Revealed Comparative Advantage: An Analysis Based on Leading Exports of Sri Lanka

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Abstract

This paper examines the competitiveness of Sri Lanka's leading exports in the international market by using Revealed Comparative Advantage index (RCA) and Revealed Symmetric Comparative Advantage index (RSCA) from 2008 to 2015. The empirical results show that the export sector has changed during the last eight years and Sri Lanka enjoys the comparative advantage in 35 product categories at Standard International Trade Classification (SITC) 3 digit level, while it is dominated by traditional industries and goods which are produced using standard techniques and are characterised by lower cost of research and development. Sri Lanka does not enjoy comparative advantage in other types of products which are characterized by higher research and development requirement.

Keywords: *Export Competitiveness, Revealed Comparative Advantage, Sri Lanka*

Introduction

A careful examination of the Sri Lanka's economic history enables to identify four distinct periods of the country's economic policy, namely, the period before colonisation (before 1505), colonial period (1505-1948), after independence to economic liberalisation (1948–1977) and the period of economic liberalisation and its aftermath (after 1977). During the period of colonisation, Sri Lankan economy shifted to an export and import economy, from a self-sufficient economic system. Further, the structure of the exports and imports changed following the policy of export diversification, which promoted products that were more industrial after trade liberalisation was introduced in 1977. Sri Lankan exports substantially depended on the agricultural sector during the colonial period but there were significant changes in the export composition as export of industrial products increased after trade liberalisation. Therefore, it is important to analyse whether the

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export product portfolio in Sri Lanka is based on principles of comparative advantage.

Ricardo laid down the basic view of Comparative advantage in international trade, and Balassa (1965) developed the concept of revealed comparative advantage (RCA). Further, Dalum et al. (1998) and Widodo (2009) computed a measurement of Revealed Symmetric Comparative Advantage (RSCA) for measuring trade competitiveness.

The critical question of interest concerning whether Sri Lanka's existing major exports are based on comparative advantage, and if so, what conditions determines the strengths. During the last two decades, many studies have been conducted on estimating the trade potentials for different regions of the world. However, as the work relevant to Sri Lanka is limited, the present study expects to find Sri Lanka's export competitiveness in the international market through the Revealed Comparative Advantage (RCA) index in the international market.

Literature Review
Balassa (1977) has undertaken an analysis of the pattern of comparative advantage of industrial countries for the period between 1953 and 1971. The empirical findings suggest a renewal of the product cycle for US that possesses an ever-increasing technical lead based on the standard deviation of the RCA index for different countries, and an association is observed to hold between size and diversification of exports. Furthermore, Balassa's results reveal that the extent of export diversification tends to increase with the degree of technological development and a reversal takes place at higher levels in trade patterns.

Leishman et al. (1999) empirically analysed the international competitiveness for agricultural commodities by applying revealed comparative advantage for wool-exporting countries. Six wool producing countries were selected for measuring RCA over a period of 37 years. RCA index for Australia, Argentina, New Zealand, South Africa, United Kingdom, and Uruguay indicates that GATT Uruguay Round has a significant impact on changing RCA of countries. RCA for the non-Oceanic nations has dropped substantially since the beginning of the Uruguay Round in 1986. This appears to suggest that liberalisation among other factors has had an equally detrimental effect on the comparative advantage of the non-Oceanic countries.

Chow (1990) assessed the shift in comparative advantage of Japan and the Asian Newly Industrialized countries (NICs). As opposed to conventional belief, Chow argued that comparative position had not shifted from Japan to NICs. Detailed analysis of three digit SITC product categories for manufactured goods indicates that NICs exports have not replaced Japan's in the US market. The NICs, rather than replacing the exports from Japan, are merely supplying some complimentary manufactured products to the industrialized markets.

Lim (1997) attempted to analyse the characteristics of the North Korean economy through foreign trade by categorising goods into three categories as Ricardo goods, Hechscher-Ohlin goods, and Product cycle goods. Firstly, Hufbauer and Chilas (1974) divide the commodities into the above three categories. Ricardo goods are characterised by the importance of natural resources in their production. Hechscher-Olin goods are produced with standard technology and manufactured with constant returns to scale in the use of capital and labour. 'Product cycle goods' are produced with advanced technology. The empirical results of the RCA for North Korean trade with the whole world show that North Korea has achieved success in improving the economic structure from Ricadian goods to Heckscher-Ohiln goods. Considering results, it concluded that North Korea has tried to improve its economic structure. Its key group has been changed from the products using natural resources intensively in production to goods using relatively standard technology.

Li and Bender (2003) argued that instead of complimenting or substituting exports, the change in comparative advantage of a country leads to gain as well as a loss for the country. They studied the RCA of manufacturing exports over the period of 1981 – 1999 of eight country groups incorporating 40 economies and put forth the view that a pattern of relative comparative advantage existed.

Moving a step further, Ferto and Hubbard (2003) used the modified RCA index which was developed by Volrath (1991), namely the relative trade advantage. They presented an analysis of the competitiveness of Hungary's agricultural food products against the European Union (EU) as its comparator. They used the 4-digit level of SITC classification from 1992 to 1998. Results suggest that in spite of the changes in the agricultural division of Hungary, the pattern of revealed comparative advantage had been stable.

Batra and Khan (2005) compared India's comparative advantage with that of China and also studied the RCA of the countries. They assessed the RCA at

2-digit and 6-digit level of Harmonized System (HS) classification for the years 2000 and 2003. The authors also found that the comparative advantage of India and China according to factor intensity using the SITC with the aim of assessing whether India's comparative advantage is in labour and resource intensive items or in technology and science-based manufactures. The study does not find any structural change in the comparative advantage of the two countries, except for some sectors within manufacturing. Further, the results show that India and China enjoyed a competitive relationship in chemicals and mineral and metal manufacturing, while a complementary association was observed in labour and resource intensive items such as textile yarn and apparel.

Hanif and Sabina (2006) constructed Balassa's RCA index for the textile sector of Pakistan to analyse the relationship between the financial development and international trade competitiveness. The results show that greater access to external finance has a substantial positive impact on the country's textile sector competitiveness over the period 1974 to 2004. The study concluded that even if the economies of scale, technology, and endowments, are identical between countries, still a country with relatively developed financial institutions will have a better comparative advantage in the production of processed goods which require more external finance.

Akhtar et al. (2008) analysed the competitiveness of footwear industry in Pakistan from a global perspective, using revealed comparative advantage at 2-digit and 4-digit level of its classification for the period of 1996-2006. Calculations indicate that Pakistan's footwear industry has shifted from a situation of comparative disadvantage to comparative advantage, especially after 2003 due to increase in value as well as in the volume of footwear exports, and thus there is an upward movement in comparative advantage.

Jayawickarma and Thangavelu (2010) find that China and India have the comparative advantage in a broad range of manufactured goods as compared to Singapore from the disaggregated analysis at the 2-digit level. The paper also finds that Singapore and China exports are complements, although the degree of complementarity has been declining over time. Meanwhile, Singapore and India exports are found to be stronger complements and stable over time. The results also reveal that China and India exports are strong substitutes. This makes the comparative advantage position of both countries more competitive. The study reported that the exports diversification had broadened the exports of China.

Wei and Zhao (2012) found that the comparative advantage of Chinese manufactured products in the global as well as US markets are gradually increasing. It is pertinent to mention that most products with comparative advantage are low-technology products, while, the comparative advantage of Chinese medium-technology products in the world market has largely improved. However, their RCA index values are low, and these kinds of products with very high comparative advantage are few. Finally, they concluded that the Chinese manufactured exports have a greater comparative advantage in the world market than in the US market.

Shohibul (2013) investigated the comparative advantage of ASEAN countries and China by using revealed symmetric comparative advantage (RSCA) and trade balance index (TBI) approach based on SITC revision 3. The results revealed that China have more established patterns of trade, while ASEAN trade patterns are dynamic, and provide energetic support for the comparative advantage theorem.

Methodology
The concept of revealed comparative advantage (Balassa, 1965 and 1977) pertains to the relative trade performance of individual countries in particular commodities. On the assumption that the commodity pattern of trade reflects the inter-country differences in relative costs as well as in non-price factors, it is assumed to "reveal comparative advantage" of the trading countries. Balassa's (1965) measure of relative export performance by country and industry/commodity is defined as a country's share of world exports of a commodity divided by its share of total world exports. The index for products of Sri Lanka is calculated as follows:

$$RCA_i^{SL} = (X_i^{SL} / X^{SL}) / (X_i^{W} / X^{W})$$

where; RCA_i^{SL} - revealed comparative advantage of product i , X_i^{SL} - Sri Lankan exports of product i, X^{SL} - Total exports of Sri Lanka, X_i^{W} – World export of product i, X^{w} – total world exports. The index of revealed comparative advantage has a relatively simple interpretation. If it takes a value greater than one, the country has comparative advantage in that product. Table 1 provides the classification of RCA index value as presented by Hinloopen and Marrewijk (2001).

Table 1 Classification of RCA Values

Class	RCA Value	Interpretation
a	0 – 1	No comparative advantage
b	1 – 2	Weak comparative advantage.
c	2 – 4	Moderate comparative advantage
d	4 <	Strong comparative advantage

Since the RCA_{ij} turns out to produce an output which cannot be compared on both side of 1. Dalum et al.(1998) and Widodo (2009) have obtained Revealed Symmetric Advantage (RSCA), This measure is calculated in the second stage of analysis as

$$RSCA_i = (RCA - 1)/(RCA + 1)$$

RSCA values vary in the interval from -1 to +1($-1 \leq RSCA_{ij} \geq 1$). $RSCA_{ij}$ index of the country j above zero indicates the comparative advantage for product i. Conversely, $RSCA_{ij}$ index of country below zero indicates comparative disadvantage for product i.

The research attempts to evaluate Sri Lanka's RSCA in exports. The purpose of such an analysis is to obtain a comprehensive view of the comparative advantage that Sri Lanka enjoys in the world. This would enable policymakers to focus on goods in which Sri Lanka's comparative advantage in exports truly lies.

Discussion
According to the results, the RCA index is greater than one for 24 products/ sectors indicating that Sri Lanka enjoys comparative advantage in these sectors in the global market.

As it can be seen from the results, higher RCA values are recorded in class d. The RCA value varying in the interval from 4 to 234.9 revealed that in 2015, Sri Lanka had a strong competitive position in the sectors of agriculture, textile and clothing. In the agricultural sector, the most significant comparative advantage was recorded by tea and malt (RCA = 23.95), spices (RCA=52.46), fruits and fruit preparations (RCA=4.86). In the industry of textile and clothing, a higher degree of comparative advantage was recorded by women's or girl's garments knitted or crocheted (RCA=26.59), articles of apparel of textile fabrics whether not knitted or crocheted (RCA=15.75), men's and boys' garments (15.33), clothing accessories of textile fabrics, whether or not knitted or crocheted (RCA=13.57), articles of apparel and clothing accessories of other than textile fabrics and other materials.

Table 2 The Results of the Evaluation of Competitiveness in Global Market by RCA Index During the Period of 2008 – 2015

Class	SITC Code	Type of Product	2008	2009	2010	2011	2012	2013	2014	2015
b	035	Fish, dried, salted or in brine, smoked fish	1.62	1.63	1.29	1.13	1.74	1.41	1.30	1.09
	047	Other cereal meals and flours	1.45	1.18	1.07	1.09	1.19	1.30	1.31	1.15
	081	Feeding stuff for animals	2.51	2.53	2.74	2.03	2.51	1.60	1.40	1.51
	634	Veneers, plywood, particle board and other wood	1.59	0.78	1.44	1.68	2.04	1.79	1.23	0.85
	635	Wood manufactures	1.16	1.12	1.28	1.38	1.25	1.02	1.0	0.73
	651	Textile Yarn	1.26	1.39	1.25	1.161	1.43	1.32	1.15	0.9
	652	Cotton fabrics, woven	0.85	1.12	0.85	1.16	2.44	2.06	1.94	1.72
	658	Made-up articles chiefly by textile materials	2.54	1.84	2.11	1.88	1.76	2.15	1.65	1.68
	785	Motor cycles	1.77	2.62	2.80	1.85	1.82	1.08	1.20	1.04
	793	Ships, boats, and floating structures	0.32	0.77	1.15	1.58	1.36	1.18	1.20	2.05
	894	Baby carriages, toys, games and sporting goods	0.89	0.88	1.02	1.08	1.30	1.41	1.31	1.00
	899	Miscellaneous goods	1.37	1.11	1.11	1.19	1.13	1.05	1.50	0.84
c	036	Crustaceans, molluscs, and aquatic invertebrates	2.41	2.62	2.66	3.11	3.05	3.89	3.15	1.80
	621	Materials of rubber	1.09	1.52	1.79	3.03	5.12	4.56	3.60	2.36
	655	Knitted or crocheted fabrics	2.22	1.57	1.58	1.57	2.27	1.71	2.44	2.45
	685	Lead	3.21	2.44	3.25	1.48	2.89	4.96	3.46	3.19
	892	Metal containers for storage or transport	2.24	2.24	3.80	8.96	2.32	1.98	2.36	2.04
d	034	Fish,	7.03	6.56	5.36	4.87	5.73	5.88	5.45	3.34
	058	Fruit, fresh, chilled or frozen	3.84	3.64	3.58	4.54	4.39	4.08	5.25	4.85
	074	Tea and Malt	419.5	365.0	387.3	373.7	366.4	350.0	325.6	234.9
	075	Spices	63.75	44.90	61.46	53.25	65.39	85.15	45.89	52.46
	625	Rubber tires, interchangeable tire treads	10.88	7.27	9.97	12.34	12.63	12.67	11.87	9.21
	629	Articles of Rubber	6.14	4.07	5.02	6.03	5.59	5.19	5.34	4.55
	656	Tulles, lace, embroiders, ribbons	3.19	3.86	5.63	4.78	6.31	8.89	6.02	5.17
	666	Pottery	11.79	8.76	8.25	7.14	6.46	7.02	5.28	3.08
	667	Pearls and precious semiprecious stones	9.22	7.82	6.89	5.65	5.92	5.37	3.68	2.38
	841	Men's or boy's garments not knitted or crocheted	15.78	16.08	17.59	16.89	17.45	17.47	16.05	12.29
	842	Women's or girl's garments not knitted or crocheted	21.75	19.97	20.24	19.8	20.41	17.90	14.62	11.16
	843	Men's or boy's garments knitted or crocheted	18.58	16.28	16.55	17.96	19.19	19.38	18.95	15.33
	844	Women's or girl's garments knitted or crocheted	33.49	31.89	30.44	32.10	29.90	31.88	30.23	26.59
	845	Articles of apparel, of textile fabrics, whether or not knitted or crocheted	16.33	17.20	16.60	16.97	17.83	16.18	18.63	15.75
	846	Clothing accessories	16.49	13.21	16.43	17.94	18.53	18.55	16.42	13.57
	848	Articles of apparel and clothing accessories of other than textile fabrics	14.01	13.64	14.68	15.35	15.86	15.91	13.04	10.81

Source: Author calculations based on UN COMTRADE data

Figure 1 Trends in Comparative Advantage by Sectors from 2008 - 2015
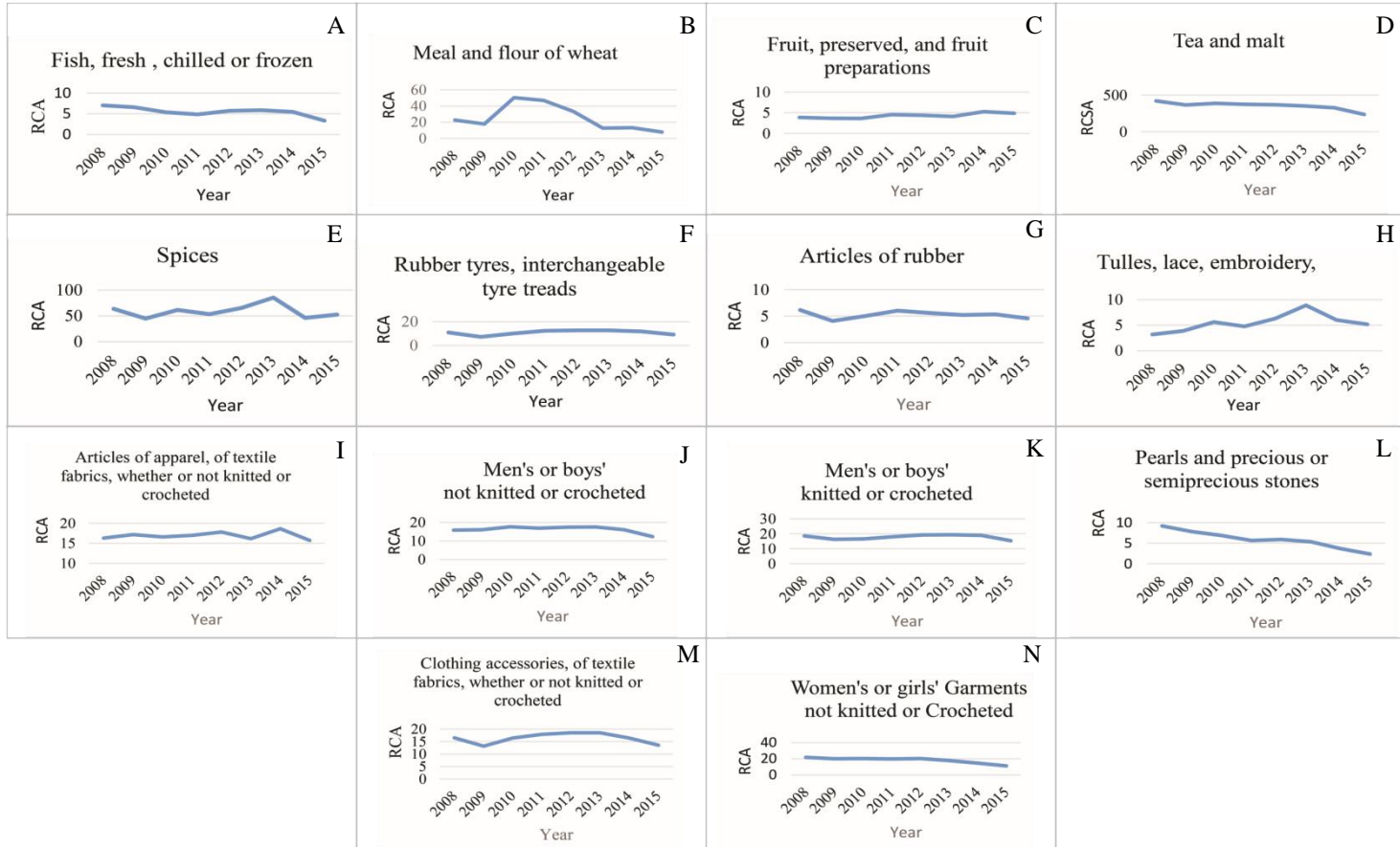
Source: Author calculations based on UN COMTRADE data

Figure 1 exhibits the trends of comparative advantage of product groups in class d. A decrease in RCA is reported in all high RCA product categories in 2015. The reason for the decrease is mainly the drop of total world exports of the products in 2015.

There is an increasing trend in six product groups i.e. fruits and fruit preparations (SITC 058), spices (SITC 075), rubber tires, interchangeable tire treads (SITC 625), tulles, lace, embroidery, ribbons, trimmings and other wares (SITC 656), clothing accessories of textile fabrics (SITC 846) and articles of apparel and clothing accessories other than textile fabrics (SITC 848) from 2008 to 2013. However seven product groups exhibited downward trends in their comparative advantage, they are fish (SITC 034), meal and flour of wheat (SITC 046), articles of rubber (SITC 629), pottery (SITC 666), pearls and precious or semi-precious stones (SITC 667), women's and girl's coats, capes, jackets, suits, trousers, shorts, shirts, dresses, skirts, underwear (SITC 842) and men's or boys' coats, capes, jackets, suits, blazers, trousers, shorts, shirts, underwear, nightwear and similar articles of textile fabrics, not knitted or crocheted (SITC 841).

Revealed Symmetric Comparative Advantage (RSCA)
According to the analysis, Sri Lanka accounted for the high value of RSCA for some sectors (Table 3), and it has changed over the period from 2008 to 2015. In 2008, RSCA value for tea and malt is 0.995 and it had gradually decreased to 0.991 in 2015. Although Sri Lanka increased the value of exports form 1270 USD million in 2008 to 1337.9 USD million in 2015, the export share of the world market has decreased from 19 percent to 15.7 percent in 2015. Further exports of SITC 0 sector accounted for 0.7 percent of world exports of the sector and 0.1 percent of total world merchandise exports in 2015. China, Sri Lanka and Kenya were the top three exporters. China was the country with the highest volume of exports (1489.8 USD million) followed by Sri Lanka (1337.9 USD million) in the year. During the period of study, the average annual growth rate of tea and malt (SITC 074) exports of Sri Lanka was negative: -2.7 percent from 2011 – 2015. This may be the reason for decreasing RCA value for Sri Lanka's exports of tea and malt during the period. The product category, women's or girls' garments not knitted or crocheted (SITC 842) also reported a similar trend during the period 2008-2015.

Sri Lanka accounted second high value of RSCA for women's garments knitted or crocheted (SITC 844) in the year 2015. In 2008, RSCA value for this category is 0.942 and it had gradually decreased to 0.927 in 2015.

Table 3 RSCA for Sri Lanka's Exports

SITC Code	Product Name	RSCA Value		RSCA Classification		Direction of Change
		2008	2015	2008	2015	
034	Fish, fresh, chilled or frozen	0.751	0.540	Advantage	Advantage	-
035	Fish, dried, salted	0.238	0.043	Advantage	Advantage	-
036	Crustaceous, molluses and aquatic invertebrates	0.414	0.285	Advantage	Advantage	-
046	Meal and flour of wheat	0.915	0.770	Advantage	Advantage	-
047	Other serial meals and flours	0.185	0.069	Advantage	Advantage	-
058	Fruit, preserved and fruit preparations	0.587	0.658	Advantage	Advantage	+
074	Tea and malt	0.995	0.991	Advantage	Advantage	-
075	Spices	0.969	0.962	Advantage	Advantage	-
081	Feeding stuff for animals	0.430	0.205	Advantage	Advantage	-
621	Materials of rubber	0.045	0.406	Advantage	Advantage	+
625	Rubber tires	0.830	0.750	Advantage	Advantage	-
629	Articles of rubber	0.720	0.640	Advantage	Advantage	-
634	Veneers, plywood, particle board	0.222	-0.076	Advantage	Disadvantage	-
635	Wood manufactures	0.077	-0.150	Advantage	Disadvantage	-
651	Textile yarn	0.116	0.813	Advantage	Advantage	+
652	Cotton fabrics	-0.079	0.264	Disadvantage	Advantage	+
655	Knitted or crocheted fabrics	0.379	0.420	Advantage	Advantage	+
656	Tulles, lace, embroidery	0.522	0.676	Advantage	Advantage	+
658	Made up articles of textile manufactures	0.436	0.254	Advantage	Advantage	-
659	Floor covering	0.031	-0.156	Advantage	Disadvantage	-
666	Pottery	0.843	0.510	Advantage	Advantage	-
667	Pearls and precious or semiprecious stones	0.804	0.409	Advantage	Advantage	-
685	Lead	0.525	0.523	Advantage	Advantage	-
744	Mechanical handling equipment	0.809	0.814	Advantage	Advantage	+
785	Motor cycles	0.279	-0.811	Advantage	Disadvantage	-
786	Trailers and semi-trailers	0.046	0.631	Advantage	Advantage	+
793	Ships, boats	-0.511	0.346	Disadvantage	Advantage	+
841	Men's or boy coats not knitted	0.880	0.849	Advantage	Advantage	-
842	Women's or girls coats not knitted	0.912	0.835	Advantage	Advantage	-
843	Men's or boy's coats knitted	0.897	0.877	Advantage	Advantage	-
844	Women's or girl's coats knitted	0.942	0.927	Advantage	Advantage	-
845	Articles of apparel of textile fabrics	0.884	0.880	Advantage	Advantage	-
846	Clothing accessories	0.885	0.862	Advantage	Advantage	-
848	Articles of apparel other than textile fabrics	0.866	0.830	Advantage	Advantage	-
892	Printed matter	0.383	0.342	Advantage	Advantage	-
894	Baby carriages, toys	-0.053	0.004	Disadvantage	Advantage	+
899	Miscellaneous manufactured articles	0.157	-0.081	Advantage	Disadvantage	-

Source: Author calculations based on UN COMTRADE data

Sri Lanka increased the value of exports form 650.4 USD million in 2008 to 1036.7 USD million in 2015, the export share of the world market has increased from 1.55 percent to 1.8 percent in 2015. Further exports of this commodity accounted for 2.8 percent of world exports of miscellaneous manufactured articles (SITC 8) and 0.4 percent of total world merchandise exports of 2015.

China, Viet Nam and Bangladesh were the top three exporters of the product in the world market in 2015. Sri Lanka ranked in the eleventh place of the world market with the volume of exports 1036 USD million in 2015. During the period of study the average annual growth rate of Sri Lanka's exports of SITC 844 product category was 5.1 percent but its RSCA value decreased. Decreasing world export of the product by 11.23 percent during the period can be considered as the reason for decreasing RCA and RSCA values. The similar trend occurred in product categories of articles of apparel, textile fabrics, whether or not knitted or crocheted. (SITC 845), men's or boys' garments knitted or crocheted (SITC 843), clothing accessories, textile fabrics, whether or not knitted or crocheted (other than those for babies) (SITC 846), articles of apparel and clothing accessories of other than textile fabrics; headgear and other materials (SITC 848), printed matter (SITC 892), rubber tyres, interchangeable tyre treads, tyre flaps and inner tubes for wheels of all kinds (SITC 625) and spices (SITC 075).

In 2015, the value of RSCA has increased for the product categories fruit, preserved, and fruit preparations (SITC 058) , materials of rubber (SITC 621), textile yarn (SITC 651), cotton fabrics, woven (SITC 652), knitted or crocheted fabrics (SITC 655), tulles, lace, embroidery, ribbons, trimmings and other small wares (SITC 656), mechanical handling equipment and parts thereof (SITC 744), ships, boats (including hovercraft) and floating structures (SITC 793), baby carriages, toys, games, and sporting goods (SITC 894) as a result of increasing word share of Sri Lanka's exports in these categories. The RSCA value of trailers and semi-trailers; other vehicles, not mechanically-propelled; specially designed and equipped transport containers (SITC 786) has increased by 0.585 due to decreasing total exports of both Sri Lanka and the World.

Conclusion

The objective of this paper is to identify Sri Lanka's export product portfolio based on the principle of comparative advantage using revealed comparative advantage index (RCA) over the eight years period from 2008 to 2015. With the purpose of obtaining the comprehensive view of comparative advantage, the paper also used the revealed symmetrical advantage index (RSCA). Results show that both RCA and RSCA index generate the similar findings over the comparative advantage of Sri Lanka's export commodities.

As indicated by RCA and RSCA values, there are four main export categories of Sri Lanka among nine SITC categories which enjoy high comparative advantage. They are: miscellaneous manufactured articles (SITC 8), food and live animals (SITC 0), manufactured goods classified chiefly by materials (SITC 6) and machinery and transport equipment (SITC 7). The results show that Sri Lanka enjoys comparative advantage in export of products based on agriculture or natural resources such as wood, food, vegetables and rubber. Further, the country enjoys comparative advantage in exports of goods which are recognized as products that require low cost in research and development as advanced technology is already available. These products include pearls and precious or semi-precious stones and textile and clothing. Further, these products are more labour intensive and hence generate more employment opportunities. Further Sri Lanka does not enjoy comparative advantage in technology intensive product categories such as chemicals, medicines, machines, etc. The paper concludes that Sri Lanka has comparative advantage in exporting primary goods and labour intensive manufactured goods.

The paper concludes that the current pattern of Sri Lanka's participation in international trade is substantially dominated by relatively higher contribution from the primary and manufactured goods. It has not been a healthy trend to be continued for the country's relatively growing economy. Therefore the country essentially requires paying serious attention to the analysis of the existing export development policy and formulation of much sophisticated policy structure that aims to increase the country's share in the international trade with more diversified, high tech and value added export productions. It requires attention to and investment in research and development as well. Such measures will certainly enhance the country's competitive capacity in international trade and generate higher level of comparative advantage to the economy.

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