Botswana's revealed comparative advantage

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Abstract

Analysis of Botswana's competitiveness in world trade has been presented based on indices of revealed comparative advantage (RCA) calculated for the period 1999 and 2004. Results show that Botswana has RCA in diamonds, copper matte, and meat of bovine animals, among other products. Changes in values of RCA over time reinforce the dynamic nature of comparative advantage. The study established that the country gained comparative specialization in the following products: sugar products; copper ores and concentrates, in which it previously had comparative disadvantage. On the downward side, the country lost specialization in products such as coal gas and water gas.

1.1 INTRODUCTION

Observations of the trade pattern between countries have been used as a method to infer in what industries or commodities a country has comparative advantage. The method used for this inference is the "revealed comparative advantage" (RCA), which was pioneered by Bella Balassa (1965). The approach emanated from difficulties in measuring an industry's actual comparative advantage in production and trade. Specifically, given the difficulties in (i) accounting for all the factors, which influence an industry's comparative advantage, and (ii) actually measuring and comparing these factors between countries and industries, Balassa argued that the revealed performance of an industry's trade pattern would serve as a reasonably adequate indicator of that industry's comparative advantage (Hamilton and Svensson, 1984).

The Classical theory of comparative advantage predicted that gains from exchange maximize welfare and free trade would lead to world economic prosperity. Following Balassa (1965, 1977, 1979), a country's relative export performance in individual product categories has been taken to reflect its 'revealed' comparative advantage. Technically, the doctrine of RCA argues that if a country's share in world exports of a particular good is greater than its overall share in total world exports, then the country has a revealed comparative advantage in exporting that good. In other words, RCA says if a country can produce a good at a lower relative cost than other countries, then with international trade, that country should devote more of its scare resources to the production of the good. Through trade, that country can obtain other goods at a lower price (opportunity cost), in exchange for the good in which it has a comparative advantage.

Openness to trade has been one of the factors that facilitated Botswana's impressive economic growth since the country's independence in 1966. The country's major exports at aggregate level include diamonds, animal products, copper products and soda ash. In the light of an increasingly competitive international environment, it is useful to examine where Botswana's comparative advantage lies. This paper therefore seeks to empirically 'reveal' or determine Botswana's comparative advantage by using international trade data

to compare exports in particular industries with the rest of the world. According to the predictions of RCA, if a country has a comparative advantage in the production of a good, it should be found to export a higher proportion of that good relative to other countries.

1.2 Objectives

Following the brief background presented above, the paper makes an attempt to:

i. Analyze the pattern of comparative advantage for Botswana in the global market.
ii. Investigate whether the pattern of comparative advantage has undergone a structural shift between 1999 and 2004 for Botswana.
iii. Coming up with relevant policy recommendations drawing from the (above) other objectives.

The outline of this chapter is as follows. Section 2 provides literature review on the subject matter, while the following section presents the research methodology. Analysis of the RCA results is done in section 4, with the last section concluded the chapter.

2 LITERATURE REVIEW

2.1 Theoretical framework

According to Adam Smith (1776), trade between two nations (producing two goods) is based on absolute advantage. When one nation is more efficient than (or has an absolute advantage over) another in the production of one of the commodity but less efficient in producing a second commodity, then both nations can gain by each specializing in the production of the commodity of its absolute advantage and exchanging part of its output with the other nation for the commodity of its absolute disadvantage.

David Ricardo's theory of comparative advantage theory states that a country will produce and export products that use the lowest amount of labour time relative to foreign countries and import those products that have highest amount of labour time in production relative to foreign countries. Furthermore, only relative amounts of labour time matters

2.2 Empirical review

Comparative advantages enjoyed by India and China in the global market, individually and in a comparative framework were investigated by Batra and Khan (2005). The overall results of the analysis revealed that the pattern of comparative advantage varied at different levels of commodity desegregations. For instance, sectors that rank among the top ten according to the value of the index of RCA at HS4-digit level of desegregations were not necessarily able to retain their position when ranked according to comparative advantage at the HS6-digit constituent commodity level. In the case of India, other than cotton, no other sector that ranked among the top ten according to the value of RCA index at the HS4-digit retained its world comparative ranking at the dis-aggregated level. For China, other made textiles, sets, worn clothing were so positioned. Conversely, there were also some sectors where either of the two countries could have been disadvantageously placed at the aggregate (HS4-digit) level but would enjoy comparative advantage at the constituent (HS6-digit) commodity level.

The predictive powers of RCA were empirical investigated by Barry and Hannan (2001). The main objectives of the study were to identify a serious flaw in the RCA methodology as well as to confirm the accurate predictive powers of the methodology under certain country-specific conditions. The study tested the predictions of the revealed-comparative-advantage methodology on the 10 manufacturing sectors into which pre-EU-accession and post-EU-accession Irish data were classified. Through calculations of RCA index, the paper successfully showed that reliance on RCA for future trade would have failed completely to predict post-EU-accession changes in Ireland's sectoral structure and in sectoral export performance. The study argued that the post-EU developments were

instead driven by the country's success in attracting foreign direct investment (FDI), and the sectoral destinations of these greenfield FDI inflows were unrelated to measures of the country's pre-accession RCA. On the other hand, the research showed however that the methodology was reasonably accurate as a predictor of developments in indigenous (i.e. domestically-owned) industry in Ireland.

Based on the arguments in Balassa's 'stages of comparative advantage thesis', the Bender and Li (2002) paper studied the performance of manufactured exports in a number of Asian and Latin American economies over the period 1981-1997 and examined the revealed comparative advantage indices of economies from East Asia, Southeast Asia and Latin America. They argued that whilst RCA indices do not distinguish between the factor endowments effects from the trade policy effect, RCA measures nevertheless provide an indication on the movement in a region's comparative advantage. The paper's empirical evidence concluded that, despite the strong export performance experienced by East Asian economies, these economies were also losing their comparative advantage to the lower-tier economies in Southeast Asia and Latin America.

Fertő and Hubbard (2002) employed both Balassa (1965) RCA indices and Vollrath (1991)'s three alternative specifications of revealed comparative advantage, in their attempt to analyze the competitiveness of Hungary's agri-food revealed comparative advantage for the period 1992 to 1998. The study results showed that all the four indices (one from Balassa and three form Vollrath) indicated that Hungary had revealed comparative advantages for eleven of the 22 aggregated product groups: live animals; meat; cereals; vegetables and fruit; sugar; beverages; oilseeds; cork and wood; and animal and vegetable materials, oils and fats. The study also noted that its results complemented previous studies on the same country, which, using price and cost based methods, had found the nation's arable production to be internationally competitive.

3 METHODOLOGY

3.1 Measuring Revealed Comparative Advantage

3.1.1 Balassa RCA Formulation

Before presenting the Balassa (1965), it is important to note that before Balassa introduced his famous RCA index in 1965, Liesner (1958) had already contributed to the empirical literature of RCA. To this end, Liesner (1958) can be argued to be the first empirical study in the area of RCA. Leisner's proposed simple measure of RCA is given as follows:

$$RCA_1 = \frac{X_{ij}}{X_{nj}} \text{ .....1}$$

where RCA = Revealed comparative advantage

X = exports

i = country

j = commodity (or industry)

n = a set of countries (e.g., EU)

Following Leisner's work, a comprehensive or advanced measure of RCA was then proposed and presented by Balassa (1965). This latter measure is the widely accepted and modified measure of RCA in the literature. Balassa's formulation is expressed as follows:

$$RCA_{ij} = (X_{ij}/X_i) / (X_{wj}/X_w) = (X_{ij}/X_{wj}) / (X_i/X_w) \text{.....2}$$

where: RCA_{ij} = country i's revealed comparative advantage for good j

X_{ij} = i^{th} country's exports of commodity (or industry) j

X_i = i^{th} country's total exports

X_{wj} = world exports of commodity (or industry) j

X_w = total world exports

RCA_{ij} measures a country's exports of a commodity (or industry) relative to its total exports and to the corresponding world exports. A comparative advantage is "revealed", if RCA2 >1. If RCA_{ij} (or equation 2) is less than unity, the country is said to have a comparative disadvantage in the commodity/industry. Nevertheless, the above formulation of RCA (equation 2) index is biased due to the omission of imports especially when country-size is important (Greenaway and Milner, 1993).

An alternative RCA index (equation 3) is computed in order to make reference to the "own" country trade performance only. This type of measurement of a country's RCA takes into account the possibility of simultaneous exports and imports (M) within a particular commodity/industry, and using the subscripts as defined in equation 2, equation can be written as:

$$RCA = (X_{ij} - M_{ij}) / (X_{ij} + M_{ij}) \text{.....3}$$

In interpreting equation 3, the index ratio ranges from negative one (-1) when Xij = 0 indicating revealed comparative disadvantage, to positive one (+1) when (Mij = 0, indicating revealed comparative advantage. However, regarding RCA of equation 3, there exist ambiguities around zero values (Greenaway and Milner, 1993).

Furthermore, one can also derive another version of RCA from Balassa (1965). The equation is as follows:

$$RCA = (X_{ij} / X_i) / (M_{ij} / M_i) = (X_{ij} / M_{ij}) / (X_i / M_t) \text{.....4}$$

where X and M represents exports and imports respectively and other terms are as defined in equations 2 and 3. A similar version of equation 4 derived from Balassa (1965) is the following:

$$RCA = ln\ (X_{ij} / X_i) / (M_{ij} / M_i) * 100 = ln\ (X_{ij} / M_{ij}) / (X_i / M_i) * 100 \text{ .....5}$$

In terms of the application of the RCA methodology, the advantages of using the comparative advantage index are that, firstly it considers the intrinsic advantage of a particular export commodity and is consistent with changes in an economy's relative factor endowment and productivity. Secondly, the fact that its computations utilize post-trade data, rather than cost data, which is relatively difficult to find or verify, is also an advantage.

On the other hand, like any other aggregative measure, it does have limitations. One of the drawbacks is that changes in a country's revealed comparative advantage cannot distinguish improvements in factor endowment from the pursuit of appropriate trade policies. That is while the theory of comparative advantage emphasized former, the latter has often affected trade improvement, though one can argue that they are inter-related. It is true that difference in trade policy regimes across countries and economic blocks or regions may contribute more to the different outcome in their revealed comparative advantage than their difference in factor endowment.

It is equally true to argue that trade is affected by inter-country differences in tastes, as well as inter-industry disparities in the extent of protection. The RCA is primarily based on relative export shares that could be biased due to distortions from various trade and non-trade barriers (Bender and Li, 2002). For instance, trade distortions in the form of exclusive production rights given to a certain country or industry may cause that country or industry to have RCA in that particular product. A good example may be the exclusive productive rights owned by Swaziland to produce and export coke paste syrup through license. In this case, it is true that in the case of withdrawal of the license, RCA in exportation of this syrup will drastically fall, if not vanish.

3.1.2 Data Sources

Following the contributions by Balassa, the present empirical analysis is based on the measurement of RCA and the study is interested in the competitiveness of Botswana in the global context. This section calculates RCA according to equation 2 presented in the

earlier section with respect to Botswana's trade with the world. The study will use export trade data classified according to Harmonized Commodity Description and Coding (HS) System, both at HS2-digit and HS4-digit levels. The source of data series utilized in this section is Trade and Industrial Policy Strategies (TIPS) South Africa's interactive database. Following the same source, the study has also aggregated HS 2 data into 22 broad chapter classifications based on the level of sophistication needed to produce the goods (see Appendix Table A1 for the components of the broad chapter description)

4 RESULTS AND RCA ANALYSIS

4.1 Introduction

HS2 and HS4-digit level data was analysed for both Botswana and the rest of the world. In order to come up with sound policy recommendations and get an appreciation of trade dynamics, the years 1999 and 2004 are examined. As it is possible that the pattern of comparative advantage may differ across different levels of dis-aggregation and sectors in which a country's exports may be typically strong. The paper start by analysing revealed comparative advantage at a broader aggregation, before proceeding to analyze at the more disaggregated levels i.e., the HS2 and HS4 digit levels. Thus, simulations are done at the broad 22 chapter categories referred to above, as well as for their respective subcomponents, that is at HS2 and HS4 digit levels.

The results of the broad chapter computations as presented in Table 1 are not too surprising. The indices for 2004 show that Botswana has a comparative advantage in two broad sectors, namely: 'Pearls and precious stones (broad chapter 14 (C14))" and "Metal Products broad (C15)". The magnitude of comparative advantage in the former is particularly striking with a RCA of 39.9. Conversely, Botswana is seen to have revealed comparative disadvantage (RCD) in producing a number of broad commodity types such as photographic and musical instruments (C18), arms and ammunition (C19), wood products (C09), and stone; cement and glass (C13) to mention a few broad categories.

Part of this reflects, as would be suggested by Heckscher-Ohlin considerations, the absence of natural resources and raw materials in these sectors, among other things.

Table 1: Revealed Comparative Advantage for Botswana at 22 chapter level, 1999 and 2004

Chapter Code	**Chapter Description**	**1999**	**2004**	**% change**
		RCA	**RCA**	
C01	Animals (live) and animal products	0.88	0.76	-14
C02	Vegetable products	0.06	0.12	102
C03	Fats and Oils (animal or vegetable)	0.08	0.02	-75
C04	Prepared Foodstuffs; Beverages; and Tobacco	0.23	0.26	12
C05	Mineral Products	0.06	0.11	66
C06	Chemical products	0.12	0.11	-10
C07	Plastics and Rubber	0.06	0.05	-18
C08	Leather products	0.30	0.25	-16
C09	Wood products	0.01	0.02	73
C10	Paper products	0.10	0.14	42
C11	Textile products	0.34	0.62	84
C12	Footwear; Headgear; and Umbrellas	0.17	0.09	-50
C13	Stone; Cement; and Glass products	0.03	0.02	-29
C14	Pearls and precious stones	38.57	39.85	3
C15	Metal Products	0.77	1.32	72
C16	Machinery	0.05	0.05	-6
C17	Vehicles; Aircraft; and Vessels	0.39	0.27	-31
C18	Photographic instruments; Clocks; & Musical instruments	0.01	0.01	-22
C19	Arms and Ammunition	0.54	0.02	-96
C20	Furniture; Toys; and other products	0.09	0.03	-67
C21	Works of Art and Antiques	0.01	0.11	1118
C22	Commodities not elsewhere specified	0	0	0

4.2 Inter-temporal movement of Botswana's RCA

Comparative advantage is very much a dynamic phenomenon due to the fact that a country's ability to produce certain goods changes through time, in response to a variety of endogenous and exogenous factors (Addison-Smith, 2005). This dynamism has been a major drawback with respect to use of RCA in predicting future trade for a given country's exports. A number of explanations have been offered as possible causes of changes in RCA. For instance, changes in comparative advantages can be brought about in cases where the state played a crucial role in determining the social and economic conditions (Bender and Li, 2002). Empirical evidence on the subject matter on Asian economies (Lee 1986, Rana 1990, Carolan *et al* 1998) showed support of comparative advantage shift from Japan to the newly industrializing economies (NIEs) of South Korea, Hong Kong, Singapore and Chinese Taipei.

Utkulu and Seymen (YEAR) also argue that there is a problem of implementing these or similar RCA indices is that real (observed) trade patterns may be distorted by government interventions, thus causing misrepresentation of underlying comparative advantage. It is thus a concern that import restrictions, export subsidies and other protectionist policies of governments, to an extent, may distort RCA indices. The RCA distortion problem were also noted by Fertö and Hubbard (2003), as they tried to avoid it by using nominal assistance coefficients (NACs) estimated by the OECD by country and commodity to filter the effects of possible distortions in measuring Hungarian Agri-food sector RCAs visà-vis the EU. Greenaway and Milner (1993), on the other hand, suggests the employment of a price-based measure of RCA called "implicit revealed comparative advantage" (IRCA) to get rid of the distortion caused by the post-policy intervention.

In the light of the RCA's tendencies to change over time, it is useful to compare the results for 2004 with five years previously in 1999 (Table 1). The results show that Botswana has a reduced degree of RCA in twelve of these broad chapter categories, as indicated by negative percentage changes. Although the other ten broad chapters have increased RCA between 1999 and 2004, of importance are the two chapters, C14 and

C15, in which the former's RCA has strengthened from 38.6 to 39.9 (an improvement of 3 per cent), while the latter's RCA indicates that this product category has improved from exhibiting RCD to a situation where it now has RCA. Overall, in percentage terms, RCA has declined by approximately half (51.7%) across all the broad 23 chapter groupings between 1999 and 2004.

Although a host of factors can be brought to explain this overall decline in RCA between these two periods, the paper argues that these results could be due to two main forces, namely declining competitiveness and structural change. As regards the former, the fall in the RCA indices across a number of sectors presumably reflects the fact that many indigenous and traditionally labour intensive sectors (e.g. clothing and footwear, and leather,) have found it increasingly difficult to compete. This has been caused mainly by greater competition on the international markets, especially strong and vigorous competition from China.

As regards structural change, the fall in RCA reflects the fact that comparative advantage is dynamic rather than static. There has been a considerable amount of structural change within the Botswana economy over a couple of years, as high-tech mining sector driven by very high levels of FDI have grown, while many indigenous industries have been relatively declining.

4.3 RCA by Industry Type

While the results above are informative, they mask developments within the HS chapters. For example, Botswana is known to have a heavy presence in meat type industries due to abundance live stock Thus, using a further decomposition of the HS, it is possible to gain a deeper insight into the extent of Botswana's RCA within each of these broad chapters. Further, to meaningfully discuss the RCA simulations, as well as provide relevant policy recommendations, the study has grouped the results under four scenarios: i) chapters which have exhibited increasing RCA, ii) chapters which have decreasing RCA though they exhibit RCA, iii) chapters whose RCA have decreased that they now have RCD and

lastly, iv) chapters which have RCA at present and has revealed comparative disadvantage (RCD) in the past.

i) Chapters with increasing RCA

Table 2 shows the chapters, both at HS2 and HS4 levels in which the country has exhibited increasing RCA over the five-year period. It is important to note that ten of the 14 products in which RCA was gained, the products are either agricultural or mineral related. This indicates the bias towards specialization in primary sector production and exportation that the country's economy has mainly been founded, with diamonds (mining) sector being the dominating economic activity. This scenario presents some important information with regards to national development planning. That is, the national planners have to decide whether to continue specializing in primary production whose exports earnings sometimes fluctuates due to international shocks, while production (of agricultural commodities) maybe affected by natural disasters such as diseases and droughts. The fact that diamonds' (HS71 and HS7102) specialization continues to increase, while its ore reserves are declining presents a challenge to the country to seriously start diverting its production (though gradually) towards other manufactured products such as tractors (as this product has increased in specialization) among other products.

Table 2: Chapters which have Increasing RCA between 1999 & 2004

HS2 & HS4	**Chapter Description**	**1999**	**2004**	**% change**
		RCA	**RCA**	
71	Pearls, precious stones, metals, coins, etc	38.57	39.85	3
74	Copper and articles thereof	7.68	13.26	73
0202	Meat of bovine animals, frozen	6.68	6.93	4
1704	Sugar confectionery, non-cocoa, white chocolate	2.68	4.77	78
2302	Bran, sharps etc, from working of cereals or legumes	3.61	5.90	64

4103	Raw hides and skins except bovine, equine, sheep	1.93	4.47	132
4808	Paper, board corrugated, nes	2.11	2.41	14
4907	Documents of title (bonds etc), unused stamps etc	3.35	6.19	84
5202	Cotton waste, including yarn waste & garnetted stock	1.12	5.63	401
6103	Mens, boys suits,jackets,trousers etc knit or crochet	1.28	1.91	50
6109	T-shirts, singlets and other vests, knit or crochet	1.12	1.78	59
7102	Diamonds, not mounted or set	86.52	95.44	10
7401	Copper mattes, cement copper (precipitated copper)	3320.37	5659.94	70
8701	Tractors (other than works, warehouse equipment)	1.50	6.39	326

ii) Chapters which showed decreasing RCA though they still have RCA

Table 3 shows that although the products still have RCA, specialization in these products has been declining over the five years as indicated by falling values of RCA. Higher falling percentage magnitudes are recorded in cereal flours (HS 1102 which recorded 63%) and beds, tables and kitchen linen (HS6302 – where a decline of 49% has been recorded). The varying degrees of decline across the product lines can help national planners to specifically decide relevant policies on how to deal with any product line(s) should they desire to halt and reverse the decline in specialization.

Table 3: Chapters which have decreasing RCA though they still have RCA between 1999 & 2004

HS2& HS4	**Chapter Description**	**1999**	**2004**	**% change**
		RCA	**RCA**	
02	Meat and edible meat offal	2.46	2.16	-12
25	Salt, sulphur, earth, stone, plaster, lime and cement	1.37	1.35	-1
28	Inorganic chemicals, precious metal compound, isotopes	1.38	1.06	-23
0201	Meat of bovine animals, fresh or chilled	6.65	6.02	-9

1102	Cereal flours other than of wheat or meslin	23.05	8.51	-63
1503	Lard stearin, oleostearin & oils, natural tallow oil	22.17	15.44	-30
1902	Pasta, couscous, etc.	3.39	2.09	-38
2501	Salt (sodium chloride) including solution, salt water	23.41	21.62	-8
2836	Carbonates	25.53	18.84	-26
4101	Raw hides and skins of bovine, equine animals	3.43	3.32	-3
6302	Bed, table, toilet and kitchen linens	2.28	1.17	-49

iii) Chapters which shifted from RCA to RCD

The period between 1999 and 2004 has also witnessed some products moving from RCA category to revealed comparative disadvantage (RCD) and these products are presented in Table 4. Depending on the importance of the different product line to the country in terms of exports earning contributions, employment and the various backward and forward production linkages, the government can also decide whether to revive some of the production lines or just let them slip forever. However, by comparing the tables, it can be deduced that given the fact that the country has RCA on products lines related to meat production (HS0202, HS0201 from Tables 1 and 2), it follows that products of animal origin (Table 3) which shows declining RCA can be revived as complimentary or joint products. The same is true for public transport, motor vehicles (HS8702 and HS8704). The fact that the country has witnessed a massive increase in RCA for tractors (HS8701) of about 326 percent means that there is potential for economies of scope if policies are instituted to revive products lines such as HS8102 and HS8704.

Table 4: Chapters whose RCA have decreased that they now have RCD between 1999 & 2004

HS2 & HS4	**Chapter Description**	**1999**	**2004**	**%change**
		RCA	**RCA**	
05	Products of animal origin, nes	1.07	0.02	-98

19	Cereal, flour, starch, milk preparations and products	1.06	0.69	-35
63	Other made textile articles, sets, worn clothing etc	1.86	0.50	-73
0507	Ivory,whalebone, unforced, simply worked, unshaped	51.36	0.23	-100
1206	Sunflower seeds	1.28	0.64	-50
1602	Prepared or preserved meat, meat offal and blood, nes	1.12	0.32	-72
1603	Extracts, juices of meat, fish, aquatic invertebrates	2.77	0.00	-100
1905	Baked bread, pastry, wafers, rice paper, biscuits, etc	1.06	0.77	-28
2301	Flour etc of meat, fish or offal for animal feed	1.22	0.64	-47
2521	Limestone materials for manufacture of lime or cement	1.32	0.00	-100
2604	Nickel ores and concentrates	2.76	0.02	-99
2705	Coal gas, water gas, etc. (not gaseous hydrocarbons)	5.57	0.42	-92
2824	Lead oxides, red lead and orange lead	1.92	0.02	-99
5209	Woven cotton nes, >85% cotton, >200g/m2	1.27	0.00	-100
5703	Carpets, tufted	1.27	0.65	-49
6101	Mens, boys overcoats, capes, cloak, etc, knit, crochet	7.61	0.64	-92
6401	Waterproof footwear, rubber, plastic (Wellingtons etc)	1.59	0.16	-90
6801	Stone setts, curbstones, flagstones (except slate)	2.64	0.01	-100
7213	Hot rolled bar, rod of iron/steel, in irregular coils	2.44	0.01	-100
7301	Sheet piling, welded angles, sections of iron or steel	1.22	0.22	-82
6301	Blankets and traveling rugs	16.29	0.63	-96
8426	Derricks, cranes, straddle carriers, crane trucks	1.18	0.41	-65
8702	Public-transport type passenger motor vehicles	2.32	0.34	-85
8704	Motor vehicles for the transport of goods	1.35	0.11	-92
9303	Other firearms, sporting, etc, signal pistols, etc	4.77	0.00	-100
9601	Worked ivory, other animal carving material	4.17	0.01	-100

iv) Chapters which shifted from RCD to RCA

Among the various changes in RCA, Table 5 shows chapters that have shown positive movement in the current specialization ladder. Given that the country can now specialize

in the product of these commodities, the relevant policy should be market seeking, among other policies. It is a fact that the international market for these products have been dominated by other country and the challenge for the country will be to gain market for its new lines of specialized products by 'stealing' from other competitive exporters. To this end, the country has to either implement vigorous marketing strategies or just relax and follow the dictum of Say's, which states "supply creates its own demand".

Table 5: Chapters which have RCA at present and has revealed comparative disadvantage in the past (RCD ⟶ RCA)

HS2 HS4	**Chapter Description**	**1999**	**2004**	**%change**
		RCA	**RCA**	
11	Milling products, malt, starches, inulin, wheat gluten	0.84	1.23	47
14	Vegetable plaiting materials, vegetable products nes	0.00	1.16	>1000
17	Sugars and sugar confectionery	0.84	1.54	84
26	Ores, slag and ash	0.02	1.07	4674
36	Explosives, pyrotechnics, matches, pyrophorics, etc	0.00	3.02	349288
61	Articles of apparel, accessories, knit or crochet	0.40	1.61	305
1007	Grain sorghum	0.11	5.43	4995
1101	Wheat or meslin flour	0.03	3.28	11065
1401	Vegetable material for plaiting	0.00	3.41	>1000
2603	Copper ores and concentrates	0.00	3.96	1350013
3602	Prepared explosives, except propellant powders	0.00	9.59	737304
3603	Safety or detonating fuses, detonators, igniters	0.00	3.68	>1000
5513	Woven fabric >85% synth + cotton, <170g/m2 unbl/blchd	0.08	2.72	3413
5808	Textile braid and trimmings, in the piece	0.00	1.53	41838
6102	Womens, girls overcoats, etc, knit or crochet	0.06	1.05	1723
6104	Womens, girls suit, dress, skirt, etc, knit or crochet	0.01	1.47	10966
6105	Mens, boys shirts, knit or crochet	0.77	1.08	41

6106	Womens, girls blouses & shirts, knit or crochet	0.03	1.81	5546
6110	Jerseys, pullovers, cardigans, etc, knit or crochet	0.13	3.00	2215
6112	Track suits, ski suits and swimwear, knit or crochet	0.07	2.61	3556
6206	Womens or girls' blouses, shirts and shirt-blouses	0.06	1.22	1809
7501	Nickel matte, interim products of nickel metallurgy	0.00	1.11	>100
8430	Earth or snow moving, boring or pile driving machines	0.47	1.09	133
8706	Motor vehicle chassis fitted with engine	0.02	9.54	47922
9307	Swords, cutlasses, bayonets, lances, scabbards, etc	0.15	3.34	2155

5 CONCLUSION AND POLICY RECOMMENDATIONS

An analysis of the competitiveness of Botswana in world trade has been presented based on indices of revealed comparative advantage calculated for the period 1999 and 2004. It is clear that Botswana has a RCA in diamonds, copper matte, meat of bovine animals, grain sorghum, prepared explosives and safety or detonating fuses, among other products.

The changes in the values of RCA over time reinforce the dynamic nature of comparative advantage. In other words, although a country may have a RCA in a particular industry/product at a specific moment in time, this does not guarantee that that comparative advantage will be maintained going forward, as has been evidenced by changes in Botswana RCA between 1999 and 2004. The study established that the country gained comparative advantage or specialization in the following products: sugar and sugar confectionery; copper ores and concentrates; and textiles braid and trimming, in which it previously had comparative disadvantage. On the downward side, the country lost specialization in products such as coal gas, water gas, ivory related products and men's/boys overcoats, among other products.

Given the RCA results presented in the various tables, the country needs to take appropriate policy measures regarding its exports. Basing on the RCA index (of course with caution), the country may choose to continue exporting the products that it currently

have higher RCA, or it may decide to revamp production and promotion of products in which it lost RCA to other international competitors.

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APPENDIX

Table 1A: HS Categories and Revealed Comparative Advantage Indices for Botswana for 1999 and 2004

		1999	2004	%change
HS2 /Sector Chapter	**Chapter Description**	**RCA**	**RCA**	
C01	**Animals (live) and animal products**	**0.88**	**0.76**	**-14**
01	Live animals	0.10	0.00	-98
02	Meat and edible meat offal	2.46	2.16	-12
03	Fish, crustaceans, mollusks, aquatic invertebrates nes	0.00	0.00	332
04	Dairy products, eggs, honey, edible animal product nes	0.01	0.01	23
05	Products of animal origin, nes	1.07	0.02	-98
C02	**Vegetable products**	**0.06**	**0.12**	**102**
06	Live trees, plants, bulbs, roots, cut flowers etc	0.00	0.01	9130
07	Edible vegetables and certain roots and tubers	0.01	0.01	88
08	Edible fruit, nuts, peel of citrus fruit, melons	0.00	0.00	36
09	Coffee, tea, mate and spices	0.02	0.02	28
10	Cereals	0.03	0.22	668
11	Milling products, malt, starches, inulin, wheat gluten	0.84	1.23	47
12	Oil seed, oleagic fruits, grain, seed, fruit, etc, nes	0.06	0.04	-45
13	Lac, gums, resins, vegetable saps and extracts nes	0.00	0.00	385
14	Vegetable plaiting materials, vegetable products nes	0.00	1.16	>1000
C03	**Fats and Oils (animal or vegetable)**	**0.08**	**0.02**	**-75**
15	Animal,vegetable fats and oils, cleavage products, etc	0.08	0.02	-75
C04	**Prepared Foodstuffs; Beverages; and Tobacco**	**0.23**	**0.26**	**12**
16	Meat, fish and seafood food preparations nes	0.37	0.10	-72
17	Sugars and sugar confectionery	0.84	1.54	84
18	Cocoa and cocoa preparations	0.00	0.01	230
19	Cereal, flour, starch, milk preparations and products	1.06	0.69	-35

20	Vegetable, fruit, nut, etc food preparations	0.03	0.09	192
21	Miscellaneous edible preparations	0.02	0.03	35
22	Beverages, spirits and vinegar	0.00	0.10	2231
23	Residues, wastes of food industry, animal fodder	0.21	0.18	-15
24	Tobacco and manufactured tobacco substitutes	0.00	0.00	-45
C05	**Mineral Products**	**0.06**	**0.11**	**66**
25	Salt, sulphur, earth, stone, plaster, lime and cement	1.37	1.35	-1
26	Ores, slag and ash	0.02	1.07	4674
27	Mineral fuels, oils, distillation products, etc	0.01	0.00	-16
06	Chemical products; Section VI	0.12	0.11	-10
28	Inorganic chemicals, precious metal compound, isotopes	1.38	1.06	-23
29	Organic chemicals	0.00	0.00	97
30	Pharmaceutical products	0.04	0.06	35
31	Fertilizers	0.00	0.00	14
32	Tanning, dyeing extracts, tannins, derivs, pigments,etc	0.07	0.09	23
33	Essential oils, perfumes, cosmetics, toileteries	0.05	0.02	-54
34	Soaps, lubricants, waxes, candles, modelling pastes	0.08	0.13	60
35	Albuminoids, modified starches, glues, enzymes	0.00	0.00	-9
36	Explosives, pyrotechnics, matches, pyrophorics, etc	0.00	3.02	349288
37	Photographic or cinematographic goods	0.00	0.00	-2
38	Miscellaneous chemical products	0.00	0.00	74
C07	**Plastics and Rubber**	**0.06**	**0.05**	**-18**
39	Plastics and articles thereof	0.08	0.06	-18
40	Rubber and articles thereof	0.02	0.01	-33
C08	**Leather products**	**0.30**	**0.25**	**-16**
41	Raw hides and skins (other than furskins) and leather	0.58	0.61	5
42	Articles of leather, animal gut, harness, travel goods	0.11	0.00	-96
43	Furskins and artificial fur, manufactures thereof	0.00	0.01	221
C09	**Wood products**	**0.01**	**0.02**	**73**
44	Wood and articles of wood, wood charcoal	0.01	0.02	86
45	Cork and articles of cork	0.00	0.00	197
46	Manufactures of plaiting material, basketwork, etc.	0.08	0.01	-84
C10	**Paper products**	**0.10**	**0.14**	**42**

47	Pulp of wood, fibrous cellulosic material, waste etc	0.06	0.12	100
48	Paper & paperboard, articles of pulp, paper and board	0.10	0.10	-2
49	Printed books, newspapers, pictures etc	0.13	0.34	160
C11	**Textile products**	**0.34**	**0.62**	**84**
50	Silk	0.00	0.00	21981
51	Wool, animal hair, horsehair yarn and fabric thereof	0.00	0.00	403
52	Cotton	0.41	0.17	-60
53	Vegetable textile fibres nes, paper yarn, woven fabric	0.02	0.00	-78
54	Manmade filaments	0.03	0.00	-97
55	Manmade staple fibres	0.02	0.25	1444
56	Wadding, felt, nonwovens, yarns, twine, cordage, etc	0.00	0.30	10018
57	Carpets and other textile floor coverings	0.63	0.41	-34
58	Special woven or tufted fabric, lace, tapestry etc	0.02	0.06	179
59	Impregnated, coated or laminated textile fabric	0.01	0.00	-71
60	Knitted or crocheted fabric	0.21	0.20	-4
61	Articles of apparel, accessories, knit or crochet	0.40	1.61	305
62	Articles of apparel, accessories, not knit or crochet	0.31	0.54	73
63	Other made textile articles, sets, worn clothing etc	1.86	0.50	-73
C12	**Footwear; Headgear; and Umbrellas**	**0.17**	**0.09**	**-50**
64	Footwear, gaiters and the like, parts thereof	0.15	0.08	-49
65	Headgear and parts thereof	0.10	0.23	122
66	Umbrellas, walking-sticks, seat-sticks, whips, etc	0.03	0.06	106
67	Bird skin, feathers, artificial flowers, human hair	0.63	0.04	-94
C13	**Stone; Cement; and Glass products**	**0.03**	**0.02**	**-29**
68	Stone, plaster, cement, asbestos, mica, etc articles	0.06	0.03	-57
69	Ceramic products	0.02	0.04	125
70	Glass and glassware	0.03	0.01	-64
C14	**Pearls and precious stones**	38.57	39.85	3
71	Pearls, precious stones, metals, coins, etc	38.57	39.85	3
C15	**Metal Products**	**0.77**	**1.32**	**72**
72	Iron and steel	0.10	0.04	-56
73	Articles of iron or steel	0.14	0.20	45
74	Copper and articles thereof	7.68	13.26	73

75	Nickel and articles thereof	0.00	0.22	7502
76	Aluminium and articles thereof	0.00	0.01	118
78	Lead and articles thereof	0.00	0.03	3720
79	Zinc and articles thereof	0.00	0.02	343
80	Tin and articles thereof	0.00	0.03	298179
81	Other base metals, cermets, articles thereof	0.00	0.01	7252
82	Tools, implements, cutlery, etc of base metal	0.03	0.05	79
83	Miscellaneous articles of base metal	0.02	0.11	536
C16	**Machinery**	**0.05**	**0.05**	**-6**
84	Nuclear reactors, boilers, machinery, etc	0.04	0.06	56
85	Electrical, electronic equipment	0.07	0.03	-48
C17	**Vehicles; Aircraft; and Vessels**	**0.39**	**0.27**	**-31**
86	Railway, tramway locomotives, rolling stock, equipment	0.11	0.05	-56
87	Vehicles other than railway, tramway	0.52	0.33	-37
88	Aircraft, spacecraft, and parts thereof	0.03	0.08	191
89	Ships, boats and other floating structures	0.00	0.00	1
C18	**Photographic instruments; Clocks; and Musical instruments**	**0.01**	**0.01**	**-22**
90	Optical, photo, technical, medical, etc apparatus	0.01	0.01	-26
91	Clocks and watches and parts thereof	0.01	0.01	37
92	Musical instruments, parts and accessories	0.01	0.01	7
C19	**Arms and Ammunition**	**0.54**	**0.02**	**-96**
93	Arms and ammunition, parts and accessories thereof	0.54	0.02	-96
C20	**Furniture; Toys; and other products**	**0.09**	**0.03**	**-67**
94	Furniture, lighting, signs, prefabricated buildings	0.04	0.03	-30
95	Toys, games, sports requisites	0.00	0.02	534
96	Miscellaneous manufactured articles	0.61	0.06	-89
C21	**Works of Art and Antiques**	**0.01**	**0.11**	**1118**
97	Works of art, collectors pieces and antiques	0.01	0.11	1118
97	Works of art, collectors pieces and antiques	0.01	0.11	1118
C22	**Commodities not elsewhere specified**	**0**	**0**	**0**
98	No Description	0	0	0
99	Commodities not elsewhere specified	0	0	0