BRICS AND SUB-SAHARAN AFRICA TRADE INTERDEPENDENCE AND PEACE: EVIDENCE BASED ON REVEALED COMPARATIVE ADVANTAGES

Hailay Gebretinsae Beyene
Institute for Dispute Resolution in Africa, University of South Africa
Email: hailayggg@gmail.com

ABSTRACT

This study examined economic integration through trade between BRICS (Brazil, Russia, India, China and South Africa) countries and sub-Saharan Africa. The study examines the comparative advantages of the two economic blocks with respect to the exportation of merchandise (food, agricultural raw materials, fuels, ores and metals, and manufactures). The findings of this study reveal the actual status of these two regions as economic partners in each of the five subsectors of merchandise exports.

The trend shows that, with the exception of manufactures exports, the competitiveness of all subsectors of the merchandise exports of BRICS is characterised by a declining trend. BRICS has a comparative advantage in the world in the exportation of manufactures and fuels, and comparative disadvantage in the export of food, agricultural raw materials, and ores and metals. Interestingly, manufactures are continuously and consistently in a steadily rising trend. This is evidence that BRICS's structural transformation towards higher valued-added commodities is proceeding well, which means that policy makers should be considering ways of enhancing it further.

In the case of sub-Saharan Africa, with the exception of manufactures exports,

UNISA university of south africa

Journal of Law, Society and Development
Multi-, Inter- and Transdisciplinary
Volume 2 | Number 1 | 2015
pp. 4–28

ISSN 2313-8289

it is found to have comparative advantages in all merchandise exports. Sub-Saharan Africa's competitive advantage is the highest in the exportation of ores and metals, followed by fuels, agricultural raw materials and food. Sub-Saharan Africa has a comparative disadvantage in the export of manufactures throughout the period considered in this study. This implies that the prospects of structural transformation to downstream of the higher value-added commodities export part of the supply chain are good: the slow pace of transformation towards higher value-added goods should therefore be demanding the attention of policy makers. The study has revealed that sub-Saharan Africa is more competitive than BRICS in the exportation of ores and metals, fuel, agricultural raw materials and food. On the other hand, BRICS is more competitive than sub-Saharan Africa in the export of manufactures.

The study has also revealed that significant economic integration can be sustained between BRICS and sub-Saharan Africa in the exportation of all merchandise subsectors. Specifically, sub-Saharan Africa is a potential destination market for BRICS's exports of manufactures. Conversely, BRICS is also a potential destination market for sub-Saharan Africa's exports of ores and metals, fuel, agricultural raw materials and food.

Economic integration between BRICS and sub-Saharan Africa favourably influences peace and stability in the regions. Sustaining peace and stability in these regions also favourably influences the wellbeing of the communities.

Key words: BRICS; economic integration; merchandise exportation; peace and stability; revealed comparative advantage; structural transformation; sub-Saharan Africa

INTRODUCTION

The concept of comparative advantage is strongly associated with international trade. The theory of international trade dates back to the era of mercantilism. To explain the reasons why nations trade various theories have been developed. Adam Smith (1978; cited in Schumacher 2012) argued that the absolute advantage of a nation is the reason for letting it engage in international trade. It is stated that a nation exports those commodities it produces more cheaply than other countries and imports those commodities that it cannot produce more cheaply than other nations. Ricardo (1817) extended the argument of absolute advantage by stating that nations can enter into trade relationships even though one of the nations has an absolute advantage in the production of both the goods to be traded between the countries.

Theorising about international trade has continued to the present; Hekscher and Ohlin (cited in Goldin 1990) attempted to fill the gaps in the reasons why nations trade. They stated that it is endowment with the factors of production that entitles a nation to have absolute and comparative advantage over other nations. This becomes the basis for embarking upon international trade.

As an extension of the previous theories, Liesner (1958) introduced the concept of 'revealed comparative advantage' (RCA). Balassa (1965) refined further the concept of RCA by introducing a method that is used to compute the RCA index of nations. Balassa's index is widely used to investigate the competitive advantage of a nation in the exportation of goods in the world. Hillman (1980) developed Balassa's RCA index further, using necessary and sufficient conditions.

The present study examines the comparative advantage situation of the two regions, or blocs, of BRICS and sub-Saharan Africa. The assessment of comparative advantage in this case is supported by the widely used tool introduced by Balassa. By adopting Balassa's method, the study determines the RCA of each bloc (BRICS and sub-Saharan Africa) in the exportation of merchandise goods. Specifically, the study examines the RCA of the subsectors of merchandise exportation that include food, agricultural raw materials, fuels, ores and metals, and manufactures. RCA indices determined for the two regions indicate the areas in which these regions can collaborate and integrate economically through the exportation of merchandise goods.

In the contemporary world, the winds of globalisation are influencing countries regardless of their economic status. One of the factors that determine the success of a country in international trade is the competitiveness of its commodities in the world. In this regard, the importance of and degree of reliance on the concept of comparative advantage has increased. The emphasis on determining the comparative advantage index of a country's exports has increased owing to its significant policy relevance for the countries concerned. The significance of competing based on RCA is highly supported and is becoming the order of the day. Furthermore, the World Trade Organisation (WTO) and the main tenet of the former General Agreement on Tariffs and Trade's (GATT) is the promotion of free trade in the world that discourages trade restrictions of various forms. Though the classical comparative advantage theory has valuable merits, its appropriateness in the present era of fast communication and mobility of resources is being called into doubt. Kowalski (2011) adds that these developments in the world have a significant influence in price, structure and trade pattern. Studies done by the Organisation of Economic Cooperation and Development OECD (n.d.) and Kowalski and Cepeda (2011) strengthened the view that the capacity of the classical comparative advantage theory to explain the current global trading pattern is limited.

Since Goldin (1990), the theory of comparative advantage has been extended by economists, with due emphasis being given to human and technological factors apart from Ricardo's focus on the competitiveness of natural and physical factors. Leontief's (1965) study of factor proportions and the structure of American trade revealed a paradoxical outcome: having assessed the trade structure and pattern of the United States with Canada, the then West Germany and Japan, his study found evidence opposed to the premises of the theory of endowment. Leontief revealed that

the United States, with its higher capital endowment, imports capital-intensive goods and exports labour-intensive goods.

The literature indicates that further research has been undertaken that re-examines the apparent paradox of Leontief's findings. Accordingly, studies by Kenen (1965) and Harkness (1975) clarified the paradox and confirmed that the factor-endowment theory of Heckscher and Ohlin is valid even for trade relationships among the United States, Canada, West Germany and Japan. They confirmed the validity of the factor-endowment theory because of the fact that in their methodology they stratified the skill level and considered models that compose three factors (human capital, physical capital and raw labour). The study done by Harkness and Kenen is supported by Krugman (1990). It is further elaborated that, despite the significant contribution the factor-endowment theory offers to international trade, it does not adequately explain the contemporary trade pattern and complexity of the factors that global trade involves.

BACKGROUND OF BRICS

Singh states that the acronym BRIC was floated for about a decade before it was formally adopted. It represented the group of countries Brazil, China, India and Russia. The acronym was coined for the first time by Goldman Sachs (as cited by Singh nd) when it grouped these countries in specifying a particular economic model in an attempt to forecast the future half-century's economic scenario. Goldman Sachs anticipated that BRIC would play a continuing and significant role in the world economic sphere. Though meetings among those countries' foreign ministries used to be held as a side event during various United Nations (UN) General Assembly sessions in New York, and in other countries, the grouping was formalised only on 16 June 2009 in Russia (Yekaterinburg). The acronym has been extended to BRICS since South Africa's inclusion as member of the group in 2010.

Singh (nd) has explained that from the time the acronym was coined in the period 2001 to 2010, BRIC has realised significant returns both economically and politically. In 2010, more than 40 per cent of the world population and about 30 per cent of the world's landmass resorted under BRICS members. In terms of purchasing power parity (PPP), the share of BRICS GDP in the world has grown from 16 per cent in 2000 to 25 per cent in 2010. It is believed that this economic growth will continue in the future along with social indicators such as literacy levels.

LITERATURE REVIEW

A study by Wood and Mayer (2001), which dealt with Africa's export structure comparatively, revealed that the dominance of unprocessed primary products export is attributed to its lower level of educational capacity and magnificent natural

resources. The study further suggests that it is very likely for some of the countries on the continent to boost their manufactured export share by improving the obvious challenge of infrastructure as well as their related policies. Furthermore, as African countries are endowed with huge natural resources, their exports can be increased by their engaging in all those sectors that use natural resources a great deal.

Subramanian and Tamirisa (2003) examined this situation and demonstrated that Africa has not benefited from global trade, which supports the view that it is not integrated into international trade: Africa has exhibited a trend towards the disintegration of its trade with advanced countries. The trend and degree of disintegration widened in the case of Francophone Africa, due to these countries' failure to exploit the trade opportunities they had. The trend towards disintegration has shown some instances of rejuvenation in the case of Anglophone Africa.

In their assessment of the relationship of growth to productivity and diversification Hammouda et al (2010) found that Africa's economic growth can be boosted through an improvement in the productivity of all factor inputs by promoting and adopting policies leading to the diversification of the continent's economic structure.

Shaw et al (2007) predicted that various tensions will exist in the future that can be anticipated. These include theocratic fundamentalism in both the North and the South, the existence of various influential power centres, such as BRIC and China, India and South Africa (CISA). The global architecture and governance of the future will depend on how the tension among the multi-power centres is settled. They also predicted that there will be multiple ripple effects at the global, regional and national levels if the economic growth pace of BRIC/CISA continues for the next 30 to 50 years. The potential socio-economic and political shift of power will be pronounced if the countries in the specified blocs work with strong co-ordination and cohesion.

Bhar and Nikolova (2007) asserted that there is a continuous integration process of BRIC countries that is more pronounced at regional level than at a global level. Their studies revealed the existence of potential investment diversification opportunities in BRIC economies. The continued global integration witnessed by these economies is an indication that investors should consider the growth areas in these economies and invest by selecting the appropriate portfolio investment options.

Weiner et al (2008) revealed that South Africa has a pattern of comparative advantage distinct from those that are customary for developing countries in general and that of East Asian newly industrialised countries (NICs) and other Asian economies. The areas of comparative advantage of South Africa are high capital-intensive products primarily meeting the demands of producers than directed towards the demands of consumers. It is stated that South Africa's comparative advantage scenario is in between that of the developing economies and the advanced economies.

Hentz (2005) concludes that the policy initiatives taken by South Africa to integrate itself within the regional economies are an indication of its prevailing competitive domestic interests within the nutshell of its local political economic framework.

It is considered as a kind of compromise that strikes a balance between labour and business.

Tran et al (2012) examined the determinants of export performance of the countries of sub-Saharan Africa and Asia. They revealed that there was a rising trend in supply matters after the early 1990s within the countries in both sub-Saharan Africa and Asia's developing countries. They added that the need for economic integration through trade between South–South has grown because of the fact that globalisation is significantly influenced and driven by China and India. Significantly, the growth dynamics of India and China have brought a change in the economic prospects of developing countries in general. The export performance of developing countries in these regions is adversely influenced by their weak institutional capacities. The performance worsens if rent-seeking behaviours prevail. It is suggested that cost-saving trade infrastructures have the capacity to boost exports. Furthermore, it is revealed that the existence of a positive correlation between the countries' access to foreign markets and their supply capacity stimulates export performance. Sub-Saharan countries will be beneficiaries by strengthening their trade integration with developing Asia in order to enjoy sustained market access. Securing market access in the Asian region reinforces the export performance of sub-Saharan countries. It is suggested that developing countries should opt for developing and strengthening South–South integration through trade.

The two giant countries on the planet, India and China, which account for about 40 per cent of the globe's population, have witnessed sustained economic growth. Their surplus labour and large diaspora populations across the world are likely to favourably influence further expansion of its economic activities in the future. It has been predicted that India and China, along with the United States, will be the three power centres of the world polity in the earlier part of the 21st century (Thakurta 2006). Moreover, it is stated that in the contemporary world, the emerging nations – Russia, India and China – are more likely to change the economic dynamism of the world and the features of the economic platform of the world in the early 21st century. It is also asserted that there will be a transformation towards a multipolar economic landscape from the current US-dominated one. This transformation is justified by the fact that BRIC is experiencing fast economic growth, the enhancement of its financial clout, and a sense of assertiveness. The multipolar economic atmosphere in the world is expected to make developing countries beneficiaries as it entitles them to have a major say in world affairs. It is asserted that the cohesion of European countries is also one potential source of influence likely to shape the global governance structure (Dailami & Masson 2010).

Carmody and Hampwaye (2010) highlighted the rapid economic growth witnessed by sub-Saharan Africa during the period 2004 to 2008. They claim that, to a large extent, this growth is stimulated by the investment and trade of Asia. A significant share of the activities carried out to date has focused on primary commodities.

Dhar (2012) examined the effect of the inclusion of South Africa in the BRICS group. The study argues that BRICS will be strengthened further as South Africa has been a natural ally of the members of BRIC. This argument is supported by the performances exhibited by the involvement of South Africa, Brazil, China and India in various forums that deal with the issues of trade and climate change. These countries have asserted their interests in crucial negotiations on, for example, agriculture, market access, and intellectual property rights. Basically, these issues are also developing countries' areas of concern. The positions of South Africa, Brazil, China and India on the stated issues have helped developing countries to streamline their interests for negotiation in international forums. BRICS's role in multilateral negotiations is significant for developing countries in that it serves as a counterpoint to earlier phases of multilateral trading patterns that were dominated by four countries or blocs (the United States, the European Union, Japan and Canada). Its supportive role on behalf of developing countries is evidenced by the fact that the members of BRICS have argued that multilateral agreements on issues related to green gas emission should not undermine the developmental endeavours of developing countries. Moreover, the confidence placed in BRICS has enhanced South–South relationships, resulting in economic integration between BRICS countries and developing countries.

With regard to the future scenario of the world economic situation and stability scenario Cooper et al (2007) envisage it as follows:

> 'Time will show how the emerging economies impact global politics, security, economics, and societies through the first quarter of the new century. It seems clear though that if the BRICSAM economic growth of the last 5–10 years continues over the next three to five decades, then multiple ripple effects will be felt at national, regional, and global levels. The potential shift in the global balance of power may be even more pronounced if the BRICSAM countries (Brazil, Russia, China, India, South Africa, ASEAN and Mexico) decide to act collectively and use their joint bargaining power to shape or reform global institutions, from the Kimberley Process to the Doha Round. Thus, a change in the key aspects of global economic governance, international architecture, and geo-politics seems inevitable and with it new challenges will arise for policy makers and scholars alike – innovative, interdisciplinary responses for the conceptualization of the BRIC/BRICSAM emergence are, thus, imperative.'

CONCEPTUAL FRAMEWORK OF THE STUDY[1]

To analyse economic integration between BRICS and sub-Saharan Africa, the study approaches it using the revealed comparative advantages the regions have on merchandise goods. The widely used measuring index suggested by Balassa is adopted for this study. The analyses base their assessment of the respective revealed com-

1 A similar conceptual model and methodology is used by Beyene (2014b, 2014c) in the studies that examine the RCA of sub-Saharan Africa versus South Asia and versus Latin America and the Caribbean.

parative advantages for each sub-category of the merchandise export from two perspectives: the first assessment deals with comparison of each BRICS member country's revealed comparative advantage with the sub-Saharan Africa region; the second assessment attempts to examine the revealed comparative advantage of the whole BRICS bloc with the comparative advantage of sub-Saharan Africa in each of the subsectors of the merchandise export. In each analytical approach it explores the opportunities for economic integration between BRICS and sub-Saharan Africa.

The analyses highlight the complementarities and competitiveness in subsectors of merchandise exportation between the two regions.

To compute the RCA of the regions or countries in each subsector, the following formula, which was initially developed by Balassa, is adopted and applied:

$$\mathbf{RCA} = \left[\frac{\left(X_{ij} \Big/ \sum_i X_{ij} \right)}{\left(\sum_j X_{ij} \Big/ \sum_j \sum_i X_{ij} \right)} \right]$$

where

X_{ij} signifies exports of sector 'i' of a region (BRICS, sub-Saharan Africa, or each member country of the BRICS) 'j',

$\sum_i X_{ij}$ signifies total exports of region 'j',

$\sum_j X_{ij}$ signifies 'world' exports of sector 'i' (sum of countries sector's 'i' exports),

$\sum_j \sum_i X_{ij}$ signifies total 'world' exports.

To analyse such data in some depth, authors use the formula developed in a modified form by Vollrath along with the widely used Balassa's RCA.Vollrath's (1991) model is considered appropriate when dealing with a group of countries whose influence in the world trading order is higher than that of an individual country. Vollrath's model is used in some of the analyses of this study relating to a group of countries such as BRICS and sub-Saharan Africa region. Essentially, the difference between Balassa's and Vollrath's RCAs is that in the calculation of the indices of RCAs, Vollrath's approach avoids double counting. Vollrath's RCA examines the RCA of the exports from a specified sector of a specific country in the world. In this study, Vollrath's RCA is denoted by $RCA_{\#}$ and is customised to the study's specificities. The model

is set in a way that enables us to examine the RCAs of the two regions (BRICS and sub-Saharan Africa) in the exportation of subsectors of merchandise.

To examine the RCAs of BRICS as a region and sub-Saharan Africa in the exportation of subsectors of merchandise, the model used, with its respective notations for the specified variables, is as shown below.

If the computed value of $RCA_{\#}$ is positive, it reveals that the country or region has a comparative advantage, whereas a negative value of $RCA_{\#}$ reveals that the country or region has a comparative disadvantage in the exportation of the specified commodity (Vollrath 1991).

DATA AND METHODOLOGY

To investigate the RCAs of the two regions, the commonly used model specified above is adopted in two ways: first, BRICS is considered as a single bloc and its RCA is computed; similarly, the RCA for sub-Saharan Africa is computed and the competitive posture of the two regions in the export of merchandise sub-sectors (food, agricultural raw materials, fuels, ores and metals, and manufactures) is assessed. Furthermore, to examine the potential for economic integration between the two regions, the differentials in their RCA indices for the exportation of merchandise subsectors are considered. The differential indices are used as valuable indicators of economic regional integration, because they reveal the gap in competitiveness in the exportation of the specified commodities. The following model is used to compute the competitiveness gap between the two regions:

$$\text{RDRCA (BRICS and SSA)} = RCA_{BRICS} - RCA_{SSA}$$

where

RDRCA refers to the revealed difference in the RCA of BRICS and sub-Saharan Africa;

BRICS refers to the bloc that consists of the countries Brazil, Russia, India, China and South Africa;

SSA refers to sub-Saharan Africa.

The expanded equation form of the differential indices of the two regions is defined as given below.

The RCA approach to examining competitiveness is one of the valuable tools that enable policy makers to obtain an input with regard to the status of the country in

$$\mathbf{RDRCA} = \left[\frac{\left(X_{ij}/\sum_i X_{ij}\right)}{\left(\sum_j X_{ij}/\sum_j \sum_i X_{ij}\right)}\right]\mathbf{BRICS} - \left[\frac{\left(X_{ij}/\sum_i X_{ij}\right)}{\left(\sum_j X_{ij}/\sum_j \sum_i X_{ij}\right)}\right]\text{SSA}$$

export competitiveness. It is also important to note that RCA has the limitation that it does not take into account the possible improvements in factors of production from which a country or region benefits. Moreover, it does not take into account trade-related policy changes that may be introduced by a country or region. These include tariff and non-tariff policy changes that could distort the international trade pattern of countries, regions or even the whole world.

The pacification role the two regions can play is examined, based on the literature review that discusses similar issues.

ANALYSIS

The computed RCAs in the exportation of the merchandise subsectors of food, agricultural raw materials, fuels, ores and metals, and manufactures of BRICS and sub-Saharan Africa are presented in Table 1 below. The trend of the RCA in the exportation of food of BRICS between 1995 and 2010 shows that it is declining: BRICS's food exports are in a comparative disadvantage position, having transformed from comparative advantage to a disadvantage status during the period.

In the case of sub-Saharan Africa, even though a decline in the RCA of food exports is exhibited between 1995 and 2010, it is placed in a comparative advantage position. As can be seen from Figure 1, the gaps in competitiveness between BRICS and sub-Saharan Africa during this period are almost all higher by 1 RCA index unit. This implies that BRICS will be a beneficiary by importing food from sub-Saharan Africa, which highlights a possible avenue for economic integration between the two regions. Sub-Saharan Africa should see the BRICS region as an important market for its food exports.

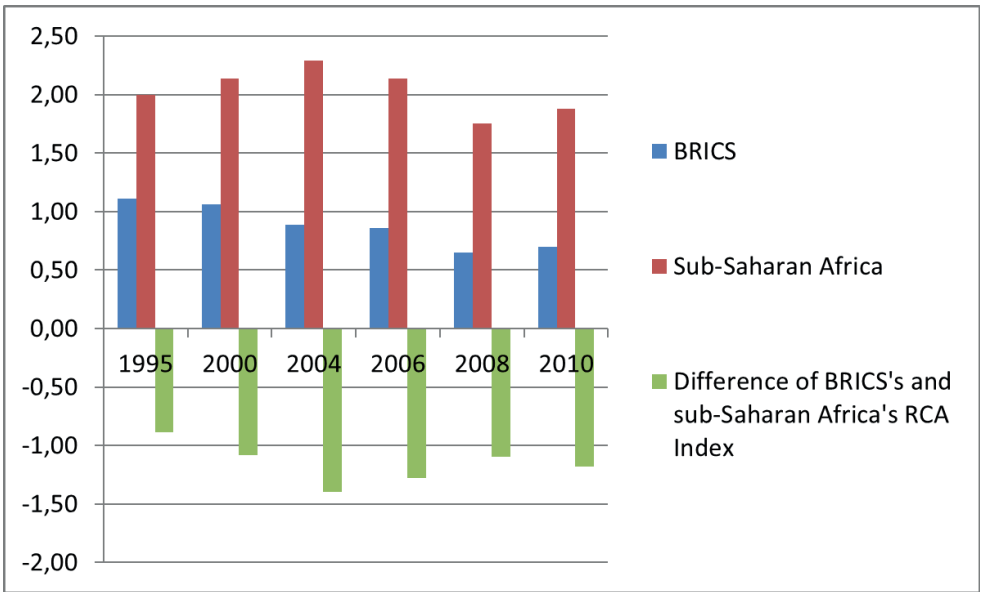
Table 1: RCA of BRICS and sub-Saharan Africa in merchandise exports

Year	Food		Agricultural raw materials		Fuels		Ores and metals		Manufactures	
	BRICS[a]	SSA[b]	BRICS	SSA	BRICS	SSA	BRICS	SSA	BRICS	SSA
1995	1.11	2.00	0.64	2.33	0.37	5.14	1.99	2.67	0.73	0.37
2000	1.06	2.14	1.05	2.50	1.38	3.70	1.68	2.33	0.90	0.41
2004	0.89	2.29	0.73	2.50	1.62	4.75	1.62	3.33	0.94	0.40
2006	0.86	2.14	0.65	2.50	1.39	3.60	1.37	3.33	0.97	0.44
2008	0.65	1.75	0.58	1.50	1.41	3.00	1.17	4.00	1.00	0.46
2010	0.70	1.88	0.59	2.00	1.19	2.67	0.99	3.60	1.04	0.45

Source: Author computation based on various annual WDI data published by World Bank: Washington, DC.

Notes: [a] BRICS stands for Brazil, Russia, India, China and South Africa.

[b] SSA stands for sub-Saharan Africa.

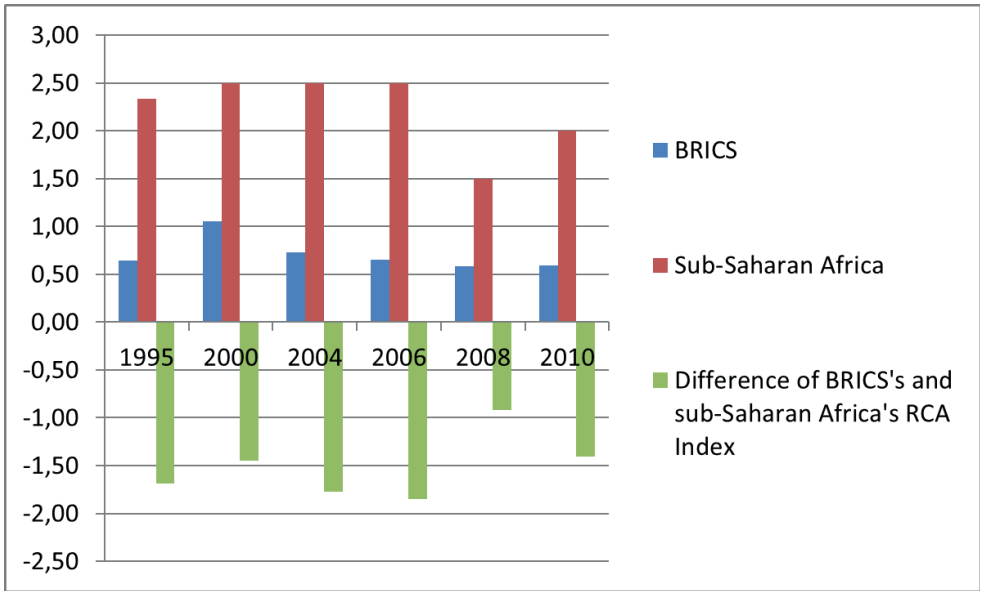


Source: Author computation based on various annual WDI data published by World Bank: Washington, DC.
Notes: BRICS stands for Brazil, Russia, India, China and South Africa.

Scores greater than unity (RCA > 1) reveal that the region has a comparative advantage, whereas scores less than unity (0 ≤ RCA < 1) reveal that the region has a comparative disadvantage in the exports of the specified subsector. (For similar computations, see Beyene 2014b, 2014c.)

Figure 1: RCA and RDCA of food exports of BRICS and sub-Saharan Africa

With regard to the exportation of agricultural raw materials, the computed RCA of both regions is depicted in Table 1 and Figure 2. In the exportation of agricultural raw materials, BRICS has assumed a comparative disadvantage status throughout the period except in the year 2000, in which it attained a neutral status. In the case of sub-Saharan Africa, it has a comparative advantage in the exportation of agricultural raw materials, though the RCA indices are characterised as being both up and down during the period under consideration. When the two regions are compared, sub-Saharan Africa's comparative advantage is on average more than two times higher than the competitiveness of BRICS. This implies that economic integration can be sustained between the two regions through the exportation of agricultural raw materials. BRICS became a beneficiary by importing agricultural raw materials from sub-Saharan Africa. On the other hand, BRICS is a potential market for sub-Saharan Africa's exports of agricultural raw materials.

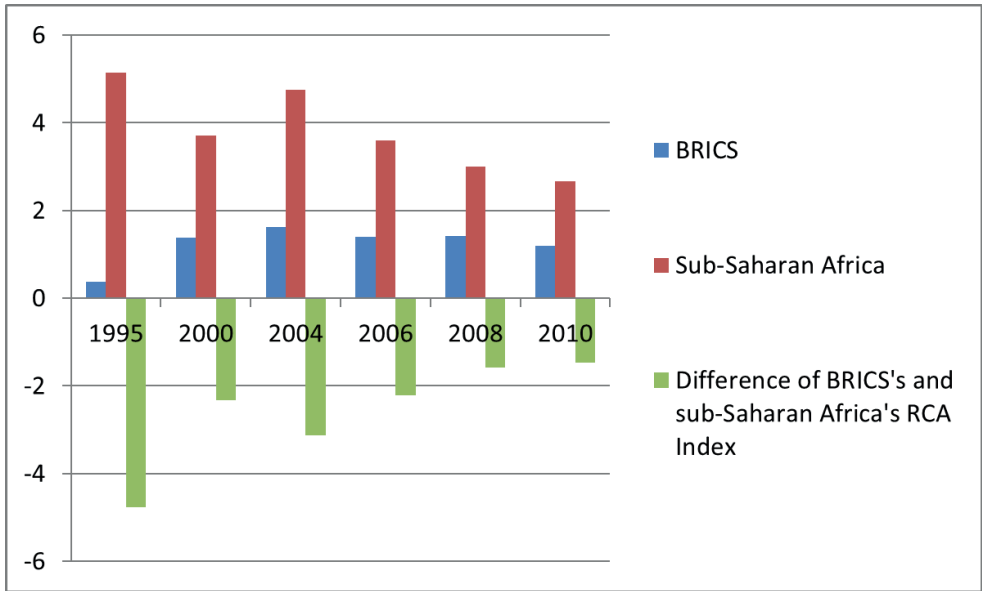


Source: Author computation based on various annual WDI data published by World Bank: Washington, DC.
Notes: BRICS stands for Brazil, Russia, India, China and South Africa.

Scores greater than unity (RCA > 1) reveal that the region has a comparative advantage, whereas scores less than unity (0 ≤ RCA < 1) reveal that the region has a comparative disadvantage in the exports of the specified subsector. (For similar computations, see Beyene 2014b, 2014c.)

Figure 2: RCA and RDCA of agricultural raw materials exports of BRICS and sub-Saharan Africa

The study further disclosed that both regions have revealed comparative advantages in the exportation of fuels to the world. BRICS has been transformed from the status of comparative disadvantage to comparative advantage during the period considered in the study. BRICS's RCA indices pattern depicted in Figure 3 is characterised by a constant trend in most of the years. In the case of sub-Saharan Africa, it has a very high comparative advantage position throughout the period considered in the study. However, the RCA indices pattern is characterised by a declining trend from 5.14 in 1995 to 2.67 in 2010. When the two regions are compared, sub-Saharan Africa's competitiveness in the export of fuels is more than 2.5 times higher than that of BRICS. In addition, the gap in competitiveness between the two regions has declined from 4.77 RCA units in 1995 to 1.48 in 2010. The shrinkage in the gap of competitiveness is mainly due to the decline in competitiveness trend exhibited in sub-Saharan Africa. Economic integration between the two regions can therefore be realised through the exportation of fuel from sub-Saharan Africa to BRICS that will enable both of them to become beneficiaries.



Source: Author computation based on various annual WDI data published by World Bank: Washington, DC.
Notes: BRICS stands for Brazil, Russia, India, China and South Africa.

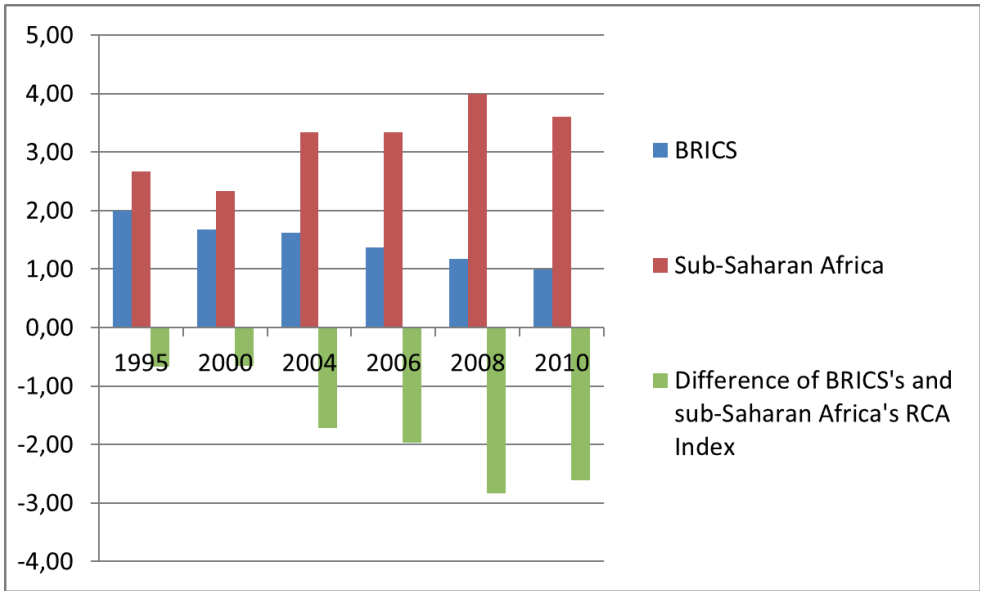
Scores greater than unity (RCA > 1) reveal that the region has a comparative advantage, whereas scores less than unity (0 ≤ RCA < 1) reveal that the region has a comparative disadvantage in the exports of the specified subsector. (For similar computations, see Beyene 2014b, 2014c.)

Figure 3: RCA and RDCA of fuels exports of BRICS and sub-Saharan Africa

The competitiveness of BRICS in the exportation of ores and metals as shown in Table-1 and Figure 4; it has RCA in the world. However, its competitive advantage has been shrinking through time from about 2 RCA index values in 1995 to about 1 RCA index value in 2010. This trend is more likely to indicate that BRICS's competitiveness will be transformed from a comparative advantage position to a comparative disadvantage position in the future.

As far as sub-Saharan Africa is concerned, unlike BRICS, its competitiveness has been enhanced during the period under study: it has risen from 2.67 RCA index values in 1995 to 3.60 in 2010.

The competitiveness trends of the two regions in the exportation of ores and metals is depicted to be the opposite of each other – while the competitiveness of BRICS shrinks, competitiveness has been boosted for sub-Saharan Africa. These two different and opposite trends have caused the competitiveness gap between the two regions to become increasingly wider during the period considered in the study. It can be inferred from the trend observed that the exportation of the ores and metals subsector is going to be one of the promising merchandise goods that could link the two regions in the future.



Source: Author computation based on various annual WDI data published by World Bank: Washington, DC.
Notes: BRICS stands for Brazil, Russia, India, China and South Africa.

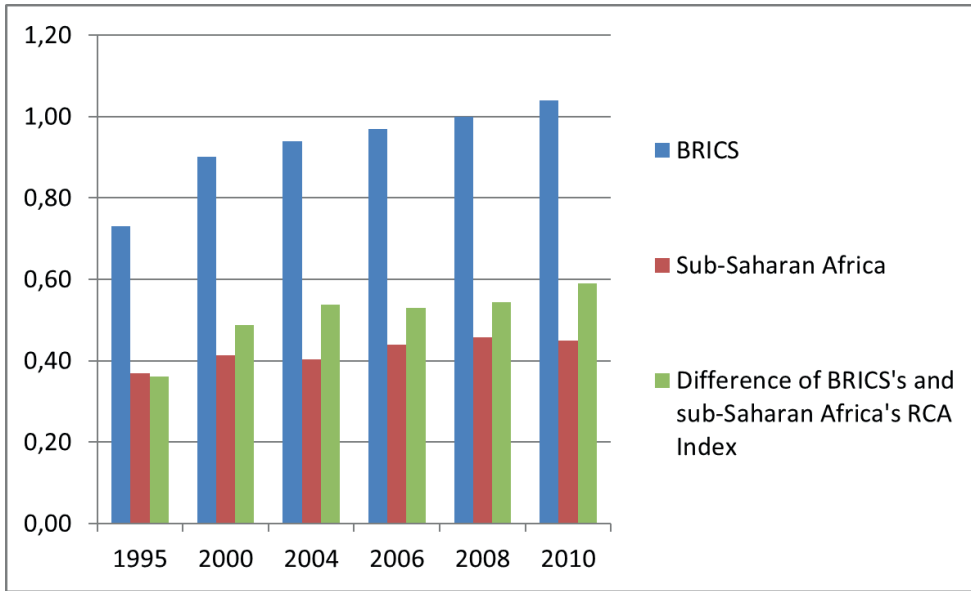
Scores greater than unity (RCA > 1) reveal that the region has a comparative advantage, whereas scores less than unity (0 ≤ RCA < 1) reveal that the region has a comparative disadvantage in the exports of the specified subsector. (For similar computations, see Beyene 2014b, 2014c.)

Figure 4: RCA and RDCA of ores and metals exports of BRICS and sub-Saharan Africa

The competitiveness of BRICS in the exportation of manufactures is shown in Table 1 and Figure 5. It is interesting to see that BRICS's competitiveness has shown continuous and consistent improvement in the exportation of manufactures. It has realised a transformation in competitiveness from the status of comparative disadvantage to that of comparative advantage in the higher value-added exportation of the merchandise subsector (manufactures). BRICS has managed to move forward, enhancing its competitiveness in the world, as evidenced by the increase from a mere RCA index value of 0.73 in 1995 to 1.04 in 2010. Even though the magnitude of the RCA value is a little more than unitary, the growth trend is a promise of the enhancement of its competitiveness in the future.

In the case of sub-Saharan Africa, even though an improvement trend is exhibited in its competitiveness in the exportation of manufactures, it is still at its lower stage. Sub-Saharan Africa is therefore found to be at a comparative disadvantage in the exportation of manufactures. This subsector of merchandise is not well developed or exported by the sub-Saharan Africa region.

Comparatively, on average, BRICS outshines in the competitiveness of manufactures exports and is higher by more than 1.83 times the competitiveness of sub-Saharan Africa. This highlights the existence of a window of opportunity for the two regions to integrate through the exportation of manufactures. The linkage between the two regions can be further strengthened through the exportation of manufactures from BRICS to the sub-Saharan Africa market in the future. In other words, the prospects for structural transformation to the down-stream phase of the supply chain are modest in the case of sub-Saharan Africa; however, structural transformation is progressing well in the case of BRICS.



Source: Author computation based on various annual WDI data published by World Bank: Washington, DC.
Notes: BRICS stands for Brazil, Russia, India, China and South Africa.

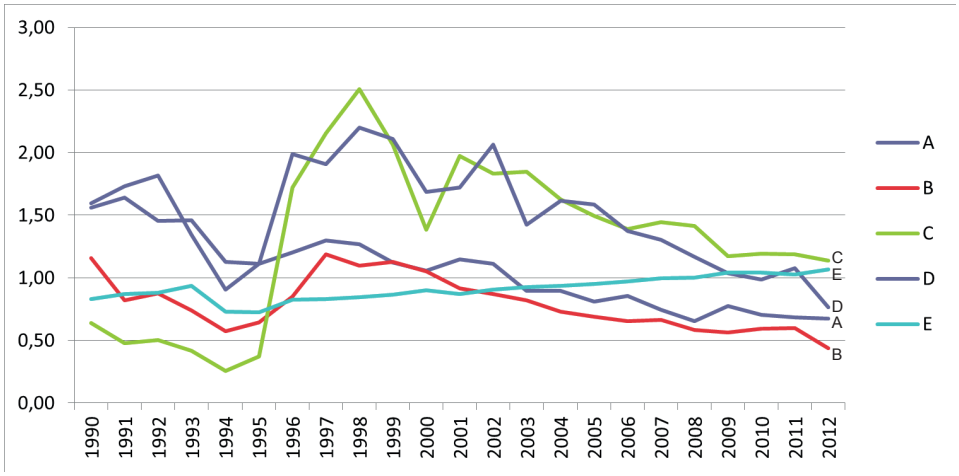
Scores greater than unity (RCA > 1) reveal that the region has a comparative advantage, whereas scores less than unity (0 ≤ RCA < 1) reveal that the region has a comparative disadvantage in the exports of the specified subsector. (For similar computations, see Beyene 2014b, 2014c.)

Figure 5: RCA and RDCA of manufactures exports of BRICS and sub-Saharan Africa

The RCAs of each of the BRICS subsectors of merchandise exportation are depicted in Figure 6 below. The trend shows that with the exception of manufactures exports, all subsectors of the BRICS merchandise exports are characterised by a declining trend. It is interesting to see that the trend of manufactures exports is continuously and consistently rising. Currently, as the graph shows, only two commodities (fuels

and manufactures exports) are in their comparative advantage stage, whereas the remainder are in their comparative disadvantage stage.

It can be summarised that BRICS has competitive advantage in the world in the exportation of manufactures and fuels, and comparative disadvantage in the exportation of food, agricultural raw materials, and ores and metals.



Source: Author computation based on various annual WDI data published by World Bank: Washington, DC.
Notes: BRICS stands for Brazil, Russia, India, China and South Africa.

Scores greater than unity (RCA > 1) reveal that the region has a comparative advantage, whereas scores less than unity (0 ≤ RCA < 1) reveal that the region has a comparative disadvantage in the exports of the specified subsector. (For similar computations, see Beyene 2014b, 2014c.)

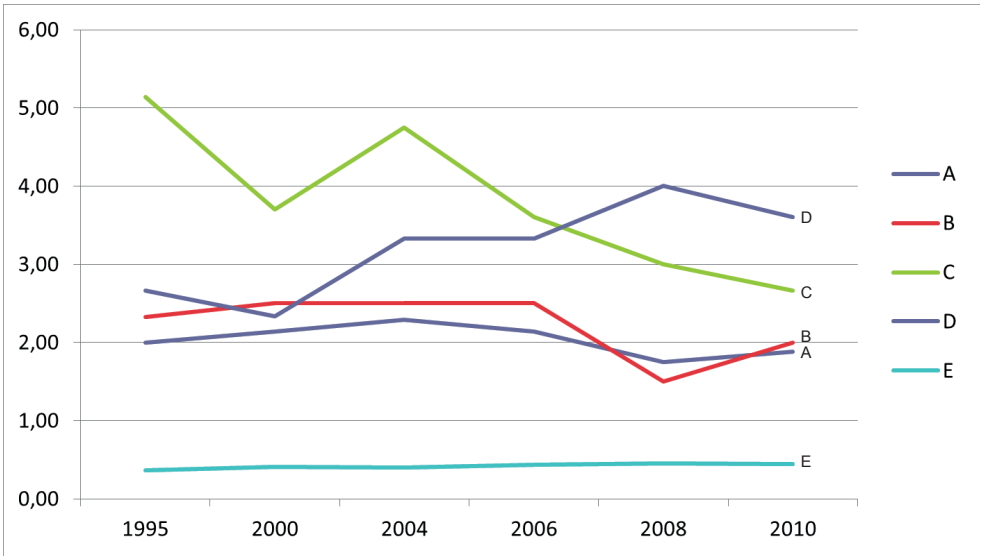
A – signifies food exports of BRICS region.
B – signifies agricultural raw materials exports of BRICS region.
C – signifies fuels exports of BRICS region.
D – signifies ores and metals exports of BRICS region.
E – signifies manufactures exports of BRICS region.

Figure 6: BRICS's RCA trends of merchandise exports in 1990–2012

The RCAs of each of the subsectors of merchandise exports of sub-Saharan Africa are depicted in Figure 7 below. The trend shows that the fuels exports are characterised by a declining trend whereas others show more of an up-and-down trend. It is interesting to observe that the trend of manufactures exports is stagnant with a low prospect of growth. This implies a low propensity for structural transformation towards the low stream phases of the supply chain. Currently, as the graph shows, with the exception of manufactures exports all the merchandise exports are found to be in their comparative advantage status. This means that sub-Saharan Africa has a comparative disadvantage in the exportation of manufactures throughout the period

considered in this study. Sub-Saharan Africa's competitive advantage is the highest in the exportation of ores and metals, followed by fuels, agricultural raw materials and food.

It can therefore be summarised that sub-Saharan Africa has competitive advantage in the world in the exportation of ores and metals, fuels, agricultural raw materials, and food. On the other hand, it has a comparative disadvantage in the exportation of manufactures in the world.



Source: Author computation based on various annual WDI data published by World Bank: Washington, DC.

Notes: BRICS stands for Brazil, Russia, India, China and South Africa.

Scores greater than unity (RCA > 1) reveal that the region has a comparative advantage, whereas scores less than unity (0 ≤ RCA < 1) reveal that the region has a comparative disadvantage in the exports of the specified subsector. (For similar computations, see Beyene 2014b, 2014c).

A – signifies food exports of sub-Saharan Africa region.
B – signifies agricultural raw materials exports of sub-Saharan Africa region.
C – signifies fuels exports of sub-Saharan Africa region.
D – signifies ores and metals exports of sub-Saharan Africa region.
E – signifies manufactures exports of sub-Saharan Africa region.

Figure 7: Sub-Saharan Africa's RCA trends in merchandise exports from 1995–2010

To examine the extent of competitiveness of each subsector's exports, the RCA computed values are categorised in intervals, as given below:[2]

Very High for RCA or $RCA_{\#} > 2.00$,
High for $2.00 > RCA$ or $RCA_{\#} > 1.00$,
Low for $1.00 > RCA$ or $RCA_{\#} > 0.50$, and
Very Low for RCA or $RCA_{\#} < 0.50$.

For convenience, the above intervals are defined and presented in tables 2 and 3 below:

RCA or $RCA_{\#} > 2.00$, to signify Very High,
RCA or $RCA_{\#} > 1.00$, to signify High,
RCA or RCA# > 0.50, to signify Low, and
RCA or $RCA_{\#} < 0.50$, to signify Very Low.

Essentially, these intervals are defined to assess the changes that have occurred, based on the average computed values in the periods 1994 to 2003 and 2004 to 2012. The study has adopted both RCA and $RCA_{\#}$. In fact, to maintain consistency in the analysis, RCA is discussed and interpreted. For further in-depth analysis on using the $RCA_{\#}$, the computed values are presented in Table A and Table B in the appendix.

The changes in the RCA of the subsectors can be observed from the average RCA values computed for the periods 1994 to 2003 and 2005 to 2012. The results are presented in Tables 2 and 3 below. BRICS have maintained three commodities in their high and two in their low comparative advantage position. In the period 1994 to 2003, ores and metal exports were the highest followed by fuels and food exports; manufactures exports were the least in terms of their RCA. In the later period (2004 to 2012), fuels exports become the highest, followed by ores and metals. It is interesting that manufactures exports, which were the least with low competitive position, have shifted to a high competitiveness status in 2005 to 2012. Moreover, it has managed to become the third-highest export item, displacing food exports from the position they had assumed.

With regard to sub-Saharan Africa, it had a very high RCA in four subsectors in 1994 to 2003, reduced to three subsectors in the period 2005 to 2010 (food was downgraded from very high to high; see Tables 2 and 3). It is revealed that no change in competitiveness is observed in the exportation of manufactures: that remains very low. It is disclosed that ores and metals exports, which ranked second in terms of competitiveness in 1994 to 2003, have shifted up, becoming the highest in terms of the RCA of the region's subsector exports. The ores and metals exports have displaced fuels exports in first position. Sub-Saharan Africa's competitiveness is the highest in ores and metals exports, followed by fuels and agricultural raw materials

2 Similar definitions and categories are used for similar analyses performed on RCAs related to sub-Saharan Africa. (For details of these analyses, see Beyene 2014b, 2014c.)

exports. Moreover, the region's competitiveness is high in the case of food exports, but very low and the lowest in the exportation of manufactures.

Table 2: Ranking of average RCA of BRICS and sub-Saharan Africa: merchandise exports

Rank	1994–2003		Rank	2004–2012	
	RCA			RCA	
	BRICS	Sub-Saharan Africa		BRICS	Sub-Saharan* Africa
1	Ores & metals > 1.00	Fuels > 2.00	1	Fuels > 1.00	Ores & metals > 2.00
2	Fuels > 1.00	Ores & metals > 2.00	2	Ores & metals > 1.00	Fuels > 2.00
3	Food > 1.00	Agr RM > 2.00	3	Manufactures > 1.00	Agr RM > 2.00
4	Agr RM > 0.50	Food > 2.00	4	Food > 0.50	Food > 1.00
5	Manufactures > 0.50	Manufactures < 0.50	5	Agr RM > 0.50	Manufactures < 0.50

Source: Author computation based on various annual WDI data published by World Bank: Washington, DC.
Notes: BRICS stands for Brazil, Russia, India, China and South Africa.

Scores greater than unity (RCA > 1) reveal that the region has a comparative advantage, whereas scores less than unity (0 ≤ RCA < 1) reveal that the region has a comparative disadvantage in the exports of the specified subsector. (For similar computations, see Beyene 2014b, 2014c.)

Agr RM stands for agricultural raw materials.
** For sub-Saharan Africa the average is computed for 2005–2010.*

Table 3: Intervals of RCA based on average value

BRICS	1994–2003				2004–2012			
	Very high	High	Low	Very low	Very high	High	Low	Very low
Food		X					X	
Agricultural raw materials			X				X	
Fuels		X				X		
Ores and metals		X				X		
Manufactures			X			X		
Sub-Saharan Africa*								
Food	X					X		
Agricultural raw materials	X				X			
Fuels	X				X			
Ores and metals	X				X			
Manufactures				X				X

Source: Author computation based on various annual WDI data published by World Bank: Washington, DC.
Notes: BRICS stands for Brazil, Russia, India, China and South Africa.

Scores greater than unity (RCA > 1) reveal that the region has a comparative advantage, whereas scores less than unity (0 ≤ RCA < 1) reveal that the region has a comparative disadvantage in the exports of the specified subsector. (For similar computations, see Beyene 2014b, 2014c.)

** For sub-Saharan Africa the average is computed for 1994–2003 and 2005–2010.*

Based on the above separate analyses of each of the subsectors of manufactured exports, it can be stated in general that economic integration can be sustained between the two regions in all sub-sectors of the merchandise exports. Specifically, sub-Saharan Africa is a potential destination market for BRICS's exportation of manufactures. On the other hand, BRICS is also a potential destination market for sub-Saharan Africa, mainly for the exportation of ores and metals followed by fuel, agricultural raw materials, and food, in order of importance.

ECONOMIC INTEGRATION VERSUS PEACE

Avdan (2014) finds that trade interdependence is inversely associated with the impact of terror. Economic partnership has the power to weaken the adverse consequences of terror. This implies that economic interdependence plays a significant role in maintaining and building peace across a region. This supports the assertion that economic partnership between BRICS and sub-Saharan Africa positively influences the regional peace that enhances further their economic linkages and the well-being of their respective communities.

In addition, Russett and Oneal (2001) have revealed that, apart from the pacification role trade plays in integrating countries, it also has the power to inhibit and settle down instances that could lead to dispute and violence at their inception stages.

It can be argued that mutual interdependence between countries is facilitated by international trade. This creates the sense of oneness among the integrating communities (Hegre et al 2010; Lu & Thies 2010). This implies that trade serves as a tool in the creation of harmonious attitudes among communities that remain apart from one another. The feeling of oneness sustained by trade relationships tends to stand against forces that detract from their stability. On the other hand, the communities become willing to co-operate in strengthening their peace and stability as they recognise the benefits derived from it.

The pacification role of trade integration has been empirically proven in a study by Beyene (2014a) on East Africa. It is revealed that the economic openness of countries has a significant impact in reducing the likelihood of interstate conflict in the East African region. It states that those countries that foster their dyadic economic ties make a significant contribution to the reduction of violence or conflict in the region. This study has supported the empirical findings that have been done more

widely in its geographical area coverage. From this it can be inferred that economic partnership plays a paramount role in building and sustaining peace among countries and regions and in the world as a whole.

CONCLUSION AND RECOMMENDATIONS

Based on the analyses of the RCA of the two regions, BRICS and sub-Saharan Africa, the following conclusions and recommendations can be drawn.

The RCA in the exportation of food of BRICS is characterised by a declining trend: the competitiveness of BRICS has changed from comparative advantage in the earlier period to comparative disadvantage in the later period. Sub-Saharan Africa has maintained its competitiveness in comparative advantage status, though a declining trend is exhibited. The gap in competitiveness between the two regions suggests an economic integration between the regions and that sub-Saharan Africa should direct its exports of food to the BRICS market.

The competitiveness of BRICS in the exportation of agricultural raw materials is low and characterised more by a declining trend. Sub-Saharan Africa has RCA in the exportation of agricultural raw materials with an up-and-down trend. Comparatively, in this sector, sub-Saharan Africa's competitiveness is more than two times higher than that of BRICS. It can be inferred from this that economic integration can be sustained between the two regions by letting BRICS import agricultural raw materials from the sub-Saharan Africa region. Sub-Saharan Africa needs to give due consideration to the BRICS market as an important destination for its agricultural raw materials exports.

The study revealed that both BRICS and sub-Saharan Africa have comparative advantage in the exportation of fuels. BRICS has been transformed from the status of comparative disadvantage to comparative advantage position, though it is in its declining trend. In the case of sub-Saharan Africa, it has a higher comparative advantage throughout the period 1995 to 2010. However, it has exhibited a continuous declining trend. Comparatively, sub-Saharan Africa's competitiveness is higher by more than twofold than BRICS in the exportation of fuels. However, the gap of competitiveness between the two regions has significantly narrowed, mainly due to a decline in the competitiveness of sub-Saharan Africa. Economic integration can be sustained through the exportation of fuels from sub-Saharan Africa to the BRICS, to their mutual benefit.

In the exportation of ores and metals, the study revealed that BRICS's competitiveness has declined and has been transformed from comparative advantage status to comparative disadvantage. Unlike BRICS, the competitiveness of sub-Saharan Africa intensified from 1995 to 2010. In the latter periods, from the merchandise exports, sub-Saharan Africa's highest record lies in ores and metals exports, and a rising trend in competitiveness continues. Economic integration between BRICS

and sub-Saharan Africa can be boosted through an exchange of ores and metals. The BRICS region is a potential destination market for sub-Saharan Africa's exports of ores and metals.

The competitiveness of BRICS in the export of manufactures has continuously and consistently increased during the period 1990 to 2012. The data reveal that BRICS is undergoing structural transformation in exports from low to higher value-added commodities. The movement towards the downstream of the supply chain is evidenced by continuous improvement shown in BRICS's RCA of manufactures exports. Unlike BRICS, sub-Saharan Africa is found at a comparative disadvantage position in the exportation of manufactures. There is a promising opportunity here for these two regions to integrate through the exchange of manufactures. Sub-Saharan Africa is a potential destination market for BRICS exports of manufactures in the future.

The study reveals that significant economic integration can be sustained between BRICS and sub-Saharan Africa in the exportation of all merchandise subsectors. Specifically, sub-Saharan Africa is a potential destination market for BRICS's export of manufactures. On the other hand, BRICS is also a potential destination market for sub-Saharan Africa's exports of ores and metals, fuel, agricultural raw materials, and food.

Economic integration between BRICS and sub-Saharan Africa favourably influences peace and stability in their respective regions. The sustainment of peace and stability in these regions can also favourably influence the wellbeing of these communities.

APPENDIX

Table A: Ranking of average $RCA_{\#}$ of BRICS and sub-Saharan Africa merchandise exports

Rank	1994–2003		Rank	2004–2012	
	$RCA_{\#}$			$RCA_{\#}$	
	BRICS	**Sub-Saharan Africa**		**BRICS**	**Sub-Saharan Africa***
1	Manufactures > 2.00	Fuels > 2.00	**1**	Fuels > 2.00	Ores & metals > 2.00
2	Fuels > 1.00	Ores & metals > 2.00	**2**	Food > 0.50	Fuels > 2.00
3	Food > 1.00	B > 2.00	**3**	Ores & metals > 0.50	Agr RM > 2.00
4	Ores & metals > 0.50	Food > 2.00	**4**	Agr RM < 0.50	Food > 1.00
5	Agr RM < 0.50	Manufactures < 0.50	**5**	Manufactures < 0.50	Manufactures < 0.50

Source: Author computation based on various annual WDI data published by World Bank: Washington, DC.
Notes: BRICS stands for Brazil, Russia, India, China and South Africa.

Scores greater than unity (RCA > 1) reveal that the region has a comparative advantage, whereas scores less than unity (0 ≤ RCA <1) reveal that the region has a comparative disadvantage in the exports of the specified subsector. (For similar computations, see Beyene 2014b, 2014c).

Agr RM – signifies Agricultural Raw Materials Export of the region.
** For sub-Saharan Africa the average is computed for 2005–2010.*

Table B: Intervals of $RCA_{\#}$ based on average value

BRICS	**1994–2003**				**2004–2012**			
	Very high	**High**	**Low**	**Very low**	**Very high**	**High**	**Low**	**Very low**
Food		X					X	
Agricultural raw materials				X				X
Fuels		X			X			
Ores and metals			X				X	
Manufactures	X							X
Sub-Saharan Africa*								
Food	X					X		
Agricultural raw materials	X				X			
Fuels	X				X			
Ores and metals	X				X			
Manufactures				X				X

Source: Author computation (in 2014) based on various annual WDI data published by World Bank: Washington, DC.
Notes: BRICS stands for Brazil, Russia, India, China and South Africa.

Scores greater than unity (RCA > 1) reveal that the region has a comparative advantage, whereas scores less than unity (0 ≤ RCA < 1) reveal that the region has a comparative disadvantage in the exports of the specified subsector. (For similar computations, see Beyene 2014b, 2014c).

** For sub-Saharan Africa the average is computed for 1994–2003 and 2004–2010.*

REFERENCES

Avdan, N. 2014. Controlling access to territory: Economic interdependence, transnational terrorism, and visa policies. *Journal of Conflict Resolution* 58(4): 592–624.

Balassa, B. 1965. Trade liberalization and revealed comparative advantage. *Manchester School* 33: 99–123.

Beyene, HG. 2014a. Does international trade reduce political disputes? Unpublished paper, Institute for Dispute Resolution, University of South Africa, Pretoria, 1–20.

Beyene, HG. 2014b. Trade integration and revealed comparative advantages of Sub-Saharan Africa and South Asian merchandize export. *Foreign Trade Review* 49(2): 163–176.

Beyene, HG. 2014c. Trade integration and revealed comparative advantages of Sub-Saharan Africa and Latin America & Caribbean merchandize export. *The International Trade Journal* 28: 1–31 (forthcoming).

Bhar, R & Nikolova, B. 2007. Analysis of mean and volatility spillovers using BRIC countries, regional and world Equity Index returns. *Journal of Economic Integration* 22(2): 369–381.

Carmody, P & Hampwaye, G. 2010. Inclusive or exclusive globalization? Zambia's economy and Asian investment. *Africa Today* 56(3): 84–102.

Cooper, AF, Antkiewicz, A & Shaw, TM. 2007. Lessons from/for BRICSAM about South–North relations at the start of the 21st century: Economic size trumps all else? *International Studies Review* 9(4): 673–689.

Dailami, M & Masson, PR. 2010. Toward a more managed international monetary system? Annual John W Holmes issue on Canadian foreign policy. *International Journal* 65(2): 393–409.

Dhar, B. 2012. The BRICS in the emerging global economic architecture. *Occasional Paper No 125*. Unisa: South African Institute of International Affairs, 1–16.

Goldin, I. 1990. Comparative advantage: Theory and application to developing country agriculture. *OECD Working Paper* 16: 12–17.

Hammouda, HB, Karingi, SN, Njuguna, AE & Jallab, MS. 2010. Growth, productivity and diversification in Africa. *Journal of Productivity Analysis* 33(2): 125–146.

Harkness, I. 1975. Factors influencing US comparative advantage. *Journal of International Economics* 5(May): 153–165.

Hegre, H, Oneal, J & Russett, B. 2010. Trade does promote peace: New simultaneous estimation of the reciprocal effects of trade and conflict. *Journal of Peace Research* 47(6): 763–774.

Hentz, JJ. 2005. South Africa and the political economy of regional cooperation in southern Africa. *The Journal of Modern African Studies* 43(1): 21–51.

Hillman, AL. 1980. Observations on the relation between 'revealed comparative advantage' and comparative advantage as indicated by pre-trade relative prices. *Weltwirtschaftliches Archiv* 116: 315–321.

Kenen, P. 1965. Nature, capital and trade. *Journal of Political Economy* 73: 437–460.

Kowalski, P. 2011. Comparative advantage and trade performance: Policy implications. *OECD Trade Policy Papers* 121(5): 1–54.

Kowalski, P & Cepeda, RH. 2011. Production, consumption and trade developments in the era of globalization. In *Globalization, Comparative advantage and the changing dynamics of trade*. Paris: OECD Publishing.

Krugman, P. 1990. *Rethinking international trade*. Cambridge, Mass: MIT Press.

Leontief, W. 1965. Factor proportions and the structure of American trade. *Review of Economics and Statistics* 38: 37–46.

Liesner, HH. 1958. The European Common Market and British industry. *Economic Journal* 68: 302–316.

Lu, L & Thies, CG. 2010. Trade interdependence and the issues at stake in the onset of militarized conflict. *Conflict Management and Peace Science* 27(4): 347–368.

OECD. n.d. *OECD Trade Policy Papers, No 121*. OECD Publishing. Available at http://dx.doi.org/10.1787/5kg3vwb8g0hl-en (accessed 20 August 2013).

Ricardo, D. 1817. *On the principles of political economy and taxation*. London: John Murray.

Russett, BM & Oneal JR. 2001. *Triangulating peace: Democracy, interdependence, and international organizations*. New York: Norton.

Schumacher, R. 2012. Adam Smith's theory of absolute advantage and the use of doxography in the history of economics. *Erasmus Journal for Philosophy and Economics* 5(2): 54–80.

Shaw, TM, Cooper, AF & Antkiewicz, A. 2007. Global and/or regional development at the start of the 21st century? China, India and (South) Africa. *Third World Quarterly* 28(7): 1255–1270.

Singh, SP. n.d. BRICS and the world order: A beginner's guide, CUTS (Centre for International Trade, Economics and Environment) and Memory Dube (South African Institute of International Affairs). Available at http://cuts-international.org/BRICS-TERN/pdf/BRICS_and_the_World_Order-A_Beginners_Guide.pdf (accessed 4 June 2014).

Smith, A. 1978. [1762]. Early draft of part of the wealth of nations. In RI Meek, DD Raphael & P Stein (eds) *The Glasgow edition of the works and correspondence of Adam Smith*. Oxford: Oxford University Press 5: 562–581.

Subramanian, A & Tamirisa, NT. 2003. Is Africa integrated in the global economy? *Palgrave Macmillan Journals* 50(3): 352–372.

Thakurta, PG. 2006. The sun rises in the East. *India International Centre Quarterly* 33(1): 126–137.

Tran, TA, Diaw, D & Rieber, A. 2012. International demand spill overs in South–South exports: Application to sub-Saharan Africa and developing Asia. *Journal of Economic Integration* 27(3): 410–436.

Vollrath, TL. 1991. A theoretical evaluation of alternative trade intensity measures of revealed comparative advantage. *Weltwirtschaftliches Archiv* 127(2): 265–280.

Weiner, RD, Roxo, T & Kellman, M. 2008. South Africa's manufactured international trade in the post-sanctions epoch: Patterns and potentials. *The American Economist* 52(1): 86–95.

Wood, A & Mayer, J. 2001. Africa's export structure in a comparative perspective. *Cambridge Journal of Economies* 25(3): 369–394.