



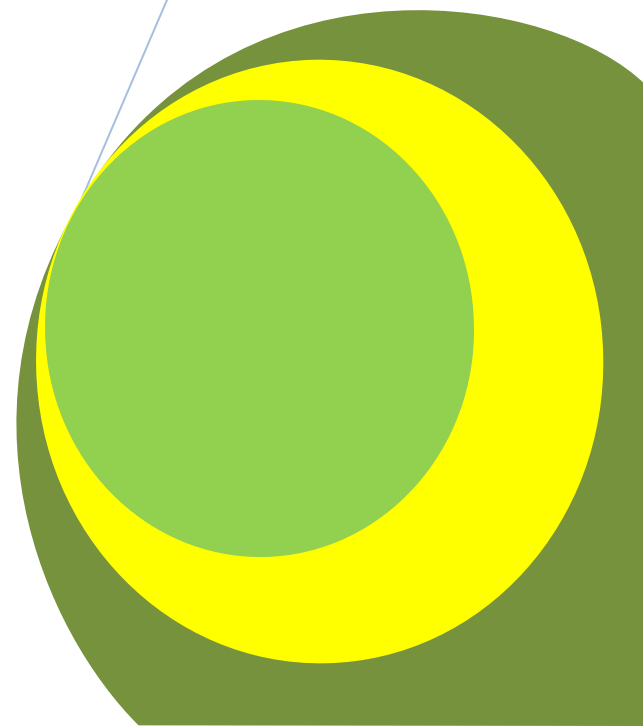
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## **An Investigation of Sectoral Comparative Advantage of Botswana**

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*Research Article*

# An Investigation of Sectoral Comparative Advantage of Botswana

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**ABSTRACT**

The paper investigated sectoral comparative advantage of Botswana. Machinery/electric sector tops inter-sectoral comparative advantage in Botswana. It is followed by the textiles sector. The least in terms of comparative advantage is foot wear/head gear sector then followed by raw hides, skins leather and furs sector. The sector which tops in Botswana in comparative advantage, is not necessarily the one that tops in export value. Diamonds which dominate Botswana's exports fall in the stone/glass sector and the sector possess less comparative advantage than other sectors ahead of it. It is recommended that Botswana should be promoting other products also other than diamonds in the international markets. That Botswana enacts a focused export promotion strategy on sectors which possess comparative advantage. Botswana should continue providing enabling environment that can lead to inflow of foreign direct investment through transnational corporations with technology that can improve sectoral comparative advantage.

**Keywords:** Sectoral comparative advantage, international trade, exports, Botswana.

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**INTRODUCTION**

Various studies have focused on comparative advantage through products. The emphasis has been to identify products which have revealed comparative advantage. Such studies fall short on influencing broader policy intervention at sectoral level. This paper investigates sectoral comparative advantage of Botswana.

The starting point here is the principle of comparative advantage. The principle of comparative advantage as Samuelson puts it is the most accurate thesis in the social sciences with both the truth and without being so trivial. It is the fundamental premises which rise specialization and benefits from international trade. It is seen as a positive theory which is able to show the direction of trade as well as predicting the terms of trade. In fact Ricardo developed the principle of comparative advantage through factor endowment and narrated as to why Portugal was able to export wine while Britain exported cloth (Goldin, 1990). The classical theory of comparative advantage forecasts that benefits from international trade optimizes welfare and that trade without restrictions brings in global prosperity (Bender & Li, 2002).

According to Mzumara (2006) goes further to link the principle of comparative advantage with the extension made by the two Swedish economists Heckscher-Ohlin. The two economists talk of international differences in the costs of the endowments. They propagate that a country with abundant endowments will use such endowments most intensively and produce goods which it is able to export. Then a country will import goods which use its less abundant endowments less intensively. The resultant effect of such a move is specialization. A country will specialize in the products produced by its abundant endowments and leave for other countries to specialize in the products in which it demonstrates a clear inefficiency. The Hecksher-Ohlin extension of the principle of comparative advantage emphasizes that the determinant of comparative advantage arise from factor endowment (Widgren (2005). Khatibi (2008) however, attribute to relative scarcity would determine comparative disadvantage.

According to Lin and Chang (2009) the role of a country is to ensure that it is promoting its firms, industries and sectors to effectively use the nation's current comparative advantage. In developing countries, it therefore refers to focusing on labour and production which use resources more intensively and enables developing nation's firms to be competitive on the local market as well as the global market. The government puts in enabling environment

without restrictions of operations of the firms and industries and enables them withstand externalities and it enables them through the principle of comparative advantage.

## METHODOLOGY

The methodology used in this paper is Balassa (1965) revealed comparative advantage (RCA) index. The fundamental logic for using RCA is to assess comparative advantage based on a nation's specialization in exports as compared to some other nations. The Balassa (1965) index remains the most popular and most commonly used RCA index. Most of the studies have used it to empirically identify a nation's strongest industries (Serin & Civan, 2008). The Balassa technique takes the form:

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

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  $RCA \geq 1$  demonstrates that the country has revealed comparative advantage. In other words, the exporting country of the product is relatively specialized in producing and exporting the product line under consideration. An  $RCA \leq 1$  demonstrates that the country has a lower revealed comparative advantage and is not specialized in the product line (Balassa, 1965; Krugell & Matthee, 2009).

Export data for Botswana and the world export data for 2008, 2009 and 2010 was obtained from International Trade Center (ITC) in Geneva, Switzerland. The data is on 6 digit level the most disaggregated international classification of products.

## RESULTS AND DISCUSSION

Sectoral results are reported in table 1.

**Table 1: Sectors with comparative advantage**

Rank	Sector code	Sector description	Number of products with $RCA \geq 1$
1	84-85	Machinery/electric	92
2	50-63	Textiles	77
3	72-83	Metals	35
4	68-71	Stone/glass	24
5	16-24	Foodstuffs	20
5	28-38	Chemicals and allied industries	20
6	90-97	Miscellaneous	18
7	06-15	Vegetable products	16
8	25-27	Minerals products	14
8	44-49	Wood and wood products	14
9	86-89	Transportation	13
10	01-05	Animal and animal products	11
11	39-40	Plastics/rubber	9
12	41-43	Raw hides, skins leather and furs	8
13	64-67	Foot wear/head gear	6

Source: From results.

In table 1, the first column is the rank of each sector in terms of comparative advantage. The second column is sectoral code. The first two digits of 6-digit product code represent the sector in which the product falls. The third column is description of the sector. The fourth column is the number of products in each sector with comparative advantage. The sector which ranks the highest in comparative advantage is machinery/electric with 92 products with comparative advantage. It is followed by textiles sector with 77 products with comparative advantage. In the third place is metals sector with 35 products with comparative advantage. In the fourth place is stone/glass sector with 24 products with comparative advantage. In the fifth place there are two sectors namely foodstuffs and chemicals and allied industries with 20 products each with comparative advantage. In the sixth place is miscellaneous sector with 18 products with comparative advantage. In the seventh place is the vegetable products with 16 products. In the eighth place are two sectors namely mineral products and wood and wood products with each 14 products with comparative advantage. In the ninth place is transportation sector with 13 products with comparative advantage. In the tenth position is animal and animal products with 11 products with comparative advantage. In the eleventh place is plastic/rubber with 9 products with comparative advantage. The sector which possesses the least comparative advantage is foot wear/head gear with only 6 products which have comparative advantage. It is followed by raw hides skins leather and furs with 8 products with comparative advantage. According to the principles of comparative advantage, it will be well for Botswana to give up the two sectors and channel its resources to the sectors in which there is significant specialization in this case, sectors with the highest numbers of products which possess comparative advantage. If all countries concentrate with the sectors in which they have comparative advantage and import products in which they have comparative disadvantage, the prosperity of the world economy would improve. Table 2 shows top 5 products in the machinery/electric sector in which Botswana has comparative advantage.

**Table 2: Top 5 products in the machinery/electric sector in which Botswana has comparative advantage**

Rank	Product code	Product description	2008 RCA	2009 RCA	2010 RCA	Average RCA
1	850920	Domestic floor polishers	368.9226	3240.721	1849.236	1819.627
2	846912	Automatic typewriters	16.78374	2851.834	1659.571	1509.396
3	851929	Record players with loud speakers	1.695119	2495.353	1369.805	1288.952
4	852010	Dictating machine requiring external power source	0	0	3082.061	1027.354
5	852020	Telephone answering machines	2.145611	127.314	2054.707	728.0556

Source: From the results.

In table 2, domestic floor polishers in the machinery/electrical sector have the highest RCA index in this sector of 1819.6. They are followed by automatic typewriters with an RCA index of 1509.4. In the third place are record players with loud speakers with an RCA of 1289. In the fourth place is dictating machine requiring external power source with an RCA of 1027.4. In the fifth place are telephone answering machines with an RCA index of 728.

Table 3 shows top 5 products in the textiles sector in which Botswana has comparative advantage.

**Table 3: Top 5 products in the textiles sector in which Botswana has comparative advantage**

Rank	Product code	Product description	2008 RCA	2009 RCA	2010 RCA	Average RCA
1	610319	Men's, boys' suits, of material knit	7.822687	309.0507	1361.553	559.4754
2	560420	Hi-ten man made yarn rubber, plastic coated impregnated	0	1148.843	0	382.9478
3	610312	Men's, boys' suits synthetic fibre	0	1056.235	0	352.0783
4	521129	Woven cotton <85% +man made fibre >200g	0	712.9586	0	237.6529
5	550310	Staple fibres of nylon, polyamides, not carded, combed	0	0	225.5166	75.1722

Source: From the results.

In table 3, men's, boys' suits, of material knit in the textiles sector have the highest RCA index in this sector of 559. They are followed by hi-ten man made yarn rubber, plastic coated impregnated with an RCA index of 383. In the third place is men's, boys' suits synthetic fibre with an index of 352. In the fourth place is woven cotton <85% +man made fibre >200g with an RCA of 237.7. In the fifth place is staple fibres of nylon, polyamides, not carded, combed with an RCA index of 75.2. Table 4 shows top 5 products in the metals sector in which Botswana has comparative advantage.

**Table 4 shows top 5 products in the metals sector in which Botswana has comparative advantage.**

Rank	Product code	Product description	2008 RCA	2009 RCA	2010 RCA	Average RCA
1	722694	Flat plated with zinc	0	3564.793	0	1188.264
2	740120	Cement copper (precipitated copper)	7.714049	0	3082.61	1029.925
3	800500	Tin foil, tin powder	0	0	3082.061	1027.354
4	740110	Copper mattes	2284.919	296.0057	0	860.3084
5	720120	Pig iron, non alloy, >0.5% phosphorous	0	1792.89	7.978871	600.2896

Source: From the results.

In table 4, flat plated with zinc in the metals has the highest index in this sector in comparative advantage. It has an RCA index of 1188.3. It is followed by cement copper (precipitated copper) with an index of 1030. In the third place is tin foil, tin powder with an index of 860. In the fifth place is pig iron, non alloy, >0.5% phosphorous with an index of 600.3. Table 5 shows top 5 products in the stone/glass sector in which Botswana has comparative advantage.

**Table 5 shows top 5 products in the stone/glass sector in which Botswana has comparative advantage**

Rank	Product code	Product description	2008 RCA	2009 RCA	2010 RCA	Average RCA
1	711290	Waste scrap, previous metals except pure gold	3298.248	0	0	1099.416
2	701331	Lead crystal table, kitchen glass (not drinking glass)	1.564557	1492.239	560.3747	684.7261
3	681250	Asbestos clothing, accessories, foot and head gear	105.1489	548.4297	513.6768	648.7261
4	710231	Diamonds (jewellery) unworked or simply sawn cleaved	284.756	319.1888	283.586	295.8436
5	710221	Diamonds, industrial, unworked or simply sawn cleave	88.09418	52.67728	241.5236	127.4317

Source: From the results.

In table 5, waste scrap, previous metals except pure gold in the stone/glass sector has the highest index in this sector of 1099. It is followed by lead crystal table, kitchen glass (not drinking glass) with an RCA index of 685. In the third place is asbestos clothing, accessories, foot and head gear with an index of 649. In the fourth place are diamonds (jewellery) unworked or simply sawn cleaved with RCA index 296. In the fifth place is diamonds, industrial, unworked or simply sawn cleave with RCA index of 127. This sector houses the lifeline of Botswana yet the sector ranks number four in terms of comparative advantage. The diamonds contribute 70% of Botswana's export earnings, contribute 30% to GDP and are the source of 50% of government revenue (Mbendi, 2011; Mzumara, 2012). This means that the sectors which are ahead of this sector such as machinery/electric, textiles, metals have products with lower export values than diamonds. The diamonds have higher values despite the sector coming fourth in comparative advantage it ranks the highest in export value signifying Botswana's overreliance on diamonds. Table 6 shows top 5 products in the foodstuffs sector in which Botswana has comparative advantage.

**Table 6: Top 5 products in the foodstuffs sector in which Botswana has comparative advantage**

Rank	Product code	Product description	2008 RCA	2009 RCA	2010 RCA	Average RCA
1	200960	Grape juice or must not be fermented or spirited	230.5766	0	0	76.85887
2	170410	Chewing gum containing sugar except medicinal	36.31284	56.09146	76.09405	56.16612
3	230230	Wheat bran, sharps, other residues	14.59994	9.019965	1.846768	8.488892
4	200930	Citrus juice not fermented	21.76229	0	0	7.254095
5	230210	Maize bran, sharps, other residues	4.944721	5.290255	1.34712	3.860699

Source: From the results.

In table 6, grape juice or must not be fermented or spirited has the highest RCA index in this sector of 76.9. This is followed by chewing gum containing sugar except medicinal with RCA index of 56.2. In the third place is wheat bran, sharps, other residues with RCA index of 8.5. In the fourth place is citrus juice not fermented with RCA index of 7.3. In the fifth place is maize bran, sharps, other residues with RCA index of 3.9. Table 7 shows top 5 products in the foodstuffs sector in which Botswana has comparative advantage.

**Table 7: Top 5 products in the chemicals and allied industries sector in which Botswana has comparative advantage**

Rank	Product code	Product description	2008 RCA	2009 RCA	2010 RCA	Average RCA
1	283620	Disodium carbonate	19.47765	49.06457	102.7599	57.10069
2	360200	Prepared explosives, except propellant powder	13.36154	14.89518	10.22603	12.82758
3	300320	Antibiotic formulated in bulk	19.80347	1.659117	0	7.154196
4	310410	Carnallite, sylvite, crude potassium salts	0	20.37025	0	6.790082
5	282540	Nickel oxides and hydroxides	0	11.80475	0	3.934917

Source: From the results.

In table 7, disodium carbonate in the chemical and allied industries sector has the highest RCA in this sector with an index of 57. It is followed by prepared explosives, except propellant powder with an RCA of 13. In the third place is antibiotic formulated in bulk with an RCA index of 7.2. In the fourth place is carnallite, sylvite, crude potassium salts with RCA index of 6.8. In the fifth place is nickel oxides and hydroxides with RCA index of 4. Table 8 shows top 3 products in the miscellaneous sector in which Botswana has comparative advantage.

**Table 8 shows top 3 products in the miscellaneous sector in which Botswana has comparative advantage**

Rank	Product code	Product description	2008 RCA	2009 RCA	2010 RCA	Average RCA
1	900930	Thermo-copying apparatus	0	3145.406	440.2944	1195.233
2	901042	Step and repeat aligners	1.686558	3564.793	0	1188.827
3	930610	Cartridges for rivet etc tools, humane killers	4.075849	0	3082.061	1028.712

Source: From the results.

In table 8, thermo-copying apparatus in the miscellaneous sector has the highest RCA in this sector with an index of 1195. It is followed by step and repeat aligners with an RCA of 1189. In the third place are cartridges for rivet etc tools, humane killers with an RCA of 1029. Table 9 shows top 3 products in the vegetable products sector in which Botswana has comparative advantage.

**Table 9: Top 3 products in the vegetable products sector in which Botswana has comparative advantage**

Rank	Product code	Product description	2008 RCA	2009 RCA	2010 RCA	Average RCA
1	110313	Maize (corn) groats or meal	1.113037	28.43984	70.43783	33.33024
2	150300	Lard sterarin, oleostearin and oil, natural tallow oil	5.652801	26.71532	43.32962	25.23258
3	110510	Potato flour or meal	1.244564	56.49179	17.13898	24.95844

Source: From the results.

In table 9, maize (corn) groats or meal in the vegetable sector has the highest RCA in this sector with an index of 33. It is followed by lard sterarin, oleostearin and oil, natural tallow oil with an index of 25. In the third place is potato flour or meal with RCA index of 24.96. Table 10 shows top 3 products in the minerals products sector in which Botswana has comparative advantage.



**Table 10: Top 3 products in the minerals products sector in which Botswana has comparative advantage**

Rank	Product code	Product description	2008 RCA	2009 RCA	2010 RCA	Average RCA
1	262100	Slag and ash including sea weed	12912.29	0	0	4304.097
2	260400	Nickel ores and concentrates	64.76517	24.0579	99.05535	62.62614
3	250100	Salt (sodium chloride) including solution	31.37854	28.98105	24.33014	28.22991

Source: From the results.

In table 10, slag and ash including sea weed in the minerals products sector has the highest RCA in this sector with an index of 4304.1. It is followed by nickel ores and concentrates with an index of 63. In the third place is salt (sodium chloride) including solution with an RCA index of 28. Table 11 shows top 3 products in the wood and wood products sector in which Botswana has comparative advantage.

**Table 11 shows top 3 products in the wood and wood products sector in which Botswana has comparative advantage**

Rank	Product code	Product description	2008 RCA	2009 RCA	2010 RCA	Average RCA
1	441293	Panels, 1 layer part	25.41789	3564.793	1408.942	1666.384
2	441223	Panels, 1 layer of particles	0	3564.793	0	1188.264
3	441029	Oriented strand board and wafer board of wood (excluding of 4410.21)	0	0	1027.354	342.4512

Source: From the results.

In table 11, panels, 1 layer part in the wood and wood products sector has the highest RCA in this sector with an index of 1666. It is followed by panels, 1 layer of particles with an index of 1188.3. In the third place is oriented strand board and wafer board of wood (excluding of 4410.21) with an index of 342.5. Table 12 shows top 3 products in the transportation sector in which Botswana has comparative advantage.

**Table 12 shows top 3 products in the transportation sector in which Botswana has comparative advantage**

Rank	Product code	Product description	2008 RCA	2009 RCA	2010 RCA	Average RCA
1	870860	Non-driving axles/parts for motor vehicles	24.59869	15.26678	61.60388	33.82312
2	870520	Mobile drilling derricks	13.38125	46.6	31.39588	30.45904
3	870831	Mounted brake linings for motor vehicles	5.2627	28.10191	22.09004	18.48488

Source: From the results

In table 12, non-driving axles/parts for motor vehicles in the transportation sector have the highest RCA in this sector with an index of 34. They are followed by mobile drilling derricks with an index of 30.5. In the third place are mounted brake linings for motor vehicles with an index of 18.5. Table 13 shows top 3 products in the animal and animal products sector in which Botswana has comparative advantage.

**Table 13 shows top 3 products in the animal and animal products sector in which Botswana has comparative advantage**

Rank	Product code	Product description	2008 RCA	2009 RCA	2010 RCA	Average RCA
1	021090	Meat and edible meat offal cured flows, meals	8850.594	0	0	2950.198
2	050710	Ivory, unworked or simply prepared, powder and waste	3572.184	0	0	1191.324
3	050900	Sponges, natural, of animal origin	0	156.3506	0	52.11686

Source: From the results.

In table 13, meat and edible meat offal cured flows, meals in the animal and animal products sector has the highest RCA in this sector with an index of 2950.2. It is followed by ivory, unworked or simply prepared, powder and waste with an RCA index of 1191. In the third place is sponges, natural, of animal origin with an index of 52. Table 14 shows top 3 products in the plastics/rubber sector in which Botswana has comparative advantage.

**Table 14 shows top 3 products in the plastics/rubber sector in which Botswana has comparative advantage**

Rank	Product code	Product description	2008 RCA	2009 RCA	2010 RCA	Average RCA
1	391721	Tube, pipe or hose, rigid, of polyethylene	9.525909	16.95259	15.1803	13.88626
2	401013	Conveyor belt plastic	0	32.37043	0	10.79014
3	401210	Retreads tyres	23.91165	0	0	7.970549

Source: From the results.

In table 14, tube, pipe or hose, rigid, of polyethylene have the highest RCA in the plastic/rubber sector with an index of 13.9. They are followed by conveyor belt plastic with an index of 10.8. In the third place are retreads tyres with an index of 8. Table 15 shows top 3 products in the raw hides, skins leather and fur sector in which Botswana has comparative advantage.

**Table 15: shows top 3 products in the raw hides, skins leather and fur sector in which Botswana has comparative advantage**

Rank	Product code	Product description	2008 RCA	2009 RCA	2010 RCA	Average RCA
1	410110	Bovine skins, whole, raw	34500.02	0	0	11500.01
2	410439	Bovine and equine leather	246.9389	0	0	82.31297
3	420400	Articles of leather and composition for technical uses	154.2019	0	0	51.40063

Source: From the results.

In table 15, bovine skins, whole, raw in the raw hides, skins leather and furs sector has the highest RCA in this sector with an index of 11500. It is followed by bovine and equine leather with an index of 82. In the third place are articles of leather and composition for technical uses with an index of 51. Table 16 shows top 3 products in the foot wear/head gear sector in which Botswana has comparative advantage.

**Table 16 shows top 3 products in the foot wear/head gear sector in which Botswana has comparative advantage**

Rank	Product code	Product description	2008 RCA	2009 RCA	2010 RCA	Average RCA
1	660310	Handles, knobs for umbrellas, walking sticks	22.12692	132.8494	276.0054	143.6606
2	650300	Felt hats and other felt head gear	13.9467	17.32053	14.54156	15.226959
3	650692	Head gear of fur skin	0	45.12396	0	15.04132

Source: From the results.

In table 16, handles, knobs for umbrellas, walking sticks in foot wear/head gear sector have the highest RCA index in this sector with an index of 143.7. It is followed by felt hats and other felt head gear with an index of 15.2. In the third place is head gear of fur skin with an index of 15.

## CONCLUSIONS AND RECOMMENDATIONS

Machinery/electric sector tops inter-sectoral comparative advantage in Botswana. It is followed by the textiles sector. The least in terms of comparative advantage is foot wear/head gear sector then followed by raw hides, skins leather and furs sector. The sector which tops in Botswana in comparative advantage, is not necessarily the one that tops in export value. Diamonds which dominate Botswana's exports fall in the stone/glass sector and the sector possess less comparative advantage than other sectors ahead of it. It is recommended that Botswana should be promoting

other products also other than diamonds in the international markets. That Botswana enacts a focused export promotion strategy on sectors which possess comparative advantage. Botswana should continue providing enabling environment that can lead to inflow of foreign direct investment through transnational corporations with technology that can improve sectoral comparative advantage.

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