Integration of Sugar Markets between Swaziland and its Major Trading Partners

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Abstract
The study was designed to examine the extent of market integration between Swaziland sugar markets and its major trading partners (i.e., South Africa, EU and USA) using monthly export sugar price data from January 2001 to December 2013. Price series were tested for stationarity with the Augmented Dickey-Fuller (ADF) test and it was found that all prices were integrated of order one I (1). Zivot and Andrews test was used to determine the structural break in the price series and it revealed that the Swaziland and USA price break was in August, 2009 while for the EU price break was in October, 2008. Price relationships were examined in one period (entire period) and two sub-periods (before structural break and after structural break). The Johansen's cointegration test revealed long-run integration for almost all the pairs of sugar markets, except for the USA in the full sample period. The integrations between the markets shows a significant improvement after the structural break. The Vector Error Correction model (VECM) estimates showed that the Swaziland's export market prices adjust significantly to the short-run shocks that appeared in the South African's and EU's sugar market for the entire period while when the structural breaks period was allowed it adjusts significantly before the break for the South African's market. Swaziland's market only adjusts significantly to the EU and USA market shocks after the structural break. The overall coefficient of the adjustment parameter has been very low due to high government interventions in the sugar sector by the Swaziland trading partners which is an impediment to the efficient market functioning. It is therefore suggested that interventions of the respective governments should be reduced for efficient functioning of the markets
Keywords: sugar, trading partners, cointegration, stationarity, structural break

1. Introduction

Sugar is a commodity of critical economic importance in many African countries. In Swaziland the sugar industry comprises of sugarcane growing (which is classified as an agricultural activity) and sugarcane manufacturing (which is classified as an industrial activity). In 2012, the agriculture sector accounts for about 8% of Swaziland's Gross Domestic Product (GDP). Out of this fraction, sugarcane growing makes up 6%. The manufacturing sector, which accounts for 35% of GDP, includes sugar manufacturing and refining (7%), as well as secondary sugar and molasses based production such as sweets and alcohol. The sugar industry, as part of the agricultural as well as the manufacturing sector, directly accounts for 18% of GDP; employment in sugar cane production takes up to 35% of the total wage employment, while sugar cane processing accounts for 18% of employment opportunities in wage employment. Currently the sugar industry employment is 16% of total private sector wage employments and 10% of the national formal sector. The sugar industry is the highest contributor to the government treasury through taxation, social services and trade, which includes exports and sugar related imports such as fuels, chemical for agriculture and processing, transport and finance (Swaziland Sugar Association, 2012). Swaziland sugar products are exported to four main market areas that include; European Union (EU), United States of America (USA), Southern African Customs Union (SACU) and the regional/world market (Swaziland Sugar Association, 2013). Sugar sales to the EU and USA benefit from preferential market access under the terms of the ACP-EU Protocol on Sugar (SP) and Tariff Rate Quota (TRQ), respectively. Swaziland is one of the world lowest cost producer that suggests that they are efficient in the sugar production and hence their sugar is cheaper compared to the other countries and hence they will be highly traded (transmitted) in the world (Sandrey *et al.*, 2011).

According to International Sugar Organization (ISO) 2012 report, the sugar market experienced and continued to experience considerable price volatility and the world raw sugar price reached the highest price in 30 years of 36 cents/lb in February 2011. The reasons for this global price volatility was due to many factors namely: increased biofuel demand; higher oil prices that have raised prices for agricultural inputs such as fuel and fertilizers; short-term supply shocks due to adverse weather conditions that had affected the major sugar producers such as Brazil and India; and short-term trade policy changes such as reduced barriers to imports and increased restriction on exports. Therefore, given these concerns in the international sugar markets, it is important to learn more about the market behavior of Swaziland sugar with other international sugar exporters. The rise in the world sugar price had influence the world market in becoming more attractive for exports and thus influencing the degree of market integration. The purpose of the study was to examine the sugar market integration and short-run dynamic interactions between Swaziland sugar market and the sugar markets of its major trading partners (i.e. South Africa, EU and USA) using cointegration techniques. This study contributes to literature in three ways. First, it examines the sugar market integration between Swaziland and its three major trading partners which has not been documented in the previous literature. Second, this paper differs from previous studies because this study employs Johansen's cointegration test which allows structural break to be examined in the sugar market integration (long-run equilibrium relationship). Third, it attempts to assess the recent evidence of long-run relationships and short-run dynamic interactions between the Swaziland sugar market and those of its major trading partners, and in particular to what extent the Swaziland market is influenced by those of its trading partners through the use of recent data. The rest of the paper is organized as follows; section 2 describes the theoretical framework; section 3 describes the price series used and presents the methodology used; section 4 presents the results and discussions; and final section 5 provides conclusion and policy implications.

2. Theoretical framework

Market integration lies in the Law of One Price (LOP) which states that for a given commodity, a representative price, adjusted by exchange rates and allowance for transportation costs, will prevail across all countries. Therefore, the LOP suggests that homogenous commodity markets across all countries should be integrated as a single market, which is warranted by efficient international commodity arbitrage. Geographically separated markets are spatially integrated if goods and information flow freely among them and, as a result, the effects of price changes in one market are transmitted to another market's prices. Theoretically, under the assumption of perfect integration, when two countries trade, the product price in the import country (market 2) equals the price in the export country (market 1) plus the costs of transporting a commodity from market 1 to market 2 (Rapsomanikis *et al*., 2006). The relationship between prices in the two markets is given by:

$$p_{2t} = p_{1t} + c \qquad (1)$$

If condition *(1)* holds, then the two markets are said to be perfectly integrated and is assumed to be efficient. It is hypothesized that if the difference between p_1 and p_2 exceeds c, then the ratio is greater than one which acts as an incentive to rational and well-informed trader to take advantage to make profits by moving commodities between the two locations will either be less or equal to relevant trade cost, c. If the joint distribution of the two prices are found to be independent of each other, then it suggests that the two markets are not integrated. Hence there is no price transmission from one market to another. The perfect integration condition is unlikely, especially in the short run. In general, the spatial arbitrage is expected to ensure that prices of the homogenous commodity will differ by an amount that is at most equal to the cost of transferring a commodity from one market to another, thus it is represented as follows:

$$p_{2t} - p_{1t} \leq c \qquad (2)$$

Equation (2) is the spatial arbitrage condition that identifies a weak form of the LOP, the strong form is characterised by equation (1). Fackler and Goodwin (2001) emphasized that condition (2) is an equilibrium condition because prices may diverge from relationship *(*1), but spatial arbitrage will ensure that the difference between the two prices moves towards the transfer cost. The spatial arbitrage condition also implies that if price changes are not passed-through instantaneously, but with a lag, price transmission is incomplete in the short run, but complete in the long run. Applied researchers often base their statistical models of market integration upon the weaker version of the LOP and cointegration models are the most widely used for this purpose. The weaker version of LOP states that two spatially separated markets are considered to be integrated for a particular commodity if there is a long-run relationship between the prices of the homogeneous commodity in the different markets.

3. Methodology

3.1. Data type and sources

In our empirical investigation we used sugar monthly export prices for Swaziland, South Africa, European Union and United States of America covering a period from January, 2001 to December, 2013 (i.e. 156 months) that were obtained from different sources including Swaziland Sugar Association, South Africa Sugar Association, Department of Trade and Industry in South Africa, National Agricultural Marketing Council of South Africa, International Trade Centre, World Bank and United States Department of Agriculture websites. All the series are quoted in US Dollars per kilogram (US$/Kg) and were expressed in logs.

3.2. Unit root test

Unit root test is important in examining the stationarity of time series because using nonstationary data will result in a spurious results. To determine whether the level series of the market price are nonstationary, which is a pre-condition for cointegration, and to find out if all series are integrated of the same order, the Augmented

Dickey-Fuller (ADF) test was employed for this study. According to Gujarati (2003), the ADF unit root test entails running a regression of the following form:

$$\Delta P_t = \alpha + \beta P_{t-1} + \delta t + \sum_{j=1}^{k} \varphi \Delta P_{t-j} + \varepsilon_t \qquad (3)$$

Where P_t is the sugar price at time t, Δ is the change operator, P_{t-1} is the past values of the sugar price, β is the coefficient on the time trend, α is the constant coefficient, δ is the coefficient on the time trend, k is the lag order of the autoregressive process, ΔP_{t-j} is the lagged difference of P whose magnitude is measured by φ and ε_t is the white noise error term. The unit root test is carried out under the null hypothesis $\alpha = 0$ against the alternative hypothesis of $\alpha < 0$; nonstationarity is rejected when α is significantly different from 1. The number of lags to be considered is selected by using the Akaike Information Criterion (AIC) and Schwarz Bayesian Information Criteria (SBIC). A common problem with the conventional such as ADF unit root tests, is that they do not allow for any break in the data generation process. In the case of a structural break, unit root test without structural break may result in misleading inferences. Zivot and Andrews (1992) extended on Perron (1989) idea and introduced an endogenous structural break in the model. The break date is selected where the t-statistic from the ADF test of unit root is at a minimum. The Zivot and Andrews (ZA) test proceed with three models to test for a unit root: model A, which permits a one-time change in the level of the series; model B, which allows for a one-time change in the slope of the trend function, and model C, which combines one-time changes in the level and the slope of the trend function of series. Hence, to test for a unit root against the alternative of a one-time structural break, ZA test use the following regression equations (derived from equation 3) corresponding to the three models below.

$$\Delta P_t = \alpha + \beta P_{t-1} + \delta t + \theta DU_t + \sum_{j=1}^{k} \varphi_j \Delta P_{t-j} + \varepsilon_t \qquad \text{(Model A)}$$

$$\Delta P_t = \alpha + \beta P_{t-1} + \delta t + \gamma DT_t^* + \sum_{j=1}^{k} \varphi_j \Delta P_{t-j} + \varepsilon_t \qquad \text{(Model B)}$$

$$\Delta P_t = \alpha + \beta P_{t-1} + \delta t + \theta DU_t + \gamma DT_t^* + \sum_{j=1}^{k} \varphi_j \Delta P_{t-j} + \varepsilon_t \qquad \text{(Model C)}$$

Where DU_t is an indicator for dummy variable representing a shift in the intercept, and used for every date while DT_t is indicator for dummy variable representing a shift in trend. The null hypothesis in all the three models is that the price series is integrated without an exogenous structural break, while the alternative hypothesis implies that the price series can be represented by a trend-stationary process with only one break point occurring at some unknown time. The Zivot and Andrews method regards every point as a potential break-date and runs a regression for every possible break sequentially.

3.3. Cointegration Analysis

Cointegration analysis examines whether the price series are linked to form an equilibrium relationship. After checking the stationarity of the time series, assuming that all the price series are integrated of the same order, then the Johansen Full Information Maximum Likelihood cointegration framework is applied (Johansen and Juselius, 1990) to test the pairwise as well as joint cointegration between the different price series. This approach allows for the determination of the number of the cointegrating vectors as well as to make inference on the estimated cointegrating relations within the maximum likelihood framework. The Johansen procedure is based on the unrestricted Vector Auto Regression (VAR) model transformed into the vector error correction (VEC) form as follows;

$$\Delta P_t = \alpha + \Pi P_{t-1} + \sum_{i=1}^{k-1} \Gamma_i \Delta P_{t-i} + \varepsilon_t \qquad (4)$$

Where Δ denotes the first difference, P_t denotes the vector of *n* sugar markets, Γ_i represents the short-run coefficients, while Π captures the long-run effects of the analysed series, α is the intercept and ε_t is the vector of white noise error terms. The goal of the Johansen maximum likelihood test is to estimate the Π matrix, which represents the number of cointegrating relationships. When Π has a reduced rank such that $r<n$, it implies that there are *r* cointegrating vector in the system, therefore, n-r common stochastic trends. In this case, Π can be factorised into $\alpha\beta'$, where both α and β are *nxr* matrices. The β matrix gives the cointegrating vectors whereas α

is the matrix of the adjustment coefficients to the long-run disequilibrium errors represented by the cointegrating relations.

4. Results and Discussions

4.1. Stationary and structural break tests

The data on the sugar export price series from the four selected markets under study were tested individually for stationarity as a pre-condition for cointegration analysis. Augmented Dickey Fuller (ADF) test was used to test the hypothesis that the price series are non-stationary without allowing for any structural breaks. The variables tested are in logarithm form for the four sugar markets. Table 1 presents the results of the stationarity test for the markets in the sampled period. The appropriate lag length was selected based on Akaike Information Criterion (AIC) and Schwarz Bayesian Information Criteria (SBIC).

Table 1: ADF Unit Root test

		Level		First Difference		Order of Integration, I(d)
	# of lags	With drift	With drift and trend	With drift	drift and trend	
Swaziland	2	-1.56	-2.97	-4.03***	-3.37**	I(1)
South Africa	2	-1.84	-2.68	-4.05***	-3.61***	I(1)
EU	2	-0. 93	-1.93	-6.54***	-6.56***	I(1)
USA	2	-1.56	-1.60	-5.00***	-5.02***	I(1)

Note: Asterisks denote levels of significance (* for 10 percent, ** for 5 percent, *** for 1 percent). The 1%, 5% and 10% critical values for ADF without trend are -3.49, -2.88 and -2.58 respectively; for the tests with trend are -4.02, -3.44 and -3.14 respectively. Critical values were obtained from MacKinnon (1996).

The ADF test for unit root in levels shows that the series studied are non-stationary both without and with trends. After taking the first difference of the series they became stationary. These results indicate that the four sugar price series exhibit unit root processes. The criticism against the ADF test was that it did not allow for existing structural breaks and therefore became biased towards unit root which reduces the ability to reject a false unit root null hypothesis (Glynn et al., 2007). It should also be highlighted that the test tends to have low power and rejecting the null hypothesis does not always mean that the series is non-stationary (Perman and Byrne, 2006). Testing for structural breaks in time series can affect the results of the unit roots as highlighted above. Zivot and Andrews test was used to test for the unit root allowing for one endogenously determined structural break for the four logarithm monthly sugar export prices over the time period January 2001 through to December 2013.

Table 2 shows the results using the ZA test; the break is chosen where the t-statistic for alpha is most significant, this is where the t-statistics from ADF test of unit root is at minimum. This is the break date where the strongest evidence against the null hypothesis of unit root. For Swaziland and USA prices the break date was August, 2009 while for the EU it was estimated to be October, 2008. The breakpoint of these variables does exactly coincide with global food prices of 2007-2009 where the prices of commodities rose sharply which was influenced by the increase of oil prices and hence this led to the global sugar production deficits in 2008-9 and 2009-10 (FAO, 2012).

Table 2: Zivot-Andrews Unit Root Test Allowing for One Break

	Model A Change in drift	Model B Change in trend	Model C Change in drift and trend
Swaziland	-5.770***(2009m8)	-4.059	-5.782***(2009m8)
South Africa	-4.064	-2.678	-3.668
EU	-5.199**(2008m10)	-3.093	-6.316***(2008m10)
USA	-2.993	-2.761	-5.131**(2009m8)
Critical values			
1%	-5.34	-4.93	-5.57
5%	-4.80	-4.42	-5.08
10%	-4.58	-4.11	-4.82

***/**/ denotes statistical significance level at 1% and 5% respectively; Break date is indicated in brackets

4.2. Cointegration

After examining the univariate time series properties of the studied markets and confirm that all the price series were non-stationary at levels and integrated of the same order I (1), it was then necessary to proceed to conduct the cointegration tests. The Johansen maximum likelihood test was firstly done on all the series of interest to test for the total number of long run cointegration vectors. Using Akaike Information Criterion (AIC) and Schwarz Bayesian Information Criterion (SBIC), a lag length 2 was chosen and used in the cointegration test estimated with linear deterministic trend. The results of the multivariate cointegration tests for prices of sugar for the four markets in the three periods, full sample; before structural breaks and after structural breaks are reported in Table 3. The trace test results revealed that the null hypothesis of no cointegration, i.e. r = 0, where r is the number of cointegrating relationships could be rejected at one percent level of significance for the three periods (full sample; before structural breaks and after structural breaks). But we fail to reject the null hypothesis of r =1 for the full sample period confirming that there is one or more distinct long-run relationships among the four series in the full sample. Before the structural break and after the structural break we fail to reject the null hypotheses that r = 3 or 4, we conclude that there are three or more distinct long-run relationships among the four series before and after the structural break.

The trace test showed the presence of one cointegrating vector in the full sample while the number of cointegrating vectors increased to three before and after the structural break. This suggests that by allowing the structural breaks in the price series we were able to see how the transmission of the price signals between the studied markets and its cointegration has improved. In order to find out which pairs of series are cointegrated, the Johansen's maximum likelihood (ML) cointegration tests were run on the pairs of series. The cointegration tests were done in the full sample and also before and after the structural break. The Johansen's ML pair wise test confirms cointegration of Swaziland-South Africa and Swaziland-EU pairs of sugar price for the full sample, while before and after the structural break all the markets pairs of sugar prices for Swaziland-South Africa; Swaziland-EU; and Swaziland-USA were cointegrated (Table 4).

Table 3: Cointegration rank test using trace statistics

H_0 (Rank =r)	H_1 (Rank > r)	Trace	5% CV
FULL SAMPLE			
0	0	68.200***	47.21
1	1	24.923	29.68
2	2	9.239	15.41
3	3	1.404	3.76
4	4		
BEFORE STRUCTURAL BREAK			
0	0	72.118***	47.21
1	1	34.537**	29.68
2	2	16.928**	15.41
3	3	3.264	3.76
4	4		
AFTER STRUCTURAL BREAK			
0	0	65.710***	47.21
1	1	36.518***	29.68
2	2	16.066**	15.41
3	3	1.986	3.76
4	4		

Note: ***/**denotes level of significance at 1% and 5% respectively

Table 4 further revealed that considering the full sample, the null hypothesis of no cointegration (i.e. r =0) between Swaziland-South Africa pairs was rejected at one percent level of significance, while the test statistic fails to reject the null hypothesis of r =1, suggesting that there is one cointegrating vector in the Swaziland-South Africa pair for the full sample. For Swaziland-EU pairs, the null hypothesis of no cointegration r =0 was also rejected at 5 percent level while the test statistic fails to reject the null hypothesis of r =1, suggesting that we have one cointegration vector in the Swaziland-EU pair. Before the structural break, the results revealed that all the sugar price pairs are integrated. In the Swaziland-South Africa and Swaziland-USA pairs the null hypothesis of r =0 and r =1 were rejected at one percent level of significance; suggesting that we have two cointegrating vectors in both sugar price pair and for Swaziland-EU pairs the null hypothesis of no cointegration (r =0) was rejected at 5 percent level of significance while we fail to reject the null hypothesis of r =1, suggesting that we have one cointegrating vector. After the structural break the results revealed that all the sugar price pairs are integrated. In the Swaziland-South Africa and Swaziland-EU pairs, the null hypothesis of r =0 and r =1 were rejected at one percent level of significance suggesting that we have two cointegrating vectors in both sugar price pair and for Swaziland-USA pairs the null hypothesis of no cointegration (r =0) was rejected at 5 percent level of significance while we fail to reject the null hypothesis of r =1, suggesting that we have one cointegrating vector.

Table 4: Johansen ML Pairwise cointegration tests for the sugar price series

Pairs of series	Ho(H1)	Trace	5%CV
FULL SAMPLE			
Swaziland-South Africa	r=0((r>0)	30.16***	15.41
	r=1(r>1)	2.54	3.76
Swaziland-EU	r=0((r>0)	16.89**	15.41
	r=1(r>1)	0.95	3.76
Swaziland-USA	r=0((r>0)	13.24	15.41
	r=1(r>1)	3.24	3.76
BEFORE STRUCTURAL BREAK			
Swaziland-South Africa	r=0((r>0)	27.74***	15.41
	r=1(r>1)	10.57***	3.76
Swaziland-EU	r=0((r>0)	17.42**	15.41
	r=1(r>1)	3.38	3.76
Swaziland-USA	r=0((r>0)	20.93***	15.41
	r=1(r>1)	8.57***	3.76
AFTER STRUCTURAL BREAK			
Swaziland-South Africa	r=0((r>0)	23.76***	15.41
	r=1(r>1)	8.09***	3.76
Swaziland-EU	r=0((r>0)	22.83***	15.41
	r=1(r>1)	6.16***	3.76
Swaziland-USA	r=0((r>0)	17.64**	15.41
	r=1(r>1)	1.41	3.76

Note: ***/**denotes level of significance at 1% and 5% respectively

The results of the long-run and short-run dynamics for the cointegrated sugar market pairs in the three periods, full sample; before structural breaks and after structural breaks are reported in Table 5. The results revealed that for Swaziland-South Africa, the long-run price transmission elasticity are all significant at 1% level and they show an increase from 0.399 to 1.348 from before the structural break to after the structural break period, suggesting that the market integration significantly increased after the structural break which coincided with the commodity price boom. These elasticities suggest that a one percent increase in the South African's sugar price increases the Swaziland's sugar price by 0.399 percent before the structural break and by 1.35 percent after the structural break. The coefficient after the structural break is close to unity which confirms that the Swaziland-South Africa pairs is perfectly cointegrated after the structural break. The higher the values of the long-run elasticity in the absolute terms, the higher the market price responsive in the long-run. During the entire time from 2001 to 2013, however the long-run price transmission is only 0.87, which suggested that a one percent increase in the South African's sugar price increases the Swaziland's sugar price by 0.87 percent.

Table 5: Long-run elasticity, short-run elasticity and the speed of adjustment coefficients

Market pairs	Long-run elasticity (β)	Speed of adjustment (α_1)
FULL SAMPLE		
Swaziland-South Africa	0.875***	-0.298**
Swaziland-EU	1.171***	-0.047**
BEFORE STRUCTURAL BREAK		
Swaziland-South Africa	0.399***	-0.248**
Swaziland-EU	1.213***	-0.006
Swaziland-USA	1.137***	-0.025
AFTER STRUCTURAL BREAK		
Swaziland-South Africa	1.348***	-0.072
Swaziland-EU	1.506***	-0.089**
Swaziland-USA	2.101**	-0.150**

Notes: ***/** / * indicates that the null hypotheses are rejected at 1%, 5% and 10% level of significant.

For Swaziland-EU, the long-run price transmission elasticities are all significant at 99 percent and they show an increase from 1.213 to 1.506 from before the structural break to after the structural break period, suggesting that the market integration significantly increased after the structural break which coincided with the commodity price boom and the EU sugar reforms. These elasticities suggest that a one percent increase in the EU's sugar price increases the Swaziland's sugar price by 1.21 percent before the structural break and by 1.51 percent after the structural break. During the entire time, however the long-run price transmission is only 1.171, which suggested that a one percent increase in the EU's sugar price increases the Swaziland's sugar price by 1.17 percent. The coefficient in all the three periods is close to unity which testifies that the Swaziland-EU pair is perfectly cointegrated in all the three periods (entire period, before and after the structural break).

The Swaziland-USA long-run price transmission elasticity shows an increase from 1.137 to 2.101 from before the structural break to after the structural break period, suggesting that market integration significantly increased after the structural break which coincided with the commodity price spike. These elasticities suggest that a one percent increase in the USA's sugar price increases the Swaziland's sugar price by 1.14 percent before the structural break and by 2.10 percent after the structural break. Since the Swaziland-USA data series were tested not cointegrated for the full sample period, no long-run price transmission elasticity was calculated and reported. The coefficient before the structural break was close to unity, which is an indication that the Swaziland-USA pair was perfectly cointegrated before the structural break.

To determine the short-run dynamics, Vector Error Correction Model (VECM) was applied to all the different combination pairs of the price series of sugar that had long-run equilibrium. The results in Table 5 show that most of the coefficients of adjustment in the sugar markets were low but significant, except with EU and USA markets before structural break and South Africa after the structural break, the speed of adjustment for Swaziland was not significant and only 0.6, 2.5 and 7.2 percent, respectively. The Swaziland's sugar market prices depict higher and significant adjustment to South African's sugar price for the entire period and before the structural break with 29.8 and 24.8 percent, respectively. It also depicts significant adjustment to the EU sugar market price for the entire period and after structural with 4.7 and 8.9 percent, respectively, while to the USA the Swaziland sugar price adjustment is significantly only after the structural period with 1.5 percent. The results of the speed of adjustment are vital for policy makers because it indicates efficiency of prices adjustment by comparing to other exporters. The Swaziland's sugar market prices depicts higher and significant adjustment to South African's sugar price for the entire period and before the structural break and not significant after the structural breaks which suggested that after the structural breaks there was low degree of integration between the Swaziland-South Africa pair and this can be explained by their government interventions. For example after the price spikes in 2007, the Government of South Africa through the South African Sugar Association controlled its imports and exports of sugar and kept the price low to protect the consumers of higher international prices and hence these have affected the integration after the structural break. The Swaziland's sugar market prices depicts significant adjustment to the EU sugar market price for the entire period and after structural period and these might be due to the EU sugar reforms which began in 2006 which includes the abolishment of the production quotas and price guarantees for ACP sugar that were replaced with a negotiated market-related price under the Interim Economic Partnership Agreement (IEPA) between certain Southern African Development Community (SADC) countries and the EU had enhance the market integration between the two markets. The Swaziland's sugar market prices depicts significant adjustment to the USA's sugar market price only after structural period. These results might be due to the general rise in prices after the 2007 food price spikes which had cause the Swaziland's sugar price to be integrated with the USA's market.

5. Conclusion and Policy implications

This paper examined the sugar market integration amongst Swaziland and its major trading partners (i.e., South Africa, EU and USA). The study employs the Johansen's cointegration and VEC framework on monthly sugar data from January 2001 to December 2013 including a single endogenous structural break on the data. From the empirical findings, we can conclude that the sugar markets between Swaziland and its trading partners for the three periods (full sample, before structural break and after the structural break), except for the USA price series in the full sample period are cointegrated, which proves that there exists a long-run equilibrium relationship among them.

Since the Swaziland sugar market is integrated with its major trading partners in the long-run, but the speed of adjustment in the short-run is either isolated or slow, which means it takes time to form a new equilibrium or to absorb the shock and hence this might be due to high government interventions in the sugar sector by the Swaziland trading partners which implements polices that intend to stabilize prices and to protect their producers through support price policy. Therefore, it can be concluded that the protectionist policies are impediments to the efficient market functioning. It is thus suggested that interventions of the respective governments should be reduced for efficient functioning of the markets.

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