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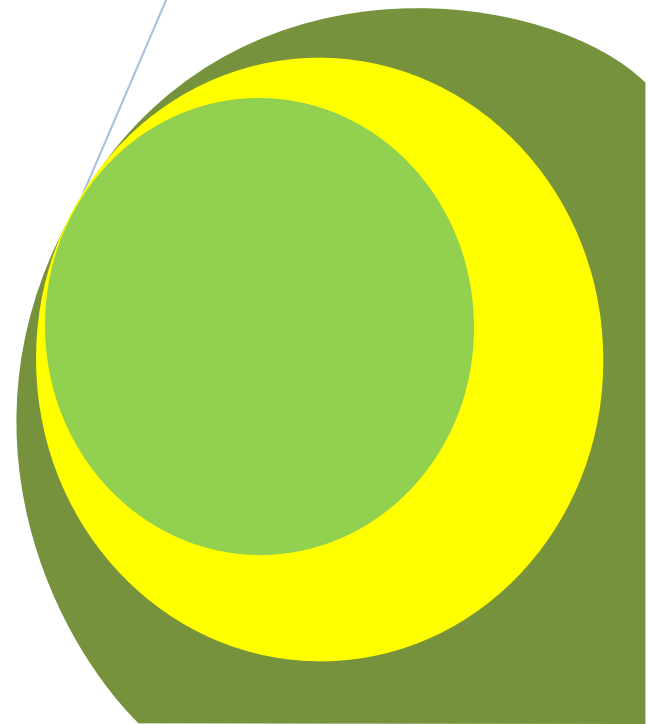
Research Article

Mozambique's Inter-Industry Comparative Advantage

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ABSTRACT

The authors investigated inter-industry comparative advantage in Mozambique. In Mozambique, industries lack comparative advantage. However, in comparison between industries (inter-industry), machinery/electric tops in Mozambique followed by vegetable product industry. Foot wear/head gear demonstrates lack of comparative advantage and it is followed by plastic/rubber industry. In general, Industries in Mozambique show lack of comparative advantage. It is recommended that Mozambique should enact policies that encourage foreign direct investment (FDI). It is further recommended that Mozambique should be investing in exploring undiscovered endowment which when discovered can boost comparative advantage. Mozambique should consider accepting these results and come up with a concrete industrial policy which can improve export capabilities of Mozambique's industries on the international market.

Keywords: Intra-industry, comparative advantage, international trade, Mozambique.

INTRODUCTION

A number of studies have been done on Mozambique including Mzumara (2011). That study dealt with products in which Mozambique has comparative advantage in. The study was exhaustive but did not tackle inter-industry comparative advantage in Mozambique. From a policy point of view, policy makers are in a better position to enact industry specific policies. However, without knowing how various industries are fairing in international trade the exercise may be futile. Mozambique is a member of the Southern African Development Community (SADC) hence the role its industry as played both at regional level and international level is paramount. The objective of this paper is to investigate Mozambique's inter-industry comparative advantage. On the onset the classical theory of comparative advantage will be used as a conceptual framework of this paper.

The classical theory of comparative advantage has explained that gains from exchange of goods improve welfare significantly and that trade without barriers leads to prosperity of the global economy (Bender & Li, 2002). Ricardo invalidated the Principle of Absolute Advantage as advanced by Adam Smith. The logic in the Absolute Advantage was that big countries will have a straight win in international trade while small and insignificant countries will have a straight loss in international trade. The benefits arising from absolute advantage in international trade were very clear. However, Ricardo argued that countries in order to benefit from international trade did not necessarily need to demonstrate absolute advantage instead what they need is comparative advantage. No matter how small a country is will have some sort of comparative advantage in some of its products it exports to the world market hence in trading each country will benefit from exchange (Mzumara, 2006).

Hescheker-Ohlin-Samuelson theory attributes comparative advantage as originating from factor price differentials. Further, the Neo-Factor-Proportion Theory concludes that comparative advantage is a result of factor efficiency. Then the technology gap and product cycle theory affirms that comparative advantage comes from the use of soft technological innovations (Bender & Li, 2002). According to Mzumara (2006) he Hescheker-Ohlin theory is not a separate trade theory rather it must be viewed as an extension of Ricardo's Theory of Comparative advantage. They did not demolish the Principle of Comparative advantage rather added the aspect that countries would possess comparative advantage due to international differences in costs of factor endowments. They advocated specialization. Those countries with an endowment of a particular factor will use the abundant factor and export products which use such a factor most intensively. They will therefore import the products which use their scarce factor less intensively.

According to Lee (1999) comparative advantage encourages nations to make up their mind whether it will be rewarding to produce as opposed to importing the product. When countries make such rational decisions, the world welfare would improve. The Principle of Comparative Advantage has been received well as a significant determinant of international output and trade pattern (Neary, 2002).

The empirical works done by researchers on Heckscher-Ohlin theory or model have focused on factors of production. In that the factors of production are less mobile between nations and that they are used in different combinations in order to produce different goods (Goldin, 1990). A nation therefore has a comparative advantage in those industries that use intensively the factors of production that are abundant in a given nation (Widgren, 2005).

METHODOLOGY

The methodology used in this paper is Balassa (1965) revealed comparative advantage (RCA). According to Deardorff (2010) the RCA remains valid in revealing true comparative advantage. It is also useful as a guide in trade policy making. Balassa's method takes the form:

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

With:

$X_{i,j}$ denoting country i's exports of product j;
$X_{i,tot}$ denoting country i's total exports;
$X_{w,j}$ denoting the world's (all countries) export of product j; and
$X_{w,tot}$ denoting total exports in the world.

An RCA ≥ 1 demonstrates that the country has revealed comparative advantage and that it is relatively specialised in producing and exporting the product line under investigation. An RCA <1 demonstrates that the country has no revealed comparative advantage and is therefore not specialised in the product line (Balassa, 1965; Krugell & Matthee, 2009).

The authors have used export trade data of Mozambique and the world obtained from International Trade Center's Trademap. The data was obtained on 6- digit level the most disaggregated and accepted international product classification.

RESULTS AND DISCUSSION

Inter –industry results are shown in table 1.

Table 1: Industry results

Rank	Industry code	Industry description	Number of products with RCA≥1
1	84-85	Machinery/electrical	65
2	06-15	Vegetable products	41
3	72-83	Metals	32
4	50-63	Textiles	25
5	01-05	Animal and animal products	18
5	25-27	Mineral products	18
5	44-49	Wood and wood products	18
6	90-97	Miscellaneous	14
7	16-24	Foodstuffs	13
8	86-89	Transportation	12
9	28-38	Chemicals and allied industries	6
10	41-43	Raw hides, skins, leather and furs	4
10	68-71	Stone/Glass	4
11	39-40	Plastic/rubber	2
12	64-67	Foot wear/head gear	1

Source: Compiled from the results

Column 1 is the rank of industry and column 2 is industry code, column 3 is the description of industry and column 4 are number of product lines in which industry has comparative advantage in. The comparative advantage of the industry depends on the number of firms in the industry.

The industry which is ranked number 1 in Mozambique compared to other industries in terms of comparative advantage is machinery/electrical. It has 65 product lines in which it has comparative advantage in. It is followed by vegetable products industry with 41 product lines. In the third rank is metal industry with 32 product lines. The industry that is least comparative advantage in Mozambique is foot wear/head gear with only 1 product line. This is followed by plastic/rubber industry with 2 product lines. In the third place are two industries namely: stone/glass and raw hides, skins, leather and furs. They both have 4 products lines.

Generally the industries in Mozambique show less comparative advantage. However, comparative advantage in the machinery/electric is significant and the least in the foot wear/head gear industry. Table 2 shows top 3 products codes in the machinery/electric industry in which Mozambique has comparative advantage.

Table 2: Top 3 product codes in the machinery/electric industry in which Mozambique has comparative advantage

Rank	Product code	Product description	2008 RCA	2009 RCA	2010 RCA	Average RCA
1	844329	Letter press printing machinery except flexographeric	4.438802	4867.991	0	1624.143
2	844359	Printing machinery	0.354673	488.8136	1.697022	163.6218
3	848590	Machinery parts, non-electrical	1.864936	217.669	0	73.17797

Source: From the results.

In table 2, letter press printing machinery except flexographeric has the highest index in the machinery/electric. It has an index of 1624. In the second place is printing machinery with an index of 164. In the third place are machinery parts, non-electrical with an RCA index of 73. Table 3 shows top 3 products codes in the vegetable industry in which Mozambique has comparative advantage.

Table 3: Top 3 product codes in the vegetable industry in which Mozambique has comparative advantage

Rank	Product code	Product description	2008 RCA	2009 RCA	2010 RCA	Average RCA
1	071339	Beans dried, shelled	71.61264	199.7716	185.6768	152.3537
2	080131	Cashew nuts in shell dried	137.7604	115.9206	173.9586	142.5465
3	120720	Cotton seeds	136.1097	147.4889	74.14158	119.2467

Source: From the results.

In table 3, beans dried, shelled in the vegetable industry has the highest RCA in this industry with an RCA index of 152. It is followed by cashew nuts in shell dried with an RCA index of 143. In the third rank are cotton seeds with an RCA index of 119. Table 3 shows top 3 products codes in the metals industry in which Mozambique has comparative advantage.

Table 4: Top 3 product codes in the metals industry in which Mozambique has comparative advantage

Rank	Product code	Product description	2008 RCA	2009 RCA	2010 RCA	Average RCA
1	780300	Lead bars, rods, profiles and wire	753.8836	214.193	0	322.692
2	760120	Aluminium unwrought, alloyed	331.9367	0	0	110.6456
3	760110	Aluminium unwrought, not alloyed	0	0	296.9547	98.98491

Source: From the results.

In table 4, lead bars, rods, profiles and wire in the metals industry have the highest RCA with an index of 322.7. The next in line is aluminium unwrought, alloyed with an index of 111. In the third position is aluminium unwrought, not alloyed with an index of 99. Table 5 shows top 3 products codes in the textiles industry in which Mozambique has comparative advantage.

Table 5: Top 3 product codes in the textiles industry in which Mozambique has comparative advantage

Rank	Product code	Product description	2008 RCA	2009 RCA	2010 RCA	Average RCA
1	530490	Sisal and agava, processed but not spun, tow and waste	5930.574	5733.34	0	3887.971
2	500100	Silk-worm cocoons suitable for reeling	0	0	5705.308	1901.769
3	530511	Coconut (coir) fibre, raw	643.5757	1219.154	36.84801	629.859

Source: From the results.

In table 5, sisal and agava, processed but not spun, tow and waste in the textiles industry has the highest RCA in this industry with an index of 3888. In the second position is silk-worm cocoons suitable for reeling with an RCA 1901.8. In the third position is coconut (coir) fibre, raw with RCA index of 629.9. Table 6 shows top 3 products codes in the animal and animal products industry in which Mozambique has comparative advantage.

Table 6: Top 3 product codes in the animal and animal products industry in which Mozambique has comparative advantage

Rank	Product code	Product description	2008 RCA	2009 RCA	2010 RCA	Average RCA
1	010620	Live reptiles, including snakes and turtles	208.2855	4.42585	19.24312	77.31817
2	030219	Salmonidae, not trout or salmon, fresh or chilled	126.3295	35.17995	22.72593	61.41179
3	030613	Shrimps and prawns, frozen	37.17789	30.01172	26.79825	31.32929

Source: From the results.

In table 6, live reptiles, including snakes and turtles in the animal and animal industry has the highest index in this industry with an index of 77. In the second place is salmonidae, not trout or salmon, fresh or chilled with an index of 61. In the third place is shrimps and prawns, frozen with an index of 31. Table 7 shows top 3 products codes in the mineral products industry in which Mozambique has comparative advantage.

Table 7: Top 3 product codes in the mineral products industry in which Mozambique has comparative advantage

Rank	Product code	Product description	2008 RCA	2009 RCA	2010 RCA	Average RCA
1	251319	Pumice stone, worked	952.3247	1864.614	0	938.9797
2	261400	Titanium ores and concentrates	204.7707	328.379	119.5272	217.559
3	250629	Quartzite , slabs	24.25878	263.1777	46.477	111.3045

Source: From the results.

Pumice stone, worked in table 7, belonging to the mineral products industry has the highest RCA in this industry with an index of 939. Titanium ores and concentrates have the second highest RCA in this industry with an index of 217.6. Quartzite, slabs is the third with an RCA index of 111. Table 8 shows top 3 products codes in the wood and wood products industry in which Mozambique has comparative advantage.

Table 8: Top 3 product codes in the wood and wood products industry in which Mozambique has comparative advantage

Rank	Product code	Product description	2008 RCA	2009 RCA	2010 RCA	Average RCA
1	441021	Oriented strand board and wafer board of wood, unworked/not further worked	4140.474	0	0	1380.158
2	440729	Lumber, tropical wood	22.27399	78.46808	161.865	87.53568
3	440610	Ties, railway or tramway, wood not impregnated	21.93694	26.63737	167.0576	71.87732

Source: From the results.

Oriented strand board and wafer board of wood, unworked/not further worked in table 8 in the wood and wood products industry has the highest RCA in this industry. It has an index of 1380. In the second rank is lumber, tropical wood with an index of 87.5. In the third place are Ties, railway or tramway, wood not impregnated with an index of 71.9. Table 9 shows top 3 products codes in the miscellaneous industry in which Mozambique has comparative advantage.

Table 9: Top 3 product codes in the miscellaneous industry in which Mozambique has comparative advantage

Rank	Product code	Product description	2008 RCA	2009 RCA	2010 RCA	Average RCA
1	901780	Instruments for measuring length, hand use	4.387351	12.83467	0.007945	5.743321
2	900791	Parts and accessories for cinematographic cameras	0.875003	16.04161	0	5.638872
3	900992	Paper feeders for the photocopying apparatus	15.80959	0	0	5.269863

Source: From the results.

Instruments for measuring length, hand use in table 9 in the miscellaneous industry has the highest RCA index in this industry of 5.7. They are followed by parts and accessories for cinematographic cameras with an index of 5.6. In the third rank are paper feeders for the photocopying apparatus with an index of 5.3. Table 10 shows top 3 products codes in the foodstuffs industry in which Mozambique has comparative advantage.

Table 10: Top 3 product codes in the foodstuffs industry in which Mozambique has comparative advantage

Rank	Product code	Product description	2008 RCA	2009 RCA	2010 RCA	Average RCA
1	230210	Maize bran, sharps, other residues	47.26937	560.2546	35.31102	214.2783
2	240120	Tobacco, unmanufactured, stemmed or stripped	132.1293	106.5857	105.0348	114.5833
3	230230	Wheat bran, sharps, other residues	53.3353	63.1986	52.66468	56.39952

Source: From the results.

Maize bran, sharps, other residues in table 10 have the highest RCA in this industry with an index of 214.3. Tobacco, unmanufactured, stemmed or stripped is in the second place with an index of 114.6. Wheat bran, sharps, other residues are in the third place with an index of 56.4. Table 11 shows top 3 products codes in the transportation industry in which Mozambique has comparative advantage.

Table 11: Top 3 product codes in the transportation industry in which Mozambique has comparative advantage

Rank	Product code	Product description	2008 RCA	2009 RCA	2010 RCA	Average RCA
1	890520	Floating, submersible drilling or production platform	0	20.18028	0	6.72676
2	890690	Vessels in 89.01 8906.10 including lifeboats other than rowing boats	0.00258	0.149054	13.4834	4.545013
3	890790	Buoys, beacons, coffer-dams, pontoons, floats	11.56931	0.235786	0.006762	3.937286

Source: From the results.

Floating, submersible drilling or production platform in table 11 has the highest RCA in the transportation industry of 6.7. It is followed by vessels in 89.01 8906.10 including lifeboats other than rowing boats with an index of 4.5. In the

third rank are buoys, beacons, coffer-dams, pontoons, floats with an index of 3.9. Table 12 shows top 3 products codes in the chemicals and allied industry in which Mozambique has comparative advantage.

Table 12: Top 3 product codes in the chemicals and allied industry in which Mozambique has comparative advantage

Rank	Product code	Product description	2008 RCA	2009 RCA	2010 RCA	Average RCA
1	290362	Hevachlorobenzene and DDT	0	0	2074.402	691.4673
2	282630	Sodium hexafluoroaluminate (synthetic cryolite)	11.30282	0	1.046673	4.116498
3	280519	Alkali metals other than sodium	5.5000485	2.69932	0	2.733335

Source: From the results.

Hevachlorobenzene and DDT in table 12 have the highest RCA in chemicals and allied industry with an RCA index of 691.5. Sodium hexafluoroaluminate (synthetic cryolite) with an RCA 4 is in the second position. In the third rank are alkali metals other than sodium with an RCA of 2.7. Table 13 shows top 3 products codes in the raw hides, skins, leather, and furs industry in which Mozambique has comparative advantage.

Table 13: Top 3 product codes in the raw hides, skins, leather, and furs industry in which Mozambique has comparative advantage

Rank	Product code	Product description	2008 RCA	2009 RCA	2010 RCA	Average RCA
1	410229	Sheep or lamb skins, raw, except pickled, no wool	47.14738	0	0	15.71579
2	410190	Bovine (including buffalo)/equine hides and skins (excluding of 4101.20 and 4101.50)	1.993656	4.49179	4.680071	3.72184
3	410390	Raw hide/skins except bovine/equine/sheep/goat/reptile	0	0	3.877612	1.292537

Source: From the results.

Sheep or lamb skins, raw, except pickled, no wool in table 13 have the highest RCA index in the raw hides, skins, leather and furs industry of 15.7. They are followed by bovine (including buffalo)/equine hides and skins (excluding of 4101.20 and 4101.50) with an RCA index of 3.7. Raw hide/skins except bovine/equine/sheep/goat/reptile are in the third place with an RCA index of 1.3. Table 14 shows top 3 products codes in the stone/glass industry in which Mozambique has comparative advantage.

Table 14: Top 3 product codes in the stone/glass industry in which Mozambique has comparative advantage

Rank	Product code	Product description	2008 RCA	2009 RCA	2010 RCA	Average RCA
1	681190	Articles of asbestos or cellulose fibre cement	122.1918	0	0	40.73058
2	681130	Tubes pipes etc of asbestos, cellulose fibre cement	47.21632	0	0	15.73877
3	710310	Precious, semi-precious stones unworked, partly worked	4.706822	4.784261	4.614159	4.701747

Source: From the results.

Articles of asbestos or cellulose fibre cement in table 14 in the stone/glass industry have the highest RCA in this industry with an index of 40.73. It is followed by Tubes pipes etc of asbestos, cellulose fibre cement with an index of

15.7. Precious, semi-precious stones unworked, partly worked with an index of 4.7. Table 15 shows all 3 products codes in the stone/glass industry in which Mozambique has comparative advantage.

Table 15: All 2- product codes in the plastic/rubber industry in which Mozambique has comparative advantage

Rank	Product code	Product description	2008 RCA	2009 RCA	2010 RCA	Average RCA
1	401213	Retreaded pneumatic tyres of rubber of a kind used on aircraft	14.7148	13.61603	0	9.443612
2	401019	Conveyor belts	1.532291	1.897262	0	1.143184

Source: From the results.

Retreaded pneumatic tyres of rubber of a kind used on aircraft in the plastic/rubber have an RCA index of 9.4. The other product code is conveyor belts with an RCA index of 1.1. Table 16 shows only one products code in the foot wear/head gear industry in which Mozambique has comparative advantage.

Table 16: Only one product code in the foot wear/head gear industry in which Mozambique has comparative advantage

Rank	Product code	Product description	2008 RCA	2009 RCA	2010 RCA	Average RCA
1	670490	Wigs, false bears, eyebrows etc of other material	96.76731	125.4997	38.30347	86.85684

Source: From the results

Wigs, false bears, eyebrows etc of other material in table 16 are the only product code in this industry with an RCA index of 86.9. The inter-industry results of Mozambique are consistent with theory as advocated by David Ricardo that a country will have some industries and products in which comparative advantage will exist.

CONCLUSIONS AND RECOMMENDATIONS

In Mozambique, industries lack comparative advantage. However, in comparison between industries (inter-industry), machinery/electric tops in Mozambique followed by vegetable product industry. Foot wear/head gear demonstrates lack of comparative advantage and it is followed by plastic/rubber industry. In general, Industries in Mozambique show lack of comparative advantage.

It is recommended that Mozambique should enact policies that encourage foreign direct investment (FDI). It is further recommended that Mozambique should be investing in exploring undiscovered endowments which when discovered can boost comparative advantage. Mozambique should consider accepting these results and come up with a concrete industrial policy which can improve export capabilities of Mozambique's industries on the international market.

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