

Dynamics of Tea Trade Competitiveness in EAC: Evidence from Tea Exports of Burundi

Willy-Marcel Ndayitwayeko^{1*} and Patrice Ndimanya²

1. University Research Centre for Economic and Social Development (CURDES), Faculty of Economics and Management, University of Burundi, B. P. 1049, Bujumbura.
2. Department of Rural Economics, Faculty of Economics and Management, University of Burundi, B.P. 1280 Bujumbura, Burundi.

Abstract

In the recent periods, tea exports in EAC (East African Community) have declined due to internal and external forces of both supply and demand sides. This paper focuses on the degree of EAC's comparative advantage in this cash crop in the third market. The study is based on proposition of trade theory that the patterns of international trade are determined by comparative advantage. An improved normalized comparative advantage index, NRCA (Normalized Revealed Comparative Advantage) is used on data of tea exports, SITC (Standard International Trade Classification) 3 4-digit, for the period 2000-2012. In order to carry out a dynamic comparative analysis, we use a time trend regression model to detect whether a country has gained or lost its comparative advantage during the period under study. Empirical results reveal that both EAC countries had comparative disadvantages in world tea market, though Kenya is the leading tea exporter in the EAC region and even in the world. Besides, they exhibited a loss of competitiveness in the world market during the period under study but at different level. The study suggests that if the countries of EAC, specifically Burundi, want to strengthen their position in the tea global market, good local and international marketing strategies have to precede the act of exportation.

Keyword: Tea, NRCA, Exports, Burundi and EAC

1. Introduction

Since 1990, the tea market development has been tremendous and it continues to expand. Tea is consumed by a wide range of age groups in all levels of society and is one of the most popular and lowest cost beverages after water¹ (Hicks, 2009). Despite of a rising production, world price remains firm due to the rising tea consumption in the world. Furthermore, the major producing and exporting countries are India, China, Kenya, Sri Lanka and Indonesia. Given the increasing number of cups of tea consumed in the world and the availability of suitable acreages in China and India, East African Community (EAC) countries, that is, Burundi, Rwanda, Kenya, Uganda and Tanzania faced since 2000 a fierce competition in the tea world market² (Sanne, 2008). Tea market share become more sophisticated and competitive as a wide range of tea products continue to be developed and affect consumers' tastes and preferences. The aim of this paper is twofold: to estimate the comparative advantage of EAC countries and compare the dynamics of EAC's competitiveness in tea exports sub-sector.

While Kenya, leader in EAC tea, has been the world's biggest tea exporter since 2004, China came on the top, following India, Sri Lanka and lastly Vietnam in 2006. Issues that led the loss of competitiveness of EAC in tea world market are climate change that hit EAC countries, slow in keeping pace with the dynamics and innovation introduced in the tea market by potential competitors, bad policies hamper efforts to add value to tea and lack of slow implementation of tea sector reforms, which remains dominated by the State (Burundi, Tanzania and Uganda). Tea is the second export product in Burundi and accounts for between 10 and 15 percent of export earnings (Table 1). Production of dry green leaf tea amounted to about 6727 tons in 2008 and a high level of 9140 tons was achieved in 2012.

Table 1: Tea Production, Tea Exports and Total Exports of Burundi

Year	Production	Yield			Total Exports	Share
2008	6727	0.82	93.2	6779.72	70026.31	0.10
2009	6729	0.84	103.7	7620.17	71233.44	0.11
2010	8025	0.84	113.8	10050.31	102117.80	0.10
2011	8817	0.84	174.6	12657.69	121849.90	0.10
2012	9140	0.87	-	14368.21	122901.90	0.12

Note: - means data not available

Source: *Faostat and **WITS, 2014

Burundi's tea yield oscillated around 0.84 tons per ha, mostly because land allocated to tea plantation did not change. This fact is attributed to arable land scarcity in Burundi. Tea exports in values and producer prices are on increase between from 2008 to 2012, which boosted Burundi's economy and producer's living standards. Figure 1 depicts a steady tea exports that goes along with an also increase of Burundi's GDP, if all other things remain constant.

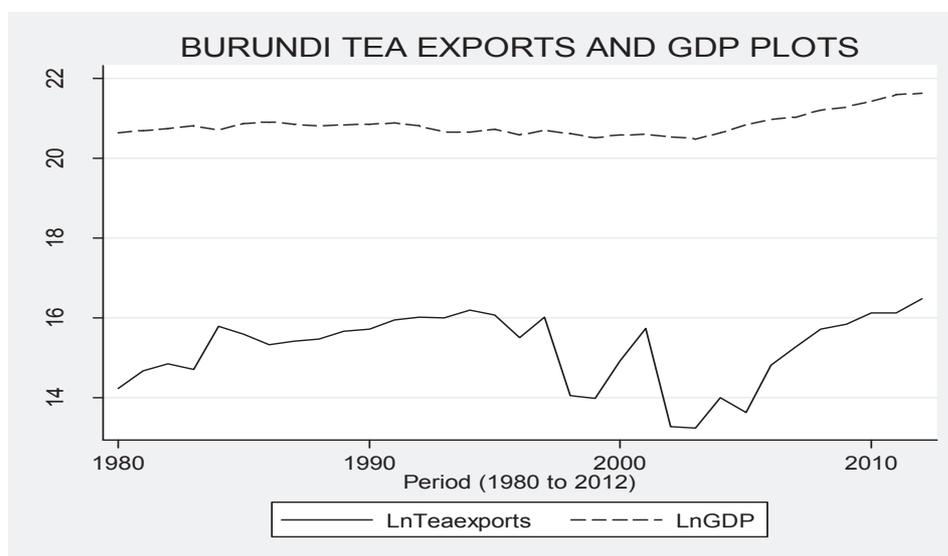


Figure 1: Burundi Tea Exports and GDP

Source: Authors' Computations, 2014

The share of tea exports in total exports is an indicator that tea production and trade contributed in Burundi's foreign exchange earnings, though a large portion of them is covered by coffee exports. Tea is an important commodity in terms of jobs and export earnings in EAC. Due to soil and weather conditions in EAC countries, tea grown is of good quality and quantity and is not prone to pest disease attack³ (USDA, 2013). Production and exports of tea have been due to upward trending tea demand in the world market. Defrêne⁴ (2012) conveyed that the strongest buoyant tea market lied in the rising demand for green tea in the West, the revival of tea culture in Asia, the immensely attractive health benefits associated with green tea, the innovation packaging and the growing awareness of specialty tea market.

EAC as an integration bloc introduced and enacted custom union and common market protocols in a bid to speed up intra-trade and land-locked countries (Uganda, Rwanda and Burundi) to have access to the ocean. The deepening of EAC regional trade has an impact on tea exports since the tea auction governed by East Africa Tea Association (EATA) is based in Mombasa (Kenya). The EAC trade collaboration may enhance transfer of agricultural technology and market know-how in tea sector where Kenya appeared to the leading country in EAC and in the world. Kenya and Uganda have an experienced tea research center that keep on producing new tea varieties for quality tea, and pest and disease resistance. They have created a strong and professional trade promotion councils connected with a number of tea traders and clients. This kind of organization may serve a good lesson to other EAC member states⁵ (Ndayitwayeko *et al.*, 2012).

2. Materials and Methods

A great contribution of the study is in its methodology. This study is based on the desk research. The measurement of the EAC countries' normalized revealed comparative advantage was done at Standard International Trade Classification revision 3 (SITC 3) 4-digit product level. The data was obtained from World Integrated Trade Solution (WITS) UNCTAD COMTRADE database. The online data of tea not exports (SITC3, 4-digit), total of country's exports, world tea exports and world total exports (all but not arms) were collected for the period 2000-2012.

The economic theory of comparative advantage is therefore anchored in the truth that countries will respond to increased opportunities to trade by exporting more of those commodities which they are able to produce relatively cheaply and import more of those commodities which are expensive to produce at home. One approach commonly followed in the literature is that of 'revealed' comparative advantage⁶ introduced by Liesner (1958 in

Bojniec and Ferto, 2007) and refined and popularized⁷ by (Balassa, 1965) and therefore known as the ‘Balassa Index’.

$$BRCA_{ij} = \left(\frac{X_{ij}}{X_{it}} \right) \left(\frac{X_{jw}}{X_{tw}} \right) \dots\dots\dots(1)$$

Where: X_{ij} is export of commodity j by country i , X_{it} is total export of country i , X_{jw} is share of commodity j in world market and X_{tw} is total exports in world market.

Its popularity was rose due to the fact that the neoclassical H-O theory is applied when one wants to measure the comparative advantage of a country due to the unobservable relative price and production costs under autarky. The Balassa Revealed Comparative Advantage index (BRCA) has threefold interpretations. It indicates the demercation between countries that reveal a comparative advantage in a certain sector and those countries that do not. Secondly, the index quantifies the sector-specific degree of comparative advantage enjoyed by one country with respect to any other one. Lastly, the index generates cross-country or cross-sector ranking⁸ (Ballace *et al.*, 1987).

However, BRCA is static in nature and not comparable in the long run⁹(Run *et al.*, 2009). The interpretation of the nature of index also raised a debate among economists. The urging issue was to know if BRCA was either a dichotomous, cardinal or ordinal. t the index has neither cardinal nor ordinal property but a dichotomous one. The index lacks property of symmetry¹⁰ (Hinloopen and van Marrewijk, 2001). BRCA index has an asymmetric distribution with a lower and upper bound. The latter (upper bound distribution) has variability that causes the index to be asymmetric and leads to an umbiguous interpretation. Another wave of critics concern the change in the value of the BRCA index with the size of the country¹¹ (Yeats, 1985) and also the double-counting pointed out by¹² Vollrath (1991) when country i 's exports of commodity j is not excluded from the world total exports.

In order to circumvert these issues, reseachers introduced the normalizaton of the BRCA index¹³ (Bebek, 2011).¹²Vollrath (1991) employed logarithmic transformation to normalize the origin index in order to give it a symetric distribution and by combining both imports and exports in the formula to curb the double-counting issue. The cross-sectional mean is taken as a method to fix the varying mean and was used to normalize the BRCA by¹⁴ Proudman and Redding (2000). Recently,¹⁵ Hoen and Oosterhaven (2006) and⁹Run *et al.* (2009) created an additive BRCA. The former computed an Additive Revealed Comparative Advantage (ARCA) with a fixed mean across countries at 0 and the latter introduced an advanced Normalized Revealed Comparative Advantage (NRCA) with a fixed mean across countries and industries and capable of solve issues mentioned above. The NRCA is given as follows.

$$NRCA_{ij} = ARCA_{ij} \left(\frac{X_{it}}{X_{tw}} \right) \dots\dots\dots(2)$$

Where:

$$ARCA_{ij} = \left(\frac{X_{ij}}{X_{it}} \right) - \left(\frac{X_{tj}}{X_{tw}} \right) \dots\dots\dots(3)$$

$ARCA_{ij}$ = Additive Revealed Comparative Advantage of country i in commodity j ,

X_{ij} = Value of export of commodity j of country i ,

X_{it} = Value of total exports of country i ,

X_{tj} = Value of total export of commodity j in the world,

X_{tw} = Value of world total exports

The interpretation is very simple: If $NRCA_{ij} > 0$ or $NRCA_{ij} < 0$ indicates that country I 's actual export of commodity j is higher or lower than its comparative advantage neutral level, that is, 0. The greater (or lower) the $NRCA_{ij}$ score, the stronger the comparative advantage (disadvantage) would be. The attractiveness of this index is that the distribution of the scores is symmetrical, that is, ranging between $-1/4$ and $+1/4$ and zero being the neutral point. Since the NRCA index is very small in nature, the index contributors suggested that a practitioner multiplies the index by 10000 in order to have a picture of it. A great contribution of NRCA is its cardinal property which allows the analyst to compare the magnitude of comparative of advantage. In addition, NRCA fixes the issues of asymmetry and double-counting. In addition, it is sensitive to the size of country's economy and enables researchers to compare comparative advantage dynamically rather than statically. According to⁹Run *et al.* (2009), this NRCA index is comparable across commodity, country and time. Hence, it could be a useful tool for studies on regional comparative advantage. Because of these NRCA properties, this study applied this novel tool on EAC-states' tea exports. It is of paramount importance to note that the results may be of empirical

meaning since EAC members have a very small share in the world market and NRCA performs well in this context.

However, the index is very sensitive to the level of classification in that the scores of more disaggregated products may show different result than the less disaggregated. In this case, tea is relatively more disaggregated since they are drawn at SITC Rev 3 four-digit level. In addition, comparison with other group of commodities was not done in this study. So the use of NRCA index is valid. Based on the NRCA index, we carried out a simple time trend analysis to detect whether tea of Burundi has statistically significant trend in gaining or losing its comparative advantage during the period under study.

The trend of NRCA for the five countries was tracked through this single regression equation:

$$NRCA_{it} = \beta_0 + \beta_1 T + \varepsilon_t \dots\dots\dots(4)$$

Where: $NRCA_{it}$ is NRCA of country i in time t , T is time trend (2000-2012), β_0 and β_1 are intercept and slope coefficient respectively and ε_t is error term. This paper hypothesizes that if β_1 is statistically different from zero, then the NRCA tea of the particular country is stable, otherwise it is unstable. If β_1 is statistically significant and greater than zero, this suggests that the country is gaining comparative advantage in the world market, otherwise it is losing.

Studies indicated that NRCA index has been applied in ¹⁶Ullat and Kazuo (n.d.), ¹⁷Run *et al.* (2010) and ¹⁸Parcon *et al.* (2010) and its performance has been of no doubt.

3. Results and Discussions

Tea is the second tradable product after coffee in Burundi ¹⁹ (Ndimanya and Ndayitwayeko, 2009). In Figure 2, apart from Uganda, all other countries in EAC have a declining slope depicting a progressive fall in competitiveness in tea world market share over a span of about thirty years (1980-2010). However, being the second producer in the world, Kenya intercept curve starts at two digits, explaining its very strong competitiveness in the region and bounced back from declining trend since 2006 (Figure 2). According to ²⁰FAOSTAT ranking (2013), Kenya is second by value to Sri-Lanka in the tea export sector. Uganda, Tanzania and Rwanda were 15th, 19th and 20th respectively in the world ranking of 2005, while in 2010, Uganda remained in its position but Tanzania fell to 20th position. Burundi was also on an increasing trend for the period between 2005 and 2010.

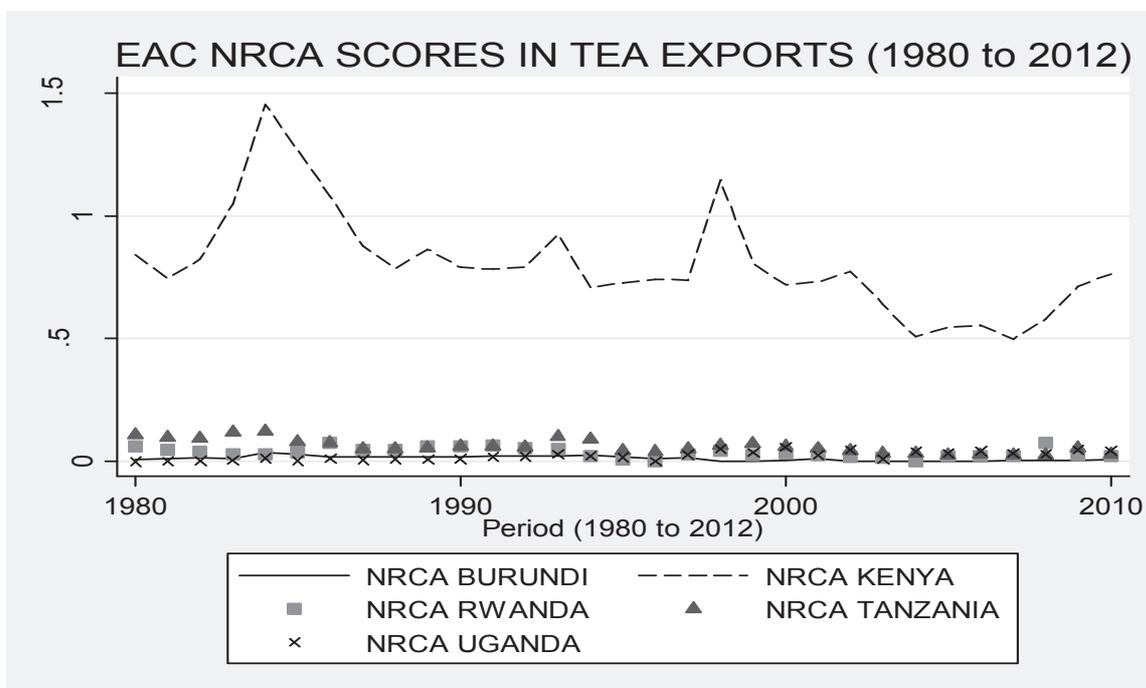


Figure 2: EAC NRCA Scores

Source: Authors' calculations, 2014

Taking average of EAC members' NRCA should inform about their rank in terms of competitiveness among themselves and also should shed light on the gaps in their performance based on the ranges of NRCA indices (Table 2). Considering the means of indices, Burundi is the least in terms of competitiveness but it has so far

tried to improve if one observes the reducing gap between the minimum and maximum values. The latter has shrunk during the period under consideration. The coefficient of variation is close to zero and this denotes that its comparative advantage stays stable or a complete inertia in the competition in tea sector. Kenya presents a higher comparative advantage, followed by Tanzania. Again, Uganda shows an unimaginable competitiveness-fitness in closing a gap which starts from negative (minimum value) to a positive value (maximum value). This has been shown in Uganda curve depicted in Figure 1.

Table 6: Normalized Revealed Comparative Advantage of Tea Exports (1980-2010)

Countries	Minimum	Mean	Maximum	SD	CV	Spearman Correlation
Burundi	0.0007	0.01	0.04	0.001	0.0001	-
Kenya	0.50	0.81	1.45	0.21	0.05	0.631***
Rwanda	0.002	0.04	0.08	0.02	0.0004	0.35
Tanzania	0.02	0.06	0.12	0.03	0.001	0.544***
Uganda	-0.0001	0.02	0.06	0.02	0.0003	-0.539***

Source: Author's Calculations, 2014

Apart from Kenya which has a greater coefficient of variation in the tea world market, the other countries have very insignificant changes and in other words, their levels of competitiveness are somehow static.

The study sought to find out whether Burundi is more competitive compared to her neighbors. A Spearman rank correlation was run. Burundi's NRCA scores are not associated to Rwanda's NRCA (or the rank is not different from zero). The Spearman coefficient, though positive, is not statistically significant. However, in the other cases (Kenya and Tanzania), the coefficients are very statistically significant but their values are not so close to one. This depicts a dismal competition between Burundi and the other two members of EAC (Kenya and Tanzania). A special case is the one where the Spearman rank correlation coefficient between Burundi and Uganda is negative. First, it is very significant ($p < 0.01$) and negative. This relationship shows a significant shift of patterns of comparative advantage during the period under study (1980-2010). Since the value is not quite high, this result reveals a moderate complementarity of these countries in the tea export third-market. In other words, their patterns of comparative advantage are dissimilar (Figure 2).

A trend regression on these NRCA of the EAC States was carried out in order to determine the dynamic changes in their comparative advantage in tea export (Table 3).

Table 7: Results of Tea Time Trend Model (1980-2010)

Variables	Burundi	Kenya	Rwanda	Tanzania	Uganda
	Model 1	Model 2	Model 3	Model 4	Model 5
Constant	0.87**	15.88*	2.08***	2.35	-2.94***
T	-0.0004**	-0.008*	-0.001***	-0.001**	0.001***
NRCA_Bu	0.53***				
NRCAKe_1		0.51***			
NRCATZ_1				0.49***	
R²	0.69	0.56	0.21	0.68	0.62
F-test	29.67***	17.44***	7.66***	28.97***	47.07***
DW	2.13	1.69	1.2	1.68	2.08

Note: * significance level at 0.1, ** significance level at 0.05, *** significance level at 0.01,

Source: Authors' Computation, 2014

The coefficient of determination (R^2), test of goodness-of-fitness (F-test), and test of autocorrelation are within the acceptable range, apart from Rwanda (R^2 and DW are small). All models are not affected by specification errors (Ramsey test). Another observation is that they show a significant downward trend depicting a waned comparative advantage during the period between 1980 and 2010 (Figure 2), except Uganda. Only the latter exhibits a strong significance in gaining comparative advantage in the period between 1980 and 2010.

Tea management was under control and regulation of Burundi government (Office du The du Burundi, OTB) before the privatization was initiated in 2004 but struggled to take off. As opposed to coffee, the world price volatility is not very pronounced and in the near future it will be very elusive because new emerging and competitive countries, China and Vietnam, have entered the world market. The latter obeyed the rule of cobweb

model which states that the price will be plummeted as long as new players are entering the market and price will rise if a certain number of players exit the market. Overproduction and increased capacity of South East Asian producers provide a permanent threat to East African tea trade (including Burundi) both in the short term and long term.

Burundi has managed to offer a good image of her tea export in terms of good quality in the world market. This has been done through auction agents, diaspora and diplomatic offices abroad. However, as noted by ²¹USAID (2006), tea sector is in dire financial need. This poses a big challenge for expansion and improvement of tea quality in various tea stations in the country. Lack of research station, poor promotion of private sector participation and lack of good coordination and market intelligence are the other challenges facing the tea sector. These may explain its comparative disadvantage albeit having potentials to produce black tea with high quality because of the good and conducive soil and weather of the country.

In the region, Kenya provides an ideal benchmark for Burundi because it is regarded as a ‘superpower’ in African tea production. Kenya is among four countries (others are China, India and Sri-Lanka) that produce three quarters of the world production. Its competitiveness does not depend on the land factor endowment alone but technology innovation in both tea production and processing. The organization and management of different entities of tea sector is one of the features that Burundi can borrow from Kenya.

The sector is dotted with a well equipped tea research station under the name of Tea Research Foundation of Kenya. Small scale and large scale farmers are organized under different bodies, KTDA (Kenya Tea Development Agency) and KTGA (Kenya Tea Growers Association), in order to raise their market negotiation power in tea pricing process, but all are under the regulation and arbitrage of Tea Board of Kenya, a public entity. These organizations also aim at improving the efficiency and management of tea production and the marketing of green leaf. Other stockholders are organized under the umbrella of EATTA (East Africa Tea Trade Association) in which Burundi is a member. These regroup members into auction, buyer, brokers, etc. Kenya has very skilled auction agents who benefit from auction market proximity. The East African tea trade is based in Mombasa where the weekly tea auction has been setting prices since 1969. Burundi is represented by foreign agents, mostly Asians, which is also one of the sources of comparative disadvantage.

4. Conclusions and Policy Implications

A Normalized Revealed Comparative Advantage (NRCA), more robust than Balassa’s Revealed Comparative Advantage, was calculated on EAC tea exports. Spearman Rank Correlation and NRCA trend regression were used as analytical tools to measure the degree and dynamic patterns of competitiveness of Burundi with respect to EAC members in the third-party market. The results revealed that Burundi had a statistically significant comparative disadvantage in this beverage commodity when compared with its counter-parts in EAC trade bloc. However, a comparative advantage comparison with Rwanda in tea export sector was undefined.

A trend regression analysis showed that the both Burundi and her counterparts in EAC region have been losing their comparative advantages in tea during the period 1980-2010, except Uganda. On overall, the trend depicted in tea export plot was alarmingly downtrend and this implies the increasing dynamics and stiff competition in world tea market. Burundi government agencies have been inefficient in managing the tea sector and now have paved way for private companies through uncoordinated privatization scheme.

However, clear policy has to be put in place in order to safeguard producers from private agencies. The government ability to set up an efficient legal and regulatory framework has been lacking since the initiation of privatization in 1990. In addition, in order to boost the exports of this commodity, good local and international marketing strategies have to precede the act of exportation. This may be done through organizing growers into competent producer associations, promoting market intelligence, branding Burundian on international markets, and modernizing production and processing procedure in order to develop product and enhance superior quality of the tea commodity at both local and international markets. Moreover, it will be good if Burundi learns from its counter-parts in EAC and attempts to draw potential investors capable to revamp tea sector as it has been the case in Rwanda.

REFERENCES

Hicks, A. (2009). Current Status and Future Development of Global Tea Production and Tea Products. Assumption University Journal of Thailand 12(4):251-264

- Sanne, W. (2008). Sustainability Issues in the Tea Sector: A Comparative Analysis with Six Leading Producing Countries. SOMO Publisher, Amsterdam (Netherland).
- USDA, (2013). Kenya: The World's Largest Black Tea Exporter. <http://gain.fas.usda.gov/>
- Dufrene, B. (2012). Global Tea Consumption Remain Robust. *Tea & Coffee Trade Journal* 184 (10): 24-30.
- Ndayitwayeko, W.M., Kwizera, E.E., Odhiambo, M.O. & Korir, M. K. (2012). Analysis of Intra Regional Trade in EAC: A Case Study on Impacts of Rwanda Potatoes Imports to Burundi. In the Proceeding of the 7th Egerton International Conference, September 26–29, Egerton (Kenya).
- Bojnec, S. & Fertő, I. (2007). Comparative advantages in agrofood trade of Hungary, Croatia and Slovenia with the European Union, Discussion paper // Leibniz Institute of Agricultural Development in Central and Eastern Europe, No. 106, urn:nbn:de:gbv:3:2-1990, <http://hdl.handle.net/10419/28499>
- Balassa, B. (1965). Trade liberalization and revealed comparative advantage. *Manchester School of Economics and Statistics* 33, (2): 99-123.
- Ballace, R.H., Forstner, H. & Murray, T. (1987). Consistency Tests of Alternative Measures of Comparative Advantage. *The Review of Economics and Statistics* 2: 157-161.
- Run Yu, Cai, J. & Leung, P. S. (2009). The normalized revealed comparative advantage index. *Annals of Regional Science* 43: 267-282.
- Hinloopen, J. & Marrewijk, V.C. (2001). On the empirical distribution of the RCA. *Weltwirtschaftliches Archive* 137: 1-35.
- Yeats, A. J. (1985). On the appropriate interpretation of the revealed comparative advantage index: implications of methodology based on industry sector analysis. *Weltwirtschaftliches Archive* 121: 61-73.
- Vollrath, T. (1991). A theoretical evaluation of alternative trade intensity measures of revealed comparative advantage. *Review of World Economics (Weltwirtschaftliches Archiv)* 127 (2): 265-280.
- Bebek, U.G. (2011) 'Monotonicity of Additive Indices of Revealed Comparative Advantage'. *Economics Bulletin*, Vol. 31 No.2.
- Proudman, J. and Stephen, Redding (1998), 'Evolving patterns of international trade' [<http://www.nuffield.ox.ac.uk/economics/papers/1998/w11/evnuffa>].
- Hoen, A. R. and Oosterhaven, J. (2006), 'On the measurement of comparative advantage', *Annals of Regional Science*, Vol. 40, pp.677-691.
- Ullat, M.S. and Kazuo, I. (n.d). Dynamics of comparative Advantage and Export Potentials in Bangladesh. Available at http://www.r-cube.ritsumei.ac.jp/bitstream/10367/4281/1/E61_4ulah.
- Run, Yu, Cai, J., Leung, P.S. & Loke, M.K. 2010. The comparative advantage of Hawaii's Agricultural export to the US mainland market. *Annals of Regional Science* 45: 473–485.
- Parcon, H., Run, Yu, Loke, M. K. & Leung, P.S. (2010). Competitiveness of Hawai'i's Agricultural Products in Japan. Economic Issues EI-19, Cooperative Extension Service, College of Tropical Agriculture and Human Resources, University of Hawaii at Manoa, 19 pp.
- Ndimanya, P. & Ndayitwayeko, W.M. (2009). La Compétitivité de la Filière Thé Burundaise: des Réservoirs de Productivité à Traquer'. *Cahier de CURDES No 10 : Compétitivité et Gestion des Risques* 10 : 1-12
- FAOSTAT, (2011). Commodities by country. <http://faostat.fao.org/site/342/default.aspx>, accessed December 20, 2013.
- USAID, (2006). Expanded External Trade and Investment. Nathan Associate Inc. Publishing, Washington DC (USA).

The IISTE is a pioneer in the Open-Access hosting service and academic event management. The aim of the firm is Accelerating Global Knowledge Sharing.

More information about the firm can be found on the homepage:

<http://www.iiste.org>

CALL FOR JOURNAL PAPERS

There are more than 30 peer-reviewed academic journals hosted under the hosting platform.

Prospective authors of journals can find the submission instruction on the following page: <http://www.iiste.org/journals/> All the journals articles are available online to the readers all over the world without financial, legal, or technical barriers other than those inseparable from gaining access to the internet itself. Paper version of the journals is also available upon request of readers and authors.

MORE RESOURCES

Book publication information: <http://www.iiste.org/book/>

Academic conference: <http://www.iiste.org/conference/upcoming-conferences-call-for-paper/>

IISTE Knowledge Sharing Partners

EBSCO, Index Copernicus, Ulrich's Periodicals Directory, JournalTOCS, PKP Open Archives Harvester, Bielefeld Academic Search Engine, Elektronische Zeitschriftenbibliothek EZB, Open J-Gate, OCLC WorldCat, Universe Digital Library, NewJour, Google Scholar

