Research Article

Do Bangladesh and Sri Lanka Enjoy Export-Led Growth? A Comparison of Two Small South Asian Economies

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Abstract

The export-led growth (ELG) hypothesis suggests that there is a strong positive linear relationship between a country's exports and economic growth. For many years, theoretical and empirical studies have examined the causal relationship between exports and economic growth and found that this relationship is one of interdependence rather than of unilateral causation. The purpose of this article is to empirically re-examine the ELG hypothesis in the context of two small South Asian countries: Bangladesh for the period of 1980–2011 and Sri Lanka for the period of 1984–2011. Using a model that controls for a host of domestic and international factors, this article tests the ELG hypothesis by employing the Auto Regressive Distributed Lag (ARDL) bounds test for cointegration and the Granger causality tests. The empirical results confirm the validity of the ELG hypothesis for both Bangladesh and Sri Lanka.

JEL: C32, F20, F41, O11

Keywords

Export-led growth, Bangladesh, Sri Lanka, ARDL bounds test, Granger causality

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Introduction

Finding ways to reach high and sustainable economic growth is one of the fundamental issues in developing economies nowadays. Advanced and newly emerging economies (NEEs) have reached higher economic growth by improving productivity through industrialization, advances in the service sector, technological efficiency (Young, 1995) and human capital accumulation (Lucas, 1993). More weight is given by advanced and NEEs to international trade as it allows for achieving higher productivity by facilitating access to new capital and intermediate goods, increased specialization, economies of scale and greater physical and human investment opportunities. Exports, being a part of trade, are considered an important component in achieving high and sustainable economic growth, especially for developing economies. Therefore, since the 1980s, many developing countries have adopted export-oriented growth strategies to push their stagnant economies towards rapid growth.

The relationship between exports and economic growth has been empirically investigated for many countries. Although the relationship between exports and economic growth has been studied extensively in recent times, there is no agreement on whether exports cause economic growth (export-led growth or ELG) or economic growth causes exports (growth-led export or GLE). This issue is of paramount significance since establishing the causality between exports and economic growth has many implications for policy-makers in respect of adopting correct strategies and policies for economic growth and development. Therefore, this article is aimed at attempting to investigate the relationship between export and economic growth in two small South Asian countries, Bangladesh and Sri Lanka. Another objective is to enhance the validity of the results by specifying a model that controls for a host of domestic and international factors and availing more appropriate econometric techniques that have not been used by prior studies.

It is no surprise that empirical studies examining the ELG hypothesis abound as it is an interesting and important topic for policy-makers. From the empirical literature, we find that the causal relationship between exports and economic growth has been rather inconclusive, and that there are four testable causal relationships between exports and economic growth: (a) exports cause economic growth, (b) economic growth causes exports, (c) there is bi-directional causality between the two variables and (d) the two variables are not causally related. In this section, we review only some of the highly influential studies on the export–growth nexus, specifically for developing countries and undertake some studies in the South Asian context. The findings on the direction of causality between exports and economic growth are mixed. This mix arises because of the different data sets, the alternative econometric methods and the different country characteristics. However, a majority of the studies support the causality from exports to economic growth, supporting the ELG hypothesis. To address this issue of a lack of consensus in the literature, this article tests the validity of the ELG hypothesis using Bangladesh and Sri Lanka as a case study. Therefore, the purpose of this article is to robustly ascertain whether small emerging economies like Bangladesh and Sri Lanka are able to exploit exports as an engine of growth.

The remainder of this article is structured as follows: Firstly, economic performance in relation to Bangladesh and Sri Lanka is discussed. Secondly, we present the analytical framework of the ELG hypothesis. Thirdly, the data, empirical results and discussions are presented, and finally, we present the conclusion and policy implications.

Economic Performance of Bangladesh and Sri Lanka

Bangladesh and Sri Lanka, both developing economies in the South Asian region, have predominantly agrarian economies, although one of the dominant features of both economies is their structural change with a declining share of agriculture in their GDP over the last three decades. During the period of 1971–2012, the annual average growth rates in Bangladesh and Sri Lanka were 3.98 and 4.88 per cent, respectively (World Bank, 2013). The following subsections contain a detailed discussion of the two countries' economic landscape and structural change.

Bangladesh

Bangladesh emerged as an independent nation in 1971 confronting the challenging task of developing and diversifying its economy, given that the country has very limited natural resources and arable land with which to support its rapidly growing population. With a population of 161 million, the country's basic economic policy is aimed at achieving high and steady growth, reducing widespread poverty and sustaining macroeconomic stability. The economic philosophy of Bangladesh has gradually changed from socialism with a dominant role for the public sector to market economy with the major thrust coming from the private sector. Bangladesh has employed several policy measures over time including Import Substitution Industrialization (ISI) and Export Promotion Industrialization (EPI). Agriculture and labour-intensive manufacturing remain the two major pillars of the Bangladesh economy. By the beginning of the twenty-first century, however, according to the World Bank, Bangladesh remains one of the poorest and least developed countries (LDC) in Asia (World Bank, 2005).

The economic situation in Bangladesh has undergone many difficulties due to several economic and political events which have occurred internally and externally since the 1980s. The government introduced policy and institutional reforms in the 1980s encompassing fiscal, financial, exchange rate, trade and industry, public resource management and public enterprise sectors (Raihan, 2008). Furthermore, the country considerably revised its economic policies by introducing elements of free market economy, limiting state intervention, downsizing the government, launching privatization and attempting to attract foreign direct investments (FDIs) and technologies since the 1990s.

Trade is considered an important component of the overall development policy of Bangladesh. Bangladesh's export volume growth accelerated as a result of high demand for its ready-made garment exports. The ready-made garments industry is

responsible for nearly 78 per cent of the country's export revenues. Other sectors, such as frozen food, leather, ceramics, home textiles, pharmaceuticals, information and communications technologies and ship building, are growing and contributing positively to Bangladesh's economy. The economy's biggest asset is its plentiful supply of labour, a major attraction for foreign investors.

Bangladesh's average gross domestic product (GDP) growth was around 1.1 per cent in the period of 1971–80, 3.7 per cent in the period of 1981–90, 4.8 per cent in the period of 1991–2000 and 5.8 per cent in the period of 2001–10 (World Bank, 2013). Thus, economic growth was quite impressive but was offset by rapid population growth. Moreover, Bangladesh's relatively fast growth over the period of 2010–12, together with international commodity price increases and expansionary macroeconomic policies, resulted in inflationary pressures.

Sri Lanka

At the time of independence in 1948, an important feature of the Sri Lankan economy was its relatively favourable economic status. Therefore, the country was regarded by many as one of Asia's most promising new nations (Athukorala, 2012). At the time of political independence and even about two decades later, Sri Lanka's economy and the level of social development were much stronger than its South Asian neighbours (Bruton et al., 1992; Silva, 2001). During the first decade after independence, Sri Lanka continued as an open trading nation with only relatively minor trade and exchange rate restrictions. In the late 1950s, a combination of the influence of the state on development thinking, changes in political leadership and balance of payment difficulties led to the adoption of a state-led import-substitution development strategy (Athukorala, 2012). In the late 1970s, there had been a major breakthrough in growth trend in the country, due to the economy moving from a 'hard' phase of import substitution in a highly controlled regime to a liberalized economy. By the mid-1970s, the Sri Lankan economy was one of the most inward-oriented and regulated outside the communist bloc, characterized by stringent trade and exchange controls and pervasive state interventions in all areas of economic activity (Athukorala & Jayasuriya, 1994; Athukorala & Rajapatirana 2000; Dunham & Kelegama, 1997; More, 1997; Panagariya, 2003; Rajapatirana, 1989; Snodgrass, 1998).

Sri Lanka began economic liberalization in 1977 with a move away from socialism. It was the first country in South Asia to undergo an extensive economic liberalization process in view of the dismal economic outcome of the protectionist import-substitution trade policies pursued over the previous three decades (Panagariya, 2003). The process has seen a paradigm shift from a reliance on the agricultural sector to an increasing emphasis on the services and manufacturing sectors. While the production and export of agricultural commodities remain important, the nation has moved steadily towards an industrialized economy with the development of food processing, textiles, telecommunication and finance (Nubin, 2002). Manufacturing, the fastest growing sector, is dominated by the garment industry (Ambrose & Sundarraj, 2014; Kelegama & Foley, 1999).

Sri Lanka's overall growth performance can be described as modest with substantial fluctuations. Although the contemporary policy environment of the country could primarily explain the trend growth of GDP, its annual fluctuations could be attributed to a series of random events in its internal and external environment. Evidently, the increasingly restrictive policy regime failed in bringing about a significant rate of economic growth in Sri Lanka. In contrast, the liberalized policy regime produced a higher growth performance (Abhayaratne, 1996). There has been a structural transformation of the Sri Lankan economy over the last six decades, and the sectoral contributions to total GDP have also shifted as a result of this structural change.

Interestingly, the average GDP growth rate during the post-liberalization period was higher (5%) than that in the period of 1951–76 (3.6%) (World Bank, 2013). Following policy reforms in 1977, there was a considerable increase in the average growth rates to the level of about 5.6 per cent from 1978 to 1986. In the latter half of the 1980s, however, the growth rate slowed down as a result of macroeconomic and political instability in the country. The average GDP growth rate came down to 2.2 per cent in the period of 1987–89. Since then, the economy has been able to maintain its growth momentum at a moderate level of 5.2 per cent from 1990 to 2012—ranging from the highest of 8.3 per cent in 2011 (the highest annual rate of growth recorded in the last three decades) to the lowest of 1.5 per cent in 2001. The long-term growth performance is characterized by an increase in the share of manufacturing and service sectors with a decline in the share of the agriculture sector. Table 1 summarizes the macroeconomic performance (discussed earlier in this article) for Bangladesh and Sri Lanka on the basis of a set

Table 1. Selected Macroeconomic Indicators of Bangladesh and Sri Lanka

	Indicators	1981–1990	1991–2000	2001–2010	2011–2012
Bangladesh	GDP Growth (annual per cent)	3.7	4.8	5.8	6.5
	GDP Per capita (Current US$)	232.1	318.1	458.4	739.7
	Trade–GDP ratio	0.19	0.27	0.41	0.57
	Inflation (CPI)	–	5.3	6.4	9.7
	Official Exchange rate (BDT/US$)	27.7	42.9	64.0	77.95
	GFC–GDP ratio	16.7	19.7	24.0	25.3
	FDI–GDP ratio	0.01	0.19	0.80	1.01
Sri Lanka	GDP Growth (annual per cent)	4.2	5.2	5.2	7.3
	GDP Per capita (Current US$)	382.4	712.5	1454.1	2879.6
	Trade–GDP ratio	0.66	0.78	0.69	0.635
	Inflation (CPI)	12.3	9.7	10.7	6.75
	Official Exchange rate (SLR/US$)	28.15	56.05	103.41	119.08
	GFC–GDP ratio	24.9	25.2	23.2	27.1
	FDI–GDP ratio	0.70	1.27	1.30	1.56

Source: World Bank (2013).

of macroeconomic indicators between 1981 and 2012. These macroeconomic indicators include: (a) GDP growth rate and GDP per capita, both used to check the overall economic performance of the countries, (b) international trade (exports and imports) to GDP ratio, used as an indicator of the external macroeconomic performance, (c) the Consumer Price Index (CPI) inflation rate, used to evaluate the degree of macroeconomic stability, (d) the exchange rate, used to determine the strength and competitiveness of the domestic currency relative to the US Dollar, (e) the gross fixed capital (GFC) formation as a percentage of GDP and (f) the FDI net inflows as a percentage of GDP. The latter two indicators are used to observe the economic capacity of the countries' over time.

The Analytical Framework

In the ELG literature, bivariate ELG analysis leave out some other relevant macroeconomic variables such as employment, capital, openness (*OPN*) and real exchange rate (*REXR*) that could have significant relationship with GDP. For that reason, we find many empirical studies that improved the export–growth relationship analysis by including in their models one or more relevant macroeconomic variables. Consequently, the framework to examine the impact of export on economic growth in this study is an augmented standard production function. Following the standard production function approach, we can express a country's aggregate output (GDP) in general form as follows:

$$Y_t = f(A_t, L_t, K_t) \tag{1}$$

Here, at time t, Y is the real GDP, A is the total factor productivity, L is the labour force and K is the capital investment. Based on prior literature, we can express exports (*EX*) as the main driver of improvements in A (see Fu, 2005; Jawaid & Raza, 2012; Kohpaiboon, 2003). The international market is highly competitive, and export-oriented firms are required to adopt the most efficient production technologies and be constantly innovative to survive. This leads to an improvement of productivity in the export-oriented firms, which eventually spreads to the rest of the economy (spillover effect). Thus, exports, in turn, result in an overall improvement of total factor productivity in an economy (Fu, 2005).

$$A_t = f(EX_t) \tag{2}$$

Other ELG studies introduce different variables to this production function (Equation 1) such as OPN (Herath, 2010) and the *REXR* (Dash, 2009; Javed, Falak, Awan & Ashfaq, 2012; Jin & Yu, 1996; Nain & Ahmad, 2010; Tang & Lai, 2011). Therefore, the omission of *OPN* and exchange rate could, for instance, seriously bias the empirical results between exports and economic growth in the case of Bangladesh and Sri Lanka. To capture the influence of trade *OPN* and the *REXR* on economic growth, we include them as additional variables in

model (Equation 1). The production function in Equation 1 resembles the following when we substitute for A (Equation 2) and augment it with *OPN* and *REXR*:

$$Y_t = f(EX_t, L_t, K_t, OPN_t, REXR_t) \quad (3)$$

We assume that Equation 3 is linear in log form and derive the following model for use in the ELG analysis:

$$LGDP_t = \beta_0 + \beta_1 LEX_t + \beta_2 LEMP_t + \beta_3 LGFCF_t + \beta_4 LOPN_t + \beta_5 LREXR_t + u_t \quad (4)$$

Here, β_i ($i = 0, 1, 2, 3, 4, 5$) are the regression parameters to be estimated, the prefix L represents the natural logarithmic value of the respective variable and u_t is the error term. In addition, *EMP* is the national employment which acts as a proxy for labour force while *GFCF* is the gross fixed capital formation which is a proxy variable for capital investment. Augmented production functions similar to ours have been used in the recent ELG literature including Herzer, Nowak-Lehmann and Siliverstovs (2006), Awokuse (2008), Dash (2009) and Cipamba and Cipamba (2013).

Data, Methodology and Empirical Results

Data Sources

Annual time series data on GDP, *EX*, *EMP*, *GFCF*, *OPN* and *REXR*, which cover Bangladesh for the period of 1980–2011 and Sri Lanka for the period of 1984–2011, have been used in this study. All the data have been gathered from the World Bank's World Development Indicators database, except for employment data which are collected from Pen World Table 8 (Feenstra, Robert & Marcel, 2013; World Bank, 2013).

GFCF is used as a proxy for capital investment because of the unavailability of data on capital stock (see Balasubramanyam, Salisu, & Sapsford, 1996; Barro, 1999; Kohpaiboon, 2003; Ravinthirakumaran, 2014). The sum of exports and imports as a percentage of GDP is used to measure trade *OPN*. Since it affects both traded and non-traded goods, we include the *REXR* in final estimation. The *REXR* is calculated as the number of US dollars (the US is used as a proxy for the world) per unit of local currency multiplied by the ratio of the price deflator of the country in question to the price deflator of the US. The expected signs for *EX*, *EMP* and *GFCF* are positive while the sign of *OPN* and *REXR* are to be determined.

Empirical Methodology

The main purpose of this study is to empirically examine the ELG hypothesis for Bangladesh and Sri Lanka by testing for cointegration and causality between export and economic growth in an augmented production function consisting of

capital, labour, *OPN* and *REXR*, as little attention has been paid to the econometric analysis of the relationship between these variables. The ARDL bounds test for cointegration, developed by Pesaran, Shin and Smith (2001), is used to test our specified model for cointegration. The bounds test is used due to the low power and other problems associated with other test methods including Engle and Granger (1987), Johansen (1988) and Johansen and Juselius (1990) tests for cointegration. The ARDL procedure has four advantages over the above cointegration techniques: (a) The ARDL procedure may be applied in spite of the explanatory variables being I(1) or I(0), and thus eliminates the need for unit root pre-testing. (b) In the ARDL procedure, the variables may have different optimal lag structures unlike in other tests which require a uniform lag length for all variables. (c) The ARDL procedure employs only a single reduced form equation, while the conventional cointegration procedures estimate the long-run relationships within a context of system equations. (d) While other cointegration techniques require large data samples for reliability, the ARDL procedure can be adopted even for small samples.

Given our small sample size, questions may be raised regarding the reliability of the estimated results. However, as documented by Pesaran, Shin and Smith (1996) and Pesaran et al. (2001), the ARDL bounds test specification is suitable for small sample sizes. Several empirical studies use the ARDL bounds test for analyzing sample sizes similar to ours. These include Tang and Nair (2002) using 28 annual observations to analyze Malaysian import demand function, Bahmani Oskooee and Nasir (2004) using 31 annual observations in testing for the productivity bias hypothesis and Narayan (2005) using 32 annual observations to examine the saving–investment nexus in China. The ARDL approach is known to have been employed on even smaller sample sizes by Tang (2002) for 26 observations in a multivariate model, similar to ours, in evaluating M3 money[1] demand in Malaysia and by Paul (2014) in testing for ELG in Bangladesh using 22 observations. As such, any concern over the reliability and stability of results estimated using our sample size can be allayed.

An ARDL representation of Equation 4 can be specified as follows:

$$\begin{aligned}\Delta LGDP_t = {} & \beta_0 + \beta_1 \sum_{i=1}^{p} \Delta LGDP_{t-i} + \beta_2 \sum_{i=1}^{p} \Delta LEX_{t-i} + \beta_3 \sum_{i=1}^{p} \Delta LEMP_{t-i} \\ & + \beta_4 \sum_{i=1}^{p} \Delta LGFCF_{t-i} + \beta_5 \sum_{i=1}^{p} \Delta LOPN_{t-i} + \beta_6 \sum_{i=1}^{p} \Delta LREXR_{t-i} \\ & + \delta_1 LGDP_{t-1} + \delta_2 LEX_{t-1} + \delta_3 LEMP_{t-1} + \delta_4 LGFCF_{t-1} \\ & + \delta_5 LOPN_{t-1} + \delta_6 LREXR_{t-1} + u_t\end{aligned} \tag{5}$$

Here, β_0 is the constant, Δ is the difference operator and u_t is the white noise error term. The error correction (EC) dynamics is denoted by summation sign while the second part of the equation corresponds to long-run relationship. An appropriate lag selection is made using the Akaike Information Criterion (AIC) (Akaike, 1974). The lag selection for each right-hand side variable is independent

of other variables, meaning that even though there are more than 12 parameters specified in Equation 5, the estimated equation may in fact have fewer parameters.

The ARDL bounds test for cointegration tests for the joint significance (F-test) between the concerned variables. The null and alternative hypotheses of the bounds test are given below:

H_0: $\delta_1 = \delta_2 = \delta_3 = \delta_4 = \delta_5 = \delta_6 = 0$ (No cointegration)

H_1: At least one $\delta_I \neq 0$ (Cointegration exists)

The computed test statistic is compared with sets of critical bounds to determine whether cointegration is present. In our case, we compare the sets of critical values suggested by Narayan (2004; 2005), who has tabulated two sets of critical values for the bound test. Although Pesaran et al. (1996) initially tabulated two sets of critical values for the bound test, these critical values are generated for sample sizes of 500 and 1000 observations and 20,000 and 40,000 replications, respectively. Narayan (2004; 2005) argues that existing critical values, because of being based on large sample sizes, cannot be used for small sample sizes. Given the relatively small sample size in the present study (some 30 observations), critical values are calculated speciûc to the sample size.

We reject the null hypothesis in favour of the alternative that cointegration is present in the model when our test statistic exceeds the relevant upper critical value. On the other hand, we fail to reject the null hypothesis at a particular significance level when our sample test statistic is below the associated lower critical value. Finally, when the reported test statistic falls in between the upper and lower bounds value, we interpret the results as being inconclusive at the given significance level.

We estimate the short-run coefficients by employing the following Error Correction Model (ECM):

$$\Delta LGDP_t = \delta_0 + \delta_1 \Delta LGDP_{t-1} + \delta_2 \Delta LEX_{t-1} + \delta_3 \Delta LEMP_{t-1} + \delta_4 \Delta LGFCF_{t-1} + \delta_5 \Delta LOPN_{t-1} + \delta_6 \Delta LREXR_{t-1} + \psi EC_{t-1} + u_t \quad (6)$$

The ECM shows the speed of adjustment needed to restore the long-run equilibrium following a short-run shock. ψ is the coefficient of EC term in the model that indicates the speed of adjustment.

Empirical Results

The estimation of the ARDL bounds test begins with testing the variables for unit roots. All variables in this study are tested for stationarity using the Phillips–Perron (PP) test (Phillips & Perron, 1988), and the results are presented in Table 2. The null hypothesis in the PP test is that the series contains a unit root against the alternative that it is stationary.

Table 2. Results of Phillips–Perron Unit Root Tests

		Test Statistic	
Country	Variables	Level	First Difference
Bangladesh	*LGDP*	−0.01 (0.99)	−6.48* (0.00)
	LEMP	−1.58 (0.78)	−3.26*** (0.09)
	LGFCF	−1.54 (0.79)	−5.55* (0.00)
	LEX	−2.07 (0.54)	−6.66* (0.00)
	LOPN	−2.45 (0.35)	−5.12* (0.00)
	LREXR	−2.96 (0.16)	−3.37*** (0.07)
Sri Lanka	*LGDP*	−0.87 (0.95)	−4.38* (0.01)
	LEMP	−2.39 (0.38)	−5.34* (0.00)
	LGFCF	−2.56 (0.30)	−4.58* (0.01)
	LEX	−1.42 (0.83)	−10.14* (0.00)
	LOPN	−1.98 (0.59)	−7.53* (0.00)
	LREXR	−0.45 (0.98)	−4.76* (0.00)

Source: World Bank (2013).

Notes: 1. *, **, and *** show rejection of null hypothesis at 1 per cent, 5 per cent, and 10 per cent levels of significance respectively.

2. P-values are included in brackets

The results of the unit roots tests in Table 2 indicate that all variables are non-stationary in their levels but stationary in their first difference forms, which means that they are integrated of Order 1 [I(1)]. The ARDL bounds test can now be applied to our model since none of the variables are integrated of Order 2 [I(2)]. The lag length is selected using AIC and the optimal lag length for Bangladesh is 3,1,1,1,0,3, while that for Sri Lanka is 1,1,0,0,0,0. As can be seen, the estimated models have only 10 parameters for Bangladesh and six parameters for Sri Lanka. As such, there are no concerns over bias or unreliability issues relating to our estimated models. The estimated ARDL results are reliable as they pass all the diagnostic tests at 5 per cent level of significance (Appendix 1). In addition, the structural stability of the estimated equations is seen in the plots of Cumulative Sum (CUSUM) of recursive residuals and CUSUM of squares ($CUSUM^2$) of recursive residuals (Appendix 2). These plots show that the parameters and error terms of the estimated models are stable as the respective plots do not cross the 5 per cent critical bounds. Once the diagnostics and stability tests are passed, the results of the bounds tests are presented in Table 3.

The test statistics of the bounds tests for both Bangladesh and Sri Lanka exceed the upper bounds at 5 per cent level of significance. This is indicative of the presence of cointegration in the model in both countries.

Afterwards, ECMs based on Equation 6 are generated using the ARDL technique for use in carrying out Granger (1969) causality tests. The ECMs in Table 4 show that the short-run elasticity of GDP with respect to exports is positive. The EC terms are negative and statistically significant at 1 per cent level of significance

Table 3. Results of ARDL Bounds Tests

Country	Computed *F*-statistic	Critical Values		Significance Level (%)
		Lower Bound	Upper Bound	
Bangladesh	6.57**	4.77	6.67	1
		3.35	4.77	5
		2.75	3.99	10
Sri Lanka	5.70**	4.54	6.37	1
		3.13	4.61	5
		2.58	3.86	10

Source: World Bank (2013).

Notes: 1. *, **, and *** show the cointegration present at 1 per cent, 5 per cent, and 10 per cent level of significance respectively.

2. Critical values are obtained from Narayan (2004, 2005).

Table 4. Estimated Error Correction Models

Variable	Country	
$\Delta LGDP$	Bangladesh	Sri Lanka
$\Delta LGDP_{t-1}$	−0.45** (0.18)	–
$\Delta LGDP_{t-2}$	−0.82*** (0.17)	–
ΔLEX	0.13*** (0.03)	0.28*** (0.06)
$\Delta LEMP$	−0.51*** (0.16)	0.29*** (0.08)
$\Delta LGFCF$	−0.10** (0.04)	0.06** (0.03)
$\Delta LOPN$	−0.08*** (0.02)	−0.18*** (0.06)
$\Delta LREXR$	−0.06 (0.04)	0.16*** (0.04)
$\Delta LREXR_{t-1}$	0.05 (0.03)	–
$\Delta LREXR_{t-2}$	0.06* (0.03)	–
EC_{t-1}	−0.18** (0.07)	−0.26*** (0.06)

Source: World Bank (2013).

Notes: 1. *, **, and *** show the statistical significance at the 1 per cent, 5 per cent, and 10 per cent level respectively.

2. Standard errors are included in brackets.

3. EC = error-correction term.

in both Bangladesh and Sri Lanka. In addition, the ECs show that the systems return to equilibrium at a rate of 18 per cent and 26 per cent per annum in Bangladesh and Sri Lanka, respectively.

The short-run elasticities of exports are positive and significant in both Bangladesh and Sri Lanka. However, the short-run elasticities of GDP with respect to *GFCF* and *EMP* are negative in Bangladesh but positive in Sri Lanka. *OPN* is also seen to reduce GDP in the short-run, and this effect is larger in Sri Lanka than in Bangladesh. Lastly, the short-run elasticities of the *REXR* are negative in the

Table 5. Granger Causality Tests Results—Bangladesh

DV	*F*-statistic						EC_{t-1}	Causality Direction
	$\Delta LGDP$	$\Delta LEMP$	$\Delta LGFCF$	ΔLEX	$\Delta LOPN$	$\Delta LREXR$		
$\Delta LGDP$	–	9.90* (0.00)	5.53** (0.02)	17.61* (0.00)	15.79* (0.00)	7.68*** (0.05)	–0.18** (0.02)	*EMP⇒GDP* *GFCF⇒GDP* *EX⇒GDP* *OPN⇒GDP* *REXR⇒GDP*
ΔLEX	32.67* (0.00)	4.26** (0.04)	5.57** (0.02)	–	56.69* (0.00)	11.94* (0.00)	–0.76* (0.00)	*GDP⇒EX* *EMP⇒EX* *GFCF⇒EX* *OPN⇒EX* *REXR⇒EX*
$\Delta LEMP$	7.67** (0.02)	–	3.17 (0.21)	0.85 (0.65)	0.41 (0.52)	7.58** (0.02)	–	*GDP⇒*EMP *REXR⇒*EMP
$\Delta LGFCF$	2.24 (0.33)	1.86 (0.39)	–	5.47*** (0.07)	0.29 (0.59)	1.64 (0.44)	–	*EX⇒GFCF*
$\Delta LOPN$	11.80* (0.00)	0.36 (0.83)	3.82 (0.15)	31.12* (0.00)	–	2.76 (0.25)	–	*GDP⇒OPN* *EX⇒OPN*
$\Delta LREXR$	4.57 (0.10)	4.51 (0.11)	7.52** (0.02)	4.45 (0.11)	1.70 (0.19)	–	–	*GFCF⇒REXR*

Source: World Bank (2013).

Notes: 1. DV = Dependent variable.
2. *, **, and *** show the statistical significance at the 1 per cent, 5 per cent, and 10 per cent level respectively.
3. P-values are included in brackets.
4. EC = error-correction term.

first lag but positive in the second and third lags in Bangladesh. However, only the coefficient at third lag is statistically significant. In contrast, in Sri Lanka, only one lag of the *REXR* is present in the model, which is positive and significant. The Granger causality tests are then carried out using the ECMs given in Table 4. In addition to using the ECMs in Table 4, we generate additional ECMs by substituting *LGDP* in Equation 6 with each right-hand side variable (*LEX*, *LEMP*, *LGFCF*, *LOPN* and *LREXR*) in turn to determine the direction of causality towards the regressors. Results of the causality tests are given in Tables 5 and 6 for Bangladesh and Sri Lanka, respectively.

In Bangladesh, long-run causality is seen to run from all model variables (*EX*, *GFCF*, *EMP*, *OPN* and *REXR*) to GDP in the long-run. However, exports are also found to be caused by GDP, *GFCF*, *EMP*, *OPN* and *REXR* in the long-run. As such, there is two-way long-run causality between GDP and exports and as a result, the ELG hypothesis is validated in Bangladesh. Our results also show that exports can be increased by growth, investment, employment growth, *OPN* and movements in Bangladesh. This is interesting since Bangladesh is a developing country and improvements in its economy appear to increase its export competitiveness.

Table 6. Granger Causality Tests Results—Sri Lanka

DV	*F*-statistic							Causality Direction
	$\Delta LGDP$	$\Delta LEMP$	$\Delta LGFCF$	ΔLEX	$\Delta LOPN$	$\Delta LREXR$	EC_{t-1}	
$\Delta LGDP$	–	4.79** (0.03)	8.76* (0.00)	25.02* (0.00)	15.23* (0.00)	16.11* (0.00)	–0.26* (0.00)	*EMP⇒GDP* *GFCF⇒GDP* *EX⇒GDP* *OPN⇒GDP* *REXR⇒GDP*
ΔLEX	26.49* (0.00)	5.55** (0.02)	0.01 (0.92)	–	23.43** (0.00)	2.06 (0.15)	–0.58* (0.00)	*GDP⇒EX* *EMP⇒EX* *OPN⇒EX*
$\Delta LEMP$	3.79 (0.15)	–	8.36** (0.02)	1.11 (0.29)	15.72* (0.00)	1.31 (0.25)	–1.50* (0.00)	*GFCF⇒EMP* *OPN⇒EMP*
$\Delta LGFCF$	2.36 (0.31)	0.20 (0.90)	–	2.21 (0.33)	3.00 (0.22)	0.32 (0.85)	–	No causality
$\Delta LOPN$	6.35** (0.04)	3.57 (0.17)	2.81 (0.25)	15.87* (0.00)	–	1.49 (0.48)	–	*GDP⇒OPN* *EX⇒OPN*
$\Delta LREXR$	3.37 (0.19)	3.41 (0.18)	0.60 (0.74)	1.40 (0.50)	1.25 (0.54)	–	–	No causality

Source: World Bank (2013).

Notes: 1. DV = Dependent variable.
2. *, **, and *** show the statistical significance at the 1 per cent, 5 per cent, and 10 per cent level respectively.
3. P-values are included in brackets.
4. EC = error-correction term.

Exports are found to cause *GFCF* in the short-run which may indicate that investment decisions, and especially foreign investment, are motivated by export opportunities enjoyed by Bangladesh. GDP and *REXR* movements cause employment in the short-run, showing the importance of the size of the economy and labour cost competitiveness in the international market in determining employment growth. In addition, *OPN* is seen to be caused by exports and GDP, while *GFCF* appears to cause *REXR* movements in the short-run. Exports and GDP causing *OPN* in the short-run is intuitive as increased exports and a larger GDP translate into bigger markets internationally and at home. The causality running from *GFCF* to *REXR* shows that the latter's movements are influenced greatly by investment decisions.

In Sri Lanka, GDP is caused by all model variables—*EX*, *GFCF*, *EMP*, *OPN* and *REXR*—in the long-run. Unlike Bangladesh, export is caused by GDP, employment and *OPN* only. Nevertheless, there is two-way long-run causality between GDP and exports and as such the ELG hypothesis is corroborated in Sri Lanka. In addition, results show that exports can be improved by GDP growth, employment growth and *OPN*, which imply that Sri Lanka's exports do not have as much room to improve as that of Bangladesh. This is probably a sign of a more developed and competitive market in Sri Lanka than in Bangladesh, which is

intuitive since Sri Lanka, unlike Bangladesh, is not an LDC. Long-run improvements in employment caused by *GFCF* and *OPN* support this notion since Sri Lanka's employment is competitive enough to take advantage of increased investment and withstand competition from overseas labour markets. Contrary to Bangladesh, *GFCF* and the *REXR* are not caused by any model variable in Sri Lanka. However, *OPN* is also seen to be caused by exports and GDP, while *GFCF* appears to cause *REXR* movements in the short-run, which is intuitive as higher exports and a larger GDP translate into bigger markets internationally and at home.

Conclusion and Policy Implications

Many studies examined the ELG hypothesis for South Asia including Bangladesh and Sri Lanka but the results are questionable. The reasons for the inconsistencies mainly include sample bias, selection of inappropriate variables for output, methodological deficiencies and poor quality of data. This article overcomes most of these shortcomings by estimating a model that controls for a number of domestic and international factors using the ARDL bounds test for cointegration. The cointegration tests are positive in both Bangladesh and Sri Lanka. Granger causality tests show that long-run causality runs from exports to GDP in Bangladesh and Sri Lanka. These findings provide strong evidence of ELG for Bangladesh over the period of 1980–2011 and for Sri Lanka over the period of 1984–2011.

The policy implication of such findings is that ELG continues to be a viable strategy for economic growth and development in these small South Asian economies. Policy-makers need to concentrate on export expansion as an engine of GDP growth and industrialization. Since 2010, Bangladesh and Sri Lanka have experience a noticeable warming of economic relations (Kelegama, 2014). Trade between the two nations more than doubled from US $47 million in 2010 to over US $100 million in 2013. Trade composition has substantially changed during this period as the two countries started to export more intermediate and high value-added goods. Both countries are also experiencing rapid economic growth in recent times. As both countries enjoy ELG, policy-makers may consider exploiting each other's growing markets for export expansion.

Our results also show that investment and employment growth have GDP growth augmenting characteristics. However, since both Bangladesh and Sri Lanka are developing economies that lack sufficient domestic investment, relevant authorities should focus increasingly on FDI as it opens possibilities for both economic growth and market access for exports. The two South Asian economies may look into each other in attracting FDI.

Kelegama (2014) reports that there is about US $320 million in combined FDI stock invested between the two nations. FDI has gone into different sectors—ready-made garments in Bangladesh and pharmaceuticals in Sri Lanka, highlighting the fact that investors are keen to exploit each country's comparative advantage. This is, indeed, a very good development between the two small South Asian economies. However, there is scope to take this further by encouraging greater

investment in other areas such as fisheries, light manufacturing industry and services.

GDP growth can also be augmented by increasing employability of the labour force, including a pro-business policy by respective governments as well as improving the skills of the labour force. Both Bangladesh and Sri Lanka lack facilities required for adequate technical and vocational training, which is indispensable for the development and industrialization of their economies (Oxenham et al., 2002). Cooperation by the two nations in the education sector may also resolve this shortcoming and bring mutual economic benefits.

While *OPN* is better for eliminating inefficiencies and monopolies in the domestic market, safeguards are needed to shield local firms from being wiped out by cheaper imports from China and India. Since Bangladesh and Sri Lanka are developing economies that require industrialization to achieve higher growth, safeguards and incentives for local firms to modernize and become more competitive must be put in place. Increased economic ties and knowledge-sharing between these two countries are also likely to help tackle these challenges.

Lastly, the *REXR* is seen to be a causal mechanism for growth. This is so because the import of capital goods, which in turn may affect investment, is often dependent on the *REXR*. Instead of excessive central bank intervention into the foreign exchange market, we advocate a policy of easing foreign exchange regime so that import of capital goods is streamlined.

Appendix 1. ARDL Diagnostic Tests

	Test Statistic	
Test	Bangladesh	Sri Lanka
Serial Correlation[1]	1.40 (0.24)	2.32 (0.13)
Ramsey RESET[2]	2.25 (0.16)	0.08 (0.77)
Normality[3]	0.26 (0.88)	1.02 (0.60)
Heteroscedasticity[4]	3.09 (0.09)	0.13 (0.72)

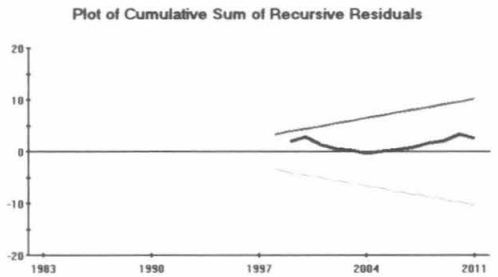
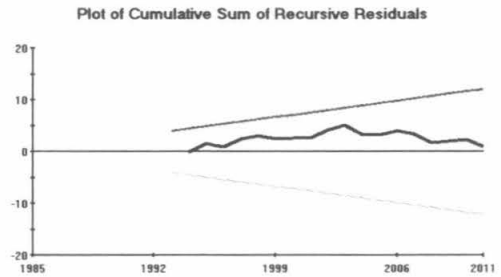
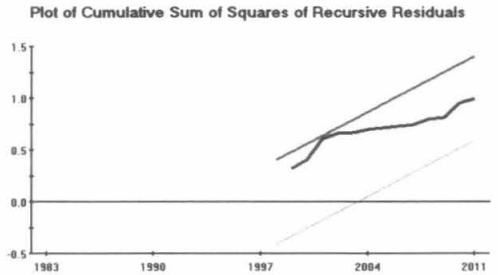
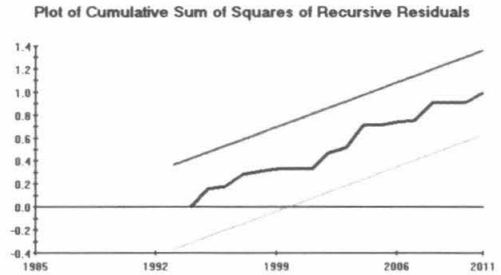
Source: World Bank (2013).

Notes: 1. P-values are included in brackets.

2. Null hypothesis in 1 = No serial correlation, 2 = Functional specification is correct, 3 = Residuals are normal, and 4 = Residuals are homoscedastic.

3. Reject H0 at the * = 1 per cent and ** = 5 per cent level of significance.

Appendix 2. Plots of CUSUM and CUSUM^2 of Recursive Residuals

	Bangladesh	Sri Lanka
CUSUM		
CUSUM^2		

Source: World Bank (2013).

Note: The straight lines represent critical bounds at 5 per cent significance level.

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Note

1. M3 is a measure of money supply that includes M2 as well as large *time deposits*, institutional money market funds, short-term repurchase agreements and other larger liquid assets.

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