Productivity of the agriculture exports of Sri Lanka

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Introduction

Exports of a country have been identified as an important driver of economic growth. The export earnings of Sri Lanka amounted to Rs. 2,185 billion in 2014 which is 22.3 percent of its Gross National Production. Sri Lanka's import bill is much higher than the export earnings at about 30 percent of Gross Domestic Product (GDP) (Central Bank of Sri Lanka, 2014). Understanding its export basket is important in identifying ways to increase export earnings. An important observation related to exports is that the export basket of developing and developed countries are different. It is also understood that primary export products face high competition, receive low unit prices and are subjected to frequent price fluctuations causing to income uncertainty. Therefore, what a country exports or the composition and the nature of a country's export basket shows an important relationship with economic growth it can achieve (Hausmann et al., 2007; Anand et al., 2012; Jarreaua & Poncet, 2010). Hence, this paper looks at the export basket of Sri Lanka for revealed comparative advantage (RCA) and productivity. In particular, it examines the agriculture exports basket because agricultural exports are important for Sri Lanka as it is the main livelihood activity of the rural and poor.

Methodology

Export data for products at HS6 level were downloaded from TRADEMAP for years from 2001 to 2014. The agricultural sectors represented by the HS 01-24 were separated out for the analysis. There are about 1096 agricultural commodities identified under these sectors at HS6 level. RCA of commodities was calculated as follows.

$$RCA_{ij} = \frac{x_{ji}/x_j}{\sum_j x_{ij}/\sum_j x_j} \qquad (1)$$

Where X_{ij} is exports of commodity i from country j. RCA is the ratio of share of exports of a commodity to the total exports of a country and share of that commodity in world exports.

A measure called PRODY, which is the proxy measure used here of a product or sector's level of sophistication, is calculated for all exported commodities for each year.

If country is j, the PRODY for product i is given by,

$$PRODY_i = \sum_j \frac{x_{ji}/X_j}{\sum_j (x_{ij}/X_j)} Y_j \quad (2)$$

Where Y_j is the GDP per capita of country j.

If a product accounts for a large share of poor countries' export baskets but a small percentage of rich-countries export baskets, then it will have a lower PRODY, as it is a "poor-country" export and vise-versa. Using PRODY index for exported commodities, EXPY for each country is calculated using the following formula.

$$EXPY_j = \sum_i \frac{x_i}{X_j} PRODY_i \quad (3)$$

The PRODY and EXPY indices aim to identify products that have high sophistication levels and, therefore, growth-enhancing effects. Since PRODY is measured using the GDP per capita of the typical exporting country, rich countries have a high EXPY and poor countries have a low EXPY.

We finally normalize the export sophistication level is normalized (*EXPYjt)* to a scale from 0 to 100 for every year. The country with the highest EXPY is set at 100 and the country with the lowest EXPY, at zero. The formula applied for this normalization to obtain the Sophistication Index (SI) is:

$$SI_{jt} = \frac{EXPY_{jt} - EXPY_t(Min)}{EXPY_t(Max) - EXPY_t(Min)} * 100 \quad (4)$$

where; SI_{jt} Could be interpreted as a quality spectrum of the export baskets of countries in the world.

Results and discussion

Average PRODY value of the agricultural commodities exported from Sri Lanka is 17,136 and 19,011 in 2001 and 2014 respectively (Table 1)

Table 1 Summary statistics of PRODY of all agricultural exports in the world

Year	**Mean**	**SD**	**Min**	**Max**
2001	17636.59	11217.41	83570.39	1272.32
2014	19232.47	11861.51	87301.48	10.04

For Sri Lanka there were 435 agriculture export commodities in 2014 for which RCA values were calculated. Of them 97 commodities had RCA values >1 and hence was having a revealed comparative advantage. In 2001, there were 354 commodities for which RCA was calculated and out of them 78 commodities with RCA values greater than one. It should also be noted that the large majority of commodities are showing RCA values <1 and hence can be identified as either "marginal" or "disappearing" products (Anand et al., 2010). This implies that Sri Lanka never had RCA in these products or it had lost RCA in these products. The

Table 2 lists the commodities with highest RCA values for Sri Lanka for year 2014 and 2001. It is evident form RCA values that Sri Lanka's major agriculture exporting sectors such as tea, coconut and spices are the ones with relatively higher RCA.

Table 2 Highest RCA commodities, their PRODY values and export shares for Sri Lanka

2014				2001			
Product Code	RCA	PRODY	% of exports	Product Code	RCA	PRODY	% of exports
90610	546.65	7587.68	4.18%	90611	341.28	8293.36	4.41%
120300	405.79	1870.37	0.68%	90230	194.67	13261.70	25.31%
90230	358.50	3854.09	27.15%	30349	154.61	6870.26	3.08%
90240	326.99	3397.62	40.25%	90240	121.48	5310.43	27.25%
80111	221.61	8747.39	3.17%	80280	82.41	12019.17	2.15%
80119	138.99	6409.44	0.51%	80111	81.24	11466.74	4.53%
30229	98.93	12283.30	1.25%	90821	67.23	12220.08	0.11%
110630	98.29	15926.89	0.58%	30232	60.53	8080.74	1.32%
90700	84.49	2259.12	1.30%	80112	58.79	5887.63	0.50%
90810	58.80	9708.30	0.34%	90811	55.12	11959.71	0.44%

It could be observed that the income levels associated with commodities with higher RCA values as measured by PRODY values are less than the average PRODY values of all agricultural commodities exported in the world (See Table 1 for averages) as well as the average PRODY for agricultural exports commodities of Sri Lanka. These values show that, Sri Lanka is having revealed comparative advantage for commodities which are exported by low income countries.

Table 3 and 4 compare top 10 RCA values and respective PRODY values of India and China respectively. It could be observed that similar to Sri Lanka, India is having RCA for commodities which are exported by low income countries. However, PRODY values associated with commodities of higher RCA for China in 2014 show that they are exported by high-income countries. From 2001 to 2014, China shows a clear shift in commodities with high RCA from those exported by low-income countries to high income countries.

The average PRODY value of all the agriculture commodities exported in 2014 is 17,636.59 and that of exported by Sri Lanka in 2014 is 18,342.11 which is little higher than the world average. Only six out of listed top twenty export commodities have above average PRODY values. Therefore, it can be inferred

that the income level associated with Sri Lanka's highest export earning agricultural commodities are very low.

Table 3 Highest RCA commodities, their PRODY values and export shares for India

2014				2001			
Code	RCA	PRODY	% Value of Exports	Code	RCA	PRODY	%Value of Exports
71140	27.98	3473.42	0.16%	130211	49.62	13542.62	0.13%
90421	31.28	9133.04	0.88%	130190	55.29	1166.29	1.29%
230649	31.90	15681.01	0.85%	81290	59.34	1891.85	0.90%
91030	41.00	6485.14	0.29%	50610	60.50	5705.20	0.33%
50100	43.64	5139.66	0.17%	71390	60.98	2819.79	0.47%
90832	44.13	11196.75	0.05%	130110	68.81	3657.67	0.48%
130232	44.14	9431.91	4.92%	80132	76.38	3636.00	5.80%
90931	47.71	506.54	0.74%	91030	99.89	3198.65	0.26%
151530	48.47	7540.84	1.68%	151530	109.26	4131.80	2.26%
130211	55.07	6331.95	0.06%	120730	118.19	2729.13	0.12%

Table 4 Highest RCA commodities, their PRODY values and export shares for China

2014				2001			
Code	RCA	PRODY	% Value of Exports	Code	RCA	PRODY	% Value of Exports
30193	6.12	21721.17	0.19%	71029	12.20	7188.78	0.55%
71440	6.28	5360.82	0.14%	220190	12.78	2692.82	1.96%
30461	6.36	12545.59	1.12%	90210	13.30	7360.38	0.57%
20751	6.51	21278.04	0.05%	91010	13.66	6049.47	0.48%
200591	6.65	20739.37	0.35%	71190	13.95	9037.44	0.97%
71239	6.83	26928.90	1.79%	230810	14.91	4703.44	0.02%
50210	6.94	24574.07	0.13%	50210	15.25	8107.26	0.45%
71233	7.59	15870.54	0.09%	140110	15.31	4761.50	0.14%
160417	7.60	15555.76	1.13%	151540	16.67	6406.09	0.08%
71232	7.72	13830.87	0.81%	90220	17.58	3966.13	0.98%

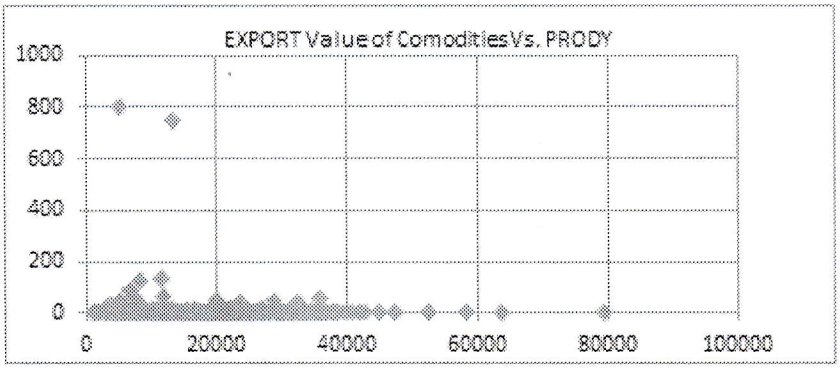

Figure 1 Export values and PRODY values of Sri Lankan exports

Figure 1 shows the relationship between values of exported agriculture commodities from Sri Lanka on 2014 in y-axis and their PRODY values on x-axis. It is clearly evident that most of the high export income earners are less sophisticated.

According to ranking of countries by the productivity of their agriculture export basket Switzerland is ranked at 100 (i.e. highest). Its EXPY value for 2014 was 28,646. Sri Lanka is ranked at 38.7 in 2014. Of 189 countries for which EXPY value was calculated in 2014, there are 104 countries with higher EXPY ranking and hence these are with higher productivity levels than Sri Lanka.

Sri Lankan government has identified the need to diversify its agricultural production and have identified certain crops is given policy attention. The list of such crops include finger millet, green gram, black gram, soya bean, cowpea, ground nut sweet potato, manioc, brinjal, okra, beet root, cabbage, gingelly, carrot, tomato, leeks, luffa, raddish, knol khol, bitter gourd, snake gourd, pumpkin and beans. Table 5 depicts the PRODY values of commodities selected from the above list of crops.It can be observed that, most of these crops are less sophisticated. It should also be noted that PRODY values of raw products are much less than processed products.

Table 5 PRODY values of commodities with policy interest

Product Code	PRODY	Product Code	PRODY
70610 (carrots)	14810.02	70390 (leeks)	16041.7
70690 (salad beetroot, radish)	14316.27	71410 (manioc)	6060.624
70810 (peas)	8851.523	71420 (sweet potato)	9489.367
70820 (beans)	6847.422	100820 (millet)	1765.263
70990 (vegetables)	5209.473	100829 (millet)	9218.49
70999 (vegetables)	11073.34	120100 (soya bean)	9651.416
70993 (pumpkins)	11566.52	120190 (soy bean)	17092.46
71029 (legume)	5161.269	120210 (ground nut)	2587.563
70930 (eggplant)	14341.62	120220 (ground nut)	2847.143
70200 (tomatoes)	18050.48	120241(ground nut)	13985.73
70490 (cabbage)	27092.29	71331 (mung gram)	1276.59
70511(lettuce)	22712.49		

Conclusion

Literature suggests a correlation between economic performance and the productivity level of the export basket. Therefore, export basket is an area that should not be neglected to study if a country is interested in economic growth. Using most recent TRADEMAP data for over 5000 export commodities at HS6 level of about 190 countries the EXPY index was calculated for the productivity

level of the agricultural export basket of each country particularly for Sri Lanka. Looking at the export basket of Sri Lanka it was found that its large agricultural export commodities are less sophisticated and low quality export commodities. Sri Lanka mainly exports agriculture commodities which are exported by less developed countries. Productivity level of the export basket has been declined since 2010. It is observed that high income countries export mainly processed and value added agricultural commodities and these commodities are associated with higher productivity values than raw products. The empirical evidence found by Hausman et al. (2007) shows that ,countries that export a set of goods that is placed higher on the quality spectrum tends to perform better providing a clear policy implication for Sri Lanka in directing its future activities. The clear implication is that the gains from globalization depend on the ability of countries to appropriately position themselves along this spectrum.

Keywords: *Economic growth, export, sophistication.*

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