

The causal relationship between exports and economic growth in Sri Lanka

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Introduction

The relationship between economic growth and export in developing countries has drawn increasing attention of both theoretical and empirical studies. An increase in exports of good and services may lead to an overall expansion in production and accompanying fall in unemployment rate. According to the classical economic theories by Adam Smith and David Ricardo who argued that international trade plays an important role in economic growth. The neoclassical approach also highlights the importance of competitive advantages in international trade.

Recent empirical estimations have tended to focus attention on causal directions between exports and economic growth, using Granger-type causality tests. The findings of these studies indicate that unidirectional or bidirectional causality between Gross Domestic Product (GDP) growth and export. A study by Shihab et al. (2014) in Jordan, using Johansen cointegration test and Granger Causality test, found that there exist a causal relationship from the economic growth to export, and not vice versa over the period 2000-2012. Further, Ronit and Divya (2014) confirmed that GDP Growth causes export growth in India using the Granger Causality test. On the other hand some studies found that, there is a long run bi-directional causality between the exports and income growth (Elbeydi, 2010). But, some researchers could not find a causal link between export and economic growth (Ahmad & Kwan, 1991). Therefore, the purpose of this paper is to examine the causal relationship between exports and economic growth in Sri Lanka.

Methodology

The data used for this study are basically time series. Two economic variables included in this study are GDP and exports (EXP) over the period 1960-2016. The data were obtained from the Central Bank Reports and Department of Census and Statistical reports in Sri Lanka. The dependent variable is the GDP and export is independent variable. All of the variables have been transformed into natural logarithmic forms as logarithms are much more useful way to measure economic data and the resulting variables are denoted as LGDP and LEXP.

In this study, unit root test, Cointegration test and Causality test were employed to examine the relationship between two variables. Unit root tests were used to determine whether the time series data were stationary. When time series data are non-stationary and used for analysis it may give spurious results because estimates obtained from such data will possess non constant mean and variance. In this regard Augmented Dickey Fuller (ADF) and Philip Perron (PP) test were used to test for unit roots. Cointegration tests were carried out in order to analyze whether the pairs of variables were cointegrated or moved jointly in the long-run. Cointegration rank is estimated using Johansen methodology. Johansen's approach derives two likelihood estimators for the Cointegration rank; a trace test and a maximum Eigen value test. The Granger causality test used to analyses causality between GDP and Exports in Sri Lanka. Cointegration between two variables does not specify the direction of a causal relation. The study used F statistics and probability to measure causality between the variables.

Results and discussion

Table 1 shows that the null hypothesis of no unit roots for all the time series are rejected at their first differences since the ADF and PP test statistic values are less than the critical values at 0.01 and 0.05 levels of significances. Thus, the variables are stationary and integrated of same order $I(1)$.

Table 1 Unit Root Tests

ADF Unit Root Test						
	Level Intercept	Trend and Intercept	None	First Difference Intercept	Trade and Intercept	None
LGDP	1.0020	-1.9716	5.8425	-7.8593***	-8.045***	-2.806**
LEXP	0.0869	-2.6475	3.9355	-7.1165***	-7.050***	-2.087**

PP Unit Root Test						
	Level Intercept	Trend and Intercept	None	First Difference Intercept	Trade and Intercept	None
LGDP	1.0914	-2.0416	6.1470	-7.8481***	-8.031***	-5.748***
LEXP	0.0253	-2.7774	3.6286	-7.1377***	-7.074***	-6.081***

*** indicates significance at 1 percent level

** indicates significance at 5 percent level

Before test the cointegration and causality, it is necessary to determine lag length. The adequate lag length can be determined using model selection criteria which provides results of the following test statistics. In the case of the current

model the LR, FPE, AIC and HQ tests show corresponding test statistics results on the presence of 4 lags. The results of the test are presented in Table 2 below.

Table 2 VAR Lag order selection criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-852.0827	NA	1.21e+12	33.4934	33.5692	33.52239
1	-838.8742	24.8630	8.40e+11	33.1322	33.3596	33.2191
2	-823.7390	27.3026	5.43e+11	32.6956	33.0744*	32.8403
3	-820.1510	6.19116	5.54e+11	32.7118	33.2421	32.9144
4	-810.9271	15.1922*	4.53e+11*	32.5069*	33.1887	32.7674*
5	-808.7069	3.48269	4.89e+11	32.5767	33.4100	32.8951

* indicates lag order selected by the criterion, LR: sequential modified LR test statistic (each test at 5% level), FPE: Final prediction error, AIC: Akaike information criterion, SC: Schwarz information criterion, HQ: Hannan-Quinn information criterion

The Johansen cointegration test was carried out in order to analyze whether the pairs of variables were cointegrated or moved jointly in the long-run. In the absence of cointegration, we can conclude that there is no long run relationship between export and GDP, namely LGDP and LEXP. The results are presented in Table 3 and show that both tests are insignificant even at the 0.10 level of significance. Therefore, we can reject null hypotheses and confirm that these two variables have no long-run association, meaning that eventually they do not move together. This result does not support the finding of some of previous studies which found long run relationship between export and GDP.

Table 3 Cointegration Test

Unrestricted co-integration Rank Test (Trace)						
Hypothesized No. of CE(s)	No.	Eigenvalue	Trace Statistics	0.05 value	Critical	Prob.**
None*		0.088222	4.828980	15.49471		0.8267
At most 1 *		0.000506	0.026327	3.841466		0.8710

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)						
Hypothesized No. of CE(s)	No. of	Eigenvalue	Trace Statistics	0.05 value	Critical	Prob.**
None*		0.088222	4.802653	14.26460		0.7665
At most 1 *		0.000506	0.026327	3.841466		0.8710

Max-eigenvalue test indicates no cointegration at the 0.05 level, * denotes rejection of the hypothesis at the 0.05 level, **MacKinnon-Haug-Michelis (1999) p-values

According to cointegration results, the empirical model requires employing an unrestricted VAR and does not permit the usage of VECM. Therefore, the analysis proceeds by testing the short term dynamics of this relationship in a Granger causality test within a finite order unrestricted vector autoregressive (VAR) model.

Table 4 VAR result

Mode	Coefficient	Standard Error	t statistics	Probability
Constant	204.7422	330.6392	0.619231	0.5390
GDPt-1	1.054278	0.188051	5.606330	0.0000***
GDPt-2	0.760423	0.269709	2.819421	0.0072**
GDPt-3	-0.415850	0.256775	-1.619512	0.1125
GDPt-4	-0.654143	0.223856	-2.922153	0.0055**
EXPt-1	-1.295612	0.704550	-1.838920	0.0727*
EXPt-2	-1.613792	0.989802	-1.630419	0.1102
EXPt-3	3.396014	0.872873	3.890617	0.0003***
EXPt-4	0.755717	0.865392	0.873265	0.3873

Table 4 provides the VAR results which imply the short-run impact of export on GDP. According to this model, there is a both positive and negative impact of export on GDP. This study identified that the actual impact of export can be felt after a three year time lag.

The Granger causality test was employed to examine the causality between export and economic growth in Sri Lanka. According to the results in Table 5, the null hypothesis that GDP did not Granger-cause export and export did not Granger-cause GDP could be rejected at 0.05 level of significance. Therefore, the findings from the causality test indicated the presence of uni-directional causality from GDP to EXP and EXP to GDP.

Table 5 Pairwise Granger Causality test

Null Hypothesis:	Obs	F-Statistic	Prob.
EXP does not Granger Cause GDP	52	6.72485	0.0003
GDP does not Granger Cause EXP		3.16565	0.0229

Conclusion

This study examines the impact of export on economic growth in Sri Lanka. The result reveals that a long-run relationship does not exist between exports and economic growth in Sri Lanka. However, a short-run effect of exports on economic growth was found. Therefore, this study concludes that exports do not have significant effect on economic growth in Sri Lanka during the period (1960-2016). Nevertheless, bidirectional relationship exists between exports and GDP.

Keywords: *Causality, Cointegration, Export, GDP.*

References

- Ahmad, J. & Kwan, A.C.C. (1991). Causality between exports and economic growth Empirical evidence from Africa, *Economic Letters*, 37(3), 243–248.
- Elbeydi, K.R.M. (2010). The Relationship between Export and Economic Growth in Libya Arab Jamahiriya, *Theoretical and Applied Economics* XVII, 69–76.

- Ronit, M. & Divya, P. (2014). The relationship between the growth of exports and growth of gross domestic product of India, *International Journal of Business and Economics Research*, 3(3), 135–139. doi:10.11648/j.ijber.20140303.13
- Shihab, R.A., Soufan, T. & Abdul-khaliq, S. (2014). The Causal Relationship between Exports and Economic growth in Jordan, *Global Journal of Management and Business Research*, 14(3).