

# **BIDPA Working Paper 55**

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## **Competitiveness of ACP Sugar Exports in the Global Market**

TEBOGO B. SELEKA AND THULA S. DLAMINI

**BOTSWANA INSTITUTE FOR DEVELOPMENT POLICY ANALYSIS**



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## **BIDPA**

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## ABSTRACT

We employ the Normalized Revealed Comparative Advantage (NRCA) index on data for the period 1961-2013 to examine the competitiveness of the African, Caribbean and Pacific (ACP) countries in the global sugar market. Results indicate that the majority of the ACP states had comparative advantage in the global sugar market during the period 1961-2013. However, most of these countries also experienced declining comparative advantage, except for a few African countries that emerged from initial states of extreme comparative disadvantage to marginal comparative (dis)advantage. This occurred despite the fact that these countries enjoyed tariff free access to the highly protected EU market. Mauritius, followed by Fiji, Guyana and Jamaica, recorded the strongest comparative advantage among the ACP countries. However, it recorded weaker comparative advantage than the leading comparator non-ACP countries of Australia, Brazil and Thailand, which experienced considerable increases in comparative advantage over the considered period. Overall, there has been convergence in comparative advantage among ACP states since the signing of the Lomé convention in 1975.

**Keywords:** ACP, Competitiveness, Revealed Comparative Advantage, Sugar exports

**JEL Classification:** F11, F13, F14, Q17, Q18

# 1. INTRODUCTION

From 1975 to the late 2000s, the African, Caribbean and Pacific (ACP) sugar exporters enjoyed non-reciprocal duty-free/quota-restricted access to the European Union (EU) market (Gotor, 2009). From 1975 to 2009, such access occurred under the Sugar Protocol (SP), which was one of the annexes to the Lomé Convention, entered into between the EU and ACP states. ACP sugar exporters gained substantially from the non-reciprocal trade preferences since domestic EU prices were higher than their corresponding world market prices; due to prohibitive EU tariffs, for which ACP states were exempt. From June 2000, the SP was continued under the Cotonou Agreement (CA), signed between the EU and ACP states. Meanwhile, interim and full Economic Partnership Agreements (EPAs) were being progressively signed between the EU and ACP regional groupings, to align EU/ACP trade arrangements with WTO principles of reciprocity and non-discrimination (Agritrade, 2010). Under both interim and full EPAs, ACP sugar exporters were granted tariff-free/quota-free access to the EU market.

Past research has focussed on how ACP states have benefitted from EU trade preferences (Herrmann and Weiss, 2007) and how preference erosion has impacted them (Koop, Prehn and Brümmer, 2016). To our knowledge, no study has focussed on examining the state and evolution of the competitiveness of ACP sugar exports during the implementation of the SP and subsequent trade arrangements. This paper attempts to close this gap by analysing the state and dynamics of comparative advantage among ACP sugar exporters benefiting from the ACP/EU trade arrangements. Five leading non-ACP sugar exporters are also included in the analysis to provide a comparative assessment of the states and dynamics of comparative advantage among ACP countries and the leading non-ACP sugar exporters. The paper adopts the Normalised Revealed Comparative Advantage (NRCA) index (Yu, Cai and Leung, 2009), which has been found to be superior to other indices of Revealed Comparative Advantage (RCA) with respect to the measurement of comparative advantage across time and space (Deb and Sengupta, 2016).

The study is important for several reasons. First, sugarcane is an important driver of economic growth in ACP countries (Serrano, 2007; Mitchell, 2005). Second, in many ACP countries, the sugar industry has been a source of employment to large proportions of the populations. For example, in the 2000s, it was reported that the sugar industry accounted for about 10% of total employment in the Pacific countries (Michell, 2005). Recently, it was reported that the industry accounts for 35% of formal sector employment in Swaziland (SSA, 2016). Third, sugar is an important earner of foreign exchange for ACP states. In Belize, Guyana, and St. Kitts & Nevis, it accounted for more than 20% of merchandise exports in the early 2000s (Mitchell, 2005). Further, in Fiji, sugar accounted for 28% (15%) of merchandise exports in 1999 (2013) (Raj and Chand, 2017).

In the next section, the paper summarises the evolution of EU's internal sugar policies and how they have impacted EU/ACP trade relations and policies. The paper then presents the methodology adopted to assess the state and dynamics of comparative advantage among ACP and the leading non-ACP sugar exporters in the global market. Next, the paper discusses data and computation of key variables. The results are then presented next, and concluding remarks provided in the final section.

## 2. BACKGROUND ON ACP/EU TRADE ARRANGEMENTS

An appreciation of the evolution of the institutional environment governing ACP sugar trade with the EU is vital to an assessment of the competitiveness of ACP states in the global sugar market. While sugarcane is one of the world's most important crops (van Berkum, Roza, van Tongeren, 2005), the sugar market is, arguably, the most protected industry in the world (Mitchell, 2005). In 1968, the EU launched policies that insulated domestic sugar producers from international market forces through a system of price support programs and prohibitive tariffs (Gotor, 2009; South Centre, 2007). This is the same year in which sugar was first included in EU's Common Agricultural Policy (CAP), which had been introduced in 1961.

The sugar policy instruments involved domestic sugar supply controls (through production quotas), export subsidies (to dispose of excess production) and prohibitive tariffs (Gotor, 2009). The primary purpose of the sugar program was to maintain high and stable producer prices in the domestic sugar beet industry. The market regime led to an accumulation of surplus in the EU and prevented sugar imports from countries that were subjected to the EU's high tariffs. It also hiked domestic prices to levels where they were up to about three times higher than world market prices (South Centre, 2007). The production surplus had to be disposed of through export subsidy programs. Consequently, the EU graduated from a net importer to a net exporter of sugar (Koop, Prehn and Brümmer, 2016), and was at one point the second largest exporter of sugar after Brazil (Gotor, 2009).

When the United Kingdom became a member of the EU in 1973, it transferred the obligations it had with Commonwealth sugar producers to the EU. As a result, the UK's Common Wealth Sugar Agreement became the EU's Sugar Protocol (SP). In 1975, the EU signed a trade and development cooperation agreement, the Lomé Convention (Lomé I), with 71 ACP countries (Dunlop, 1999). Annexed to the Lomé Convention were four commodity protocols of Banana, Beef/veal, Rum and Sugar, which extended non-reciprocal duty-free/quota-restricted access of exports of these commodities from ACP countries into the EU market. The SP, a pre-Lomé trade arrangement, became the ACP/EU sugar trade agreement during the first Lomé convention, and was continued through Lomé II, III and IV (Gotor, 2009). The Lomé convention ultimately ended in 2000, after 25 years of being in force. It was replaced with the Cotonou Agreement (CA), a twenty-year treaty covering the period from March 2000 to February 2020

(Gotor, 2009), which continued the non-reciprocal tariff-free/quota-restricted access of ACP sugar exports into the EU during the 2000s.

The non-reciprocal tariff-free/quota-restricted access accorded ACP sugar exports into the EU market allowed ACP countries to attain prices that were much higher than world market prices (Koop, Prehn and Brümmer, 2016). This is because the guaranteed prices on imports from ACP countries were based on EU market prices, which had been hiked through prohibitive tariffs. The SP therefore allowed even the higher cost and uncompetitive ACP sugar producers to stay in the market (South Centre, 2007). Given this trade arrangement, the EU has represented the largest single market for ACP sugar exports. The high Most Favored Nation (MFN) tariffs that were imposed by the EU meant that sugar imports into the EU were only viable under preferential trade arrangements (South Centre, 2007). This meant that only ACP countries (and India, which also benefitted from the SP) could traditionally export sugar to the EU; as they were exempt from such prohibitive tariffs.

EU sugar policies were unaffected by the 1992 and 2003 CAP reforms, and the 1994 Agreement on Agriculture under the World Trade Organization (WTO) (Richardson, 2009). However, EU/ACP trade preferences were challenged in both EU and WTO circles for being incompatible with Article I of the GATT on non-discrimination, which prescribes that preferences should be extended without discrimination to all members of the WTO (Lecomte, 2001). The trade arrangement was also incompatible with article XXIV of the GATT, where discrimination is only allowed if preferences are reciprocal and are applied to all WTO members, members of a Regional Trade Agreement (RTA), or by a developed country to all Least Developed Countries (LDCs).

The EU also advanced the same reasons to argue for the replacement of Lomé-type trade preferences with WTO-compatible RTAs, also known as EPAs, between the EU and regional ACP groupings (Lecomte, 2001). In 2001, the EU unilaterally granted all LDCs (including ACP LDCs) tariff-free/quota-restricted access to its market through the Everything But Arms (EBA) initiative, which was applied on all goods from LDCs except for arms and ammunition (Koop, Prehn and Brümmer, 2016). The sugar quota for LDCs was progressively increased from its initial figure in 2001/02 until 2008/09, but from October 2009, all LDC sugar exports had duty-free/quota-free access to the EU market (Goodison, 2015). This move led to increased supply of sugar in the EU market.

The EU and ACP regional groupings negotiated WTO-compatible EPAs, after the signing of the CA in the 2000s. Meanwhile, in 2003, three non-ACP sugar exporters, namely Brazil, Australia and Thailand, filed a dispute with the WTO regarding conformity of EU sugar export subsidies with the Uruguay round agreement (South Centre, 2007; Richardson, 2009). The WTO ruled in favor of the complainants on grounds that EU's sugar export subsidies were more than its corresponding commitments (Koop, Prehn and Brümmer, 2016).



As part of the response to WTO ruling, in 2005 the EU agreed to reform its sugar policy (Gotor, 2009), leading to the adoption of a reform program for the period from 2006/07 to 2009/10. The aim of the program was to reduce domestic sugar production by progressively reducing EU reference prices by a total of 36% over the four-year period (Gotor, 2009) and by reducing EU production quotas until their complete removal in 2017 (Goodison, 2015). In turn, EU export subsidies would also be reduced to ensure conformity with WTO ruling on the dispute between the EU and the leading sugar producers of Brazil, Australia and Thailand.

Meanwhile, the SP was denounced by the EU in October 2007, and a two-year obligatory notice was given to formally terminate it by October 2009 (Agritrade, 2010). The renunciation provided for a phased removal of guaranteed prices for ACP/LDC sugar exports into the EU market by October 2009, the reason being to reduce the over-supply of sugar in the EU and to ensure compliance with WTO obligations (Goodison, 2015). Therefore, ACP guaranteed prices were progressively reduced during the 2005/06 to 2008/09 seasons (Agritrade, 2010). For the subsequent seasons from 2009/10 to 2011/12, EU sugar importers would be mandated to pay to ACP sugar exporters not less than 90% of EU reference prices, which, as indicated previously, were also undergoing progressive reduction. From the 2012/13 season, ACP sugar exports to the EU would be based on prevailing market prices, with no price guarantees. The move would also involve the progressive introduction of duty-free/quota-free access for ACP sugar exporters that had initialed or signed interim or full EPAs with the EU (Agritrade, 2010). However, a safeguard mechanism would also be imposed by setting ceilings on total non-LDC ACP sugar exports into the EU for the 2009/10 to 2015/16 seasons.

### 3. METHODOLOGY

#### 3.1 THE NORMALIZED REVEALED COMPARATIVE ADVANTAGE INDEX

The Balassa index (and its variants) is the most commonly used measure for assessing the international competitiveness of countries in particular commodities or commodity groups (Balassa, 1965; Ballance, Forstner and Murray, 1987; Bowen, 1983; Vollrath, 1991). The index, which is a measure of the relative export performance of a country, is defined as “the share of country *i*’s exports in world trade of product *j* divided by that country’s share of world trade in manufactures” (Balance, 1988, p.12). Formally, it is expressed as:

$$BRCA_j^i = (E_j^i/E_j^w)/(E^i/E^w) \quad (1)$$

where  $E_j^i$  is country *i*’s exports of commodity *j*,  $E_j^w$  represents world exports of commodity *j*,  $E^i$  denotes total exports of country *i* and  $E^w$  represents world exports of all commodities (Hoen and Oosterhaven, 2006).  $BRCA_j^i > 0$  ( $BRCA_j^i < 0$ ) would imply that country *i*

has comparative advantage (disadvantage) in commodity  $j$  (Yu, Cai and Leung, 2009) and  $BRCA_j^i = 0$  would suggest that country  $i$  is at the comparative-advantage-neutral position.

One of the criticisms of the Balassa index is that it cannot be used to make comparisons of comparative advantage across space and time, because it is neither a cardinal nor ordinal measure of comparative advantage (Yeats, 1985; Hinloopen and van Marrewijk, 2001). Another criticism is that the Balassa index is distributed asymmetrically around its mean; because it has a mean greater than 1 (the comparative-advantage-neutral point), a lower bound of 0 and no upper limit (Hoen and Oosterhaven, 2006; Yu, Cai and Leung, 2009). Alternative RCA indices developed to address some of these shortcomings have yielded improved symmetry properties of the index (Bowen 1983; Hoen and Oosterhaven 2006; Vollrath 1991), but have failed to address issues relating to comparison of comparative advantage across space and time (Hoen and Oosterhaven, 2006; Yu, Cai and Leung, 2009).

This paper adopts the Normalized Revealed Comparative Advantage (NRCA) index, which addresses the above shortcomings of the Balassa index and its variants (Yu, Cai and Leung, 2009). The NRCA index is derived as follows. From equation 1, the condition for attaining the comparative-advantage-neutral point may be expressed as:  $(\hat{E}_s^i/E_s^w) = (E_A^i/E_A^w)$ , where  $\hat{E}_s^i$  represents comparative-advantage-neutral sugar exports for country  $i$ ,  $E_s^w$  denotes world exports of sugar,  $E_A^i$  is country  $i$ 's agricultural exports and  $E_A^w$  denotes world agricultural exports. Comparative-advantage-neutral sugar exports may be derived by rearranging terms to yield:  $\hat{E}_s^i = E_A^i E_s^w / E_A^w$ . Deviations of actual sugar exports from the comparative-advantage-neutral exports may then be measured as:  $E_s^i - \hat{E}_s^i = E_s^i - E_A^i E_s^w / E_A^w$ . Dividing through by world agricultural exports  $E_A^w$  yields the NRCA index:

$$NRCA_s^i = E_s^i/E_A^w - E_A^i E_s^w / E_A^w E_A^w \quad (2)$$

where a value of 0 defines the comparative-advantage-neutral point and a value greater (less) than 0 implies that country  $i$  has comparative advantage (disadvantage) in sugar. The "NRCA index measures the degree of deviation of a country's exports from its comparative-advantage-neutral level in terms of its relative scale with respect to world export market and thus provides a proper indication of the underlying comparative advantage" (Yu, Cai and Leung, 2009; p270).

The NRCA index has, among others, the following three desirable properties (Yu, Cai and Leung, 2009). First, the sum of the NRCA scores across countries or commodities is equal to zero, implying that the sum of positive scores is always equal to the sum of the absolute values of the negative scores. Consequently, the mean of the NRCA index across countries or commodities is equal to zero. Therefore, if one country gains

comparative advantage, other countries must lose comparative advantage to restore the balance. Second, NRCA scores are additive across space or commodities. Therefore, "... the NRCA index is independent of the classification of the commodities and countries", implying that "the aggregation levels of data have no influence on the measurement of comparative advantage" (Yu, Cai and Leung, 2009, p 273). Third, the NRCA index is distributed symmetrically around its mean of 0 (the comparative-advantage-neutral point), with its values ranging from -0.25 to +0.25.

Another desirable feature of the NRCA index is that it allows for cross-country (or cross-commodity) and temporal comparisons of comparative advantage (Yu, Cai and Leung, 2009, p 273). Therefore, "if country A's score is twice that of country B, we can conclude that the strength of country A's comparative advantage is twice that of country B" and "if country A's score in time  $t$  is twice that of time  $t-1$ , we can conclude that the strength of country A's comparative advantage doubled between times  $t-1$  and  $t$ " (Seleka and Kebakile, 2016, p.9).

### 3.2 COMPARATIVE ADVANTAGE ACROSS TIME

This section proposes two simple methods for assessing changes in the patterns of comparative advantage across time. The first method is intended to determine whether the comparative advantages of the individual countries increased or decreased over time, and whether changes in the patterns of comparative advantage occurred in the mid-1970s when the SP became active. We therefore used the ordinary least squares (OLS) method to estimate a two-period piece-wise linear regression equation of the form:

$$NRCA_{st}^i = \alpha + \beta Y_t + \delta(Y_t - \bar{Y})D_t + \varepsilon_t, \quad (3)$$

where  $Y$  denotes year (1961, 1962, ... 2013),  $\bar{Y}$  is the year during which the Lomé convention was signed (1975),  $D$  is a dummy variable for capturing the turning point in the pattern of comparative advantage ( $D_t=0$  for 1961 to 1975 and  $D_t=1$  otherwise),  $i$  denotes country,  $t$  represents year,  $\varepsilon$  is the error term and  $\alpha$ ,  $\beta$ , and  $\delta$  are parameters to be estimated (Seleka and Kebakile, 2017). Accordingly,  $\beta$  is the annual change in the NRCA score for the period 1961-1975 while  $(\beta+\delta)$  represents the annual change in the NRCA score for the period 1975-2013. For countries that experienced declining comparative advantage during 1961-1975 and increasing comparative advantage during 1975-2013,  $\beta<0$ ,  $\delta>0$ ,  $|\beta|<\delta$  and  $\beta+\delta>0$ . For those that have experienced reversed scenarios,  $\beta>0$ ,  $\delta<0$ ,  $|\delta|>\beta$  and  $\beta+\delta<0$ . In cases where the NRCA scores exhibited single-period trends, we estimated equations of the form  $NRCA_{st}^i = \alpha + \beta Y_t + \varepsilon_t$ , where  $\beta$  represents the annual change in the NRCA score and  $\beta>0$  ( $\beta<0$ ) implies increasing (decreasing) comparative advantage.

The second method involved the computation of the percentage deviation of country  $i$ 's NRCA scores in period  $k$  to its NRCA score in period  $\bar{k}$ :

$$N_{sk}^i = 100(NRCA_{sk}^i - NRCA_{s\bar{k}}^i) / |NRCA_{s\bar{k}}^i| \quad (4)$$

where  $k$  represents five-year periods (1961-65, 1966-70, ..., 2006-2010),  $\bar{k}$  denotes a fixed period (1961-1965) and other variables are as previously defined (see also Seleka and Obi 2017).<sup>1</sup> For the period 1961-65,  $NRCA_{sk}^i = NRCA_{s\bar{k}}^i$  and  $N_{sk}^i = 0$ . For other periods,  $N_{sk}^i = 0$  would imply that country  $i$ 's comparative advantage in period  $k$  is equal to its comparative advantage in period  $\bar{k}$  and  $N_{sk}^i > 0$  ( $N_{sk}^i < 0$ ) would imply that country  $i$ 's comparative advantage in period  $k$  is  $N_{sk}^i$  % stronger (weaker) than its comparative advantage in period  $\bar{k}$ .

### 3.3 COMPARATIVE ADVANTAGE ACROSS COUNTRIES

The study implemented cross-country comparisons of comparative advantage in two ways. First, we ordered (ranked) countries based on the strengths of their NRCA scores for each of the 10 five-year periods from 1961 to 2010. This allowed for an assessment of changes in the rankings of countries and identification of countries that gained or lost positions over time. Second, we normalized each country's NRCA scores by those for country  $\bar{i}$  as follows:

$$R_{sk}^i = 100(NRCA_{sk}^i - NRCA_{s\bar{k}}^{\bar{i}}) / |NRCA_{s\bar{k}}^{\bar{i}}| \quad (5)$$

where  $|NRCA_{s\bar{k}}^{\bar{i}}|$  is the absolute value of the NRCA score for country  $\bar{i}$  (the country with the strongest comparative advantage) in period  $k$  and  $R_{sk}^i$  is the percentage deviation of country  $i$ 's comparative advantage from the comparative advantage of country  $\bar{i}$  (see also Seleka and Obi 2017). Thus,  $R_{sk}^i = 0$  would imply that country  $i$ 's comparative advantage is equal to the comparative advantage of country  $\bar{i}$  and  $R_{sk}^i > 0$  ( $R_{sk}^i < 0$ ) would imply that country  $i$ 's comparative advantage is  $R_{sk}^i$  % stronger (weaker) than the comparative advantage of country  $\bar{i}$ .

<sup>1</sup> Note that the normalization is implemented by dividing the deviation by the absolute value of the score for 1961-65 because some of the scores could be negative. The direction of the deviation is therefore captured by the numerator. Using actual rather than absolute values would produce erroneous results where negative scores occur for period  $\bar{k}$ .

## 4. DATA AND CONSTRUCTION OF VARIABLES

The analysis considers five groups of countries: African ACP sugar exporters, Pacific ACP sugar exporters, Caribbean ACP sugar exporters, non-ACP leading sugar exporters and Rest of World (ROW). African ACP sugar exporters include Congo, Côte d'Ivoire, Kenya, Madagascar, Malawi, Mauritius, Swaziland, Tanzania, Uganda, Zambia and Zimbabwe. Caribbean ACP sugar exporters are Barbados, Belize, Guyana, Jamaica, Saint Kitts and Nevis, Suriname and Trinidad and Tobago. Pacific ACP sugar exporters include only Fiji. Non-ACP leading sugar exporters are Australia, Brazil, China, India, Mexico, Pakistan and Thailand. ROW defines residual exports derived by deducting aggregate exports of the four groups of countries from world exports.

The data utilized in this study was obtained from FAO (2016) and covers the period 1961-2013. The data consisted of sugar exports for each country  $E_s^i$ , world sugar exports  $E_s^w$ , agricultural exports for each country  $E_A^i$  and world agricultural exports  $E_A^w$ . For each country or region, sugar exports were derived by aggregating exports of sugar (raw centrifugal) and exports of sugar (refined).

We derived aggregate sugar exports by region as follows:

$$E_{st}^r = \sum_i E_{st}^i, \quad r = a, c, p, n \quad (6)$$

$$E_{st}^{acp} = E_{st}^a + E_{st}^c + E_{st}^p \quad (7)$$

$$E_{st}^{row} = E_{st}^w - E_{st}^n - E_{st}^{acp} \quad (8)$$

where  $E_s^a$ ,  $E_s^c$ ,  $E_s^p$ ,  $E_s^n$ ,  $E_s^{acp}$  and  $E_s^{row}$  are aggregate sugar exports for African ACP, Caribbean ACP, Pacific ACP, non-ACP leading exporters, ACP and ROW and  $t$  represents year. Agricultural exports were also aggregated along similar lines to derive:  $E_{At}^a$ ,  $E_{At}^c$ ,  $E_{At}^p$ ,  $E_{At}^n$ ,  $E_{At}^{acp}$  and  $E_{At}^{row}$ . From equation 2, the NRCA score for each country or region, in year  $t$ , was computed as:

$$NRCA_{st}^m = E_{st}^m / E_{At}^w - E_{At}^m E_{st}^w / E_{At}^w E_{At}^w, \quad m = i, a, c, p, n, acp, row \quad (9)$$

## 5. EMPIRICAL RESULTS

### 5.1 STATE OF COMPARATIVE ADVANTAGE

Table 1 provides five-year mean NRCA scores for ACP and the leading non-ACP sugar exporters. The last column reports mean NRCA scores for the entire period from 1961 to 2013. The results indicate that some countries had consistent comparative advantage while others recorded consistent comparative disadvantage throughout the

review period. Yet others switched from states of comparative advantage to states of comparative disadvantage or visa-versa.

Three African countries (Congo, Mauritius and Swaziland) had comparative advantage for all the five-year periods from 1961 to 2010. Côte d'Ivoire and Kenya had comparative disadvantage for all the considered periods. Similarly, Tanzania and Uganda had comparative disadvantage for most of the periods, except for 2001-05 and 2006-2010, respectively. Malawi, Zambia and Zimbabwe switched from states of comparative disadvantage to those of comparative advantage, and on balance had comparative advantage. Madagascar moved back and forth between comparative advantage and comparative disadvantage, and, on balance, it had comparative disadvantage. Broadly, East and West African countries had comparative disadvantage while Southern African countries had comparative advantage. As an aggregate, African countries had comparative advantage during all the considered periods.

Each individual Caribbean country had comparative advantage for all the considered periods, except that Saint Kitts and Nevis had comparative disadvantage during 2006-2010 and that Suriname has had comparative disadvantage since the period 1971-1975. Thus, collectively, Caribbean countries had consistent comparative advantage in the global sugar market. Fiji, the only Pacific state, had comparative advantage throughout the considered period.

Comparator non-ACP sugar exporters also exhibited mixed results with respect to the state of comparative advantage. Australia had comparative advantage throughout the review period. Brazil and Thailand moved into states of comparative advantage during 1966-70 and 1971-75, respectively, and maintained such status right through to the period 2006-2010. Mexico initially had comparative advantage, then moved to comparative disadvantage and later moved back to comparative advantage; but it had net comparative advantage when considering the entire review period. India, also oscillated between comparative advantage and comparative disadvantage, but recorded comparative advantage when considering the mean NRCA score for the entire period from 1961 to 2013.

China and Pakistan recorded comparative advantage during the first and the last three periods, respectively. On balance, the two countries had comparative disadvantages. The non-ACP sugar exporters considered in this study collectively had comparative advantage, despite the dismal performance of some of them. As expected, ROW, a collection of sugar exporters that are not necessarily among the world leaders, had comparative disadvantage for all the periods.

**Table 1: Mean NRCA scores for individual countries and regions, 1961–2013**

Country	1961-1965	1966-1970	1971-1975	1976-1980	1981-1985	1986-1990	1991-1995	1996-2000	2001-2005	2006-2010	1961-2013
<b>African ACP countries:</b>											
Congo	0.000045	0.000175	0.000054	0.000014	0.000017	0.000026	0.000028	0.000031	0.000037	0.000017	0.000042
Côte d'Ivoire	-0.000256	-0.000247	-0.000375	-0.000497	-0.000324	-0.000250	-0.000089	-0.000100	-0.000090	-0.000106	-0.000226
Kenya	-0.000188	-0.000142	-0.000183	-0.000178	-0.000114	-0.000106	-0.000022	-0.000046	-0.000033	-0.000049	-0.000102
Madagascar	0.000014	0.000071	-0.000021	-0.000043	-0.000024	0.000018	0.000014	-0.000001	-0.000002	0.000006	0.000004
Malawi	-0.000048	-0.000041	-0.000011	0.000078	0.000089	0.000057	0.000028	0.000041	0.000089	0.000049	0.000036
Mauritius	0.001683	0.001254	0.001464	0.001237	0.000881	0.001111	0.000908	0.000753	0.000592	0.000303	0.000973
Swaziland	0.000232	0.000290	0.000391	0.000439	0.000439	0.000462	0.000367	0.000337	0.000189	0.000202	0.000325
Tanzania	-0.000228	-0.000168	-0.000166	-0.000096	-0.000066	-0.000022	-0.000014	-0.000005	0.000005	-0.000009	-0.000072
Uganda	-0.000087	-0.000108	-0.000184	-0.000129	-0.000080	-0.000043	-0.000017	-0.000023	-0.000007	0.000020	-0.000059
Zambia	-0.000010	-0.000010	-0.000009	-0.000003	0.000003	0.000013	0.000026	0.000053	0.000069	0.000082	0.000024
Zimbabwe	-0.000026	0.000079	0.000163	0.000065	0.000142	0.000091	0.000051	0.000120	0.000066	0.000064	0.000079
<b>Total</b>	<b>0.001132</b>	<b>0.001154</b>	<b>0.001123</b>	<b>0.000885</b>	<b>0.000963</b>	<b>0.001357</b>	<b>0.001280</b>	<b>0.001160</b>	<b>0.000914</b>	<b>0.000580</b>	<b>0.001022</b>
<b>Caribbean ACP countries:</b>											
Barbados	0.000507	0.000374	0.000218	0.000154	0.000109	0.000099	0.000070	0.000065	0.000038	0.000017	0.000156
Belize	0.000080	0.000114	0.000174	0.000144	0.000137	0.000115	0.000106	0.000092	0.000069	0.000041	0.000103
Guyana	0.000850	0.000683	0.000807	0.000479	0.000341	0.000293	0.000310	0.000324	0.000202	0.000134	0.000423
Jamaica	0.001171	0.000802	0.000639	0.000317	0.000208	0.000244	0.000219	0.000204	0.000137	0.000082	0.000382
Saint Kitts & Nevis	0.000120	0.000081	0.000053	0.000060	0.000046	0.000038	0.000030	0.000025	0.000015	0.000000	0.000044
Suriname	0.000006	0.000010	-0.000011	-0.000010	-0.000012	-0.000007	-0.000003	-0.000005	-0.000002	-0.000001	-0.000003
Trinidad & Tobago	0.000606	0.000444	0.000380	0.000177	0.000097	0.000081	0.000078	0.000073	0.000036	0.000009	0.000187
<b>Total</b>	<b>0.003359</b>	<b>0.002509</b>	<b>0.002260</b>	<b>0.001322</b>	<b>0.000927</b>	<b>0.000863</b>	<b>0.000811</b>	<b>0.000779</b>	<b>0.000496</b>	<b>0.000283</b>	<b>0.001292</b>
<b>Pacific ACP countries:</b>											
Fiji	0.000741	0.000638	0.000624	0.000635	0.000508	0.000491	0.000446	0.000320	0.000214	0.000110	0.000449
<b>Total</b>	<b>0.000741</b>	<b>0.000638</b>	<b>0.000624</b>	<b>0.000635</b>	<b>0.000508</b>	<b>0.000491</b>	<b>0.000446</b>	<b>0.000320</b>	<b>0.000214</b>	<b>0.000110</b>	<b>0.000449</b>
<b>Non-ACP countries:</b>											
Australia	0.000008	0.000514	0.001475	0.002615	0.002497	0.001242	0.001943	0.002973	0.002562	0.002971	0.001904
Brazil	-0.000294	0.000732	0.004374	0.000628	0.000671	0.000141	0.001666	0.003004	0.004022	0.006768	0.002512
China	0.000464	-0.000244	-0.000086	-0.000470	-0.001185	-0.001650	-0.001269	-0.000926	-0.000766	-0.000773	-0.000705
India	0.001010	0.000444	0.000260	-0.000195	-0.000336	0.000127	0.000810	0.000119	-0.000037	-0.000017	0.000196
Mexico	0.001297	0.001090	0.001941	0.000363	-0.000067	-0.000110	-0.000075	-0.000101	0.000068	0.000269	0.000471
Pakistan	-0.000090	-0.000205	-0.000222	-0.000172	-0.000210	-0.000145	-0.000072	0.000119	0.000006	0.000239	-0.000042
Thailand	-0.000563	-0.000418	0.000383	0.000774	0.000725	0.001030	0.001409	0.001404	0.001066	0.001028	0.000755
<b>Broader groupings:</b>											
ACP	0.005211	0.004301	0.004006	0.002843	0.002398	0.002711	0.002537	0.002258	0.001624	0.000973	0.002763
Non-ACP	0.001832	0.001913	0.008125	0.003543	0.002095	0.000635	0.004411	0.006591	0.006921	0.010485	0.005092
ROW	-0.007044	-0.006214	-0.012132	-0.006386	-0.004493	-0.003346	-0.006948	-0.008849	-0.008545	-0.011458	-0.007855
World	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000

Notes. NRCA: Normalized Revealed Comparative Advantage.



## 5.2 DYNAMICS IN COMPARATIVE ADVANTAGE

This section examines the patterns and dynamics of comparative advantage to identify countries gaining or losing comparative advantage across time. The ACP countries can be categorized into four groups, depending on the patterns of their NRCA scores. Countries in group A, Côte d'Ivoire, Madagascar, Suriname and Uganda, switched from declining to increasing comparative advantage in the mid-1970s, after the signing of the Lomé Convention in 1975. Table 2 corroborates this because period 1 (period 2) slope coefficients for these countries are negative (positive). Therefore, these countries experienced declining (increasing) competitiveness before (during) the SP implementation. On the contrary, countries in group B, Belize, Swaziland and Zimbabwe, experienced rising NRCA scores during the period 1961-1975 and falling scores thereafter (Table 2), which suggests that these countries experienced increasing (declining) competitiveness before (during) SP implementation.

Countries in group C, Kenya, Malawi, Tanzania and Zambia, generally experienced increasing comparative advantage throughout the considered period (Table 2). However, Zambia's NRCA scores were stagnant before the implementation of the SP and only rose during SP implementation, while the NRCA scores for Malawi and Tanzania increased slower during than before SP implementation. Lastly, Kenya's NRCA scores did not fit a two-period trend model, but indicate consistent rise in competitiveness throughout the period under review.

Countries in group D, Barbados, Congo, Guyana, Fiji, Jamaica, Mauritius, Saint Kitts and Nevis and Trinidad and Tobago, experienced declining comparative advantage throughout the considered period (Table 2). However, the comparative advantages for Barbados, Congo, Guyana, Jamaica, Saint Kitts and Nevis and Trinidad and Tobago declined faster before than during SP implementation, implying continued but slower erosion in competitiveness during SP implementation. However, Mauritius' comparative advantage declined faster during than before SP implementation, suggesting increased loss in competitiveness. Lastly, Fiji experienced stagnant (declining) NRCA scores before (during) SP implementation.

Collectively, African countries experienced weakening competitiveness during the period from 1961 to 2013 (note that only a single period model fitted the data). As an aggregate, Caribbean countries also witnessed weakening comparative advantage during the review period, but at a higher rate during than before SP implementation. As a single unit, ACP witnessed weakening comparative advantage over the review period, but such trend was slower during, than before, SP implementation.



**Table 2: Estimation of annual changes in NRCA scores, 1961-2013**

Country/Region	Estimated Parameter					Adj. R <sup>2</sup>
	Intercept ( $\alpha$ )	Period 1 slope coefficient ( $\beta$ )		Period 2 incremental slope Coefficient ( $\delta$ )	Period 2 slope coefficient ( $\beta+\delta$ )	
Group A:						
Cote d'Ivoire	0.031758 (4.174)***	-0.0000163	(-4.218)***	0.0000272 (5.880)***	0.0000109	0.619
Madagascar	0.011461 (4.289)***	-0.00000581	(-4.288)***	0.00000680 (4.191)***	0.00000099	0.240
Suriname	0.00352 (7.642)***	-0.00000179	(-7.648)***	0.00000208 (7.442)***	0.00000029	0.521
Uganda	0.008349 (3.088)***	-0.0000043	(-3.134)***	0.00000936 (5.865)***	0.00000533	0.778
Group B:						
Belize	-0.014985 (-7.258)***	0.00000767	(7.325)***	-0.0000114 (-9.101)***	-0.00000373	0.722
Swaziland	-0.048079 (-6.622)***	0.0000246	(6.675)***	-0.0000331 (-7.516)***	-0.0000085	0.553
Zimbabwe	-0.0228193 (-4.272)***	0.0000143	(4.285)***	-0.0000172 (-4.292)***	-0.0000029	0.242
Group C:						
Kenya	-0.007222 (-8.274)***	0.00000358	(8.157)***			0.558
Malawi	-0.018847 (-5.565)***	0.00000957	(5.566)***	-0.00000908 (-4.415)***	0.00000047	0.502
Tanzania	-0.020652 (-7.670)***	0.0000104	(7.616)***	-0.00000683 (-4.175)***	0.0000036	0.849
Zambia	0.000938 (0.765)	-0.00000048	(-0.775)	0.00000322 (4.329) ***	0.00000273	0.844
Group D:						
Barbados	0.056995 (16.323)***	-0.0000288	(-16.241)***	0.0000244 (11.506)***	-0.0000044	0.932
Congo	0.008981 (2.564)**	-0.00000452	(-2.546)**	0.00000364 (1.709)*	-0.00000088	0.257
Fiji	0.002007 (0.230)	-0.000000675	(-0.152)	-0.0000155 (-2.928)*	-0.0000162	0.800
Guyana	0.046471 (3.719)***	-0.0000232	(-3.666)***	0.0000101 (1.331)	-0.0000131	0.701
Jamaica	0.124975 (11.880)***	-0.0000631	(-11.817)***	0.0000536 (8.394)***	-0.0000131	0.873
Mauritius	0.035487 (1.965)*	-0.0000173	(-1.886)*	-0.0000114 (-1.042)	-0.0000287	0.782
St Kitts and Nevis	0.009517 (8.788)***	-0.00000479	(-8.718)***	0.0000033 (5.016)***	-0.00000149	0.870
Trinidad & Tobago	0.064662 (11.405)***	-0.0000326	(-11.342)***	0.000026 (7.541)***	-0.0000066	0.886
Non-ACP						
Australia	-0.093587 (-5.319)***	0.0000481	(5.428)***			0.354
Brazil	-0.239145 (-6.381)***	0.000122	(6.448)***			0.438
Pakistan	-0.020069 (-7.272)***	0.0000101	(7.257)***			0.498
Thailand	-0.078254 (-8.055)***	0.0000398	(8.133)***			
Mexico	0.05593 (4.371)***	-0.0000279	(-4.334)***			0.255
India	0.024798 (2.762)***	-0.0000124	(-2.740)***			0.111
China	0.046286 (5.224)***	-0.0000236	(5.303)***			0.343
Broader Groupings:						
Africa	0.017757 (3.273)***	-0.00000842	(-3.085)***			0.141
Caribbean	0.291156 (9.671)***	-0.000147	(-9.599)***	0.000108 (5.911)***	-0.000039	0.873
Pacific	0.002007 (0.230)	-0.000000675	(-0.152)	-0.0000155 (-2.928)*	-0.0000162	0.800
ACP	0.271850 (5.589)***	-0.000136	(-5.506)***	0.0000683 (2.311)**	-0.0000677	0.821
Non-ACP Leaders	-0.304040 (-5.329)***	0.000156	(5.412)***			0.352
ROW	0.141985 (2.314)**	-0.0000754	(-2.442)**			0.087

Notes. t-values are in parentheses next to parameter estimates. \*\*\*, \*\*, and \*: statistically significant at 1%, 5% and 10%, respectively. NRCA: Normalized Revealed Comparative Advantage.

Figure 1 plots aggregate NRCA scores for ACP countries by group. As observed, there was convergence in their comparative advantages at least since SP implementation in the mid-1970s. The NRCA scores reveal that countries that initially had stronger (weaker) comparative advantages experienced weakening (strengthening) competitiveness, which led to convergence in the comparative advantages of these countries. Indeed, by the 2010s cross-country (cross-group) differences in comparative advantage had narrowed (Figure 1). Non-ACP countries also exhibited mixed patterns of comparative advantage, with Australia, Brazil, Pakistan and Thailand experiencing increasing competitiveness and Mexico, India and China exhibiting declining competitiveness (Table 2). India, in particular, experienced declining competitiveness despite also benefiting from the SP.

**Figure 1 Aggregate NRCA scores for ACP countries by group**

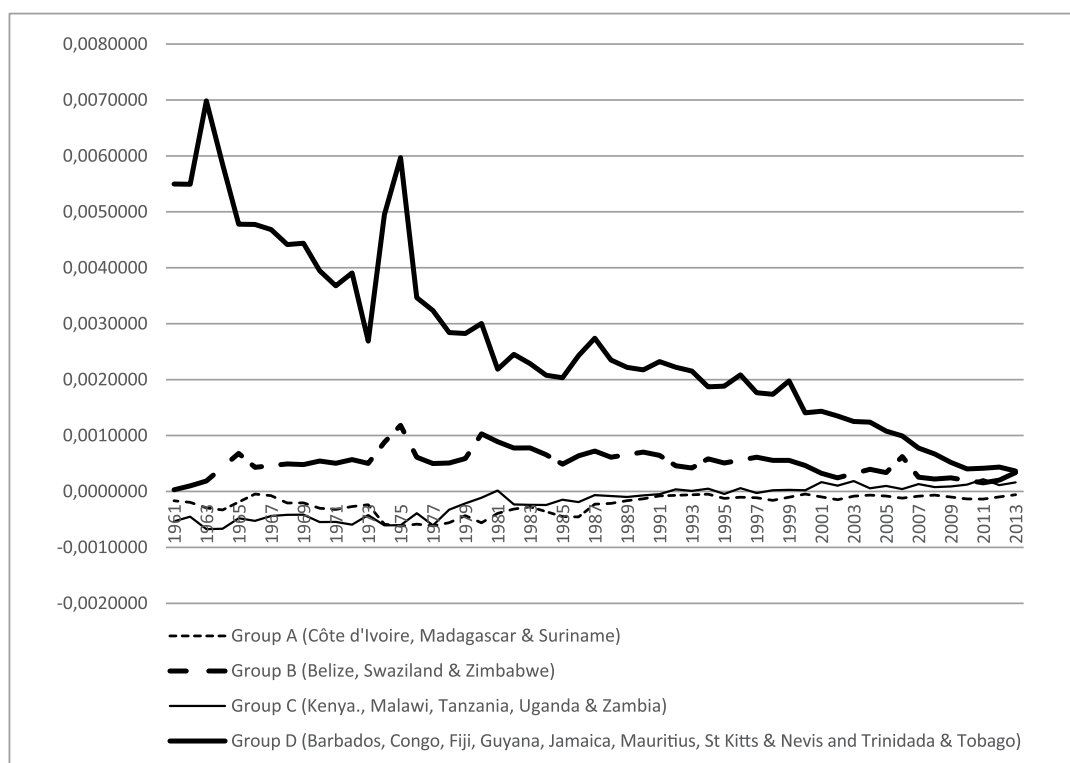


Table 3 provides a comparative analysis of each country's comparative advantage across time, with the NRCA scores for each period normalized by the NRCA score for the period 1961-65 (1961-65=0) (see equation 4). In group A, Côte d'Ivoire's comparative advantage was 59% stronger in 2006-2010 than in 1961-65. However, Madagascar's comparative advantage was 59% weaker in 2006-2010 than in 1961-65. And Suriname's comparative advantage had weakened by 122% between 1961-65 and 2006-2010. In group B, the comparative advantages of Belize and Swaziland were respectively 48% and 13% weaker

**Table 3: Changes in comparative advantage over time, 1961-65 to 2006-2010**

Country/Region	1961-1965	1966-1970	1971-1975	1976-1980	1981-1985	1986-1990	1991-1995	1996-2000	2001-2005	2006-2010
<b>Group A:</b>										
Côte d'Ivoire	0.00	3.42	-46.31	-94.06	-26.32	2.51	65.28	60.84	64.94	58.58
Madagascar	0.00	400.38	-244.43	-404.51	-268.04	25.03	0.19	-106.58	-115.61	-59.09
Suriname	0.00	82.57	-290.80	-273.09	-305.99	-216.06	-154.58	-185.13	-127.66	-122.28
<b>Group B:</b>										
Belize	0.00	42.53	116.59	79.87	70.60	43.23	32.18	14.75	-14.03	-48.39
Swaziland	0.00	25.03	68.13	89.15	88.90	98.90	58.00	44.99	-18.68	-12.93
Zimbabwe	0.00	403.02	726.62	348.74	647.94	449.51	294.57	562.48	353.24	347.19
<b>Group C:</b>										
Kenya	0.00	24.33	2.16	4.81	39.35	43.57	88.27	75.53	82.50	73.79
Malawi	0.00	14.17	76.43	262.15	285.46	217.63	158.58	185.81	284.20	201.06
Tanzania	0.00	26.51	27.45	57.78	70.89	90.40	93.91	97.86	102.15	96.27
Uganda	0.00	-23.17	-110.50	-48.06	7.88	50.70	80.21	74.22	91.70	122.67
Zambia	0.00	-8.08	7.25	67.78	127.76	234.46	367.22	640.52	812.42	948.77
<b>Group D:</b>										
Barbados	0.00	-0.26	-0.57	-0.70	-0.79	-0.80	-0.86	-0.87	-0.93	-0.97
Congo	0.00	289.69	20.51	-69.65	-62.36	-42.45	-37.23	-31.96	-17.51	-61.54
Fiji	0.00	-13.83	-15.76	-14.23	-31.44	-33.67	-39.84	-56.86	-71.14	-85.09
Guyana	0.00	-19.60	-5.06	-43.68	-59.87	-65.53	-63.55	-61.83	-76.25	-84.21
Jamaica	0.00	-31.50	-45.43	-72.89	-82.21	-79.19	-81.27	-82.56	-88.29	-93.00
Mauritius	0.00	-25.49	-13.03	-26.49	-47.65	-34.01	-46.05	-55.29	-64.84	-81.99
Saint Kitts and Nevis	0.00	-32.44	-55.79	-49.59	-61.57	-68.34	-74.55	-78.87	-87.36	-100.07
Trinidad & Tobago	0.00	-26.70	-37.26	-70.79	-83.92	-86.66	-87.05	-87.95	-94.01	-98.50
<b>Non-ACP Group:</b>										
Australia	0.00	6453.87	18712.22	33253.24	31750.59	15743.14	24678.23	37816.25	32582.26	37795.95
Brazil	0.00	349.10	1588.80	313.70	328.35	148.03	667.04	1122.42	1469.08	2403.59
China	0.00	-152.47	-118.63	-201.33	-355.32	-455.48	-373.37	-299.39	-264.98	-266.59
India	0.00	-56.05	-74.22	-119.32	-133.25	-87.40	-19.87	-88.25	-103.70	-101.66
Mexico	0.00	-15.97	49.71	-71.99	-105.14	-108.52	-105.79	-107.82	-94.74	-79.25
Pakistan	0.00	-128.26	-147.66	-91.69	-134.12	-62.16	19.43	232.61	106.33	366.24
Thailand	0.00	25.76	168.03	237.49	228.69	282.89	350.19	349.18	289.22	282.54
<b>Broader Grouping:</b>										
Africa	0.00	1.96	-0.76	-21.75	-14.86	19.90	13.16	2.49	-19.18	-48.74
Caribbean	0.00	-24.85	-32.33	-60.39	-72.24	-74.16	-75.71	-76.67	-85.15	-91.54
Pacific	0.00	-13.83	-15.76	-14.23	-31.44	-33.67	-39.84	-56.86	-71.14	-85.09
ACP	0.00	-17.47	-23.12	-45.44	-53.98	-47.98	-51.31	-56.67	-68.84	-81.33
Non-ACP	0.00	4.40	343.42	93.35	14.35	-65.35	140.74	259.67	277.70	472.18
ROW	0.00	11.78	-72.24	9.33	36.20	52.50	1.35	-25.63	-21.32	-62.67

Notes. Normalized Scores reported here are comparable across periods and not across countries.

in 2006-2010 than in 1960-65. However, Zimbabwe's comparative advantage for 2006-2010 was 347% stronger than its comparative advantage for 1961-65. All the countries in group C had stronger comparative advantages during 2006-2010 than during 1961-1965, and the gains ranged from 74% (Kenya) to 949% (Zambia). On the contrary, countries in group D had weaker comparative advantages during 2006-2010 than during 1961-65, with losses ranging from 1% (Barbados) to 100% (St Kitts and Nevis).

Four of the non-ACP states, Australia, Brazil, Pakistan and Thailand, experienced astronomical gains in comparative advantage during the considered period, with their NRCA scores rising by 37796%, 2404%, 366% and 283%, respectively. However, China, India and Mexico respectively had 267%, 102% and 79% weaker comparative advantages during 2006-2010 than during 1961-65.

African, Caribbean and Pacific countries had respectively lost 49%, 91% and 85% of their comparative advantages in 2006-2010 compared to 1961-65. On balance, the comparative advantage of ACP countries, as a collective, was 81% weaker in 2006-2010 than in 1961-65. However, non-ACP countries collectively gained 472% while ROW lost 61% of their comparative advantages between the same periods. Therefore, an important finding of this study is that non-ACP countries were the key drivers of changes in comparative advantage in the global sugar market.

### 5.3 COMPARATIVE ADVANTAGE ACROSS COUNTRIES

#### Ranking countries based on comparative advantage

Table 4 ranks countries in terms of the strengths of their comparative advantages. The rankings indicate that during the most recent period, 2006-2010, Brazil had the strongest comparative advantage, followed by Australia and Thailand; all of which are non-ACP sugar exporters. These were followed by Mauritius (an ACP country), Mexico, and Pakistan. Swaziland, was in seventh position, while Guyana and Fiji came next at positions eight and nine, respectively. Zambia and Jamaica were at positions ten and eleven, respectively.

When considering all the periods, Mauritius was the leading African sugar exporter, followed by Swaziland. Zimbabwe, Zambia and Congo. The remaining African states ranked amongst the lowest performers. Guyana and Jamaica led Caribbean countries, followed by Belize, Barbados and Trinidad and Tobago. While not ranking high, the remaining Caribbean states ranked better than half of the African states in the bottom tier. China, a non-ACP country, maintained the lowest ranking for most of the periods. Indian, Pakistan and Mexico, other non-ACP countries, exhibited varied rankings.

The last column of Table 4 reports changes in the rankings between the periods 1961-65 and 2006-2010, which appear to have been mainly propelled by the dynamics in non-

**Table 4: Ranking of ACP and non-ACP sugar exporters by strength of comparative advantage, 1961-65 to 2006-2010**

Country	1961-65	1966-70	1971-75	1976-80	1981-85	1986-90	1991-95	1996-00	2001-05	2006-10	Change in Ranking
<b>Group A:</b>											
Côte d'Ivoire	24	25	26	26	24	25	25	24	25	25	-1
Madagascar	14	16	20	19	18	17	18	19	21	19	-5
Suriname	16	17	18	18	17	19	19	20	20	21	-5
<b>Group B:</b>											
Belize	12	13	13	12	10	10	10	12	11	14	-2
Swaziland	10	11	8	7	6	5	7	5	7	7	3
Zimbabwe	18	15	14	14	9	12	13	9	13	12	6
<b>Group C:</b>											
Kenya	22	21	23	23	22	22	22	23	23	24	-2
Malawi	19	19	19	13	13	14	16	16	9	13	6
Tanzania	23	22	22	20	19	20	20	21	19	22	1
Uganda	20	20	24	21	21	21	21	22	22	15	5
Zambia	17	18	17	17	16	18	17	15	10	10	7
<b>Group D:</b>											
Barbados	8	10	12	11	11	11	12	14	14	17	-9
Congo	13	12	15	16	15	16	15	17	15	16	-3
Fiji	6	6	7	4	5	4	6	7	5	9	-3
Guyana	5	5	5	6	7	6	8	6	6	8	-3
Jamaica	3	3	6	9	8	7	9	8	8	11	-8
Mauritius	1	1	4	2	2	2	4	4	4	4	-3
St Kitts & Nevis	11	14	16	15	14	15	14	18	17	20	-9
Trinidad & Tobago	7	9	10	10	12	13	11	13	16	18	-11
<b>Non-ACP Countries:</b>											
Australia	15	7	3	1	1	1	1	2	2	2	13
Brazil	25	4	1	5	4	8	2	1	1	1	24
China	9	24	21	25	26	26	26	26	26	26	-17
India	4	8	11	24	25	9	5	11	24	23	-19
Mexico	2	2	2	8	20	23	24	25	12	5	-3
Pakistan	21	23	25	22	23	24	23	10	18	6	15
Thailand	26	26	9	3	3	3	3	3	3	3	23
ROW	27	27	27	27	27	27	27	27	27	27	0

ACP sugar exporters. In particular, Brazil, Australia and Thailand gained 24, 13 and 23 spots (respectively) while India and China lost 19 and 17 positions (respectively). While it witnessed varied rankings, Mexico lost only three spots between 1961-65 and 2006-10. Five African countries, Congo, Cote d'Ivoire, Kenya, Madagascar and Mauritius lost one to five positions, while the remaining African countries gained between two and seven spots. Caribbean and Pacific ACP states lost between two and eleven positions.

### **Cross-country comparison of comparative advantage**

Table 5 compares the comparative advantages across ACP countries (using equation 5), with country  $\bar{i}$  being Mauritius, the most competitive ACP state. The results reveal that the comparative advantage for Swaziland, the second leading African ACP country, was 33-86% weaker than that for Mauritius during the considered period. However, the gap in the comparative advantages of the two countries generally narrowed over time, implying convergence in competitiveness. The comparative advantage for Côte d'Ivoire was 110-140% weaker than that for Mauritius. Other estimates may be interpreted in a similar manner.

With respect to Caribbean countries, Jamaica and Guyana were the best performers against Mauritius. Jamaica's (Guyana's) comparative advantage was 30-78% (45-74%) weaker than that for Mauritius. Generally, both of these countries' comparative advantages were eroded over time against that for Mauritius. Suriname performed much poorly against the ACP leader. Scores for other Caribbean countries suggest that these countries had much weaker comparative advantages than Mauritius, although they performed much better than five of the seven African countries reported in Table 5. Fiji's comparative advantage was 42-64% weaker than that for Mauritius.

Australia has had the strongest comparative advantage among ACP and non-ACP sugar exporters, particularly in more recent periods, despite being surpassed by Brazil in the last three periods. Normalized NRCA scores were recomputed treating Australia as country  $\bar{i}$  (equation 5), with both ACP and non-ACP countries included in the analysis. Results, presented in Table 6, suggest that 14 countries had stronger comparative advantages than Australia during the period 1961-65. However, during the period 1966-1970, Australia had stronger comparative advantage than the majority of the countries, except for Brazil, Mauritius, Guyana, Jamaica, Fiji and Mexico. For the remaining periods, Australia had stronger comparative advantage than most countries, except for Mexico and Brazil during 1971-75, and Brazil during 1996-2000, 2001-2005 and 2006-2010. The normalized scores presented in Table 6 may be interpreted as before. For example, Mauritius' comparative advantage was 1-90% weaker than that for Australia during the periods from 1971 to 2010.

**Table 5: Cross-country comparisons of comparative advantage in sugar (Mauritius = 0), 1961-65 to 2006-2010**

Country	1961-1965	1966-1970	1971-1975	1976-1980	1981-1985	1986-1990	1991-1995	1996-2000	2001-2005	2006-2010
<b>Group A:</b>										
Côte d'Ivoire	-115.22	-119.73	-125.61	-140.18	-136.72	-122.48	-109.79	-113.33	-115.18	-135.01
Madagascar	-99.15	-94.31	-101.41	-103.51	-102.72	-98.40	-98.43	-100.12	-100.38	-98.08
Suriname	-99.67	-99.18	-100.73	-100.79	-101.31	-100.59	-100.34	-100.64	-100.26	-100.41
<b>Group B:</b>										
Belize	-95.23	-90.88	-88.13	-88.34	-84.47	-89.65	-88.32	-87.77	-88.34	-86.34
Swaziland	-86.20	-76.84	-73.31	-64.48	-50.19	-58.40	-59.58	-55.24	-68.07	-33.27
Zimbabwe	-101.55	-93.72	-88.87	-94.77	-83.83	-91.82	-94.43	-84.02	-88.87	-78.79
<b>Group C:</b>										
Kenya	-111.14	-111.31	-112.53	-114.43	-112.91	-109.53	-102.42	-106.10	-105.55	-116.21
Malawi	-102.86	-103.30	-100.78	-93.68	-89.86	-94.90	-96.89	-94.51	-85.00	-83.93
Tanzania	-113.57	-113.38	-111.32	-107.79	-107.54	-101.97	-101.53	-100.65	-99.17	-102.81
Uganda	-105.19	-108.57	-112.55	-110.45	-109.13	-103.87	-101.90	-102.99	-101.22	-93.47
Zambia	-100.58	-100.84	-100.62	-100.25	-99.69	-98.82	-97.14	-93.02	-88.30	-72.80
<b>Group D:</b>										
Barbados	-69.90	-70.17	-85.14	-87.52	-87.66	-91.09	-92.28	-91.43	-93.59	-94.32
Congo	-97.33	-86.01	-96.29	-98.90	-98.08	-97.67	-96.89	-95.93	-93.73	-94.29
Fiji	-56.00	-49.12	-57.38	-48.66	-42.37	-55.78	-50.94	-57.54	-63.88	-63.57
Guyana	-49.50	-45.51	-44.87	-61.31	-61.29	-73.62	-65.89	-56.88	-65.88	-55.73
Jamaica	-30.42	-36.04	-56.34	-74.34	-76.36	-78.06	-75.84	-72.86	-76.82	-72.94
Mauritius	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Saint Kitts & Nevis	-92.89	-93.56	-96.39	-95.13	-94.78	-96.59	-96.65	-96.64	-97.45	-100.03
Trinidad & Tobago	-64.01	-64.60	-74.04	-85.70	-88.95	-92.73	-91.37	-90.30	-93.87	-97.01

Notes. Normalized scores reported here are comparable across countries and not across periods.

**Table 6: Cross-country comparisons of comparative advantage in sugar (Australia = 0), 1961-65 to 2006-2010<sup>†</sup>**

Country	1961-1965	1966-1970	1971-1975	1976-1980	1981-1985	1986-1990	1991-1995	1996-2000	2001-2005	2006-2010
<b>Group A:</b>										
Côte d'Ivoire	-3367.54	-148.15	-125.41	-119.01	-112.96	-120.11	-104.58	-103.37	-103.50	-103.57
Madagascar	81.76	-86.12	-101.40	-101.66	-100.96	-98.57	-99.27	-100.03	-100.09	-99.80
Suriname	-28.30	-98.00	-100.73	-100.37	-100.46	-100.53	-100.16	-100.16	-100.06	-100.04
<b>Group B:</b>										
Belize	923.44	-77.74	-88.22	-94.48	-94.52	-90.75	-94.54	-96.90	-97.31	-98.61
Swaziland	2863.29	-43.47	-73.52	-83.19	-82.42	-62.80	-81.10	-88.67	-92.63	-93.19
Zimbabwe	-431.69	-84.66	-88.95	-97.53	-94.29	-92.68	-97.40	-95.95	-97.43	-97.84
<b>Group C:</b>										
Kenya	-2491.67	-127.61	-112.44	-106.83	-104.55	-108.52	-101.13	-101.54	-101.28	-101.65
Malawi	-714.65	-108.05	-100.77	-97.01	-96.42	-95.44	-98.55	-98.61	-96.54	-98.36
Tanzania	-3012.36	-132.66	-111.23	-103.69	-102.66	-101.76	-100.72	-100.16	-99.81	-100.29
Uganda	-1213.36	-120.92	-112.46	-104.94	-103.22	-103.46	-100.89	-100.76	-100.28	-99.33
Zambia	-223.91	-102.04	-100.61	-100.12	-99.89	-98.95	-98.66	-98.23	-97.30	-97.22
<b>Group D:</b>										
Barbados	6361.54	-27.20	-85.25	-94.09	-95.64	-92.03	-96.39	-97.83	-98.52	-99.42
Congo	474.13	-65.86	-96.32	-99.48	-99.32	-97.91	-98.55	-98.97	-98.55	-99.42
Fiji	9346.28	24.19	-57.70	-75.71	-79.67	-60.45	-77.07	-89.25	-91.66	-96.28
Guyana	10741.05	32.99	-45.29	-81.69	-86.34	-76.41	-84.05	-89.09	-92.12	-95.48
Jamaica	14837.70	56.12	-56.67	-87.86	-91.66	-80.38	-88.71	-93.13	-94.65	-97.24
Mauritius	21368.40	144.08	-0.75	-52.68	-64.71	-10.58	-53.25	-74.68	-76.91	-89.80
Saint Kitts & Nevis	1425.69	-84.27	-96.41	-97.69	-98.16	-96.95	-98.43	-99.15	-99.41	-100.00
Trinidad & Tobago	7625.63	-13.60	-74.23	-93.23	-96.10	-93.50	-95.96	-97.54	-98.58	-99.69
<b>Non-ACP states:</b>										
Australia	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Brazil	-3847.25	42.42	196.56	-75.99	-73.13	-88.64	-14.25	1.05	56.97	127.79
China	5820.26	-147.40	-105.86	-117.99	-147.46	-232.84	-165.32	-131.13	-129.89	-126.03
India	12788.02	-13.57	-82.34	-107.47	-113.45	-89.75	-58.32	-96.01	-101.46	-100.56
Mexico	16439.32	112.05	31.62	-86.11	-102.67	-108.89	-103.87	-103.41	-97.34	-90.94
Pakistan	-1243.31	-139.82	-115.05	-106.57	-108.40	-111.70	-103.72	-96.00	-99.78	-91.97
Thailand	-7284.63	-181.38	-74.02	-70.38	-70.97	-17.06	-27.45	-52.78	-58.40	-65.39

Notes. Normalized scores reported here are comparable across countries and not across periods.



## 6. CONCLUDING REMARKS

The primary objective of this paper was to assess the state and dynamics of comparative advantage among ACP sugar exporters. Results indicate that Congo, Fiji, Mauritius, Swaziland and all the Caribbean countries had comparative advantage during all the considered periods. Zimbabwe, Malawi and Zambia transited from comparative disadvantage to comparative advantage during the second, fourth and fifth periods, respectively. However, Suriname transited from comparative advantage to comparative disadvantage in the third period, while Madagascar oscillated between comparative advantage and comparative disadvantage. Tanzania and Uganda recorded comparative disadvantage during nine of the 10 periods, while Côte d'Ivoire and Kenya had comparative disadvantage during all the 10 periods. As single units, African, Caribbean and Pacific countries had comparative advantage for all the ten considered periods. As a single group, ACP had comparative advantage throughout the considered period.

However, the comparative advantages changed considerably across time for individual countries. Côte d'Ivoire, Madagascar, Suriname and Uganda experienced declining (rising) comparative advantage before (during) SP implementation. However, Belize, Malawi and Zimbabwe witnessed reversed scenarios, with their comparative advantage rising (declining) before (during) SP implementation. Kenya, Malawi, Tanzania and Zambia experienced rising comparative advantage throughout the considered period, while Barbados, Congo, Fiji, Guyana, Jamaica, Mauritius, Saint Kitts and Nevis and Trinidad and Tobago witnessed opposite trends. However, since the 1970s, ACP countries have experienced convergence in their comparative advantages. Non-ACP sugar exporters also showed a mixed picture, with Australia, Brazil, Pakistan and Thailand gaining comparative advantage and China, India and Mexico losing comparative advantage.

The ranking of countries in terms of comparative advantage also showed that changes occurred across time, with non-ACP states, Australia, Brazil, Pakistan and Thailand gaining 13, 24, 15 and 23 places, respectively. To the contrary, India, China and Mexico lost 19, 17 and 3 positions, respectively. Caribbean and Pacific states lost one to ten positions, despite the majority of them having consistent comparative advantage. African states exhibited a mixed picture with four countries losing between one to four positions, six gaining two to eight positions, and one retaining its position.

Cross-country comparisons of comparative advantage indicate that Mauritius was the leading ACP state in the global sugar market. For example, the NRCA scores for Fiji, Guyana and Jamaica were 42-64%, 45-74% and 30-78% weaker than those for Mauritius, respectively. Moreover, Swaziland's comparative advantage was 33-86% weaker than that for Mauritius. The remaining ACP states had much weaker comparative advantages relative to Mauritius. Also, ACP states performed poorly against the leading non-ACP sugar exporters of Australia, Brazil and Thailand. For example, Mauritius' comparative

advantage was 1-90% weaker than Australia's comparative advantage during the periods from 1971 to 2010. The remaining ACP countries registered much weaker comparative advantages relative to Australia.

In sum, most of the ACP states have lost competitiveness since the signing of the Lomé Convention in the mid-1970. The exceptions are some of the East and West African countries that saw improvements from extreme comparative disadvantage or marginal comparative (dis)advantage. Generally, there has been convergence in the comparative advantages among ACP countries since the signing of the Lomé Convention in 1975. This suggests that the implementation of the SP has led to convergence in the competitiveness of beneficiary ACP countries as they were all given access to one of the world's highly protected sugar market.

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