Global Agro-food Value Chains: new evidence from SSA

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Abstract:
In the past twenty years, production has been increasingly unbundled and shared across many countries at different levels of development. The common perception is that Africa, contrary to Latin America, Asia, and China in particular, has not been able so far to intercept the main changes in trade patterns nor enter massively into global production networks. By using the EORA Input-Output Tables and applying for the first time to this data the gross exports decomposition method provided by Wang et al. (2013), we analyze the Global Value Chain participation and position of Sub-Saharan African countries with a focus on global agro-food chains. Results show that, despite the low trade shares at the global level, SSA agricultural sector is deeply involved in GVC participation and the relevance of its international linkages is increasing over time, although still limited to upstream (likely unprocessed) production stages of the chain. Furthermore, we show that the demand pull for SSA agricultural production is not regional but mainly driven by the EU and emerging countries. Our outcomes also suggest that GVC participation could be a key driver for supporting the process of structural transformation and inclusive growth in the region. In fact, it could open access to unprecedented flows of knowledge, skills, capital, and sophisticated inputs which would boost sectorial productivity and favor the gradual shift of labor force out from farming. It would also give a go for the inclusion of small-holder farmers into the global markets while improving standards and contract enforcements. However, it needs pre-conditions such as the availability of efficient ancillary services, including transport and logistics. By providing a deeper analysis of SSA GVC participation and position, this work opens the ground to a refinement of the policy mix able to maximize the hoped for benefits for Africa of the so-called “unbundling revolution” going beyond the simple narrative of “upgrading for compete”.

Keywords: global value chains, agro-food activities, multi-region input-output tables, sub-saharan africa.

JEL codes: F15, L23, O11, O55, Q17.
1. Introduction

Scholars and practitioners are increasingly aware that the emergence of Global Value Chains (GVCs) asks for a rethinking of public strategies aiming at fostering competitiveness, as well as trade and development policies at large (Cattaneo et al., 2015). They also argue that the international fragmentation of production is a golden opportunity for Sub-Saharan Africa (SSA) in particular, since those countries are characterized by a limited existing manufacturing or service export base and a large pool of labor (IMF, 2015). By specializing in a specific segment of the supply chain, they can now have new opportunities of industrialization and the possibility to better exploit their comparative advantages without having to provide all the upstream capabilities. GVCs may indeed represent a key driver for Africa structural transformation by triggering pro-competitive market restructuring effects and spurring local production in other sectors through minimum scale achievements (Taglioni and Winkler, 2014). However, the common perception is that Africa, contrary to Latin America, Asia, and China in particular, has not been able so far to intercept the main changes in trade patterns nor enter massively into global production networks.

By exploiting the EORA global multi-region I-O (MRIO) tables, which provide a contiguous, continuous dataset for the period 1990-2013 (Lenzen et al., 2012; 2013), this work investigates the GVC participation and position of Sub-Saharan African (SSA) countries for agriculture, fishing and food and beverages industries. Specifically, it applies the most recent gross exports decomposition method provided by Wang et al. (2013) that allows us to i) differently from other common methods, investigate bilateral GVC participation in agro-food global/regional value chains and identify direct upstream and downstream trade patterns and ii) single out the “pure” double counting components as in the work of Koopman et al. (2014). Furthermore, for a sub-set of SSA countries included in the Monitoring and Analyzing Food and Agricultural Policies (MAFAP) programme of the Food and Agriculture Organization (FAO), this work additionally provides a more detailed investigation of the revealed comparative advantages in value added. This is to the best of our knowledge the first comprehensive work as such, as it differently to the previous literature in the field, it aims at a finer sectoral and bilateral understanding of the phenomenon in the region and it gives additional insights on the complex policy mix of public policies and multi-stakeholder initiatives that should come along to support GVC participation. The goal is to discuss the possible benefits for Africa of the so-called “unbundling revolution” (Baldwin, 2013), going beyond the simple narrative of “upgrading for compete”.

This work follows up the most recent literature suggesting that Africa is more engaged in GVCs than many other developing countries, as well as developed countries such as the USA (Foster-McGregor et al., 2015). It also suggests that the importance of global linkages has been increasing over time, even if much of Africa’s participation in GVCs is essentially in upstream production (i.e., providing primary inputs to firms in countries further down the value chain) and active in low value added stages (Del Prete et al., 2016a). Our outcomes also suggest that boosting GVC participation could be a key driver for supporting the process of structural transformation and inclusive growth in the region and that more reflections on the supporting policy implications and on the adequate multi-stakeholders’ strategies is needed, probably on a case-by-case scenario.
2. GVCs and Agricultural Transformation in SSA: opportunities and constraints

African economies remain dominated by primary activities linked to natural resources and by services. Only a few countries in the region have managed to diversify their export structure away from unprocessed commodities, while some others still largely depend on exports of a single crop such as cocoa, coffee, tea and cotton (AEO, 2015). Family farming remains the main occupation in SSA as two-thirds of the workforce are still engaged in on-farm activities. In comparison, the formal (waged) sector – manufacturing and services, including administration – is estimated only at an average 16% of the jobs in SSA, and the percentage is much lower in many countries (Filmer and Fox, 2014). While of course the flexibility of the informal sector, including family farms, is key to Africa’s economic resilience, it undeniably correlates with low incomes and under-employment, with few hours worked per active person.

The common wisdom is that GVCs are golden opportunities for supporting the transition of the SSA economies (IMF, 2015). Thanks to the unbundling of complex production processes (Baldwin, 2013), by assimilating off-shored links of the supply chain, developing countries can industrialize more rapidly without waiting to build the deep industrial base formerly required. By specializing in a specific segment of the production chain, African countries can have the opportunity to join the global production chains without having to provide all the upstream capabilities. This is supposed to give Africa at last a real new opportunity for industrialization, even though can happen at the expenses of the domestic value added that can be captured locally (the so-called denationalization of comparative advantages). Moreover, the SSA region – with abundance of natural capital and labor – is in a good position to attract GVC-oriented investment (Engel, 2016).

Boffa et al. (2016) highlight that sharing production allows to specialize while reaching economies of scale thanks to the access to the global markets – a phenomenon not accounted for by traditional trade and Foreign Direct Investment literature. On this, Del Prete et al. (2016b) show that the performance of North African firms, measured by several indicators, is positively associated with the involvement into international fragmented production networks. Thus, GVC participation may represent a key driver for Africa structural transformation by stimulating investments in infrastructure that would otherwise not be profitable and spurring local production in other sectors through minimum scale achievements. This can translate into pro-competitive market restructuring effects that are not limited to GVC suppliers, but also extend to non-participants (Taglioni and Winkler, 2014).

It also opens access to unprecedented flows of knowledge, skills, capital, and sophisticated inputs which can lead to an accelerated path of structural transformation and income growth. The transmission channels include backward linkages, i.e. GVC-linked purchases of local inputs, spurring production in various upstream sectors, and forward linkages, i.e. sales of GVC-linked intermediates to the local economy, spurring production in various downstream sectors. World Bank (2011) distinguishes four types of transfers and spillover effects taking place in GVCs: i) **training and skills**: multinational firms’ training programs can provide long-term benefits for the recipients who can apply their newly acquired skills in numerous ways, resulting in positive spillover effects for the country; ii) **technology, know-how, and finance**: a number of private sector efforts revolve around transfers of technology, know-how, and knowledge, and efforts to improve the business environment. While benefiting the company at the origin of the transfers, these capacity-building efforts can be expected to have positive
spillover effects, including to local small and medium-sized enterprises; iii) standards: assistance in meeting quality and safety standards is particularly important to help incorporate local producers into global value chains (see also Del Prete et al., 2016b); iv) trade facilitation: initiatives and projects led by firms and industry groups can range from road safety initiatives to more efficient customs processes achieved through customized software development.

This improved access to inputs can have important spillovers on small-holder farmers and household food security (Swinnen and Vandeplas, 2014). By generating higher incomes, and because of technology spillovers on food production, income stability and the food security of households improves with participation in the export chains. Minten et al. (2009) find that high-standards vegetable export production in Madagascar is entirely based on small scale contract farming, including thousands of very poor farmers. There, the access to better technology and management practices related to contract-farming spilled over to other crops, generating large productivity increases in rice production, and further improving the food security situation of rural households. These effects are the strongest for the poorest farmers and farmers in remote areas since their access to fertilizer and other inputs is most constrained.

Last but not least, the access to global markets is likely to positively influence income growth. Xiang et al. (2012) show that the impact of export demand is more likely to lead to poverty reduction than the growth of domestic demand for higher value products since the growth of domestic demand can lead to increased imports, leaving poor local producers in low value local markets.

However, as Cattaneo et al. (2013) underline the benefits of the economic transformation of African economies driven by GVCs requires pre-conditions. Moving up from agricultural unprocessed activities to regional and global value chains in the agro-food sector implies, first of all, the availability of efficient ancillary services, including transport and logistics. While this would offer Africa the potential to develop a formal service economy, with many more and much better jobs linked to modern manufacturing for the young labor force, it requires also the availability of adequate human capacity and physical infrastructures. Despite the progress of recent years, it is hard to see how the African economies can insert themselves or move up in the global value chains without better provision of electricity, telecommunication capabilities, and infrastructure for transport—roads, railroads, airports, and ports. As Devarajan and Fengler (2013) also highlight, exporters from Africa pay some of the highest transport prices in the world.

Furthermore, a deeper involvement into GVCs can enhance the volatility of international markets (the 2008-09 crisis revealed a higher trade elasticity and exposure to imported crises through trade, Escaith et al., 2010) with pervasive implications on farmer households’ consumption volatility and vulnerability (Montalbano, 2011). It can be also detrimental socioeconomically to a country if the lead chain firm engages in predatory behavior (see Kaplinsky et al., 2010 for the examples of timber in Gabon). Additional concerns include: the depletion of natural resources by foreign companies, land grabbing, the unequal partition of value along the production chains¹, captive market relationships, etc.

¹ It is also worth noting that the agro-food industry is increasingly structured around GVCs led by food processors and retailers (e.g. supermarkets) (OECD, 2013).
Cattaneo and Miroudot (2015) highlight that the GVCs’ potential for assisting a country’s socioeconomic development cannot be taken for granted. They flesh out three phases in the maturity of value chains: i) a predation phase in which developing countries are confined to exporting raw materials and importing processed goods and services; ii) a segmentation phase in which developing countries benefit from the delocalization of certain production activities, mostly to serve local markets; iii) and a consolidation phase in which local innovation turns into export of processed goods and services to other developing and developed countries (Figure 1). While the last phase has the greatest potential for assisting a country’s development, it is also more selective: the consolidation of GVCs corresponds to a diminution of the number of participants in the network, and hence threatens to leave more developing countries outside major trade flows and upgrading paths. Preliminary empirical evidence shows that most of the African GVC participation is still limited to low value added stages of the chains and that the biggest GVC partner for Africa remains the EU, while intra-African GVCs are assumed not to be particularly important (Foster-McGregor et al., 2015). Cattaneo et al. (2013) warn against the risk that a shift in end markets to China —in particular for raw materials or minimally processed goods— would kick the development ladder away from Africa. As Kaplinsky et al. (2010) show, Chinese importers are mostly interested in quantities and price, paying little attention to labor standards and sustainable harvesting. Thus, the China-Africa relationship appears to be in its predation phase; rather than contributing to socioeconomic development in the upstream country, the value chain acts to reduce and downgrade that country’s capacities.

In conclusion, while the literature on GVC is increasingly obsessed by the participation dogma as the key policy implication, the most recent analyses for Africa highlight that join the value chains is not enough. The issue is how much value SSA can capture in terms of jobs, income, technology transfers, sustainable development and what are the main potentials for a green and inclusive growth (but also the likely risks) in a medium term scenario. This is not independent from the comparative advantages of each country, including its main industry specialization, but also the institutional and socio-economic country characteristics (along with human and physical capital). It depends also from the nature of backward and forward linkages’ countries, and the
characteristics of the final destination markets as well as the actual stage of maturity of the specific chain. We believe that such complex phenomena cannot be addressed by looking only at the available I-O databases, as in previous literature, but rather additional investigation are needed. In this respect, the added value of this work is to provide a more complete and detailed picture for the agro-food sector on a subsample of SSA by gathering different empirical techniques and pieces of information. In this way, we deem to be able to give additional insights on the complex policy mix of public policies and multi-stakeholder initiatives that should come along to GVC participation for maximizing the benefits of the “unbundling revolution”.

3. Methodology and Data

The increasing international fragmentation of production has challenged the conventional wisdom on how we look at and interpret trade. As different stages of the same production process are now allocated to different countries, intermediate inputs cross borders multiple times and are then counted each time by gross trade flows. As a result, conventional trade statistics become increasingly misleading as a measure of value produced by any particular country. The relevance of this issue is confirmed by the many initiatives and efforts that try to address the measurement of trade flows in the context of the fragmentation of world production and try to estimate the so-called trade in value-added. The latter reflects the value that is added by industries in producing goods and services and it is equivalent to the difference between industry output and the sum of its intermediate inputs (Montalbano et al., 2015). Looking at trade from a value-added perspective better reveals how upstream domestic industries contribute to exports, as well as how much (and how) participate in GVCs (OECD–WTO, 2012).

A new literature has emerged regarding tracing the value added of a country’s trade flows by combining input-output tables with bilateral trade statistics and proposing new indicators. In particular, several attempts have been proposed in order to estimate correctly the domestic value added included in a country’s exports by separating it from foreign value added and double counting. Koopman et al. (2014) (KWW) provides a workable decomposition of gross exports in various value added components. While the latter method already has many useful applications, an important limitation of the approach is that the gross trade decomposition is only done at the aggregate level, not at the bilateral, or bilateral sector level. This methodology can indeed only track the value added linkages between the country of origin and that of final destination (Borin and Mancini, 2015). In this work, we follow the methodology developed by Wang et al. (2013, subsequently referred to as WWZ), who compute a single breakdown of bilateral exports that can be exactly mapped into the original KWW decomposition summing all the export flows across the destinations. The framework proposed by the authors is particular informative as it permits not only to extract value added exports from gross exports, but also recovers additional useful information about the structure of international production sharing at a disaggregated level.

Conceptually, WWZ (2013) decompose a country’s total gross exports into the following four main buckets (Figure 1): 1) the country’s value added exports that are absorbed abroad (DVA); 2) the part of a country’s domestic value added that is first exported but eventually returned home (RDV); 3) the foreign value added that

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2 See among others Hummels et al. (2001); Johnson and Noguera (2012); OECD (2012); Koopman et al. (2011); Koopman et al. (2014); Timmer et al.,(2015).
is used in the production of a country’s exports and eventually absorbed by other countries (FVA); 4) and the “pure double counted terms”, arising from intermediate goods that cross border multiple times (PDC). Some of the terms in the fourth bucket double count value added originated in the home country, while others double count value added originated in foreign countries (WWZ, 2013).

Each group is then furtherly disaggregated and sixteen value-added and double counted components are defined (Figure 2 and Figure 3). The DVA share (Figure 2) reflects the direct contribution made by a country in producing a final or intermediate good for export. It is the sum of the domestic value added in final goods exports, T1, and the domestic value added in intermediates exports absorbed by direct importers, T2, to third countries to produce domestic final goods, T3, to produce final goods exports to third countries, T4, and to produce intermediate exports to third countries to produce exports, T5. The FVA share (Figure 3) is the sum of components T11, T12, T14 and T15 as a share of gross exports. It indicates the share of a country's exports that consist of inputs produced in other countries and thus does not add to the GDP of the country of interest. It captures the extent of involvement in GVC for downstream firms and industries (i.e. backward integration). This approach allows to calculate also the 'indirect value added exports' (DVX), which corresponds to the sum of components T3, T4, T5, T6, T7 and T8 as a share of gross exports. It is the share of a country’s value added exports embodied in other countries’ exports as intermediate inputs, which captures the contribution of the domestic sector to the exports of other countries, thus it is a rough information of the extent of GVC involvement for relatively upstream sectors (i.e. forward integration). Summing the FVA, the DVX and the PDC component (PDC i.e. the sum of T9, T10, T13 and T16 ad a share of gross exports) of a single country/area and sector, we can get a measure of the GVC participation (Rahman and Zhao, 2013; Cappariello and Felettigh, 2015; Borin and Mancini, 2015). The higher (or lower) the value of the GVC participation index, the larger (or smaller) is the participation of a country in global supply chains.

To complete information on international integration into global markets, we present a second index that characterizes the position of country (or industry) exporters in GVCs: the GVC position indicator. It is determined by the extent to which the country (or industry) is upstream or downstream in the GVCs, depending on its specialization (Koopman et al., 2011). A country lies upstream either if it produces inputs and raw materials for others, or provides manufactured intermediates or both; a country lies downstream if it uses a large portion of intermediates from other countries to produce final goods for export (i.e., it is a downstream processor or assembler adding inputs and value toward the end of the production process). The position indicator is given by the ratio of the DVX and the FVA. Since at the global level DVX and FVA equal each other, the average DVX/FVA ratio is equal to 1. Therefore, a ratio larger than 1 indicates the country lies upstream, while a ratio lower than 1 means the country lies downstream in the GVCs.

Data used in this analysis come from the Eora Multi-Region input–output (MRIO) database. It brings together a variety of primary data sources including national I-O tables and main aggregates data from national statistical offices and combines these primary data sources into a balanced global MRIO, using interpolation and estimation in some places to provide a contiguous, continuous dataset for the period 1990–2013 (Lenzen et al., 2012; 2013). The Eora tables are particularly useful as they provide the access to each country’s structure and function - as seen through its input-output tables - and also information on the interactions between trading partners. Hence

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The Eora project was funded by the Australian Research Council.
the world system can be viewed as a single entity with all trade flows reconciled in economic terms. Regarding country coverage, Eora contains data for 187 countries and 25 harmonized ISIC-type sectors (Table 1). Here we focus our attention on 48 African countries (Table 2) and the agro-food industry (that includes agriculture, fishing and food and beverages) (see the Methodological Appendix for a comparison between different measures and I-O tables).

4. A full map of Participation/Position of SSA economies in global/Agro-food value chains

Looking at the WWZ decomposition of gross exports, a preliminary remark is that more than 80% of value added in SSA is domestic (Figure 2). This is actually in line with all the other developing regions, with the relevant exception of ASEAN (which similarly to EU27 produces domestically only about 60% of the value of its exports). It is also in line with the previous literature applying different decomposition methods. Differently from standard methods, however, WWZ methodology is able to isolate properly the double counting, which indeed shows to be appreciable (e.g., 0.14 for the EU; 0.04 for SSA), thus providing a more realistic picture of the value added of exports worldwide.

According to our computation about 10% of SSA exports contains value added actually produced abroad (FVA), which is similar to the figures in other developing regions (e.g. emerging economies such as China and India register overall 14% and 13% respectively) with the exception of ASEAN. This latter (with 26% of foreign value added exports), can be considered one of the world “main hubs”, together with the EU and NAFTA, whose foreign value added of their export is 25% and 16% respectively. The same holds at the country level: for instance, all the MAFAP countries show a very similar pattern (about 80-90% of their value added exports is domestic, DVA), with the relevant exception of Ethiopia (where, on aggregate, only 57% of the value of its exports is produced domestically) and, even if less relevant, of Rwanda and Tanzania (72% and 70%, respectively).

It is worth noting however that the rate of GVC participation of SSA is indeed relevant (40% of SSA gross exports) and increasing over time (Figure 3). This is also in line with the other developing regions (China and India included). Again EU27 and ASEAN show the highest rates (more than 50% of gross exports), with the EU overtaking ASEAN after the EMU, reaching 60%. North Africa shows one of the highest rate of GVC participation in the developing world (48%). Note, however, that this measure does not say anything about the actual weight on world trade of each region. Within the group of MAFAP countries, Ethiopia jumped from one of the lower rate in 1995 to the highest in 2005 (68%, then decreasing to 58% in 2013) and Rwanda reached 51% of GVC involvement in 2013.

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4 In the original dataset 189 countries are provided, but we exclude from our analysis the recently born South Sudan (2011) and Sudan, and Zimbabwe for data inconsistency.
5 Note that the reported measures tend to be inflated by intermediate flows between countries of the same region. This inserts a bias in favor of the EU relative to other large single countries or smaller regional groups (e.g., NAFTA).
6 MAFAP is active in Bangladesh, Benin, Burkina Faso, Burundi, Ethiopia, Ghana, Kenya, Malawi, Mali, Mozambique, Nigeria, Rwanda, Senegal, Tanzania and Uganda.
As largely expected – due to the limited percentage of FVA origin of SSA exports – the relative high rate of GVC participation is mainly driven by the domestic value added supplied to other countries’ exports (DVX) (Figure 4). After controlling for double counting, SSA shows one of the best performance in terms of DVX (about 25% of the value of gross exports). The best performer in the world is North Africa where 36% of gross exports is value added supplied abroad (even higher than the Middle East). More heterogeneity is shown by MAFAP countries. Ghana, Burundi and Nigeria are the only countries above the average (31%, 26% and 28% of DVX respectively). It follows that the high rate of GVC participation of Ethiopia is mainly driven by the presence of a high foreign value added content of its exports (more than 30%). A similar pattern is followed by Rwanda (23% of gross exports’ value added of foreign origin) and Tanzania (15%). It is worth noting that these very high figures can be considered as a prudent estimate because of the appreciable degree of double counting that we have identified and taken into account from the measure of GVC participation (14% for the EU; 11% for ASEAN and 04% for SSA, Figure 4). This lets us to present a cleaner and more reliable index of GVC participation with respect to the previous literature.
in the field. For MAFAP countries the portion of double counting is notable for Ethiopia (0.12), but also for Rwanda (0.08), confirming that the high rates of GVC involvement highlighted in our analysis can be considered as more reliable.

**Figure 4 GVC Participation composition 2013, regions and mafap countries**

As a matter of fact, the common feature of a very high degree of DVA emphasized in Figure 2 actually hinders different patterns in terms of GVC participation, with Africa (especially North Africa, but also SSA) being the best performer in providing value added to other countries in the world. About 30% of the domestic value added produced in SSA are inputs for other countries’ exports (over 40% in the case of North Africa). For a matter of comparison, these figures are in line with those of the EU (30%) –that are actually inflated by the high degree of intermediate trade flows within the single market - and higher than those of China, India, and NAFTA that register figures around 20%. As for MAFAP countries, it is worth noting the peculiar case of Ghana that registers one of the highest domestic value added (about 90% of the value of its total exports) of which 35% is value added included in other countries’ exports (a performance higher than the oil exporting Nigeria).

Consistently with the high performance in the indirect value added to other countries’ export, SSA shows a clear and increasing upstream position along the GVC (the highest performance in the world after North Africa). While SSA shows an average rate of GVC position about 2-2.5, Ghana and Nigeria register a rate of GVC position above 4 in 2000s. Other countries above the average are in 2005 Burkina Faso, Burundi and Rwanda, while in 2013 Mozambique and Senegal climb the ladder. It is worth noting the peculiar case of Ethiopia that felt down from 4.30 in 1995 to 0.5 in 2000s.

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7 It is worth recalling here that at the global level DVX and FVA should be equal, thus a ratio higher than 1 should be interpreted as a clear sign of upstream position in the GVC (see section 3 for details).
This comprehensive map of SSA GVC participation and position for the 25 sectors included in the EORA database confirms the high degree of GVC participation of African countries and their upstream position. This involves likely natural-resource production as well as simple manufacturers. In the next section we will focus on the agro-food sector to provide a more detailed investigation of the agro-food value chain and its involvement into global production networks.

### 5.1 Global Agriculture Value Chains

Over the past twenty years the agriculture involvement into global networks has been steady with the exception of NAFTA and SSA countries, where Ghana and Malawi present the highest growth rates, with 40% and 27% respectively (Figure 7).
Overall, agriculture GVC participation accounts for less than 5% of the total GVC participation worldwide, with the SSA being the most involved area (7%) (Figure 8). This suggests that most of the value added in the sector is produced for final demand consumption and does not enter agri-food GVC. However, turning to individual MAFAP countries the figure radically changes as the average agriculture participation is above 20%. Malawi (40%) followed by Ghana and Uganda present the highest shares, with about one third of the total measure, while conversely, Nigeria (3%) and Rwanda (8%) confirm their different specialization pattern, mainly in oil and mineral-related activities (Figure 7).

Figures 9 and 10 confirm the relatively high share of the DVX component with respect to FVA and DC also for agriculture, meaning that its value added is mainly used as input for other countries’ exports, likely in the form of unprocessed inputs. For a matter of comparison, it is worth noting that in the more advanced regions, such as NAFTA and EU27, the two main components are more balanced, suggesting an intensive use of foreign agricultural inputs for their exports.
In the next section we will focus on MAFAP countries and the agro-food sector to provide a more detailed investigation of the true revealed comparative advantages in valued added as well as the bilateral partners for both backward and forward linkages (main suppliers and recipients). This lets us shedding light on the real opportunities for MAFAP countries to increase the benefit of GVC participation qualifying the most suitable policy mix. Some preliminary considerations are now reported for Uganda.

5. Country focus on Uganda

As it is apparent from Figure 11 the bulk of the domestic value added of Ugandan exports is on Agriculture, and accordingly is the most internationally involved Ugandan sector. Looking at the various components of GVC participation, as expected, the indirect value added to other countries’ exports (DVX) is the main component. This shows the relevant role of Uganda as international provider of unprocessed agricultural products.
Thanks to the adopted WWZ (2013) decomposition we are able also to give insights on the bilateral forward linkages (i.e., destination countries) of this Ugandan agro-food indirect value added. Notwithstanding the majority of Ugandan agricultural exports are directed towards Kenya, Ugandan agricultural value added is mainly included in the exports of Netherlands (and also significant for the exports of Germany and Belgium). This highlights the relevance of these European countries’ exports (and their correlated international demand) for the Ugandan agricultural sector putting back in its right perspective the role of the regional agricultural trade flows (Figure 12).

Another issue to undertake is that multiple counting of certain value added components in the official trade statistics suggests that the traditional computation of revealed comparative advantages (RCA) could be noisy and misleading. Our further task is thus re-computing the RCA index at the country-sector level for the SSA countries and specific sectors in the database using both gross exports and domestic value added in gross exports. A deeper
understanding of trade patterns and revealed comparative advantage in value added exports in the agro-food sector for SSA can surely provide a key input for improving the policy mix needed to foster SSA competitiveness in GVC.

6. Policy implications

The capacity to take advantages of GVCs as drivers for the structural transformation of African economies relies on a complex mix of factors that go beyond the simple narrative of upgrading. These include the characteristics of the comparative advantages of each country but also the availability of ancillary services (including transport and logistics) as well as institutional and socio-economic country features (along with human and physical capital). It depends also from the nature of backward and forward linkages’ countries, and the characteristics of the final destination markets together with the actual stage of maturity of the specific chain.

However on one side, both high-entry barriers and access to critical agro-inputs and services, such as technology, logistics and capital still impede small farmers from participating in value chain related activities. This suggests a need for a new agenda for a multi-stake holder strategies since through GVCs, and the related financial, knowledge and logistic spillovers, private companies can provide unprecedented opportunities to foster the structural transformation of African economies. This should be complemented with targeted policy interventions by local authorities and the ability to regulate public-private partnerships.

Despite all the difficulties of the new approach, a clear identification of the sectors involved at the bilateral level, can leverage the conditions under which contract farming is successful. When such conditions are met, then GVC can become an important mean for linking developing countries to global production and trade, with possible positive impacts on African countries and widespread benefits for rural farmer household. As a matter of fact, the most recent micro empirical studies document mostly positive effects on food security and household income, once farmers are included in contract schemes and high value export chains (Minten et al., 2009, and Subervie and Vagneron, 2013, for Madagascar; Handschuch et al., 2013, for Chile).
References


Table and Figure Appendix

Table 1 - Common 25 ISIC-type classification

<table>
<thead>
<tr>
<th>Sector name</th>
<th>ISIC Rev.3 correspondence</th>
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<tbody>
<tr>
<td>Agriculture</td>
<td>1,2</td>
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<tr>
<td>Fishing</td>
<td>5</td>
</tr>
<tr>
<td>Mining and quarrying</td>
<td>10,11,12,13,14</td>
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<tr>
<td>Food and beverages</td>
<td>15,16</td>
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<tr>
<td>Textiles and wearing apparel</td>
<td>17,18,19</td>
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<tr>
<td>Wood and paper</td>
<td>20,21,22</td>
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<tr>
<td>Petroleum, chemical and non-metallic mineral products</td>
<td>23,24,25,26</td>
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<tr>
<td>Metal products</td>
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<tr>
<td>Electrical and machinery</td>
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<tr>
<td>Transport equipment</td>
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<td>Other manufacturing</td>
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<td>Construction</td>
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<td>Maintenance and repair</td>
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<tr>
<td>Wholesale trade</td>
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<td>Retail trade</td>
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<tr>
<td>Hotels and restaurants</td>
<td>55</td>
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<tr>
<td>Transport</td>
<td>60,61,62,63</td>
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<tr>
<td>Post and telecommunications</td>
<td>64</td>
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<tr>
<td>Financial intermediation and business activities</td>
<td>65,66,67,70,71,72,73,74</td>
</tr>
<tr>
<td>Public administration</td>
<td>75</td>
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<tr>
<td>Education, health and other services</td>
<td>80.85,90,91,92,93</td>
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<tr>
<td>Private households</td>
<td>95</td>
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<tr>
<td>Others</td>
<td>99</td>
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</table>

Table 2  African countries available in Eora (Mafap countries in red).

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<th>7</th>
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<th>10</th>
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<td>Algeria</td>
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<td>Ghana</td>
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<td>Mauritius</td>
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<td>Somalia</td>
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<td>Congo</td>
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<td>Guinea</td>
<td>32</td>
<td>Morocco</td>
<td>43</td>
<td>Swaziland</td>
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<tr>
<td>Benin</td>
<td>12</td>
<td>Cote d'Ivoire</td>
<td>Democratic Republic of the Congo</td>
<td>Kenya</td>
<td>Mozambique</td>
<td>43</td>
<td>Tanzania</td>
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<td>Togo</td>
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<td>Botswana</td>
<td>13</td>
<td>Democratic Republic of the Congo</td>
<td>Lesotho</td>
<td>34</td>
<td>Namibia</td>
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<td>Tanzania</td>
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<td>Togo</td>
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<td>Burkina Faso</td>
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<td>24</td>
<td>Lesotho</td>
<td>34</td>
<td>Namibia</td>
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<td>Tanzania</td>
<td>44</td>
<td>Togo</td>
</tr>
<tr>
<td>Burundi</td>
<td>15</td>
<td>Djibouti</td>
<td>25</td>
<td>Liberia</td>
<td>35</td>
<td>Niger</td>
<td>45</td>
<td>Togo</td>
<td>45</td>
<td>Togo</td>
</tr>
<tr>
<td>Cameroon</td>
<td>16</td>
<td>Egypt</td>
<td>26</td>
<td>Libya</td>
<td>36</td>
<td>Nigeria</td>
<td>46</td>
<td>Tunisia</td>
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<td>Eritrea</td>
<td>27</td>
<td>Malawi</td>
<td>37</td>
<td>Rwanda</td>
<td>47</td>
<td>Uganda</td>
<td>47</td>
<td>Uganda</td>
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<tr>
<td>Cape Verde</td>
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<td>Ethiopia</td>
<td>28</td>
<td>Madagascar</td>
<td>38</td>
<td>Sao Tome and Principe</td>
<td>48</td>
<td>Zambia</td>
<td>48</td>
<td>Zambia</td>
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<tr>
<td>Central African Republic</td>
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<td>Gabon</td>
<td>29</td>
<td>Mali</td>
<td>39</td>
<td>Senegal</td>
<td>49</td>
<td>Zambia</td>
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<td>Chad</td>
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<td>Gambia</td>
<td>30</td>
<td>Mauritania</td>
<td>40</td>
<td>Sierra Leone</td>
<td>50</td>
<td>Zambia</td>
<td>50</td>
<td>Zambia</td>
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Figure 12 Gross exports accounting: Major categories

Gross exports (E*)

- Domestic value-added absorbed abroad (DVA)
- Value-added first exported but eventually returned home (RDV)
- Foreign value-added (FVA)
- Pure double counted Terms (PDC)

Source: WWZ, 2013

Figure 7 Gross exports accounting: Domestic value added

DVA in gross exports

- Domestic value-added absorbed abroad (DVA)
- Domestic value-added returns home (RDV)

(T1*) In final goods exports (DVA FIN)
(T2) Intermediates exports absorbed by direct importers (DVA_INT)
(T3+T4+T5) Intermediates re-exported to third countries (DVA_INTrex)
(T6) Intermediates that return via final imports (RDV_FIN)
(T7) Intermediates that return in final imports via third countries (RDVFIN2)
(T8) Intermediates that return via intermediate imports (RDV_INT)

(T3) Intermediate exports to third countries to produce domestic final goods (DVA_INTrexI)
(T4) Produce final goods exports to third countries (DVA_INTrexF)
(T5) Produce intermediate exports to third countries to produce exports (DVA_INTrexI2)

Source: WWZ, 2013
Methodological Appendix

Nowadays a number of world I–O tables exist providing a measurement of value added trade and thus allowing, in principle, a benchmarking exercise, at least for the common countries and indicators that can be identified within each dataset. In Table 3 we report the DVX, FVA, DC and GVC participation for France, Germany, Italy and Spain as retrieved directly from Cappariello and Felettigh (2015), which use the Koopman et al. (2014)’s decomposition on WIOD data, and computed from KWW on EORA, WWZ on WIOD and WWZ on EORA respectively.

The FVA is easily comparable across datasets. Cappariello and Felettigh (2015), working with the WIOD database and the KWW methodology, estimate that the foreign content of exports in 1995 is for instance 15.5% in France. The same figure for the EORA data is at 17.4%. This confirm the slight upper bias (both at the country level and at the world level) that latter has with respect to WIOD (UNCTAD, 2013). However this can be expected, considering that EORA is the only one covering all individual countries in the world and as such it does not include an artificial ‘Rest of the World’ country whose I–O matrix has been derived through a proportionality assumption based on an ‘average’ world technology. As pointed by the UNCTAD (2013) this assumption could yield a downward bias in the computed world FVA, as the world average I–O includes by definition large, relatively close, countries, while most excluded countries in the ‘Rest of the World’ aggregate tend to be small, relatively more open, economies. In a dynamic perspective, Figure 5 below reports the extent of the difference in world FVA share between EORA and the WIOD data for various years. As it can be seen, within a common time trend of increasing FVA over time, level differences in the two datasets are not large, and are getting smaller over time.

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8 PDC terms follow a similar pattern.
Secondly, KWW do not properly allocate the DVA embedded in intermediate exports between the share going to direct importers and the share absorbed in third markets (Nagengast and Stehrer, 2014). Borin and Mancini (2015), exploiting the WIOD dataset and a revised version of the WWZ methodology, find a considerably larger weight of global GVCs participation in total trade than the KWW decomposition (35.2 against 29.5 in 1995), where the bulk of the difference is due to the alternative classification of the value added absorbed by direct importers (i.e. T1 and T2 components). Therefore both the DVX(C&F) and DVX(eoraKWW) measures are steadily lower than those computed making use of the WWZ decomposition (respectively 9.1, 11.1, 15.2 and 21 for France in Table 3).

Table 3 GVC components in 1995

<table>
<thead>
<tr>
<th></th>
<th>FVA(C&amp;F)</th>
<th>FVA(eoraKWW)</th>
<th>FVA(wiodWWZ)</th>
<th>FVA(eoraWWZ)</th>
<th>DVX(C&amp;F)</th>
<th>DVX(eoraKWW)</th>
<th>DVX(wiodWWZ)</th>
<th>DVX(eoraWWZ)</th>
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<td>FRA</td>
<td>15.5</td>
<td>17.4</td>
<td>15.4</td>
<td>18.2</td>
<td>9.1</td>
<td>11.1</td>
<td>15.2</td>
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<td>GER</td>
<td>13.4</td>
<td>18.5</td>
<td>13.3</td>
<td>18.9</td>
<td>10.3</td>
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<td>19.5</td>
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<td>15.4</td>
<td>16.3</td>
<td>15.3</td>
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<td>8.9</td>
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<td>ESP</td>
<td>16.9</td>
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<table>
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<th>PDC(C&amp;F)</th>
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<td>33.9</td>
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Figure 15 FVA, comparison between EORA and WIOD