

4. COMPETITIVENESS OF AFRICAN AGRICULTURAL EXPORTS

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The performance of African agricultural trade has improved in recent years. Substantial gains have been made in export value, with a concomitant increase in Africa's share of global exports. Agricultural imports by African countries have increased faster, however, and the continent is still below the world market share it secured three decades ago. Thus, accelerating current export trends and diversifying African export commodities and destination markets appear as a crucial policy objective in an attempt to reduce foreign trade deficits across countries and help stabilize intra-African food markets. To that end, a starting point is greater understanding of how current advances in African exports have been brought about. Of particular interest is how changes in domestic production and trading conditions have enabled the improvement or degradation of Africa's export competitiveness in global as well as intra-African markets. This knowledge would provide more insight into national and regional strategies to help exploit untapped export potential and opportunities for investments in emerging markets and new export commodities.

This chapter investigates the patterns and determinants of changes in export competitiveness

among African countries and products over the 1998–2013 period. It is based on the measurement of changes in competitiveness through analyses of the decomposition of constant market shares and comparisons of competitive effects in alternative export destination markets and across countries and commodity groups. The next section presents the analytical methods and data used to derive changes in country- and commodity-level competitiveness. Thereafter, country and commodity rankings are examined based on their competitiveness in global markets; competitiveness rankings in global and intra-African markets are compared; and corresponding rankings in the markets of the regional economic communities (RECs) are examined, including the Common Market for Eastern and Southern Africa (COMESA), the Economic Community of Central African States (ECCAS), the Economic Community of West African States (ECOWAS), and the Southern African Development Community (SADC).

Finally, an econometric model of the determinants of changes in country competitiveness in alternative agricultural export markets is proposed, the main findings are summarized, and recommendations for policy action are offered.

Model and Data Description

The Model

Competitiveness has been widely explored through the Constant Market Share (CMS) decomposition model as a means of assessing how countries compare with their competitors in terms of their trade performance across time. Since its first application to trade analysis by Tyszynski (1951), the CMS methodology has been refined and expanded through alternative model formulations attempting to enrich its analytical features (Leamer and Stern 1970; Richardson 1971a; Richardson 1971b)

or to deal with issues arising with its applications (Chepatea, Gaulier, and Zignago 2005). The formulation used in this chapter was developed by Magee (1975). It explains the growth in a country's or region's share of world markets by decomposing it into two major growth sources: (1) structural changes in market distribution and product composition, and (2) changes in competitiveness. The market share growth model starts with the following identity.

$$S_{it}^m = R^m \cdot S_{it_0}^m \quad (1)$$

where $S_{it_0}^m$ and S_{it}^m denote the shares of a given country or region m in total world exports in the beginning and end periods t_0 and t_1 , respectively. R^m represents a relative growth factor defined as follows:

$$R^m = \frac{1 + g^m}{1 + g^w} \quad (2)$$

where g^m and g^w stand for the compound yearly growth rate (between the beginning and end periods) of total exports of country or region m and of the world w , respectively. Equation (2) expresses the growth of country or region m 's exports relative to the world's exports and can be rewritten as

$$R^m = \frac{\sum_i \left(\frac{1 + g_i^m}{1 + g^w} \right) X_{it_0}^m}{X_{it_0}^m} \quad (3)$$

with

$$X_{it_0}^m = \sum_i X_{it_0}^m$$

where i denotes export products, and $X_{it_0}^m$ stands for the country's or region's exports of product i and $X_{it_0}^m$ its total exports of all goods to world markets in the first period.

Expressing $X_{it_0}^m$ for the different export products i and destinations j in (3), multiplying by $[(1 + g^w)X_{it_0}^m / (1 + g_i^w)X_{it_0}^m]$ and by $[(1 + g_i^w) / (1 + g_j^w)]$, and summing over i and j yields the following, after rearranging and substituting the new expression for (3) in (1):

$$S_{it}^m = S_{it_0}^m \sum_i \frac{(1 + g_i^w) X_{it_0}^m}{(1 + g_i^w) X_{it_0}^m} \sum_j \frac{(1 + g_j^w) X_{it_0}^{mj}}{(1 + g_j^w) X_{it_0}^m} \quad (4)$$

with

$$X_{it_0}^m = \sum_j X_{it_0}^{mj}$$

where $X_{it_0}^{mj}$ denotes the country's or region's exports of product i to destination j in the first period.

The objective in this chapter is to rank African countries and agricultural commodities on changes in their competitiveness in different export markets, including global markets (treated as one market entity); intra-African markets (treated as one market entity); and the regional markets of COMESA, ECCAS, ECOWAS, and SADC (each treated as one market entity). Therefore, the model is applied in three different settings corresponding to different levels of exporters and products aggregations as indicated below.

In the first setting, m represents Africa as a whole and the model decomposes the growth in Africa's share of world exports of each of 59 agricultural commodity groups i . The second setting is a variant of the first, where m stands for each REC as an aggregate exporter instead of Africa as a whole. Thus, the model explains the growth in the REC's share of world exports of each of 59 agricultural commodity groups. In the third setting, m denotes each of 51 African countries, and i is an aggregate agricultural good. The model decomposes the growth in a country's share of world aggregate agricultural exports. In all three settings, calculations are carried out for j representing, in turn, global markets, intra-African markets, and each of the regional markets of COMESA, ECCAS, ECOWAS, and SADC. With exporters and products aggregated as defined in the three settings, equation (4) simplifies to

$$s_i^m = s_i^m \sum_{j=1}^J \frac{(1 + g_i^{mj}) (1 + g_j^{mj}) X_{ij}^{mj}}{(1 + g_i^m) (1 + g_j^m) X_{ij}^m} \quad (5)$$

(a) (b) (c)

In the case where represents global markets, equation (4) further simplifies to

$$s_i^m = s_i^m \frac{(1 + g_i^{mj})}{(1 + g_i^m)} \quad (6)$$

From equation (1) it is clear that whether a country's or region's share of world exports increases or diminishes during the considered time period depends on whether the growth factor R is greater or less than unity. Given the reduced expression for R in equation (5), the contribution of a destination to the performance of a given country or region (in terms of the change in its export share) can be decomposed into two components: a competitive effect and a market effect.

The competitive effect corresponds to the first expression (a) of the right hand side of equation (5). It is a measure of the change in competitiveness experienced by country or region m in exporting a good i to destination j . If it is greater (or smaller) than 1.0, the competitive effect translates some gain (or loss) of competitiveness by the country or region compared with the group of its competitors in the export destination considered.

The market effect corresponds to the product of the terms (b) and (c) in equation (5). It measures the portion of the country's or region's export share growth which is due to faster or slower growth of world exports of good i to destination markets j compared with global markets. It reflects the change in the importance of j as a destination for the country's exports attributable to the expansion of markets j . For instance, in the case where j denotes the regional markets of a REC, the market effect translates as the change in the importance of the community markets as a destination for its members' exports which is associated with the expansion of the regional markets. For an easier interpretation, the market effect MRK can be derived in value terms from the simplified expression in equation (5) as follows:

$$MRK = \frac{\left[\frac{(1 + g_i^w)}{(1 + g_i^j)} \frac{X_{it}^m}{X_{it}^w} \frac{X_{it}^m}{X_{it}^j} \right] X_{it}^m}{X_{it}^m} \quad (7)$$

The value of MRK measures the magnitude of the positive or negative impact of the expansion of markets on the considered country or region's export performance. As it appears in equation (6), it is clear that no market effect can be derived in the case where global markets are the destination under consideration.

Data Sources and Product and Country Coverage

The model is applied using data on the values of bilateral exports of agricultural products at the HS4 aggregation level⁸ over the 1998–2013 period. The data were obtained from the International Trade Database at the Product Level (BACI) built by the Centre d'Etudes Prospectives et d'Informations Internationales (CEPII). The data are for individual African countries, except for the members of the Southern African Customs Union (SACU), namely Botswana, Lesotho, Namibia, South Africa and Swaziland, for which trade data are aggregated in the database.

For this analysis, bilateral export values are first aggregated so as to construct the variables of each country's total exports to world markets, to intra-African markets, and to each REC's regional markets. These are then aggregated to construct the variables of Africa's and each REC's aggregate exports to the different export markets under consideration.

In addition, bilateral export values are aggregated from the BACI database to construct the variables of the world's total exports of the different agricultural products to the different export destinations under analysis. In order to reduce the number of HS4 product lines, the different variables were aggregated from HS4 to HS2 level, except for a few HS4 lines of interest that were kept as such.

The final dataset used for the CMS model comprises 59 commodity groups (hereafter designated as commodities or products) and 51 individual countries, including the SACU country aggregate described above.

The dataset includes all 11 ECCAS members and all 15 ECOWAS members. SADC enters the dataset with 10 individual member countries, while its other 5 members are aggregated as one case (SACU countries). With Swaziland among the aggregated countries, COMESA is left with 18 of its 19 members. The dataset also includes some countries that are not members of any REC, including Algeria, Mauritania, Morocco, Saint Helena, Somalia, Tunisia, and Western Sahara.

⁸The Harmonized System (HS) is an international nomenclature for the classification of products that allows participating countries to classify traded goods on a common basis for customs purposes.

Only competitive effect values are reported and analyzed in this chapter. In addition, the chapter does not present results of the application of the model under the second setting (where the model decomposes the export share growth for each REC as an aggregate exporter). Thus, in the following development,

the results that refer to the change in a REC's competitiveness reflect averages of changes in the competitiveness of its member countries. Unsurprisingly, such averages reveal more meaningful differences across RECs than do the results obtained from modeling the RECs as aggregate exporting entities.

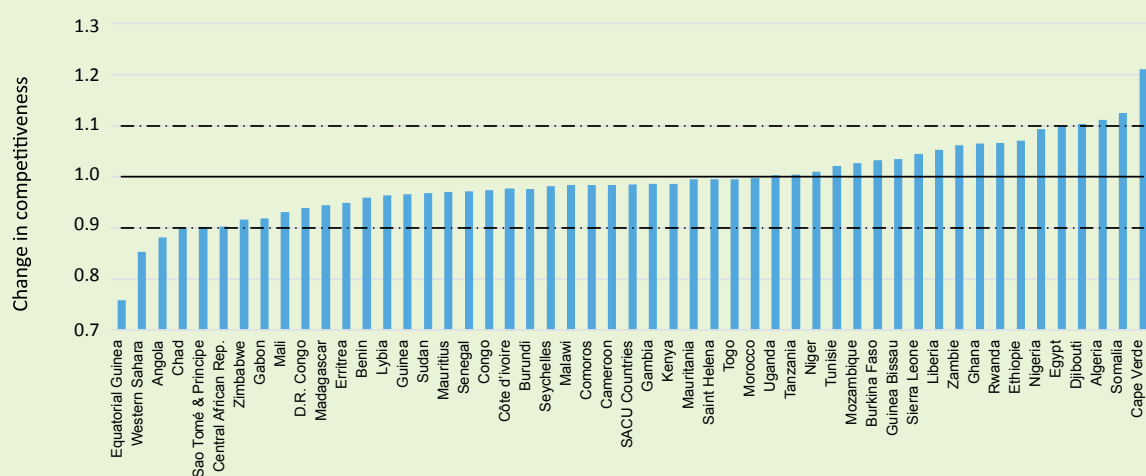
Competitiveness in Global Markets: Country and Commodity Rankings

The values of the competitive effect derived from the decomposition analysis of growth shares for individual African countries are presented in Table 4A.1 in Appendix 4A. They reflect the changes in competitiveness of African countries compared with their competitors as a group in selected agricultural export markets during 1998–2013.

The coefficients of the competitive effect in global markets are smaller than 1.0 for 32 of the 51 countries under analysis, which means that those countries have underperformed the group of their competitors in global markets (Figure 4.1). The countries with the largest declines in competitiveness include three ECCAS

members (Equatorial Guinea, Angola, and Chad) for which estimates of the competitive effect are not greater than 0.9. Between the 0.9 and 1.0 thresholds are the values of the competitive effect estimated for all other ECCAS members, with the only exception being Rwanda. Apart from Angola, almost two-thirds of the other SADC members recorded a competitive effect within the 0.9 to 1.0 interval, the three exceptions being Mozambique, Tanzania, and Zambia. As many ECCAS and SADC members are also COMESA members, up to two-thirds of COMESA members are among the countries that underperformed the group of their competitors. For ECOWAS, half of its members are also among underperforming countries.

Figure 4.1. Change in country competitiveness in global agricultural export markets, 1998–2013



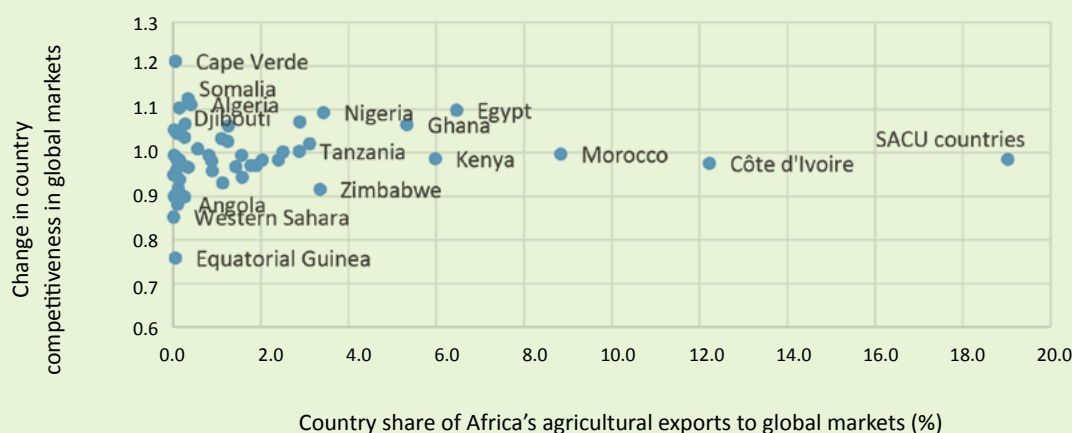
Source: Authors' calculations based on CEPII (2015).

Note: The change in competitiveness is measured by the coefficient of the competitive effect derived from export share decomposition analysis for individual countries.

However, for 19 of the 51 countries considered, the coefficients of the competitive effect are greater than 1.0. These countries succeeded in raising their levels of competitiveness by expanding their exports to global markets faster than their competitors. The strongest increases in competitiveness were achieved by Cabo Verde, Somalia, Algeria, and Djibouti, where estimated values of the competitive effect are greater than 1.1. The other 15 countries more modestly outperformed their competitors, with competitive effect values between the 1.0 and 1.1 thresholds. These countries include the other half of ECOWAS members (Niger, Burkina Faso, Guinea-Bissau, Sierra Leone, Liberia, Ghana, and Nigeria). Tunisia also falls within the outperforming countries, as do Tanzania, Mozambique, and Zambia within SADC and Uganda, Rwanda, Ethiopia, and Egypt within COMESA.

Changes in country competitiveness are plotted in Figure 4.2 against country shares in Africa's global agricultural exports as presented in Table 4A.2. The most notable changes in competitiveness occurred among countries that contribute very small shares of African global exports. Conversely, countries with higher export shares did not experience a notable change in competitiveness. Thus, Africa's export performance mostly improved among small exporting countries like Algeria, Cabo Verde, Djibouti, and Somalia, whereas it stagnated among larger exporting countries like Côte d'Ivoire, Kenya, and Morocco. It is worth noting the performance of Egypt and Ghana, in that both countries represented at least 5 percent of Africa's global agricultural exports during 1998–2013, and both recorded an index of change in competitiveness close to 1.1.

Figure 4.2. Changes in country competitiveness compared with shares of Africa's agricultural exports to global markets, 1998–2013

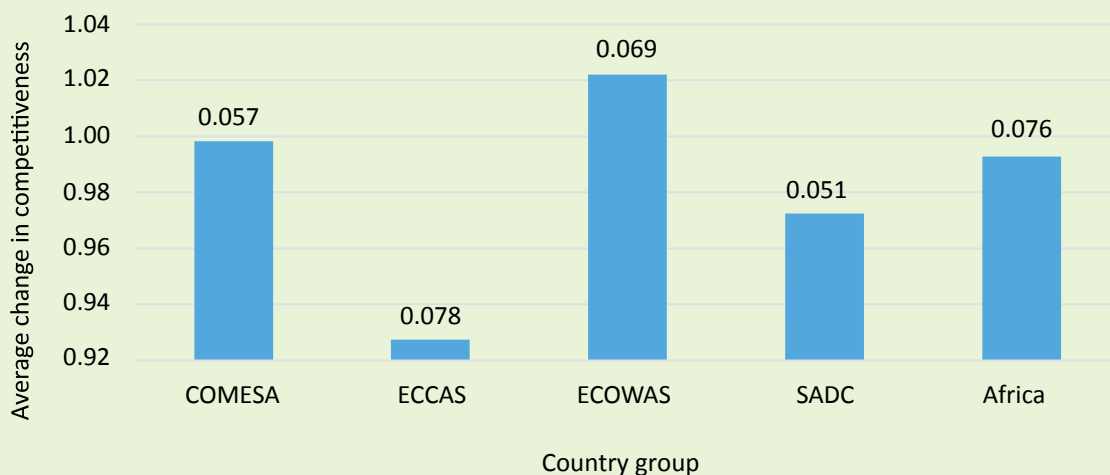


Source: Authors' calculations based on CEPII (2015).

Note: The change in competitiveness is measured by the coefficient of the competitive effect derived from export share decomposition analysis for individual countries.

In sum, ECCAS appears to be lagging behind in its attempts to increase its competitiveness in global agricultural export markets, but the shares of underperforming countries within COMESA, ECOWAS, and SADC are also of concern. In order to get clearer insight into the differences among regional country groupings, average sizes of the competitive effect were plotted (Figure 4.3). Within-group variations

in the values of the competitive effect seem to be homogenous across groups, which justifies comparisons of the average effects. SADC, and more notably ECCAS, members appear to have lost competitiveness on average, with ECCAS showing a bigger loss. In contrast, on average, ECOWAS members appear to have raised their competitiveness, whereas little or no average change was recorded by COMESA members.

Figure 4.3. Average change in competitiveness in global agricultural export markets, 1998-2013

Source: Authors' calculations based on CEPII (2015).

Note: Change in competitiveness is measured by the coefficient of the competitive effect derived from export share decomposition analysis for individual countries. Standard deviation values are shown on top of the bars.

Table 4.1. Analysis of variance of changes in country competitiveness in global agricultural export markets, 1998-2003

Test group	Sum of squares		df	Mean square	F	Sig.	Eta squared
COMESA vs. non-COMESA countries	Between groups	0.001	1	0.001	0.142	0.708	0.003
	Within groups	0.286	49	0.006			
	Total	0.287	50				
ECCAS vs. non-ECCAS countries	Between groups	0.06	1	0.060	12.919	0.001	0.209
	Within groups	0.227	49	0.005			
	Total	0.287	50				
ECOWAS vs. non-ECOWAS countries	Between groups	0.018	1	0.018	3.282	0.076	0.063
	Within groups	0.269	49	0.005			
	Total	0.287	50				
SADC vs. non-SADC countries	Between groups	0.006	1	0.006	1.009	0.32	0.02
	Within groups	0.281	49	0.006			
	Total	0.287	50				

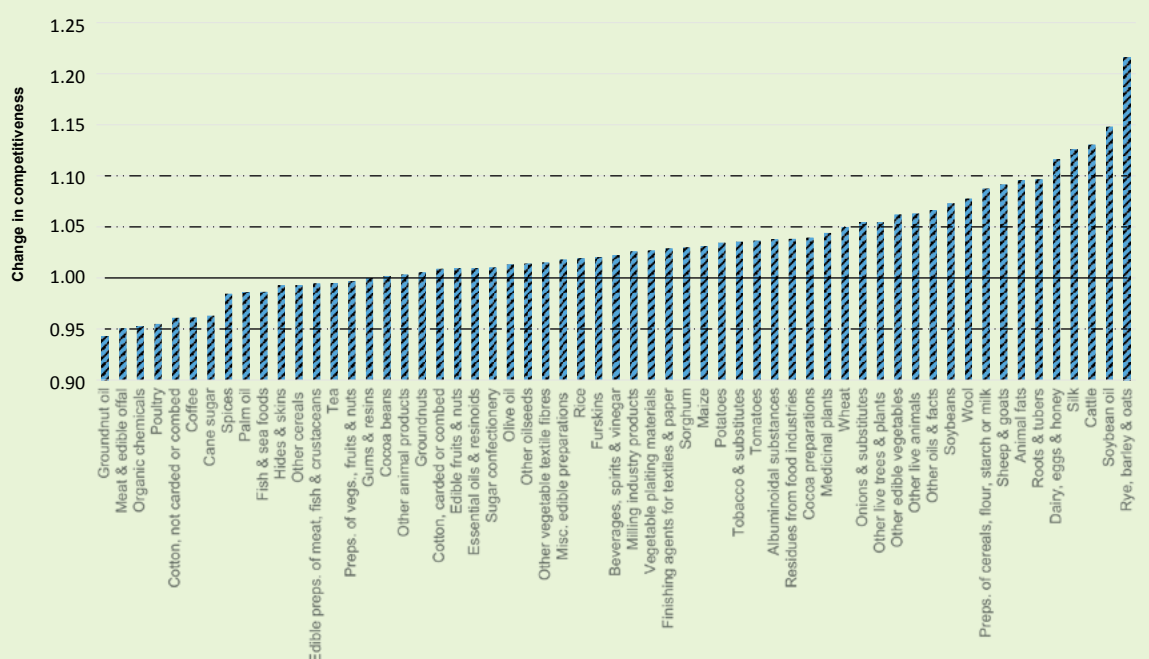
Source: Authors' calculations based on CEPII (2015).

Note: Change in competitiveness is measured by the coefficient of the competitive effect derived from export share decomposition analysis for individual countries.

An analysis of variance was undertaken to statistically test the difference between each regional country grouping and the rest of Africa (Table 4.1). The results confirm that the size of competitive effects are, on average, significantly lower for ECCAS and higher for ECOWAS compared with other African countries/regions. However, variations across groups contribute minimally to the overall variations among countries. This means that the larger part of the variations in the change in competitiveness between countries is not related to regional factors, but to domestic ones, such as changes in total factor productivity and the competitiveness of most exported commodities by individual countries. Indeed, as postulated by Hausman, Hwang, and Rodrik (2005), what countries export matters for their overall competitiveness.

Table 4A.3 (in Appendix 4A) presents the values of the competitive effect calculated for agricultural commodities through the decomposition of Africa's commodity-specific growth in export shares in alternative export markets during 1998–2013. The values capture the magnitudes of changes in competitiveness that Africa achieved compared with its non-African competitors in the different export markets. In Figure 4.4, commodities are sorted in increasing order of changes in competitiveness in global markets. In addition to the threshold of 1.0, demarcating commodities in which Africa lost competitiveness from those in which Africa gained competitiveness, thresholds of 0.95, 1.05, and 1.10 are also presented to more clearly differentiate between lower and higher losses or gains.

Figure 4.4. Changes in competitiveness of commodities in global agricultural export markets, 1998–2013



Source: Authors' calculations based on CEPII (2015).

Note: Change in competitiveness is measured by the coefficient of the competitive effect derived from commodity-level export share decomposition analysis for African countries as a group.

African exporters lost competitiveness in global markets in the exports of 15 of 59 commodities. Important food staples affected include groundnut oil, meat and edible offal, poultry, palm oil, fish and seafood, and some cereals (within the commodity group comprising buckwheat, millet, and canary seed). However, the size of the

loss in competitiveness was modest (the corresponding estimates of the competitive effect fall within the 0.95 to 1.0 interval).

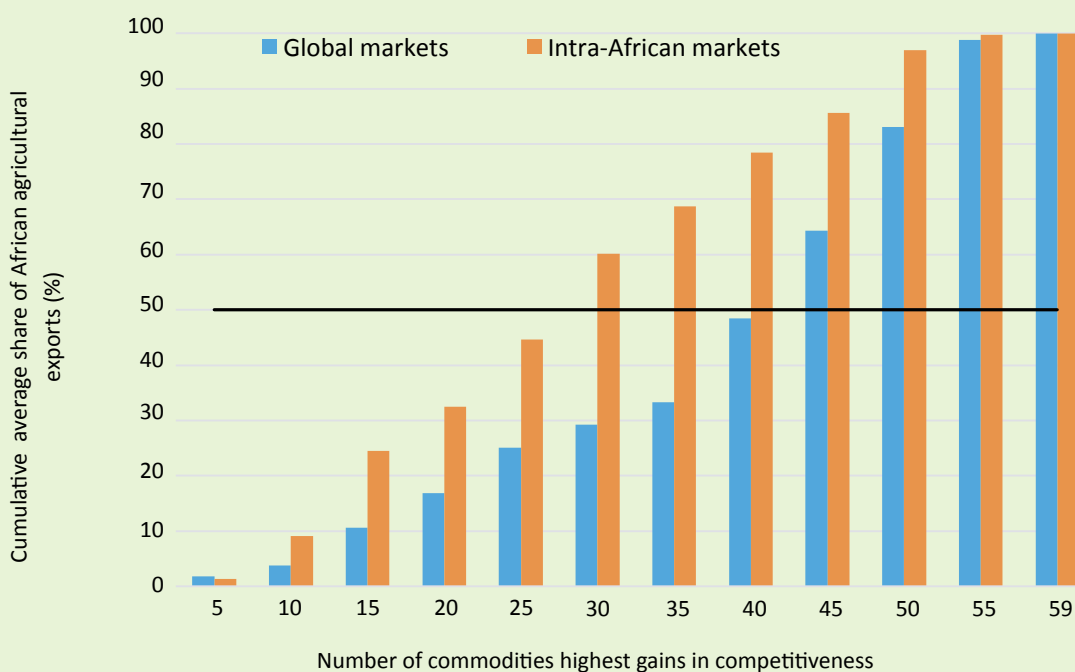
For the majority of the commodities under analysis, Africa increased its competitiveness in global markets by expanding its exports of

these commodities faster than did the group of non-African competitors. Up to 44 of 59 commodities considered show a competitive effect higher than 1.0. Commodities with the strongest increase in competitiveness, with values greater than 1.10, were rye, barley, and oats; soybean oil; cattle; silk; and dairy, eggs, and honey. Many food staples are found among the commodities for which gains in competitiveness were higher than 1.05 but smaller than 1.1. Such commodities include roots and tubers, sheep and goats, other live animals, onions and substitutes, and wheat. But a number of other staples are among commodities for which Africa more modestly outperformed its group of competitors, including tomatoes, potatoes, maize, sorghum, and rice, which show competitive effect values in the 1.0 to 1.05 interval.

Overall, African exporters either lost competitiveness or modestly increased competitiveness for traditional African cash crops like coffee, cocoa beans, tea, cotton, groundnut oil, palm oil, sugarcane, groundnuts, and other oilseeds.

In contrast, exporting countries were, on average, able to improve their competitiveness for new export commodities like wool, soybeans, soybean oil, live trees and plants, and cocoa preparations. Figure 4.5 presents an assessment of the importance of the commodities with the highest competitiveness gains in terms of their shares of the value of Africa's total agricultural exports to global markets compared with intra-African markets. The top-15 commodities account for only 10 percent of Africa's global agricultural exports, and the top-40 commodities in the ranking barely reach the 50 percent share threshold. Conversely, the bottom-19 commodities in the ranking represent up to 51.5 percent of African agricultural exports. This confirms the implication that competitiveness gains in global markets are not only occurring for traditional African export commodities, but also for emerging export products. It is indicative of the scope for further expanding Africa's global exports by exploiting increased commodity competitiveness.

Figure 4.5. Relative importance of commodities with the highest increase in competitiveness in global and intra-African markets



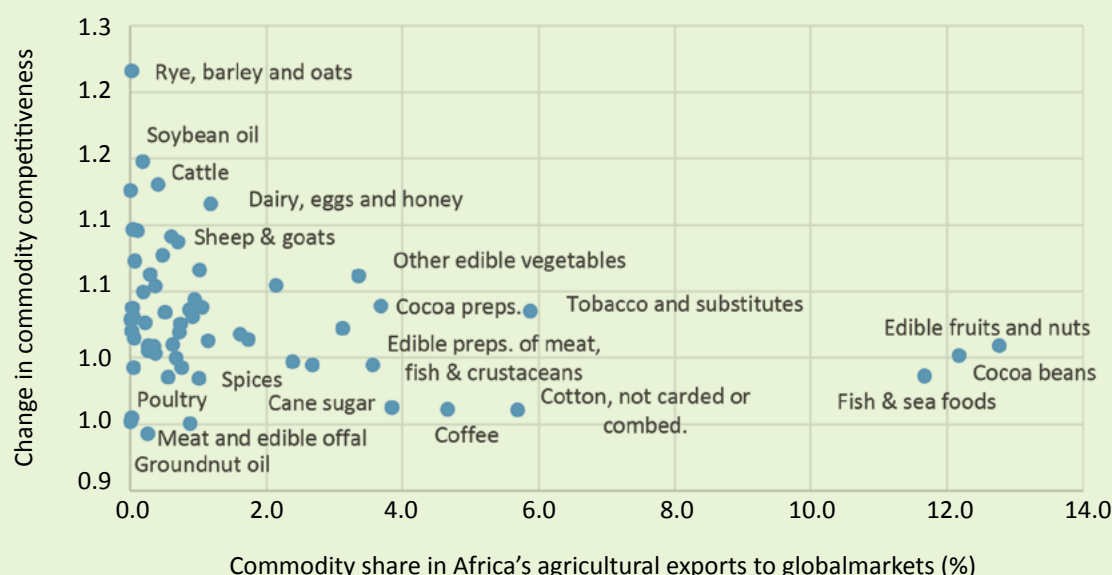
Source: Authors' calculations based on CEPII (2015).

Note: Change in competitiveness is measured by the coefficient of the competitive effect derived from commodity-level export share decomposition analysis for African countries as a group.

The same conclusions are illustrated in Figure 4.6, which shows a scatter plot of changes in commodity competitiveness against commodity shares in Africa's global agricultural exports (presented in Table 4A.4 in Appendix 4A). Changes in competitiveness were generally achieved for commodities that account for small shares of Africa's global agricultural exports.

Conversely, commodities that represent higher export shares recorded little or no change in competitiveness. Thus, the performance of African exporters mostly improved in minor export products like rye, barley, and oats; soybean oil; and cattle, whereas their performance stagnated in major export products like edible fruit and nuts, cocoa beans, fish and seafood, coffee, cotton, and cane sugar.

Figure 4.6. Changes in commodity competitiveness compared with commodity shares of Africa's agricultural exports to global markets, 1998–2013



Source: Authors' calculations based on CEPII (2015).

Note: Change in competitiveness is measured by the coefficient of the competitive effect derived from commodity-level export share decomposition analysis for African countries as a group.

So far the analysis has focused on changes in competitiveness for countries and commodities in global markets. The next section explores changes in the competitiveness of countries and commodities in intra-African markets compared with the results for global markets already discussed.

Competitiveness in Intra-African Markets: Country and Commodity Rankings

Changes in the competitiveness of individual African countries in global and intra-African agricultural markets were measured by the coefficients of the competitive effect derived through country-level share growth decomposition (Figure 4.7 and Table 4A.1). In the case of intra-African markets, only 20 countries re-

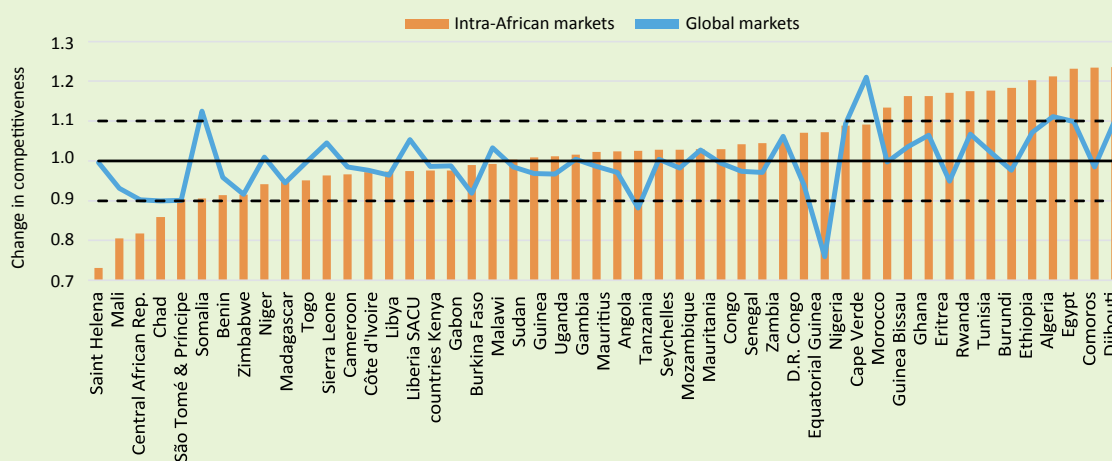
corded competitiveness changes lower than 1.0, compared with 32 countries in the ranking of competitiveness in global markets (see Figure 4.1). This means that a smaller share of African countries underperformed their competitors in intra-African markets compared with global markets. Of those 20 countries,

Saint Helena, Mali, Central Africa Republic, and Chad strongly underperformed, with competitive effect values lower than 0.9.

At the top of the ranking, 12 countries strongly outperformed, with estimates of the competitive effect greater than 1.1. The top-five ranked countries are Djibouti, Comoros, Egypt, Algeria, and Ethiopia. It is worth recalling that

only four countries reached that level of increased competitiveness in global markets. More interestingly, almost all the outperforming countries performed better in intra-African markets than in global markets (Figure 4.7). And conversely, almost all underperforming countries lost more competitiveness in intra-African markets than in global markets.

Figure 4.7. Change in competitiveness of countries in intra-African agricultural export markets compared with global markets, 1998-2013



Source: Authors' calculations based on CEPII (2015).

Note: Change in competitiveness is measured by the coefficient of the competitive effect derived from export share decomposition analysis for individual countries.

Table 4.2. Paired-sample T-tests for equality of changes in country competitiveness in pairs of African agricultural export markets

Paired markets	Paired samples correlation			Mean paired differences	t	df	Sig. (2-tailed)
	N	Correlation	Sig.				
COMESA and global markets	48	0.417	0.003	0.002	0.086	47	0.932
ECCAS and global markets	46	0.631	0.000	-0.030	-2.183	45	0.034
ECOWAS and global markets	50	0.239	0.095	-0.009	-0.514	49	0.610
SADC and global markets	50	0.114	0.431	-0.025	-1.387	49	0.172
Intra-African and global markets	50	0.398	0.004	0.033	2.144	49	0.037
COMESA and intra-African markets	48	0.721	0.000	-0.024	-1.690	47	0.098
ECCAS and intra-African markets	46	0.479	0.001	-0.069	-4.069	45	0.000
ECOWAS and intra-African markets	50	0.487	0.000	-0.042	-2.532	49	0.015
SADC and intra-African markets	50	0.574	0.000	-0.058	-3.904	49	0.000

Source: Authors' calculations based on CEPII (2015).

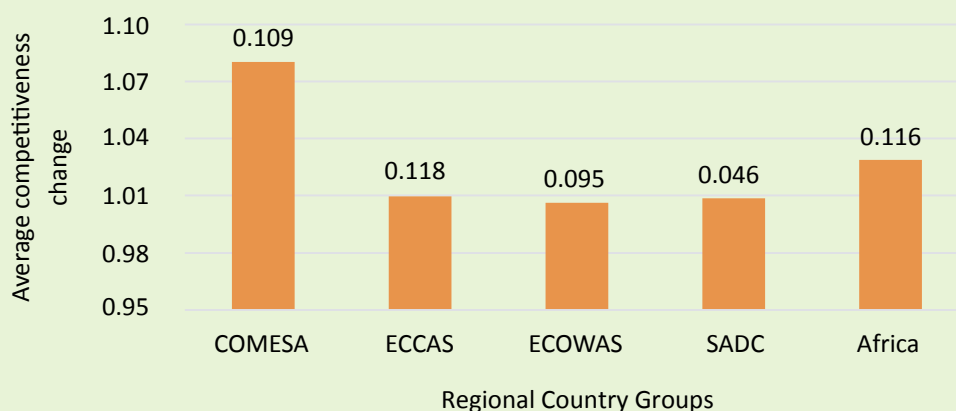
Note: Change in competitiveness is measured by the coefficient of the competitive effect derived from export share decomposition analysis for individual countries

The results of paired-sample T tests for no difference between competitive effects in global versus regional and intra-African markets are presented in Table 4.2. The last row of the first panel shows that changes in competitiveness in intra-African and global markets are weakly and positively correlated. In other words, overall, changes in competitiveness were higher in intra-African markets compared with global markets, but not consistently for all sample countries. It also appears that a significant difference exists in the magnitude of changes in competitiveness between intra-African and global markets. On average, changes in competitiveness were higher by 0.033 points in intra-African markets than in global markets.

It is of interest to see how the member countries of the different RECs performed in intra-African markets, on average.

COMESA members generally achieved higher gains in competitiveness than the rest of African countries in intra-African markets (Figure 4.8). Indeed, seven COMESA members ranked in the top ten (Djibouti, Comoros, Egypt, Ethiopia, Burundi, Rwanda, and Eritrea), and only Kenya ranked within the bottom 20 (Figure 4.7). An analysis of variance of the competitive effect in intra-African markets confirms that, on average, COMESA members performed significantly better than other African countries (Table 4.3). In contrast, no perceptibly significant difference exists among the members of ECCAS, ECOWAS, and SADC in terms of changes in their competitiveness in intra-African markets. This may be due in part to differences in competitiveness gains achieved for particular export commodity groups.

Figure 4.8. Average change in competitiveness in intra-African agricultural export markets, 1998–2013



Source: Authors' calculations based on CEPII (2015).

Note: Change in competitiveness is measured by the coefficient of the competitive effect derived from export share decomposition analysis for individual countries. Standard deviation values are shown on top of the bars.

Table 4.3. Analysis of variance in changes in country competitiveness in intra-African agricultural export markets, 1998–2013

Test group	Sum of squares		df	Mean square	F	Sig.	Eta squared
COMESA vs. non-COMESA countries	Between groups	0.075	1	0.075	6.196	0.016	0.114
	Within groups	0.579	48	0.012			
	Total	0.654	49				
ECCAS vs. non-ECCAS countries	Between groups	0.005	1	0.005	0.379	0.541	0.008
	Within groups	0.649	48	0.014			
	Total	0.654	49				
ECOWAS vs. non-ECOWAS countries	Between groups	0.011	1	0.011	0.806	0.374	0.017
	Within groups	0.643	48	0.013			
	Total	0.654	49				
SADC vs. non-SADC countries	Between groups	0.006	1	0.006	0.424	0.518	0.009
	Within groups	0.648	48	0.014			
	Total	0.654	49				

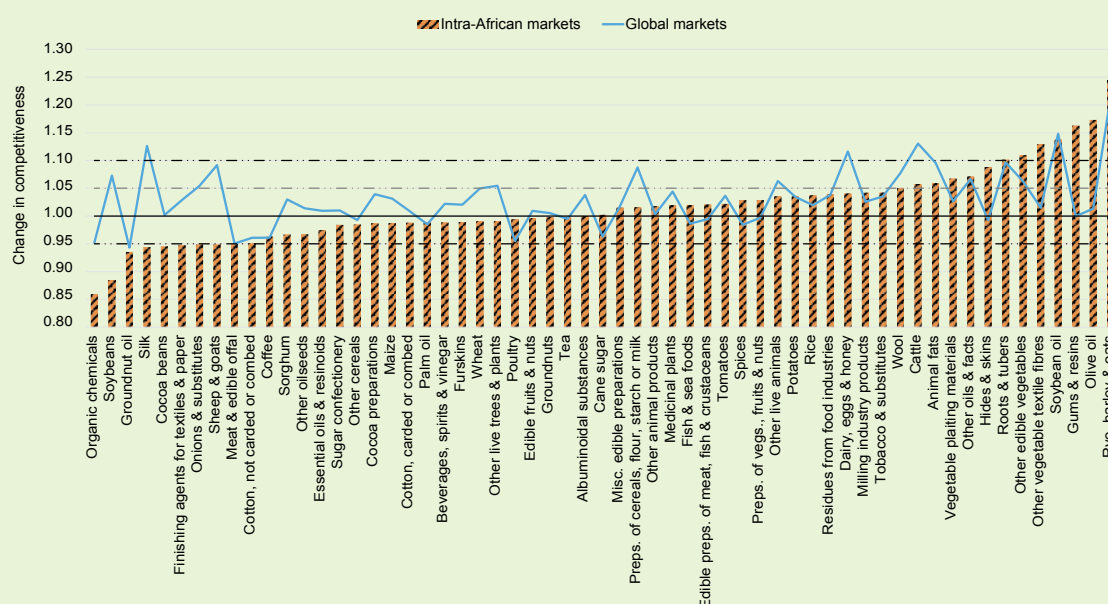
Source: Authors' calculations based on CEPII (2015).

Note: Change in competitiveness is measured by the coefficient of the competitive effect derived from export share decomposition analysis for individual countries.

Changes in the competitiveness of African countries in intra-African and global markets for individual agricultural commodity groups are presented in Figure 4.9, constructed from Table 4A.3. For 29 of the 59 commodities under analysis, Africa underperformed the group of its competitors in intra-African markets. The corresponding number in the preceding ranking relative to global markets is 15 of 59 commodities. Furthermore, in terms of commodity competitiveness gains, it appears that Africa's performance was generally lower in intra-African markets than in global markets, as appears to be the case for the majority of commodities (Figure 4.9).

The statistical significance of these comparisons was analyzed through a test for equality of changes in commodity competitiveness in global markets compared with intra-African and regional markets. Competitiveness changes in intra-African and global markets are positively but weakly correlated (Table 4.4, last row). Simply put, changes in competitiveness tend to be greater in global markets than in intra-African markets, but not consistently across all commodities. At the 10 percent significance level, competitiveness changes were indeed lower in intra-African than in global markets; however, the average difference is as small as 0.014 points.

Figure 4.9. Change in competitiveness of commodities in intra-African agricultural export markets compared with global markets, 1998-2013



Source: Authors' calculations based on CEPII (2015).

Note: Change in competitiveness is measured by the coefficient of the competitive effect derived from commodity-level export share decomposition analysis for African countries as a group.

Many staple food products are among the commodities for which Africa underperformed, including onions and substitutes, sheep and goats, meat and edible offal, poultry, sorghum, maize, wheat, and other cereals. Africa strongly or weakly outperformed its competitors in global markets in exporting some of those staples (onions and substitutes, sheep and goats, wheat, maize, and sorghum). Similarly to its competitiveness in global markets, Africa experienced positive changes in its competitiveness in intra-African markets for a number of other important foodstuffs, including roots and tubers; cattle; other live animals; dairy, eggs, and honey; rice; potatoes; tomatoes; and fish and seafood. In contrast, and as in global markets, Africa lost some competitiveness in intra-African markets for its traditional cash crops, such as coffee, cocoa beans, tea, cotton, groundnut oil, palm oil, groundnuts, and other oilseeds.

The products that showed the highest competitiveness increase in intra-African markets,

including rye, barley and oats (maintaining the highest ranking) and soybean oil, also topped the rankings for global markets. It also appears that African exporters did better in intra-African markets than in global markets in exporting emerging export products like olive oil, soybean oil, gums and resins, other (than cotton) vegetable textile fibers, hides and skins, and spices. The top-15 commodities only accounted for 24.5 percent of intra-African agricultural exports during the timeframe under study, and the top-25 commodities did not reach the 50 percent share threshold (Figure 4.5). However, the contributions of the same numbers of the top-ranked commodities in global markets to Africa's global agricultural exports were much smaller—that is, more commodities with relatively higher export value gained competitiveness in intra-African markets compared with global markets (Figure 4.5). This is in line with the faster growth of intra-African agricultural trade in terms of value over the period under analysis.

Table 4.4. Paired-sample T test for changes in equality of commodity competitiveness in pairs of African agricultural export markets

Paired markets	Paired samples correlation			Mean paired differences	t	df	Sig. (2-tailed)
	N	Correlation	Sig.				
COMESA and global markets	59	0.475	0.000	-0.003	-0.306	58	0.761
ECCAS and global markets	59	0.430	0.001	-0.037	-4.238	58	0.000
ECOWAS and global markets	59	0.087	0.513	-0.020	-1.706	58	0.093
SADC and global markets	59	0.331	0.010	-0.015	-1.529	58	0.132
Intra-African and global markets	59	0.444	0.000	-0.014	-1.709	58	0.093
COMESA and intra-African markets	59	0.635	0.000	0.012	1.555	58	0.125
ECCAS and intra-African markets	59	0.377	0.003	-0.022	-2.246	58	0.029
ECOWAS and intra-African markets	59	0.294	0.024	-0.005	-0.484	58	0.630
SADC and intra-African markets	59	0.637	0.000	-0.001	-0.129	58	0.898

Source: Authors' calculations based on CEPII (2015).

Note: Change in competitiveness is measured by the coefficient of the competitive effect derived from commodity-level export share decomposition analysis for African countries as a group.

Competitiveness in Regional Markets: Country and Commodity Rankings

The analysis now turns to exploring the scope of Africa's competitiveness gains or losses in regional markets during the 1998–2013 time-frame, ranking African countries in increasing order of improvements in their competitiveness in the agricultural markets of each REC and comparing changes in competitiveness in regional markets with those in global and intra-African markets.

Ten countries (Cameroon, Central African Republic, Kenya, Madagascar, Mali, Niger, São Tomé and Príncipe, Togo, Zimbabwe, and SACU countries as a group) underperformed in all four regional markets (Figure 4A.1. in Appendix 4A). Similarly, nine countries (Algeria, Egypt, Ethiopia, Malawi, Mauritania, Morocco, Nigeria, Rwanda, and Senegal) outperformed in all regional markets. As a general trend, changes in country competitiveness in regional markets were lower than in broader intra-African and global markets, particularly among the lowest-ranked countries.

Results from the test for equality reveal that average changes in competitiveness were significantly lower in ECCAS markets than in global markets (by 0.03 points); no significant

differences were identified among the other regional and global markets (Table 4.2). Nevertheless, the test indicates that changes in country competitiveness were significantly lower in all regional markets than in the broader intra-African markets, with differences ranging from 0.024 to 0.069 points, on average.

Results provide clearer insight into Africa's performance in regional markets, with a breakdown of both underperforming and outperforming countries by regional grouping (Table 4.5; Figure 4A.1). More than half of African exporters (26–28 countries) underperformed their competitors in ECCAS, ECOWAS, and SADC markets, with effects being smaller than 1.0. Relatively fewer of African exporters also underperformed in COMESA markets (19 countries). Indeed, at least half of each REC's member countries outperformed their competitors in COMESA markets, recording competitive effects greater than 1.0.

Table 4.5. Breakdown of the number of underperforming and outperforming countries in agricultural export markets by regional economic community

Country grouping	Global markets	Intra-African markets	COMESA markets	ECCAS markets	ECOWAS markets	SADC markets
Number of underperforming countries (with a competitive effect < 1.0)						
COMESA members	12	4	4	8	11	6
ECCAS members	10	5	6	8	7	7
ECOWAS members	7	8	6	8	6	12
SADC members	8	3	4	8	8	5
Whole sample	32	20	19	26	27	28
Number of outperforming countries (with a competitive effect > 1.0)						
COMESA members	6	14	14	8	7	12
ECCAS members	1	6	4	3	4	4
ECOWAS members	8	7	8	7	9	3
SADC members	3	8	7	3	3	6
Whole sample	19	30	29	20	23	22
Total number of countries in sample						
Whole sample	51	50	48	46	50	50

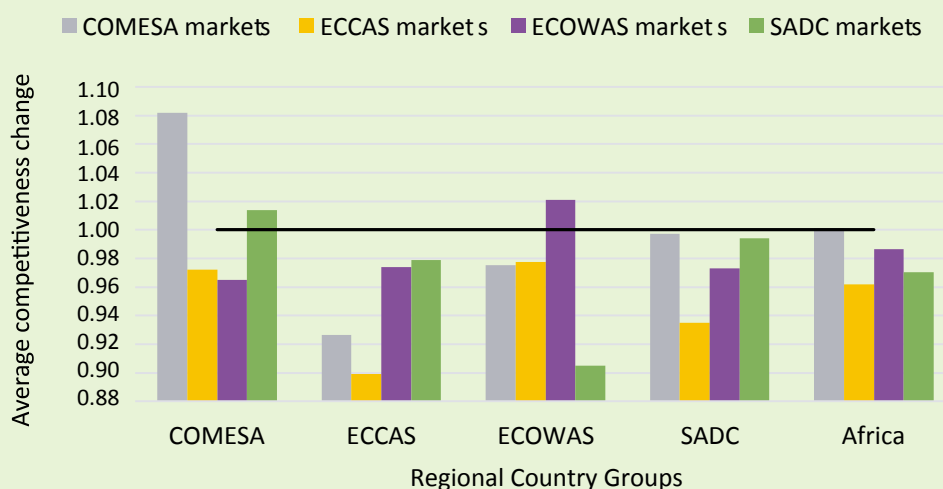
Source: Authors' calculations based on CEPII (2015).

Note: Change in competitiveness is measured by the coefficient of the competitive effect derived from export share decomposition analysis for individual countries.

For the COMESA region, for example, only 4 of its members underperformed in their intra-regional markets compared with 11 members in more distant extra-regional ECOWAS markets (Table 4.5, first row of the upper panel). Conversely, up to 14 of COMESA's members outperformed their competitors in their intra-regional markets compared with only 7 members in extra-regional markets within ECOWAS (Table 4.5, first row of the lower panel). Similarly, a smaller number of ECOWAS members underperformed in intra-regional markets than in the remoter extra-regional SADC markets. The same is true for the SADC region, where results show fewer underperforming members in intra-regional markets than in the remoter ECOWAS and ECCAS markets. Surprisingly, however, more ECCAS members underperformed and fewer outperformed in intra-regional markets compared with extra-regional markets.

On average, the change in competitiveness among COMESA members was positive in intra-regional markets, and to a lesser extent in SADC markets, but negative in the more distant ECCAS and ECOWAS markets (Figure 4.10). On average, ECOWAS members also raised their competitiveness in intra-regional markets and reduced their competitiveness in extra-regional markets, with the largest average reduction incurring in the remotest SADC markets. The average competitiveness level of SADC members remained virtually unchanged in intra-regional and COMESA markets, but fell in ECOWAS markets and more notably in ECCAS markets. The patterns are different for the ECCAS region, which underperformed in all regional markets and, more remarkably, in intra-regional markets as well.

Figure 4.10. Average change in competitiveness in regional agricultural export markets, 1998–2013



Source: Authors' calculations based on CEPII (2015).

Note: Change in competitiveness is measured by the coefficient of the competitive effect derived from export share decomposition analysis for individual countries.

The statistical significance of pairwise comparisons of average changes between regional markets and Africa-wide markets was also tested (Figure 4.10; Tables 4B.1–4B.4 in Appendix 4B). It appears that the COMESA region raised its competitiveness in intra-regional and SADC markets significantly more than the rest of Africa. The ECOWAS region only performed significantly better than the rest of Africa in SADC markets. The ECCAS region underwent a significantly stronger loss of competitiveness compared with the rest of Africa in intra-regional and COMESA markets. These patterns of disparities between regional groups of countries suggest that differences in country competitiveness stem from factors other than trading distance or costs. Differences in the competitiveness of most traded goods in individual countries may have been a contributing factor.

For some commodities, mostly those ranked highest, changes in competitiveness were higher in regional markets than in global and intra-African markets, whereas for other commodities, mostly those ranked lowest, the reverse was true (Figure 4A.2). In order to assess the consistency and significance of these differences, paired-sample T tests of the equality

of changes in competitiveness were carried out, comparing regional markets with global and intra-African markets (Table 4.4). Changes in commodity competitiveness in global markets were positively but weakly correlated with changes in COMESA, as well as in ECCAS and SADC markets (Table 4.4, upper panel). No significant correlation was found in changes in competitiveness in global and ECOWAS markets. On average, the changes were lower by 0.037 points in ECCAS markets compared with global markets at the 1 percent significance level, versus 0.020 points in ECOWAS markets at the 10 percent significance level. In contrast, on average, no significant difference was identified in changes in competitiveness in global and COMESA or SADC markets.

The analysis found positive and weak correlations of commodity competitiveness changes in intra-African and intra-regional markets, except for COMESA and SADC, where competitiveness changes were more strongly associated with changes in intra-African markets (Table 4.4, lower panel). This means that the changes in competitiveness among intra-African markets reflect changes in COMESA and SADC significantly more than changes elsewhere in Africa.

On average, changes in the competitiveness of commodities were lower by 0.022 points in ECCAS markets than elsewhere in Africa at the 5 percent significance level.

The loss of competitiveness by African countries affected a greater number of commodities in ECCAS markets compared with the other regional markets (Table 4.6). For a total of 32 commodities, the competitive effect was smaller than 1.0 (including 26 commodities with small losses in competitiveness, but only 6 with high losses).

Conversely, the gains in competitiveness among African exporters benefited a greater number of commodities in COMESA markets compared with other regional markets (up to 31 commodities with small gains, and only 8 with high gains). Nevertheless, the number of commodities with increased competitiveness was still greater in global markets than in regional markets. In other words, room exists to expand Africa's share of total world agricultural exports by aligning changes in competitiveness in regional markets with improvements being made outside Africa.

Table 4.6. Number of commodity groups by class of competitiveness change in agricultural export markets

Competitiveness class	Export markets					
	Global markets	Intra-African markets	COMESA markets	ECCAS markets	ECOWAS markets	SADC markets
Competitive effect ≤ 0.9	0	2	1	6	2	2
$0.9 < \text{Competitive effect} \leq 1.0$	16	27	19	26	22	24
$1.0 < \text{Competitive effect} \leq 1.1$	38	23	31	23	30	28
Competitive effect > 1.1	5	7	8	4	5	5
Whole sample size	59	59	59	59	59	59

Source: Authors' calculations based on CEPII (2015).

Note: Change in competitiveness is measured by the coefficient of the competitive effect derived from commodity-level export share decomposition analysis for African countries as a group.

Commodities that lost competitiveness in at least three regional markets included cotton, wheat, sorghum, some oilseeds (excluding soybeans and groundnuts), meat and edible offal, groundnut oil, and tea—all of which were also ranked among products with no or low competitiveness gains in intra-African markets and (with the exception of wheat and sorghum) in global markets. Among the highest ranked commodities, many—including rice, potatoes, onions and substitutes, fish and seafood, sheep and goats, other live animals,⁹ and roots and tubers—had gained competitiveness in at least three regional markets.

These commodities all gained in competitiveness in global markets (with the exception of fish and seafood), as well as in intra-African markets (with the exception of onions and substitutes and sheep and goats, which lost competitiveness in ECOWAS markets).

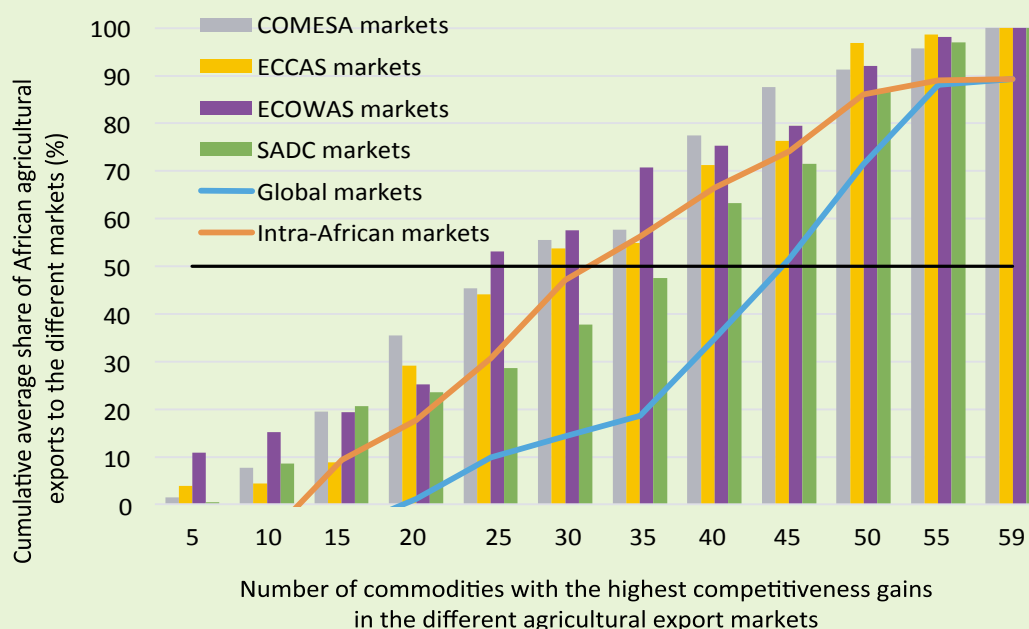
In efforts to assess the importance of the highest-ranked commodities, the cumulative share of Africa's total agricultural exports to alternative markets was analyzed in terms of the contributions of the commodities with the highest gains in competitiveness in those markets (Figure 4.11). As in global and intra-African markets, the highest-ranked commodities in regional markets accounted for small shares of African exports to these markets. As already noted, however, the top-ranked commodities represented higher cumulative shares of ex-

⁹ This group comprises a broad range of live swine, horses, asses, mules and hinnies.

ports in intra-African markets and in regional markets than in global markets. Results indicate that the top-five and top-ten commodities weighed more heavily in ECOWAS markets than in other intra-African markets. For instance, the top-five commodities in ECOWAS markets accounted for 10.8 percent of Africa's exports to that region, whereas the corresponding shares

in all intra-African markets and in global markets were 1.3 and 1.8 percent, respectively. Thus, the products with the highest gains in competitiveness in the different markets are not among the most exported ones, indicating that competitiveness gains occurred among products that could be further exploited by the relevant African countries to increase their export base.

Figure 4.11. Relative importance of commodities with the highest competitiveness gains in regional markets compared with global and intra-African markets



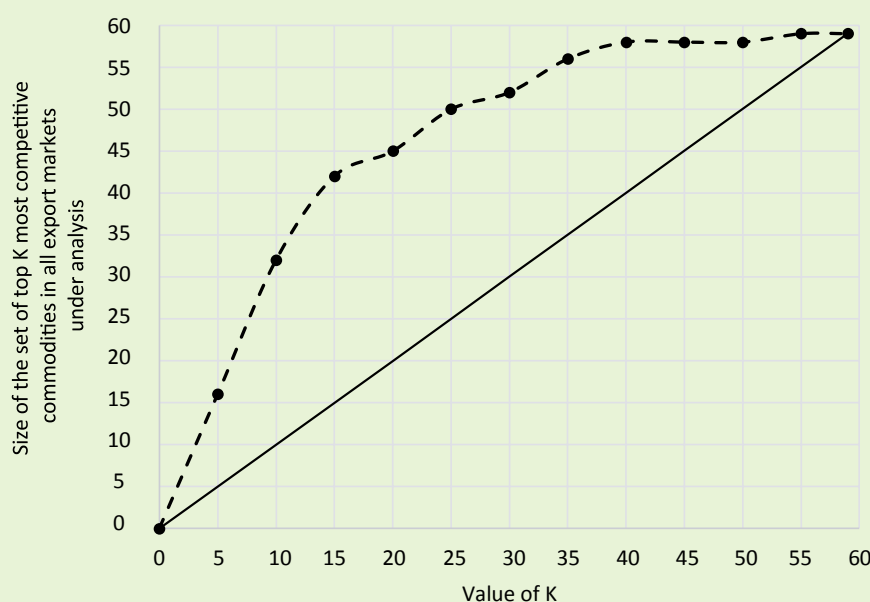
Source: Authors' calculations based on CEPII (2015).

Note: Change in competitiveness is measured by the coefficient of the competitive effect derived from commodity-level export share decomposition analysis for African countries as a group.

In exploring scope for expansion of exports both within and beyond Africa, it would appear that no single set of commodities gained competitiveness equally in different export markets. In contrast, the commodity rankings are quite dissimilar across markets (Figure 4.12). In those cases where commodity rankings are the same across markets, the top K ranked commodities in each market would be found in a unique set of K products (depicted in the figure by the 45 degree line). The greater the size of the set is than K, the greater the dissimilarity in the various rankings. The distance from the curved line to the straight line indicates the level of dis-

similarity among the rankings. For instance, the curved line shows that a set of 16 commodities encompassed the top five across all rankings. Similarly, a set of 32 commodities comprised the top ten across all rankings. In other words, the commodities with the greatest competitiveness gains are not the same across different markets, which justifies the inference that scope exists to expand the export base through commodity diversification in the markets under analysis. More simply, nontraditional export products are gaining competitiveness in different markets and hence are good candidates for export diversification and expansion.

Figure 4.12. Dissimilarity of commodity rankings in the different export markets



Source: Authors' calculations based on CEPII (2015).

Note: The change in competitiveness is measured by the coefficient of the competitive effect derived by decomposition analysis of the commodity-level export share for African countries as a group.

Determinants of Export Competitiveness in Global and Regional Markets

The preceding analyses have highlighted considerable variation across African countries in terms of changes in their competitiveness compared with the group of non-African competitors in agricultural export markets. These patterns of competitiveness changes differ not only across export markets, but also according to membership in the different RECs. Trading distance and costs appear to have affected the changes in competitiveness of REC members in intra-regional compared with extra-regional markets.

Nevertheless, the larger part of the differences across countries appears to have more to do with country-specific production and trade environments than with regional differences. Indeed, the analysis of changes in commodity competitiveness suggests that differences in productivity gains and domestic market conditions may play a large role in the differences in gains or losses of competitiveness achieved by African countries for the different commodities.

This section focuses on the factors causing disparities among countries in terms of changes in their competitiveness in the different markets. Potential determinants considered include changes in total factor productivity, drawing on data from the United States Department of Agriculture; the World Bank's Doing Business-Distance to Frontier indicator; the World Economic Forum's Global Competitiveness Index, and country attributes related to each of its 12 pillars; the International Logistics Performance Index, and its component indicators; and Transparency International's Corruption Perceptions Index.

A linear regression analysis was conducted, whereby the series of changes in country-level competitiveness in the various export markets were pooled to form a single variable, which was then regressed on the country-level indicators noted above taken as potential explanatory variables, controlling for REC membership and export markets (Tables 4.7 and 4.8). This procedure is formally summarized as follows:

$$COMP_{mj} = \alpha + \sum_i \beta_i \cdot REC_i + \sum_j \gamma_j \cdot MKT_j + \sum_p \theta_p \cdot IND_p + \varepsilon_{mj} \quad (8)$$

where $COMP_{mj}$ is the pooled variable standing for the change in competitiveness for country m , which is a member of the regional economic community r , in export markets j . REC_r represents dummy variables for the different RECs, MKT_j are dummy variables for the different export markets, and IND_m stands for the different indicators considered above as potential explanatory variables.

Table 4.7. Parameter estimates for the determinants of changes in country competitiveness

Parameter	Coefficient	Std. Error	t	Sig.
Constant	0.560	0.085	6.612	0.000
SADC region	-0.062	0.016	-3.872	0.000
Intra-African markets	0.039	0.017	2.267	0.025
Doing Business-Distance to Frontier ^a	0.003	0.001	2.242	0.026
Institutions (GCI 1st Pillar) ^b	0.043	0.018	2.316	0.022
Country market size (GCI 10th Pillar) ^b	0.048	0.011	4.182	0.000
Logistics Performance Index, Customs ^c	0.150	0.026	5.815	0.000
Logistics Performance Index, International shipments ^c	-0.128	0.029	-4.396	0.000
Total factor productivity growth estimates, 1961-2012	-1.613	0.949	-1.701	0.091

Source: Authors' calculations.

a. Doing Business-Distance to Frontier, maximum score between 2010 and 2016.

b. Global Competitiveness Index, average attribute value between 2006 and 2015.

c. International Logistics Performance Index (LPI 2014 score).

Table 4.8. Analysis of variance and model summary

	Sum of squares	df	Mean square	F	Sig.
Regression	0.769	8	0.096	12.321	0.000
Residual	1.381	177	0.008		
Total	2.150	185			
Number of observations	186				
R Squared	0.36				
Adjusted R Squared	0.33				
Durbin-Watson	2.36				

Source: Authors' calculations.

A subset of explanatory variables provide the best model fit (Table 4.7). As previously established, changes in country competitiveness are higher in intra-African markets than in global markets. The changes appear to be positively affected by the Doing Business-Distance to Frontier score, the quality of institutions, country market size, and the quality of the customs

service. Surprisingly, the model revealed that changes in country competitiveness are negatively associated with the ease of international shipments and changes in total factor productivity. The model accounts for nearly two-fifths of the variation in changes in competitiveness (Table 4.8).

Conclusion

Results of the analysis presented in this chapter indicate, almost consistently, that in all export markets under consideration, ECCAS members underperformed their competitors, on average, whereas SADC, COMESA, and ECOWAS members either maintained their competitiveness or outperformed the group of their competitors. In addition, changes in country competitiveness were, on average, lower in ECCAS markets and generally higher in intra-African markets than in global markets. The analysis also indicates that competitiveness gains for COMESA, ECOWAS, and SADC members were significantly greater in intra-regional markets than in extra-regional markets. For ECCAS, rare increases in country competitiveness occurred in extra-regional markets but not in intra-regional markets. It should be noted, however, that although ECCAS lags behind the other RECs in terms of its competitiveness, the shares of underperforming countries within COMESA, SADC, and ECOWAS are also a concern.

The analysis of Africa's competitiveness at the commodity level revealed significant losses for some important products, although the majority of commodities gained more competitiveness in global markets.

The levels of commodity competitiveness are lower, however, in intra-African than in global markets. They are even lower in regional markets, except in COMESA markets, where the commodity competitiveness level is higher than in global and intra-African markets. In other words, room exists to expand Africa's share of the world's total agricultural exports by aligning changes in competitiveness in regional markets with improvements being made outside Africa. The highest-ranked commodities contribute small shares to the intra-African agricultural export value, and an even smaller share of Africa's global agricultural export value. This further reflects scope for expanding African exports by exploiting increased competitiveness among new and emerging export products. The results show that the set of these potential products for export expansion varies remarkably across the different export markets, showing scope for product diversification by countries in conquering both African and world markets. Apart from REC membership, the Doing Business-Distance to Frontier score, the quality of domestic institutions, country market size, and the quality of customs service were shown to be significant contributors to variability in changes in competitiveness.

References

- CEPII (Centre d'Etudes Prospectives et d'Informations Internationales). 2015. "BACI: The International Trade Database at the Product Level." Accessed April 2017. www.cepii.fr/CEPII/en/bdd_modele/presentation.asp?id=1.
- Cheptea, A., G. Gaulier, G., and S. Zignago. 2005. *World Trade Competitiveness: A Disaggregated View by Shift-Share Analysis*. CEPII Working Paper 2005-23. Paris: Centre d'Etudes Prospectives et d'Informations Internationales.
- Hausman, R., J. Hwang, and D. Rodrik. 2005. "What You Export Matters." *Journal of Economic Growth* 12 (1): 1–25.
- Leamer, E., and R. Stern. 1970. *Quantitative International Economics*. Aldine.
- Magee, S. 1975. "Prices, Income, and Foreign Trade." In *International Trade and Finance: Frontiers for Research*, edited by P. Kenen. New York: Cambridge University Press.
- Richardson, J. 1971a. "Constant-Market-Shares Analysis of Export Growth." *Journal of International Economics* 1 (2): 227–239.
- _____. 1971b. "Some Sensitivity Tests for a 'Constant Market Shares Analysis' of Export Growth." *Review of Economics and Statistics* 53: 300–304.
- Tyszynski, H. 1951. "World Trade in Manufactured Commodities, 1899–1950." *The Manchester School of Economic and Social Studies* 19: 222–304.

Appendix 4A. Supplementary Tables and Figures

Appendix Table 4A.1. Change in competitiveness by country and agricultural export market, 1998–2013

Country	Global markets	Intra-African markets	COMESA markets	ECCAS markets	ECOWAS markets	SADC markets
Algeria	1.111	1.212	1.083	1.050	1.163	1.051
Angola	0.882	1.025	0.757	0.796	1.005	0.978
Benin	0.959	0.914	1.110	0.914	0.913	0.992
Burkina Faso	1.033	0.993	0.832	1.075	1.053	0.724
Burundi	0.976	1.183	1.089	1.037	0.900	1.071
Cameroon	0.984	0.966	0.841	0.971	0.964	0.865
Cabo Verde	1.211	1.092	1.110	1.039	1.083	0.892
Central African Republic	0.903	0.818	0.715	0.706	0.948	0.859
Chad	0.900	0.859	0.958	0.650	1.067	0.931
Comoros	0.984	1.235	1.148	0.812	0.725	1.128
Congo	0.974	1.042	0.774	0.931	0.937	1.102
Côte d'Ivoire	0.976	0.971	1.032	0.976	0.999	0.895
Dem. Rep. of Congo	0.939	1.071	1.087	1.027	0.972	0.911
Djibouti	1.104	1.236	1.178		1.095	0.940
Egypt	1.098	1.232	1.198	1.115	1.084	1.080
Equatorial Guinea	0.758	1.073		0.850	1.141	1.057
Eritrea	0.949	1.171	1.189		1.092	1.017
Ethiopia	1.071	1.203	1.110	1.107	1.057	1.103
Gabon	0.918	0.990	1.016	0.956	0.841	0.915
Gambia	0.986	1.022	0.991	0.879	1.040	0.849
Ghana	1.065	1.163	1.133	1.051	1.191	0.992
Guinea	0.966	1.011	1.010	0.772	1.066	0.837
Guinea-Bissau	1.035	1.163		0.893	1.206	1.085
Kenya	0.987	0.976	0.980	0.939	0.952	0.997
Liberia	1.053	0.975	0.897	1.107	1.069	0.900
Libya	0.963	0.973	1.233	0.990	0.717	1.057
Madagascar	0.944	0.947	0.949	0.792	0.944	0.902
Malawi	0.984	1.004	1.061	1.032	1.003	1.013
Mali	0.931	0.805	0.703	0.859	0.779	0.717
Mauritania	0.995	1.030	1.073	1.033	1.012	1.177
Mauritius	0.971	1.024	1.020	0.758	0.967	1.055
Morocco	0.997	1.134	1.093	1.078	1.161	1.099
Mozambique	1.027	1.029	1.069	0.986	0.871	1.030
Niger	1.009	0.941	0.827	0.884	0.941	0.963
Nigeria	1.093	1.088	1.040	1.127	1.046	1.093
Rwanda	1.067	1.175	1.197	1.070	1.037	1.158
SACU countries	0.986	0.975	0.983	0.950	0.992	0.971
Saint Helena	0.995	0.731	0.719		0.841	0.822
São Tomé and Príncipe	0.901	0.905	0.829	0.897	0.902	0.921
Senegal	0.971	1.044	1.099	1.019	1.074	1.029
Seychelles	0.982	1.027	1.084	0.966	0.889	1.032
Sierra Leone	1.045	0.963	1.060	1.135	0.920	0.734
Somalia	1.125	0.906	0.956		0.775	0.937
Sudan	0.968	1.008	0.996	1.016	0.877	0.743
Tanzania	1.004	1.027	1.025	1.125	0.965	1.056
Togo	0.995	0.950	0.807	0.934	0.937	0.871
Tunisia	1.022	1.176	1.044	1.047	1.063	0.930
Uganda	1.003	1.015	1.023	1.040	0.961	1.052
Western Sahara	0.853					
Zambia	1.062	1.051	1.091	0.996	1.196	1.069
Zimbabwe	0.916	0.915	0.841	0.857	0.901	0.919

Source: Authors' calculations based on CEPII (2015).

Note: Change in competitiveness is measured by the coefficient of the competitive effect derived from export share decomposition analysis for individual countries.

Table 4A.2. Share of Africa's agricultural export value by country and market, 1998-2013 average

Exporting country	Global markets	Intra-African markets	COMESA markets	ECCAS markets	ECOWAS markets	SADC markets
Algeria	0.411	0.775	0.423	0.025	1.829	0.018
Angola	0.110	0.090	0.000	0.040	0.194	0.095
Benin	0.890	1.362	0.060	0.141	4.516	0.197
Burkina Faso	1.103	1.760	0.215	0.004	5.752	0.187
Burundi	0.178	0.097	0.167	0.177	0.014	0.078
Cameroon	2.399	1.098	0.203	5.239	0.333	0.288
Cabo Verde	0.054	0.031	0.001	0.002	0.054	0.001
Central African Republic	0.078	0.076	0.098	0.193	0.040	0.030
Chad	0.261	0.108	0.023	0.429	0.048	0.027
Comoros	0.093	0.017	0.028	0.001	0.001	0.041
Congo	0.145	0.272	0.032	1.474	0.053	0.063
Côte d'Ivoire	12.225	7.124	0.227	2.476	17.027	1.301
Dem. Rep. of Congo	0.149	0.160	0.293	0.260	0.027	0.040
Djibouti	0.137	0.276	0.552	0.000	0.006	0.010
Egypt	6.463	5.082	6.420	1.715	1.363	0.978
Equatorial Guinea	0.054	0.003	0.000	0.005	0.004	0.000
Eritrea	0.016	0.012	0.027	0.001	0.001	0.000
Ethiopia	2.894	2.887	3.490	0.045	0.057	0.227
Gabon	0.114	0.337	0.001	2.228	0.034	0.010
Gambia	0.124	0.137	0.003	0.012	0.481	0.032
Ghana	5.336	1.224	0.072	0.306	4.106	0.150
Guinea	0.344	0.610	0.008	0.030	1.416	0.006
Guinea-Bissau	0.256	0.079	0.000	0.049	0.265	0.001
Kenya	5.974	7.380	13.475	3.592	0.573	4.468
Liberia	0.031	0.021	0.002	0.001	0.038	0.002
Libya	0.095	0.106	0.034	0.006	0.030	0.002
Madagascar	1.577	0.374	0.538	0.012	0.046	0.555
Malawi	2.030	2.331	2.854	0.335	0.154	3.982
Mali	1.125	3.068	0.286	0.005	10.757	0.340
Mauritania	1.557	2.712	0.057	3.888	8.192	0.026
Mauritius	1.889	0.841	1.347	0.070	0.591	1.540
Morocco	8.839	3.478	1.571	5.033	6.251	1.268
Mozambique	1.251	1.593	2.236	0.084	0.029	4.148
Niger	0.557	2.491	0.081	0.022	8.917	0.008
Nigeria	3.433	1.308	0.159	0.719	3.183	0.647
Rwanda	0.273	0.621	1.263	0.973	0.004	0.566
SACU countries	19.025	25.132	30.421	43.820	10.880	50.927
Saint Helena	0.024	0.005	0.006	0.000	0.001	0.005
São Tomé and Príncipe	0.028	0.005	0.004	0.012	0.006	0.003
Senegal	1.774	2.417	0.062	2.858	6.608	0.050
Seychelles	0.885	0.441	0.875	0.001	0.055	1.086
Sierra Leone	0.091	0.017	0.002	0.001	0.027	0.007
Somalia	0.342	0.077	0.057	0.000	0.194	0.004
Sudan	1.437	1.098	2.187	0.003	0.013	0.090
Tanzania	2.882	2.521	4.754	5.161	0.144	2.487
Togo	0.819	1.163	0.025	0.262	3.695	0.044
Tunisia	3.112	4.430	7.082	0.796	1.664	0.115
Uganda	2.509	3.945	7.772	8.026	0.191	2.210
Western Sahara	0.006	0.004	0.000	0.000	0.015	0.000
Zambia	1.260	4.079	6.675	7.993	0.015	10.422
Zimbabwe	3.344	4.728	3.829	1.476	0.105	11.216
Africa	100	100	100	100	100	100

Source: Authors' calculations based on CEPII (2015).

Table 4A.3. Change in competitiveness by commodity and agricultural export market, 1998–2013

Export commodity	Global markets	Intra-African markets	COMESA markets	ECCAS markets	ECOWAS markets	SADC markets
Cattle	1.130	1.058	1.129	0.996	1.000	0.980
Sheep and goats	1.092	0.949	1.051	1.010	0.999	1.036
Poultry	0.955	0.994	1.018	0.967	1.029	0.983
Other live animals	1.063	1.035	1.040	0.951	1.016	1.013
Meat and edible offal	0.951	0.949	0.991	0.918	1.009	0.918
Fish and sea foods	0.986	1.020	1.033	0.979	1.025	1.045
Dairy, eggs, and honey	1.116	1.040	1.074	0.972	1.030	0.976
Other animal products	1.003	1.017	1.036	0.983	1.026	1.026
Roots and tubers	1.097	1.101	1.043	1.103	0.954	1.012
Other live trees and plants	1.055	0.990	1.031	0.997	0.942	1.004
Potatoes	1.034	1.035	0.967	1.015	1.066	1.002
Tomatoes	1.036	1.022	1.006	0.993	1.072	0.999
Onions and substitutes	1.054	0.949	1.021	1.030	0.905	1.019
Other edible vegetables	1.062	1.110	1.102	0.983	0.993	1.013
Edible fruits and nuts	1.009	0.996	0.980	1.005	1.016	1.006
Coffee	0.961	0.963	0.945	0.926	1.032	1.001
Tea	0.995	0.998	1.005	0.859	0.961	0.998
Spices	0.984	1.028	1.047	1.062	0.985	0.985
Wheat	1.050	0.990	0.934	0.997	1.177	0.933
Rye, barley, and oats	1.216	1.243	1.140	1.045	0.846	1.382
Maize	1.031	0.987	0.991	1.035	0.971	1.033
Rice	1.019	1.037	1.042	1.017	1.023	1.071
Sorghum	1.030	0.967	0.950	0.798	0.968	1.007
Other cereals	0.993	0.985	0.976	1.006	1.020	0.974
Milling industry products	1.026	1.042	1.062	1.027	1.047	1.005
Soybeans	1.073	0.884	0.842	0.887	1.052	1.040
Groundnuts	1.005	0.998	1.089	0.992	1.016	1.014
Other oilseeds	1.014	0.967	0.954	0.997	1.034	0.975
Medicinal plants	1.044	1.019	1.016	0.946	0.992	0.998
Gums and resins	1.000	1.163	1.080	0.974	1.024	1.099
Vegetable plaiting materials	1.027	1.067	0.975	1.047	0.921	1.132
Animal fats	1.096	1.059	1.147	1.115	1.015	1.047
Soybean oil	1.148	1.138	1.147	1.162	1.246	1.068
Groundnut oil	0.943	0.935	1.004	0.935	0.949	0.992
Olive oil	1.013	1.173	1.205	1.073	1.250	1.164
Palm oil	0.985	0.988	1.066	0.925	0.921	1.026
Other oils and facts	1.066	1.071	1.063	1.080	1.033	1.041
Edible preps. of meat, fish and crustaceans	0.995	1.021	1.009	1.014	1.084	0.986
Cane sugar	0.963	1.002	1.001	1.009	0.982	0.977
Sugar confectionery	1.010	0.984	0.994	0.985	0.970	0.980
Cocoa beans	1.002	0.945	1.009	1.068	1.012	0.944
Cocoa preparations	1.039	0.987	0.991	1.012	1.039	0.982
Preps. of cereals, flour, starch or milk	1.087	1.016	1.041	0.997	1.011	1.011
Preps. of vegg., fruits and nuts	0.997	1.029	1.022	1.043	1.067	0.986
Misc. edible preparations	1.018	1.015	1.025	0.999	1.021	0.982
Beverages, spirits, and vinegar	1.022	0.988	1.037	0.948	1.005	0.971
Residues from food industries	1.038	1.039	1.100	0.970	0.955	1.003
Tobacco and substitutes	1.035	1.042	1.044	1.029	1.110	0.997
Organic chemicals	0.952	0.859	0.901	0.898	0.821	0.873
Essential oils and resinoids	1.009	0.974	0.980	0.995	0.976	0.968
Albuminoidal substances	1.038	0.999	0.960	1.078	1.030	1.011
Finishing agents for textiles and paper	1.029	0.947	0.995	1.075	0.933	1.009

Export commodity	Global markets	Intra-African markets	COMESA markets	ECCAS markets	ECOWAS markets	SADC markets
Hides and skins	0.993	1.088	0.963	1.030	0.920	1.235
Furskins	1.020	0.989	1.070	0.870	1.050	1.122
Silk	1.126	0.944	1.205	1.125	0.994	0.942
Wool	1.078	1.049	1.020	1.000	1.073	0.862
Cotton, not carded or combed	0.961	0.951	0.937	0.878	0.967	0.999
Cotton, carded or combed	1.009	0.988	0.997	0.907	0.911	1.012
Other vegetable textile fibers	1.015	1.130	1.149	0.905	1.140	1.023

Source: Authors' calculations based on CEPII (2015).

Note: Change in competitiveness is measured by the coefficient of the competitive effect derived from commodity-level export share decomposition analysis for African countries as a group.

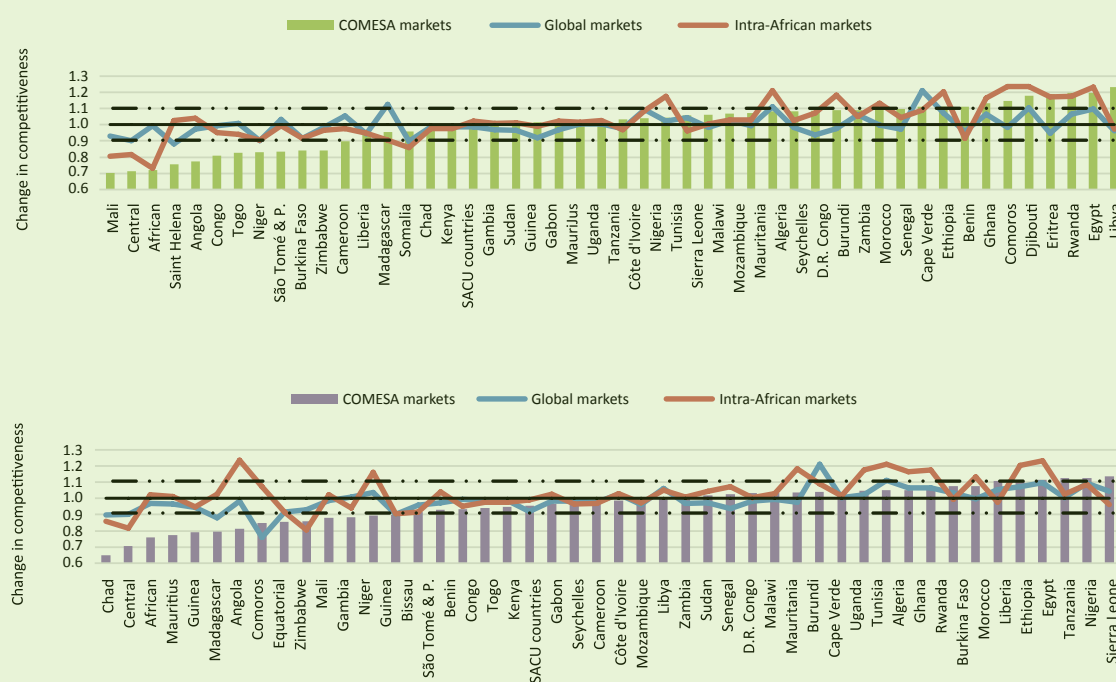
Table 4A.4. Share of Africa's agricultural export value by commodity and market, 1998–2013 average

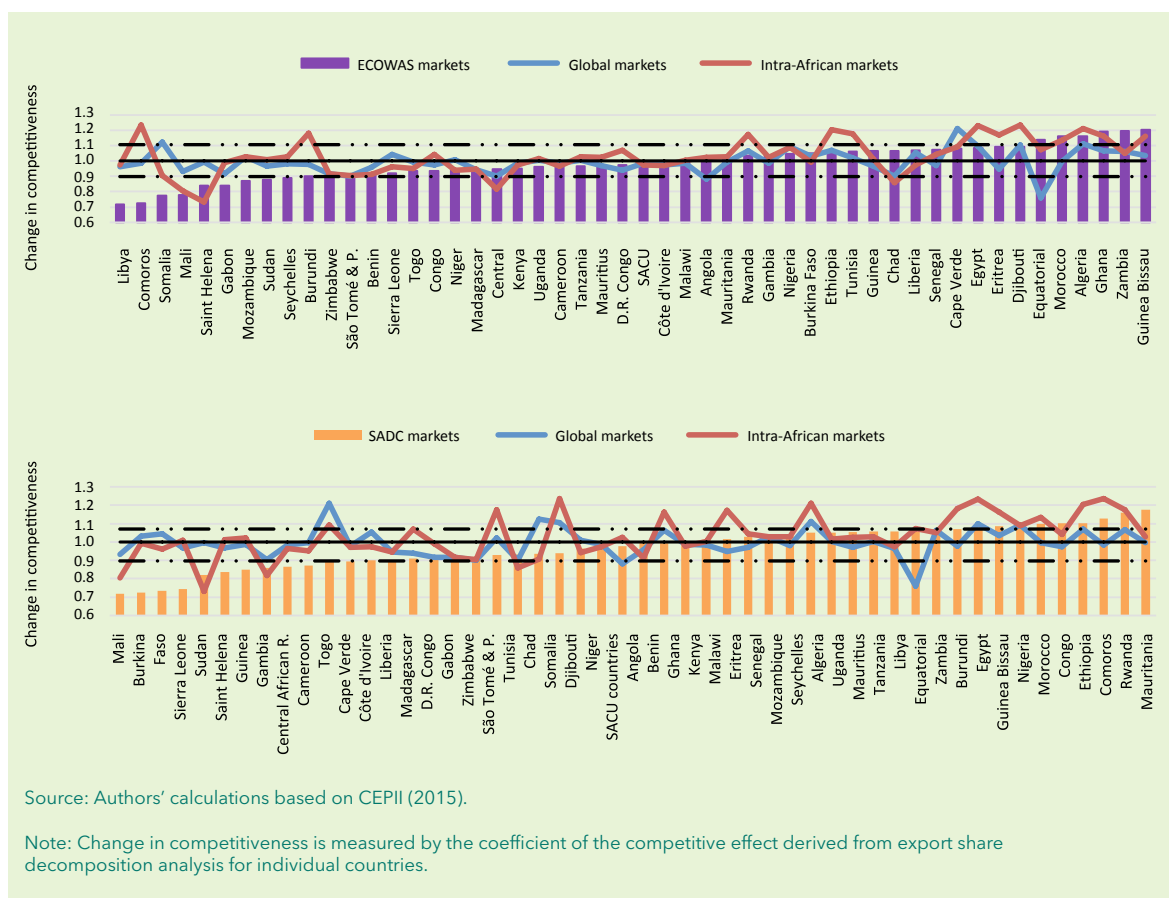
Export commodity	Global markets	Intra-African markets	COMESA markets	ECCAS markets	ECOWAS markets	SADC markets
Cattle	0.41	1.623	0.875	0.439	4.098	0.686
Sheep and goats	0.61	0.686	0.076	0.065	2.517	0.040
Poultry	0.02	0.120	0.104	0.043	0.033	0.229
Other live animals	0.29	0.477	0.708	0.081	0.454	0.225
Meat and edible offal	0.88	0.871	0.630	1.249	1.005	1.451
Fish and sea foods	11.66	7.599	3.512	11.800	15.716	5.486
Dairy, eggs, and honey	1.18	3.171	3.520	3.693	2.804	3.675
Other animal products	0.37	0.228	0.196	0.035	0.530	0.200
Roots and tubers	0.04	0.015	0.021	0.006	0.023	0.006
Other live trees and plants	2.14	0.468	0.432	0.321	0.162	0.344
Potatoes	0.51	0.343	0.294	0.851	0.051	0.651
Tomatoes	0.87	0.107	0.103	0.058	0.102	0.087
Onions and substitutes	0.37	0.649	0.224	0.606	1.643	0.396
Other edible vegetables	3.35	2.800	2.616	1.769	1.461	1.793
Edible fruits and nuts	12.77	2.786	2.052	1.663	3.277	2.596
Coffee	4.66	3.852	2.377	0.584	0.509	0.832
Tea	2.68	5.216	10.621	1.014	0.563	1.775
Spices	1.01	0.532	0.584	0.138	0.162	0.563
Wheat	0.19	0.932	1.532	0.305	0.792	1.521
Rye, barley, and oats	0.02	0.066	0.094	0.071	0.003	0.101
Maize	0.91	3.824	6.990	2.108	0.671	7.104
Rice	0.72	1.625	2.064	1.267	2.520	0.918
Sorghum	0.06	0.185	0.331	0.050	0.090	0.214
Other cereals	0.05	0.195	0.199	0.066	0.319	0.110
Milling industry products	0.74	4.008	6.087	8.829	2.953	5.924
Soybeans	0.07	0.225	0.380	0.445	0.011	0.351
Groundnuts	0.27	0.417	0.308	0.242	0.246	0.579
Other oilseeds	1.73	1.252	1.402	0.236	0.865	0.859
Medicinal plants	0.94	0.693	0.857	0.594	0.400	0.961
Gums and resins	0.67	0.376	0.280	0.813	0.385	0.180
Vegetable plaiting materials	0.22	0.849	1.010	0.015	0.009	0.077
Animal fats	0.11	0.102	0.146	0.025	0.098	0.157
Soybean oil	0.18	0.729	1.187	0.264	0.169	1.324
Groundnut oil	0.26	0.023	0.012	0.016	0.033	0.024
Olive oil	1.14	0.175	0.196	0.232	0.026	0.189
Palm oil	0.56	2.699	1.977	3.212	5.753	1.725

Export commodity	Global markets	Intra-African markets	COMESA markets	ECCAS markets	ECOWAS markets	SADC markets
Other oils and facts	1.02	3.858	6.063	3.672	2.365	4.370
Edible preps. of meat, fish and crustaceans	3.56	1.889	1.081	4.429	2.896	1.755
Cane sugar	3.85	6.382	8.727	9.292	1.785	8.471
Sugar confectionery	0.62	1.691	1.474	2.496	1.595	2.008
Cocoa beans	12.18	0.570	0.012	0.010	0.342	0.416
Cocoa preparations	3.68	1.100	1.064	1.171	0.453	1.612
Preps. of cereals, flour, starch or milk	0.70	2.825	2.888	2.584	3.501	2.770
Preps. of vegs., fruits and nuts	2.39	2.069	2.674	1.614	1.244	2.458
Misc. edible preparations	1.62	5.366	3.301	5.065	8.795	4.087
Beverages, spirits, and vinegar	3.11	5.578	3.964	16.045	4.270	9.001
Residues from food industries	1.05	2.319	2.314	0.509	0.948	2.835
Tobacco and substitutes	5.88	9.696	9.181	9.321	9.861	10.510
Organic chemicals	0.00	0.004	0.008	0.002	0.001	0.010
Essential oils and resinoids	0.27	0.083	0.097	0.059	0.031	0.174
Albuminoidal substances	0.03	0.094	0.142	0.090	0.052	0.157
Finishing agents for textiles and paper	0.00	0.018	0.034	0.004	0.006	0.038
Hides and skins	0.76	0.169	0.176	0.010	0.082	0.119
Furskins	0.02	0.002	0.001	0.001	0.001	0.004
Silk	0.00	0.002	0.003	0.001	0.000	0.006
Wool	0.47	0.037	0.074	0.001	0.003	0.053
Cotton, not carded or combed	5.69	5.971	2.366	0.270	11.073	5.398
Cotton, carded or combed	0.35	0.359	0.359	0.156	0.270	0.394
Other vegetable textile fibers	0.05	0.002	0.002	0.001	0.001	0.001
Agricultural exports	100	100	100	100	100	100

Source: Authors' calculations based on CEPII (2015).

Figure 4A.1. Change in competitiveness of countries in regional exports markets compared with global and intra-African markets by REC, 1998-2013

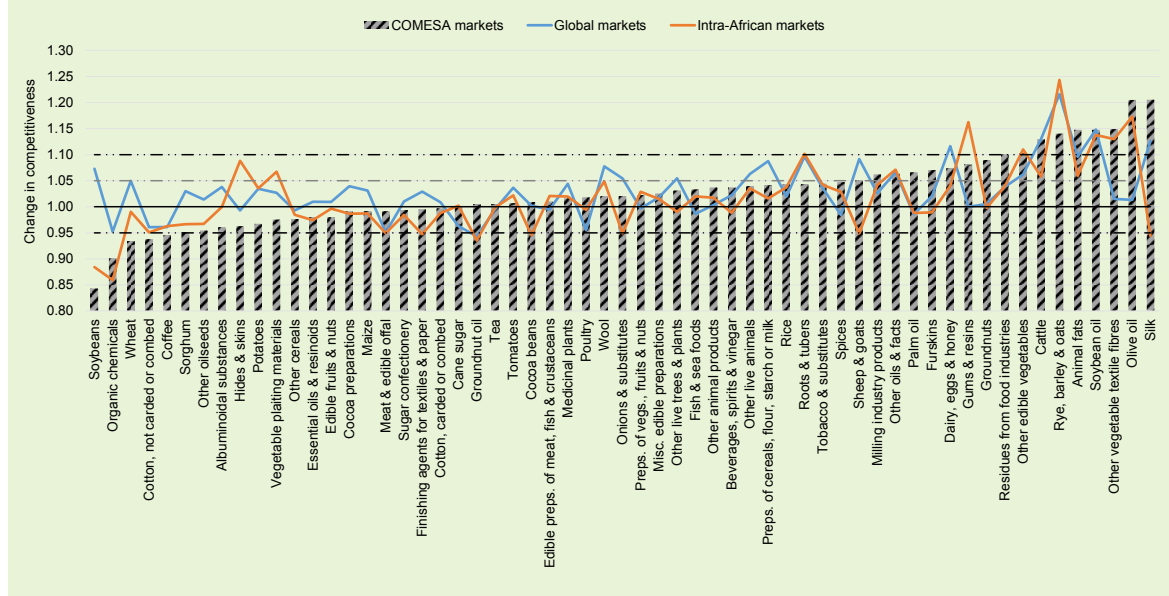


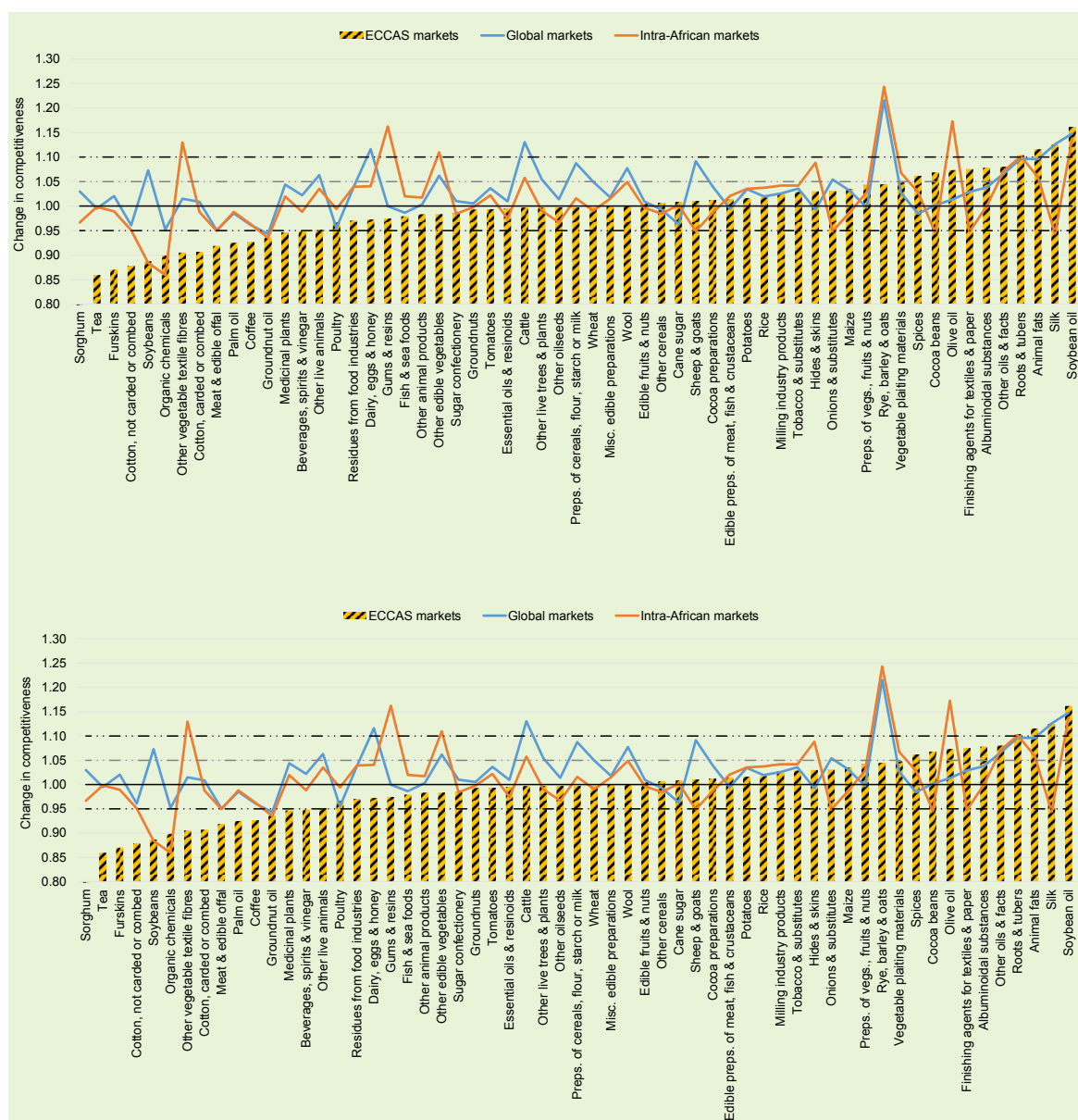


Source: Authors' calculations based on CEPII (2015).

Note: Change in competitiveness is measured by the coefficient of the competitive effect derived from export share decomposition analysis for individual countries.

Figure 4A.2. Change in competitiveness of commodities in regional export markets compared with global and intra-African markets by REC, 1998-2013

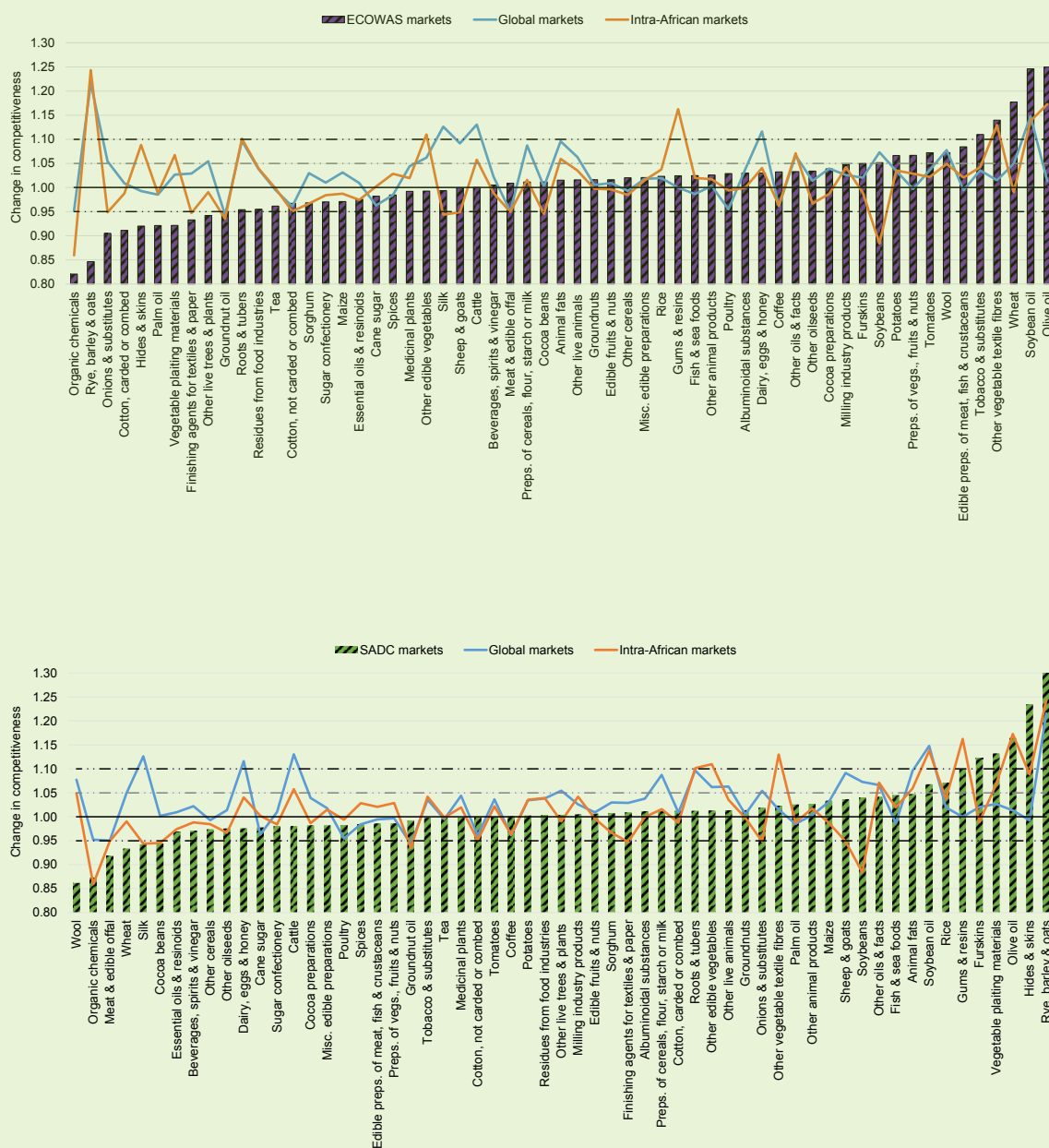




Source: Authors' calculations based on CEPII (2015).

Note: Change in competitiveness is measured by the coefficient of the competitive effect derived from commodity-level export share decomposition analysis for African countries as a group.

Figure 4A.2. Continued



Source: Authors' calculations based on CEPII (2015).

Note: Change in competitiveness is measured by the coefficient of the competitive effect derived from commodity-level export share decomposition analysis for African countries as a group.

Appendix 4B. Statistical Tests

The series of competitive effect values derived for all countries and commodities and for different export markets were used to carry out two statistical comparison procedures. The first, an analysis of variance (ANOVA), was used to test the hypothesis that the means of competitiveness changes are equal across country groups.

The second, the paired-samples T test, was used to test the hypothesis that changes in competitiveness in two export markets are equal. These tests were run for changes in both country and commodity competitiveness. Results are presented in Tables 4A.1–4A.4 in Appendix A, and in Tables 4B.1–4B.4 below.

Prior to running these procedures, the one-sample Kolmogorov-Smirnov test was first performed to confirm the assumption of the normality of the distribution of competitiveness change indices in each of the country groups under comparison. The same test was carried out to check the assumption that, for each pair of export markets, the differences in competitiveness changes in those markets follow a normal distribution. The Levene's homogeneity-of-variance test was also used to check the assumption that the country groups under comparison come from populations with equal

variances. In the large majority of comparisons, the Levene's test confirmed an equality of variances across groups, allowing the performance of an ANOVA procedure using the standard F statistic. However, in the rare comparisons where variances were significantly different, a robust ANOVA procedure using the Welch statistic was also performed to check whether the p value associated with the standard ANOVA F statistic could be trusted. The results of the Kolmogorov-Smirnov test and the Levene's test are presented in Tables 4B.5- 4B.8.

Table 4B.1. Analysis of variance in changes in competitiveness of COMESA members in agricultural export markets, 1998-2013

Country group	Sum of squares		df	Mean square	F	Sig.	Eta squared
COMESA vs. non-COMESA countries	Between groups	0.187	1	0.187	11.970	0.001	0.206
	Within groups	0.720	46	0.016			
	Total	0.907	47				
ECCAS vs. non-ECCAS countries	Between groups	0.071	1	0.071	3.904	0.054	0.078
	Within groups	0.836	46	0.018			
	Total	0.907	47				
ECOWAS vs. non-ECOWAS countries	Between groups	0.014	1	0.014	0.697	0.408	0.015
	Within groups	0.893	46	0.019			
	Total	0.907	47				
SADC vs. non-SADC countries	Between groups	0.000	1	0.000	0.013	0.909	0.000
	Within groups	0.907	46	0.020			
	Total	0.907	47				

Source: Authors' calculations based on CEPII (2015).

Note: Change in competitiveness is measured by the coefficient of the competitive effect derived from export share decomposition analysis for individual countries.

Table 4B.2. Analysis of variance in changes in competitiveness of ECCAS members in agricultural export markets, 1998-2013

Country group	Sum of squares		df	Mean square	F	Sig.	Eta squared
COMESA vs. non-COMESA countries	Between groups	0.003	1	0.003	0.182	0.672	0.004
	Within groups	0.629	44	0.014			
	Total	0.631	45				
ECCAS vs. non-ECCAS countries	Between groups	0.057	1	0.057	4.346	0.043	0.090
	Within groups	0.574	44	0.013			
	Total	0.631	1	0.006	0.389		
ECOWAS vs. non-ECOWAS countries	Between groups	0.006	44	0.014		0.536	0.009
	Within groups	0.626	1	0.010	0.737		
	Total	0.631	44	0.014			
SADC vs. non-SADC countries	Between groups	0.010	45			0.395	0.016
	Within groups	0.621					
	Total	0.631					

Source: Authors' calculations based on CEPII (2015).

Note: Change in competitiveness is measured by the coefficient of the competitive effect derived from export share decomposition analysis for individual countries.

Table 4B.3. Analysis of variance in changes in competitiveness of ECOWAS members in agricultural export markets, 1998-2013

Country group	Sum of squares	df	Mean square	F	Sig.	Eta squared
COMESA vs. non-COMESA countries	Between groups	0.013	1	0.013	0.978	0.328
	Within groups	0.652	48	0.014		0.020
	Total	0.665	49			
ECCAS vs. non-ECCAS countries	Between groups	0.002	1	0.002	0.164	0.687
	Within groups	0.663	48	0.014		0.003
	Total	0.665	49	0.025	1.908	0.174
ECOWAS vs. non-ECOWAS countries	Between groups	0.025	1	0.025		0.038
	Within groups	0.640	48	0.003	0.186	0.668
	Total	0.665	49	0.014		0.004
SADC vs. non-SADC countries	Between groups	0.003	1			
	Within groups	0.663	48			
	Total	0.665	49			

Source: Authors' calculations based on CEPII (2015).

Note: Change in competitiveness is measured by the coefficient of the competitive effect derived from export share decomposition analysis for individual countries.

Table 4B.4. Analysis of variance in changes in competitiveness of SADC members in agricultural export markets, 1998-2013

Country group	Sum of squares	df	Mean square	F	Sig.	Eta squared
COMESA vs. non-COMESA countries	Between groups	0.053	1	0.053	4.369	0.042
	Within groups	0.579	48	0.012		0.083
	Total	0.632	49			
ECCAS vs. non-ECCAS countries	Between groups	0.001	1	0.001	0.077	0.782
	Within groups	0.631	48	0.013		0.002
	Total	0.632	49	0.092	8.184	0.006
ECOWAS vs. non-ECOWAS countries	Between groups	0.092	1	0.092		0.146
	Within groups	0.540	48	0.008	0.612	0.438
	Total	0.632	49	0.013		0.013
SADC vs. non-SADC countries	Between groups	0.008	1			
	Within groups	0.624	48			
	Total	0.632	49			

Source: Authors' calculations based on CEPII (2015).

Note: Change in competitiveness is measured by the coefficient of the competitive effect derived from export share decomposition analysis for individual countries.

Table 4B.5. One-Sample Kolmogorov-Smirnov tests of normality of the distributions of changes in competitiveness by country group

Test group		Export destination markets					
		Global markets	Intra-African markets	COMESA markets	ECCAS markets	ECOWAS markets	SADC markets
COMESA countries	Kolmogorov-Smirnov Z	1.039	0.793	0.506	0.756	0.536	0.695
	Asymp. Sig. (2-tailed)	0.231	0.555	0.960	0.617	0.937	0.720
Non-COMESA countries	Kolmogorov-Smirnov Z	0.672	0.531	0.887	0.542	0.450	0.435
	Asymp. Sig. (2-tailed)	0.757	0.940	0.412	0.931	0.987	0.991
ECCAS countries	Kolmogorov-Smirnov Z	0.624	0.378	0.621	0.456	0.483	0.752
	Asymp. Sig. (2-tailed)	0.831	0.999	0.835	0.985	0.974	0.625
Non-ECCAS countries	Kolmogorov-Smirnov Z	0.892	0.970	0.837	0.664	0.568	0.744
	Asymp. Sig. (2-tailed)	0.404	0.303	0.486	0.770	0.904	0.638
ECOWAS countries	Kolmogorov-Smirnov Z	0.514	0.433	0.708	0.463	0.650	0.463
	Asymp. Sig. (2-tailed)	0.954	0.992	0.698	0.983	0.792	0.983
Non-ECOWAS countries	Kolmogorov-Smirnov Z	0.775	0.752	0.752	0.751	0.421	0.775
	Asymp. Sig. (2-tailed)	0.585	0.623	0.624	0.626	0.994	0.586
SADC countries	Kolmogorov-Smirnov Z	0.414	0.888	0.729	0.620	0.883	0.576
	Asymp. Sig. (2-tailed)	0.995	0.410	0.663	0.836	0.416	0.894
Non-SADC countries	Kolmogorov-Smirnov Z	0.717	0.771	0.715	0.800	0.831	0.736
	Asymp. Sig. (2-tailed)	0.683	0.591	0.685	0.544	0.495	0.651

Source: Authors' calculations based on CEPII (2015).

Note: The change in competitiveness is measured by the coefficient of the competitive effect derived from export share decomposition analysis for individual countries. The probability of the Z statistic is above 0.05, meaning that the normal distribution is a good fit for competitiveness changes for the different country groups tested and across all export destinations.

Table 4B.6. One-Sample Kolmogorov-Smirnov tests of normality of the distributions of the differences in changes in the competitiveness of countries by pairs of export markets

Pairs of markets	N	Kolmogorov-Smirnov Z	Asymp. Sig. (2-tailed)
COMESA and global markets	48	0.973	0.300
ECCAS and global markets	46	0.796	0.551
ECOWAS and global markets	50	0.722	0.675
SADC and global markets	50	0.759	0.612
Intra-African and global markets	50	0.593	0.874
COMESA and intra-African markets	48	0.747	0.632
ECCAS and intra-African markets	46	0.899	0.394
ECOWAS and intra-African markets	50	0.824	0.505
SADC and intra-African markets	50	0.936	0.345

Source: Authors' calculations based on CEPII (2015).

Note: The change in competitiveness is measured by the coefficient of the competitive effect derived from export share decomposition analysis for individual countries. The probability of the Z statistic is above 0.05, meaning that the normal distribution is a good fit for the differences of competitiveness changes in pairs of export destination markets

Table 4B.7. One-Sample Kolmogorov-Smirnov tests of normality of the distributions of the differences in changes in the competitiveness of commodities by pairs of export markets

Pairs of markets	N	Kolmogorov-Smirnov Z	Asymp. Sig. (2-tailed)
COMESA and global markets	59	0.626	0.828
ECCAS and global markets	59	1.023	0.246
ECOWAS and global markets	59	0.665	0.769
SADC and global markets	59	1.058	0.213
Intra-African and global markets	59	0.780	0.577
COMESA and intra-African markets	59	1.051	0.219
ECCAS and intra-African markets	59	0.747	0.631
ECOWAS and intra-African markets	59	1.073	0.200
SADC and intra-African markets	59	0.792	0.557

Source: Authors' calculations based on CEPII (2015).

Notes: The change in competitiveness is measured by the coefficient of the competitive effect derived from commodity-level export share decomposition analysis for African countries as a group. The probability of the Z statistic is above 0.05, meaning that the normal distribution is a good fit for the differences of competitiveness changes in pairs of export destination markets.

Table 4B.8. Levene's test for homogeneity of variance of changes in competitiveness of countries by pairs of country groups

Country groups		Export destination markets					
		Global markets	Intra-African markets	COMESA markets	ECCAS markets	ECOWAS markets	SADC markets
COMESA vs. non-COMESA countries	Levene	0.834	0.543	4.551	0.201	0.000	0.897
	Statistic Sig.	0.366	0.465	0.038*	0.656	0.994	0.348
ECCAS vs. non-ECCAS countries	Levene	0.127	0.034	2.926	0.900	2.294	0.247
	Statistic Sig.	0.723	0.854	0.094*	0.348	0.136	0.621
ECOWAS vs. non-ECOWAS countries	Levene	0.044	1.042	0.060	0.019	0.069	0.655
	Statistic Sig.	0.834	0.312	0.807	0.890	0.793	0.422
SADC vs. non-SADC countries	Levene	1.370	9.432	1.710	0.006	4.206	6.343
	Statistic Sig.	0.247	0.004*	0.198	0.939	0.046*	0.015*