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Agro-processing and horticultural exports from Africa

Emiko Fukase[1] and Will Martin[2]

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Abstract: Sub-Saharan African exports of horticultural and processed agricultural products are growing in line with the major shift towards these products in world markets. Continued growth in these exports may be vitally important for expanding returns from African agriculture and for increasing its overall exports. 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 and beyond would all further stimulate exports of processed agriculture. While essential, expansion of these exports should be regarded as complements to—rather than substitutes for—development of other dynamic export sectors.

[1] World Bank, Washington DC, United States; [2] International Food Policy Research Institute, Washington DC, United States, corresponding author: w.martin@cgiar.org.

1   Introduction

Agricultural exports from Sub-Saharan Africa (SSA)[1] include a much larger share of bulk agricultural exports than is the norm on world markets where processed products have come to dominate. In looking at how Africa might move beyond traditional bulk exports and the resource-based exports which are also disproportionately important in Africa, a few questions appear to be key. Should African exports move into labour-intensive manufactures of the type that have dominated the export-led growth of Asian economies from Hong Kong, Korea, and Taiwan (China), through China, Bangladesh, Cambodia, and Vietnam (Page 2012; Newman et al. 2016b)? Should they pursue alternative approaches such as adding value to existing agricultural exports, or developing new high-value agricultural exports? Or should policy makers undertake strategies to encourage entrepreneurs to 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)?

While it is well known that the share of the agricultural sector in an economy typically declines with economic growth, it is less known that the share of the agro-processing sectors in GDP tends to increase as local consumption shifts from raw, starchy staple foods to foods such as vegetables, fruits, and meats and as food consumed comes to embody more services (da Silva et al. 2009). We examine whether SSA is following this pattern and whether agricultural exports from Africa are moving from bulk products to processed and horticultural goods. Given SSA's current income, is this an area in which Africa is lagging and potentially large gains can be made? Or are African exporters already acting to exploit potential gains?

Export growth is vitally important for a wide range of reasons, as it promotes economic growth, creates jobs (Fukase 2013), and is a source of the foreign exchange needed to import goods that cannot readily be produced locally. Domestic and international policies, however, influence both the level and the mix of products that are traded. In recent years, the 'trade in tasks' in the new wave of globalization (Baldwin 2006) appears to have been creating new opportunities for African countries to tap into export markets, as they enjoy a number of location-specific comparative advantages. How should African governments act to influence the development of non-traditional exports such as those from agro-processing operations, and/or high-value export crops such as horticultural products?

This paper analyses the principal features of agro-processing and horticultural exports from SSA and explores policy alternatives based on simulation analyses. We first provide a conceptual section focusing on changing patterns of processing and exports (section 2). We then turn to examine how the pattern of exports from Africa compares with the pattern in other regions (section 3). Following that, we examine the directions of trade in African agricultural exports and the patterns of protection facing, and imposed by, African countries (section 4). Next, we turn to simulation exercises to examine the impacts of potential reforms on exports of processed and horticultural exports from Africa (section 5). With this as background, we turn to consider the options for policy makers in Africa (section 6). The final section presents a brief conclusion (section 7).

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[1] The focus of this paper is SSA countries. Throughout the paper, we use the terms 'SSA' and 'Africa' interchangeably.

2 Changing patterns of processing and exports

Prior to the Industrial Revolution and 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 processes 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 produced 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 plans and prototypes of processing plants from other countries were available, it frequently proved difficult to operate them successfully (Hausmann and Rodrik 2003).

During this first phase of globalization, 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: cotton ginning; 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, changes in the costs and allocation of factors have created new opportunities for developing countries in both industrial production and further processing of agricultural commodities. Lower transport and communication costs and increased mobility of people have made it possible for more parts of the production process to 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 yarn and fabric (likely using blends of cotton and other fibres) in China; assembling garments

in Bangladesh; and enabling the transfer of information, such as the designs for clothes and the authorization of production samples, to take place over great distances. To exploit cost advantages created by these developments, firms from more advanced countries are increasingly 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 has opened up opportunities for developing countries not available under the earlier approach to industrialization. Countries such as China, Vietnam, and Bangladesh have developed export-oriented manufacturing systems that are deeply engaged in this production system. Thailand has been very active in agro-processing, frequently using domestically produced products, but sometimes using imported inputs. This approach involves an important change in policy mindset from the traditional approach. In Eat Asia, it is a dynamic process—frequently termed the flying-geese model—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.

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 rapidly. Unhappiness about this approach to development appears to be emerging in high-income countries, based on perceptions about loss of manufacturing jobs to developing countries.

The unbundled approach to global value chains involves much greater transfer of materials than the traditional approach and hence is more demanding of logistics than traditional approaches. Issues such as low transport costs and smooth customs clearance become important for the organization of production. Once efficient logistics are in place, however, countries with suitable agro-ecological 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. In this case, the logistics and trade facilitation are also vitally important, given the high costs of delay. African producers of products such as green beans, cut flowers, and fresh fruit appear to have seized some of these opportunities.

A recent advancement of economists' approach in 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 transaction-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 (e.g. Bernard and Jensen 1995), they were quickly confirmed for developing countries (Clerides et al. 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 (Bigsten et al. 2004; Van Biesebroeck 2005; Brambilla et al. 2015). However, there are also indications that firms continue to benefit from learning-by-doing after entering export markets (Bigsten et al. 2004; Mengistae and Pattillo 2004; Van Biesebroeck 2005; Newman et al. 2016a). Mengistae and Pattillo, in particular, find that the

productivity of exporting firms grows 10 per cent 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 provide an opportunity for 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 et al. 2007). Easterly and Reshef (2010) find that exports from several African countries are dominated by a small number of 'big hits' with large export shares.

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 reduce volatility. However, switching from exporting a raw product to exporting the same product in processed form might 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. 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 (da Silva 2009). For this reason, it seems more likely that markets for processed agricultural products will grow more rapidly than markets for raw products when incomes rise in consuming countries. Demand for horticultural products such as tropical fruits and fresh flowers is also likely to grow relatively rapidly as incomes rise, potentially making the exports of these products grow faster than staple agricultural products.

3   Global perspective on agricultural processing and horticultural exports

In this section, we first examine the evolution of exports from SSA and other regions. Figure 1 shows the composition of Africa's exports of goods and services, divided into agriculture, resources, manufactures, and services. Figure 1 reveals the small share of agriculture in African exports at around 10 per cent which is lower than the 12 per cent accounted for by exports of non-factor services. This low share of agriculture in total exports suggests that the opportunities for expanding total exports by processing existing agricultural exports—some of which are already processed—are likely to be more limited than in the case when exports of unprocessed agricultural products account for a large proportion of total exports.

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Figure 1: Export shares from Sub-Saharan Africa
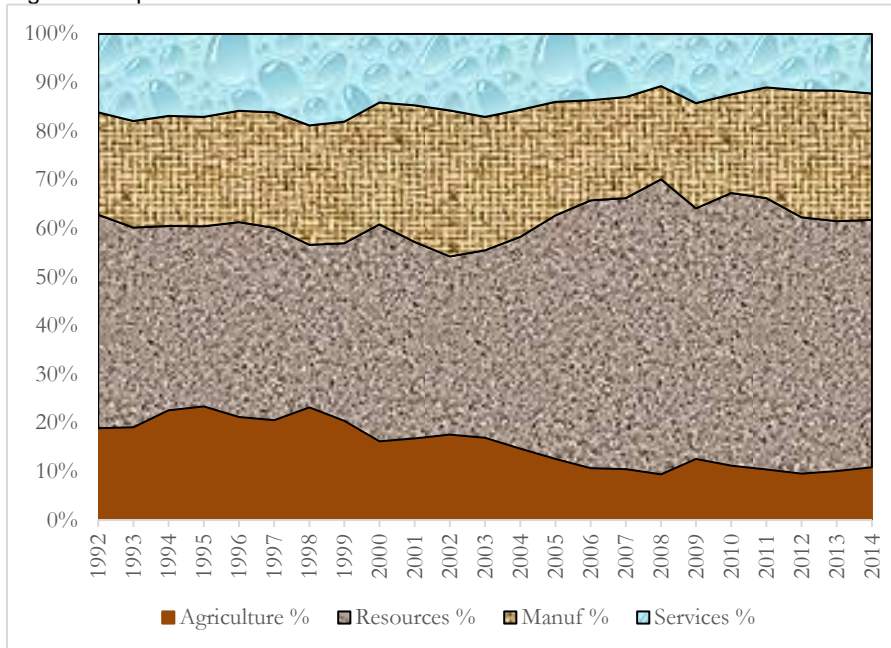
Source: Merchandise export data from COMTRADE, accessed through World Integrated Trade Solutions (WITS) (World Bank 2016a). Exports of Services from World Development Indicators (World Bank 2016b).

Because the relative share of different export categories depends partly on factors such as the prices of agricultural and resource commodities, and on the importance of each good in world trade, we compare the export structure of SSA with global export patterns using an index of Revealed Comparative Advantage (RCA) (Balassa 1965). This index compares shares of exports from SSA with the corresponding global shares. Table 1 indicates that the RCA 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 exporting African countries, 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			
	Agriculture	Resources	Manuf	Services	Agriculture	Resources	Manuf	Services
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 per cent.

Source: Merchandise export data from COMTRADE, accessed through World Integrated Trade Solutions (WITS) (World Bank 2016a). Exports of Services from World Development Indicators (World Bank 2016b).

Between 1988 and 2014, world agricultural exports expanded from US$83.4 billion to US$1,532 billion while SSA's agricultural exports increased from US$2.7 billion to US$44.3 billion (the UN COMTRADE System). As a result, SSA's share in world agricultural exports declined from 3.3 per cent in 1988 to 2.9 per cent in 2014. We distinguish among agricultural products using the Regmi et al. (2005) definitions of bulk, semi-processed, and processed agricultural products, plus horticultural products. As noted by Liapis (2011: 12), 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 geographically linked and could potentially be produced using inputs from other locations. With these 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—decreasing from 25 per cent in 1988 to 17 per cent in 2014. By contrast, processed and semi-processed agricultural products accounted for almost three-quarters of global agricultural exports by 2015. Horticultural exports accounted for around 12 per cent of global agricultural exports in 2014.

For Africa, the corresponding patterns are quite different. The share of bulk agricultural exports also declined, but from around 60 per cent to 42 per cent in 2014, leaving these exports still as a large share of total agricultural exports. The share of processed and semi-processed agricultural products rose, but only to 35 per cent by 2015. The share of horticultural exports rose from around 10 per cent in 1988–89 to 22 per cent in 2014. It seems clear that African exporters are adjusting 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 et al. 2009; Page 2012).
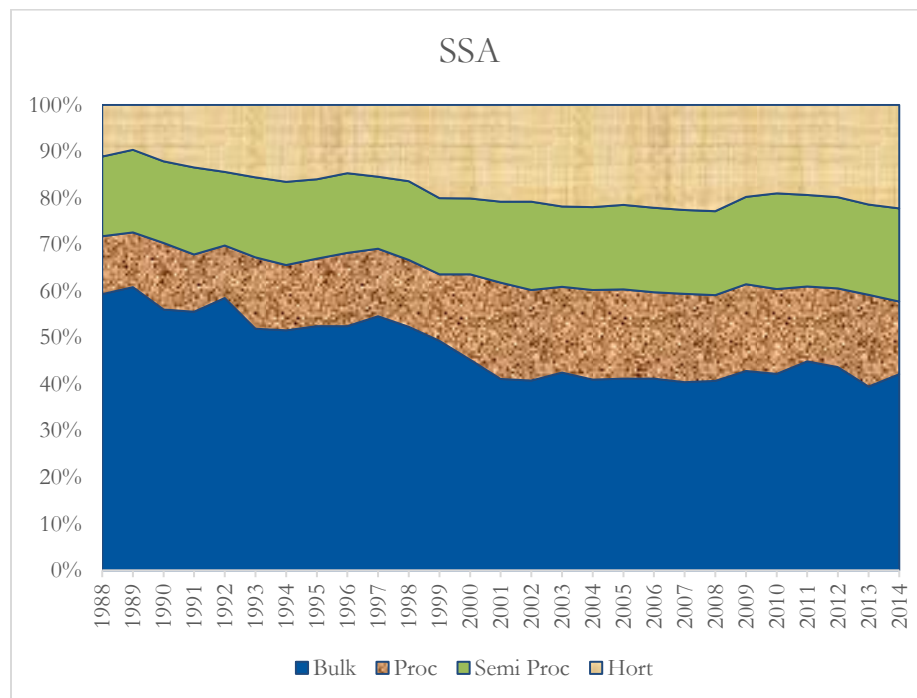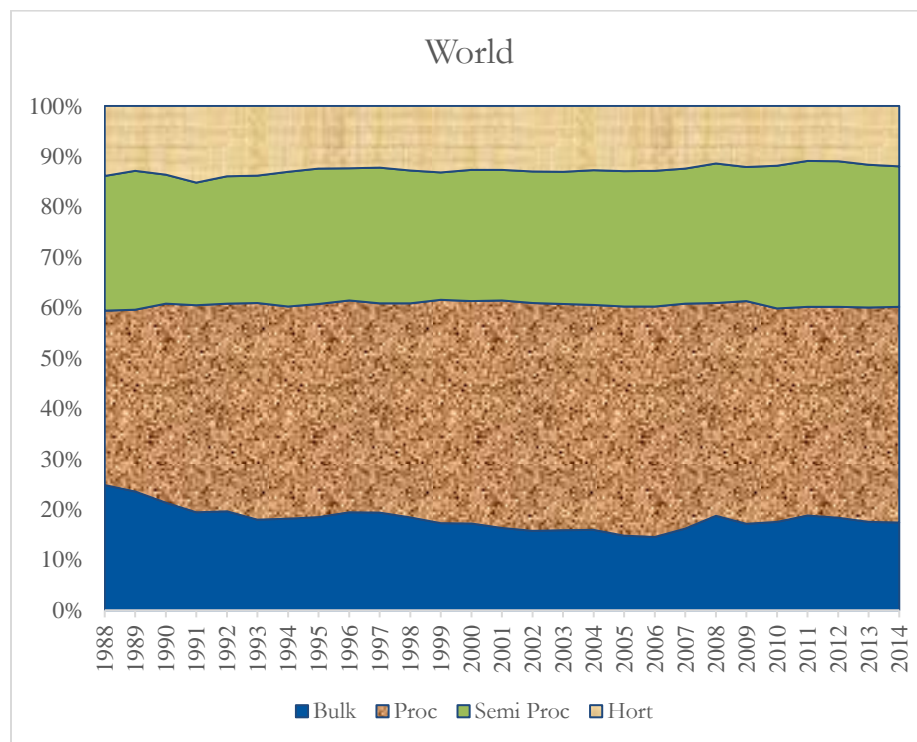
Figure 2: Shares of agricultural exports

Source: Merchandise export data from COMTRADE, accessed through World Integrated Trade Solutions (WITS) (World Bank 2016a).

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 ten focus countries and for SSA 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	Ethiopia	Ghana	Kenya	Mozam-bique	Nigeria	Rwanda	Senegal	S. Africa	Tanzania	Uganda	SSA as a group	SSA to SSA
1	23.3	59.0	39.6	37.1	32.1	22.1	13.9	7.3	12.2	30.4	12.8	7.9
2	16.9	9.9	15.7	27.6	17.6	18.6	12.6	6.2	11.9	6.8	4.7	4.2
3	15.9	7.9	6.2	4.7	5.6	8.7	6.4	5.3	9.2	6.0	4.7	3.9
4	15.0	4.5	3.2	4.5	5.0	7.9	5.7	4.6	6.8	4.9	4.4	3.2
5	6.5	2.8	2.9	3.3	4.0	5.9	5.5	4.6	5.2	4.2	3.8	2.9
6	4.5	1.4	2.3	2.4	3.5	4.2	4.5	3.4	4.2	3.9	2.7	2.8
7	2.2	1.4	2.0	2.0	3.4	3.2	4.2	2.2	4.0	3.4	2.7	2.6
8	1.9	1.0	1.7	1.6	3.2	3.2	4.2	2.2	3.5	2.9	2.2	2.4
9	1.9	0.9	1.4	1.3	2.6	3.1	4.2	2.0	3.2	2.2	2.1	2.3
10	1.4	0.8	1.2	1.1	2.4	2.9	3.0	2.0	2.9	2.1	1.7	1.9
11	1.2	0.8	1.2	1.1	2.0	2.9	2.9	1.9	2.9	2.1	1.7	1.8
12	0.9	0.7	1.2	0.9	1.5	2.3	2.4	1.7	2.0	2.0	1.6	1.8
13	0.9	0.7	1.1	0.9	1.2	1.8	1.9	1.4	1.9	1.8	1.6	1.7
14	0.7	0.6	1.0	0.8	1.1	1.4	1.9	1.3	1.9	1.7	1.5	1.4
15	0.7	0.6	0.9	0.8	1.1	1.0	1.7	1.3	1.7	1.6	1.5	1.3
16	0.6	0.6	0.9	0.7	1.0	1.0	1.6	1.1	1.7	1.4	1.5	1.2
17	0.4	0.5	0.8	0.7	0.9	0.9	1.6	1.1	1.2	1.3	1.3	1.1
18	0.4	0.5	0.7	0.7	0.9	0.7	1.5	1.0	1.2	1.3	1.2	1.1
19	0.3	0.5	0.7	0.6	0.6	0.6	1.4	1.0	1.1	1.2	1.1	1.0
20	0.3	0.3	0.6	0.6	0.5	0.6	1.1	1.0	1.1	1.1	1.1	1.0
Top 20 share	96.2	95.5	85.4	93.5	90.2	93.0	82.2	52.7	79.8	82.4	55.9	47.8
No of exports	249	362	520	208	299	233	591	655	357	402	670	662
Nos equiv	7	3	5	5	7	9	17	44	18	9	33	54

Source: Merchandise export data from COMTRADE, accessed through World Integrated Trade Solutions (WITS) (World Bank 2016a).

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.[2] Consistent with this, the top 20 exports accounted for 80 per cent or more of export returns in each of our focus countries except South Africa, and over 90 per cent in five of our focus countries. While each country has what appears to be a large number of agricultural exports (between 208 and 655), the very large shares accounted for by the top products mean 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 520 and 208 agricultural exports from Kenya and Mozambique respectively provide little more diversification, being equivalent to only five identically distributed products. In contrast, the agricultural export baskets of Senegal, Tanzania, and South Africa are much more diversified, being equivalent to 17, 18, and 44 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: SSA's top 20 exports to the world and to the SSA accounted for 56 per cent and 48 per cent, while the corresponding 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 3 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 and fresh fruit (including apples, oranges, and grapes) also 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 water. In value terms, nearly two-thirds of the agricultural products traded within SSA in 2013, were processed agricultural products.

Given the diversity of African countries, looking at SSA exports in total may well miss important details. Are, for instance, exports of horticultural products from just a few countries? Appendix Table A1 shows the composition of the top 20 exports for our ten focus countries. The importance of coffee, cocoa, and tea stands out at the country level: coffee (090111) was the most important agricultural export item for Ethiopia, Rwanda, and Uganda, and was the second and third in rank for

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[2] 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.

Tanzania and Kenya respectively; cocoa beans (180100) were the leading export for Ghana and Nigeria in 2013, while black tea (90240) was the most and second most important item for Kenya and Rwanda respectively.

Horticultural products appear to be important for a number of our focus countries. For instance, 'other' vegetables (70990) and fresh cut flowers (60310) were the second and third most important agricultural export goods for Ethiopia; fresh cut flowers (60310) were second most important for Kenya; and fresh fruit such as oranges (80510), apples (80810), and grapes (80610) were the second, fourth and fifth ranked items for South Africa. Cashew nuts (080131) were the most important export item for Tanzania and the second and fourth most important item for Ghana and Nigeria respectively. A variety of processed food items appears in the list including fish fillets, sugar, flour, vegetable oil, cigarettes, and alcoholic beverages.

The 'big hits' change from one period to the next (Easterly and Reshef 2010) and a question arises as to whether changes in the importance of 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 2 per cent of total export value in the initial period ('bottom 2 per cent' items). 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 for which the data are available in the COMTRADE system.

Appendix Table A2 reports a set of items which were bottom 2 per cent in the oldest available years, but made the top 20 list in 2013 for our focus countries. Except for Rwanda, the item which appeared first in each list was either a horticultural or a processed agricultural product. For instance, while 'other' vegetables (70990) and fresh cut flowers (60310) were among the bottom 2 per cent items at the turn of the millennium in Ethiopia, they became the country's second and third largest export goods in 2013. Similarly, while bananas (80300) and almonds (80212) were among the bottom 2 per cent goods for Mozambique, they became Mozambique's fifth and ninth most important agricultural exports in 2013. The leading emerging processed goods include such products as palm kernel or babassu oil (151329) in Ghana, cigarettes (240220) and cocoa paste (180310) in Nigeria, oil cake (230630) in Tanzania, and sugar (170199) in Uganda. The emerging bulk products include oil seeds such as soya beans (120100) in Ethiopia, sesamum seeds (120740) in Ghana, and other oil seeds (120799) in Tanzania and Nigeria, perhaps reflecting rising demand for vegetable oils and animal feeds. For South Africa, in contrast, none of the top 20 agricultural export items in 2013 came from the bottom 2 per cent in earlier years.

Table 3: Composition of SSA's top 20 exports to the world and to SSA 2013

		To the world					To SSA		
Rank	hs6	Name	Cat.[*1]	Share (%)	Rank	hs6	Name	Cat.[*1]	Share (%)
1	180100	Cocoa beans, whole or broken	B	12.8	1	240120	Unmanufactured tobacco	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	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	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 flavour	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	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	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 or stripped	B	1.2
17	220421	Other wine; grape must with ferment	P	1.3	17	240310	Smoking tobacco	P	1.1
18	80610	Grapes	H	1.2	18	230990	Other preparations for 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	P	1.1	20	220210	Waters, including mineral waters	P	1.0

Note: [*1] B, H, and P represent bulk, horticulture, and processed agriculture respectively.

Source: Merchandise export data from COMTRADE, accessed through World Integrated Trade Solutions (WITS) (World Bank 2016a).

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 value added/agriculture value added rises as per capita income rises, 2011
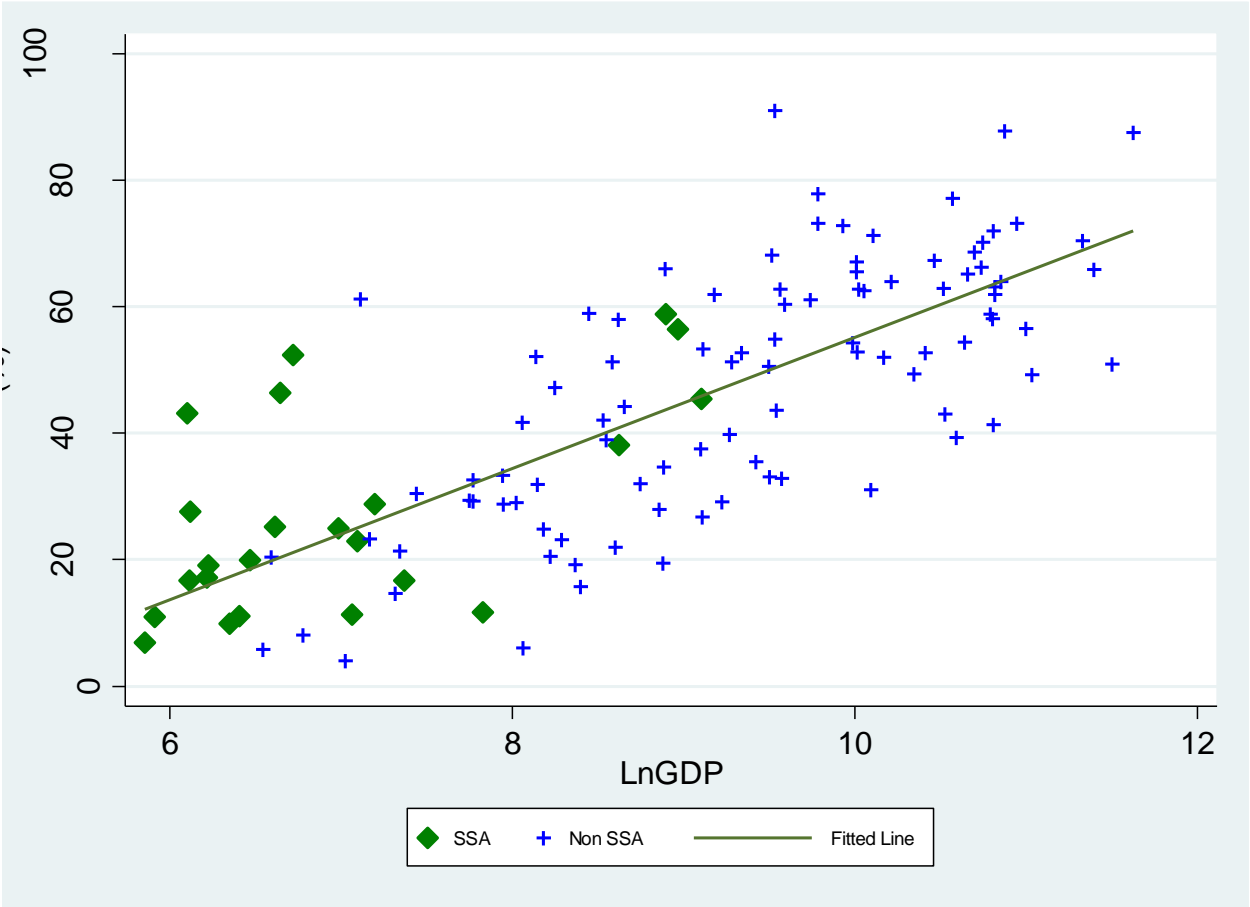
Turning to the relationship between processed agricultural exports as a share of total agricultural exports, we also find a positive relationship with real GDP, as shown in Figure 4. In this case, the relationship appears to be nonlinear, with the rate of increase declining as incomes rise. However, 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
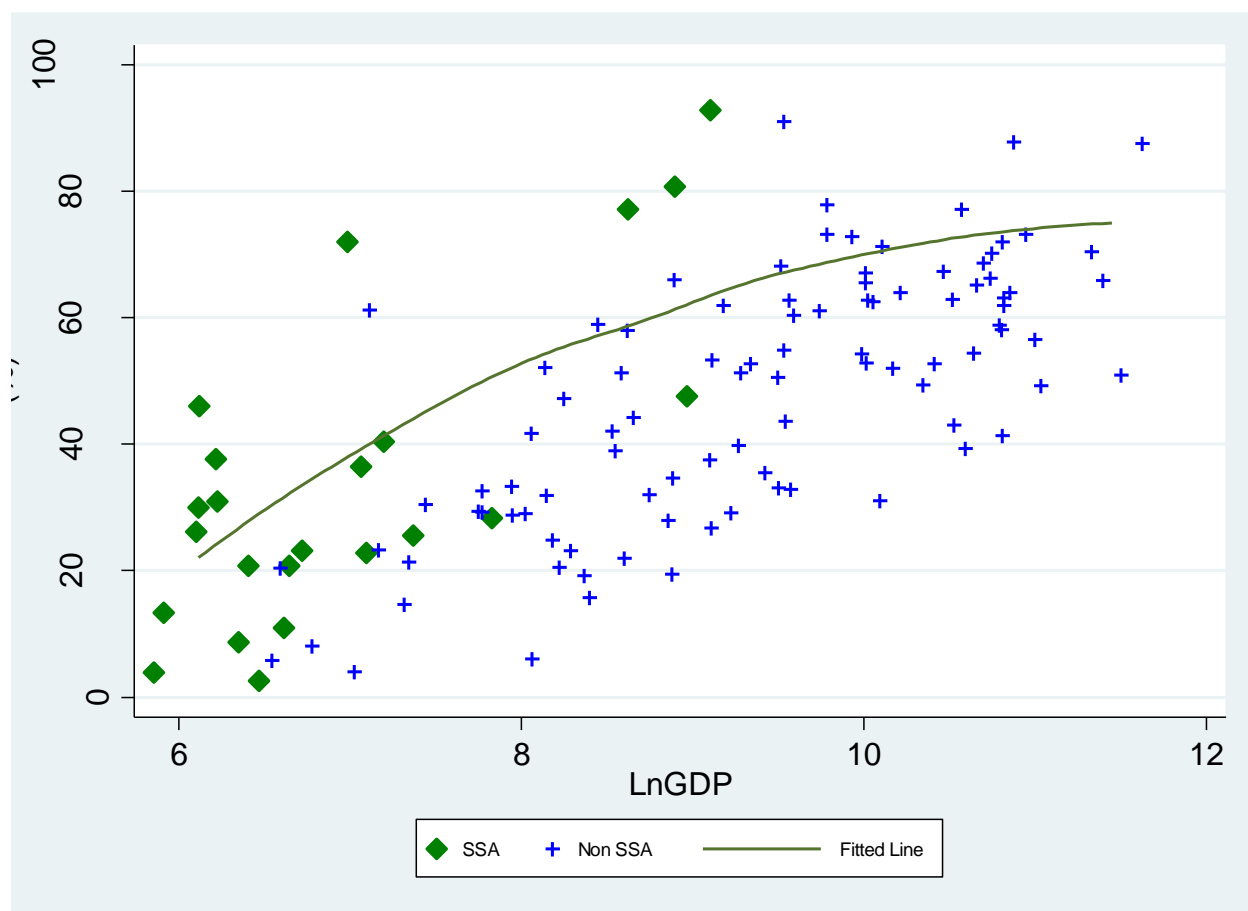
Source: Global Trade Analysis Project (GTAP) database (Version 9).

4   Trade and protection patterns

In this section, we use the GTAP database to allow us to capture both trade and protection, and to prepare for the simulation analysis undertaken in the next section. Using this database, we find SSA's agricultural exports were US\$46.0 billion in 2011 of which US\$21.8 billion (47.4 per cent), US\$7.4 billion (16.2 per cent), and US\$16.8 billion (36.5 per cent) were bulk, horticulture, and processed agriculture respectively (GTAP 9 database).[3] In doing this, we build on the insight from Jensen et al. (2010), that the impact of a trade regime on production incentives requires a general equilibrium treatment, going beyond the impacts captured in either the nominal or the effective rate of protection.

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[3] '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), 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.

Figure 5 shows the destinations of SSA's exports for total, bulk, horticulture, and processed agriculture. This shows that the EU was the largest destination for SSA's exports, taking 39.6 per cent of SSA's exports (37.3 per cent, 42.4 per cent, and 41.3 per cent of bulk, horticulture, and processed agriculture respectively). 19.0 per cent of SSA's exports went to SSA, with processed agriculture disproportionately accounting for 34.9 per cent of SSA's total 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 were more geographically dispersed. The South Asia region absorbed 17.7 per cent of SSA's horticultural exports.

Columns 1–3 of Table 4 show the Ad Valorem Equivalent (AVE) protection (Guimbard et al. 2012) 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 per cent of AVE in its export market (7.7 per cent, 3.8 per cent, 7.6 per cent for its bulk, horticulture, and processed agriculture exports respectively) which were slightly lower than the world average of 8.2 per cent (8.3 per cent, 5.2 per cent, and 8.6 per cent 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 per cent was about 50 per cent 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. SSA enjoys preferential access to the EU market. Its preferential rate for agriculture of 0.8 per cent on average is substantially lower than the rate the EU imposes against its suppliers other than SSA and the EU itself (7.3 per cent). In particular, SSA appears to benefit from the lower preferential rates for its processed agricultural goods (1.3 per cent on average) relative to the AVE the EU imposes against other suppliers (11.1 per cent on average). The preference margins appear to be especially large for such products as meat (1.9 per cent vs. 54.0 per cent), dairy products (2.0 per cent vs. 23.9 per cent), and sugar (1.2 per cent vs. 43.8 per cent).

In its export markets, SSA faces tariff escalation within many value chains: paddy rice (1.2 per cent) vs. processed rice (5.7 per cent); oil seeds (7.0 per cent) vs. vegetable oils and fats (8.0 per cent); sugar cane and sugar beet (0.4 per cent) vs. sugar (9.1 per cent); raw milk (0.0 per cent) vs. dairy products (10.9 per cent); and cattle, sheep, goats, horses (1.3 per cent) vs. animal products n.e.c. (2.6 per cent), cattle, sheep, goat and horse meat (33.7 per cent) and other meat products (5.0 per cent) (column 1 of Tale 4). 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 SSA's agricultural exports took place within SSA. Figure 6 visualizes intra-SSA trade for agricultural goods. The horizontal and vertical axes represent exporting and importing 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 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 with each other for their agricultural goods (except for South Africa, which 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

relatively high at 10.1 per cent (higher than the world average AVE of 8.2 per cent), with an especially high AVE for processed agriculture, at 12.6 per cent.

Figure 5: Destinations of SSA's exports, 2011
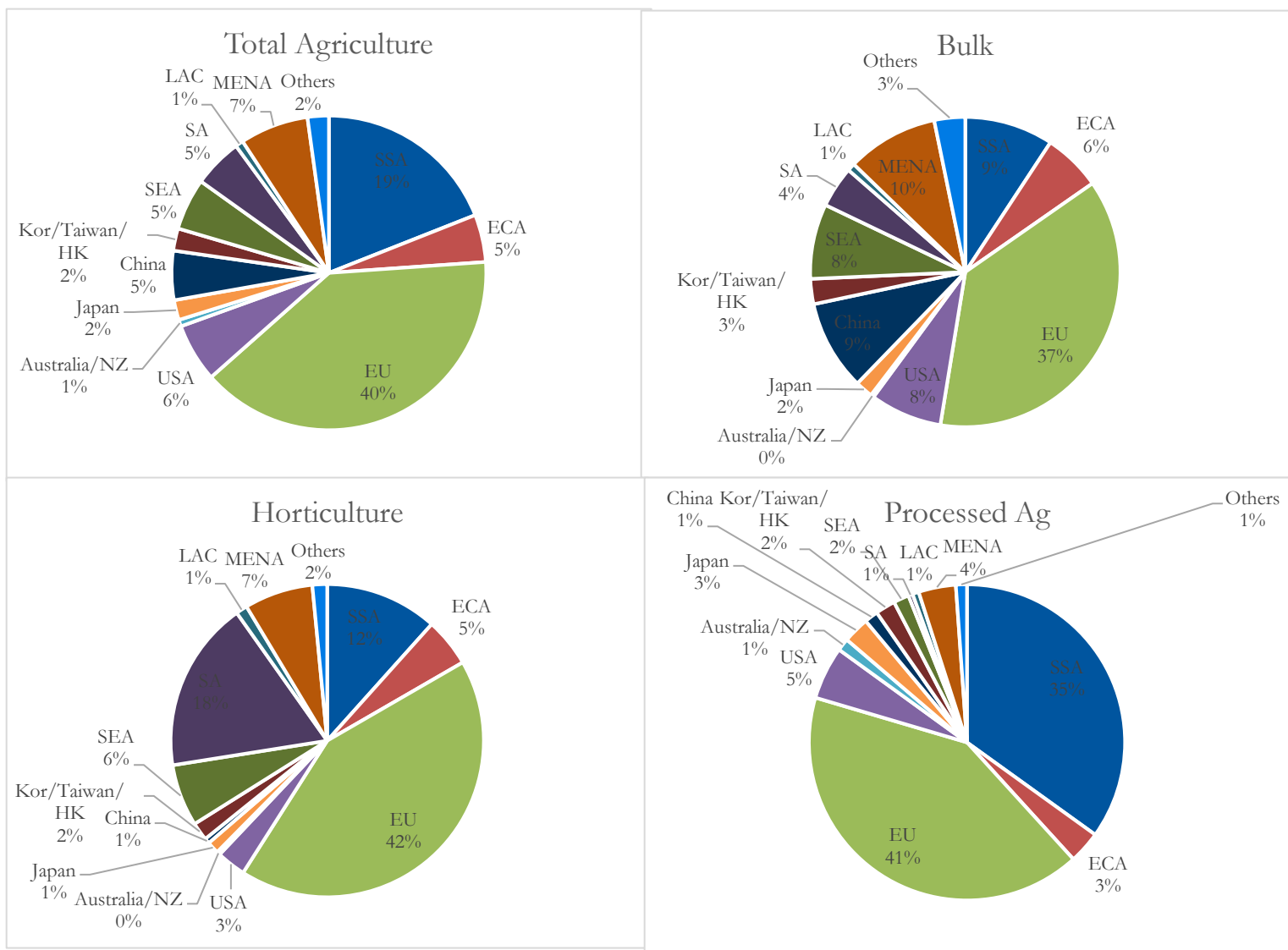
Source: Global Trade Analysis Project (GTAP) database (Version 9).

Figure 6: Intra-SSA direction of trade for agricultural goods (US$ million)
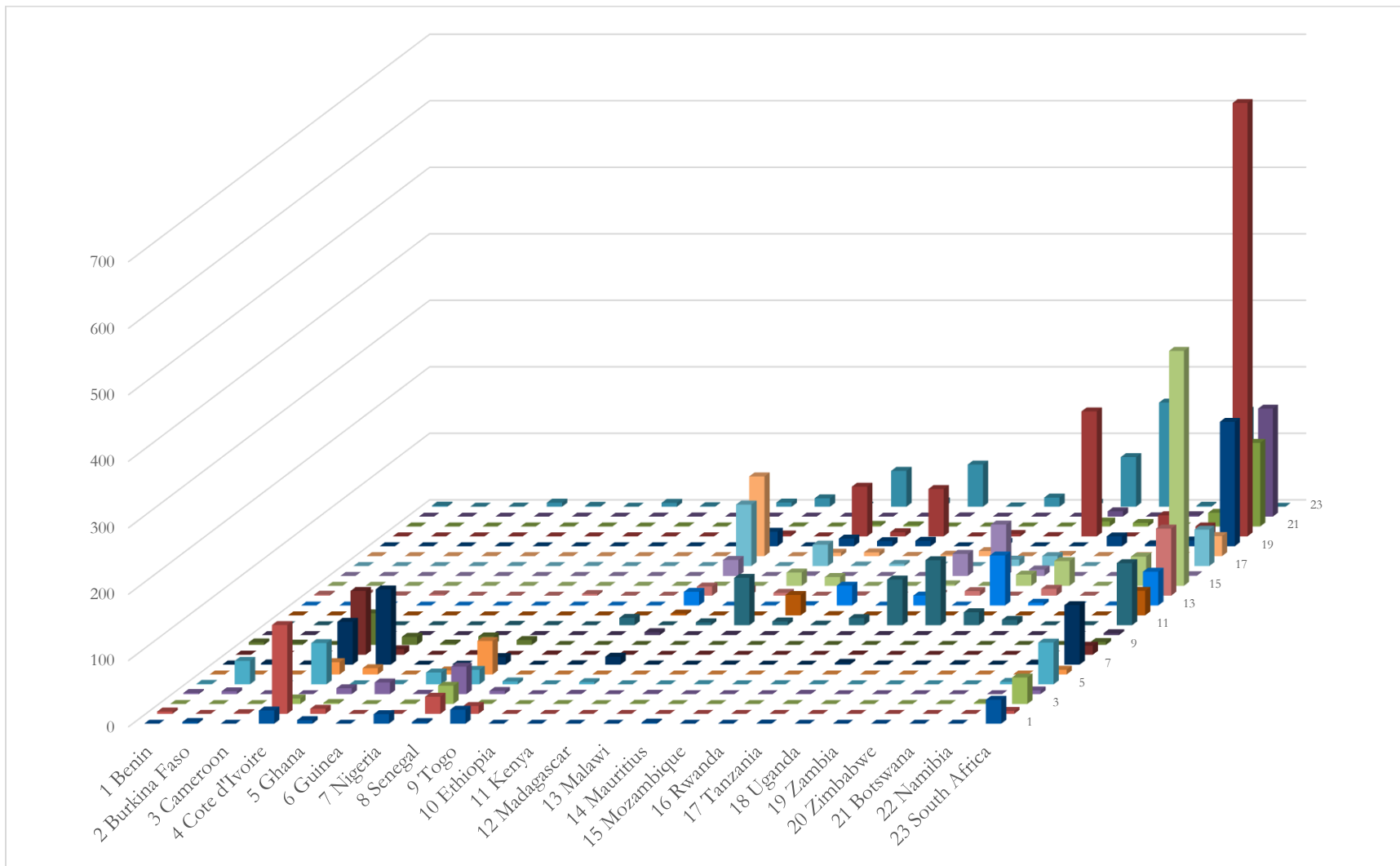
Note: The horizontal and vertical axes represent exporting and importing countries respectively. The numbers along the vertical axis correspond to those along the horizontal axis.
Source: Global Trade Analysis Project (GTAP) database (Version 9).

Table 4: Structure of Ad Valorem Equivalent (AVE) protection

		AVE in SSA's exports and imports and world average			AVE in EU			AVE SSA
		SSA's exports (%)	SSA's imports (%)	World average (%)	Against SSA (%)	Against others (%)	EU average (%)	Intra-SSA (%)
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	Non-agriculture	1.1	8.0	2.3	0.0	1.4	0.6	5.2
Total		1.7	8.7	2.9	0.1	1.8	0.7	6.1

Summary of Agricultural AVE Protection

	SSA's exports (%)	SSA's imports (%)	World average (%)	Against SSA (%)	Against others (%)	EU average (%)	Intra-SSA (%)
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: Global Trade Analysis Project (GTAP) database (Version 9).

5   Simulation scenarios and results: trade effects

In this section, we use the standard GTAP model (Hertel 1997), with the patterns of trade and protection discussed in the previous section, to analyse the impacts of different potential policy reforms. By simulating the removal of protection, these experiments are intended to assess the effects of the existing distortions on SSA's agricultural trade rather than to evaluate specific impacts of any actual trade reforms.

As this paper focuses on agro-processing and horticultural exports, the purpose of the simulations is to measure trade effects.[4] Simulation 1 considers the effects of removing tariff escalation in SSA

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[4] Since the model assumes full employment, further studies are required to assess employment effects.

partner countries. Simulation 2 focuses 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 countries removing all AVE protection, including protection 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 per cent while its bulk and horticulture exports decrease slightly by 4.6 per cent and 3.5 per cent respectively. Overall, SSA's agricultural exports would increase by 39.0 per cent.[5] These results show that tariff escalation in external markets poses substantial barriers for SSA's exports of processed agricultural products. While SSA receives duty-free access from some partners such as the EU (and it is likely that the preferential access creates incentives for processing in SSA), there appears to remain scope to increase agro-processing exports further resulting from the removal of tariff escalation by other trading partners. The dramatic increase in exports of processed agriculture from SSA under Simulation 1 suggests that the provisions in the Doha Agenda proposals on reducing tariff escalation (WTO 2008: 18) may have very favourable effects on exports of processed agricultural products from Africa. They make a case for policy makers focusing on this issue in future trade negotiations.

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 imposes against other suppliers (columns 2–3 of Table 5). SSA's agricultural exports to the EU would decrease by 14.9 per cent which would lead to a reduction of its overall agricultural exports by 5.5 per cent. 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 per cent to the EU, and by 12.2 per cent to the world.

Simulation 3 investigates the impacts of ECOWAS, COMESA, and SADC countries reducing their AVE agricultural protection against each other to zero 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 the 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 per cent while SSA's total agricultural exports to the world would increase by 5.1 per cent. 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 per cent and 13.1 per cent increase in processed agricultural exports to SSA and to the world respectively). They illustrate the extent to which protection within Africa discourages export of all agricultural items.

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[5] The 5,056.8 per cent increase in the exports of cattle, sheep, goat, and horse meat (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 4 explores what would happen if SSA countries were to increase productivity in processing of agricultural goods by 10 per cent (6th column of Table 5). The results reveal that SSA's exports of processed agriculture would expand by 30.3 per cent; its exports of bulk and horticulture goods would decrease slightly by 2.5 per cent and by 1.9 per cent respectively; and its overall agricultural exports would expand by 9.6 per cent. 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 the modelling framework that we use does not allow for the emergence of new activities. Thus, it misses the extensive-margin impact of increases in productivity, where higher productivity may cause new export activities to take place.

Simulation 5 involves complete removal of AVE protection against SSA's imports including non-agricultural goods. Perhaps not surprisingly, it leads to a much larger increase in total exports than any of the other simulations (last column in Table 5). 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 exports from 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's 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 outweighs 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
		To Wld	To EU	To Wld	SSA	To Wld	To Wld	To Wld
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	Non-agriculture	-2.96	0.41	0.38	-0.18	-1.36	-1.36	9.45
Total		1.10	-2.05	-0.19	4.91	-0.30	-0.30	9.27

Summary of agricultural exports changes (%)								
		To Wld	To EU	To Wld	Intra-SSA	To Wld	To Wld	To Wld
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 results.

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6   Policy questions

The decision on whether or not 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' (Baldwin 2006) 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 may 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, in the 'unbundled' trade system, 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 an especially large share of rents that can be dissipated—particularly in the short term—without the activity shutting down. Consider, for example, the decision on 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 US$100 animal is valued at US$150 on the world market and intermediate inputs and labour costs account for US$35 of the US$50, increases in the cost of intermediate inputs or labour 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. Responses of this type would not require 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 comes 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 per cent to its initial value, then a tariff margin of 20 per cent between the raw and the processed form of a product creates a 100 per cent 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 per cent 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.

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) need to be addressed by adequate policy reforms and associated investments. For instance, in examining the effect of trade times on Africa's exports of new products, Freund and Rocha (2011) report that reducing inland transit times significantly boosts exports (especially for time-sensitive agricultural exports) and suggest the importance of investments on inland transportation and infrastructure.

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) would seem to allay 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 possible, and perhaps vital to create a situation which stimulates firms to 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 US$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: 630)—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: 173) 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 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. In China, duty exemptions were a central feature of its economic reforms, allowing exporters to use imported materials and to increase processed exports in a wide range of labour-intensive activities (Ianchovichina 2004). Other successful exporters of industrial goods, for instance, Cambodia, Mauritius, Tunisia, and Vietnam, also established a 'free trade regime for exporters' through a variety of mechanisms such as tariff exemptions, duty drawbacks, and rebates of indirect taxes (Newman et al. 2016a).

A duty exemption or duty drawback system reduces the burden imposed by a country's own protection regime and decreases 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. 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 (SEZ) (Farole 2011). SEZs typically 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 favoured regions near infrastructure. Farole (2011: Chapter 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 labour productivity.

The high wage rates relative to productivity seem surprising given the very low incomes prevailing in much of SSA. 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, Table 6 shows that wage rates in the African SEZs are almost 90 per cent of wage rates in his four comparator countries, even though GDP per capita, and, hence, likely the opportunity cost of labour to the zone, is only 42 per cent 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 labour in zones, and GDP per capita

	Output/worker (US$ 2008)	Wage (US$)	GDP/capita (US$)
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: Authors' calculations based on Farole (2011: Table 8.2) and World Development Indicators for GDP/capita for 2014 (World Bank 2016b).

Following his detailed consideration of SEZs in Africa, Farole recommends that African policy makers consider processing of agricultural and resource exports in addition to labour-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 SSA 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 substantially to expand the range of products with which potential exporters can experiment. Current, generally closed, SEZs 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 labour 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 higher levels of future exports. As argued by Newman et al. (2016b), it is not enough just to improve the investment climate—which nevertheless remains a high priority—but what is needed is a broader push for export development of the type seen in countries such as Vietnam and Cambodia.

7 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 the agricultural processing and horticultural 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 per cent of the total, somewhat less than the 12 per cent of exports accounted for by non-factor services. This is 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 42 per cent, 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 per cent of agricultural exports in 2014 as against 12 per cent for the world as a whole.

The relatively low—but rising—share of processed agricultural exports 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 agricultural products in export markets would substantially increase exports of processed products from Africa. Cutting agricultural protection within main African trade blocs and extending liberalization to all the trading partners and to all the goods 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, in a way that the export promotion strategy for these products is consistent with the development of other export-oriented goods and services. For instance, a promising way to encourage a surge in agro-processing and horticultural exports would be to reduce the cost of intermediate inputs generally. Reducing this disadvantage for 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 in a wide range of 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 agricultural exports at the country level 2013 (US$1,000)

Ethiopia					Ghana			
Rank	HS6	Name	Cat.[*1]	2013	HS6	Name	Cat.[*1]	2013
1	90111	Coffee, not roasted	B	770618	180100	Cocoa beans, raw or roasted	B	1380501
2	70990	Other vegetables, fresh or chilled	H	558771	80131	Cashew nuts in shell	H	232581
3	60310	Fresh cut flowers	H	527056	80132	Cashew nuts, Shelled	H	184282
4	120740	Sesamum seeds	B	494808	151329	Palm kernel or babassu oil	P	104550
5	10290	Other Live bovine animals	B	215168	180400	Cocoa butter, fat and oil	P	65701
6	71333	Beans (Vigna spp., Phaseolus spp.)	H	149442	120740	Sesamum seeds	B	33448
7	10600	Other live animals	B	73595	151110	Palm oil, whether or not refined	P	31851
8	20450	Meat of goats	P	63640	120810	Flours & meals of oil seeds or fruits	P	24416
9	60210	Other live plants (including roots)	H	62582	120799	Other oil seeds & oleaginous fruits	B	20340
10	10410	Sheep	B	47550	71490	Manioc, Jerusalem artichokes	H	19710
11	71320	Dried leguminous vegetables	P	40711	220890	Other ethyl alcohol	P	18750
12	120799	Other oil seeds & oleaginous fruits	B	31387	80290	Other nuts, fresh or dried	H	16292
13	70190	Potatoes, fresh or chilled	H	30916	151190	Other Palm oil and its fractions	P	15867
14	71350	Broad beans (Vicia faba var.major)	H	24266	220850	Gin and Geneva	P	15085
15	120100	Soya beans, whether or not broken	B	23463	190110	Malt extract	P	14596
16	71390	Dried leguminous vegetables	H	18605	151710	Margarine, excl liquid margarine	P	14435
17	91010	Ginger	H	13554	151321	Palm kernel or babassu oil	P	12674
18	130190	Lac; natural gums, resins	H	12185	151590	Other fixed vegetable fats & oils	P	11184
19	230640	Oil-cake & other solid residues	P	10454	220720	Ethyl alcohol & other spirits	P	11163
20	70200	Tomatoes, fresh or chilled	H	9765	200811	Nuts, ground-nuts & other seeds	H	7739

Kenya					Mozambique			
Rank	HS6	Name	Cat.[*1]	2013	HS6	Name	Cat.[*1]	2013
1	90240	Black tea (fermented) and others	B	1202919	240120	Unmanufactured tobacco	B	249879
2	60310	Fresh cut flowers	H	477890	170111	Raw sugar not containing added flav	B	185708
3	90111	Coffee, not roasted, not decaffe	B	189569	30613	Frozen shrimps and prawns	P	31484
4	70820	Beans (Vigna spp., Phaseolus spp.)	H	96782	120740	Sesamum seeds	B	30178
5	240220	Cigarettes containing tobacco	P	89062	80300	Bananas, including plantains, fresh	H	22146
6	200820	Pineapples	H	68866	80132	Cashew nuts, shelled	H	16123
7	151190	Other Palm oil and its fractions	P	62259	120220	Ground-nuts, shelled	H	13737
8	60210	Other live plants	H	51900	230230	Bran, sharps and other residues	P	10519
9	220300	Beer made from malt	P	42656	80212	Almonds, shelled	H	8648
10	140490	Vegetable products n.e.s.	P	37738	151211	Sunflower-seed or safflower oil	P	7449
11	170410	Chewing gum	P	36018	240110	Tobacco, not stemmed/stripped	B	7418
12	240120	Unmanufactured tobacco	B	35993	80131	Cashew nuts in shell	H	6370
13	200559	Beans (Vigna spp., Phaseolus spp.)	H	34268	120720	Cotton seeds	B	5761
14	80440	Avocados	H	29283	151219	Sunflower-seed or safflower oil	P	5651
15	170490	Other sugar confectionery	P	26744	71390	Dried leguminous vegetables	P	5452
16	151710	Margarine	P	25983	90240	black tea (fermented) and others	B	4948
17	71333	Beans (Vigna spp., Phaseolus spp.)	H	25415	170310	Cane molasses	P	4761
18	200940	Pineapple juice	P	21577	110100	Wheat or meslin flour	P	4554
19	151620	Vegetable fats and oils	P	21417	30559	Dried fish	P	4325
20	240399	Other manufactured tobacco	P	19361	71310	Peas (Pisum sativum)	H	4244

Nigeria					Rwanda			
Rank	HS6	Name	Cat.[*1]	2013	HS6	Name	Cat.[*1]	2013

Rank	HS6	Name	Cat.[*1]	2013
1	180100	Cocoa beans, raw or roasted	B	1542736
2	120740	Sesamum seeds	B	842682
3	180400	Cocoa butter, fat and oil	P	269928
4	80131	Cashew nuts in shell	H	238217
5	100190	Other wheat and meslin	B	194321
6	30613	Frozen shrimps and prawns	P	169411
7	240220	Cigarettes containing tobacco	P	163479
8	60390	Other cut flowers and flower buds	H	153789
9	40229	Powdered milk or cream	P	124572
10	180310	Cocoa paste, not defatted	P	115512
11	91010	Ginger	H	94213
12	180200	Cocoa shells, husks, skins and other	P	69742
13	190220	Stuffed pasta, whether or not cooked	P	55203
14	40221	Powdered Milk & cream	P	55002
15	130120	Gum Arabic	P	53994
16	30379	Frozen fish , excluding fish fillets	P	46513
17	80132	Cashew nuts, shelled	H	43051
18	200819	Nuts, ground-nuts and other seeds	H	42560
19	220210	Waters, including mineral waters an	P	30942
20	120799	Other oil seeds and oleaginous fruits	B	24666

HS6	Name	Cat.[*1]	2013
90111	Coffee, not roasted, not decaffe	B	49884
90240	Black tea (fermented) and others	B	41906
90230	Black tea (fermented) and partly ferm	B	19678
220300	Beer made from malt.	P	17770
110100	Wheat or meslin flour.	P	13241
170199	Other Cane or beet sugar	P	9565
151620	Vegetable fats and oils	P	7255
10290	Other Live bovine animals	B	7149
100630	Semi-milled or wholly milled rice	P	7067
110220	Maize (corn) flour	P	6606
220290	Waters, including mineral waters	P	6588
100640	Broken rice	B	5212
121190	Plants and parts of plants	H	4052
190530	Sweet biscuits; waffles and wafers	P	3252
90190	Coffee, whether or not roasted	B	2305
100590	Other Maize (corn)	B	2145
110290	Cereal flours other than wheat	P	1964
110310	Groats and meal of wheat	P	1548
70820	Beans (Vigna, Phaseolus spp.)	H	1428
210320	Tomato ketchup & other tom sauce	P	1244

South Africa

Rank	HS6	Name	Cat.[*1]	2013
1	100590	Other Maize (corn)	B	695949
2	80510	Oranges	H	589592
3	220421	Other wine	P	507557
4	80810	Apples	H	443291
5	80610	Grapes	H	441039
6	220429	Other wine	P	326723
7	170199	Other Cane or beet sugar	P	214754
8	170111	Raw sugar not containing added flav	B	208419
9	240220	Cigarettes containing tobacco	P	193597
10	80820	Pears and quinces	H	192010
11	80290	Other nuts, fresh or dried	H	186563
12	210690	Other food preparations	P	162961
13	80530	Lemons	H	129522
14	80520	Mandarins	H	126510
15	80540	Grapefruit	H	125337
16	110313	Groats and meal of maize (corn)	P	109430
17	230990	Other reparations in animal feeding	P	106517
18	30420	Frozen fillets	P	98736
19	151219	Sunflower-seed or safflower oil	P	96748
20	220710	Undenatured ethyl alcohol	P	92489

Senegal

HS6	Name	Cat.[*1]	2013
210410	Soups and broths	P	122797
30379	Frozen fish , excluding fish fillets	P	111698
30269	Other fish, fresh or chilled	B	56675
240220	Cigarettes containing tobacco	P	50724
240310	Smoking tobacco	P	48286
190190	Malt extract; food prep of flour	P	39449
40221	Milk and cream	P	37365
100640	Broken rice	B	37037
150810	Ground-nut oil and its fractions	P	36896
240120	Unmanufactured tobacco	B	26637
30613	Frozen shrimps and prawns	P	25596
120220	Ground-nuts, shelled	H	21421
30349	Tunas (of the genus Thunnus)	P	17027
70990	Other vegetables, fresh or chilled	H	16775
70820	Beans (Vigna spp., Phaseolus spp.)	H	15411
30749	Cuttle fish	B	13976
80711	Melons (including watermelons)	H	13905
70200	Tomatoes, fresh or chilled	H	13346
30759	Octopus	B	12361
160414	Fish, whole or in pieces	P	9386

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

Note: [*1] B, H, and P represent bulk, horticulture, and processed agriculture respectively.

Source: Merchandise export data from COMTRADE, accessed through World Integrated Trade Solutions (WITS) (World Bank 2016a).

Table A2. List of bottom 2 per cent Items which made top 20 list in 2013

			Ethiopia					
			Average of 2001, 2002, 2003			2013		
HS6	Name	Cat.[*1]	Exports (US$1,000)	Share (%)	Rank	Exports (US$1,000)	Share (%)	Rank
70990	Other vegetables, fresh or chilled	H	0.5	0.000	220	558771	16.90	2
60310	Fresh cut flowers	H	152.4	0.043	57	527056	15.94	3
10290	Other live bovine animals	B	130.0	0.037	62	215168	6.51	5
10600	Other live animals.	B	131.7	0.037	61	73595	2.23	7
60210	Other live plants (including their roots)	H	0.1	0.000	270	62582	1.89	9
10410	Sheep	B	151.9	0.043	58	47550	1.44	10
120100	Soya beans, whether or not broken.	B	43.4	0.012	83	23463	0.71	15
71390	Dried leguminous vegetables	P	110.1	0.031	70	18605	0.56	16
230640	Oil-cake and other solid residues	P	0.0	0.000		10454	0.32	19

			Ghana					
			Average of 2003, 2004, 2005			2013		
HS6	Name	Cat.[*1]	Exports (US$1,000)	Share (%)	Rank	Exports (US$1,000)	Share (%)	Rank
151329	Palm kernel or babassu oil	P	56.8	0.004	155	104550	4.47	4
120740	Sesamum seeds	B	348.0	0.027	67	33448	1.43	6
120810	Flours and meals of oil seeds	P	57.3	0.005	153	24416	1.04	8
220890	Other undenatured ethyl alcohol	P	4.4	0.000	292	18750	0.80	11
80290	Other nuts, fresh or dried	H	106.7	0.008	120	16292	0.70	12
220850	Gin and Geneva	P	84.4	0.007	132	15085	0.64	14
151321	Palm kernel or babassu oil	P	10.2	0.001	248	12674	0.54	17
220720	Ethyl alcohol and other spirits	P	9.8	0.001	250	11163	0.48	19

			Kenya					
			Average of 1997, 1998, 1999			2013		
HS6	Name	Cat.[*1]	Exports (US$1,000)	Share (%)	Rank	Exports (US$1,000)	Share (%)	Rank
140490	Vegetable products not specified	P	431.5	0.037	77	37738	1.24	10
71333	Beans (vigna spp., phaseolus spp.)	H	88.5	0.008	137	25415	0.84	17
240399	Other manufactured tobacco	P	495.8	0.042	70	19361	0.64	20

			Mozambique					
			Average of 2001, 2002, 2003			2013		
HS6	Name	Cat.[*1]	Exports (US$1,000)	Share (%)	Rank	Exports (US$1,000)	Share (%)	Rank
80300	Bananas, including plantains, fresh	H	0.0	0		22146	3.29	5
80212	Almonds, shelled	H	90.1	0.049	54	8648	1.28	9
151211	Sunflower-seed or safflower oil	P	7.3	0.004	128	7449	1.11	10
151219	Sunflower-seed or safflower oil	P	16.3	0.009	97	5651	0.84	14
71390	Dried leguminous vegetables	P	31.0	0.017	77	5452	0.81	15

			Nigeria					
			Average of 1999, 2000, 2001			2013		
HS6	Name	Cat.[*1]	Exports (US$1,000)	Share (%)	Rank	Exports (US$1,000)	Share (%)	Rank
240220	Cigarettes containing tobacco	P	0.7	0.0023	104	163479	3.41	7
60390	Other cut flowers and flower buds	H	0.0	0.0000		153789	3.20	8
180310	Cocoa paste, not defatted	P	0.0	0.0000		115512	2.41	10
180200	Cocoa shells, husks, skins and others	B	0.0	0.0000		69742	1.45	12
190220	Stuffed pasta, whether or not cooked	P	0.0	0.0000		55203	1.15	13
30379	Frozen fish, excluding fish fillets	P	0.1	0.0002	155	46513	0.97	16
80132	Cashew nuts, shelled	H	0.2	0.0007	131	43051	0.90	17
200819	Nuts, ground-nuts and other seeds	H	0.0	0.0000		42560	0.89	18
220210	Waters, including mineral waters	P	2.8	0.0089	77	30942	0.64	19
120799	Other oil seeds and oleaginous fruits	B	0.8	0.0025	102	24666	0.51	20

			Average of 2001, 2002, 2003			2013		
	Rwanda							
HS6	Name	Cat.[*1]	Exports (US$1,000)	Share (%)	Rank	Exports (US$1,000)	Share (%)	Rank
90240	Black tea (fermented) and others	B	1.6	0.008	34	41906	18.56	2
90230	Black tea (fermented) and partly fermented	B	0.0	0.000	398	19678	8.72	3
220300	Beer made from malt	P	1.7	0.008	32	17770	7.87	4
110100	Wheat or meslin flour	P	0.0	0.000	364	13241	5.87	5
170199	Other cane or beet sugar	P	9.3	0.046	19	9565	4.24	6
151620	Vegetable fats and oils	P	3.6	0.018	27	7255	3.21	7
10290	Other live bovine animals	B	0.0	0.000	702	7149	3.17	8
100630	Semi-milled or wholly milled rice	P	0.0	0.000	369	7067	3.13	9
110220	Maize (corn) flour	P	0.0	0.000	362	6606	2.93	10
220290	Waters, including mineral waters	P	72.4	0.359	8	6588	2.92	11
121190	Plants and parts of plants	H	1.3	0.006	36	4052	1.79	13
190530	Sweet biscuits; waffles and wafers	P	1.2	0.006	37	3252	1.44	14
90190	Coffee, whether or not roasted	B	0.0	0.000	401	2305	1.02	15
100590	Other maize (corn)	B	0.7	0.003	42	2145	0.95	16
110290	Cereal flours other than of wheat or meslin	P	0.0	0.000	360	1964	0.87	17
110311	Groats and meal -- of wheat	P	0.0	0.000	359	1548	0.69	18
70820	Beans (vigna spp., phaseolus spp.)	H	0.0	0.000	488	1428	0.63	19
210320	Tomato ketchup and other tomato sauce	P	10.8	0.053	17	1244	0.55	20

			Average of 1996, 1997, 1998			2013		
	Senegal							
HS6	Name	Cat.[*1]	Exports (US$1,000)	Share (%)	Rank	Exports (US$1,000)	Share (%)	Rank
190190	Malt extract; food preparations of flour	P	0.7	0.001	239	39449	4.46	6
30349	Tunas (of the genus thunnus)	P	11.5	0.023	117	17027	1.93	13
80711	Melons (including watermelons)	H	0.4	0.001	252	13905	1.57	17

			Average of 1997, 1998, 1999			2013		
	Tanzania							
HS6	Name	Cat.[*1]	Exports (US$1,000)	Share (%)	Rank	Exports (US$1,000)	Share (%)	Rank
230630	Oil cake of sunflower seeds	P	170.4	0.040	70	24942	1.85	13
170191	Cane or beet sugar and sucrose	P	0.0	0.000	509	24939	1.85	14
240290	Cigars, cheroots, cigarillos and cigarettes	P	27.0	0.006	160	23524	1.75	15
120799	Other oil seeds and oleaginous fruits	B	23.2	0.005	166	15879	1.18	18
71390	Dried leguminous vegetables	P	50.7	0.012	117	14517	1.08	19

			Average of 1996, 1997, 1998			2013		
	Uganda							
HS6	Name	Cat.[*1]	Exports (US$1,000)	Share (%)	Rank	Exports (US$1,000)	Share (%)	Rank
170199	Other cane or beet sugar	P	48.0	0.011	88	67766	4.85	4
60210	Other live plants (including their roots)	H	155.0	0.037	60	25750	1.84	13
220300	Beer made from malt	P	162.2	0.038	59	23698	1.70	14
100640	Broken rice	B	170.9	0.040	57	18850	1.35	16
100510	Maize (corn) seed	B	266.6	0.063	48	18501	1.33	17
100630	Semi-milled or wholly milled rice	P	77.4	0.018	75	17733	1.27	18

Note: [*1] B, H, and P represent bulk, horticulture, and processed agriculture respectively.

Source: Merchandise export data from COMTRADE, accessed through World Integrated Trade Solutions (WITS) (World Bank 2016a).