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INTER-SECTORAL COMPARATIVE AND COMPETITIVE ADVANTAGES OF SOUTH AFRICA

Macleans MZUMARA* and Anna CHINGARANDE*

The authors investigate the inter-sectoral comparative and competitive advantages of South Africa using Balassa technique. South Africa demonstrates significant, comparative and competitive-advantages in chemicals and the allied industries, metals and machinery/electrical sectors. There are comparative and competitive disadvantages in foot wear/head gear sector. This sector is followed by raw hides, skin, leather, and fur sectors. Most of the sectors fall in the middle ranks and there is an evidence of substantial manufacturing in South Africa. It is recommended that South Africa should work on attracting new investment, especially the foreign direct investment to improve those sectors which fall in the middle ranks. It is also recommended that South African channel resources from sectors which lack comparative and competitive advantages to sectors with such advantages, to ensure specialization where South Africa's productive capacities are efficient.

I. Introduction

South African economy is one of the strongest economy in the Southern African Development Community (SADC) region It also leads in the Southern African Customs Union (SACU) and has relatively developed better infrastructure than the most other African countries. A number of studies have been undertaken on South Africa; the notable one includes Mzumara, et al. (2013). The study looks at comparative advantage in SADC member states wherein the South Africa was studied in context to the regional economy. Chingarande and Mzumara (2013) also looked at the comparative advantage of South Africa. Both these studies concentrated on comparative advantages at products level and left out the sectoral analysis. This paper fills the gap left by the two studies. The objective of this study is to investigate the inter-sectoral comparative and competitive advantages of South Africa.

In Section II, literature review and comparative advantage is discussed. Section III presents the methodology, where as section IV provides results. Finally, Section V concludes the paper and give recommendations.

* Department of Economics, Bindura University of Science Education, Bindura, Zimbabwe.

II. Literature Review on Comparative Advantage

In this paper the major theory to review is the theory of comparative advantage. David Ricardo proposed the principle of comparative advantage; but however, before Ricardo introduced this principle of absolute advantage it was already being applied. Initially, this principle was promoted by Adam Smith and accordingly, countries in possession of absolute advantage benefitted only from the international trade. The implication of this principle was such that small countries could not benefit by engaging in trade as the benefit always accrued to big countries. David Ricardo criticized the principle of absolute advantage with a response that 'what is important is comparative advantage'. Therefore, with comparative advantage, even a small country would benefit from exchange as it will have some products in which comparative advantage would exist [Mzumara (2006)]. According to Khatibi (2008) the Ricardian theory attributes comparative advantage to differences in technological advancement in various countries. Further, the Hecksher-Ohlin theory focuses on cost differences based on factor scarcity in each country, as determinant of comparative advantage. Hecksher-Ohlin, the two Swedish economists who wrote at different times independently, in fact, opined on similar views and wrote on it. They did not invalidate the principle of comparative advantage but simply extended this principle [Mzumara (2006)].

The classical theory of comparative advantage focuses on gains obtained from the exchange which increases the welfare. It is further assumed that trade without barriers would make the world economy better and prosperous. In Ricardian theory, 'comparative advantage comes from difference in cost, as well as, advancement in technology'. The Heckscher-Ohlin-Samuelson theory 'attributes factor prices differential as determinant of comparative advantage' and the 'Neo-Factor Proportion' says that 'productivity of factors is determinant to comparative advantage'. The last, but not least technology gap and product cycle theory 'attributes comparative advantage as originating from technological innovations.' Various theories attribute comparative advantage to originate from various sources [Bender and Li (2002)].

Comparative advantage is traced in the ability to produce a given product at a lower marginal and opportunity cost over another product [Baumol and Blinder (2009)]. According to Case and Fair (2002), a nation has comparative advantage in producing a given product, if it is gifted with sufficient input that can be transformed into a product. Differences in factors endowment leads to specialization which occurs when nations begin to concentrate on production of goods in which they have comparative advantage via factors endowment. Therefore, the country will export products which it produces efficiently, to other countries. By doing so, the world economy will expand by engaging in external trade [Mzumara (2006)]. The other relevant concept is the competitive advantage. Sometimes, comparative advantage and competitive advantage are used inter-changeably.

The most used definition of competiveness is the one made by the President's Commission on Industrial Competitiveness. The definition provides a scope on competitiveness of a country. According to the President's Commission on Industrial Competitiveness in 1985 the term competitiveness refers to the extent at which a nation can produce goods and services in a free and fair environment and at the same time, meets standards of the external markets, being able to increase the living standards of its people. The term competitiveness has impact on a country's macroeconomic performance. In particular, innovations and productivity can easily be identified. Such factors depend on investment and capital for building a factory. There is also dependency on institutional factors which are available in a given nation [Durand, et al. (1992)].

According to Porter [(1990), (2009)] the term competitiveness is a product of a country's human capital, physical capital in the form of factories and natural resources. It is further influenced by demand conditions enhanced by the performance of firms and their adopted strategies in response to threats of competitors. Another meaningful definition is provided by Ezeala-Harrison (1999) who defines competitiveness to be the ability of nations' firms to produce goods or provide a service, and their promotion. The products do not deviate from higher standards set in the global markets where goods are also sold at lower prices. Competitiveness focused on performance of the foreign sector is always in conflict with competitiveness based on productivity [Ezeala-Harrison (1995)].

III. Methodology

In this paper, the author applies Balassa (1965) technique which uses the revealed comparative advantage (RCA). According to Wu and Chen (2004) in a dynamic competitive market economy, comparative advantage as shown in export composition is same with comparative advantage based on the nation's factor endowment. It evolves along with economic development. Balassa (1965) technique takes the form of:

$$RCA = \left(\frac{X_{i,j}}{X_{W,j}}\right) \Big/ \left(\frac{X_{i,tot}}{X_{W,tot}}\right)$$

with:
$X_{i,j}$ representing country *i*'s exports of product *j*;
$X_{i,tot}$ representing country *i*'s total exports;
$X_{W,j}$ representing the world's (all countries) export of product *j*; and
$X_{W,tot}$ representing total exports in the world.

An RCA of ≥ 1 shows that the country has revealed comparative advantage, in other words, the country is relatively specialized in producing and exporting the product-line under consideration. An RCA < 1 shows that the country has no revealed comparative advantage and is not specialized in the product-line [Balassa (1965), Krugell and Matthee (2009)]. These measures are applicable to competitive advantage.

Data used in this paper, both South Africa and the world exports was secured from the World Trade Centre's Trademap. For 2008, 2009 and 2010 the data was obtained on a 6-digit level - individual RCAs were also computed for these years. This level was preferred because it is the most disaggregated product classification which is internationally recommended. An average RCA was then computed for each product-line. It is this average that was used to select the product with RCA ≥ 1, and grouped in their respective sectors.

IV. Results and Discussion

Inter-sectoral results of South Africa are reported in Table 1.

TABLE 1

Inter-Sectoral Results of South Africa

Rank	Sector code	Description of Sector	Number of product in the sector with RCA≥1
1	28-38	Chemicals and Allied Industries.	150
2	72-83	Metals.	149
3	84-85	Machinery/Electrical.	96
4	06-15	Vegetable Products.	66
5	25-27	Mineral Products.	52
6	16-24	Food stuffs.	49
7	50-63	Textile.	49
8	01-05	Animal and Animal Products.	43
9	68-71	Stone/Glass.	38
10	44-49	Wood and Wood Products.	30
11	86-89	Transportation.	29
12	90-97	Miscellaneous.	28
13	39-40	Plastic/Rubber.	25
14	41-43	Raw Hides, Skin, Leather and Fur.	19
15	64-67	Foot Wear/Head Gear.	4

Source: From the results.

Column 1 (Table 1) is the rank of sector based on the number of products in the sector with ≥ 1. Column 2 is the sector code derived from the first two digits of the product code. Column 3 is the description of the sector. Column 4 contains the number of products in each sector with RCA ≥ 1.

South Africa has the highest number of product codes in which it has comparative and competitive advantages in chemicals and the allied industries sector. This sector ranks number one in the 15 sector economy. It has 150 product codes in which the country has comparative and competitive advantages. This sector puts the South Africa to have very high comparative and competitive advantages as compared to some other African countries described in other studies, such as, Mzumara, et al. (2013a) in Burundi, the highest was machinery/electrical sector with 42 product codes, Mzumara, et al. (2013b) in Angola, the highest was textile sector with 121 product codes, Mzumara, et al. (2013c) in Malawi, the highest was textile sector with 48 product codes; and, Mushanyuri and Mzumara (2013) in Uganda, the highest was vegetable sector with 75 product codes.

In the second position, is the metal sector with 149 product codes in which South Africa has demonstrated comparative and competitive advantage. In the third position, it is the machinery/electrical sector with 96 product codes in which comparative and competitive advantages have been demonstrated. In the fourth position, is the vegetable products sector with 66 product codes in which comparative and competitive advantages exist. In the fifth place, is the mineral products sector with 52 product codes in which the country has comparative and competitive advantage.

South Africa has comparative and competitive disadvantages in foot-wear/head gear sector. The sector exhibits inability to demonstrate capabilities as they exist in other sectors, such as, chemicals and allied industries and metals. The sector has only 4 product codes in which it has RCA ≥ 1. This makes the sector lack comparative and competitive advantages. The other sector next to this sector with less comparative and competitive advantage is raw hides, skins, leather and fur. It has only 19 product codes in which it has RCA ≥ 1.

Table 2 shows the top 3 product codes in the chemicals and allied industries sector in which the South Africa has comparative and competitive advantages.

TABLE 2

Top 3 Product Codes in the Chemicals and Allied Industries Sector

Rank	Product code	Product description	2008 RCA	2009 RCA	2010 RCA	Average RCA
1	293991	Cocaine, ecqonine, levometamfetamine, metamfetamine.	110.5687	84.89725	84.07054	93.17882
2	320120	Wattle tanning extract.	86.52148	95.55541	93.75252	91.17882
3	370400	Photographic plate, film, paper.	62.86082	64.13078	48.14169	58.37760

Source: From the results.

In the chemicals and allied industries sector (Table 2) cocaine, ecqonine, levometamfetamine, metamfetamine have the highest RCA in this sector with an index of 93. Wattle tanning extract is the second with an index of 91; and, Photographic plate, film, paper are the third with an index of 58. Table 3 shows the top 3 product codes in the metals sector in which the South Africa has comparative and competitive advantages.

Ferro-chromium, > 4 per cent carbon (Table 3) in the metals sector has the highest RCA in this sector with an index of 103. Plates, sheets, strips and foils, nickel but not the alloyed are in the second place with an index of 84; and Ferro-manganese is > 2 per cent carbon in the third place with an index of 78.2. Table 4 shows the top 3 product codes in the machinery/electrical sector in which the South Africa has comparative and competitive advantages.

Filtering or purifying machinery for gases (Table 4) in the machinery/electrical sector has the highest RCA in this sector with an index of 35.7. Bulldozers and angledozers wheeled are in the second place with an index of 11 and Parts for mineral sort, screen, mix, etc., and machines are in the third place with an index of 6.6. Table 5 shows the top 3 product codes in the vegetable products sector in which the South Africa has comparative and competitive advantages.

TABLE 3

Top 3 Product Codes in the Metals Sector

Rank	Product code	Product description	2008 RCA	2009 RCA	2010 RCA	Average RCA
1	720241	Ferro-chromium, > 4% carbon.	95.48695	116.3572	97.16413	103.0028
2	750610	Plates, sheets, strips and foils, nickel, not alloyed.	93.75941	57.76272	100.2124	83.9115
3	720211	Ferro-manganese, > 2% carbon.	71.54378	79.16923	83.73832	78.15045

Source: From the results.

TABLE 4

Top 3 Product Codes in the Machinery/Electrical Sector

Rank	Product code	Product description	2008 RCA	2009 RCA	2010 RCA	Average RCA
1	842139	Filtering or purifying machinery for gases.	44.14091	31.01665	31.90936	35.68897
2	842919	Bulldozers and angledozers, wheeled.	10.0372	13.03808	9.627105	10.90079
3	847490	Parts for mineral sort, screen, mix, etc., machines.	6.432258	6.644635	6.72729	6.601394

Source: From the results.

Apricots, prepared or preserved (Table 5) in the vegetable products sector have the highest RCA in this sector with an index of 35.2. Maize (corn) groats or meal is in the second position with an index, of 25.1 and Oranges fresh or dried are in the third position with an index of 24.4. Table 6 shows the top 3 product codes in mineral products sector in which the South Africa has comparative and competitive advantages.

Niobium, tantalum and vanadium ores (Table 6) in the mineral products sector have the highest RCA in this sector with an index of 107.8. Titanium ores and concentrates are in the second place with an index of 105.7, and Ores and concentrates are in the third place with an index of 105.2. Table 7 shows the top 3 product codes in the foodstuffs sector in which the South Africa has comparative and competitive advantages.

TABLE 5

Top 3 Product Codes in the Vegetable Products

Rank	Product code	Product description	2008 RCA	2009 RCA	2010 RCA	Average RCA
1	120890	Apricots, otherwise prepared or preserved.	30.73907	37.14769	37.69943	35.1954
2	110313	Maize (corn) groats or meal.	21.46729	30.23165	23.6005	25.09966
3	080510	Oranges, fresh or dried.	23.29943	22.7802	27.05917	24.3796

Source: From the results.

TABLE 6

Top 3 Product Codes in the Mineral Products Sector

Rank	Product code	Product description	2008 RCA	2009 RCA	2010 RCA	Average RCA
1	261400	Titanium ores and concentrates.	104.2123	126.3092	86.4459	105.6558
2	261790	Ores and concentrates.	18.12654	153.0822	144.5147	105.2411

Source: From the results.

Apricots, prepared or preserved (Table 7) in foodstuffs sector have the highest RCA in this sector with an index of 35.2. Pears, prepared or preserved are in the second position with an index of 32.8 and Grape fruit juice (excluding of 2009.21) unfermented is in the third place with an index of 26. Table 8 shows the top 3 product codes in the textile sector in which the South Africa has comparative and competitive advantages.

Fine animal hairs, carded/combed other than kashmire (cashmere) goats (Table 8) in the textiles sector has the highest RCA in this sector with an index of 25. Fine

animal hair not carded/combed other than of kashmire (cashmere) goats is in the second position with an index of 17.6 and Greasy shorn wool, not carded or combed is in the third position with an index of 15.2. Table 9 shows the top 3 product codes in the animal and animal products sector in which the South Africa has comparative and competitive advantages.

Live birds (order psittaciformes) including parrots/parakeets/macaws/cockatoos (Table 9) in the animal and animal products sector have the highest RCA in this sector with an index of 78.1. Meat and edible meat offal of whates/dolphins/porpoiseses is in the second position with an index of 54.5 and Ivory unworked or simply prepared, powder and waste is in the third position with an index of 24.4. Table 10 shows the top 3 product codes in the stone/glass sector in which the South Africa has comparative and competitive advantages.

TABLE 7

Top 3 Product Codes in the Foodstuffs Sector

Rank	Product code	Product description	2008 RCA	2009 RCA	2010 RCA	Average RCA
1	200850	Apricots, otherwise prepared or preserved.	30.73907	37.14769	37.69943	35.1954
2	200840	Pears, otherwise prepared or preserved.	29.35476	32.22095	36.89637	2.82403
3	200929	Grape fruit juice (excluding of 2009.21) unfermented.	25.95932	26.92811	24.87126	25.91956

Source: From the results.

TABLE 8

Top 3 Product Codes in the Textile Sector

Rank	Product code	Product description	2008 RCA	2009 RCA	2010 RCA	Average RCA
1	510539	Fine animal hairs, carded/combed, other than kashmire (cashmere) goats.	22.53528	29.56446	22.98388	25.02787
2	510219	Fine animal hairs, not carded/combed, other than kashmire (cashmere) goats.	23.58871	13.39135	15.90359	17.62788
3	510111	Greasy shorn wool, not carded or combed.	13.49975	18.73419	13.33497	15.18964

Source: From the results.

Rhodium in the semi-manufactured forms (table 10) in the stone/glass sector has the highest RCA in this sector with an index of 203. Platinum semi-manufactured form is in the second position with an index of 120.3 and Rhodium unwrought or in powder form is in the third position with an index of 72. Table 11 shows the top 3 product codes in the wood and wood products sector in which the South Africa has comparative and competitive advantages.

Chemical wood-pulp, dissolving grades (Table 11) in wood and wood products sector has the highest RCA in this sector with an index of 42.9. Wood in chips non-coniferous is in the second position with an index of 23.7 and Paper, kraftliner, other than unbleached, uncoated is in the third position with an index of 22.2. Table 12 shows the top 3 product codes in the transportation sector in which the South Africa has comparative and competitive advantages.

TABLE 9

Top 3 Product Codes in the Animal and Animal Products Sector

Rank	Product code	Product description	2008 RCA	2009 RCA	2010 RCA	Average RCA
1	010632	Live birds (order psittaciformes) including parrots/ parakeets/macaws/ cockatoos.	67.231450	96.61131	70.44619	78.09632
2	021082	Meat and edible meat offal of whates/dolphins /porpoiseses.	0.000000	163.36010	0.0	54.45338
3	050710	Ivory, unworked or simply prepared, powder and waste.	1.792667	70.55980	0.940069	24.43085

Source: From the results.

TABLE 10

Top 3 Product Codes in the Stone/Glass Sector

Rank	Product code	Product description	2008 RCA	2009 RCA	2010 RCA	Average RCA
1	711039	Rhodium in semi-manufactured form.	203.0357	214.0747	192.8537	203.3214
2	711019	Platinum semi-manufactured form.	113.8857	120.1697	126.7232	120.2595
3	711031	Rhodium unwrought or in powder form.	59.68504	84.9906	71.13765	71.94058

Source: From the results.

Buses, except diesel powered (Table 12) in the transportation sector have the highest RCA in this sector with an index of 15.3. Mufflers and exhaust pipes for motor vehicles are in the second position with an index of 7.2 and Sail boats, with or without auxiliary motor are in the third place with an index of 7.2. Table 13 shows the top 3 product codes in the miscellaneous sector in which the South Africa has comparative and competitive advantages.

Electro-cardiographs (Table 13) in the miscellaneous sector have the highest RCA in this sector with an index of 7.1 and electricity supply production and calibrating meters are in the second position with an index of 6.2. Collections and collectors pieces are in the third position with an index of 5.2. Table 14 shows the top 3 product codes in plastic/rubber sector in which the South Africa has comparative and competitive advantages.

Conveyor belt (Table 14) in plastic/rubber sector has the highest RCA in this sector with an index of 10.6. Balata, gutta-percha, guayule chiclead similar gums are in the second position with an index of 6.3 and Polypropylene in the primary forms is in the third position with an index of 3.1. Table 15 shows the top 3 product codes in the raw hides, skins, leather and fur sector in which the South Africa has comparative and competitive advantages.

TABLE 11

Top 3 Product Codes in the Wood and Wood Products Sector

Rank	Product code	Product description	2008 RCA	2009 RCA	2010 RCA	Average RCA
1	470200	Chemicals, wood pulp, dissolving grades.	39.75345	42.80666	46.11747	42.89253
2	440122	Wood in chips non-coniferous.	29.03971	23.30428	18.69250	23.67883
3	480419	Paper, kraftliner, other than unbleached, uncoated.	19.24997	24.67708	22.73977	22.22221

Source: From the results.

TABLE 12

Top 3 Product Codes in the Transportation Sector

Rank	Product code	Product description	2008 RCA	2009 RCA	2010 RCA	Average RCA
1	870290	Buses, except diesel powered,	8.404869	27.0942	10.45439	15.31782
2	870892	Mufflers and exhaust pipes for motor vehicles.	7.39747	6.628162	7.511892	7.179175
3	890391	Sail boats, with or without auxiliary motor.	6.039532	7.400429	8.064193	7.168051

Source: From the results.

TABLE 13

Top 3 Product Codes in the Miscellaneous Sector

Rank	Product code	Product description	2008 RCA	2009 RCA	2010 RCA	Average RCA
1	901811	Electro-cardiographs.	0.068942	21.0954	0.086845	7.083729
2	902830	Electricity supply, production and calibrating meters.	5.696738	5.389363	7.467016	6.184372
3	970500	Collections and collectors pieces.	4.56963	6.516112	4.409042	5.164928

Source: From the results.

TABLE 14

Top 3 Product Codes in the Plastic/Rubber Sector

Rank	Product code	Product description	2008 RCA	2009 RCA	2010 RCA	Average RCA
1	401019	Conveyor belts.	7.17982	11.35077	13.26505	10.59855
2	400130	Balata, gutta-percha, guayule chiclead similar gums.	7.877707	4.104881	6.883258	6.288615
3	390210	Polypropylene I primary form.	3.314349	3.82254	2.963588	3.120063

Source: From the results.

TABLE 15

Top 3 Product Codes in the Raw Hides, Skins, Leather and Furs Sector

Rank	Product code	Product description	2008 RCA	2009 RCA	2010 RCA	Average RCA
1	411390	Leather, further prepared after tanning/crusting including parchment-dressed leather.	26.03538	29.8187	23.85145	26.56851
2	410221	Sheep or lambs skin, pickled without wool.	22.04912	29.67907	26.03594	25.92138
3	410221	Raw hides/skin except bovine/equine/ sheep/goats.	16.42841	15.82734	16.34752	16.20109

Source: From the results.

Leather, prepared after tanning/crusting, including parchment-dressed leather (Table 15) in the raw hides, skin, leather and fur sector has the highest RCA in this sector with an index of 26.6. Sheep or lambs skin, pickled without wool are in the second position with an index of 26 and Raw hides/skin except bovine/equine/sheep /goats are in the third position with an index of 16.2. Table 16 shows the top 3 product codes in foot wear/head gear sector in which the South Africa has comparative and competitive advantages.

Birds skin and feathers, and articles there from (Table 16) the foot-wear/head gear sector has a highest RCA in this sector with an index of 7.62 and water proof foot wears (wellington, etc.,) metal toe is in the second position with an index of 3.5. Water proof foot wear (wellington) no toe cap is in the third position with an index of 1.1.

The composition of the products in South Africa shows the high level of manufacturing products in which it has comparative and competitive advantage. Of all the product codes, Rhodium in semi-manufactured forms has the highest RCA with an index of 203.

TABLE 16

Top 3 Product Codes in the Foot Wear/ Head Gear Sector

Rank	Product code	Product description	2008 RCA	2009 RCA	2010 RCA	Average RCA
1	670100	Birds skin and feathers articles there-from.	7.73311	6.603178	8.533525	7.623271
2	640110	Water proof foot-wears (wellington, etc.,) metal-toe up.	2.991526	3.763804	3.754009	3.503113
3	640199	Water proof foot-wears (wellington) no toe cap. sheep/goats.	1.034548	1.127465	1.046448	1.069487

Source: From the results.

V. Conclusion and Recommendations

South Africa demonstrates significant comparative and competitive advantages in chemicals and the allied industries, metals and machinery/electrical sector. There is a comparative and competitive disadvantage in foot wear/head gear sector. This sector is followed by raw hides, skin, leather and fur sector. Majority of the sectors, fall in the middle ranks. There is an evidence of substantial manufacturing in the South Africa.

It is recommended that South Africa should work on attracting new investment, especially the foreign direct investment to improve the sectors which fall in the

middle ranks. It is also recommended that South Africa channels resources from the sectors which lack comparative and competitive advantages to ensure specialization to occur where South Africa's productive capacities are efficient.

Bindura University of Science Education,
Bindura, Zimbabwe.

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