 2009).

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.

5. Results

5.1 Model of export diversification

Results of model (4), analysing the determinants of export diversification are reported in Table 3 both at the aggregate level and grouped by broad sectors.

Overall, results show that export diversification is a path dependent process considering the positive and significant coefficient of its lagged value. Looking at the sectoral level, it is interesting to notice that this path dependency is stronger in primary sectors, characterized by a small number of different activities, than to more dynamic ones such as manufacturing and the services.

Table 3 Export diversification

Ldiv	All sectors	Agriculture	Mining	Manufacturing	Services
Lldiv	0.153*** (0.0363)	0.286*** (0.0738)	0.361*** (0.0614)	0.154*** (0.0342)	0.145** (0.0626)
lgdp_pc	0.240*** (0.0827)	-0.0922 (0.0615)	-0.0402 (0.0562)	0.201*** (0.0713)	-0.0774 (0.0796)
Xrat	6.46e-05*** (2.33e-05)	-7.16e-06 (1.89e-05)	1.71e-05 (2.94e-05)	5.08e-05** (1.99e-05)	2.01e-05 (3.02e-05)
inv_gdp	-0.0141*** (0.00481)	-0.00591 (0.00492)	0.00540 (0.00579)	-0.0152*** (0.00405)	-0.0116* (0.00682)
gov_eff	0.291*** (0.0907)	0.384*** (0.105)	0.0819 (0.0710)	0.382*** (0.0801)	0.388*** (0.112)
Infl	-0.0119* (0.00693)	0.00840* (0.00488)	-0.00408 (0.00445)	-0.0111** (0.00565)	-0.0105* (0.00544)
landlocked	0.124 (0.175)	-0.0866 (0.140)	-0.404** (0.158)	0.0732 (0.153)	0.0482 (0.138)
ToI	-0.000336 (0.00103)	0.00307** (0.00122)	0.00272** (0.00127)	0.000443 (0.00101)	-0.00269** (0.00136)
primary_100	-0.958*** (0.251)	-0.293 (0.188)	-0.0661 (0.215)	-0.925*** (0.226)	0.624** (0.259)
lv_imp_isic_OECD	0.00229 (0.0392)	0.0120 (0.0178)	-0.0273 (0.0231)	0.00511 (0.0304)	0.0131 (0.0151)
lv_imp_isic_nonOECD	0.142*** (0.0404)	0.0270 (0.0171)	-0.0121 (0.0201)	0.112*** (0.0316)	0.0119 (0.0235)
stock_OECD	0.0154 (0.0198)		0.0163 (0.0197)	0.0423* (0.0223)	-0.00308 (0.00707)
stock_nonOECD	-0.0205 0.153***		0.0656 0.361***	0.00981 0.154***	0.0912 0.145**
Constant	0.127 (0.583)	1.979*** (0.469)	0.717* (0.422)	0.587 (0.515)	1.745*** (0.553)
Observations	9,980	983	910	7,498	589
Number of panel	1,570	150	164	1,137	119
Year 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

Moving on to conventional determinants of export diversification, the analysis confirms that there is a strong positive nexus between the degree of diversification and the level of development of a country, as represented by the significant positive coefficient of the per capita GDP. This result is much in line with the existing empirical literature (Agosin et al., 2012; Tadesse and Shukralla, 2013), including the one specific on African countries (Osakwe, 2007; Caldeira and Veiga, 2010), and confirms that countries at an early stage of development have larger opportunities to diversity. Again, however, such

results mask sectoral heterogeneity. Table 3 shows in fact that this relation seems to hold only for the manufacturing sector. Similarly, we find a positive yet small contribution of a devaluation of the exchange rate for all the sample and for the manufacturing sector, in line with the existing literature pointing out that this makes exports more profitable, allowing the entry of new exporters (Melitz, 2003). We find also that higher levels of macroeconomic instability, proxied by the inflation rate, have a significantly negative effect, through very small, on the diversification index, this result being generalized to the manufacturing and the service sectors. The share of domestic investment over GDP reports a negative and significant sign in both the aggregate specification and for the manufacturing sector, possibly showing a not efficient allocation of resources in the production sector.

It is relevant to notice that, as pointed out in the literature on African economies, countries with a more stable and effective level of governance are those with the largest chances to diversify their exports (Osakwe, 2007). This finding can be generalized to all the main sectors but the mining, a result that does not surprise given that the latter is generally the most relevant sector in politically weaker countries. Related to this we find that countries whose export structures are largely characterized by natural resources have low levels of diversification, a characteristic that seems to constraint the opportunities to diversify the manufacturing sector (IV column). Conversely, we do not find evidence of an adverse impact of terms of trade on export diversification, except for the services. Conversely, an improvement in ToTs is found to promote a weak diversification in the primary sector, this being probably a consequence of the larger resources accruing to the sector. Lastly, with the exception of the mining sector, where it is found that countries with no access to the sea have less opportunities to diversify their exports, we do not find evidence of an adverse effect of geographical remoteness.

Moving to our variables of interest, we find that the stronger impact on export diversification comes mainly from imports originating from other developing countries rather than from OECD countries, whose coefficient is not significant for both the aggregate level (column I) and for all the sectoral specifications. Importing from other developing countries, on the other hand, gives rise to an increase in the number of products exported within the same divisions, especially in the manufacturing sector.

On the other hand, when observing the impact of FDI, we do not find evidence of a diversification enhancing effect neither from investment of OECD or non-OECD countries. We find only a marginal positive impact on export diversification within the manufacturing sector when FDI originates from OECD countries.

Despite this first set of results is relevant enough to explain the determinants of the recent patterns of diversification of African economies for their exports as a whole and disaggregated by the main sectors, in what follows we try to enrich our analysis by making a specific focus on the manufacturing sector, which is by no means the one where diversification can give rise to the most significant growth

enhancing effects. The aim of this further analysis on more disaggregated data is to understand whether the external effects observed in column IV of Table 3 for the manufacturing as a whole reflect the dynamics of the major groups of products included in the sector. To do this, we run model (4) on the main two-digit divisions of the manufacturing sector, grouped according to the similarity of the production process. Table 4 reports the results, showing in general that coefficients of the control variables reflect the trends observed in Table 3.

Table 4 Export diversification

	Man. of agricultural products (ISIC 15-16)	Textiles, apparel, leather (ISIC 17-19)	Wood, paper, printing (ISIC 20-22)	Man. of natural resources (ISIC 23-28)	Machinery & equipment (ISIC 29-33)	Motor vehicles and transport eq. (ISIC 34-35)
L.ldiv	0.546*** (0.0824)	0.335*** (0.0637)	0.146* (0.0749)	0.212*** (0.0471)	0.136*** (0.0465)	0.181*** (0.0628)
lgdp_pc	-0.0922 (0.0584)	-0.0417 (0.0899)	-0.000438 (0.0796)	0.0645 (0.0710)	0.139 (0.0857)	0.0840 (0.120)
xrat	2.27e-05* (1.30e-05)	6.88e-07 (2.80e-05)	1.69e-05 (2.42e-05)	-3.14e-07 (2.23e-05)	9.45e-06 (2.17e-05)	1.97e-05 (2.91e-05)
inv_gdp	-0.00173 (0.00617)	-0.0102* (0.00543)	-0.0147** (0.00705)	-0.0158*** (0.00479)	-0.0146*** (0.00540)	-0.00569 (0.00742)
gov_eff	0.303** (0.125)	0.454*** (0.124)	0.384*** (0.128)	0.539*** (0.0924)	0.452*** (0.112)	0.347** (0.144)
infl	-0.00779 (0.00612)	-0.00948* (0.00558)	-0.0243*** (0.00808)	0.00120 (0.00574)	0.00367 (0.00477)	0.00275 (0.00580)
landlocked	0.0381 (0.171)	-0.266 (0.213)	-0.662*** (0.235)	-0.0840 (0.148)	0.0519 (0.150)	0.262 (0.224)
tot	0.000581 (0.00116)	0.00280 (0.00186)	0.00352** (0.00169)	0.00192 (0.00136)	0.00115 (0.00133)	-0.00403* (0.00229)
primary_100	0.0184 (0.228)	-0.332 (0.260)	-0.491 (0.339)	-0.351 (0.232)	-0.524* (0.268)	-0.328 (0.321)
lv_imp_isic_OECD	0.0168 (0.0197)	-0.0308 (0.0361)	-0.0593 (0.0361)	0.0357* (0.0203)	0.0181 (0.0280)	0.0213 (0.0283)
lv_imp_isic_nonOECD	0.0135 (0.0164)	0.0153 (0.0292)	0.0517* (0.0273)	0.0118 (0.0244)	0.0530* (0.0311)	0.0561** (0.0284)
stock_OECD	0.0851*** (0.0255)	0.0899 (0.0547)	0.0409 (0.189)	0.0772* (0.0412)	0.0246 (0.0338)	0.0246 (0.0199)
stock_nonOECD	0.189*** (0.0686)	1.032*** (0.243)	-0.499 (1.833)	0.199 (0.156)	0.0348 (0.230)	0.0175 (0.0705)
Constant	1.556*** (0.476)	2.276*** (0.718)	2.193*** (0.633)	1.458*** (0.525)	1.035* (0.624)	1.522* (0.847)
Observations	579	1,008	993	2,001	1,690	673
Number of panel	93	150	150	300	250	100
Year effects	Yes	Yes	Yes	Yes	Yes	Yes
hansenp	0.192	0.893	0.884	0.148	0.729	0.354
ar2p	0.737	0.236	0.362	0.167	0.821	0.760

Standard errors in parentheses

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

Most relevant in view of our research question, results for our variables of interest show that the impact of external flows from different sources behave quite differently according to the groups of products being considered. Overall, the results show that, taken together, external flows coming from non OECD countries have a diversification enhancing impact on almost all the groups except the one including the manufacturing of natural resources. More specifically, southern FDI have a significant impact on the export diversification of low technology and labour intensive sectors such as those including the processing of agricultural products and the textiles-apparel. This result, which is very

relevant, can be certainly interpreted as a positive spillover effect accruing to local firms as a consequence of local linkages with foreign firms adopting similar (and presumably low standard) technology levels. However, it can also be a consequence of new products exported directly by foreign companies, which have based their production in the continent. There is indeed evidence pointing out 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). This, following the existing literature, has been especially true for investments in the textiles and garment sectors directed to AGOA member countries, especially from Eastern Asian investors (UNIDO, 2007; UNCTAD, 2007). On the other hand, medium and high technology products such as those included in the machinery and equipment and the motor vehicles seem to benefit more on the imports of goods from more similar countries, considering also that the level of technology embodied in the products is certainly more accessible.

On the other hand, our results show that external flows coming from OECD countries exert a positive influence on the export diversification for the group including the processing of natural resources, considering that this positive effect is enhanced both by the trade and the investment channels. Such result is probably affected by the strong sectoral concentration of such external flows, but allows to affirm that – when it comes to the manufacturing sector and to more traditional specializations – there is little or no interaction nor spillover arising from external flows from countries with whom Africa has a greater technology gap.

5.2 Model of export quality

Results of the model measuring the determinants of unit values are reported in Table 5 following the same sectoral classification adopted for the previous part of the analysis.

Results, as expected, are different from those in Table 5 given the diverse nature of the dependent variables as well as finer level of disaggregation of the data adopted to measure the unit values. In line with results of the previous case, however, as well as with the extant literature (Harding and Javorcik, 2011; Schott, 2008), we find a strongly significant nexus all over the sectors between the quality of exports and the level of per capita income of the exporter. As one could expect, the investment on GDP and a favourable trend in the terms of trade positively affects unit values. Conversely, we find that macroeconomic instability positively affects export sophistication, even if marginally, and especially that countries with a weaker level of governance are those who have experienced higher growth in unit values.

Looking at the results for our variables of interest, we notice that importing the same product from either developed or developing countries translates into a slight improvement on the quality of exports, this being true especially for the manufacturing. On the other hand, we find evidence of positive linkages arising from southern FDI for both all sector and for the manufacturing. In the latter sector, in addition, we find evidence of a negative impact of FDI from developed countries. This shows that the origin of the investment matters in terms of the contribution of foreign investments to the export upgrading of African countries included in our sample.

Table 5 Export upgrading

IUV	All sectors	Agriculture	Mining	Manufacturing	Services
lgdp_pc	1.243*** (0.0222)	1.100*** (0.0829)	1.194*** (0.237)	1.237*** (0.0256)	4.325*** (0.685)
Xrat	1.51e-05 (1.05e-05)	-2.94e-05 (3.26e-05)	0.000174 (0.000117)	1.48e-05 (1.13e-05)	0.000214 (0.000313)
inv_gdp	0.00553*** (0.000651)	0.00874*** (0.00229)	0.0112 (0.00687)	0.00713*** (0.000747)	0.0593*** (0.0208)
gov_eff	-0.0556*** (0.0191)	-0.143** (0.0687)	0.196 (0.197)	-0.0905*** (0.0218)	-0.925* (0.528)
infl	0.00214*** (0.000484)	-0.00112 (0.00179)	-0.00122 (0.00458)	0.00349*** (0.000527)	0.0235* (0.0136)
tot	0.00127*** (0.000149)	0.00168*** (0.000549)	0.00541*** (0.00142)	0.00148*** (0.000165)	0.0107*** (0.00403)
primary_100	-0.0197 (0.0376)	0.225 (0.139)	0.149 (0.420)	0.0257 (0.0440)	0.518 (1.064)
lv_imp_OECD	0.00983*** (0.00157)	0.0117* (0.00663)	0.00842 (0.0183)	0.0188*** (0.00229)	-0.00999 (0.0409)
lv_imp_nonOECD	0.00157* (0.000831)	-0.00251 (0.00241)	0.00178 (0.00642)	0.00171* (0.00101)	-0.00596 (0.0187)
stock_OECD	-0.00334 (0.00207)		-0.0364 (0.0338)	-0.00520** (0.00214)	-0.0268 (0.0265)
stock_nonOECD	0.0184** (0.00767)		0.0687 (0.110)	0.0147* (0.00783)	0.138 (0.232)
Constant	-8.123*** (0.162)	-8.329*** (0.594)	-10.40*** (1.710)	-8.071*** (0.185)	-33.55*** (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

Standard errors in parentheses

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

Also in this case, we try to explore our results more in details disaggregating the data on the manufacturing sector by grouping the products at 6 digits according to the same structure adopted in Table 6. Based on such further disaggregation, we find that imports from OECD countries have a positive spillover on the quality upgrade of products included in the processing of natural resources, in the machinery and equipment and in the motor vehicles and transport equipment. On the latter group, there is also a positive effect from imports originating from other developing countries.

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Table 6 Export upgrading

	Man. of agricultural products	Textiles, apparel, leather	Wood, paper, printing	Man. of natural resources	Machinery & equipment	Motor vehicles and transport eq.
lgdp_pc	1.037*** (0.0665)	1.124*** (0.0501)	1.320*** (0.106)	1.307*** (0.0469)	1.278*** (0.0564)	1.258*** (0.133)
xrat	-5.83e-05** (2.46e-05)	5.41e-06 (3.11e-05)	-1.63e-05 (4.52e-05)	1.88e-05 (2.21e-05)	1.79e-05 (2.23e-05)	0.000129*** (4.36e-05)
inv_gdp	0.00818*** (0.00174)	0.00689*** (0.00156)	0.00133 (0.00316)	0.00723*** (0.00147)	0.00718*** (0.00156)	0.0102*** (0.00337)
gov_eff	-0.159*** (0.0519)	-0.109** (0.0454)	-0.0422 (0.0902)	-0.0586 (0.0402)	-0.114** (0.0476)	-0.0881 (0.105)
infl	-0.00132 (0.00132)	0.00168 (0.00121)	-0.00209 (0.00226)	0.00482*** (0.00102)	0.00613*** (0.00105)	0.00288 (0.00224)
tot	0.00140*** (0.000426)	0.000954*** (0.000361)	0.00116* (0.000666)	0.00242*** (0.000295)	0.000850** (0.000354)	0.000987 (0.000789)
primary_100	0.324*** (0.110)	0.199** (0.0993)	-0.201 (0.183)	0.187** (0.0828)	-0.211** (0.0924)	-0.187 (0.174)
lv_imp_OECD	0.00436 (0.00508)	0.00198 (0.00437)	0.00882 (0.00931)	0.0258*** (0.00404)	0.0322*** (0.00568)	0.0395*** (0.0109)
lv_imp_nonOECD	0.00153 (0.00198)	-0.00192 (0.00197)	-0.000990 (0.00384)	0.00201 (0.00185)	0.000649 (0.00258)	0.0115** (0.00452)
stock_OECD	0.0103** (0.00503)	-0.00687 (0.00467)	-0.0667 (0.0567)	-0.0239*** (0.00411)	0.000950 (0.00418)	-0.00221 (0.00873)
stock_nonOECD	0.0252** (0.0105)	0.0160 (0.0608)	-0.165 (0.127)	0.0292 (0.0205)	0.0556** (0.0225)	-0.0214 (0.0177)
Constant	-7.932*** (0.476)	-6.814*** (0.362)	-9.078*** (0.759)	-9.504*** (0.339)	-7.189*** (0.406)	-8.053*** (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

Standard errors in parentheses

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

As FDI are concerned, an increase in the number of investments from both developed and developing countries contribute to raise the unit values of products related to the transformation of agricultural products. In addition, FDI from non-traditional sources report a positive spillover effect on the export upgrading of African products within the machinery and equipment group. Interestingly enough, we find also a negative impact of FDI from OECD countries on the upgrading of productions in the processing of natural resources, a result possibly indicating that the value added by African countries in such sector remains very low.

6. Conclusion

To be added

References

To be added