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Revisiting the Export-led Growth Hypothesis for Liberalised Sri Lanka

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Abstract

The export-led growth (ELG) hypothesis postulates the existence of a strong positive linear relationship between exports and output growth in the long run for a given economy. The empirical nexus between exports and economic growth so far is mixed. Thus, this paper aims to empirically shed more light on the causal relationship between exports and economic growth in the context of a small open economy by re-investigating the validity of the ELG hypothesis for Sri Lanka. Using time series data on Gross Domestic Product (GDP), exports, imports and remittances over four decades from 1980 to 2019 during which Sri Lanka had a liberalised economy regime in place, Johansen cointegration test results provide evidence of a long run association among the variables. However, vector error correction model (VECM) results fail to confirm the long run relationship between exports and GDP. Consequently, this paper finds no evidence to support the validity of the ELG growth hypothesis for Sri Lanka. Hence, the findings raise the question of the efficacy of the trade policies that Sri Lanka has adopted since the early 1980s.

Key Words: *Economic growth, Export, Export-led growth hypothesis, Sri Lanka*

JEL Classification: *F14; F43; N15*

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1. Introduction

Sri Lanka opened its economy in late 1977 embarking on a series of liberalisation reforms, becoming the first South Asian country to do so (Kelegama, 2000). Opening up helped Sri Lanka to attract more Foreign Direct Investment (FDI) inflows, establish a sound institutional framework and adopt a flexible exchange rate system (Dias, 1991). Specifically, it facilitated the economy to get integrated to the world economy creating new trade opportunities. This was followed by moves to simplify foreign trade procedures and a gradual reduction in tariffs and non-tariff barriers. As a part of this, industrial and trade policies were directed at promoting exports. Of them, the important policies were the establishment of export processing zones and providing financial incentives such as tax exemptions, tax holidays and tax reductions to export oriented industries. Following the liberalisation, Sri Lanka reported the notable annual average growth of Gross Domestic Product (GDP), imports, exports and remittances at 4.9 per cent, 7.7 per cent, 7 per cent and 14.2 per cent, respectively, during the four decades ending in 2019 (Central Bank of Sri Lanka, 1980-2019).[2]

However, during the post-liberalisation period, Sri Lanka has oscillated between protectionist and liberalisation strategies such as state controls and import substitutions (IMF, 2018; Athukorala and Rajapatirana, 2000). During this period, trade as a percentage of GDP has gradually been slowing down (Central Bank of Sri Lanka, 1978-2019).[3] Also, Sri Lanka's exports as a share of GDP was lower than some of its regional peers. For instance, in 2019 exports of goods and services as a share of GDP was 107 per cent in Vietnam, 65 per cent in Malaysia, 61 per cent in Cambodia, and 58 per cent in Thailand, in contrast to 23 per cent in Sri Lanka (World Bank, 2020). In addition to exports, remittances have also been a significant source of foreign exchange inflows for Sri Lanka since liberalisation. These remittances are usually used for either investment in capital goods or consumption, particularly for the consumption of imported goods. However, remittances may contribute to economic growth when they are mostly used for capital investments.

[2] Please see Table A1 in Appendices, for details.

[3] Please see Figure A1 in Appendices, for a detailed exposition.

Even though exports as a percentage of GDP have been declining, the impressive output growth in Sri Lanka during the four decades under review poses the question whether trade liberalisation, specifically, exports, exert a significant impact on output growth. It is also of interest to examine whether the ELG hypothesis holds for Sri Lanka. Theoretically, the ELG hypothesis suggests that there is a strong positive linear relationship between exports and output in the long run for a given country.

Empirically, the validity of the ELG hypothesis has been investigated by several researchers in respect of a number of economies by using different methodologies and variables. However, only a few published studies tested the validity of the ELG hypothesis for Sri Lanka. Previous studies have employed a wide range of explanatory variables including exports, imports, investments, trade openness, capital formation, and employment among others. Also, those studies cover different sample periods. Thus, the findings of these studies are mixed and inconclusive. Against this backdrop, revisiting the validity of the ELG hypothesis for Sri Lanka by including new explanatory variables for different sample periods is of interest to policymakers. Hence, adopting Ahmed and Uddin (2009)[4] for Bangladesh, this paper contributes to the literature by reinvestigating the validity of the ELG hypothesis for Sri Lanka including remittances as an explanatory variable in the model for the first time. Similarly, this study covers the whole post-liberalisation period spanning over four decades from 1980 to 2019.[5]

Using annual data on GDP, imports, exports and remittances, Johansen cointegration test results provide evidence for long run cointegration among the variables. However, vector error correction model (VECM) does not suggest the existence of any long run or short run relationship between exports and output. Hence, this study fails to support the validity of the ELG hypothesis for Sri Lanka. However, Granger causality test results show a unidirectional causality running from imports to GDP, and remittances to imports. The findings of this study

[4] Ahmed and Uddin (2009) investigated the causal nexus between exports, imports, remittances and GDP growth for Bangladesh and found limited evidence to support the ELG hypothesis as exports cause GDP growth only in the short run.

[5] After liberalisation, both exports and imports reported exponential growth in 1978 and 1979 reflecting immediate positive response to policy change in the former case and release of the pent-up demand in the latter. The economy started to stabilise from 1980. Also, the government significantly intervened in foreign trade in 2020. Therefore, this study considers only the period from 1980 to 2019 that had a liberalised economy regime.

facilitate Sri Lanka to revisit its policies and reorganise the institutions that facilitate trade. Specifically, findings will help policymakers in reformulating tariff, export diversification and resource reallocation policies.

The paper is organised as follows: Section 2 discusses the related theoretical and empirical literature. Section 3 presents the data, model specification, and the empirical investigation procedure. The empirical results and discussions are presented in Section 4. Section 5 concludes with policy recommendations.

2. Literature Review

2.1 Theoretical Foundation

The theoretical foundation for the relationship between trade openness and economic growth can be traced far back to 1700s. The founders of classical theory have extensively discussed the importance of trade openness for economic growth and the advantages that can be drawn by countries through liberalised trade. Among them, Smith (1776), argued that all nations would gain simultaneously, if they practised free trade and specialised in accordance with their absolute advantage. Alternatively, discussing the comparative advantage, Ricardo (1817) showed that counties can reallocate their scarce resources to more productive sectors to improve the wellbeing, if they were open to trade. Even in the subsequent periods, the success of the free market, outward oriented policies and trade liberalization for generating export oriented growth has widely been accepted by academics (Feder, 1983; Krueger, 1978; Krueger, 1990; Krueger, 1998). The positive causality running from exports to output growth takes many forms such as increasing economies of scale (Helpman and Krugman, 1985), enhancing technological improvements or fast technology diffusion (Grossman and Helpman, 1991), relaxing the foreign exchange constraints by increasing a country's capacity to import capital goods and raw materials (McKinnon, 1964; Habiyaremye, 2013), and enhancing economic efficiencies through increased competition (Krueger, 1980). However, refuting the validity of the ELG hypothesis, Pack (1988) suggests that both economic growth and trade are the outcomes of structural changes, economic development and technological changes mainly due to globalisation.

2.2 Empirical Literature

A growing body of literature examines the validity of the ELG hypothesis for various countries by using both cross country and single country time series data. Those studies have employed different econometric techniques ranging from simple ordinary least squares to multivariate cointegration tests. They cover different time periods and selected different variables in different forms. Those studies have produced mixed and inconclusive results.

In the global context, some empirical studies documented a strong and positive relationship between exports and economic growth supporting the validity of the ELG hypothesis for various countries. For instance, Abual-Foul (2004) finds evidence to support the ELG hypothesis for Jordan; Thurayia (2004) for Saudi Arabia and Sudan; Kalaitzi (2013) for the United Arab Emirates; Muse et al. (2013) for Nigeria; Medina-Smith (2001) for Costa Rica; Bashir et al. (2015), Love and Chandra (2004) for Pakistan; Al Mamun and Nath (2005) and Paul (2014) for Bangladesh; Dash (2009), Sahni and Atri (2012) and Venkatraja (2015) for India, and Kim et al. (2020) for Myanmar. Furthermore, another set of literature finds the bidirectional causality or the causality running from exports to output and vice versa. This view was established by Mah (2005) for China; Elbeydi et al. (2010) for Libya, and (Kumari and Malhotra, 2014) for India. Meanwhile, some other studies provide evidence to support reduced form that is the unidirectional causation from output growth to exports. For instance, Oxley (1993); Dhawan and Biswal (1999) and Panas and Vamvoukas (2002) find evidence in favour of growth led hypothesis for Portugal, India and Greece, respectively. However, several other studies find no evidence to support the ELG hypothesis. For example, findings of Shan and Sun (1998) for Hong Kong, Korea, and Taiwan; Panas and Vamvoukas (2002) for Greece; Afzal and Hussain (2010) for Pakistan, and Mishra (2011) for India do not support the ELG hypothesis.

Although the literature is growing, there are limited studies that test the validity of the ELG hypothesis for Sri Lanka. Particularly, Sri Lanka was included in country comparison studies, and hence, standalone studies on Sri Lanka are rare. Also, the literature uses different explanatory variables and covers different sample periods. Hence, it delivers mixed and conflicting results.

For instance, using annual data on GDP and exports for 1960-1997 from eight Asian developing countries and employing cointegration and error correction model, Ekanayake (1999) found evidence for ELG in Sri Lanka. By conducting a country specific study to cover a longer time period from 1960 to 2010 Balamurali and Sivarajasingam (2012) provided strong evidence to support the ELG hypothesis in Sri Lanka. They also employed annual data on GDP and exports and cointegration and error correction model for the imperial investigation. Confirming Ekanayake (1999) and Balamurali and Sivarajasingam (2012), in a recent study, Francis and Vijayakumar (2019) using annual data on GDP, exports, gross fixed capital formation, employment, and inflation for 1977-2018 and VEC methodology established the validity of the ELG hypothesis for Sri Lanka. Alternatively, Priyankara (2018) by using data on GDP, exports of top services, good exports and terms of trade index for 1984-2013 found that the ELG hypothesis holds for services exports of Sri Lanka. This study adopted the vector autoregressive model to identify the causality.

In contrast, by examining the relationship between exports and economic growth, Abhayaratne (1996) found no evidence to support the ELG hypothesis in Sri Lanka during 1960-1992. GDP, exports and imports are used in this paper to calibrate the model in cointegration analysis. Similarly, the findings of Dilrukshini (2008) failed to support the validity of ELG hypothesis for Sri Lanka. She employed annual data on GDP, exports, imports, investment and labour for 1960-2015, and adopted VARs for the empirical estimation. Confirming both Abhayaratne (1996) and Dilrukshini (2008), Tahir et al. (2015) also found no evidence in support of the ELG hypothesis for Sri Lanka.

In this setting, this study would contribute to the literature by reinvestigating the ELG hypothesis for Sri Lanka including remittances as an explanatory variable in the model. To the best of this researcher's knowledge, there is no study in the literature that uses remittances to test the ELG hypothesis for Sri Lanka.

3. Data and Methodology

3.1 Variables and Data

This analysis tests the validity of ELG hypothesis for Sri Lanka covering four decades from 1980 to 2019 during which the country had a liberalised economy regime in place. For the empirical analysis, annual time series data on GDP, imports, exports, private remittances and GDP deflator are sourced from different issues of the Annual Reports of the Central Bank of Sri Lanka published from 1980 to 2019 (Central Bank of Sri Lanka, 1980-2019). All the nominal variables are deflated by the GDP deflator with 1996 as the base year to make them real and expressed in logarithmic transformation to avoid the problems associated with the annual time series data (Gujarati, 2021). The summary statistics of the variables are in Table 1.

Table 1: Summary Statistics[1]

Variable[2]	Mean	Std.Dev	Min	P1[3]	P50[3]	P99[3]	Max
LGDP	9.63	0.19	9.24	9.97	9.24	9.60	9.97
LEXP	8.09	0.23	7.72	8.64	7.72	8.10	8.64
LIMP	8.52	0.22	8.08	9.29	8.08	8.49	9.29
LREM	11.08	0.85	9.50	12.36	9.50	11.06	12.36

Source: Author's calculations using the data from the Central Bank of Sri Lanka.

Notes: 1. Summary statistics are for the natural log of real variables. Number of observations are 40.
2. LGDP, LEXP, LIMP and LREM represent real GDP, real exports, real imports and real remittances in log terms, respectively.
3. P1, P50 and P99 are 1st, 50th (median) and 99th per centiles, respectively.

Figure 1 depicts the time series behaviour of real variables in their log forms. The log of real GDP, exports and imports are in the declining trends, while remittances were increasing during 1980 to 2019.

Figure 1: Log of Real GDP, Real Exports, Real Imports and Real Remittances

Source: Author's calculations using the data from the Central Bank of Sri Lanka.

3.2 Model Specification

To empirically examine the validity of the ELG hypothesis for Sri Lanka, this study uses two alternative model specifications. Model-1 includes GDP as the dependent variable and, exports and imports as explanatory variables, while Model-2 adds remittances as the third explanatory variable. Particularly, this study uses remittances as an explanatory variable to test the validity of the ELG hypothesis for Sri Lanka for the first time by following Ahmed and Uddin (2009) who did the same for Bangladesh. Accordingly, two model specifications are given in equation (1) and (2).

Model-1

$$LGDP_t = \alpha_0 + \alpha_1 LEXP_t + \alpha_2 LIMP_t + \varepsilon_t, \quad (1)$$

Model-2

$$LGDP_t = \beta_0 + \beta_1 LEXP_t + \beta_2 LIMP_t + \beta_3 LREM_t + \varepsilon_t \quad (2)$$

where $LGDP_t$, $LEXP_t$, $LIMP_t$ and $LREM_t$ represent real *GDP*, real exports, real imports and real remittances in log terms, respectively, at time t. ε_t is the error term.

3.3 Testing Procedure

This study uses VECM to test the ELG hypothesis for Sri Lanka. The first step of the testing procedure is to determine the order of integration of the series by using an appropriate test.[6] The stationarity of the variables is tested by using a widely recognised unit root test, the Augmented Dickey-Fuller (ADF) test (Dickey and Fuller, 1979). The ADF test is applied on both at *level* and *first* difference series. A time series is said to be integrated of order zero, i.e., I(0), if it is stationary at the level form. A differenced series is called integrated of order *d*, i.e., I(*d*), if it is stationary at a differentiated form. If the individual variable is y_t, the general form of ADF test with intercept (α_0) and with both intercept and trend ($\alpha_t t$) can be written as in equations (3) and (4), respectively.

$$\Delta y_t = \alpha_0 + \gamma y_{t-1} + \sum_{i=0}^{k} \beta_i \Delta y_{t-i} + \varepsilon_t \quad \textit{(with intercept)} \quad (3)$$

$$\Delta y_t = \alpha_0 + \alpha_1 t + \gamma y_{t-1} + \sum_{i=0}^{k} \beta_i \Delta y_{t-i} + \varepsilon_t \quad \textit{(with intercept and trend)} \quad (4)$$

[6] If time series data do not have the characteristic of stationarity, the resultant regressions produce spurious results (Dougherty, 2011)

where $\Delta y_t = y_t - y_{t-1}$ is the first difference of series y_t, k is the optimum number of lags, α, γ *and* β are the parameters and ε_t is the stochastic disturbance term. If all the variables are stationary and integrated of the same order, then it is permitted to move to the second step to check the existence of a long term relationship among variables.

Even if the variables, GDP, exports, imports and remittances, individually are non-stationary, it may be possible that a linear combination of the variables may be stationary. Thus, the second step investigates whether the series are cointegrated and have a long run equilibrium relationship. This study uses vector autoregression (VAR) based Johansen's cointegration test developed by Johansen (1988) and Johansen and Juselius (1990) to estimate the cointegration[7] as adopted by Dilrukshini (2008) and Francis and Vijayakumar (2019) for Sri Lanka. This test uses two statistics named trace statistics and maximum eigenvalue to determine the number of cointegrating vectors. Trace statistics and maximum eigenvalue statistics estimate two VARs as in equation (5) and (6), respectively.

$$\Delta y_t = r_1 \Delta y_{t-1} + r_2 \Delta y_{t-2} + \ldots\ldots\ldots\ldots + r_p \Delta y_{t-p+1} \quad (5)$$

$$y_t = r_1 \Delta y_{t-1} + r_2 \Delta y_{t-2} + \ldots\ldots\ldots\ldots + r_p \Delta y_{t-p+1} \quad (6)$$

where, y_t is the vector of the variables involved in the model and p is the order of autoregression. In those tests the null hypothesis is that there is no cointegrating vector against the alternative hypothesis that indicates one or more cointegrating vectors. Since the test results of this paper suggest the long run cointegration between variables, in the third step, VECM is carried out to investigate both long run and short run causality between variables.[8]

[7] Before performing the cointegration test, to ensure an appropriate model specification, optimal lag length which removes the autocorrelation can be determined using several criteria: the sequential modified LR test, the Final prediction error (FPE), the Akaike (1974) information criterion (AIC), the Schwarz (1978) information criterion (SC), and the Hannan-Quinn information criterion (HQ).

[8] The selection of the appropriate test, i.e., VAR or VECM in the third step depends on the results of the cointegration test in the second step. If cointegration results show long run relationship between variables, VECM is conducted to investigate both long run and short run relationships between variables. Alternatively, if there is no cointegration between variables, the VAR is implemented.

The causality may occur from lagged difference and error correction term. Hence, to understand the causal relationship among the variables, the following specifications are tested.

Model-1

$$\Delta LDGP_t = \alpha_1 + \alpha_{LGDP} ECM_{t-1} + \sum_{i=1}^{p} \alpha_{11} \Delta LEXP_{t-1} + \sum_{i=1}^{p} \alpha_{12} \Delta LIPM_{t-1} + \varepsilon_{LGDP_t} \quad (7)$$

$$\Delta LEXP_t = \alpha_2 + \alpha_{LEXP} ECM_{t-1} + \sum_{i=1}^{p} \alpha_{21} \Delta GDP_{t-1} + \sum_{i=1}^{p} \alpha_{22} \Delta LIMP_{t-1} + \varepsilon_{LEXP_t} \quad (8)$$

$$\Delta LIMP = \alpha_3 + \alpha_{LIMP} ECM_{t-1} + \sum_{i=1}^{p} \alpha_{31} \Delta LGDP_{t-1} + \sum_{i=1}^{p} \alpha_{32} \Delta LEXP_{t-1} + \varepsilon_{LIMP_t} \quad (9)$$

Model-2

$$\Delta LDGP_t = \beta_1 + \beta_{LGDP} ECM_{t-1} + \sum_{i=1}^{q} \beta_{11} \Delta LEXP_{t-1} + \sum_{i=1}^{q} \beta_{12} \Delta LIPM_{t-1} + \sum_{i=1}^{q} \beta_{13} \Delta LREM_{t-1} + \mu_{LGDP_t} \quad (10)$$

$$\Delta LEXP_t = \beta_2 + \beta_{LEXP} ECM_{t-1} + \sum_{i=1}^{q} \beta_{21} \Delta LGDP_{t-1} + \sum_{i=1}^{q} \beta_{22} \Delta LIPM_{t-1} + \sum_{i=1}^{q} \beta_{23} \Delta LREM_{t-1} + \mu_{LEXP_t} \quad (11)$$

$$\Delta LIMP_t = \beta_3 + \beta_{LIMP} ECM_{t-1} + \sum_{i=1}^{q} \beta_{31} \Delta LGDP_{t-1} + \sum_{i=1}^{q} \beta_{32} \Delta LEXP_{t-1} + \sum_{i=1}^{q} \beta_{33} \Delta LREM_{t-1} + \mu_{LIMP_t} \quad (12)$$

$$\Delta LREM_t = \beta_4 + \beta_{LREM} ECM_{t-1} + \sum_{i=1}^{q} \beta_{41} \Delta LGDP_{t-1} + \sum_{i=1}^{q} \beta_{42} \Delta LEXP_{t-1} + \sum_{i=1}^{q} \beta_{43} \Delta LIMP_{t-1} + \mu_{LREM_t} \quad (13)$$

where, α_i, α_{ij} and β_i, β_{ij} are parameters; ECM_{t-1} is the error correction term lagged one period and ε_t and μ_t are the error correction terms. Finally, the VECM Granger causality test is employed to determine the direction of causality between variables. If two variables have a common trend, causality exists at least in one direction: unidirectional or bidirectional. This test estimates the Granger causality between X and Y variables using the following equations:

$$X_t = \sum_{i=0}^{n} \alpha_i X_{t-i} + \sum_{i=0}^{n} \beta_j Y_{t-i} + u_{1t} \quad (14)$$

$$X_t = \sum_{i=0}^{m} \lambda_i X_{t-i} + \sum_{i=0}^{n} \delta_j Y_{t-i} + u_{2t} \quad (15)$$

where u_{1t} and u_{2t} are serially uncorrelated random distributions with zero mean. Equation (14) tests the following hypothesis on the basis of F-statistics at chosen level of significance where null hypothesis, $H_0 : X_t$ does not Granger cause Y_t, against the alternative hypothesis, H_1: X_t Granger causes Y_t. Similarly, Equation (15) tests the hypothesis where null hypothesis, *H0*: Y_t does not Granger cause X_t against the alternative hypothesis, *H1:* Y_t Granger causes X_t. This study tests four time series simultaneously.

4. Empirical Results

This section discusses the main findings of the study. Following the procedure to test the ELG hypothesis stated in section 3.3, two different models are separately estimated, i.e., Model-1 without remittances and Model-2 with remittances as an independent variable, to obtain the results presented below.

4.1 Unit Root Tests

The estimation of the VAR/VECM test begins with the testing of the variables for unit roots. As the first step, all the variables in this study are tested for stationarity by using the ADF test and the results are presented in Table 2. The null hypothesis in ADF is that the series contains the unit root against the alternative that the series is stationary. The unit root test results revealed that all variables under consideration are non-stationary at their levels. However, all variables are stationary at their first difference forms, and hence they are integrated in the same order, i.e., order 1, or I (1). The Johansen cointegration test then can be applied as data series are integrated in the same order.

Table 2: Results of Augmented Dickey-Fuller Unit Root Test

Variable	Level		First Difference		Results
	Intercept	Trend and Intercept	Intercept	Trend and Intercept	
LGDP	-1.631	-1.539	-3.386 **	-3.494 *	**I (1)**
LEXPO	-1.485	-2.692	-6.647 ***	-6.524 ***	**I (1)**
LIMP	-2.565	-3.193	-6.020***	-6.152 ***	**I (1)**
LREM	-0.083	-2.578	-5.454 ***	-5.380 ***	**I (1)**

Source: Author's calculations using the data from the Central Bank of Sri Lanka.

Notes: ***, ** and * show the rejection of null hypothesis at 1 per cent 5 per cent and 10 per cent levels of significance, respectively. I (1) represents stationary after first difference.

4.2 Testing Cointegration

Before performing the cointegration test, optimal lag lengths are determined for the VAR systems, i.e., by using the LR, FPE and AIC criteria for Model-1 and FPE, AIC and HQIC criteria for Model-2[9]. The selected optimal lag length for both models is 3. Detailed lag length selection results are in Table A2 in Appendices.

In the second step, the Johansen cointegration test is performed on the stationary series with three lags and the results are in Table 3. The results revealed the presence of at least two cointegrating relationships between variables at 5 per cent significance level in both models, failing to reject the null hypothesis that specifies no cointegrating equations in the model. The prevalence of the long run association requires the VECM to test the long run and short run relationships between variables and their causal effects.

[9] Following the literature, majority of criteria that also includes AIC is considered for optimal lag selection.

Table 3: Results of Johansen Cointegration Test

Number of Cointegrating vectors	Trace Statistics	Critical Value at 5%	Max-Eigen Statistics	Critical Value at 5%
Model-1				
None	39.269	29.68	21.983	20.97
At most 1	17.286	15.41	17.107	14.07
At most 2	0.179*	3.76	0.179	3.76
Model-2				
None	74.726	47.21	41.420	27.07
At most 1	33.305	29.68	25.428	20.97
At most 2	7.877*	15.41	4.616	14.07
At most 3	3.261	47.21	3.261	3.76

Source: Author's calculations using the data from the Central Bank of Sri Lanka.

Notes: * denotes rejection of the hypothesis at the 5 per cent level.

4.3 VECM Test Results

In the third step, the VECM is carried out and the test results are reported in Table 4. The estimated VECM results are reliable as both models pass the diagnostic tests at 5 per cent level of significance as in Tables A3 and A4. There is no serial residual correlation and residuals are normally distributed in the estimated VECM models. Similarly, VECM results have been found to be stable. The long run causality is prevalent if the coefficient of the lag error correction term (ECM_{t-1}) is negative and statistically significant. The coefficients attached to the error correction terms, i.e., ECM_{t-1} of Model-1 and Model-2 are non-negative. Hence, the results of both VECM models do not support the presence of a long run causality running from explanatory variables to economic growth. Consequently, the results fail to support the validity of the ELG hypothesis for Sri Lanka.

Then, to examine the short run causality between variables, the individual lag coefficients and p value for each independent variable are considered. To establish a short run relationship, the p value should be significant. Accordingly, a few short run elasticities are observed in Table 4. The short run elasticity of GDP with respect to import is negative and statistically significant in both models. Therefore, imports contribute negatively to economic growth in Sri Lanka. In contrast, the short run elasticities of GDP with respective remittances are positive and

statistically significant in Model-2. Similarly, results show strong evidence of causality to suggest that remittances lead to increase imports in the short run. Hence, remittances contribute positively to both economic growth and imports. Contrastingly, exports lower the remittances in the short run. However, there is no short run casual effects between exports and GDP as the coefficients are not statistically significant in both models. Hence, the VECM test results of this study fail to establish any causal relationship between exports and GDP either in the long run or in the short run for Sri Lanka. To complete the analysis, it is important to determine the direction of causality between variables.

Table 4: VECM Test Results

	Model-1			**Model-2**			
	Δ(LGDP)	**Δ(LEXP)**	**Δ(LIMP)**	**Δ(LGDP)**	**Δ(LEXP)**	**Δ(LIMP)**	**Δ(LREM)**
ECM_{t-1}	0.080	0.134	0.538***	0.0879	0.172	0.491***	0.154***
	(0.076)	(0.137)	(0.149)	(0.061)	(0.119)	(0.110)	(0.061)
$\Delta(LGDP_{t-1})$	0.643***	0.507	0.762*	0.618***	0.393	0.573	0.188
	(0.226)	(0.425)	(0.441)	(0.219)	(0.428)	(0.396)	(0.220)
$\Delta(LGDP_{t-2})$	0.302	-0.262	0.090	0.266	-0.200	0.163	0.168
	(0.228)	(0.411)	(0.46)	(0.219)	(0.427)	(0.396)	(0.219)
$\Delta(LEXP_{t-1})$	-0.194	-0.264	-0.232	-0.141	-0.225	0.672	-0.228*
	(0.152)	(0.273)	(0.296)	(0.130)	(0.254)	(0.235)	(0.130)
$\Delta(LEXP_{t-2})$	0.004	-0.331	-0.137	0.074	-0.268	0.175	0.154
	(0.145)	(0.261)	(0.283)	(0.135)	(0.264)	(0.245)	(0.136)
$\Delta(LIMP_{t-1})$	-0.280*	-0.098	-0.081	-0.297**	-0.046	-0.156	0.236*
	(0.151)	(0.272)	(0.296)	(0.143)	(0.280)	(0.259)	(0.144)
$\Delta(LIMP_{t-2})$	-0.100	0.233	-0.021	-0.134	0.210	-0.179	-0.051
	(0.126)	(0.226)	(0.246)	(0.115)	(0.225)	(0.209)	(0.116)
$\Delta(REM_{t-1})$				0.292*	0.054	0.492*	0.161
				(0.159)	(0.311)	(0.288)	(0.160)
$\Delta(REM_{t-2})$				-0.019	0.252	0.477*	0.108
				(0.160)	(0.313)	(0.290)	(0.160)
C	-0.007	-0.016	0.005	-0.015	-0.017	-0.013	0.069
	(0.010)	(0.018)	(0.020)	(0.014)	(0.027)	(0.254)	(0.141)***

Source: Author's calculations using the data from the Central Bank of Sri Lanka.

Notes: ***, ** and * statistically significant at 1 per cent, 5 per cent and 10 per cent level, respectively. Δ(..) indicates the first difference of the logged variable: $\Delta(Y_t) = Y_t - Y_{t-1}$. Standard errors are in parentheses.

4.4 Granger Causality Test

As the last step, the VECM Granger causality test is carried out to determine the direction of causality. The results of the causality tests are presented in Table 5. This test shows the short run causality running from explanatory variable to dependent variable, in which the null hypothesis, namely, the lagged value of coefficients in each equation are zero. If the p value is less than 5 per cent, then the null hypothesis is rejected. The Model-1 results does not suggest any directional causality between variables. However, Model-2 suggests a unidirectional causality running from exports to remittances, a unidirectional causality running from imports to GDP and a very strong unidirectional causality running form remittances to imports. Granger causality results are largely in line with the VECM results.

Table 5: Granger Causality Test Results – Chi Statistics

	Δ(LGDP)	**Δ(LEXP)**	**Δ(LIMP)**	**Δ(LREM)**
Model-1				
Δ(LGDP)		1.56	4.20	
Δ(LEXP)	1.93		0.65	
Δ(LIMP)	3.45	1.60		
Model-2				
Δ(LGDP)		0.85	3.73	2.57
Δ(LEXP)	2.10		0.52	6.30**
Δ(LIMP)	4.65*	1.08		3.58
Δ(LREM)	3.83	0.96	9.56***	

Source: Author's calculations using the data from the Central Bank of Sri Lanka.

Notes: ***, ** and * denote significance at 1 per cent, 5 per cent and 10 per cent, respectively.

In conclusion, by using two different model specifications, one with remittances and another without remittances, the results do not find any causal relationship between exports and output either in the long run or in the short run. Hence, this study finds no evidence to support the validity of the ELG hypothesis for Sri Lanka. The finding of this study is consistent with Abhayaratne (1996); Dilrukshini (2008) and Tahir et al. (2015) for Sri Lanka.

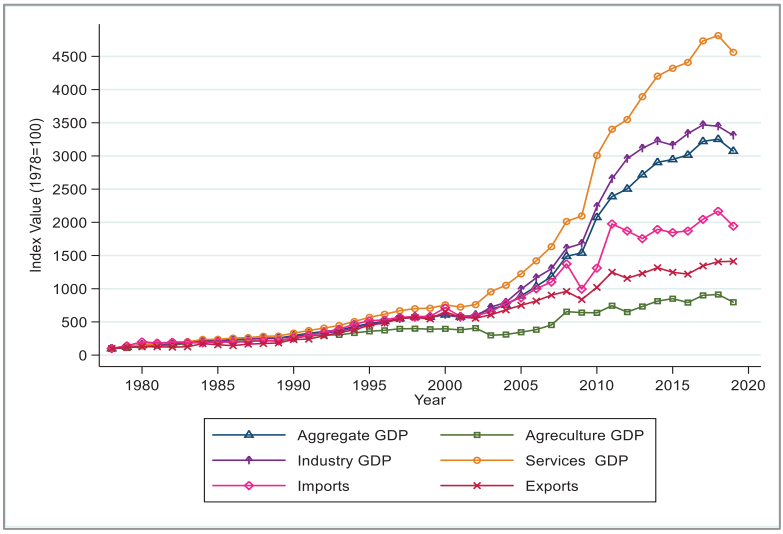
4.5 Discussion of Results

The results show that the economic policy strategies adopted in the past and the institutions built to promote exports have so far not been effective in generating sustainable long run economic growth in Sri Lanka. Specifically, Sri Lanka has been concentrating on simple technology-based exports of which the value addition has been insufficient to record a high economic growth. For instance, Sri Lanka has been promoting labour intensive and low value adding apparel and garment industry as the main thrust of exports. In 2019, this single sector accounted for nearly 47 per cent of the total export revenue but had only a share of 5 per cent in GDP (Central Bank of Sri Lanka, 2019). Thus, the growth of the apparel and garment industry did not make a significant contribution to GDP. Furthermore, around 80 per cent of garments are exported to EU, UK and USA making its growth principally dependent on the economic performance of those export destinations. The performance of the apparel and garment sector and its contribution to GDP growth are constrained by the competition coming from the low wage economies like Bangladesh, Myanmar and Cambodia. Similarly, Sri Lanka's exports are mostly buyer-driven products relative to the products that are producer-driven (Athukorala, 2016).

Additionally, the very strong positive causality running from remittances to import shows that like in many other developing countries, the remittances inflows to Sri Lanka are mostly used for the consumption of imported goods instead of being invested in capital goods. It may have hindered the potential capital accumulation and economic growth that would have been realised through optimal allocation of remittances.

Moving a further step ahead to see what would have been the sources of output growth, stylised facts in Figure 2 suggest that Sri Lanka's past growth may have come from the growth of services and manufacturing that has not been directed towards exports. However, further research is needed to establish this perspective, a potential area of research for the future.

Figure 2: GDP, Sectoral GDP, Imports and Exports Indices



Source: Central Bank of Sri Lanka.

5. Conclusions and Recommendations

In empirical literature, the nexus between exports and economic growth is mixed. The heterogeneity in these results may be due to the selection of different sample periods, different explanatory variables and diverse data sources, and different methodological procedures. In this backdrop, this study aimed to shed more light on causal relationship between exports and economic growth by re-testing the validity of the ELG hypothesis for Sri Lanka. This study differs from the other similar studies as it uses remittances as an independent variable and covers four decades of post-liberalisation from 1980 to 2019. Using annual data on GDP, exports, imports and remittances, VECM results do not support the presence of long run causality running from exports to GDP. Hence, the findings of the study fail to support the validity of the ELG hypothesis for Sri Lanka confirming the findings of Abhayaratne (1996); Dilrukshini (2008) and Tahir et al. (2015).

The results show that the economic policy strategies adopted in the past and the institutions built to promote exports have so far not been effective in generating sustainable long run economic growth in Sri Lanka. Hence, the findings of this study facilitate Sri Lanka to revisit

its policies and reorganise the institutions that facilitate trade. Broadly, findings will help policymakers in reformulating tariffs, export diversification and resource reallocation policies. Particularly, the future export strategy should facilitate the country to move away from the single sector-based exports to a diversified export structure that uses complex technology. This is important because it would help Sri Lanka to be competitive in trade on one hand and allow the country to join the global supply chain to produce inputs for the globalised manufacturing sector, on the other (Athukorala, 2016b). Also improving Sri Lanka's ranking in the ease of doing business and corruption perception indices is of paramount importance in this regard to ensures a favourable business climate.

Although it is widely used, adopting a conventional methodology to estimate the cointegration relationships may be a potential caveat of this study. Furthermore, Sri Lanka's past growth may have come from the growth of services and manufacturing that may has not been directed for exports. However, further investigation of this perspective and the estimation of cointegration using relatively new techniques with structural breaks are left for future research.

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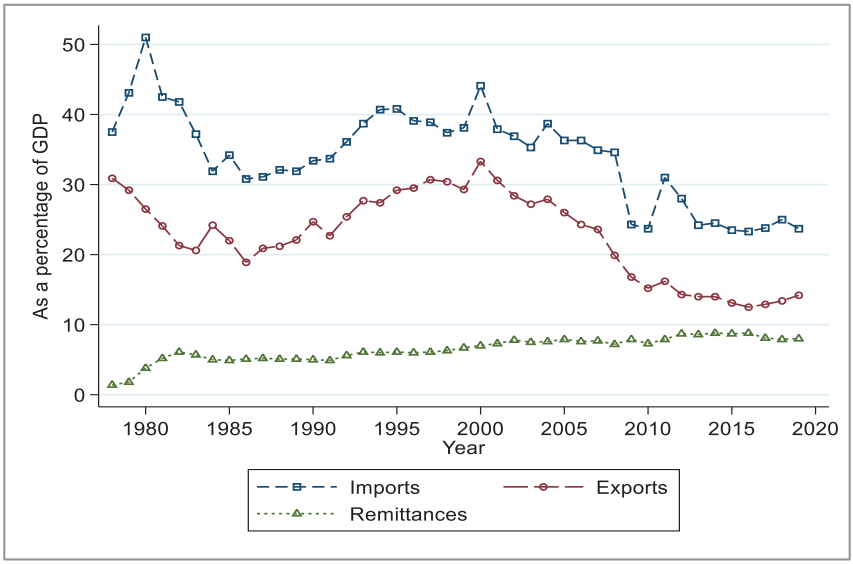
Appendices

Table A1: Growth of GDP, Imports, Exports and Remittances (%) in Sri Lanka

Period	GDP	Imports	Exports	Remittances
1980-1989	4.3	5.1	5.4	25.2
1990-1999	5.2	10.6	11.9	11.6
2000-2009	5.0	6.9	4.9	12.3
2010-2019	5.3	8.3	5.8	7.7
1980-2019	4.9	7.7	7.0	14.2

Source: Central Bank of Sri Lanka.

Figure A.1. Imports, Exports and Remittances as a Percentage of GDP



Source: Central Bank of Sri Lanka.

Table A2: Results of Optimal Lag Order Selection

Model-1

Endogenous Variables: LGDP, LEXP, LIMP

Lags	LL	LR	FPE	AIC	HQIC	SBIC
0	72.381	N/A	4.30E-06	-3.854	-3.808	-3.723
1	147.063	149.36	1.10E-07	-7.503	-7.319	-6.976
2	164.384	34.64	7.10E-08	-7.966	-7.643*	-7.042*
3	175.511	22.256*	6.5e-08*	-8.084*	-7.623	-6.764
4	181.417	11.812	8.10E-08	-7.912	-7.313	-6.196

Model-2

Endogenous Variables: LGDP, LEXP, LIMP, LREM

Lags	LL	LR	FPE	AIC	HQIC	SBIC
0	51.916	N/A	8.20E-07	-2.662	-2.601	-2.486
1	205.463	307.090	4.00E-10	-10.304	-9.996	-9.424*
2	233.18	55.436	2.10E-10	-10.955	-10.402	-9.371
3	257.838	49.316	1.5e-10*	-11.436*	-10.637*	-9.148
4	272.086	28.495*	1.90E-10	-11.338	-10.294	-8.347

Source: Author's calculations using the data from the Central Bank of Sri Lanka.

Note: * indicates lag order selected by the criterion at 5 per cent level.

Table A3: Test Results for Serial Correlation

Lag	Chi Statistics	
	Model-1	Model-2
1	15.367*	14.571
2	18.058**	13.401

Source: Author's calculations using the data from the Central Bank of Sri Lanka.

Note: ** and * statistically significant at 5 per cent and 10 per cent level, respectively. If probability is less than 5 per cent, the null hypothesis (H0: no autocorrelation at lag order) is rejected. In Model-1 at lag 1 and in Model-2, at lag 1 and 2, the probability more than 5 per cent, hence null is not rejected. Hence, (except for lag 2 in Model-1) there is no autocorrelation in VECM models.

Table A4: Test Results for Residual Normality

Equation	Chi Statistics	
	Model-1	Model-2
Δ(LGDP)	3.118	1.650
	(0.210)	(0.438)
Δ(LEXP)	0.302	0.654
	(0.860)	(0.721)
Δ(LIMP)	1.140	2.103
	(0.566)	(0.349)
Δ(LREM)		0.682
		(0.711)
ALL	4.560	5.088
	(0.601)	(0.748)

Source: Author's calculations using the data from the Central Bank of Sri Lanka.

Note: Probabilities are in parantheses. If probability is less than 5 per cent, the null hypothesis (H0: residuals are normally distributed) is rejected. Since, the probabilities are more than 5 per cent both models, both Model-1 and Model-2 are desirable.