Authors:
Roger Hosein
The University of the West Indies, Department of Economics, St. Augustine, Trinidad and Tobago
Nirvana Satnarine-Singh
The University of the West Indies, Department of Economics, St. Augustine, Trinidad and Tobago
George Saridakis
The University of Kent, Business School, United Kingdom

THE SPILLOVER EFFECT OF EXPORTS: AN ANALYSIS OF CARIBBEAN SIDS

ABSTRACT

The paper empirically examines the degree to which exports are productivity enhancing in fourteen Caribbean Community (CARICOM) states. To do so, exports are included in a modified production function and a panel autoregressive distributed lag (ARDL) model is specified and estimated using a Common Correlated Effects (CCE) estimator to determine the spillover effect of the export sector to the non-export sectors in these economies. The results indicate that there is a crowding out effect, such that as exports increases, non-export Gross Domestic Product (GDP) decreases.

Keywords: Exports; Productivity; CARICOM States; Caribbean; ARDL
Jel Classification: C01; C13; F14; O11; O40

RIASSUNTO

L'effetto spillover delle esportazioni: studio del caso Caraibi

Questo articolo esamina in quale misura le esportazioni stimolano la produttività in quattordici stati della comunità caraibica (CARICOM). A questo fine le esportazioni sono incluse in una funzione di produzione modificata ed in un modello ARDL ad intervallo autoregressivo distribuito. Per determinare l'effetto *spillover* delle esportazioni sugli altri settori viene utilizzato un metodo Common Correlated Effects (CCE). I risultati indicano che c'è un effetto spiazzamento per cui quando l'export aumenta la quota di PIL generata dagli altri settori diminuisce.

1. INTRODUCTION

This paper assesses the long-run and short-run spillover effects of exports on the non-export sector for fourteen small Caribbean states. Small Island Developing states (SIDs) are prone to many challenges in the development process. Apart from high vulnerability to external shocks as a result of natural disasters and other environmental factors, these economies are at a disadvantage when compared to non-island developing states due to small size and insularity (Briguglio, 1995; Briguglio, 2001; Ruprah, 2013; Nurse *et al.,* 2014; Moncada *et al.,* 2018). Specifically, as it relates to their ability to maximize on the benefits from the export sector, the characteristics of these economies prevent them from expanding production, due to relatively limited factors of production and resources, as well as limited scope to benefit from economies of scale (Alesina *et al.,* 2005).

The insularity of these islands also increases the transportation costs associated with international trade thereby decreasing their export competitiveness relative to other economies (Scobie, 2013). In terms of the composition of factors of production and export patterns, many structural theories have emerged on the role of trade in the development process with a focus on the Caribbean. Lewis (1954, 1979) noted the high labour to capital ratio in the economies and suggested a dual sector economy via inviting foreign investment and allowing the surplus labour from the traditional sectors to be absorbed into an industrial sector thereby allowing for structural transformation of these predominantly agrarian economies. Such policies would be aimed at altering the countries' comparative advantage with focus on the industrialisation[1]. Best (1968) noted that the economies' production and export patterns were consistent with a 'plantation' economy via producing mainly primary products to be exported to developed economies with minimal connection to the domestic economy.

Many of these countries also remain mainly dependent on natural resource based, low value added exports as compared to high technology manufactured goods in relation to their merchandise export basket[2]. In relation to the export led growth (ELG) hypothesis, manufactured exports are seen as a significant source of spillovers via forward and backward linkages and technology knowledge diffusion (Szirmai, 2012; Cantore *et al.,* 2017). However, as

[1] For detail on the relation between changing comparative advantage and its effect on transforming or upgrading export structure see Dorado (1991) and Lectard and Rougier (2018).
[2] Many Caribbean economies rely heavily on travel and tourism as a source of service exports.

noted by Cantore *et al.* (2017), intensive industrialisation is a superior driver of overall growth as compared to extensive industrialisation. Extensive industrialisation captures changes in manufacturing value added on account of changes in employment while the intensive industrialisation explains changes in manufacture value added due to changes in productivity or structural transformations. Since export-oriented sectors increase factor productivity[3], theoretically it acts as a positive externality, eventually diffusing into the non-export sector (Feder, 1983; Herzer, 2007).

Hence, exports can also be indirectly linked to the production function through numerous avenues including increased capacity utilisation (Feder, 1983; Medina-Smith, 2001), economies of scale (Thangavelu and Owyong, 2003; Awokuse, 2003), incentives for technological improvement and knowledge diffusion (Grossman and Helpman, 1991; Bernard and Jensen, 1999), reduced foreign exchange constraints (McKinnon, 1964; Kemp-Benedict *et al.,* 2018) and higher efficiency as a result of exposure to competition (Fu, 2005; Aghion *et al.,* 2018). Further, Caribbean economies are heavily reliant on imports (for capital and consumption goods); therefore, exports (of either service or commodity) are an important source of foreign exchange[4].

While previous studies on ELG focus mainly on the structural analysis of the Caribbean economies, this paper empirically investigates the degree to which exports are productivity enhancing in these Caribbean Community (CARICOM) states or whether the export sector remains isolated from the other sectors of the economy in relation to structural claims of the plantation economy. Existing papers on the topic in relation to this region focus on a single country or treat the Caribbean countries as part of a larger group (such as developing countries). The paper utilises second generation panel data techniques[5] so as to account for cross-sectional dependence as well as expands on the traditional production function approach in examining factors specific to these countries as a subset of small island developing states.

[3] Exports are seen as productivity enhancing due to exposure to competition, knowledge spillovers from research and development (R&D) and technological diffusion.
[4] Noted, when characterising Caribbean economies, the growth rate of Gross Domestic Product (GDP) is tied to the rate of growth of exports.
[5] Unlike first generation tests, these tests assume that cross-sectional dependence exists in the dataset.

The structure of the paper is as follows. Section 2 puts forward the theoretical background for the model. The associated data and the statistical model are presented in sections 3 and 4. Section 5 discusses the results. The final section concludes the paper.

2. BACKGROUND

For many years, the concept of export causing economic growth has been highlighted in economic theory. It has been discussed from various perspectives, including the classical and Hecksher-Ohlin models, as a contrast to the import substitution industrialisation framework and as a measure to facilitate increased productivity and generate spillovers of technology and knowledge (Palley, 2012). From a Caribbean perspective, the role of exports on economic growth was also discussed by Lewis (1950) in his known model of 'industrialisation by invitation'.

Further, the relationship between the domestic sector and the export sector of these small island economies were also highlighted. For instance, Best (1968, p.295) in relation to the plantation economy model and specific to the plantation export staple, noted that there was

"limited plantation demand for domestically produced output"

therefore foreign exchange was needed from the export staple to enable importation for production (to export) and to facilitate consumption patterns of residents. Also, Demas (2009) highlighted the need for greater interdependence between the domestic and export sector, in that, the export sector should generate import substitution production. In reference to these seminal pieces on the Caribbean economic thought, a recent study by Kemp-Benedict *et al.* (2018, p.3) noted that

"while an effective insertion into the global economy is necessary for development, it must be accompanied by an equally effective insertion of the export-oriented sectors into the domestic economy".

While the concept has been widely empirically investigated in many developing regional groups (Bahmani-Oskooee *et al.*, 2005; Parida and Sahoo, 2007; Dreger and Herzer, 2013; Moyo and Khobai, 2018; Odhiambo, 2021) only single country analyses are available in relation to the CARICOM region. Michael (2002) uses time series data to assess the direction of causality between imports, exports and growth for Trinidad and Tobago, finding evidence of export causing growth. Brown (2015), using quarterly data for Jamaica, assesses the validity of the ELG

hypothesis using an autoregressive distributed lag (ARDL) bounds test approach, concluding that there is evidence of ELG. Hosein *et al.* (2019), on examining the effects of FDI and exports on GDP growth for St. Lucia using an ARDL bounds test approach, concludes that there is evidence of export positively affecting growth. Fraser *et al.* (2020) tested the ELG hypothesis in the case of Suriname, using a dynamic Ordinary Least Squares (OLS) estimator found that exports are positively related to GDP *per capita*.

However, the common factor, in all aforementioned cases for CARICOM, is the impact of exports on overall GDP and not specifically the spillover effect to the domestic sector. Given that the value of exports is accounted for in calculating the value GDP of a country, a positive and significant effect is expected between the two variables and therefore the spillover effect will be indeterminate. McIntyre (1992), in using Feder's (1983) model to test for the externality effect of exports on economic growth for 24 small developing states (over the time periods 1965-1989, 1965-1980 and 1980-1989) concluded that there is no evidence to support that export has an externality effect on the domestic sector. His further analysis of Barbados, Jamaica and Trinidad and Tobago (individually) supported the claim that foreign exchange inflows do not significantly influence domestic output of these countries.

In terms of the overall empirical literature, the ELG hypothesis can be divided into four stages. The first stage focuses on cross-sectional data in testing the correlation between exports and economic growth from only a bi-variate perspective and includes the classic work done by Emery (1967), Kravis (1970) and Balassa (1978). This stage was succeeded by a production function approach, which sought to link aggregate output to factor inputs, with exports being used as an argument under a number of different rationalisations. The often cited papers in this period include those of Michalopolous and Jay (1973), Balassa (1978), Tyler (1981) and Feder (1983). Given the path breaking insights into time series analysis, which were taking place during the 1970's and 80's, the second stage of the empirical analysis placed emphasis on testing the causality links between economic growth and export growth for individual countries or groups of countries (see, for example, Fajana, 1979 and Jung and Marshall, 1985). The third stage is marked by testing for unit roots and co-integration between the variables. Some of the key research work thus far, in this field, has been that of Bahmani-Oskooee *et al.* (1991), Greenaway and Sapsford (1994), Ghatak *et al.* (1997), Chandra (2003) and Herzer (2007). Finally, panel data econometric techniques of unit root, cointegration and cross-sectional dependence tests

followed with some empirical studies including Bahmani-Oskooee *et al.* (2005), Parida and Sahoo (2007), Dreger and Herzer (2013) and Hagemejer and Mućk (2019). The overall finding on the effects of exports remains generally inconclusive, with some studies finding evidence of ELG while others find evidence of exports decreasing growth.

Based on early cross-sectional works by Balassa (1978), Tyler (1981) and Feder (1983), and adapting to a panel data perspective, we follow a production function approach, where the total GDP of country i is sub-divided into two sectors: the 'non-export' sector which captures production for domestic utilisation and the 'export' sector which captures the exports of goods and services of the country.

$$Y_{it} = NX_{it} + X_{it} \tag{1}$$

Where time periods are denoted as t=1, 2...T and groups (countries) denoted as i=1,2...N, Y_{it} represents total GDP, NX_{it} is output of the non-export sector and X_{it} is exports of goods and services. Using total GDP as a dependent variable intertwines the direct and indirect effects of the export variable on overall growth, therefore the externality effect will be indeterminate in such a case (Dreger and Herzer, 2013). In this regard, the study focuses on the production function of the non-export sector which is given as:

$$NX_{it} = A_{nit} K_{it}^{\beta i} L_{it}^{\delta i} \tag{2}$$

Where K_{it} is the capital stock of country i, L_{it} is the labour force of country i, βi is the output elasticity of capital, δi is the output elasticity of labour and A_{nit} is the productivity associated with the non export sector. Exports are relevant to the production function of the non-export sectors through its externality effects via changes in the productivity parameter. Some of the positive externalities include improvements in production techniques, introduction of higher quality training of the labour force and more efficient management of resources etc. (Keesing, 1967; Feder, 1983; de Melo and Robinson, 1992; Bernard and Jensen, 1999). Hence, the productivity associated with the non-export sector, A_{nit} can be shown to be a function of exports among other factors.

$$A_{nit} = f(P_{nit} X_{it}) = P_{nit} X_i^{\gamma i} \tag{3}$$

Where P_{nit} captures other unobserved factors affecting productivity of NX_{it}. Given this notion, equation (2) can be rewritten as:

$$NX_{it} = f(K_{it}L_{it}X_{it}) = (P_{nit}X_{it}^{\gamma i})K_{it}^{\beta i}L_{it}^{\delta i} \quad (4)$$

Taking natural logarithms of (4), we obtain the following equations:

$$ln(NX_{it}) = ln(P_{nit}X_{it}^{\gamma i}K_{it}^{\beta i}L_{it}^{\delta i}) \quad (5)$$

Equation (4) can be simplified to:

$$ln\ (NX_{it}) = \gamma_i ln(X_{it}) + \beta_i ln\ (K_{it}) + \delta_i ln\ (L_{it}) + ln\ (P_{nit}) \quad (6)$$

In this case, P_{nit} can be accounted for by adding country and time effects, represented by μ_i and v_t.

$$\ln\ (NX_{it}) = \gamma_i ln(X_{it}) + \beta_i \ln\ (K_{it}) + \delta_i \ln\ (L_{it}) + v_t + \mu_i + \varepsilon_{it} \quad (7)$$

In creating a model specific to CARICOM as well as other small island developing states, the output of the domestic sector is also influenced by exogenous factors, which can cause either seasonal or cyclical changes in non-export GDP. While these factors may change the structure of exports in the long-run, the effects are more evident in the short to medium-term. These include natural disasters, global commodity price fluctuations, inflation rates and the production and export structure of the economies (Nurse *et al.,* 2001; Guillaumont, 2010; Fuentes *et al.,* 2015). Lewis (1980, p.555) noted

"for the past hundred years the rate of growth of output of the developing world has depended on the rate of growth of output of the developed world".

Therefore, it is expected that when developed countries experience contractions in economic growth, then the developing countries' growth rates are expected to slow, especially as they become more integrated into the global economy. Particularly in terms of non-export growth global recessions generate negative transmission effects via reduced capital flow and tourism traffic, fall in remittances and lack of access to foreign and domestic loans (Naude, 2009). Hence, global economic crises are expected to cause a contraction of the domestic growth rate of small developing countries.

Small island developing states are left highly vulnerable to environmental factors, specifically natural disasters (Briguglio, 1995, 2001; Nurse *et al.*, 2014; Moncada *et al.*, 2018). While in the short-run, destruction due to storms, hurricanes and flooding are expected to negatively affect output (both of domestic and export) due to infrastructural damages, it is difficult to measure the impact specific to GDP growth, since the negative financial effects are buffered by increased expenditure on rebuilding, increases in remittances and drawdowns in savings (Ouattara and Strobl, 2013; Henry *et al.*, 2020). Changes in commodity prices on a global scale also affect non-export output. In terms of service reliant countries, for example, the increase in energy prices is expected to result in a contraction of non-tradeable activity, while for resource abundant economies the opposite is expected. Further, exogenous shocks also trigger changes to the non-export sector indirectly via affecting the productivity levels of the tradeable sector. Of particular importance is the Balassa-Samuelson effect, which occurs as a result of the relative productivity of the tradeable sector in relation to the non-tradeable sector. As the exporting sector's productivity levels increase, it is expected to be accompanied by wage increases, which occurs in all sectors of the economy given the mobility of labour. For the non-tradeable sector, if productivity remains stagnant while wages increase, the prices of their commodities are expected to increase, therefore causing the overall price levels in the economy to increase. These inflationary pressures can in turn negatively affect output of the non-export sector.

3. DATA

Data are collected for fourteen CARICOM economies over the period 1970 to 2019. These are: Antigua and Barbuda, the Bahamas, Barbados, Belize, Dominica, Grenada, Guyana, Haiti, Jamaica, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Suriname and Trinidad and Tobago. The dependent variable in the study (non-export GDP) is calculated as GDP minus Exports of Goods and Services (see Table 1 for data source)[6]. The perpetual inventory method was used to calculate a proxy for capital stock using data on Gross Capital Formation as proposed by De La Fuente and Doménech (2000). Data on GDP, exports of goods and services and gross capital formation (all in constant 2015 USD) were sourced from the United Nations Statistic Division's Statistical database. Labour force data were collected from the World Bank,

[6] We assume for simplicity that changes in exports impact on changes in GDP in the same time period. Therefore, exports are not treated as part of accumulated inventory for more than one year. This is a practical assumption given that many of these countries are service oriented.

World Development Indicators. All additional data and associated details are presented in Table A1 in Appendix. Summary statistics are presented in Table A2 in Appendix.

4. STATISTICAL MODEL

In this paper, we use an ARDL model to assess the long-run and short-run spillover effect of exports in these developing island economies. This model was chosen to ascertain impact of the export variable on non-export GDP. Eq. (7) can be written as:

$$ln(NX_{it}) = \sum_{j=1}^{p} \omega_{it} ln\left(NX_{i,t-j}\right) + \sum_{j=1}^{q} \theta_{it} ln\left(X_{i,t-j}\right) + \sum_{j=1}^{q} \delta_{it} ln\left(K_{i,t-j}\right) + \sum_{j=1}^{q} \tau_{it} ln\left(L_{i,t-j}\right) + \varepsilon_{it} \quad (8)$$

where p and q denote the lags of dependent and independent variables, respectively. We then can write equation (8) as an error correction equation. Thus:

$$\Delta\, ln(NX_{it}) = \partial_i\left[ln\left(NX_{i,t-1}\right) - \varphi_i\, ln\left(X_{i,t-1}\right) - \vartheta_i\, ln\left(K_{i,t-1}\right) - \rho_i ln\left(L_{i,t-1}\right)\right] + \sum_{j=1}^{p-1} v_{it} \Delta ln\left(NX_{i,t-j}\right) + \sum_{j=0}^{q-1} \gamma_{it} \Delta ln\left(X_{i,t-j}\right) + \sum_{j=0}^{q-1} \beta_{it} \Delta ln\left(K_{i,t-j}\right) + \sum_{j=0}^{q-1} \delta_{it} \Delta ln\left(L_{i,t-j}\right) + u_{it} \quad (9)$$

where the ∂_i denotes the speed of adjustment parameter, which $\partial_i \neq 0$ for long-run relationship to exist and Δ is the first difference operator. This method produces consistent and efficient estimators of the parameters in the presence of country heterogeneity (Pesaran *et al.*, 1999). It also allows for testing the existence of a long-run relationship between the variables, regardless of whether the underlying regressors are purely stationary *I(0)*, purely non-stationary *I(1)*, or mutually cointegrated[7].

Under the Pooled Mean Group (PMG) estimation, the long-run coefficients are the same for all countries while the intercepts, short-run coefficients and error variances are allowed to differ across individuals (Pesaran *et al.*, 1999). The technique therefore involves both pooling and averaging. In such a case, Eq. (9) can be estimated as:

[7] Here in testing the order of integration we use the Im *et al.* (IPS) (2003) unit root test and Pesaran (2007) cross-sectional unit root test which uses cross section averages of lagged level and first differences of each series and presented a modified ADF unit root test in the presence of cross-sectional dependence (CADF) under the null hypothesis that all series are stationary. The results are presented in Table A3 in Appendix.

$$\Delta\, ln(NX_{it}) = \partial_i\left[ln\left(NX_{i,t-1}\right) - \varphi_i\, ln\left(X_{i,t-1}\right) - \vartheta_i\, ln\left(K_{i,t-1}\right) - \rho_i ln\left(L_{i,t-1}\right)\right] + \quad (10)$$
$$\sum_{j=1}^{p-1} v_{it}\Delta ln\left(NX_{i,t-j}\right) + \sum_{j=0}^{q-1} \gamma_i{}^{*}\Delta ln\left(X_{i,t-j}\right) + \sum_{j=0}^{q-1} \beta_i{}^{*}\Delta ln\left(K_{i,t-j}\right) + \sum_{j=0}^{q-1} \delta_i{}^{*}\Delta ln\left(L_{i,t-j}\right) + u_{it}$$

Where $\gamma_i{}^{*}$, $\beta_i{}^{*}$ and $\delta_i{}^{*}$ are the mean of individual coefficients of the differenced variables.

5. Results

Given that there is evidence of cross-sectional dependence (as shown in Table A4), a common correlated effects (CCE) estimator is implemented (using the PMG specification)[8]. The estimation results for the dynamic ARDL[9] model are presented in Table 1. Columns I is specified with capital stock being the only factor of production, column II is specified with labour force being the only factor of production and column III is specified with both capital stock and labour force (I and II are only presented as checks for robustness of the export coefficient). In all cases the error correction coefficient (ECC) is found to be negative and statistically significant, hence in the long-run the variables are expected to follow a steady path such that any deviation from the long-run equilibrium is expected to be corrected via a series of short-term adjustments (Mishra, 2011)[10].

Focusing on the results presented in column III of Table 1, in the long-run case, exports were shown to be negative and statistically significant at all levels, hence as exports increases, resources are directed away from the non-export sector causing a long-term contraction in output of this sector. Capital stock is positive and significant therefore as these countries' capital stock increases in the long-run, non-export output is also expected to increase. The labour force coefficient is shown to be statistically insignificant in the long-run estimation. In terms of the short-run, the export coefficient is negative and statistically significant while capital stock and labour force are shown to be statistically insignificant at all levels in this estimation[11]. For capital stock, this insignificance shows that the non-export sector may only have limited capacity for productively absorbing capital in the short- run. This is consistent with Baumol's (1967) premise that some sectors of an economy only have limited potential to benefit from productivity

[8] The PMG estimates assuming no cross-sectional dependence is presented in Table A5 in Appendix.
[9] Lag lengths was determined by the Akaike Information Criterion (AIC) and Schwarz Information Criterion (SIC).
[10] This finding is consistent with other tests for cointegration (see Pedroni, 1995; 1999). Table A6 in the Appendix provides the cointegration test results.
[11] Further analysis into the short-run is presented in Table 3.

increases, on account of technical progress or capital deepening. The results also show limited potential of the non-export sector to absorb additional units of labour in its current capacity.

TABLE 1 - *Common Correlated Effects (CCE) Estimates for Non-Export GDP*

Model:	**(I)**	**(II)**	**(III)**
	Panel A: Short-run est.		
∆ln(exports)	-0.473***	-0.529***	-0.439***
	(0.001)	(0.000)	(0.001)
∆ln(capital stock)	0.019		-0.018
	(0.528)		(0.533)
∆ln(labour force)		-0.701	-0.445
		(0.503)	(0.698)
	Panel B: Long-run est.		
ECC	-0.528*	-0.465***	-0.513***
	(0.067)	(0.000)	(0.000)
ln(exports)	-0.227	-0.100	-0.185***
	(0.205)	(0.433)	(0.002)
ln(capital stock)	0.351***		0.310***
	(0.000)		(0.000)
ln(labour force)		0.504	0.486
		(0.343)	(0.285)

Notes: p-value in brackets. **p*-value<0.1, ***p*-value<0.05, ****p*-value<0.01.
'*ln'* means natural logarithm.

Table 2 below shows the export coefficient (short-run) as generated from the CCE estimator above for each individual country in the study. For 8 out of the 14 countries, the export coefficient is negative and significant at least at 5% level. This suggests that the crowding out effect is experienced by the majority of CARICOM countries. However, there are many observed and unobserved factors which may affect the coefficients for these countries. Hence an alternative specification is provided in the next section.

TABLE 2 - *CCE Individual Results for the Export Variable (Short-Run)*

Individual Results CCE		
	Coef.	***p*-value**
Antigua and Barbuda	-0.987***	0.000
The Bahamas	0.022	0.913
Barbados	-0.149	0.313
Belize	-0.621***	0.000
Dominica	-0.141	0.151
Grenada	-1.959***	0.000
Guyana	-0.369***	0.000
Haiti	-0.011	0.922
Jamaica	-0.267	0.101
St. Kitts and Nevis	-0.337**	0.049
St. Lucia	-0.076	0.657
St. Vincent and the Grenadines	-0.719***	0.000
Suriname	-0.522***	0.000
Trinidad and Tobago	-0.485***	0.000

Notes: **p*-value<0.1, ***p*-value<0.05, ****p*-value<0.01.

5.1. Alternative Specifications

Table 3 presents the fixed effects (FE) and random effects (RE) estimates as a means of ascertaining the medium to short-run effect of exports on non-export GDP, while accounting for other factors[12] including; natural disasters, inflation, changes in the world economic landscape and energy prices (Lewis, 1980; Piton, 2017)[13]. This is done to further investigate the short-run results of Table 1, since neither capital stock nor labour force changes sufficiently explain short-run changes in non-export output using the full-time span (1990-2019). The estimation is done in intervals (1991-2000, 2001-2010, 2011-2019) so as to account for any structural breaks, or country specific changes while the additional control variables account for any misspecification issues associated with omission. In this estimation, the distinction between resource abundant and service reliant countries were captured using a binary variable. For this group of Caribbean countries, the resource exporters are Guyana, Suriname and Trinidad and Tobago (based on

[12] Some of these factors were suggested by an independent reviewer.
[13] The details of the variables are presented in Table A1 in Appendix.

Figure A1). A binary variable for natural disasters takes the value 1 if a country experienced a natural disaster in a given year and 0 otherwise. In all cases the effect of exports on the non-export sector remains consistent, such that an increase in exports leads to movement of resources away from other sectors of the economy, hence causing a contraction. The results show that the coefficients of capital stock and labour force are positive and statistically significant.

In terms of the additional variables, high inflation causes a contraction of non-export output, while resource abundant economies[14] (binary variable for resource-based economies) are shown to have higher non-export output relative to other countries. These are linked to the Balassa-Samuelson effect and possible Dutch Disease effects of these resource rich countries. In terms of the former, under the assumption that exports are productivity enhancing, it allows for increases in wages in the export sector. Consequently, this causes an increase in wages in the non-export sector since labour is mobile. If wages are increased in the non-export sector, while productivity remained unchanged, the prices of non-export commodities are expected to rise to facilitate the higher wages, thus causing the overall price level in the economy to increase. If we assume that non-export commodities are inelastic, then this effect is expected to cause a fall in output of the non-export sector. As it relates to Dutch Disease, however, the dummy variable, for resource-based countries, in this case is positive and significant, since due to the spending effect, non-export GDP are expected to increase as a lagged effect of a resource boom. As a result, non-export output is expected to be high in resource rich economies as compared to the other countries in the dataset.

Specifically on the spillover effect of exports, the results point to a distinct separation between the export sector and the non-export sector of these economies. Both sectors do not simultaneously grow, instead, the export sector tends to grow at the expense of other sectors of the economy. This implies a lack of linkage between both sectors and shows that current export patterns do not manifest positive spillovers to the domestic sectors. This can be as a result of numerous factors, including enclaved resource exports, reduction or stagnation in manufacture value added and rent seeking behavior. This finding is consistent with an argument presented by Myrdal (1957) that developing countries exhibit a backwash effect. Cypher and Dietz (2009

[14] Trinidad and Tobago, Guyana and Suriname.

p.184) using this notion noted that for developing economies, such as those included in the study,

"the structure of the economy was one wherein the predominance of backwash effects arose because of past institutional arrangements rather than through the workings of the laws of comparative advantage...The failure of the investment in the export sector to generate multiplier effects sufficient to swamp the backwash effects arose from colonial policies and adverse path dependence".

TABLE 3 - *Fixed Effects and Random Effects Estimation (at Intervals)*

	FE			RE		
Variable	**1991-2000**	**2001-2010**	**2011-2019**	**1991-2000**	**2001-2010**	**2011-2019**
ln(exports)	-0.573***	-0.607***	-0.345***	-0.478***	-0.378***	0.110
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.113)
ln(capital stock)	0.247***	0.362***	0.264***	0.373***	0.524***	0.481***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
ln(labour force)	1.852***	-0.542	0.761***	0.722***	0.341**	0.227***
	(0.000)	(0.200)	(0.001)	(0.000)	(0.023)	(0.003)
Inflation (consumer price)	-0.004***	-0.005*	-0.002**	-0.005***	-0.001	-0.001
	(0.000)	(0.088)	(0.022)	(0.000)	(0.674)	(0.493)
Resource based country	-	-	-	1.284*	1.007**	0.351
	-	-	-	(0.057)	(0.026)	(0.103)
ln(oil price)	0.051	0.304***	-0.033	0.032	0.133***	-0.004
	(0.462)	(0.000)	(0.164)	(0.716)	(0.004)	(0.910)
Financial crisis	-	-0.079	-	-	-0.063	-
	-	(0.108)	-	-	(0.312)	-
Natural disaster	-0.033	-0.026	0.007	-0.026	-0.024	0.060**
	(0.274)	(0.360)	(0.698)	(0.507)	(0.506)	(0.039)
Const.	4.567	31.558***	13.406***	13.279***	10. 432***	9.645***
	(0.202)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
R-sq. (within)	0.874	0.635	0.689	0.854	0.489	0.558
Number of Groups	9	9	9	9	9	9
Number of Obs.	83	90	79	83	90	79

Notes: Only 9 out of the 14 countries were included due to limitation on data availability. *p*-value in brackets. **p*-value<0.1, ***p*-value<0.05, ****p*-value<0.01. '*ln*' means natural logarithm.

6. CONCLUSION

The paper utilised a production function approach for analyzing the spillover effect of exports in relation to the ELG hypothesis for fourteen CARICOM states. A panel ARDL model was specified and estimated using a CCE estimator. In relation to the ELG hypothesis, the results indicate that in the long-run, the spillover effect of exports follows a stable path, so that any deviations are expected to be corrected, given no major exogenous shocks. In the case of cross-sectional dependence, the coefficient for exports was negative in the long-run, such that as activity in the export sector increases, activity in the non-export sectors fall. In the short-run, increases in exports also negatively impact non-export GDP, hence, as activity increases in the export sectors of these countries, economic activity in the remaining sectors are crowded out. This is possibly due to reallocation of resources away from the non-tradeable sectors towards the tradeable sectors, using the terminology of Corden and Neary (1982).

Similar results were found in other country specific cases (Debnath *et al.*, 2014; Iftikhar *et al.*, 2016) and panel data cases (Dreger and Herzer, 2013; Ribeiro *et al.*, 2016). Specifically, in terms of the Caribbean economies, this further emphasizes the plantation economy theory of a minimal link between the export sector and the domestic sectors of these economies. Export concentration will therefore have minimal benefits to these economies, instead, increasing production integration of the export sector can allow for a greater spillover effect. Further, given the comparative advantage structure of these economies, some infant industry measures may be necessary in developing new export industries that can effectively compete on a global scale.

There is room for investment to cause growth of the domestic economy, however this would likely be more substantial in the long-run if exports displayed a positive spillover effect. Further, given the export composition and the high propensity to import in these SIDs, an 'ultra' export led policy (Bhagwati, 1988) does not allow for balanced growth since such over reliance on the export sector leave these small open economies highly susceptible to external shocks. Overcoming these issues requires greater insertion of the export sector into the domestic economy so that overall productive capacity is improved. The physical benefits of exports should be invested into capital building instead of fueling consumption via imports, which in the long- and short-run will expand export potential and decrease economic vulnerability.

REFERENCES

Aghion, P., A. Bergeaud, M. Lequien, and M.J. Melitz (2018), "The Impact of Exports and Innovation: Theory and Evidence", Working Paper Series No. 678, Banque de France.

Alesina, A., E. Spolaore and R. Wacziarg, (2005), *Trade, Growth, and the Size of Countries*, in: P. Aghion, S. Durlauf (Eds), "Handbook of Economic Growth – Vol. 1B", Stanford University: CA, United States.

Awokuse, T.O. (2003), "Is the Export-Led Growth Hypothesis Valid for Canada?", *Canadian Journal of Economics*, 36(1), 126-136.

Bahmani-Oskooee, M., C. Economidou and G.G. Goswami (2005), "Export Led Growth Hypothesis Revisited: A Panel Cointegration Approach", *Scientific Journal of Administrative Development*, 3, 40-55.

Bahmani-Oskooee, M., H Mohtadi and G. Shabsigh (1991), "Exports, Growth and Causality in LDCs: A Re-Examination", *Journal of Development Economics*, 36(2), 405-415.

Balassa, B. (1978), "Exports and Economic Growth: Further Evidence", *Journal of Development Economics*, 5(2),181-189.

Baumol, W.J. (1967), "Macroeconomic of Unbalanced Growth: The Anatomy of Urban Crisis", *The American Economic Review*, 57(3), 415-326.

Bernard, A.B. and J.B. Jensen (1999), "Exceptional Exporter Performance: Cause, Effect, or Both?", *Journal of International Economics*, 47(1), 1-25.

Best, L.A. (1968), "Outlines of a Model of Pure Plantation Economy", *Social and Economic Studies,* 17(3), 283-326.

Bhagwati, J. (1988), "Export-Promoting Strategies: Issues and Evidence", *The World Bank Research Observer*, 3(1), 27-57.

Briguglio, L. (1995), "Small Island Developing States and their Economic Vulnerabilities", *World Development*, 23(9),1615-1632.

Briguglio, L. (2001), The Vulnerability Index, Paper presented at the AOSIS Workshop on Trade Sustainable Development and SIDs, Montego Bay, Jamaica, 12-15 December.

Brown, D. (2015), "Testing the Export-Led Growth Hypothesis: An Application of the ARDL Bounds Testing Approach – Evidence from Jamaica and Selected Latin American Caribbean Countries", Bank of Jamaica Research and Economic Programming Division Working Paper, October.

Cantore, N., M. Clara, A. Lavopa and C. Soare (2017), "Manufacturing as an Engine of Growth: Which is the Best Fuel?", *Structural Change and Economic Dynamics*, 42, 56-66.

Chandra, R. (2003), "Reinvestigating Export-Led Growth in India Using a Multivariate Cointe-Gration Framework", *Journal of Developing Areas*, 37(1), 73-86.

Corden, M. and J.P. Neary (1982), "Booming Sector and De-Industrialisation in a Small Open Economy", *The Economic Journal*, 92(368), 825-848.

Cypher, J.M. and J.L. Dietz (2009), The Process of Economic Development (third ed.), Routledge: New York.

de La Fuente, A. and R. Doménech (2000), "Human Capital in Growth Regressions: How much Difference Does Data Quality Make?", *Economics Department Working Paper* 262, OECD: Paris.

de Melo, J. and S. Robinson (1992), "Productivity and Externalities: Models of Export-Led Growth", *The Journal of International Trade and Economic Development*, 1(1), 41-68.

Debnath, A., A.B. Laskar, N. Bhattacharjee, and N. Mazmuder (2014), "Is India's GDP Really Led by Export? A Further Examination", *Journal of Transnational Management*, 19(4), 247-260.

Demas, W.G. (2009), The Economics of Development in Small Countries: With Special Reference to the Caribbean, University of the West Indies Press: Kingston and St. Michael, First published: 1965.

Dodaro, S. (1991), "Comparative Advantage, Trade and Growth: Export-Led Growth Revisited", *World Development*, 19(9), 1153-1165.

Dreger, C. and D. Herzer (2013), "A Further Examination of the Export Led Growth Hypothesis", *Empirical Economics*, 45(1), 39-60.

Emery, R.F. (1967), "The Relationship of Exports and Economic Growth", *Kyklos*, 20(4), 470-486.

Fajana, O. (1979), "Trade and Growth: The Nigerian Experience", *World Development*, 7(1), 73-78.

Feder, G. (1983), "On Exports and Economic Growth", *Journal of Development Economics*, 12(1-2), 59-73.

Fraser, N., J. Narain and G. Ooft (2020), "Testing the Export-Led Growth Hypothesis: The Case of Suriname", *Social and Economic Studies*, 69(1-2), 113-137.

Fu, X. (2005), "Exports, Technical Progress and Productivity Growth in a Transition Economy: A Non-Parametric Approach for China", *Applied Economics*, 37, 725-739.

Fuentes, J.R., K. Melgarejo and V. Mercer-Blackman, (2015), "Understanding Economic Growth in the Caribbean Region: A Conceptual and Methodological Study", IDB Working Paper Series IDB-WP-595.

Ghatak, S. and S.W. Price (1997), "Export Composition and Economic Growth: Cointegration and Causality Evidence for India", *Review of World Economics*, 133(3),538-553.

Greenaway, D. and D. Sapsford (1994), "What does Liberalisation do for Exports and Growth?", *Review of World Economics*, 130(1),152-174.

Grossman, G.M. and E. Helpman (1991), Innovation and Growth in the Global Economy, MIT Press: Cambridge, MA.

Guillaumont, P. (2010), "Assessing the Economic Vulnerability of Small Island Developing States and Least Developed Countries", *Journal of Development Studies*, 46(5), 828-854.

Hagemejer, J. and J. Mućk (2019), "Export-Led Growth and its Determinants: Evidence from Central and Eastern European Countries", *The World Economy*, 42(7), 1994-2025.

Henry, M., N. Spencer and E. Strobl (2020), "The Impact of Tropical Storms on Households: Evidence from Panel Data on Consumption", *Oxford Bulletin of Economics and Statistics*, 82(1), 1-22.

Herzer, D. (2007), "How does Trade Composition Affect Productivity; Evidence for Chile", *Applied Economics Letters*, 14(12), 909-912.

Hosein, R., R. Deonanan and K. Evans (2019), "Foreign Direct Investments, Exports and Economic Growth in SIDS: Evidence from Saint Lucia", *Economia Internazionale/International Economics*, 72(1), 47-76.

Iftikhar, S., Fakhar-un-Nisa, M. Ali and S. Umar, (2016), "Gross Domestic Capital Formation, Exports and Economic Growth", *Journal of Economics and Sustainable Development*, 7(13), 44-48.

Im, K.S., M.H. Pesaran and Y. Shin (2003), "Testing for Unit Roots in Heterogeneous Panels", *Journal of Econometrics*, 115(1), 53-74.

Jung, W.S. and P.J. Marshall (1985), "Exports, Growth and Causality in Developing Countries" *Journal of Development Economics*, 18(1), 1-12.

Keesing, D.B. (1967), "Outward-Looking Policies and Economic Development", *Economic Journal*, 77(306), 303-320.

Kemp-Benedict, E., C. Drakes and T.J. Laing (2018), "Export-Led Growth, Global Integration, and the External Balance of Small Island Developing States", *Economies,* 6(2), 35.

Kravis, I. (1970), "Trade as a Handmaiden of Growth: Similarities between the Nineteenth and Twentieth Centuries", *Economic Journal*, 80(320), 850-872.

Lectard, P. and E. Rougier (2018), "Can Developing Countries Gain from Defying Comparative Advantage? Distance to Comparative Advantage, Export Diversification and Sophistication, and the Dynamics of Specialization", *World Development*, 102, 90-110.

Lewis, W.A. (1950), "The Industrialization of the British West Indies", *Caribbean Economic Review*, 2(1), 1-51.

Lewis, W. A. (1954), "Economic Development with Unlimited Supplies of Labour", *The Manchester School*, 22(2), 139-191.

Lewis, W.A. (1979), "The Dual Economy Revisited", *The Manchester School*, 47(3), 211-229.

Lewis, W.A. (1980), "The Slowing Down of the Engine of Growth", *The American Economic Review*, 70(4), 555-564.

McIntyre, A. (1992), Exports and Economic Growth in Caribbean Countries. 24th Regional Programme of Monetary Studies Annual Conference, Bahamas: Nassau.

McKinnon, R. (1964) "Foreign Exchange Constraint in Economic Development and Efficient Aid Allocation", *Economic Journal*, 74(294), 338-409.

Medina-Smith, J. (2001), "Is Export Led Growth Hypothesis Valid for Developing Countries? A Case Study of Costa Rica", UNCTAD Study Series No. 7.

Michael, H. (2002), "Causality Between Exports, Imports and Income in Trinidad and Tobago", *International Economic Journal*, 16(4), 97-106.

Michalopoulos, C. and K. Jay (1973), "Growth of Exports and Income in the Developing World: A Neoclassical View", Agency for International Development Discussion Paper No. 28, Washington, DC.

Mishra, P.K. (2011), "The Dynamics of Relationship between Exports and Economic Growth in India", *International Journal of Business and Economic Sciences Applied Research*, 4(2), 53-70.

Moncada, S., L. Briguglio, H. Bambrick and I. Kelman (2018), "Guest Editorial – Development and Climate Change in Small Island Developing States", *International Journal of Climate Change Strategies and Management*, 10(2), 214-216.

Moyo, C.Z. and H. Khobai (2018), "Trade Openness and Economic Growth in SADC Countries", *Economia Internazionale/International Economics*, 71(4), 417-436.

Myrdal, G. (1957), Economic Theory and Underdeveloped Regions, New York: Harper & Row.

Naudé, W. (2009), "The Financial Crisis of 2008 and the Developing", WIDER Working Paper No. 2009/01.

Nurse, L.A., G. Sem, J.E. Hay, A.G. Suarez, P.P. Wong, L. Briguglio and S. Ragoonaden (2001), *Small Island States*, in: J. McCarthy, O. Canziani, N. Leary, D. Dokken, K. White (Eds), "Climate Change 2001: Impacts, Adaptation, and Vulnerability" (pp. 843-875), Cambridge University Press.

Nurse, L.A., Mclean, R.F., Agard, J., Briguglio, L.P., Duvat-Magnan, V., Pelesikoti, N., Tompkins, E. and Webb, A. (2014), "Small Islands, Climate Change 2014: Impacts, Adaptation, and Vulnerability, Part B: Regional Aspects, Working Group II Contribution to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change" (pp. 1613-1654), [Barros, V.R., Field, C.B., Dokken, D.J., Mastrandrea, D.J., Mach, K.J., Bilir, T.E., Chatterjee, M., Ebi, K.L., Estrada, Y.O., Genova, R.C., Girma, B., Kissel, E. S., Levy, A.N., Maccracken, S., Mastrandrea, P.R. and White, L.L. (Eds)], Cambridge University Press: Cambridge, UK and New York, USA.

Odhiambo, N.M. (2021), "Is Export-Led Growth Hypothesis Still Valid for Sub-Saharan African Countries? New Evidence from Panel Data Analysis", *European Journal of Management and Business Economics,* available at: <https://www.emerald.com/insight/content/doi/10.1108/EJMBE-06-2020-0156/full/pdf?title=is-export-led-growth-hypothesis-still-valid-for-sub-saharan-african-countries-new-evidence-from-panel-data-analysis>.

Ouattara, B. and E. Strobl (2013), "The Fiscal Implications of Hurricane Strikes in the Caribbean", *Ecological Economics*, 85, 105-115.

Palley, T. (2012), "The Rise and Fall of Export-led Growth", *Investigación Económica*, 71(280), 141-161.

Parida, P.C. and P. Sahoo (2007), "Export-led Growth in South Asia: A Panel Cointegration Analysis", *International Economic Journal*, 21(2), 155-175.

Pedroni, P. (1995), "Panel Cointegration: Asymptotic and Finite Sample Properties of Pooled Time Series Tests, with an Application to the PPP Hypothesis", Indiana University Working Papers in Economics No. 95-013.

Pedroni, P. (1999), "Critical Values for Cointegration Tests in Heterogeneous Panels with Multiple Regressors", *Oxford Bulletin of Economics and Statistics*, 61(S1), 653-670.

Pedroni, P. (2001), *Fully Modified OLS for Heterogeneous Cointegrated Panels*, in: B.H. Baltagi, T.B. Fomby and R. Carter Hill (Eds), "Nonstationary Panels, Panel Cointegration, and Dynamic Panels" (Advances in Econometrics, Vol. 15), Emerald Group Publishing Limited, Bingley, pp. 93-130 <https://doi.org/10.1016/S0731-9053(00)15004-2>.

Pesaran, M.H. (2007), "A simple panel unit root test in the presence of cross-section dependence", *Journal of Applied Econometrics*, 22(2), 265-312.

Pesaran, M.H., Y. Shin and R.P. Smith (1999), "Pooled Mean Group Estimation of Dynamic Heterogeneous Panels", *Journal of the American Statistical Association*, 94, 621-634.

Piton, S. (2017), "Economic Integration and the Non-tradable Sector: The European Experience", *Job Market Papers*, ppi361.

Ribeiro, A.P., V. Carvalho and P. Santos (2016), "Export-Led Growth in the EU: Where and What to Export?", *The International Trade Journal*, 30(4), 319-344.

Ruprah, I.J. (2013), "Does Size Matter? Yes, If You are Caribbean", *Inter-American Development Bank Policy Brief*, No. IDB-PB-201.

Scobie, M. (2013), *Climate Regulations: Implications for Trade Competitiveness in Caribbean States*, in: W. Filho, F. Mannke, R. Mohee, V. Schulte, D. Surroop (Eds), "Climate Smart Technologies: Integrating Renewable Energy and Energy Efficiency in Mitigation and Adaptation Responses" (pp. 33-50), Springer.

Szirmai, A. (2012), "Industrialisation as an Engine of Growth in Developing Countries, 1950–2005", *Structural Change and Economic Dynamics,* 23(4), 406-420.

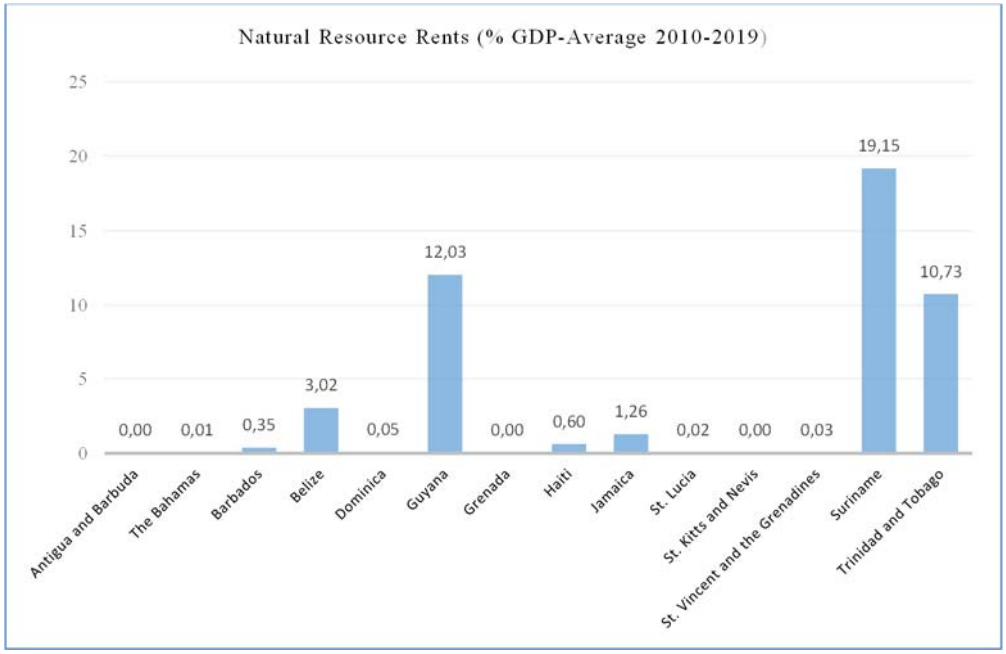
Thangavelu, S. and D.T. Owyong (2003), "The Impact of Export Growth and Scale Economies on Productivity in Singapore's Manufacturing Industries", *Journal of Economic Studies*, 30(6), 623-635.

Tyler, W. (1981), "Growth and Export Expansion in Developing Countries: Some Empirical Evidence", *Journal of Development Economics*, 9(1), 121-130.

van den Berg, H. and J.R. Schmidt (1994), "Foreign Trade and Economic Growth: Time Series Evidence from Latin America", *Journal of International Trade and Economic Development*, 3, 249-268.

APPENDIX

FIGURE A1 - *Natural Resource Rents* (%of GDP)



Source: World Development Indicators.

TABLE A1 - *Data, Source and Time Span*

Variable	Source	Year
GDP (constant 2015 US$)	United Nations Statistic Division's Statistical database	1970-2019
Exports of goods and services (constant 2015 US$)	United Nations Statistic Division's Statistical database	1970-2019
Gross capital formation (constant 2015 US$)	United Nations Statistic Division's Statistical database	1970-2019
Average depreciation rate of capital stock	Penn World	1970-2019
Labour force (total)	World Development Indicators	1990-2019
Oil prices (US$/bbl)	Central Bank of Trinidad and Tobago	1970-2019
Inflation (Consumer Price) (annual %)	World Development Indicators	1970-2019 (with gaps)
Resource based country	Dummy variable: 1 for resource based economies (Trinidad and Tobago, Sur, Guy)	-
Global financial crisis	Dummy variable: 1 for year 2008	-
Natural disaster	EM-DAT. CRED. Dummy variable: 1 if county experienced natural disaster (storm, hurricane, earthquake, flooding) in year *t*.	-

TABLE A2 - *Descriptive Statistics of Variables*

Variable	Obs.	Mean	Std. Dev.	Min	Max
ln(non-export GDP)	683	20.739	1.529	13.185	23.381
ln(exports)	700	20.368	1.241	17.472	23.621
ln(capital stock)	700	22.184	1.395	19.266	25.270
ln(labour force)	300	12.471	1.271	10.633	15.455
Inflation (consumer price)	570	8.560	21.020	-11.449	368.478
Resource based country	700	0.214	0.411	0	1
ln(oil prices)	700	3.205	1.000	0.262	4.601
Financial crisis	700	0.020	0.140	0	1
Natural disaster	700	0.25	0.433	0	1

Notes: Data for in some cases were missing. '*ln'* means natural logarithm. Inflation, consumer price (annual %) for Suriname in 1994 was 368.478.

TABLE A3 - *Unit Root Test*

Variable	Method	
	IPS	CADF
ln(non-export GDP)	-2.137*	-1.190
	(0.064)	(0.117)
ln(exports)	-1.459	-1.685**
	(0.587)	(0.046)
ln(capital stock)	-1.591	-2.353***
	(0.366)	(0.009)
ln(labour force)	-1.888	0.061
	(0.856)	(0.524)
Variable	**Method**	
	IPS	**CADF**
Δln(non-export GDP)	-8.007***	-13.252***
	(0.000)	(0.000)
Δln(exports)	-7.350***	-11.789***
	(0.000)	(0.000)
Δln(capital stock)	-7.554***	-13.036***
	(0.000)	(0.000)
Δln(labour force)	-2.490***	0.154
	(0.007)	(0.561)

Notes: 1) IPS- Im Pesaran and Shim (2003). CADF- Covariant Augmented Dicky Fuller (see Pesaran 2007). 2) The results are presented under the assumption of intercept only. *ln(labour force)* is shown to be *I(2)* according to the CADF unit root. For this reason, the long-run (CCE) estimates are done, with and without the variable. In other trials, the first difference of *ln(labour force)* was used to replace the level values. The sign and level of significance of this and other variables in the estimation remained unchanged. *p*-value in brackets. **p*-value<0.1, ***p*-value<0.05, ****p*-value<0.01.

TABLE A4 – *Pesaran (2007) Cross-Section Dependence Test*

Variable	CD-test	*p*-value
ln(non-export GDP)	*22.950***	*0.000*
ln(exports)	*12.630***	*0.000*
ln(capital stock)	*19.030***	*0.000*
ln(labour force)	*30.900***	*0.000*

Notes: H0: Cross-sectional independence ***p-value<0.01.

TABLE A5 - *PMG Estimates (no cross-sectional dependence)*

Variable	Coef.
Panel A: Short-run est.	
Δln(exports)	-0.596***
	(0.000)
Δln(capital stock)	0.069**
	(0.023)
Δln(labour force)	-0.858
	(0.585)
Panel B: Long-run est.	
ECC	-0.268**
	(0.000)
ln(exports)	-0.065*
	(0.041)
ln(capital stock)	0.15***
	(0.000)
ln(labour force)	0.684***
	(0.000)
Const.	2.954***
	(0.000)

Notes: p-value in brackets. *p-value<0.1, **p-value<0.05, ***p-value<0.01. '*ln*' means natural logarithm.

TABLE A6 - *Pedroni (2001) Tests Statistics*

Variables: *ln(non-export GDP), ln(exports), ln(capital stock)*					
Alternative hypothesis: *common AR coefficients. (within dimension)*			***Alternative hypothesis:*** *individual AR coefficients. (between-dimension)*		
	Statistic	***Prob.***		**Statistic**	***Prob.***
Modified variance ratio	-1.316*	0.094	Modified Phillips-Perron *t*	0.399	0.345
Modified Phillips-Perron *t*	-3.800***	0.000	Phillips-Perron *t*	-3.748***	0.000
Phillips-Perron *t*	-4.866***	0.000	Augmented Dickey-Fuller *t*	-0.788	0.215
Augmented Dickey-Fuller *t*	-4.174***	0.000			
Variables: *ln(non-export GDP), ln(exports), ln(capital stock), ln(labour force)*					
Alternative hypothesis: *common AR coefficients. (within dimension)*			***Alternative hypothesis:*** *individual AR coefficients. (between-dimension)*		
	Statistic	***Prob.***		**Statistic**	***Prob.***
Modified variance ratio	-1.570*	0.058	Modified Phillips-Perron *t*	0.399	0.345
Modified Phillips-Perron *t*	0.714	0.238	Phillips-Perron *t*	-3.748***	0.000
Phillips-Perron *t*	-1.668**	0.048	Augmented Dickey-Fuller *t*	-0.788	0.215
Augmented Dickey-Fuller *t*	-0.542	0.294			

Notes: The results are generated under the assumption of an individual intercept only and the lag length was determined by the AIC. **p*-value<0.1, ***p*-value<0.05, ****p*-value<0.01.