Causal Relationship between Export and Economic Growth: Evidence from SAARC Countries

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Abstract: This study investigates the relationship between export and economic growth in the SAARC countries during 1990-91 to 2012-13. The nature and direction of relationship between export and economic growth was examined by applying cointegration and Granger Causality tests. The obtained results showed that there is unidirectional causation from economic growth to export for Bangladesh and India, and bidirectional causation was found for Afghanistan and Sri Lanka and no causation was obtained for Bhutan, Maldives, Nepal and Pakistan. The obtained contradictory results for the SAARC countries indicate that despite the fact a long period of economic co-operation there was not enough export orientation to have its effect on the economic growth. Unless and until the social / political issues are settled, it will be difficult to realize the benefits of export to augment economic growth.
Keywords:export, economic growth, co integration, causality, SAARC

I.   Introduction

There has been a paradigm shift in the world economic and political order in the last three decades and the world has become increasingly interdependent due to the adoption of globalization across countries of all levels of development. Interestingly "the process of 'globalisation' has been accompanied by the strengthening of economic and financial linkages within geographic regions. Indeed the world economy is simultaneously becoming more 'regionalized' and more 'globalized'. The trend towards regional integration has been supported in many areas by regional policy initiatives, particularly in the field of trade"(McKay,2005). The regional economic groupings are playing an important role in shaping the future of the countries, notable being the European Union (EU), Asia and Pacific Economic Cooperation (APEC), Organization for Economic Cooperation and Development (OECD), etc. The South Asian countries founded, in December 1985, the South Asian Association for Regional Cooperation (SAARC) with seven member countries namely, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan and Sri Lanka. In April 2007, Afghanistan became its eighth member. The objective of this cooperation is to strengthen the economic, political and cultural ties with each other. It is one of the largest regional organizations with a population of more than 1.5 billion people. The member countries differ vastly not only in terms of their demographic features but also in their economic strength. Since the impact of the changes in the world economic order as also the nature of domestic economies of SAARC nations differs considerably, it is imminent that the economies of these countries have undergone some structural change. The pace and pattern of this change amongst the SAARC nations must be different in terms of their demographic as well as economic parameters.The basic aim of the Association is to accelerate the process of economic and social development in member states through joint action in the agreed areas of co-operation. SAARC is a manifestation of the determination of the peoples of South Asia to cooperate regionally and to work together towards finding solutions to their common problems in a spirit of friendship, trust and understanding based on mutual respect, equity and shared benefits.

The relationship between export growth and economic growth in developing countries has been of continuing interest both in theoretical and empirical literature. A large number of empirical studies have been conducted during the last two decades to investigate the role of exports on economic growth or the export-led growth hypothesis, using either time-series or cross-section data or panel data. These studies have been conducted along a number of divergent lines. The early studies on this issue examined the simple correlation coefficient between export growth and economic growth

Export growth is important because of its effect on internal trade and economic stability of an economy. Moreover, the rate of economic growth and the distribution of income and wealth in a country are closely related to export growth (Dee Kay, 2009). Empirical evidences supports that growth of an economy is directly related to exports. Therefore, the relationship between export and economic growth has become a crucial issue of debate among economists and researchers all over the World. An agreement has emerged on theoretical ground among Neo-classical economists in regard to export-led–growth (ELG) strategy as an instrument of economic progress. This agreement has got more support due to the success of free-market, and outward-oriented policies of Asian Tigers (Asian tigers include Taiwan, Hong Kong, Singapore and Korea have

been successful in achieving high and persistent rates of economic growth since early 1960s; because of their free market, outward oriented economies.(World Bank, 1991).

Neoclassical economists have strongly argued that export has emerged as an important factor, which make major contributions to economic growth. There are four major reasons for the support of export-led-growth hypothesis: (a)fostering specialization helps to benefit from the comparative advantages; (b) helps to utilize the full capacity of the plant size, where domestic demand is less than the full capacity production;(c) generate benefits of the greater economies of scale due to large market; and(d) increase the rate of investment and technological change (Dash, 2009).Therefore, export promotion strategy is considered as an important instrument of economic growth.

The second proposition, the growth-driven exports hypothesis, postulates a reverse relationship. It is based on the idea that economic growth induces trade flows. It can also create comparative advantages in certain areas leading to specialization and facilitating exports.

A large number of studies have investigated the relationship between export growth and economic growth and tested the hypothesis of export led growth (ELG) or growth led export (GLE). For example, Michaely (1977), Heller and Porter (1978), Tyler (1981) and Kormendi and Mequire (1985) applied simple correlation coefficient to find out the relationship between export and economic growth. Their conclusion was purely based on the significance of correlation coefficient. Later, there was an improvement and some studies applied regression equation and the obtained significant slope coefficient of export growth on economic growth was treated as an evidence of the cause of economic growth (Voivadas (1973), Feder (1983), Balassa (1985), Ram (1987), Sprout and Weaver (1993) and Ukpolo (1994)). These studies are subject to criticism that they have made a *priori* assumption of export led growth and did not consider the direction of causal relationship between export and economic growth.

This criticism was overcome by the application of relatively advanced techniques of co-integration and error correction model (for example, Kugler (1991), Dutt and Ghosh (1994, 1996), Ekanayake (1999), Dhawan and Biswal (1999), Raju and Kurien (2005) and Sharma and Panagiotidis (2005)).

The present study mainly focuses on the estimation of the direction of causation between exports and economic growth of SAARC countries.

Export and Economic Growth: A review of earlier studies

This section of the paper presents a brief review of earlier work on the relationship between export and economic growth both at the national and international level and the same has been presented in the tabular form for better understanding.

AUTHORS	COUNTRIES	PERIOD	METHOD	VARIABLES	ECONOMETRIC TECHNIQUES	RESULTS
Kumari and Malhotra (2014)	India	1980-2012 Annual	Time series data	exports and GDP per capita	Johansen cointegration and Granger causality approach	The cointegration test does not confirm the existence of long run equilibrium relationship between exports and GDP per capita Granger Causality test support ELG hypothesis
Ronit and Divya (2014)	India	1969-2012Annual	Time series data	real GDP, export	VAR, Granger causality test	Rejection of ELG
Jarra (2013)	Ethiopia	1960-2011 Annual	Time series data	export, government consumption , household consumption (%GDP)	ADF and PP tests for satationarity, Johansen cointegration and Granger causality tests	Economic growth has an impact on exports and domestic demand in Ethiopia.
Dar and others (2013)	India	January 1992 to October 2011 monthly data	Time series data	IIP, real export	wavelet correlation and cross correlation	The result is exports and output are not related in the short run but are related in medium and long run.
Kilavuz and Topcu (2012)	22 developing countries	1998–2006 Annual	panel data	GDP, investment, population, high and low-tech manufacturing industry exports and imports	Panel Unit Root Tests, Random Effects , Fixed Effects and Panel Corrected Standard Errors	Export has a significant effect on the economic growth performance of those countries.

Mehdi and Shahryar (2012)	Iran	1961-2006 Annual	panel data	total export, value added by sectors	Unit Root Test by ADF test, Feder Model	Export growth has a positive effect on the growth of value added in the same sector. But the effect of export growth on the value added in industry and mining sector is more than other sectors
Sahni and Atri (2012)	India	1980-81 to 2008-09 Annual	Time series data	gross national product, total exports, manufactured exports and investment	OLS method	The study supports the Export - Led growth Hypothesis in India.
Elbeydi, Hamuda and Gazda (2010)	Libya	1980-2007 Annual	Time series data	GDP, exports, and exchange rate	Johansen cointegration test, VECM	The study indicated that the export promotion policy contributes to the economic growth in Libya.
Funke and Ruhwedel (2005)	14 East European transition economies	1993-2000 Annual	panel data	final output, produced labour and differentiated capital goods, export, import, GDP	Panel cointegration test	No role of export variety fostering economic growth of the East European transition economies. The result showed that export product variety in capital-intensive industries and investment are spearheading the growth process is consistent with Ventura's (1997) neoclassical export-led growth model
Shirazi and Manap (2004)	Pakistan	1960-2003 Annual	Time series data	real GDP, the real export, and the real imports	Johansen and JuseliusCointegration test, Engle-Granger test and CRDW test, Granger Causality test	It has been suggested that Pakistan may continue with the imports of necessary raw material for value addition and needed technology to expand capacity and improve productivity. It may pay full attention to boost up the exports.
Konya and Laszlo (2004)	25 OECD Countries	1960-1997	Time series data	real exports and real GDP	Wald tests for Granger causality – VAR	No causality between exports and growth (NC) in Luxembourg and in the Netherlands, Denmark, France, Greece, Hungary and Norway, exports cause growth (ECG) in Iceland, Australia, Austria and Ireland, and growth causes exports (GCE) in Canada, Japan and Korea, Finland, Portugal and the USA and there is two way causality between exports and growth (TWC) in Sweden and in the UK.. However, in the case of Belgium, Italy, Mexico, New Zealand, Spain and Switzerland the results are too controversial to make a simple choice.
Lee and Huang (2002)	Hong Kong, Korea, Taiwan, the Philippines and Japan.	Quarterly	Time series data	output , capital, exports , imports , and the labor force	multivariate Granger causality, multivariate threshold autoregressive model	Except for Hong Kong, the relationship whereby exports lead output prevails in at least one regime for each of four of the countries being studied.
Ekanayake (1991)	8 Asian developing countries India, Indonesia, Korea, Malaysia, Pakistan, Philippines, Sri Lanka, and Thailand	1960 – 1997 Annual	Time series data	real exports and real GDP	Cointegration and error-correction models ADF Unit Root Test, Engle-Granger and Johansen Cointegration Tests	Short-run Granger causality running from economic growth to export growth in all cases except Sri Lanka. While there is strong evidence for long-run Granger causality running from export growth to economic growth in all cases, there is evidence of short-run causality running from export growth to

						economic growth only in Indonesia and Sri Lanka
Anoruo and Ramchander	India, Indonesia, Korea, Malaysia, and the Philippines	1950-1998 for India; 1969-1998 for Indonesia, 1953 -1998 for Korea; 1955- 1998 for Malaysia; and 1949-1998 for Philippines	Time series data	GDP, exports, broad real money supply and real exchange rate	Johansen test cointegration, multi-variate VECM, ADF test	Study supports that export growth has a causal influence on economic growth for all countries with the exception of Indonesia

Data and Methodology

The study has been made only with secondary data collected from the official web sites of SAARC and UNCTAD (United Nations Conference on Trade and Development). These web sites contain economic and trade related variables for a long period of time (since 1961). The study covers a period of 23 years from 1990-91 to 2012-13. All the variables required for the study were collected for this period and were expressed in US dollar ($) for homogeneity in comparison.

. The study examines the Export Led Growth Hypothesis by applyingcointegration and Ganger Causality tests. The stationarity of the variables under study were tested using Augmented Dickey Fuller Test (ADF test).

Description of the Model

The study applies co-integration model to study the causal relationship between export growth and economic growth in SAARC countries. Following Granger (1969), the Granger-causality tests have been developed to check whether or not the inclusion of past values of X, do or not help in the prediction of present values of variable Y. If the variable Y is better predicted by the inclusion of past values of X than by not including it, then X is said to Granger cause Y. In the same way, if the past values of Y can be used to predict X more accurately than simply using the past values of X, the Y is said to Granger cause X. A feedback occur when X Granger cause Y and Y Granger cause X.

The application of causality test requires that the variables under consideration must be stationary and co-integrated. The existence of long term equilibrium (stationary) relationship is referred as co-integration in the economic literature.

Granger (1986) and Engle and Granger (1987) studied the causal relationship between two variables when a commontrend exists between them. They defined a non-stationary time series X_t to be integrated of order d, I (d), if it becomes stationary after being differenced 'd' times. For example, if d=0, variable X becomes stationary in level and there is no need for differencing the variable X. But if d=1, first order differencing is needed to make the variable X to be stationary and so on. If two variables X and Y are integrated of order d, I(d), a linear combination of $Z_t = X_t -bY_t$ will also be I(d). For X and Y to be co-integrated, both X_t and Y_t should have same order of integration.

Since this section concentrates on export and economic growth, the causal relationship between these variables are investigated in two steps, first being the estimation of stationarity and the second is the co-integration between them. As defined earlier, exports refer to real export and economic growth measured by GDP is real GDP both expressed in natural logarithmic values, that is, lnRgdp and lnRexp to refer economic and export growth in this section.

The stationarity of the time series export and economic growth are tested with unit root test suggested by Dickey-Fuller. The augmented Dickey-Fuller (ADF) was applied to test whether export and GDP are integrated of order I (0) that is whether they stationary or not. This is achieved by applying ADF test by including a constant and time trend in the following form.

$$\Delta X_t = \beta_1 + \beta_1 t + \delta X_{t-1} + \sum_{i=1}^{m} \alpha : \Delta X_{t-1} + \varepsilon_t \text{ ----------- (1)}$$

Where, ε is a pure white noise, $\Delta X_{t-1} = X_{t-1} - X_{t-2}$, the lagged value of the variable X. The stationarity of the variable X is tested by the null hypothesis $\delta = 1$ against the alternative hypothesis of $\delta < 1$. If the null hypothesis is rejected then the variable is stationary otherwise higher order differencing is necessary to make it stationary.

The next step in the causality is the test of co-integration between lnRgdp and lnRexp. The direct and reverse regressions, lnRgdp = f (lnRexp) and lnRexp = f (lnRgdp), are estimated using OLS. The stationarity of the residual is tested using ADF test as described earlier.

Johansen (1988) and Johansen and Juselius (1990) derived the likelihood ratio on the number of co-integrating vector. There are two tests viz., Trace test and Maximum Eigen Value test. The trace test statistic for the null hypothesis that there are at most 'r' co-integrating vectors is computed as,

$$Trace = -T \sum_{i=r+1}^{n} ln(1-\lambda) \text{ -----------(2)}$$

Where λ_{r+1} ... λ_n are the (n-r) smallest estimated eigen values. The likelihood ratio test statistic for the null hypothesis of 'r' co-integrating vector is the maximum eigen value test is given by,

$$\lambda_{max} = -T \ ln \ (1- \lambda_{r+1}) \text{ -----------(3)}$$

Johansen (1988) showed that these equations have non-standard distribution and the approximated critical values for the statistic are reported in Johansen and Juselius (1990).

If the variable and Y are both integrated of order one, I (1), and the error term is stationary then X and Y is said to be co-integrated. There are two fundamental implications of co-integration. First, co-integration between two variables can be interpreted as the presence of long term equilibrium relationship between the variables and as a result they will not drift far apart in the long run. Secondly, co-integration between X and Y by itself implies the existence of at least unidirectional causality between them.

The Granger Representation theorem states that if X and Y are integrated of same order like order one, I (1) or order two I (2), and co-integrated then, the Granger causality test can be run in this case it takes the following form.

$$\Delta lngdp_t = \alpha + \beta1 \ \Delta lngdp_{t-1} + \beta_2 \ \Delta lnexp_{t-1} + \varepsilon \text{ ------------ (4)}$$
$$\Delta lnexp_t = \alpha + \beta1 \ \Delta lnexp_{t-1} + \beta_2 \ \Delta lngdp_{t-1} + \varepsilon \text{ ------------ (5)}$$

The obtained 'F' test in the each equation will signify the presence of causation and the direction of causation running from X to Y or Y to X. These procedure was repeated for all the SAARC countries during the study period.

II. Empirical Results

Based on the methodology described in the previous section, the co-integrating properties of the variables, Real GDP and Real exports, (both expressed in natural logarithmic values) are tested and are reported in table-1.1. The obtained results of unit root test based on Augmented Dickey Fuller test (ADF) indicate the presence of unit root of the variable and therefore, the null hypothesis of the presence of unit root cannot be rejected at the level of the variables. However, when the first differences are taken, the null hypothesis can be rejected in favour of the alternative hypothesis that the series are stationary. Thus the first difference of the variables is found to be stationary and hence lngdp and lnexp are both integrated of order one, I (1) for all the countries except Bangladesh for which the concerned variables become stationary at second order difference. It could therefore be inferred that the variables export and GDP become stationary at level 2 or integrated of order two I (2). Since the variables are stationary and integrated of the same order, Johansen test of cointegration can very well be applied to test the presence of long term relationship between the variables.

The rejection of null hypothesis at 1 per cent level of significance of first difference (second difference in the case of Bangladesh) of the variables, lngdp and lnexp confirm that both variables are stationary. Having tested for the stationarity, the next step is to check whether the two variables under consideration are co-integrated. The optimum lag lengths are determined by the AIC (Akaike Information Criterion) and SIC (Schwarz information Criterion). The results of ADF test on the residuals of the co-integrating equations and the results of Johansen-Juselius co-integrating tests are reported in table-1.2.

The results presented in the table-1.2 state that the estimated ADF statistics on residuals are greater than their corresponding critical values indicating the existence of co-integration between lngdp and lnexp. The Johansen-Juselius co-integrating tests also provide the evidence of more than one co-integrating vector which implies that two variables are co-integrated. As contented by Johansen and Juselius (1990), the more co-integrating vectors in the model, more will be the stable long term relationship between the variables.

Table 1.1 Stationarity Test (ADF Test)

Country	Variable	Level (I = 0)	First difference (I = 1)	Second Difference (I=2)
Afghanistan	Lngdp	0.062	-4.4817***	---
	lnExp	-2.074	-6.9659***	---
Bangladesh	Lngdp	4.2821	-2.125	-5.49***
	lnExp	-0.587	-4.948***	-7.92***
Bhutan	Lngdp	0.87	-3.79***	---
	lnExp	-0.59	-3.56**	---
India	Lngdp	0.77	-3.58**	---
	lnExp	0.28	-4.45***	---
Maldives	Lngdp	-0.611	-5.55***	---
	lnExp	-0.279	-6.16***	---
Nepal	Lngdp	-0.703	-3.887***	---
	lnExp	-2.078	-4.317***	---
Pakistan	Lngdp	0.272	-3.091**	---
	lnExp	-0.087	-5.105***	---
Sri Lanka	Lngdp	1.506	-3.718**	---
	lnExp	-2.084	-5.024***	---

*** Significant at 1 % and ** significant at 5 %

Test statistic 1%, 5% and 10% are -3.769, -3.004,-2.642 (at level) -3.788, -3.012, -2.646 (at first difference) -3.831, -3.029, -2.655(at second difference)

Table 1.2Johansen Cointegration Tests

Country	Hypothesised No of CE(S)	Eigen Value	Trace Statistic	0.05 Critical Value	Prob**
Afghanistan	None*	0.7926	39.592	15.494	0.000
	At most1*	0.333	8.125	3.841	0.004
Bangladesh	None	0.287	12.321	15.494	0.142
	At most1*	0.219	5.209	3.841	0.022
Bhutan	None	0.425	16.204	15.494	0.039
	At most1*	0.225	5.105	3.841	0.023
India	None*	0.438	21.781	15.494	0.004
	At most1*	0.4	10.229	3.841	0.001
Maldives	None*	0.767	47.832	15.494	0.000
	At most1*	0.605	18.627	3.841	0.000
Nepal	None*	0.521	25.565	15.494	0.001
	At most1*	0.456	11.571	3.841	0.000
Pakistan	None*	0.558	22.925	15.494	0.003
	At most1*	0.28	6.589	3.841	0.01
Sri Lanka	None*	0.5	20.455	15.494	0.008
	At most1*	0.244	5.883	3.841	0.015

The empirical results of the estimated Granger causality test have been presented in table-1.3. The test statistics of the equation 'F' indicates the presence and the direction of causation between exports and economic growth of the SAARC countries. The null hypothesis is that there is no causation and a significant 'F' value indicates the rejection of null hypothesis and acceptance of alternative hypothesis that the causation runs from X to Y (uni-directional). When the 'F' is significant in both the equations, the inference is that the causation is bi-directional. On the contrary, if 'F' is insignificant, there is no causation.

From the table 1.3, it is evident that the export led growth is not relevant to the SAARC countries. On the contrary there is a unidirectional causation from economic growth to exports for Bangladesh and India since the F is statistically significant. The significant 'F' obtained in both the equations indicate the presence of bi-directional causation running from export to GDP and GDP to exports. The higher exports expands market beyond the boundaries and leads to higher economic growth. In the same way, higher economic growth increases output and leads to higher exports in Afghanistan and Sri Lanka. The insignificant 'F' was obtained for Bhutan, Maldives, Nepal and Pakistan. The export growth was not sufficient enough to result in higher economic growth nor the economic growth results in higher export growth in these countries.

Table 1.3Granger Causality Test

Country	Hypothesis	F-Statistic	Prob**
Afghanistan	Export does not Granger cause GDP	7.525	0.0055
	GDP does not Granger cause Export	9.702	0.002
Bangladesh	Export does not Granger cause GDP	1.104	0.384
	GDP does not Granger cause Export	3.142	0.058
Bhutan	Export does not Granger cause GDP	0.794	0.469
	GDP does not Granger cause Export	2.255	0.139
India	Export does not Granger cause GDP	0.725	0.5
	GDP does not Granger cause Export	16.982	0.00
Maldives	Export does not Granger cause GDP	0.61	0.556
	GDP does not Granger cause Export	0.166	0.848
Nepal	Export does not Granger cause GDP	0.578	0.573
	GDP does not Granger cause Export	2.204	0.147
Pakistan	Export does not Granger cause GDP	0.246	0.784
	GDP does not Granger cause Export	1.82	0.196
Sri Lanka	Export does not Granger cause GDP	4.156	0.035
	GDP does not Granger cause Export	5.408	0.016

III. Conclusion

It is reasonable to recognize that a large number of factors, such as capital accumulation, entrepreneurship, innovation, learning by doing and human capital accumulation, determine economic growth. However, in this particular case it should be emphasized to the reader that the evidence obtained from the supply side implies that growth was driven primarily by traditional factors of production and, although exports acted as an additional engine of growth, the impact was relatively small and limited.

This study investigates the relationship between export and economic growth in the SAARC countries during 1990-91 to 2012-13. The nature and direction of relationship between export and economic growth was examined by applying cointegration and Granger Causality tests. The obtained results showed that there is unidirectional causation from economic growth to export for Bangladesh and India, and bidirectional causation was found for Afghanistan and Sri Lanka and no causation was obtained for Bhutan, Maldives, Nepal and Pakistan. The obtained contradictory results for the SAARC countries indicate that despite the fact a long period of economic co-operation there was not enough export orientation to have its effect on the economic growth. Unless and until the social / political issues are settled, it will be difficult to realize the benefits of export to augment economic growth.

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