

Agro-Processing and Horticultural Exports from Africa

by

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Abstract

African exports of horticultural and processed agricultural products are growing rapidly, in line with the major shift towards these products in world markets. This is vitally important for expanding returns from African agriculture. Policy reforms such as reductions in the tariff escalation facing Africa, improvements in the productivity of agricultural processing, and reductions in trade barriers within Africa would all further stimulate exports of processed agriculture. While essential for increasing returns from agricultural exports and to African farmers, expansion of these exports should be regarded as complements to—rather than substitutes for—development of other dynamic export sectors.

Agro-Processing and Horticultural Exports from Africa

Agricultural exports from Sub-Saharan Africa (SSA) include a much larger share of bulk agricultural exports than is the norm on world markets, where processed products have come to dominate. Clearly, it is now important to examine whether Africa should move beyond these traditional, bulk exports, and the resource-based exports which are also disproportionately important in Africa. A key question is whether this move should be into labor-intensive manufactures of the type that have dominated the dramatic growth of exports from succeeding waves of Asian exporters beginning with Hong Kong, Korea and Taiwan (China), through China, Bangladesh, Cambodia and Vietnam (Page 2012). Or should it be through alternative approaches such as adding value to existing agricultural exports, or developing new high-value agricultural exports. Or should policy makers look everywhere for opportunities, recognizing that it will often be difficult to find successes, but that the rewards from identifying a highly-successful export are very great (Hausmann and Rodrik 2003, Easterly and Reshef 2010).

Export growth is vitally important for a wide range of reasons. Most obviously, it is a source of the foreign exchange that is needed to import goods that cannot readily be produced locally—whether because they require special inputs or technology not available locally, or because they can be obtained at much lower cost internationally than domestically. Domestic and international policies will, however, influence both the level and the mix of products that are exported and imported. A key question for this paper is the action that governments should take to influence the development of nontraditional exports such as those from agro-processing operations, and/or high value export crops such as horticultural products.

This initial examination of agro processing in Africa will look at the importance of agro-processing industries in African economies. While it is well-known that the share of the agricultural sector in the economy declines with economic growth, it is less well known that the share of the agro-processing sectors in GDP increases as consumption moves away from raw, starchy staple foods and into foods such as vegetables and fruits, meats and as food consumed comes to embody more services (da Silva et al 2009). An important initial question to be examined by looking at industry shares is whether Sub-Saharan Africa is following this experience. Another is how quickly agricultural exports from Africa are moving from bulk

products to processed and horticultural goods. Is this an area in which Africa is lagging and potentially large gains can be made? Or are African exporters already moving fast?

In this broad-ranging paper we can only hope to provide broad impressions on the potential for expanding exports through further processing of agricultural products from Africa. We hope to do this through provision of an analytical framework and through examination of data. Identifying opportunities for particular products will require detailed analysis of particular products at the country level.

In this paper, we first provide a conceptual section focusing on the determinants of trade patterns. We then turn to examine how the pattern of exports from Africa compares with the pattern in other countries. Following that, we examine the directions of trade in African agricultural exports and the patterns of protection facing, and levied by, African countries. Next, we consider the impacts of potential reforms on exports of processed and horticultural exports from Africa. With this as background, we turn to consider the options for policy makers in Africa.

Determinants of Export Patterns

Prior to the Industrial Revolution, and particularly the development of steam transport, international trade was very limited because of high transport and communication costs. Some very high value-to-weight items such as spices and gemstones were traded over long distances, but most foods and manufactures were produced locally. Basic production patterns and income levels were very similar across the world.

As noted by Baldwin (2006), the first wave of globalization frequently involved the production of raw materials in developing countries, with the processing of these products into final manufactured goods generally taking place through vertically-integrated production process in industrial countries. During this phase of industrialization, communications were not sufficiently well-developed to allow coordination of activities at a distance, and the capital needed for industrial development tended to be most readily available in the industrial countries. This pattern of industrialization appeared to generate many gains from learning by doing in the industrial countries and to contribute to a major divergence in income levels, with incomes in the industrial countries rising far above the levels in developing countries.

Developing countries, understandably, were unhappy with this model of industrial development and frequently tried to develop their own integrated industrial sectors, often by creating incentives to process the raw materials that they happened to produce as suggested by Hamilton (Hamilton 1791). Unfortunately, this typically proved to be very difficult to achieve without excessive cost and loss to the producers of raw materials. Even where the plans and prototypes of processing plants from other countries were available, it frequently proved difficult to operate them successfully (Hausmann and Rodrik 2003).

In this era, the initial processing stages needed to preserve, or to lower the weight, of raw material exports were established in producing areas. Activities of this type include: ginning of cotton, processing coffee cherries into dry coffee beans; initial processing of tea; and slaughter of livestock. Some export-oriented processing activities going beyond this stage were undertaken in developing countries, such as the transformation of cotton into textiles in India and Pakistan, but these were the exception rather than the rule. Sometimes, these activities were artificially induced by imposing taxes or quantitative restrictions on exports of raw materials—frequently under the banner of “value adding”. A key problem with this approach is that—unless the activity can be performed efficiently in the country—the associated high processing costs reduce the amount available for payment to the producers of the raw material. This is both inefficient and inequitable when the suppliers of the raw material are small, low income producers. Unfortunately, this problem was quite common when countries sought to increase the processing of their commodities—whether for export or, more commonly, for domestic consumption--because many processing activities were capital and skill intensive and difficult to undertake economically in countries very poorly endowed with capital and skilled workers.

In recent years, an important change in the nature of industrial development has occurred, creating many new opportunities for developing countries in both industrial production and further processing of agricultural commodities. Given lower transport and communication and greater mobility of people, parts of the production process can now be conducted in different locations, depending upon the competitiveness of the particular activity in that location. Production of garments, for example, may involve growing cotton in West Africa where agro-ecological conditions are particularly suited; making yarns and fabric (likely using blends of cotton and other fibers) in China; and assembling garments in Bangladesh. This way of

organizing production is feasible given low transport costs, high speed communications and greater mobility of skilled workers which together allow the transfer of information, such as the designs for clothes and the authorization of production samples, over great distances. Given the new options for transport and communication, firms from more advanced countries are frequently willing to bring the capital and knowledge needed for successful production via foreign direct investment. This can obviate the very long process of learning otherwise needed to establish an entirely new export activity (Hausmann and Rodrik 2003).

This new approach to production opens up opportunities for developing countries not available under the earlier approach to industrialization. Countries such as China, Vietnam and Bangladesh have rapidly developed export-oriented manufacturing systems deeply engaged in this production system. Thailand has been very active in agro-processing frequently using domestically-produced products, but sometimes using imported inputs. It involves an important change in policy mindset from the traditional approach under which industrialization required that most stages in the production chain be located in the same area. Activities can instead be located where the capital and skill mix needed for that activity allow it to be performed at lower cost than elsewhere. This is a dynamic process—frequently termed the flying-geese model—in East Asia, where countries at the earliest stage of the development process undertake relatively simple activities handed down from the earlier industrializers who, move progressively up the ladder of skill and capital requirements. When this process works well, as in many economies in East Asia, economies can grow and transform very rapidly by moving up a ladder involving activities with progressively increasing requirements for capital and skill.

This new form of industrialization has been associated with a dramatic change in the distribution of world income, with countries that have engaged in this process raising their average incomes and lowering poverty very rapidly. Unhappiness about this approach to development appears to be emerging in the high income countries, based on perceptions about loss of manufacturing jobs to developing countries.

The unbundled approach to global value chains involves much more transfer of materials than the traditional approach and hence is much more demanding of logistics than traditional approaches. Transport costs must be lowered, and issues such as customs clearance become much more important for the organization of production. Once efficient logistics are in place,

however, new approaches to production become possible. Countries with suitable agroecological conditions can potentially produce high-value products, such as cut flowers and fresh vegetables, which formerly needed to be produced near their point of consumption. African producers of products such as green beans, cut flowers and fresh fruit have seized some of these opportunities with alacrity.

Exports of horticultural products such as cut-flowers, fresh fruit and vegetables require a somewhat different framework of analysis. In this case, the logistics and trade facilitation are also vitally important, given the high costs of delay. The risks of activities being inadvertently ruled out through high costs on intermediate inputs are just as relevant as for processing activities.

A recent change in economists' approach to the analysis of exports involves a recognition of the diversity of experience by firms and with particular products. While trade theory did not explicitly consider firms until the 1990s, the availability of transactions level data revealed striking heterogeneity of firms, with most exports accounted for by a surprisingly small share of firms. Further these firms tended to be more productive than non-exporting firms even when they began exporting—in contrast with the traditional model in which firms learned by doing in the very different business environment facing exporting firms. Only the most productive firms also tended to export multiple products and to multiple export markets. While these findings were originally established for industrial countries (eg Bernard and Jensen 1996), they were quickly confirmed for developing countries (Clerides, Lach and Tybout 1998) and subsequently for exports of processed agricultural products (Gopinath et al 2007).

In Africa, considerable evidence has emerged that exporting firms are—as in other regions—more productive and pay higher wages than non-exporting firms (Van Biesebroeck 2005; Bigsten et al 2004; Brambilla et al 2015). However, there are also indications that firms continue to benefit from learning-by-doing after entering export markets (Van Biesebroeck 2005; Bigsten et al 2004; Mengistae and Pattillo 2004). Mengistae and Pattillo, in particular, find that the productivity of exporting firms grows 10 percent faster than that of non-exporting firms. A recent paper by Mulangu and Olarinde (2016) finds evidence of learning by doing, but no evidence of higher productivity firms selecting into exporting. It also concludes that the fixed costs associated with starting exports to African countries are lower than those to other

markets—suggesting that intra-African exports may allow more firms to export, and to reap the productivity gains associated with exporting.

Another recent perspective on developing country exports has come from the realization that exports from most countries are dominated by a relatively small range of specific products (Hausmann and Rodrik 2003). This is the case for even very large countries such as China and India for which only one six-digit product (unrefined petroleum) appears on the list of top-25 exports (Dimaranan, Ianchovichina and Martin 2007). Easterly and Reshef (2010) find that exports in a number of African countries are strongly dominated by a small number of “big hits” with large export shares. The importance of specific products suggests that the process of learning about production of particular products is very important as a focus for policy.

Whether African exports are highly specialized or not has important implications for the volatility of export returns because highly concentrated export bundles are much more likely to be volatile than more diversified export bundles. Adding processed agricultural exports to an export bundle dominated by something else—such as resource exports—may well reduce volatility. However, switching from exporting a raw product to the same product in processed form may well not lead to a substantial reduction in export volatility, if the price received for the processed product is heavily influenced by the price of the raw material. Diversifying from agricultural and resource products to manufactures seems likely to provide the largest gains from diversification.

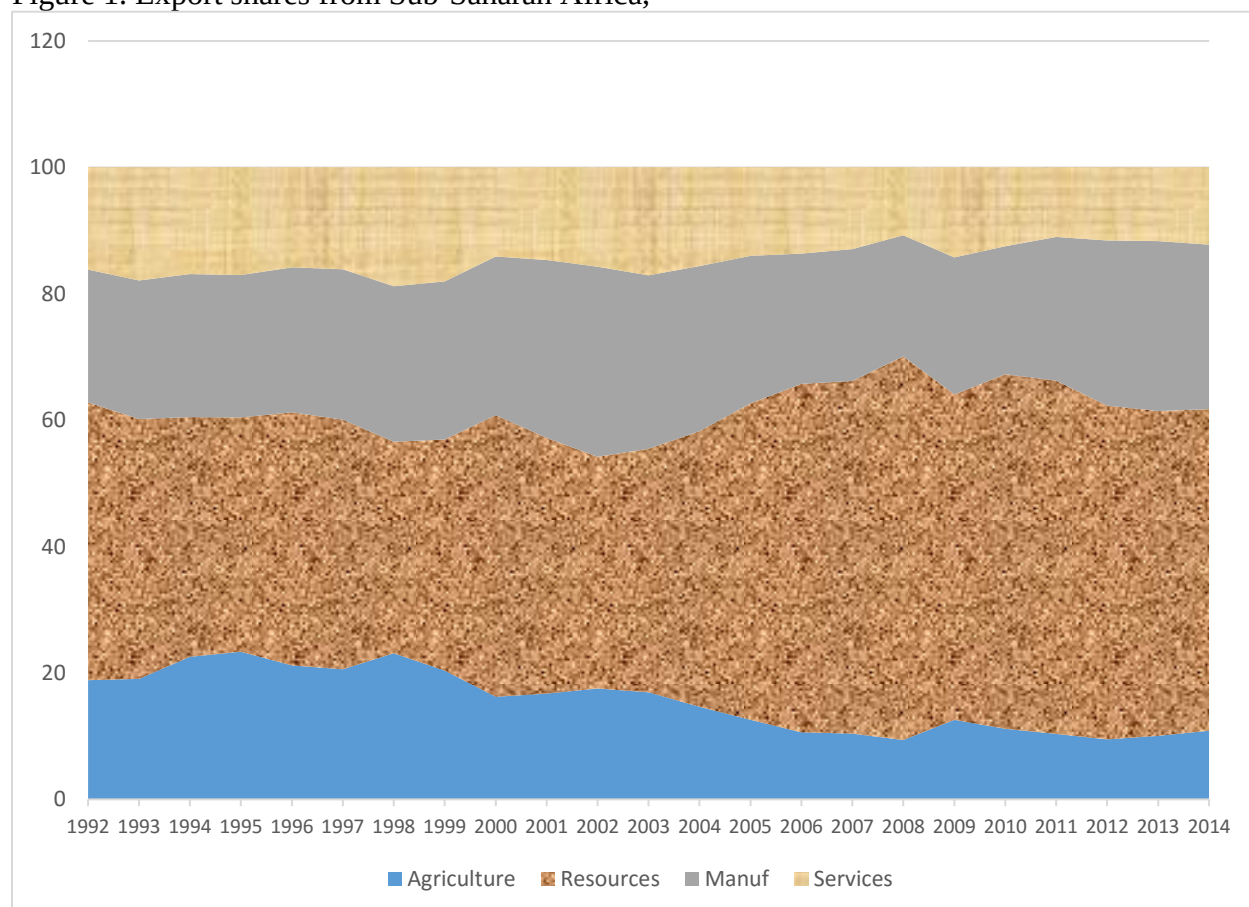
Another factor influencing export outcomes is whether markets for particular products are expanding or contracting. Exporting into a growing market is more likely to be desirable than exporting into a shrinking overall market. When markets are growing, prices are more likely to be buoyant in order to provide an incentive for additional resources to flow into the sector. In shrinking markets, competition between suppliers—and particularly suppliers with large fixed investments in production—is more likely to put downward pressure on prices. With income growth consumers are likely to move from purchasing raw agricultural products to consuming products with additional embedded services. For this reason, it seems more likely that markets for processed agricultural products will grow more rapidly than markets for raw products. Demand for horticultural products such as tropical fruits and fresh flowers are also likely to grow

relatively rapidly as incomes rise, potentially making these higher growth than staple agricultural products.

A Global Perspective on Agricultural Processing and Horticultural Exports

In this paper, we first examine the evolution of exports from Sub-Saharan Africa and other regions to assess the similarities and differences between Africa and other regions. Figure 1 shows the composition of Africa's exports of goods and services, divided into Agriculture, Resources, Manufactures and Services. This graph shows the small and declining share of agriculture in African exports. Rather than being dominated by agricultural exports, only around 10 percent of African exports are of agricultural products. This is lower than the 12.2 percent accounted for by exports of nonfactor services.

Figure 1. Export shares from Sub-Saharan Africa,



Note: Merchandise export data from COMTRADE, accessed through World Integrated Trade Solutions (WITS). Exports of Services from World Bank, *World Development Indicators*.

Because the importance of different export categories depends on factors such as the prices of agricultural and resource commodities, we compare the export structure of Sub-Saharan Africa with global export patterns using an index of Revealed Comparative Advantage (RCA). This index compares shares of exports from Sub-Saharan Africa with the corresponding global share. This indicates that the Revealed Comparative Advantages of Africa in agriculture has fallen from 2 to 1.5 since 1992. The RCA for resources exports has also declined—from 4.5 to 3.2, while that for manufactures has risen slightly, from 0.4 to 0.5. These results suggest that African exports have moved somewhat closer to the world average over the past two decades.

For non-oil exporters, we see a similar pattern of decline in the RCA for agricultural and resource products, although the agricultural product RCA is substantially above that for the region as a whole. The increase in the RCA for exports of manufactures is much stronger for the non-oil exporters, rising from 0.5 to 0.8.

Table 1. Revealed Comparative Advantage of African Exports.

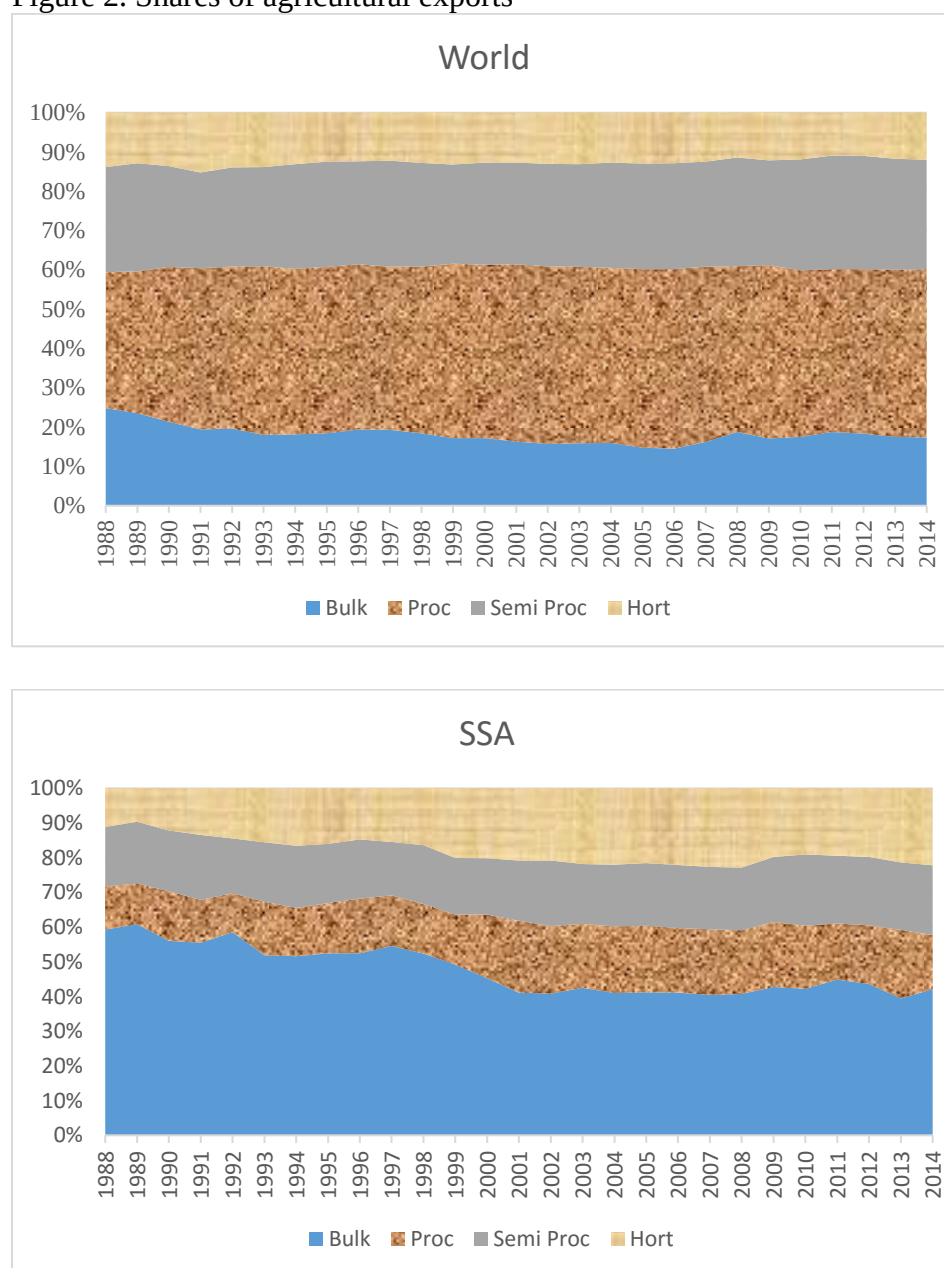
	SSA Countries				SSA without Oil Exporters			
	<u>Agriculture</u>	<u>Resources</u>	<u>Manuf</u>	<u>Services</u>	<u>Agriculture</u>	<u>Resources</u>	<u>Manuf</u>	<u>Services</u>
1992	2.0	4.5	0.4	0.7	2.7	2.5	0.5	0.8
1995	2.5	4.2	0.4	0.8	3.2	2.3	0.5	0.8
2000	2.3	4.2	0.4	0.7	3.2	2.0	0.6	0.8
2005	1.9	3.6	0.4	0.7	2.9	1.6	0.7	0.8
2010	1.6	3.5	0.4	0.6	2.6	1.8	0.7	0.8
2014	1.5	3.2	0.5	0.6	2.3	1.5	0.8	0.7

Note: Countries are classified as oil exporters if the share of fuels exports relative to GDP is above 10 percent.

We look within agriculture using the Regmi et al (2005) definitions of bulk, semi-processed and processed agricultural products, plus horticultural products. As noted by Liapis (2011, p12), the bulk and horticultural products are tied strongly to geographic conditions, while semi-processed products such as sugar or cocoa products and processed products such as meat and chocolate are less strongly linked and could potentially be produced using inputs from other locations. With these widely-used definitions, we see a sharp difference between Africa and the world as a whole. As shown in Figure 2, for the world as a whole, bulk agricultural products account for a small and declining share of agricultural exports—declining from 25 percent in 1988 to 17 percent in 2014. By contrast processed and semi-processed agricultural products accounted for almost three-quarters of agricultural exports by 2015. Horticultural exports accounted for around 12 percent of agricultural exports in 2014.

For Africa, the corresponding patterns are quite different. The share of bulk agricultural exports also declined, but from around 60 percent to 42 percent in 2014, leaving these exports still a large share of total agricultural exports. The share of processed and semi-processed agricultural products rose, but only to 35 percent by 2015. The share of horticultural exports rose from around 10 percent in 1988-89 to 22 percent in 2014. It seems clear that African exporters are adjusting quickly to the changes in the world markets, but doing it in a distinctively African way. In particular, the expansion of horticultural exports suggests that Africa has seized new opportunities, for instance, in becoming integrated into global agricultural value chains in flowers and horticultural crops (Minten, Randrianarison and Swinnen 2009; Page 2012).

Figure 2. Shares of agricultural exports



Source: Merchandise export data from COMTRADE, accessed through World Integrated Trade Solutions (WITS).

To look in more detail at agricultural exports from Africa, we consider individual six-digit products using the Harmonized System product definitions—the finest for which internationally-comparable measures are available. In Table 2, we examine these products for seven focus countries and for Sub-Saharan Africa as a whole. The table shows the export value share for each of the top 20 agricultural exports, the share held by the top 20 products, the

number of agricultural exports and the numbers equivalent of the Herfindahl Index for agricultural exports (Adelman 1969). This numbers-equivalent measure—measured as $\frac{1}{\sum s_i^2}$ where S_i is the share of each product in the total—shows the number of equally-distributed exports that would provide the same degree of diversification as the observed set of exports, assuming independent and identically-distributed volatility for each commodity export.

Table 2. Export shares for Six-Digit Agricultural Goods, 2013

Rank	Cote d'Ivoire	Ethiopia	Ghana	Nigeria	Rwanda	Tanzania	Uganda	SSA as a group	SSA to SSA
1	46.2	23.3	59.0	32.1	22.1	12.2	30.4	12.8	7.9
2	12.3	16.9	9.9	17.6	18.6	11.9	6.8	4.7	4.2
3	7.1	15.9	7.9	5.6	8.7	9.2	6.0	4.7	3.9
4	6.0	15.0	4.5	5.0	7.9	6.8	4.9	4.4	3.2
5	3.9	6.5	2.8	4.0	5.9	5.2	4.2	3.8	2.9
6	3.9	4.5	1.4	3.5	4.2	4.2	3.9	2.7	2.8
7	3.4	2.2	1.4	3.4	3.2	4.0	3.4	2.7	2.6
8	3.3	1.9	1.0	3.2	3.2	3.5	2.9	2.2	2.4
9	2.0	1.9	0.9	2.6	3.1	3.2	2.2	2.1	2.3
10	2.0	1.4	0.8	2.4	2.9	2.9	2.1	1.7	1.9
11	1.2	1.2	0.8	2.0	2.9	2.9	2.1	1.7	1.8
12	0.9	0.9	0.7	1.5	2.3	2.0	2.0	1.6	1.8
13	0.8	0.9	0.7	1.2	1.8	1.9	1.8	1.6	1.7
14	0.8	0.7	0.6	1.1	1.4	1.9	1.7	1.5	1.4
15	0.7	0.7	0.6	1.1	1.0	1.7	1.6	1.5	1.3
16	0.6	0.6	0.6	1.0	1.0	1.7	1.4	1.5	1.2
17	0.4	0.4	0.5	0.9	0.9	1.2	1.3	1.3	1.1
18	0.4	0.4	0.5	0.9	0.7	1.2	1.3	1.2	1.1
19	0.3	0.3	0.5	0.6	0.6	1.1	1.2	1.1	1.0
20	0.3	0.3	0.3	0.5	0.6	1.1	1.1	1.1	1.0
Top 20 Share	96.5	96.2	95.5	90.2	93.0	79.8	82.4	55.9	47.8
No of exports	386	249	362	299	233	357	402	670	662
Nos Equiv	4	7	3	7	9	18	9	33	54

Source: Merchandise export data from COMTRADE, accessed through World Integrated Trade Solutions (WITS).

Table 2 shows that agricultural exports from African countries tend to be highly concentrated, with the largest export having a very large share of total agricultural exports, and subsequent exports having much smaller shares. Following Easterly and Reshef (2010), we plotted the log of the rank for each export against the log of its export share and confirmed that these distributions followed a power law, under which a small share of products accounts for a very large share of exports. Consistent with this, the top 20 exports accounted for 80 percent or more of export returns in each of our focus countries, and over 90 percent in five of our focus countries. While each country has what appears to be a large number of agricultural exports (between 233 and 402), the very large shares accounted for by the top products means that these export baskets are much less diversified than they might at first appear. The numbers equivalent of the Herfindahl

Index suggests that, for instance, the 362 agricultural exports from Ghana provide the export market diversification that would be provided by having just three equally-distributed agricultural exports. The 386 agricultural exports from Cote d'Ivoire provide little more diversification, being equivalent to only 4 identically-distributed products. By contrast, the agricultural export baskets of Tanzania, Rwanda and Uganda are much more diversified, being equivalent to 18, 9 and 9 products respectively—numbers which should provide considerable diversification.

The last two columns of Table 2 show the results for SSA as a group for goods which went to the world and to SSA respectively. The exports which went to SSA turn out to be somewhat more diversified: the SSA's top 20 exports accounted for 56 percent to the world and 48 percent to the SSA, while the equivalent indexes were 33 and 54 respectively. This may reflect the relatively low entry costs into exporting to SSA countries reported by Mulangu and Olarinde (2016). It may also reflect a tendency to re-export high value processed agricultural items—often imported from outside Africa.

Table 3 shows the composition of SSA's top 20 exports for SSA as a group to the world and to the SSA. Tables 2b also categorizes the SSA's exports into bulk (B), horticulture (H) and processed agriculture (P) which are shaded in blue, green and pink respectively. In terms of SSA's exports to the world (first panel), the five top items are dominated by bulk exports such as cocoa beans, coffee, unmanufactured tobacco, sesamum seeds and black tea. Fresh cut flowers and horticulture products such as cashew nuts, fresh fruits including apples, oranges and grapes made the list. Processed agricultural goods such as cocoa paste, cocoa butter and frozen fish may reflect the availability of local raw materials.

The second panel of Table 3 reveals the quite different nature of the top 20 exports which were traded within SSA, with a disproportionately high share of processed goods including such items as cigarettes and tobacco, frozen fish, sugar, palm oil, beer, soup, flour, milk and cream and mineral waters. Interestingly, about two thirds of the agricultural products traded within SSA in 2013, were processed agricultural products.

Given the diversity of Africa, looking at SSA exports in total may well miss important details. Are, for instance, exports of horticultural products from just a few countries? But at the same time, we can't possibly examine export patterns for all African countries. As a compromise

approach, we examine data for seven focus countries. Appendix Table A1 shows the composition of top 20 exports for these seven individual countries. The importance of coffee and cocoa stands out at the country level: coffee (090111) was the most important exports item for Uganda, Rwanda and Ethiopia and second and fifth important for Tanzania and Cote d'Ivoire respectively; cocoa beans (180100) was the leading export for Nigeria and Cote d'Ivoire and Ghana in 2013. Horticultural products appear to be especially important for Ethiopia with other vegetables (70990) and fresh cut flowers (60310) are the second and third most important export goods. Cashew nuts (080131) was the most important export item for Tanzania and second, third, fourth important item for Ghana, Cote d'Ivoire and Nigeria respectively. A variety of processed food items appear in the list including fish fillets, sugar, flour, vegetable oils, cigarettes and alcoholic beverages.

The “big hits” change from one period to next (Easterly and Reshef, 2010) and a question arises whether the current important agricultural exports are driven by new products. To answer the question, we follow Kehoe and Ruhl (2013) in constructing the set of least-exported agricultural goods which were originally either not exported or exported only in small quantities. Specifically, starting with the smallest amounts of exports including zero, we add products to the set until the sum of their export values reaches two percent of total export value in the initial period. To reduce the chance that a good is typically exported but not exported in any one year (Kehoe and Ruhl, 2013) and to mitigate potential inaccuracy of the data reporting in the earlier years, we average each country's exports for the three oldest years of which the data are available in the Comtrade system.

Appendix Table A2 reports a set of items which were bottom two percent in the oldest available years, but made the top twenty list in 2013 for our seven countries. The results show that the emerging export products are disproportionately represented by the processed agriculture and horticultural product categories. The leading emerging processed goods include such products as sugar (170199) in Uganda, oil cake (230630) in Tanzania, cigarettes (240220) and cocoa paste (180310) in Nigeria and palm or babassu oil (151329) in Ghana. In terms of horticultural products, the second and third largest export items in Ethiopia in 2013, namely, other vegetables (70990) and fresh cut flowers (60310) were among bottom two percent products in the early 2000s. The emerging bulk products are over-represented by oil seeds including other

oil seeds (120799) in Tanzania and in Nigeria, soya beans (120100) in Ethiopia and sesamum seeds (120740) in Ghana, potentially reflecting rising demand for vegetable oils and animal feeds..

Table 3. Composition of SSA's Top Twenty Exports to the World and to SSA 2013

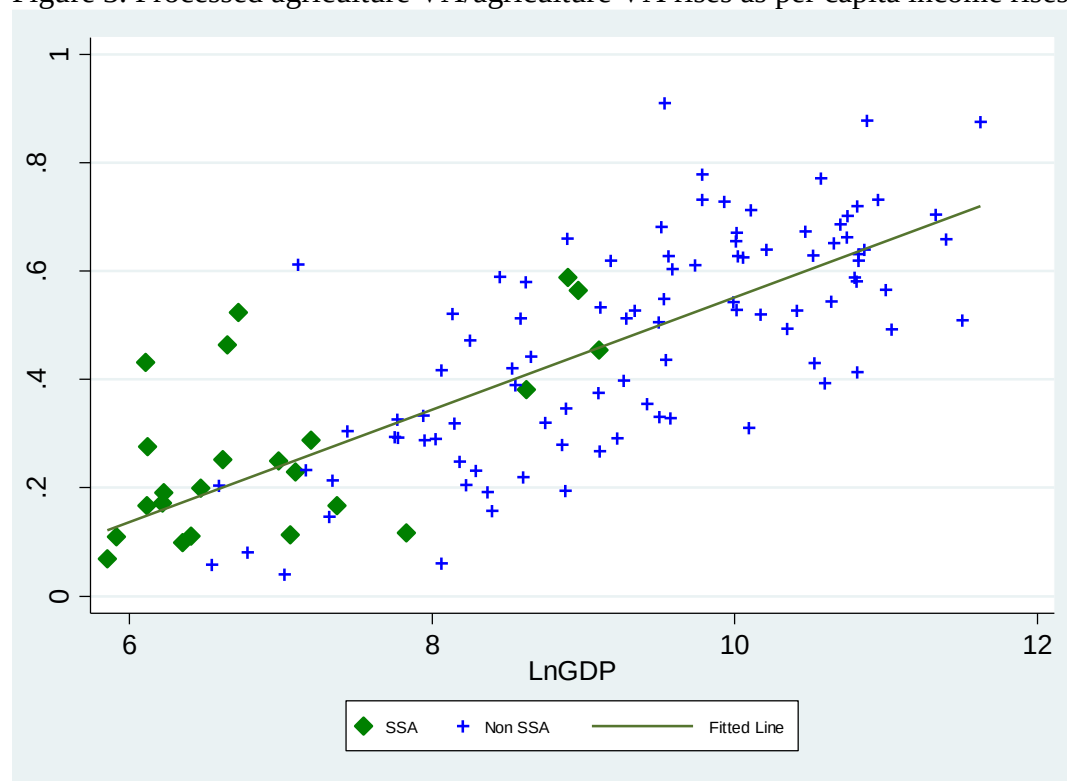
To the World					To SSA				
Rank	hs6	Name	Cat.	Share (%)	Rank	hs6	Name	Cat.	Share (%)
1	180100	Cocoa beans, whole or broken, raw or roasted.	B	12.8	1	240120	Unmanufactured tobacco; tobacco refuse.	B	7.9
2	90111	Coffee, not roasted :-- Not decaffeinated	B	4.7	2	240220	Cigarettes containing tobacco	P	4.2
3	240120	Unmanufactured tobacco; tobacco refuse.	B	4.7	3	70990	Other vegetables, fresh or chilled.	H	3.9
4	120740	Sesamum seeds	B	4.4	4	100590	Other Maize (corn)	B	3.2
5	90240	black tea (fermented) and others	B	3.8	5	30379	Frozen fish , excluding fish fillets	P	2.9
6	60310	Fresh cut flowers	H	2.7	6	170199	Other Cane or beet sugar	P	2.8
7	80131	Cashew nuts :-- In shell	H	2.7	7	170111	Raw sugar not containing added flav	P	2.6
8	100590	Other Maize (corn)	B	2.2	8	151190	Other Palm oil and its fractions	P	2.4
9	170111	Raw sugar not containing added flav	P	2.1	9	220300	Beer made from malt.	P	2.3
10	180310	Cocoa paste, not defatted.	P	1.7	10	90240	black tea (fermented) and others	B	1.9
11	30379	Frozen fish , excluding fish fillets	P	1.7	11	210410	Soups and broths and preparations t	P	1.8
12	170199	Other Cane or beet sugar	P	1.6	12	110100	Wheat or meslin flour.	P	1.8
13	70990	Other vegetables, fresh or chilled.	H	1.6	13	10290	Other Live bovine animals.	B	1.7
14	240220	Cigarettes containing tobacco	P	1.5	14	210690	Other food preparations nei.	P	1.4
15	180400	Cocoa butter, fat and oil.	P	1.5	15	80810	Apples	H	1.3
16	80510	Oranges	H	1.5	16	240110	Tobacco, not stemmed/stripped	B	1.2
17	220421	Other wine; grape must with ferment	P	1.3	17	240310	Smoking tobacco, whether or not con	P	1.1
18	80610	Grapes, fresh	H	1.2	18	230990	Other preparations used in animal feeding.	P	1.1
19	80810	Apples	H	1.1	19	40229	Powdered Milk or cream	P	1.0
20	160414	Fish, whole or in pieces, but not m	P	1.1	20	220210	Waters, including mineral waters an	P	1.0

Source: Merchandise export data from COMTRADE, accessed through World Integrated Trade Solutions (WITS).

Note: *1 B, H and P represent bulk, horticulture and Processed agriculture respectively.

One potential explanation for the low share of processed agricultural exports in Africa's exports on average is the relatively low income of most African countries. We know that a key feature of consumer demand for food is that—as incomes rise—consumers shift from purchasing raw agricultural products to products that embody more and more value-added services. To see whether Africa is following this trend, or a distinctly different trend, we look at the relationship between real GDP and the ratio of value added in agricultural processing to value added in agriculture, a relationship examined by de Janvry (2009). Figure 3 reveals something close to a linear relationship between the ratio of value added in agricultural processing to value added in agriculture. The African countries in the graph appear broadly to follow this pattern. A dummy variable for Africa included in this regression failed to reveal a significant difference between African and other countries. This suggests that the relatively low share of agricultural processing in African economies reflects their relatively low incomes, rather than a specific feature of African agriculture, such as the mix of commodities or consumer preferences.

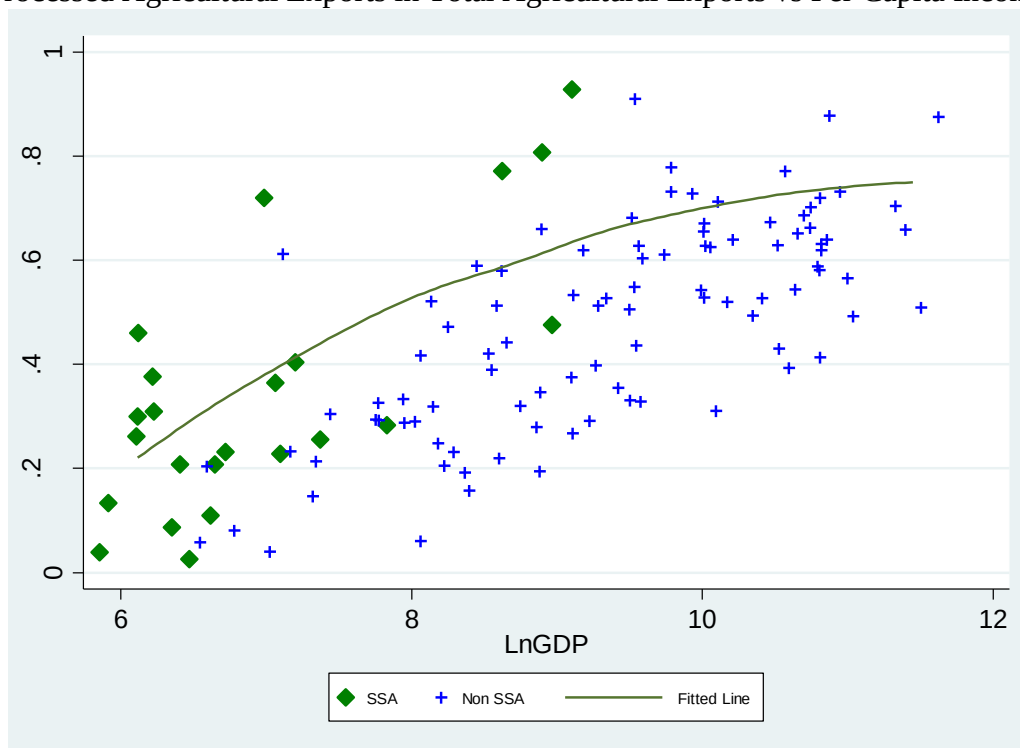
Figure 3. Processed agriculture VA/agriculture VA rises as per capita income rises 2011



Source: Global Trade Analysis Project (GTAP) database (Version 9)

Turning to the relationship between processed agricultural exports as a share of total agricultural exports, we also find a positive relationship with real GDP, as shown in Figure 4. In this case, the relationship appears to be nonlinear, with the rate of increase declining as incomes rise. However, there is no indication either in the plot or from statistical testing, that African countries are not following a similar path to other countries.

Figure 4. Processed Agricultural Exports in Total Agricultural Exports vs Per Capita Income 2011



Source: GTAP database (Version 9)

Trade and Protection Patterns

In this section, we use the GTAP database to allow us to capture both trade and protection, and in preparation for the simulation analysis undertaken in the next section. Using this database, we find SSA's agricultural exports were \$46.0 billion in 2011 of which \$21.8 (47.4 percent) billion, \$7.4 billion (16.2 percent) and \$16.8 billion (36.5 percent) were bulk, horticulture and processed agriculture respectively (GTAP 9 database).¹ Figure 5 shows the destinations of SSA's exports for

¹ 'Bulk' includes paddy rice (pdr), wheat (wht), cereal grains nec (gro), oil seeds (osd), sugar cane, sugar beet (c_b), plant-based fibres (pfb), crops nec (ocr), cattle, sheep, goats, horses (ctl), animal products nec (oap), raw milk (rmk),

total, bulk, horticulture and processed agriculture. This shows that the EU was the largest destination for SSA's exports, absorbing 39.6% of SSA's exports (37.3 percent, 42.4 percent and 41.3 percent of bulk, horticulture and processed agriculture respectively). 19.0 percent of SSA's exports went to SSA of which those of processed agriculture was disproportionately large accounting for 34.9 percent of SSA's processed agriculture exports. The EU and SSA combined accounted for about three quarters of SSA's processed agriculture exports while its exports of bulk agriculture are more geographically dispersed. The South Asia (SA) region absorbed 17.7 percent of SSA's horticultural exports.

Columns 1-3 of Table 4 show the Ad valorem Equivalent (AVE) protection that SSA's exports face, the AVE that SSA imposes against its imports and the world AVE for the purpose of comparison. The last four rows show the summary of AVE for agricultural goods. SSA's agricultural exports face 7.0 percent of AVE in its exports market (7.7 percent, 3.8 percent, 7.6 percent for its bulk, horticulture and processed agriculture exports respectively) which were slightly lower than the world average of 8.2 percent (8.3 percent, 5.2 percent and 8.6 percent for bulk, horticulture and processed agriculture respectively), perhaps reflecting its preferential access to certain developed countries including the EU and the United States. The SSA's own AVE against its agricultural imports of 12.2 percent was about 50 percent higher than the world average.

Columns 4-6 of Table 4 show the AVE that SSA faces in the EU market, the AVE that the EU imposes against its imports other than SSA and EU, and the EU's average AVE respectively. The SSA enjoys the preferential access to the EU market with the preferential rate for agriculture of 0.8 percent on average is substantially lower than that the EU imposes against its suppliers other than SSA and EU itself (7.3 percent). In particular, the SSA appears to benefit from the lower preferential rates for its processed agricultural goods (1.3 percent on average) relative to that the EU imposes against the other suppliers (11.1 percent on average). For instance the preference margins appear to be especially large for such products as meat (1.9 percent vs.

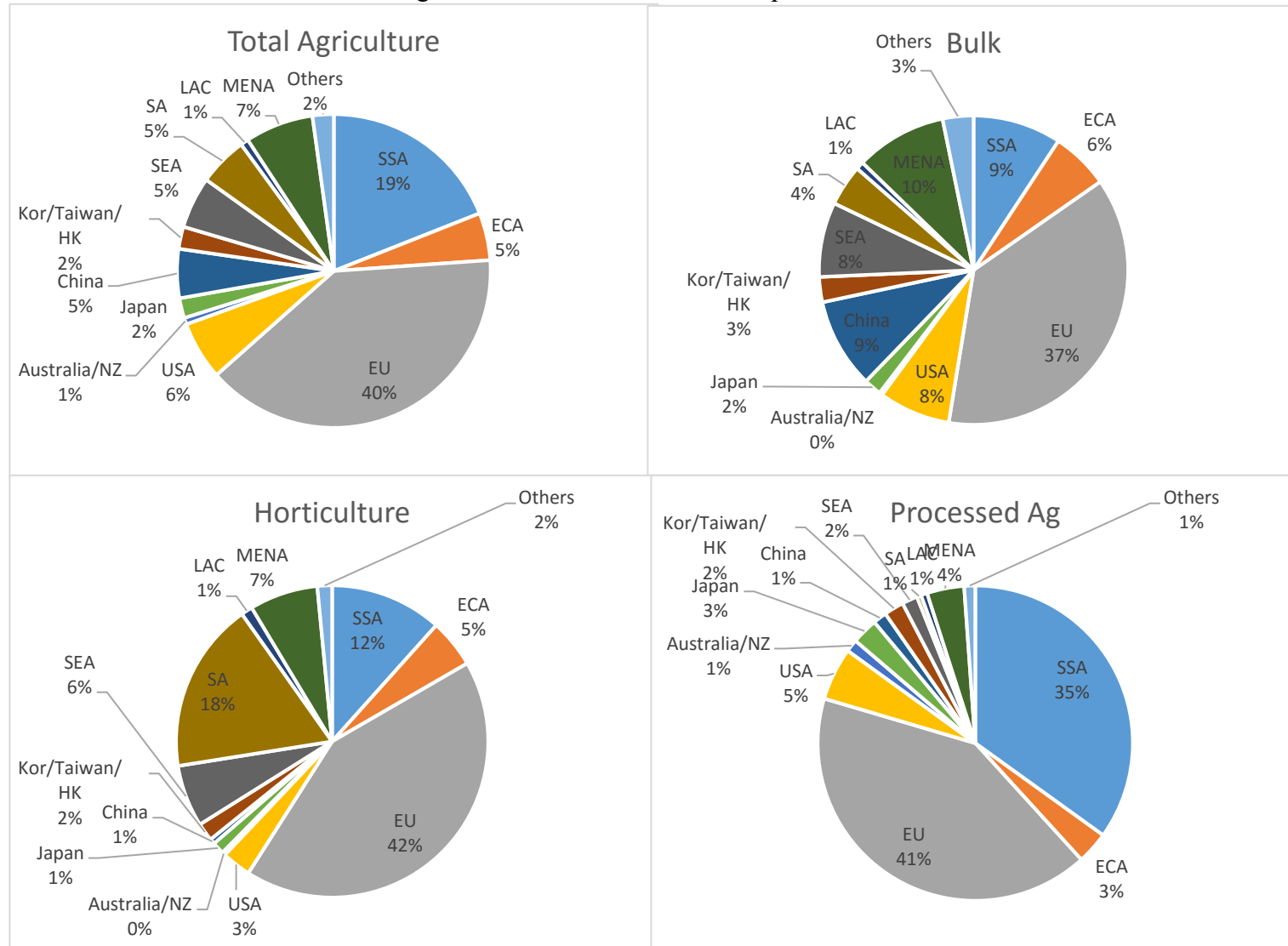
wool, silk-worm cocoons (wol) and fishing (fsh). Vegetable, fruits and nuts (v_f) is used as a proxy of 'horticulture'. 'Processed agriculture' includes: meat: cattle, sheep, goats and horse (cmt), meat products nec (omt), vegetable oils and fats (vol) dairy products (mil), processed rice (pcr), sugar (sgr), food products nec (ofd) and beverages and tobacco products (b_t). See GTAP website for detailed product breakdown.
(<https://www.gtap.agecon.purdue.edu/databases/contribute/detailedsector.asp>)

54.0 percent), dairy products (2.0 percent vs. 23.9 percent) and sugar (1.2 percent vs. 43.8 percent).

In its export markets, SSA faces tariff escalation within many value chains: paddy rice (1.2 percent) vs. processed rice (5.7 percent); oil seeds (7.0 percent) vs. vegetable oils and fats (8.0 percent); sugar cane and sugar beet (0.4 percent) vs. sugar (9.1 percent); raw milk (0.0 percent) vs. dairy products (10.9 percent); and cattle, sheep, goats, horses (1.3 percent) vs. animal products n.e.c. (2.6 percent) cattle, sheep, goat and horse meat (33.7 percent) and other meat products (5.0 percent) (Column 1 of Tale 3). SSA's own AVE against its imports (column 2), intra-SSA AVE (last Column) and world AVE (third column) also demonstrate similar tariff escalation.

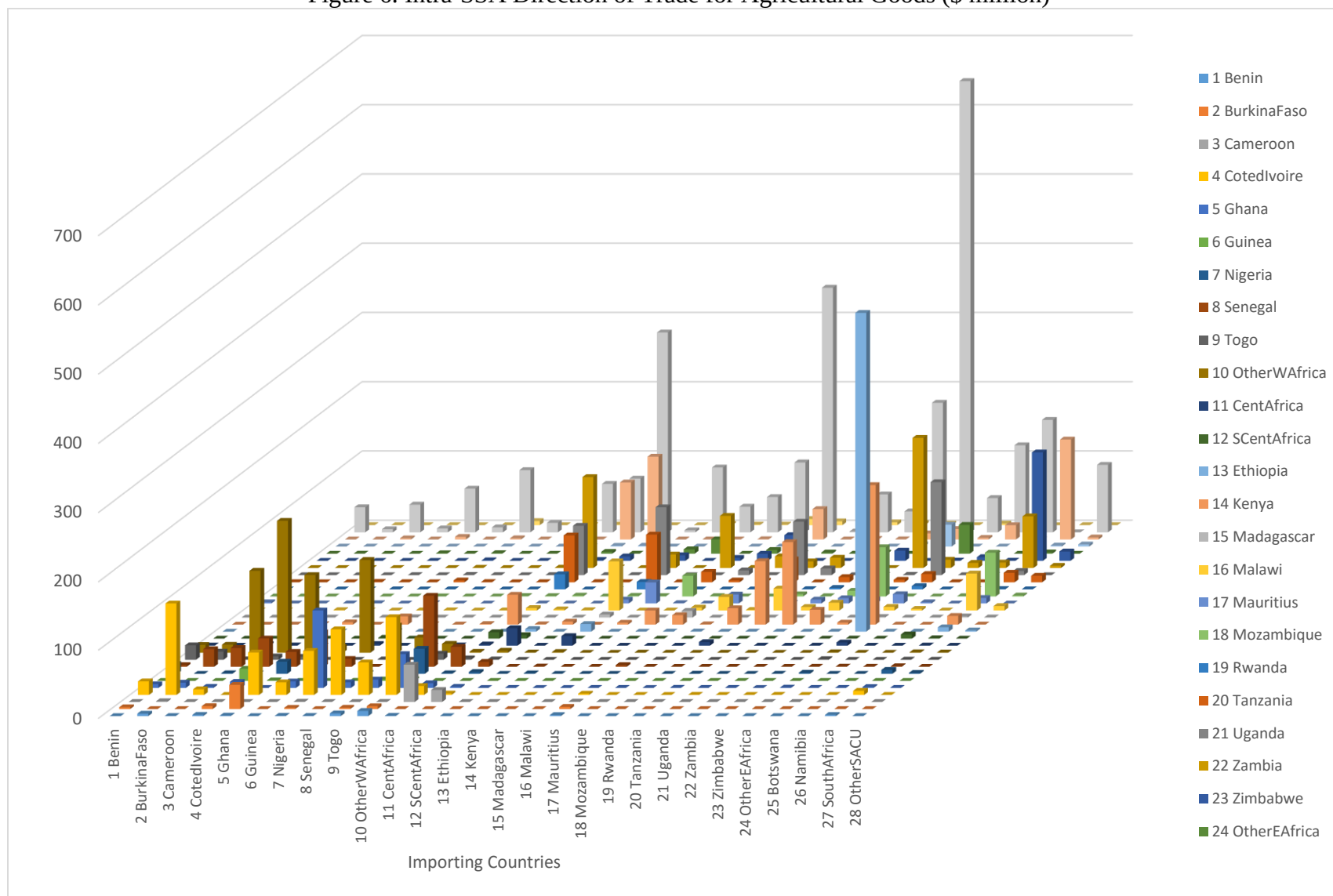
In 2011, about one fifth of agricultural exports took place within SSA. Figure 6 visualizes intra-SSA trade for agricultural goods. The horizontal and vertical axes represent importing and exporting countries respectively. The south-west corner represents the trade within *Economic Community of West African States (ECOWAS)*; the north-east corner represents trade for the *Southern African Development Community (SADC)*; and the countries belonging to the *Common Market for Eastern and Southern Africa (COMESA)* tend to be in between. Several countries are the members of both the COMESA and the SADC. We observe that the agricultural trade in SSA tends to occur in the same regions. The ECOWAS and the COMESA/SADC countries rarely trade each other for their agricultural goods (except South Africa exports agricultural goods to some ECOWAS countries). The last column of Table 4 reports the AVE for intra-SSA trade. Despite the presence of a number of trade blocs within Africa, AVE protection for agricultural goods within SSA remains at 10.1 percent of which that for processed agriculture is especially high at 12.6 percent.

Figure 5 Destinations of SSA's Exports 2011



Source: GTAP database (Version 9)

Figure 6. Intra-SSA Direction of Trade for Agricultural Goods (\$ million)



Source: GTAP database (Version 9)

Table 4. Structure of Ad Valorem Equivalent (AVE) Protection

		AVE in SSA's Exports and Imports			AVE in EU			AVE SSA
		<u>SSA's Exports</u>	<u>SSA's Imports</u>	<u>World Average</u>	<u>Against SSA</u>	<u>Against Others</u>	<u>EU Average</u>	<u>Intra-SSA</u>
		(%)	(%)	(%)	(%)	(%)	(%)	(%)
1 pdr	Paddy rice	1.2	3.5	7.1	0.9	3.8	2.7	1.8
2 wht	Wheat	1.3	6.6	7.0	0.0	11.7	2.5	0.8
3 gro	Cereal grains nec	71.2	3.4	26.0	0.0	2.6	0.6	2.8
4 v_f	Vegetables, fruit, nuts	3.8	10.6	5.2	1.4	4.3	1.6	8.8
5 osd	Oil seeds	7.0	4.6	8.3	0.0	0.0	0.0	2.5
6 c_b	Sugar cane, sugar beet	0.4	0.2	0.5	1.0	1.5	0.8	0.0
7 pfb	Plant-based fibres	1.7	1.9	2.2	0.0	0.0	0.0	1.5
8 ocr	Crops nec	3.4	12.5	4.5	0.0	1.2	0.5	4.9
9 ctl	Cattle, sheep, goats, horses	1.3	1.7	4.6	0.0	2.1	0.2	1.3
10 oap	Animal products nec	2.6	7.7	3.3	0.0	2.5	0.6	5.3
11 rmk	Raw milk	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12 wol	Wool, silk-worm cocoons	16.7	0.0	21.1	0.0	0.0	0.0	1.2
13 fsh	Fishing	3.7	10.3	2.7	1.8	2.7	1.0	9.8
14 cmt	Meat: cattle, sheep, goats etc	33.7	12.6	13.9	1.9	54.0	11.7	7.8
15 omt	Meat products nec	5.0	12.3	13.0	2.5	19.1	2.1	5.9
16 vol	Vegetable oils and fats	8.0	12.5	9.3	0.0	2.3	1.1	10.1
17 mil	Dairy products	10.9	10.3	7.9	2.0	23.9	1.1	10.9
18 pcr	Processed rice	5.7	9.9	16.6	0.8	15.8	7.2	7.4
19 sgr	Sugar	9.1	15.6	12.5	1.2	43.8	12.3	23.4
20 ofd	Food products nec	4.8	14.8	6.0	0.9	7.3	1.8	11.0
21 b_t	Beverages, tobacco products	13.4	16.9	8.7	4.3	6.7	1.0	15.9
22 Others	Manufactures, resources, services	1.0	6.5	1.9	0.0	1.1	0.5	5.0
Total	Total	1.6	7.2	2.4	0.1	1.4	0.6	5.9

Summary of Agricultural AVE Protection

	<u>SSA's Exports</u>	<u>SSA's Imports</u>	<u>World Average</u>	<u>Against SSA</u>	<u>Against Others</u>	<u>EU Average</u>	<u>Intra-SSA</u>
	(%)	(%)	(%)	(%)	(%)	(%)	(%)
Bulk	7.7	7.4	8.3	0.1	1.8	0.7	3.3
Horticulture	3.8	10.6	5.2	1.4	4.3	1.6	8.8
Processed Agriculture	7.6	13.6	8.6	1.3	11.1	2.4	12.6
Total Agriculture	7.0	12.2	8.2	0.8	7.3	2.0	10.1

Source: GTAP database (Version 9)

Simulation Scenarios and Results: Trade Effects

In this section, we use the GTAP model, with the patterns of trade and protection discussed in the previous section, to analyze the impacts of different policy reforms. These experiments are intended more to assess the impacts of the existing structure of distortions, rather than to provide an indication of potential impacts of actual reforms. The first experiment, Simulation 1, considers the effects of removing tariff escalation in SSA partner countries. Simulation 2 focusses on the loss of preferences in the EU. Simulation 3 considers agricultural trade reform within major trading blocs in Africa. Simulation 4 considers the impact of higher productivity in agricultural processing in Africa. Finally, Simulation 5 considers the impacts of SSA's removing all protection, including that of manufacturing and resources goods, against all its trading partners.

Column 1 of Table 5 shows the simulation result from elimination of tariff escalation by SSA's partner countries, reducing their AVE protection for processed goods to the levels of unprocessed goods in the same value chain identified above (e.g., lowering the AVE rate of processed rice to the level of paddy rice) (Simulation 1). SSA's exports of processed goods increase by 114.3 percent while its bulk and horticulture exports decrease slightly by 4.6 percent and 3.5 percent respectively. Overall, SSA's agricultural exports would increase by 39.0 percent.² These results show that tariff escalation in external markets poses substantial barriers for SSA's exports of processed agricultural products. This is despite the fact that tariff escalation in partner markets such as the EU that provide duty-free access to LDCs creates greater incentives for processing in LDCs and any other countries with unconstrained access to these markets. The dramatic increase in exports of processed agriculture from SSA under Simulation 1 suggest that the provisions in the Doha Agenda proposals on reducing tariff escalation (WTO 2008, p 18) may have had very favorable effects on exports of processed agricultural products from Africa. They also make a case for policy makers focusing on this issue in future trade negotiations.

² 5056.8 percent increase in the exports of cattle, sheep, goats, horse meats (cmt) appears to reflect initially very high AVE protection imposed by some partner countries (e.g., Norway) against SSA's exports of this category.

Simulation 2 explores what happens if the SSA loses its preferential access to the EU market for its agricultural goods, with the EU increasing AVE protection against SSA from the preferential rates to those that the EU impose against other suppliers (Columns 2-3 of Table 5). SSA's agricultural exports to the EU would reduce by 14.9 percent which leads to the reduction of its overall agricultural exports by 5.5 percent. As the EU's AVE protection for processed agriculture against non-preferential suppliers is especially high, the loss of preferences would result in a sharp reduction in SSA's exports of processed agricultural products—by 29.9 percent to the EU, and by 12.2 percent to the world.

Simulation 3 investigates the impacts of ECOWAS, COMESA and SADC countries reducing their AVE agricultural protection to zero each other within their regional arrangements (Columns 4-5). The simulation is partly motivated by the potential for regional agricultural trade to contribute to food security by enhancing resilience of Africa's food supply system (Badiane et al 2013). The result shows that the agricultural liberalization within these trade blocs combined would lead to the expansion of intra-SSA agricultural trade by 28.8 percent while SSA's total agricultural exports to the world would increase by 5.1 percent. The results of this simulation reflect the effects of removing agricultural barriers in general, and the tariff escalation within these barriers, and hence result in more rapid growth in exports of processed agricultural products than in total agricultural exports (37.6 percent and 13.1 percent increase in processed agricultural exports to SSA and to the world respectively). They illustrate the important extent to which protection within Africa discourages exports of all agricultural exports.

Simulation 4 explores what would happen if SSA countries increase productivity in processing of agricultural goods by 10 percent (6th column of Table 5). The results reveal that SSA's exports of processed agriculture would expand by 30.3 percent; its exports for bulk and horticulture goods would decrease slightly by 2.5 percent and by 1.9 percent; and its overall agricultural exports would expand by 9.6 percent. This simulation result is consistent with the literature on high productivity associated with exports and highlights the importance of improving the productivity of agricultural processing activities for expansion of these exports. This simulation understates the long run impacts of raising productivity in these sectors because many such activities do not currently exist—either because of low productivity or because of the cost-raising impact of domestic protection or the profitability-reducing impact of tariff escalation

in export markets. Because the modeling framework that we use does not allow for the emergence of new activities, it misses the extensive-margin impact of increases in productivity, where higher productivity causes new activities to emerge.

Simulation 5 involves complete liberalization of import barriers in African countries and, perhaps not surprisingly, it leads to a much larger increase in total exports than any of the other simulations. Because processing agricultural products is typically a low-margin activity, we had anticipated that it might also result in a large increase in the share of agricultural exports shipped in processed form. Three effects on processing removing all import protection can be anticipated: (i) the removal of each country's own tariff escalation is likely to reduce production of processed goods for domestic markets; (ii) the removal of tariff escalation by African partners increases opportunities for processing; and (iii) reductions in the costs of inputs used into processing would be expected to expand processing for both domestic and export markets. The model results point to an increase in processed agricultural exports relative to bulk and horticultural exports, suggesting that the reduction in production costs and in market access opportunities outweigh the reduction in incentives to process for domestic markets. However, the increase in agricultural exports is not much larger than the increase in overall exports.

Table 5 Simulation Results: Trade Effects

		Sim 1	Sim 2		Sim 3		Sim 4	Sim 5
		<u>To Wld</u>	<u>To EU</u>	<u>To Wld</u>	<u>SSA</u>	<u>To Wld</u>	<u>To Wld</u>	<u>To Wld</u>
1 pdr	Paddy rice	-9.87	-22.14	-2.96	9.01	-5.76	-5.76	9.05
2 wht	Wheat	-7.46	-61.76	-3.08	3.87	-3.24	-3.24	-16.05
3 gro	Cereal grains nec	-1.54	-5.70	-0.44	2.95	-0.59	-0.59	1.76
4 v_f	Vegetables, fruit, nuts	-3.46	-8.58	-3.30	17.42	-1.89	-1.89	4.32
5 osd	Oil seeds	-5.63	1.31	1.09	6.36	-3.21	-3.21	5.16
6 c_b	Sugar cane, sugar beet	-7.21	1.30	1.96	1.42	-4.40	-4.40	8.80
7 pfb	Plant-based fibres	-3.83	0.48	0.67	4.42	-1.92	-1.92	6.21
8 ocr	Crops nec	-5.69	-4.92	-1.73	14.10	-3.03	-3.03	7.06
9 ctl	Cattle, sheep, goats, horses	3.00	-7.04	0.20	2.36	-1.10	-1.10	2.60
10 oap	Animal products nec	2.78	-5.92	-1.08	10.74	0.93	0.93	3.24
11 rmk	Raw milk	-10.48	1.94	1.61	0.00	0.81	0.81	13.71
12 wol	Wool, silk-worm cocoons	-9.48	1.92	1.96	2.02	-0.33	-0.33	26.47
13 fsh	Fishing	-2.80	-1.45	-0.65	16.24	-1.08	-1.08	4.09
14 cmt	Meat: cattle, sheep, goats, horse	5056.80	-95.74	-28.99	48.44	77.81	77.81	8.88
15 omt	Meat products nec	34.23	-72.99	-12.08	67.06	80.20	80.20	3.02
16 vol	Vegetable oils and fats	35.31	-13.27	-1.90	52.56	50.95	50.95	10.16
17 mil	Dairy products	194.54	-75.59	-6.03	90.31	45.98	45.98	36.78
18 pcr	Processed rice	22.76	-50.50	-4.88	38.38	34.96	34.96	3.25
19 sgr	Sugar	60.62	-83.72	-52.15	54.57	37.01	37.01	29.03
20 ofd	Food products nec	-1.82	-21.19	-9.77	29.66	28.63	28.63	7.71
21 b_t	Beverages and tobacco products	-0.49	-4.93	-1.48	20.33	7.87	7.87	7.94
22 Others	Manufactures, resources, services	-2.96	0.41	0.38	-0.18	-1.36	-1.36	9.45
Total	Total	1.10	-2.05	-0.19	4.91	-0.30	-0.30	9.27

Summary of Agricultural Exports Changes (%)

	<u>To Wld</u>	<u>To EU</u>	<u>To Wld</u>	<u>Intra-SSA</u>	<u>To Wld</u>	<u>To Wld</u>	<u>To Wld</u>
Bulk	-4.58	-4.60	-1.04	8.24	0.28	-2.48	6.36
Horticulture	-3.46	-8.58	-3.30	17.42	1.48	-1.89	4.32
Processed Agriculture	114.27	-29.86	-12.20	37.57	13.08	30.31	10.50
Total Agricultural Exports	38.96	-14.91	-5.48	28.81	5.14	9.58	7.54

Source: Authors' simulation

Policy Questions

The decision on whether to export a raw agricultural product should still be based solely on the economics of the value-adding process. If, for instance, coffee may be exported in fresh or roasted form, the decision on whether to undertake the roasting stage should depend only on the costs and returns associated with undertaking that stage. The “great unbundling” means, however, that other countries may well have become competitors for the bean-producing country in roasting the coffee. Naïve calculations that consider only the value of the roasted beans relative to the value of the raw beans—without considering the costs of the processing phase—are insufficient as a basis for deciding whether to undertake the processing phase in the producing country.

In general, it seems sensible for policy makers to delegate to producing and processing firms the decisions about whether to undertake particular stages of production, and to focus on providing an enabling environment in which producers will be able to take advantage of those opportunities that generate positive value added. Only producing firms are likely to have the information needed to assess whether it will pay them to undertake additional processing. However, it is now much more important for governments to keep channels of communication open in order to identify when particular constraints that might be relaxed are preventing the emergence of particular processing stages in the country. If there are, for example, high tariffs on inputs needed in the production process, this may turn out to make it uneconomic to process the good domestically even though doing so would add value at world prices. Or costs associated with customs clearance and domestic transport may make it uneconomic for firms to process the good. In this situation, governments face important policy choices. Can they, and should they, reduce some of these costs to enable firms to undertake processing operations that would be economically worthwhile?

Vulnerability to excess costs is particularly acute for processing activities because these activities frequently operate on small margins relative to, say, production of a traditional export. Traditional exports such as coffee frequently embody a particularly large share of rents that can be dissipated—particularly in the short term—without the activity shutting down. Consider, for example, the decision whether to export live cattle or chilled, boxed, deboned beef. The livestock

herder is likely to be cash poor and willing to sell cattle even if the price is quite far below the expected level and to be little affected by distortions in input markets. By contrast, the returns from slaughtering, boning and packing beef are likely to be quite small relative to the cost of the animal and the needed intermediate inputs. If, for example, the beef from a \$100 animal is valued at \$150 on the world market and intermediate inputs and labor costs account for \$35 of the \$50, increases in the cost of intermediate inputs or labor could easily wipe out the needed returns from processing and either block the emergence of this activity or cause it to shut down.

If we find that high tariffs and other charges on intermediate inputs result in negative value added (at market prices) in at least some processing activities, the disincentive to undertaking these activities may result in economically desirable processing not being undertaken. If the government wishes, it may deal with these problems either by reforming its tariffs and customs regimes, or by specific export-focused policy responses such as providing duty exemptions on intermediates used in the production of exports. There is no need to undertake negotiations with trading partners.

Another potential cause of failure to undertake desirable processing actions arises from distortions imposed by trading partners. A key challenge for processing in developing countries arises from tariff escalation in importing markets. In this situation, the tariff in the importing market is low on raw materials, higher on intermediates and highest on final consumer goods. This policy option creates—and typically is intended to create—incentives to undertake processing in the importing country and to discourage processing in the exporting country. Such incentives could be countered by the exporting country, but this action would surely be difficult to undertake successfully. However, information on the extent of such tariff escalation is likely to be useful background for tariff negotiations.

The impact of tariff escalation is likely to be turned on its head when considering exporters which have access to effective preferences for raw and processed products. If we assume that processing a good adds 20 percent to its initial value, then a tariff margin of 20 percent between the raw and the processed form of a product creates a 100 percent effective rate of protection on the processing activity. Under a non-discriminatory tariff regime, this assistance is provided to processors in the importing country. If this tariff applies against imports of most

producers but some small producers receive a tariff preference, the 20 percent effective rate of protection may be available to processors in the exporting market. Comparison of the mix of processing in preference and non-preference receiving exporters may provide some indication of the effectiveness of the preference regime in creating incentives for additional processing in exporting countries.

The challenge of developing new exports from Africa is both vitally important and very challenging. Some of the barriers that have been identified—such as geography and landlocked status (Freund and Rocha 2011) are difficult to address. Others, however, such as the slow customs procedures and transit times emphasized by Freund and Rocha (2011) are more amenable to policy action. The stylized fact emerging from the recent literature on exporting firms that a small number of highly-productive firms generally dominate exporting activities (Bernard et al 2007) allays the concerns expressed by Hausmann and Rodrik (2003) that firms investing in costly discovery of successful exports lose the returns from export success through entry of copycat firms.

In this situation, it seems vitally important to create a situation in which firms can invest in discovery of new opportunities. Approaches to creating incentives for innovative exports by providing protection to sales on the domestic market appear to have little applicability in Africa. Large domestic markets for these products only rarely exist, and even if they do, are likely to become saturated relatively rapidly, leaving innovators with low returns on their investment. While export subsidies for developing countries are only loosely constrained by WTO rules (Creskoff and Walkenhorst 2009)—and are almost unconstrained for LDCs and countries with incomes below \$1000—the fiscal costs of such export subsidies are likely to be very high. Fiscal problems are likely to arise with the third policy option considered by Hausmann and Rodrik (2003, p630)—the provision of grants and subsidies to chosen firms. If these subsidies are large enough to make a difference, they are likely to be very costly. Further, Farole (2011, p173) finds that these incentives are associated with poorer performance in African economic zones.

By contrast, the approach of providing a relatively level playing field on which exporters can experiment in order to identify successful exports seems extremely promising. One approach to providing an environment for experimentation is to allow exporters to access intermediate

inputs for use in production of exports at world prices. Such a duty exemption or duty drawback system reduces the burden imposed by a country's own protection regime and reduces the inefficiency associated with the country's trade regime by eliminating the negative effective rates of protection resulting from exporters having to pay import duties on their intermediate inputs while receiving no protection on their outputs. Given the low margins inherent in many processing activities, this problem of negative protection can frequently explain the absence of many highly-productive export activities. They were a central feature of China's economic reforms, allowing exporters to identify and become highly productive in a wide range of labor-intensive activities (Ianchovichina 2004). Duty exemptions, under which duties are waived on imported inputs subject to subsequent verification of their incorporation in exports, are strongly preferred by exporters to duty drawbacks where duties must be paid and are—in principle—refunded on export of the final good.

A related export facilitation mechanism needed in countries applying a Value Added Tax (VAT) is a refund of the VAT paid on intermediate inputs used in the production of exports. This is an inherent feature of any destination VAT and not a special export processing incentive. It, like a duty exemption arrangement, is fully consistent with WTO rules on subsidies (Creskoff and Walkenhorst 2009).

Duty exemptions and VAT refund mechanisms are frequently part of more comprehensive export promotion mechanisms such as Special Economic Zones (Farole 2011). Special Economic Zones (SEZs) frequently involve other features such as improved infrastructure, and a different regulatory environment from the rest of the economy. Frequently, this environment is designed to attract foreign direct investment. Collier and Page (2009) point to strong advantages if they are located in geographically-favored regions near infrastructure. Farole (2011, ch 8) finds that African zones have encountered difficulties in a number of areas, including: unreliability of power supply relative to Asian zones; slow customs procedures; and wage rates that are high relative to labor productivity.

The high wage rates relative to productivity seem surprising given the very low incomes prevailing in much of sub-Saharan Africa. This may reflect some sort of insider-outsider distinction that results in relatively high wage rates and high output per firm for a relatively small

volume of output and level of employment. Using Farole's (2011, Table 8.2) numbers on output per person in the zones and adding 2014 GDP per person, it appears that wage rates in the African country zones are almost 90 percent of wage rates in his four comparator countries, even though GDP per capita, and hence likely the opportunity cost of labor to the zone, is only 42 percent of the level in the comparator countries. The difference is even more stark with the two highly-successful Asian comparators—Bangladesh and Vietnam—where wages average less than half the African rate even though national incomes are higher.

Table 6. Output per worker and the cost of labor in zones, and GDP per capita.

	<u>Output/worker</u>	<u>Wage</u>	<u>GDP/cap</u>
Bangladesh	11,715	46	1087
Dominican Republic	45,063	225	6164
Honduras	37,921	313	2435
Vietnam	15,167	102	2052
Average	27,467	172	2,934
Ghana	37,294	118	1442
Kenya	13,646	117	1358
Lesotho	9,913	150	1034
Senegal	12,433	225	1067
Average	18,322	153	1,225

Source: Farole (2011, Table 8.2) and World Development Indicators for GDP/capita for 2014.

Following his detailed consideration of SEZs in Africa, Farole recommends that African policy makers consider processing of agricultural and resource exports in addition to labor intensive manufactures that have been the focus of export processing activities in Asia. It seems to us that this may be a part—but surely only a part—of the solution to the problem of stimulating a take-off of new exports from Africa.

Drawing on the lessons of recent decades, it seems more likely to us that deep, sustained growth in exports from Sub-Saharan Africa will result from policies that provide as much scope as possible for entrepreneurs to search and discover in the sense suggested by Hausmann and Rodrik (2003) the products that will be the highly-successful exports of the future. Making sure that a wide range of potential exporters have access to the intermediate inputs they need seems likely to substantially expand the range of products with which potential exporters can

experiment. Current, generally closed, Special Economic Zones do not seem to have worked very well in doing this, despite the provision of duty exemptions on intermediates, improved infrastructure and fiscal incentives. Perhaps one way to overcome these challenges is to draw from China's experience and to extend the most important of these incentives—the duty exemptions for intermediates used in the production of exports—to export processors of all kinds throughout each country. Once processors of agricultural products, along with producers of other potential exports, have access to intermediates at world prices and to labor and other inputs at domestic prices, their experimentation is likely to lead to identification of exports that will become the future “big hits” and mainstays of much higher levels of future exports.

Conclusions

The recent focus on the potential for agricultural processing and horticultural exports as growth engines for Africa appears to be driven in part by pessimism about the prospects for growth of manufacturing exports of the type that have been so stunningly successful in driving export growth from many Asian countries. Key questions include whether this pessimism is warranted, and whether these exports can become the engine of growth so much needed to promote African development.

New developments in economics have given us new insights into the growth of exports that are highly relevant for analysis of this question. We now know that exports of any country tend to be dominated by a relatively small number of products, often exported to a relatively small number of markets (Easterly and Reshef, 2009, 2010), and frequently by a small number of highly-productive firms. This reduces the concerns that have been expressed by authors such as Hausmann and Rodrik (2003) about the risk that innovators will not be able to recoup their fixed costs of discovery because of excessive entry of imitators.

When we look at the pattern of exports from African countries, we find that the share of agricultural exports has declined to around 10 percent of the total, somewhat less than the 12 percent of exports accounted for by nonfactor services. While this share is 50 percent greater than the share of agriculture in global exports, it remains a very small share on which to build if the goal is to stimulate dramatic growth in exports through exports of horticultural or processed agricultural products. Within agricultural exports, the share of traditional, bulk agricultural

exports has fallen sharply, from 60 to 35 percent, although this is now twice the share of these exports in global trade. Where Africa does stand out is in the share of horticultural products in total exports—over 22 percent of agricultural exports in 2014 as against 15 percent for the world as a whole.

The relatively low—but rising—share of processed agricultural export from Africa may reflect the relatively low incomes in African countries. When we plot the share of value added of processed agriculture relative to total agriculture in Africa against real incomes, we find no need for an Africa-specific explanation. Most of the observations are distributed around a rising trend. When we look at the share of exports, African exports of processed products relative to total agricultural exports also seem to follow the same broad relationship as other countries, in this case a quadratic response to income growth.

Simulation analysis is used to examine the response of processed agricultural exports from Africa to changes in protection rates and productivity growth in processing. The results suggest that tariff escalation in export markets has powerful impacts. Cutting protection on processed products in export markets would substantially increase exports of processed products from Africa. Cutting domestic protection within Africa would similarly increase exports of processed agricultural products.

Our overall assessment is that increased exports of processed agricultural products could be a worthwhile contributor to an overall upturn in African agricultural exports. Horticultural products could also contribute to such a turnaround. However, our view is that policy makers should think much more broadly. The best way to prime the pump for a surge in agroprocessed and horticultural exports is likely to be by ensuring the exporters face much less of the discrimination against exports that is inherent in the current trade regime in Africa. Reducing this discrimination against exports—ideally by reducing protection, but perhaps initially by ensuring that all exporters have access to intermediates at world prices—is likely to stimulate growth not only in these exports but in a wide range of other exports as entrepreneurs discover what exports best use the country's skills and resources.

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Appendix Table A1. Composition of Top 20 Exports at the Country Level 2013 (\$1,000)

Uganda					Tanzania				
Rank	HS6	Name	Cat	2013	HS6	Name	Cat	2013	
1	90111	Coffee, not roasted :-- Not decaffe	B	424457	80131	Cashew nuts :-- In shell	H	164905	
2	30410	Fish fillets and other fish meat	P	95614	90111	Coffee, not roasted :-- Not decaffe	B	160405	
3	240120	Unmanufactured tobacco; tobacco ref.	B	84114	120740	Sesamum seeds	B	124540	
4	170199	Other Cane or beet sugar	P	67766	240120	Unmanufactured tobacco; tobacco refuse.	B	91551	
5	90240	black tea (fermented) and others	B	59013	170199	Other Cane or beet sugar	P	69502	
6	180100	Cocoa beans, raw or roasted.	B	54833	71310	Peas (Pisum sativum)	H	57097	
7	151620	Vegetable fats and oils	P	47259	90240	black tea (fermented) and others	B	54306	
8	151190	Other Palm oil and its fractions	P	40342	30490	Fish fillets and other fish meat	P	46831	
9	240110	Tobacco, not stemmed/stripped	B	30852	90700	Cloves (whole fruit, cloves and ste	H	43061	
10	110100	Wheat or meslin flour.	P	29745	30420	Frozen fillets	P	39578	
11	60240	Roses, grafted or not	H	28715	110100	Wheat or meslin flour.	P	38740	
12	120740	Sesamum seeds	B	28459	30410	Fish fillets and other fish meat	P	27436	
13	60210	Other live plants (including roots)	H	25750	230630	Of sunflower seeds	P	24942	
14	220300	Beer made from malt.	P	23698	170191	Cane or beet sugar	P	24939	
15	90230	Black tea (fermented) and partly fe	B	22871	240290	Cigars, cheroots, cigarillos and cigarettes	P	23524	
16	100640	Broken rice	B	18850	80132	Cashew nuts :-- Shelled	H	23269	
17	100510	Maize (corn) seed	B	18501	180100	Cocoa beans, raw or roasted.	B	16361	
18	100630	Semi-milled or wholly milled rice,	P	17733	120799	Other oil seeds and oleaginous fruits	B	15879	
19	30559	Dried fish, whether or not salted b	P	16646	71390	Dried leguminous vegetables	P	14517	
20	110220	Maize (corn) flour	P	15387	60210	Other live plants (including their roots)	H	14164	

Rwanda					Nigeria				
Rank	HS6	Name	Cat	2013	HS6	Name	Cat	2013	
1	90111	Coffee, not roasted :-- Not decaffe	B	49884	180100	Cocoa beans, raw or roasted.	B	1542736	
2	90240	Black tea (fermented) and others	B	41906	120740	Sesamum seeds	B	842682	
3	90230	Black tea (fermented) and partly ferm	B	19678	180400	Cocoa butter, fat and oil.	P	269928	
4	220300	Beer made from malt.	P	17770	80131	Cashew nuts :-- In shell	H	238217	
5	110100	Wheat or meslin flour.	P	13241	100190	Other wheat and meslin.	B	194321	
6	170199	Other Cane or beet sugar	P	9565	30613	Frozen :-- Shrimps and prawns	P	169411	
7	151620	Vegetable fats and oils	P	7255	240220	Cigarettes containing tobacco	P	163479	
8	10290	Other Live bovine animals.	B	7149	60390	Other cut flowers and flower buds	H	153789	
9	100630	Semi-milled or wholly milled rice,	P	7067	40229	Powdered milk or cream	P	124572	
10	110220	Maize (corn) flour	P	6606	180310	Cocoa paste, not defatted.	P	115512	
11	220290	Waters, including mineral waters	P	6588	91010	Ginger	H	94213	
12	100640	Broken rice	B	5212	180200	Cocoa shells, husks, skins and other	P	69742	
13	121190	Plants and parts of plants	H	4052	190220	Stuffed pasta, whether or not cooked	P	55203	
14	190530	Sweet biscuits; waffles and wafers	P	3252	40221	Powdered Milk & cream	P	55002	
15	90190	Coffee, whether or not roasted	B	2305	130120	Gum Arabic	P	53994	
16	100590	Other Maize (corn)	B	2145	30379	Frozen fish , excluding fish fillets	P	46513	
17	110290	Cereal flours other than wheat.	P	1964	80132	Cashew nuts :-- Shelled	H	43051	
18	110311	Groats and meal :-- Of wheat	P	1548	200819	Nuts, ground-nuts and other seeds,	H	42560	
19	70820	Beans (Vigna, Phaseolus spp.)	H	1428	220210	Waters, including mineral waters an	P	30942	
20	210320	Tomato ketchup & other tom sauce	P	1244	120799	Other oil seeds and oleaginous fruits	B	24666	

Cote d'Ivoire					Ethiopia				
Rank	HS6	Name	Cat	2013	HS6	Name	Cat	2013	
1	180100	Cocoa beans, raw or roasted.	B	2044456	90111	Coffee, not roasted	B	770618	
2	180310	Cocoa paste, not defatted.	P	544008	70990	Other vegetables, fresh or chilled.	H	558771	
3	80131	Cashew nuts :-- In shell	H	312280	60310	Fresh cut flowers	H	527056	
4	180400	Cocoa butter, fat and oil.	P	265603	120740	Sesamum seeds	B	494808	
5	90111	Coffee, not roasted :-- Not decaff	B	173731	10290	Other Live bovine animals.	B	215168	
6	180200	Cocoa shells, husks, skins& other	B	171447	71333	Beans (Vigna spp., Phaseolus spp.)	H	149442	
7	80300	Bananas, incl plantains, fresh	H	151247	10600	Other live animals.	B	73595	
8	151190	Other Palm oil & its fractions	P	147819	20450	Meat of goats	P	63640	
9	180500	Cocoa powder, not containing added	P	88121	60210	Other live plants (including roots)	H	62582	
10	210111	Extracts, essences and concentrates	P	87906	10410	Sheep	B	47550	
11	240310	Smoking tobacco, whether or not con	P	53188	71320	Dried leguminous vegetables	P	40711	
12	151110	Palm oil and its fractions	P	40337	120799	Other oil seeds & oleaginous fruits	B	31387	
13	190219	Uncooked pasta	P	36147	70190	Potatoes, fresh or chilled.	H	30916	
14	210410	Soups and broths and preparations	P	33670	71350	Broad beans (Vicia faba var.major)	H	24266	
15	110100	Wheat or meslin flour.	P	30865	120100	Soya beans, whether or not broken.	B	23463	
16	80132	Cashew nuts :-- Shelled	H	27138	71390	Dried leguminous vegetables	H	18605	
17	80430	Pineapples	H	19265	91010	Ginger	H	13554	
18	120720	Cotton seeds	B	16959	130190	Lac; natural gums, resins	H	12185	
19	170199	Other Cane or beet sugar	P	12636	230640	Oil-cake & other solid residues	P	10454	
20	80450	Guavas, mangoes and mangosteens	H	11864	70200	Tomatoes, fresh or chilled.	H	9765	

Ghana				
Rank	HS6	Name	Category	2013
1	180100	Cocoa beans, raw or roasted.	B	1380501
2	80131	Cashew nuts :-- In shell	H	232581
3	80132	Cashew nuts :-- Shelled	H	184282
4	151329	Palm kernel or babassu oil & frac	P	104550
5	180400	Cocoa butter, fat and oil.	P	65701
6	120740	Sesamum seeds	B	33448
7	151110	Palm oil, whether or not refined	P	31851
8	120810	Flours & meals of oil seeds or fruits	P	24416
9	120799	Other oil seeds & oleaginous fruits	B	20340
10	71490	Manioc, Jerusalem artichokes	H	19710
11	220890	Other ethyl alcohol	P	18750
12	80290	Other nuts, fresh or dried	H	16292
13	151190	Other Palm oil and its fractions	P	15867
14	220850	Gin and Geneva	P	15085
15	190110	Malt extract	P	14596
16	151710	Margarine, excl liquid margarine	P	14435
17	151321	Palm kernel or babassu oil & frac	P	12674
18	151590	Other fixed vegetable fats & oils	P	11184
19	220720	Ethyl alcohol & other spirits	P	11163
20	200811	Nuts, ground-nuts & other seeds,	H	7739

Source: Merchandise export data from COMTRADE, accessed through World Integrated Trade Solutions (WITS).

Note: *¹ B, H and P represent bulk, horticulture and Processed agriculture respectively.

Appendix Table A2. List of Bottom 2 percent Items Which Made Top Twenty List in 2013

Uganda								
HS6	Name	Category	Average of 1996, 1997, 1998			2013		
			Exports (\$1,000)	Share (%)	Rank	Exports (\$1,000)	Share (%)	Rank
170199	Other Cane or beet sugar	P	72	0.016	92	67766	4.85	4
60210	Other live plants (including their roots), cuttings and slips	H	155	0.035	66	25750	1.84	13
220300	Beer made from malt.	P	162	0.037	65	23698	1.70	14
100640	Broken rice	B	171	0.038	62	18850	1.35	16
100630	Semi-milled or wholly milled rice,	P	116	0.026	75	17733	1.27	18

Tanzania								
HS6	Name	Category	Average of 1997, 1998 1999			2013		
			Exports (\$1,000)	Share (%)	Rank	Exports (\$1,000)	Share (%)	Rank
230630	Oil cake of sunflower seeds	P	170	0.039	82	24942	1.85	13
170191	Cane or beet sugar and chemically pure sucrose, in solid form.	P	0	0.000		24939	1.85	14
240290	Cigars, cheroots, cigarillos and cigarettes	P	40	0.009	156	23524	1.75	15
120799	Other oil seeds and oleaginous fruits	B	23	0.005	192	15879	1.18	18
71390	Dried leguminous vegetables, shelled, whether or not skinned	P	51	0.012	136	14517	1.08	19

Rwanda								
HS6	Name	Category	Average of 2001, 2002, 2003			2013		
			Exports (\$1,000)	Share (%)	Rank	Exports (\$1,000)	Share (%)	Rank
90240	black tea (fermented) and others	B	2	0.008	37	41906	18.56	2
90230	Black tea (fermented) and partly fermented	P	0	0.000		19678	8.72	3
220300	Beer made from malt.	P	5	0.017	31	17770	7.87	4
110100	Wheat or meslin flour.	P	0	0.000		13241	5.87	5
170199	Other Cane or beet sugar	P	28	0.092	17	9565	4.24	6
151620	Vegetable fats and oils and their f	P	11	0.036	26	7255	3.21	7
10290	Other Live bovine animals.	B	0	0.000		7149	3.17	8
100630	Semi-milled or wholly milled rice,	P	0	0.000		7067	3.13	9
110220	Maize (corn) flour	P	0	0.000		6606	2.93	10
121190	Plants and parts of plants (including seeds and fruits)	H	4	0.012	34	4052	1.79	13
190530	Sweet biscuits; waffles and wafers	P	4	0.012	35	3252	1.44	14
90190	Coffee, whether or not roasted or decaffeinated	B	0	0.000		2305	1.02	15
100590	Other Maize (corn)	B	2	0.007	38	2145	0.95	16
110290	Cereal flours other than of wheat or meslin.	P	0	0.000		1964	0.87	17
110311	Groats and meal :-- Of wheat	P	0	0.000		1548	0.69	18
70820	Beans (Vigna spp., Phaseolus spp.)	H	0	0.000		1428	0.63	19
210320	Tomato ketchup and other tomato sau	P	16	0.053	21	1244	0.55	20

Nigeria								
HS6	Name	Category	Average of 1999, 2000, 2001			2013		
			Exports (\$1,000)	Share (%)	Rank	Exports (\$1,000)	Share (%)	Rank
240220	Cigarettes containing tobacco	P	2	0.005	103	163479	3.41	7
60390	Other cut flowers and flower buds	H	0	0.000		153789	3.20	8
180310	Cocoa paste, not defatted.	P	0	0.000		115512	2.41	10
180200	Cocoa shells, husks, skins and others	P	0	0.000		69742	1.45	12
190220	Stuffed pasta, whether or not cooke	P	0	0.000		55203	1.15	13
30379	Frozen fish , excluding fish fillets	P	0	0.001		46513	0.97	16
80132	Cashew nuts :-- Shelled	H	1	0.002	130	43051	0.90	17
200819	Nuts, ground-nuts and other seeds,	H	0	0.000		42560	0.89	18
220210	Waters, including mineral waters an	P	8	0.019	73	30942	0.64	19
120799	Other oil seeds and oleaginous fruits	B	2	0.005	101	24666	0.51	20

Cote d'Ivoire

HS6	Name	Category	Average of 2001, 2003, 2004			2013		
			Exports (\$1,000)	Share (%)	Rank	Exports (\$1,000)	Share (%)	Rank
110100	Wheat or meslin flour.	P	242	0.009	87	30865	0.70	15
80132	Cashew nuts :-- Shelled	H	808	0.031	54	27138	0.61	16

Ethiopia

HS6	Name	Category	Average of 2001, 2002, 2003			2013		
			Exports (\$1,000)	Share (%)	Rank	Exports (\$1,000)	Share (%)	Rank
70990	Other vegetables, fresh or chilled.	H	1	0.000	234	558771	16.90	2
60310	Fresh cut flowers	H	152	0.043	61	527056	15.94	3
10290	Other Live bovine animals.	B	130	0.036	65	215168	6.51	5
10600	Other live animals.	B	132	0.037	64	73595	2.23	7
60210	Other live plants (including their roots), cuttings and slips	H	0	0.000		62582	1.89	9
120100	Soya beans, whether or not broken.	B	65	0.018	84	23463	0.71	15
71390	Dried leguminous vegetables, shelled	H	110	0.031	72	18605	0.56	16
230640	Oil-cake and other solid residues	P	0	0.000		10454	0.32	19

Ghana

HS6	Name	Category	Average of 2003, 2004, 2005			2013		
			Exports (\$1,000)	Share (%)	Rank	Exports (\$1,000)	Share (%)	Rank
151329	Palm kernel or babassu oil c	P	57	0.004	155	104550	4.47	4
120740	Sesamum seeds	B	348	0.027	67	33448	1.43	6
120810	Flours and meals of oil seeds or oleaginous fruits	P	57	0.005	153	24416	1.04	8
220890	Other ndenatured ethyl alcohol	P	4	0.000	292	18750	0.80	11
80290	Other nuts, fresh or dried, whether or not shelled or peeled.	H	107	0.008	120	16292	0.70	12
220850	Gin and Geneva	P	84	0.007	132	15085	0.64	14
151321	Palm kernel or babassu oil	P	10	0.001	248	12674	0.54	17
220720	Ethyl alcohol and other spirits, de	P	10	0.001	250	11163	0.48	19

Source: Merchandise export data from COMTRADE, accessed through World Integrated Trade Solutions (WITS).

Note: *¹ B, H and P represent bulk, horticulture and Processed agriculture respectively