Export market diversification and export performance of Sri Lanka: a cointegration analysis

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ABSTRACT

This paper aims to investigate the existence of geographical export market diversification and its relations with export performance of Sri Lanka. The paper identifies the existence of geographical export market diversification by using Herfindahl Index, and empirically investigates the long run and the short run relationship between market diversification and export performance. The time series data extracted from the World Bank database are used to construct Index and appropriate variables. Johansen's co-integration analysis was performed to investigate the relationships between export market diversification over a period 1999 to 2015. The trend of the Herfindhal Index reveals that market diversification exists in the structure of export patterns. The findings derived from the analyses further suggest that the existence of geographical export market diversification of Sri Lanka has long run relationship with export performance.

Contribution/ Originality
The major contribution of this paper is that it classifies export market share to reveal structural changes among export partnering countries of Sri Lanka and detects the degree of geographical export market diversification. Furthermore, the findings of this paper add new knowledge to the existing literature in Sri Lankan perspective, and this would be useful to trigger off sound policies to come out from the trade deficit trap.

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1. INTRODUCTION

Sri Lanka has been experiencing trade deficit since 1977 where the trade liberalization policy was materialized. Of course, the trade deficit is not always problematic, but however Sri Lanka's trade deficit has drawn much concern because of its trend, causes, composition and size, and becoming extremely crucial for last two decades, alarming policy makers to pay immediate attention to sound policies to recover the external sector. The indicators of external sector of Sri Lanka are not producing favorable and constructive information over the recent decades. Especially, for the last two decades, the trend and prognosis of trade balance, tariff and non-tariff barriers, the extent of product and market concentration, and productivity of the resource and factors are becoming a vitally debatable topic in the Sri Lankan context. As a whole, the present and past trend, and the forecasted trade balance have not given any hope for the external sector of Sri Lanka.

The export performance of goods and services as a percentage of GDP has considerably declined from 35% in 1995 to 21% in 2009. After 2009 the trend was manageable to seem stable with minor fluctuation between 21% and 23%. However, the balance of trade has been significantly increased in negative term for last two decades with the record of the average trade deficit is 475.70 million USD from 2003 until 2016 that was peaked to 1100 million USD in 2011, and recorded at 922 million USD at the end of 2016. Moreover, Sri Lankan share in global export and share of GDP has been in decline (Saman, 2013) whereas imports in increase because inescapably the government revenue, post war growth and exports are heavily dependent on imports. Thus, it is seriously noted that the expansion between export and import has been increasing after 2009, alarming to see more concentration over this sector.

Asia has a low degree of export concentration despite it is identified as a region with the highest export dependency. However, the case of Sri Lanka draws much attention with opposite characteristics. Export market structure and products are labeled as highly concentrated. Though, the concentration pattern can be identified in both production and export market, the objective of this study is only focusing on export market diversification but excludes investigation on product diversification. Sri Lanka's exports were highly depended on the EU and North-American markets recorded at 69.6% in 1999, of which market shares for USA and UK were 39.9 % and 13.4%, and later in 2000 which were 41.2% and 13.70%, respectively. Others were shared among other EU member countries. The export is partnering countries in this market are UK, Germany, Belgium, Netherlands, France, Italy, Turkey, Canada, and the USA. The rest of the market share is recorded of some Arabic, Asian, and other countries. However, the motivation of this study was triggered because of the notable change in the geographical export market share of Sri Lanka since 2000. That is the market share for the USA market has declined from 41.2% in 2000 to 21.28% in 2010, and then has a slight improvement to 27.7% in 2015, whereas the market share of UK declined from 13.7% in 2000 to 10% in 2015. At the same time, market share of Asian, Arabic, and other number of countries that have very less market share each, together have an improvement during this period. Further, it should be noted here that while the overall export performance of Sri Lanka is on the decline there is a change in the structure of market share. Therefore, this study measures the degree of geographical export market diversification and investigates whether this export market diversification can be motivated to be used as a one of the strategies by policy makers among other policy moves such as investment promotion, import substitution, trade liberalization etc.

A numerous studies have already produced evidence on what makes the successes of exporters in foreign markets one of which is geographical export market diversification because export performance plays an imperative role and becoming a driving force of economic growth. Empirical interest on diversification is not new (Olivier *et al.,* 2013) and diversification is seen as a one of the desirable trade objectives (Paul *et al.,* 2009). Diversification is defined in various manners such as the change in existing composition of product mix or export market destination or spread of product over many sectors (Salomon, 2010; Berthelemy and Chaivin, 2000; Ali *et al.,* 1991). However, the impact of geographic or market and product diversification is still a substantial debatable topic in

international trade literature (Jerzy *et al.,* 2012) because the countries that have more diversified export (Horizontal and vertical product) will have stable export revenue and which would lead to long-run growth (Dierk and Felicitas, 2007; Fahim, 2010; Sheila and Michael, 1997; Manuel, 2008). On the contrary, highly concentrated market or product would lead vulnerable condition in export performance and export revenue stream (Federico and Kiichiro, 2003). On the other hand, the countries that have a high concentration in export also have much deviation in export earnings. At the same highly concentrated product structure naturally set the country to move towards highly concentrated in export market. Sri Lanka has to factor endowment to be characterized to have concentration over a less number of products. This structure associates with the theories of Devid Ricardo and Heckscher-Ohlin models, implying that factor endowment accelerates international trade but not about diversification. Therefore, the characteristics of concentrated export market structure are also streamlined with factor endowment and export product mix of Sri Lanka. Not surprisingly, a wide range of product only would lead to have the opportunity to get a wide range of international markets (Michael *et al.,* 1997). When exports are more diversified the country can enjoy knowledge spillover, productivity improvement, efficient management, low risk, and technical and technology enhancement (Gutierrez-Pineres and Ferrantino, 2000; Chan *et al.,* 1993). Export diversification also reduces exposure to external shocks, macroeconomic volatility (Manuel *et al.,* 2011). Moreover, market diversification will enable export firms to make use of excess manufacturing capacity by fully exploit available economies of scale and finally achieve stabile status (Craig and Yunus, 2009). In addition, increasing levels of diversification will have positive effects on performance due to economies of scope and scale, market power effects, risk reduction effects and learning effects (Michael *et al.,* 2000). Ade (1993) also emphasized that market diversification strategy produces better performance in the case of MNEs than market concentration strategy. According to Jean-Emile and Daniel (1985), based on U.S market, slow expansion exporters have the characteristics on the high concentration market whereas moderate and rapid exporters are characterized by greater market diversification. Craig and Yunus (2009) have concluded that chances to diversify into new markets being a significant predictor of export marketing performance. According to Michael *et al.* (2000) diversification strategy has significant effects on the performance of Japanese multinational companies. Opinion of Craig and Yunus (2009) is that micro and macro level of export of goods and services are becoming important for the survival of domestic firms and to overcome trade deficit issues. In contrast, Sheila and Michael (1999) found that export diversification does not cause growth in the case of Colombia. Adding to that George (2001) has also classified diversification into three, such as product, functional and geographic diversification and concluded that diversification and the direction of diversification collectively explain a higher proportion of the export and sales stability only for unrelated product diversification but not for geographical or functional diversification.

The rest of the paper is organized as follows. Section 2 measures and discusses existence of export market diversification. Section 3 presents analytical methods and briefly discusses empirical findings. The final section summarizes the main results and concludes with policy suggestions.
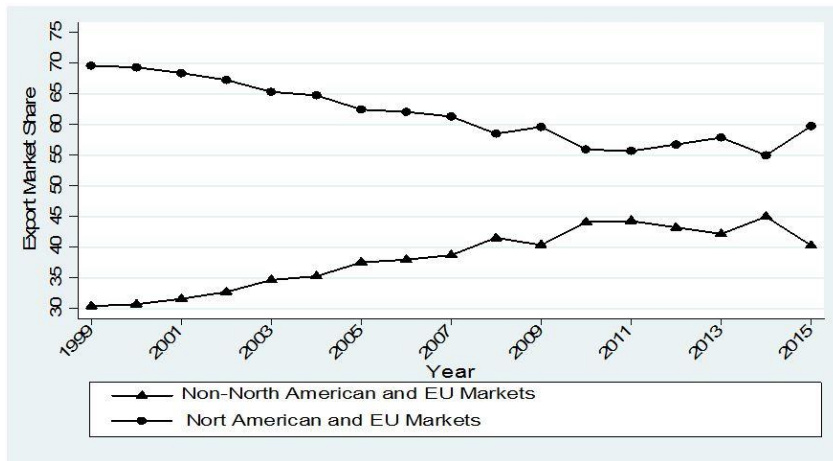
2. EXISTENCE OF MARKET DIVERSIFICATION

Figure 1: Change in market share of Sri Lanka

Source: World Bank World Development Indicators

The annual time series data, running from 1999 to 2015, were extracted from the World Bank Development Indicators database to measure market share and index, and construct variables. The whole export market share for Sri Lanka can generally be classified as EU, North American, Asian, Arabic, and other countries. However, this study classifies the whole export market into two (North American and EU Market, and Non-North American and EU market) to avoid complication in figures and to have a clear disclosure of the structural change in export market pattern. The first category includes North American and EU countries that played a major role entertaining Sri Lankan products, and ensured stable export revenues to Sri Lankan exporters. Thus, North American and EU market include USA, Canada, UK, Italy, German, Belgium, Netherland and France. The second category includes Asian, Arabic, Australia and other countries. The Figure 1 shows the horizontal bottle shaped curves that disclose how market concentration get diversified among the above said two groups of markets over the period of 1999 to 2015. The upper boundary curve continuously falls till 2010 and takes stable with minor volatile. The lower bound curve has a synchronized move upward. Thus, this trend clearly shows that due reasons market concentration of a less number of countries, particularly USA and UK is getting diversified over a relatively wide range of Asian and Arabic countries.

For more in detail, the Herfindahl Index (HI) which is commonly used for concentration studies, sometimes called as Hirschman-Herfindahl index (HHI) (Manuel *et al.,* 2011), is used to measure the existence of market diversification and its trend. The formula used is the following:

$$HI = \sum_{i=1}^{n} (Si^2)$$

where Si is the market share of the ith firm. This study applies this formula to study the export market concentration of Sri Lanka. Therefore, this study takes Si into account to reveal market share of the ith export partnering country of Sri Lanka. It is calculated by squaring the market share of each export partnering country in the global market, and the index ranges from close to zero to 10,000. The Herfndahl index is sometimes referred to some modified forms that ranges from zero to one (Salomon, 2010; Olivier, 2013).
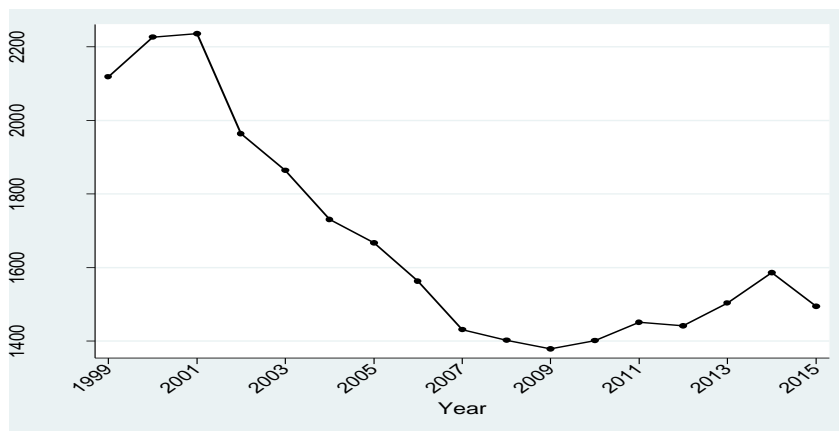
Figure 2: Trend of herfindahl index

The Figure 2 shows the trend of Herfindahl Index that indicates transformation in market concentration. A steady decline of the Index value from 2100 to 1500 over the period indicates declining in concentration and move towards market diversification.

3. ECONOMETRIC METHODS

Though the index has clearly defined that Sri Lanka's export market is streamlined with diversification, however, the relevant econometric techniques are required to test whether the export market diversification has any relationship with export performance because though the export performance is on decrease, the market diversification may serve as one of the pushing factors of export performance. Therefore, this paper employs Co-integration analysis to test long run as well as short run dynamic relations.

3.1. Model Specification
In this paper the empirical model form for the specification can be formed as follows:

$$lnexgdp_t = \beta_0 + \beta_1 lnherfin_t + \beta_2 lnwpcin_t + \beta_3 lnimp_t + \beta_3 lninf_t + \varepsilon_t \qquad \text{............. (1)}$$

where, *lnexgdp* is logarithm of export as a percentage of GDP, *lnherfin* is logarithm of Herfindhal Index serves as a proxy variable of market diversification *, lnwpcin* is logarithm of weighted average of per capita income of export partnering countries, *lnimp is* logarithm of imports, *lninf* is logarithm of inflation, and ε and *t* are error term and time respectively.

3.2. Unit root test
The Augmented Dickey-Fuller (ADF) was performed in order to test stationary properties of time series data because OLS technique with the non stationary property will result in a spurious regression. The ADF test here consists of estimating the following regression.

$$\Delta Y_t = \Phi + \beta_t + \delta Y_{t-1} + \sum_{j-1}^{m} \alpha_i \Delta Y_{t-i} + \varepsilon_t \qquad \text{............. (2)}$$

where, Δ is the first difference operator, *m* is lag, *t* indicates trend, *Φ, β, δ* and *α* are parameters to be estimated and *ε* denotes a stochastic error term. A series Y_t is said to be integrated of order *d* denoted by *Yt ~I(d)* if it becomes stationary after differencing d times and thus *Yt* contains *d* unit roots. A series which is I(0) is said to be stationary. The optimum lag length was selected using Schwarz Bayesian Criterion (SBC).

Table 1: Unit root analysis results

Variables	Test statistic at Level	Test static at first difference	Lag	Deterministic Term	Critical Values			Order of Integration
					1%	5%	10%	
lnexgdp	-0.474	-3.331	0	Constant	-2.65	-1.771	-1.35	I (1)***
lnherfin	-1.424	-2.666	0	Constant	-2.65	-1.771	-1.35	I (1)***
lnwpcin	-0.05	-9.51	4	Trend	-4.38	-3.6	-3.24	I (1)***
lnimp	-1.387	-3.939	1	None	-3.75	-3	-2.63	I (1)***
lninf	-3.584	--	0	None	--	--	--	I (0)***

*, **, *** indicate 10%, 5% and 1% significant levels, respectively

The Table 1 shows the results of the unit root analysis of the variables incorporated into the study. According to the results, the null hypothesis that no unit root can be rejected for the variables *lnexgdp, lnherfin, lnwpcin* and *lnimp* as they are non stationary but become stationary at first difference I (1). Null hypothesis cannot be rejected for the variable *lninf* as it is stationary I(0).
Co-integration Analysis

Johansen (1988) proposed a general framework for considering the possibility of multiple cointegrating vectors. Johansen's methodology begins with the point in the Vector Auto Regression (VAR) of order *p* given by

$$\boldsymbol{Z}_t = \varPhi + \varUpsilon_1\boldsymbol{Z}_{t\text{-}1} + \varUpsilon_2\boldsymbol{Z}_{t\text{-}2} + \ldots\ldots + \varUpsilon_p\boldsymbol{Z}_{t\text{-}p} + \varepsilon_t \qquad \ldots\ldots\ldots\ldots\ldots (3)$$

where, $\boldsymbol{Z}_t$ is an $n \times 1$ vector of the variables that are integrated of order one denoted as I (1), ε_t is an $n \times 1$ vector of innovations while $\varUpsilon_1$ through $\varUpsilon_p$ are $m \times m$ coefficient matrices. The VAR (p) can be reformulated in a vector error correction model as follows:

$$\Delta\boldsymbol{Z} = \varPhi + \Gamma_1\Delta\boldsymbol{Z}_{t\text{-}1} + \Gamma_2\Delta\boldsymbol{Z}_{t\text{-}2} + \ldots.. + \Gamma_{p\text{-}1}\Delta\boldsymbol{Z}_{t\text{-}p+1} + \Pi\boldsymbol{Z}_{t\text{-}1} + \varepsilon_t \qquad \ldots\ldots\ldots\ldots\ldots (4)$$

where, the matrix Π contains information on the long run relationships. Hence, the cointegration analysis is employed to test the long run relationship among the variables. The Johansen's multiple-trace test method was adopted in determining the number of cointegrating equations. The Schwarz Bayesian Criterion (SBC) method was used to select an optimum lag length.

Table 2: Johansen tests for cointegration

Maximum rank (r)	Parms	LL	Eigenvalue	Trace Statistic	5% Critical Value
0	05	69.3936	.	78.4616	68.52
1	14	88.2892	0.9194	40.6703*	47.21
2	21	97.4775	0.7062	22.2937	29.68
3	26	104.9002	0.6283	7.4483	15.41
4	29	108.3635	0.3698	0.5217	3.76
5	30	108.6243	0.0341	.	.

The trace statistics in Table 2 at r = 0 of 78.4616 exceeds the critical value of 68.52, leads to reject the null hypothesis that no co-integrating equations among the variable, but at r = 1 results that one co-integrating vector exists between the variables. Since the variables are found to have a cointegrating relationship, the Vector Error Correction method (VECM) is employed to describe the dynamic interrelationship among the stationary variable.

Table 3: Normalized cointegration coefficients

Variables	coefficients	Standard Error	t-value	p-value
lnexpgdp	1	-	-	-
lnherfin	-0.702	0.274	-2.560	0.010
lnpcinw	-4.294	0.883	-4.860	0.000
lninf	0.393	0.036	10.810	0.000
lnimp	-0.248	0.105	-2.360	0.000
cons	0.031	-	-	-

The Table 3 shows the results of normalized cointegration coefficients. The results disclose that all variables are statistically significant at the 1% level. Hence, the model can be formed by reversing the signs according to Johansen's method as follows:

$$lnexpgdp = 0.0313 + 0.7019 \, lnherfin_t + 4.2942 \, lnpcinw_t - 0.3937 \, lninf_t + 0.2485 lnimp_t \,.. (3)$$

Since all variables are in logarithm, the coefficient values explore elasticity values of each variable. Except inflation other variables are positively associated with export performance. Thus, the coefficient for Herfindhal Index shows that if market diversification is 10% there will be a 7% increase in export, revealing that market diversification for Sri Lankan export will stimulate export volume. The coefficient value of the weighted average of per capita income of the people in the export partnering country is relatively high and indicating 40% export increase in association with a 10% increase in per capita income. Further, a 10% increase in import is likely promoting export by 24%. Obviously, the association between export performance and inflation found to have negative, indicating that 3% export declines can be in association with 10% of inflation.

Table 4: Error correction model

Variables	D_lnexpgdp	D_lnimp	D_lninf	D_lnpcinw	D_lnherfin
α Coefficients	-0.3190***	-0.5301***	-2.7326***	-0.0838***	-0.1328
Standard Errors	0.1046	0.2525	0.7736	0.0338	0.0900
T-Statistics	-3.05	-2.10	-3.53	-2.48	-1.48

*, **, *** indicate 10%, 5% and 1% significant levels, respectively

The Table 4 shows the results of the Error Correction model of Johansen's method. According to the results, except the variable of Herfindhal Index, all other variables are found to have statistically significant at 1%, revealing that they have a significant effect on export performance in the short run where as the Herfindhal Index does not have a short run effect. The coefficient for *D_dlnexpgdp* discloses that the speed of adjustment to the long run equilibrium is significant and can be concluded that 31% of deviation would be eliminated annually.

4. CONCLUSION AND POLICY RECOMMENDATION

The principle objective of this study was to investigate whether export market diversification can promote export performance in Sri Lanka. The results detected the existence of diversification among the export partnering countries of Sri Lanka. The results obtained from econometric analyses suggest that there is optimism for Sri Lanka's external sector to enhance trade performance by concentrating on market diversification strategies. However, export market diversification is a slow process and this process need to be sustained by appropriate strategies (Federico and Kichiro, 2003). The important thing is what sort of strategies likely promotes export market diversification and how the strategies are listed of government priorities are much more questionable (Olivier *et al.,* 2013). Further, though the export growth is certainly caused by market diversification, it also depends on the foreign market mix (Jean-Emile and Daniel, 1985). While Patrick (2007) and Manuel (2008) recommend quality of infrastructure, resource endowments, tariff, non-tariff and diplomatic tie

policies of export seeking and partnering countries, Paul *et al.* (2009) noted three required critical elements in shaping a country to reap success of market diversification that reallocation of resource among the sectors based on their performance, accelerating backbone services to have potential support international trade and pro-active policies to overcome government and market failure. (Manuel *et al.,* 2011) suggest from a large set of data of countries that exchange rate volatility, human capital development and remoteness of the country are positively associated with market diversification. Allen and Ben (2011) suggest that trade facilitation that emphasizes reducing export, market entry and international transport costs can be highly effective promoting export diversification. Therefore, with the development of appropriate instrument Sri Lanka has to find the ways to materialize appropriate strategies to capture a wide range of market share in the global market.

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