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Testing the Export-Led Growth Hypothesis for India: An Econometric Analysis

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Abstract
Since 1991 India witnessed rapid rise in exports and robust economic growth. It is widely believed that the rapid economic growth of India over the last two decades is mainly due to the expansion of her exports. It is against this backdrop that the present paper attempts to reinvestigate the issue of 'exports-economic growth nexus' in the context of India. The paper aims at examining the dynamics of short term linkages and long term equilibrium relationship between export and economic growth and captures the linear interdependencies among the select variables. The study investigates the causal relationship between Export (Ex) and Gross Domestic Product (GDP) over the period 1970-2013 using annual data. The study has employed certain econometric tools to analyse the behaviour of both the series. Unit root test has been applied to test for stationarity of time series data. Johansen's co-integration test reveals that Export and GDP are co-integrated and, thus, a long-run equilibrium relationship exists between them. The Vector Error Correction Model (VECM) has shown that the lagged (1) terms of both Export and GDP influence each other in the determination of their current value. The Granger causality test exhibits the presence of short run relationship between Export and GDP and the relationship appears to be unidirectional. The causality runs from Export to GDP, indicating, high export drives economic growth. Thus, the study provides adequate empirical evidences to accept the export-led economic growth hypothesis for India. Findings of the study have significant policy implications.
Keywords: Export-led Growth, Causality, Cointegration, VECM, India

1. Introduction

Several theoretical arguments concerning export-economic growth nexus have been propounded and empirically verified by economists and researchers belonged to different schools of thought at different times. Broadly there are four such different views on the causal relationship between export and economic growth.

A school of thought, majorly led by Kaldor (1967), views the reverse causation i.e. economic growth promotes exports. This school of thought presumes that the economic growth in a country is the result of economies of scale which is the result of innovation, technological advancement and mass scale production (Ghartey, 1993). They view export is just surplus production which is sold in the foreign market (Tahir et.al. 2015).

The neo-classical school of thought rejects the growth-led export theory and advocates export led growth (ELG) hypothesis. According to the proponents of this hypothesis export promotes economies of scale, technological progress, production of higher quality goods and services eliminate unemployment of labor and other factors of production and reduce economic inefficiencies and thus promote economic growth (Bhagwati, 1978; Kruger, 1985; Feder, 1982; Helpman and Krugman 1985; Rodrik, 1988; Vohra, 2001).

The third school of thought (Dutt and Ghosh, 1994; Thornton, 1997; Shan and Sun, 1998; Khalafalla and Webb, 2001 and others) demonstrates the presence of feedback relationship between export and economic growth. They argue that there exists a bi-directional causal relationship between these variables such that export causes economic growth and economic growth causes export. This school of thought believes that trade openness is the best option for the promotion of economic goals like growth and prosperity and elimination of economic inefficiency all over the world.

While, the fourth school of thought of economists (Pack, 1992; and Yaghamian 1994) profusely reject the existence of any long run dynamic relation between economic growth and exports. They believe that there is no relationship or just a simple contemporaneous relation between economic growth and trade and these two variables are the results of the process of structural changes and economic development majorly due to globalization.

It is due to such contradicting evidences about the dynamic relation between exports and economic growth that many developing countries are still in dilemma whether to open up their economies to promote international trade or whether they should concentrate on economic activities that will promote international trade. Today, there has been much worldwide debate about Doha Development Agenda, Trade for Aid discussion, etc. and a good number of researchers and policy makers believe that developing countries can achieve economic growth through free market while others believe that developing countries should protect their industries from imported goods and promote their economic activities which will lead to the economic growth (Mishra, 2011).

It is widely believed that the rapid growth of China and India is mainly due to the expansion of their

exports. "The success of China and India largely caused by both the export-led growth and access to technology through globalization" (Stiglitz, 2007 quoted in Mishra, 2011). It is against this backdrop that the present paper attempts to reinvestigate the issue of the relationship between growth of exports and economic growth in case of India.

2. Review of Literature

The argument over the role of exports as one of the leading factors in determining the national economic growth is not new. Rather, it goes back to the classical theories of international trade of Adam Smith and David Ricardo. They advocated that international trade plays an important role in economic growth and that there are economic gains from specialisation. Such theoretical arguments concerning export-economic growth nexus have been empirically verified by economists and researchers at different times. Some of the recent studies are reviewed and presented below.

Maneschiöld (2008) analyses the export-led growth hypothesis for Argentina, Brazil, and Mexico using cointegration and causality techniques. Cointegration is found for Argentina and Mexico in both a pre-break and post-break period, where the break is related to the introduction of the NAFTA. Furthermore, the causal relationship is either bi-directional or unidirectional from export to GDP revealing support to the hypothesis and an outward oriented policy.

Uddin et.al (2010) focus on the casual relationship between export, import and Gross Domestic Product (GDP) for Bhutan using annual data from 1980 to 2005. The Granger causality test and Co-integration Models are employed taking care of stochastic properties of the variables. The co-integration analysis suggests that there is a long-run equilibrium relationship. The results of Granger causality test shows that there is a causal relationship between the examined variables. The causal nexus is unidirectional from export to import and GDP, and GDP to import only. Here export led growth is empirically proven in Bhutan.

Mehrara, et.al (2011) investigate the Granger causality relationship between non-oil export and economic growth based on panel cointegration analysis for 73 developing countries during the period 1970-2007. Sample countries are categorized into two groups of oil dependent countries and nonoil developing countries. Also, for evaluating the causality direction, bivariate and tri-variate specifications are applied. The results show that in both bi- and tri-variate models, there is bidirectional long-run causality between export and GDP growth for both groups of countries. Also, in bivariate model, there is bidirectional short-run causality between export and GDP growth for nonoil developing countries, however, for oil countries, there is no short run causality relationship between the variables, in any of the two models.

Shihab et.al (2014) try explore the presence of the causal relationship between economic growth and exports in Jordan using the Granger methodology during the period 2000-2012. The study found that there is a causal relationship going from the economic growth to Export, and not vice versa. Based on the outcome of causality tests, the changes in the economic growth help explain the changes that occur in the Export.

Tahir et.al (2015) examine the export led growth (ELG) hypothesis for Sri Lanka on the basis of annual data for the period 1981 to 2012. Johansen cointegration test is used to check the long run association which rejected the hypothesis of any long run association between export and GDP and GDP net of exports. Same results are also revealed by Granger causality and existence of short run relationship between exports and GDP and GDP net of exports is also rejected by VAR. In the study, no empirical evidence in support of ELG hypothesis for Sri Lanka is found.

The study of the dynamics of the relation between exports and economic growth has been addressed by a number of researches in the context of India.

Nandi et.al (1991) found the evidence of unidirectional causality from growth of exports to economic growth. Sharma et al (1994) offer some evidence of the export-led growth hypothesis in case of India. Bhat (1995) re-examines the exports-economic growth nexus for India, and finds evidence of bi-directional causality between growth of exports and economic growth. However, contrary to these results, Xu (1996) rejects the export-led growth hypothesis for India. While the study of Ghatak et.al (1997) concludes that growth of exports is caused by output growth in India. Dhawan et.al (1999) examine the same issue for the period 1961 to 1993, and find that growth in GDP causes growth in exports while causality from exports to GDP appears to be a short run phenomenon.

Anwar et.al (2000) examine the export-led growth hypothesis for 97 countries (including India, Pakistan and Sri Lanka) for the period 1960 to 1992. They found the evidence of unidirectional causality in the case of Pakistan and Sri Lanka, and no causality in the case of India. However, Nidugala (2001) finds that exports had a crucial role in influencing GDP growth in the 1980s.Even Kemal et al (2002) find a positive association between exports and economic growth for India as well as for other economies of South Asia. While, Chandra (2002) found bi-directional causal relationship between growth of exports and GDP growth which is a short-run causal relation, as cointegration between growth of exports and GDP growth was not found.

Sharma et.al (2005) investigate the export-led growth hypothesis in the context of India, and the results

strengthen the arguments against the export-led growth hypothesis for the case of India. Raju et.al (2005) analyzed the relationship between exports and economic growth in India over the pre-liberalization period 1960-1992, and found strong support for unidirectional causality from exports to economic growth.

Dash et.al (2007) re-examine the relationship among FDI, trade, and economic growth in the case of India. The study is based on a Vector Auto regression (VAR) model applying Ganger non-causality test for the period 1996Q4 to 2007Q4. Evidence shows that there is a unidirectional causality, which runs from FDI to export as well as from FDI to import. Furthermore, decomposition of causality suggests that 46 per cent causality runs from FDI flows to export, 2l per cent from export to FDI, and the remaining 33 per cent is due to two-way causality.

Dash (2009) investigates the causal relationship between growth of exports and economic growth in India for the post-liberalization period 1992-2007, and the results indicate that there exists a long-run relationship between output and exports, and it is unidirectional, running from growth of exports to output growth.

Mishra (2011) reinvestigates the dynamics of the relationship between exports and economic growth for India over the period 1970 to 2009. Applying popular time series econometric techniques of cointegration and vector error correction estimation, the study provides the evidence of stationarity of time series variables, existence of long-run equilibrium relation between them, and finally, the rejection of export-led growth hypothesis for India by the Granger causality test based on vector error correction model estimation.

Sultan et.al (2011) examine the relationship between domestic investment, export and economic growth in India during 1970-71 to 2007-08. Using Johnson's cointegration methodology the study found the presence of a long term relationship between investment, exports and the economic growth of India. The study further shows that only domestic investment significantly contributes to economic growth both in the long run and in the short run. The export, though, has positive relation with economic growth, its contribution has not been found to be significant.

Joshi (2013) studies the long term and short term relationship between GDP and Export for a period of 41 years i.e. 1970 to 2011. Various statistical tests like Johansen Co-integration Test, Vector Error Correction Estimates, Wald test, ARCH Test and Serial Correlation Test have been performed. It result shows co-integration between the variables but long term association was not found.

Kumari et.al (2014) extensively test the export led growth hypothesis in India. This paper explores the causal relationship between exports and economic growth by employing Johansen cointegration and Granger causality approach. Annual time series data on India for the variables exports and GDP per capita stemming from 1980 to 2012 have been used in analysis. The tests on the long run and short run relationship between exports and economic growth are conducted. Based on the findings of cointegration approach this paper concludes that there does not exist long run equilibrium relationship between exports and GDP per capita. Granger causality test exhibits bidirectional causality running from exports to GDP per capita and GDP per capita to exports.

Debnath, et.al (2014) analyse the relationship between exports and non-export GDP in the context of the Indian economy during 1981–2012. Their study indicates that (1) at the aggregate level, exports do not have any significant impact on output of the non-export sector, thereby nullifying the popular export-led growth hypothesis at the aggregate level in India; (2) When we disaggregate exports into merchandise and services export, the latter has positive spillover effects on the non-export sector of the economy. However, the association between merchandise export and non-export GDP is statistically insignificant. The results support the internally generated growth hypothesis whereby economic growth in India appears to have been the outcome of non-export factors such as accumulation of capital, employment, and technical progress.

2.1 Research Gap

It is, therefore, clear from the above literature review that the empirical evidence regarding exports-economic growth nexus is rather ambiguous, mixed and inconclusive. A number of studies support the export-led economic growth while others do not. Differences in time periods covered for investigation, definition of variables used for the study and techniques adopted for the investigation are the possible reasons for varied results. Further, all the studies used absolute values of GDP or Export or in terms of their growth rate. Usage of such variables may not reflect the real growth since growth of population wipes out the benefits of the growth of GDP and Exports. Only per capita GDP and per capita export will depict the real growth. And against this backdrop fresh enquiry on the issue ‘exports-economic growth nexus’ in the context of India is justified.

3. Objectives

The main objective of this study is to reinvestigate the export-led economic growth hypothesis in Indian context. The specific objectives are:

- To examine the dynamics of short term linkages between export and economic growth.
- To explore the presence of long term equilibrium relationship between export and economic growth.
- To capture the linear interdependencies among the variables under study.

4. Methodology

4.1 Variables and Data

As the present study aims at exploring the causal relationship between export growth and economic growth in Indian context, export and economic growth form the two main variables. Export (Ex) percapita and Gross Domestic Product (GDP) percapita are used as the proxies for export and economic growth respectively. The study uses the annual data for the period from 1970 to 2013 which indicates 44 annual observations. All the necessary data for the sample period are obtained from the secondary sources. Data are processed by applying econometric tools and techniques for facilitating further analysis through E-views.

4.2 Econometric Specification

The study has employed certain econometric tools and techniques for analysing the relationship between the variables. The study consists of the following steps:

- Test the stationary of data
- Test the co-integration between the variables
- Fitting an error correction model, if co-integration is established, then,
- Test the causal relationship between the variables

4.2.1 Test of Stationarity- Unit Root Test

Empirical work based on time series data assumes that the underlying time series is stationary. Broadly speaking a data series is said to be stationary if its mean and variance are constant overtime and the value of covariance between two time periods depends only on the distance or lag between the two time periods and not on the actual time at which the covariance is computed (Gujarati and Sangeetha, 2007). The present study investigates whether GDP and Export series are stationary by applying Unit Root Test.

The stationarity condition has been tested using the Augmented Dickey Fuller (ADF) method. ADF test is the modified version of Dickey-Fuller (DF) test. The ADF makes a parametric correction in the original DF test for higher order correlation by adding lagged difference terms of the dependent variable to the right hand side of the regression. The ADF test, in the present study, consists of estimating the following regression.

$$Yt = bo + \beta \Delta Yt_{-1} + \mu_1 \Delta Yt_{-1} + \mu_2 \Delta Yt_{-2} + \sum_{i=1}^{m} \mu i \Delta Yt_{-1} + et \quad \text{---------- (1)}$$

Yt represents the series to be tested, bo is the intercept term, β is the coefficient of intercept in the unit root test, μ1 is the parameter of the augmented lagged first difference of the dependent variable, Yt represents the ith order autoregressive process, et is the white noise error term. The number of lagged difference terms to include is determined empirically, the idea being to include enough terms so that the error term is serially uncorrelated (Gujarathi and Sangeetha, 2007).

The stationary condition under ADF test requires that: p value is less than 1 (IpI <1). Another way of stating the same is that the computed t value should be more negative than the critical t value (t statistic < critical value). The computed t statistic will have a negative sign and large negative t value is generally an indication of stationarity (Gujarathi and Sangeetha, 2007).

4.2.2 Johansen's Co-integration Test

If ADF test results exhibit the stationarity of the time series data and all the data sets are integrated at the same order, then we have to examine whether or not there exists a long run relationship between Export and GDP. To investigate the co-integration between Export and GDP, Johansen's Co-integration Test is administered. The Johansen method of co-integration applied in the study is as the follows:

$$Xt = a + \sum_{j=1}^{p} \beta j \, Xt - j + et \quad \text{---------- (2)}$$

where, Xt is an n×1 vector of non-stationary I(1) variables, a is an n×1 vector of constants, p is the maximum lag length, βj is an n×n matrix of coefficient and et is a n×1 vector of white noise terms. The coefficient value (β) indicates the degree of co-integration or relationship, while the sign preceding to the coefficient indicates whether the long run relationship between the variables is positive or negative.

4.2.3 Vector Error Correction Model (VECM)

Johansen's co-integration test reflects only the long term balanced relations between Export (Ex) and Gross Domestic Product (GDP). Of course, in the short run there may be disequilibrium. In order to cover the shortage, correcting mechanism of short term deviation from long term balance could be adopted. Therefore, under the circumstances of long term causality, short term causalities should be further tested (Ray, 2012). Hence, the Vector Error Correction Model (VECM) is used to analyse whether error correction mechanism takes place if some disturbance comes in the equilibrium relationship. In other words, it is to measure the speed of convergence to the long run steady state of equilibrium. Thus the Johansen co-integration equation (2) has to be turned into a vector error correction equation as follows.

$$\Delta Xt = a + \sum_{j=1}^{p-1} \Gamma j \, \Delta Xt - j + \Pi Xt - p + et \quad \text{---------- (3)}$$

Where Δis the first difference operator, Γj is $-\sum_{j=1+1}^{p} \beta j$ and Π is equal to $-1 + \sum_{j=1+1}^{p} \beta j$ and is an identity metrics.

4.2.4 Granger Causality Test

Upon confirmation of variables being co-integrated, study will proceed towards testing the presence of casual relationship between Export and GDP administering the Granger causality test. Causality is a kind of statistical feedback concept which is widely used in the building of forecasting models (Ray, 2012). The Granger causality Test (1969, 1988) seeks to determine whether past values of a variable help to predict changes in another variable. The Granger causality technique measures the information given by one variable in explaining the latest value of another variable. In addition, it also says that variable Y is Granger caused by variable X if variable X assists in predicting the value of variable Y. If this is the case, it means that the lagged values of variable X are statistically significant in explaining the variable (Ray, 2012).

Export and GDP are interlinked and co-related. However, co-integration test provides no theoretical or empirical evidence that could conclusively indicate sequencing from either direction. For this reason, in the present study, Granger causality test was carried out on Export and GDP. The causality test will see the reaction between Export and GDP such as, if variable Export has Granger cause to GDP and GDP also has Granger cause to Export, it means that the value after GDP can help us to expect the value for the next period of Export and also the value after Export can help us to expect the value for the next period of GDP respectively. The Granger method involves the estimation of the regression equations. In this study of two-way variables (Export & GDP) the following two equations are the formula for Granger causality regression test.

If the causality runs from Export to GDP, then the Granger causality regression equation is;

$$GDPt = n + \sum_{a11} GDPt - 1 + \sum_{\beta 11} Ext - 1 + \varepsilon_1 t \quad \text{---------- (4)}$$

If the causality runs from GDP to Export, then the Granger causality regression equation is;

$$Ext = n + \sum_{a12} Ext - 1 + \sum_{\beta 12} GDPt - 1 + \varepsilon_2 t \quad \text{---------- (5)}$$

From the equation (4), Ext-1 Granger causes GDPt if the coefficient of the lagged values of Ex as a group β11 is significantly different from the zero based on F-test. Similarly, from equation (5), GDPt-1 Granger causes Ext if β12 is statistically significant.

5. Hypotheses

The following hypotheses are developed to meet the objectives of the present study.

H_1: Export has a unit root
H_2: GDP has a unit root
H_3: There is no co-integration between Export and GDP
H_4: GDP does not Granger cause Export
H_5: Export does not Granger cause GDP

6. Results and Discussion

In order to test whether there exists any co-integration and causality between Gross Domestic Product (GDP) and Exports (Ex), the pre-condition is that the time series data pertaining to both the variables are stationary and do not encounter unit root problem. For this purpose ADF unit root test is administered and the results are presented in Table-1.

Table-1. ADF Unit Root Test for Export and GDP

Particulars	Export (Ex)				GDP			
	t-statistic	Critical Value		P- value	t-statistic	Critical Value		P-value
At level I(0)	4.340004	1%	-3.615588	1.0000	0.239730	1%	-3.605593	0.9719
		5%	-2.941145			5%	-2.936942	
		10%	-2.609066			10%	-2.606857	
At 2nd difference I(2)	-8.315108	1%	-3.610453	0.0000	-10.87953	1%	-3.605593	0.0000
		5%	-2.938987			5%	-2.936942	
		10%	-2.607932			10%	-2.606857	

The results of ADF Unit Root Test show that both variables under study, namely GDP and Export are non-stationary 'at level' (I (0)). However, only after second differencing (I(2)) both the variables become stationary. The results indicate that the null hypotheses-

H_1: Export has a unit root; and
H_2: GDP has a unit root

-can be rejected as the t-statistic value is smaller than the ADF critical value at first difference (I(2)) at 1% level of significance. That is, in case of Export the t-value is -8.315, which is lower than calculated ADF critical value (-3.610), at 1% level of significance. Even in respect of GDP the t-value (-10.879) is smaller to the computed ADF critical value (-3.605) at 1% level of significance. Hence, one can conclude that GDP and Export time series are stationary at second difference (I(2)) in ADF test. In other words, GDP and Export time series data do not have any unit root problem and hence, they can be taken up for testing the presence of co-integration.

After ensuring the stationarity of the time series data of Export and GDP, a co-integration test is carried out by using Johansen method to identify whether there exists any long run equilibrium relationship between the variables. The results of this test are presented in Table-2.

Table-2. Results of Johansen Co-integration test.

Cointegration Test	Level	Max.Eigen Value	t-statistic	C.V at 5%	Prob
Trace Test	H_0: r=0 (none)*	0.288209	17.43039	15.49471	0.0252
	H_1: r≤1 (at most 1)	0.122889	4.851484	3.841466	0.0276
Max.Eigen	H_0: r=0 (none)*	0.288209	12.57891	14.26460	0.0908
	H_1: r≤1 (at most 1)	0.122889	4.851484	3.841466	0.0276

Trace test indicates 2 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

The results of Johansen co-integration test as presented in Table-2 exhibit that the trace statistic for the calculated Max-Eigen value (17.43039) is more than its critical value (15.49471) indicating the presence of co-integration between variables. While the Max-Eigen test do not confirm the existence of long run co-integration between the two variables, since Max-Eigen t-statistic value (12.57891) is smaller than its critical value (14.26460) at 5% level of significance. Since the present study is a bivariate analysis, the results of only trace test are applicable and not Max.Eigen test.

The results of Johansen co-integration test denote that the null hypothesis H_3: there is no co-integration between the Export and GDP is rejected at 5 percent level of significance. This, in turn, leads to the acceptance of alternative hypothesis that there is co-integration between Export and GDP.

After confirming the presence of co-integrating vectors based on Johansen co-integration test results, the short run and long run interaction of the underlying variables is examined by fitting them in Vector Error Correction Model (VECM) based on Johansen co-integration methodology. The results show that a long run equilibrium relationship exists between the GDP and Export. The estimated co-integrating coefficient for the GDP based on the first normalized eigenvector, derived from the results presented in Table-3, is as follows:

LGDP= -599.6490 + 1.458301 LExport

[1.48074]

The variables are converted into log transformation and these values represent long term elasticity measures. The t-statistic of the co-integrating coefficient of Export is given in the bracket. The coefficient for Export is positive, which implies that increase in the export enhances the economic growth of India. Thus the result is in line with the theoretical predictions. However, this positive impact of Export does not appear to be statistically significant. Hence, further econometric investigation is necessary before arrive at conclusion on the relationship between the exports and GDP.

Table-3. Co-integrating Vector

Co-integration Equation		
GDP	Export	Constant
1.0000	1.458301 (0.98485) [1.48074]	-599.6490

Standard errors in ( ) & t-statistics in [ ]

Table-4. Vector Error Correction Estimates (VECE)

Error Correction	D(GDP)	D(Ex)
CointEq1	0.085229 (0.03259) [2.61554]	0.032829 (0.00664) [4.94516]
D(GDP(-1)	0.759543 (0.30099) [2.52348]	0.320734 (0.06132) [5.23054]
D(GDP(-2))	-0.087254 (0.45978) [-0.18977]	-0.211128 (0.09367) [-2.25398]
D(Ex(-1))	-2.690061 (1.19257) [-2.25568]	-0.882562 (0.24296) [-3.63257]
D(Ex(-2))	-0.765042 (1.24356) [-0.61520]	0.084444 (0.25335) [0.33332]
C	42.42889 (14.1237) [3.00409]	12.79356 (2.87737) [4.44628]

( ) error term
[ ] t-value

From the results of the Vector Error Correction Estimates presented in the Table-4, it could be inferred that GDP will converge towards its long run equilibrium after the change in Exports at lag 1. Thus, the value of next year's GDP is influenced to a higher degree by the current year's Exports and this prediction appears to be accurate by 95 percent.

The results also show that GDP at lag 1 also influences the current outcome of Exports. the change in the Exports is influenced much by the lagged value of GDP. Thus, from this it found that the lagged values of GDP and Export have impact on each other in the Indian economy.

As the Johansen co-integration test exhibits only the presence of long run equilibrium relationship between Exports and GDP, pairwise Granger causality test is applied to capture the degree and direction of relationship between the two variables under study. The results of granger causality test are presented in Table-5.

Table-5. Results of Granger Causality Test

Null Hypotheses	Observations	F-statistic	Prob.	Decision
Export does not Granger Cause GDP	42	5.88984	0.0060	Reject
GDP does not Granger Cause Export	42	28.0025	4.E-08	Accept

From the results it appears that there exists causality between Export and GDP. The test explores unidirectional causality between the two variables. The causality runs from Export to GDP. It means that the value after Export can help us to expect the value for the next period of GDP. Hence, GDP is Granger caused by Export. Based on the results of Granger causality test, F-statistic value of the null hypothesis -H_4: Export does not Granger cause GDP is rejected. While, null hypothesis – H_5: GDP does not Granger cause Export is accepted since the F value is not statistically significant. This leads to the conclusion that Export Granger cause economic growth and economic growth does not Granger cause Export. Therefore, export and economic growth are correlated in India and the relationship flows from Export to GDP.

7. Summary and Findings

The paper examines the relationship between export and economic growth in India using annual data over the period 1970 to 2013. The unit root properties of the time series data were assessed using ADF test after which the co-integration and causality tests were conducted. The Vector Error Correction Model was also estimated in order to examine the short run dynamics. The major findings of this study are the following;

- Based on the results of unit root test, the null hypotheses that there exist unit root problem in Export and GDP time series data are rejected. The unit root test revealed that both Export & GDP are stationary at second difference [I(2)] in case of Augmented Dickey Fuller (ADF) test.
- The Johansen co-integration test confirmed that economic growth and export are co-integrated, indicating an existence of long run equilibrium relationship between the two. The trace test under Johansen co-integration method indicates two co-integrating equation at 5 percent level of significance.

- From the Vector Error Correction Estimates, it appears that the lagged (1) value of GDP determines the current value of Export and similarly the lagged (1) value of Export governs the current value of the GDP.
- The Granger causality test results revealed the presence of unidirectional causality. The study concludes that Export Granger cause GDP. Thus, the causality runs from Export to GDP and no causality is found running from GDP to Export. To sum up, results indicate that, in case of Indian economy, high export growth leads to high economic growth.

8. Conclusion

Thus, the result that export causes growth provides strong evidence to accept export-led growth hypothesis of the neo-classical school of thought. The findings of the present study corroborate with the empirical outcome of Nidugala (2000), Raju et.al (2005), Dash (2009) and contradicts the results of Sharma et.al (2004), Mishra (2011) and Debnath, et.al (2014). The export driven economic growth of India, as revealed in the study, has significant policy implications. It is imperative for the national government to create pre-conditions for export growth. Perusal of simplified and liberalised global trade policy of India would benefit to her in facilitating easy inflow of technologies and capital and enhance global demand for India made goods/services. Bureaucracy has to function transferently and efficiently to boost up the investment sentiments which presently remain very low. Export promotion measures such as export credit, publicity, fiscal and financial incentives need more clarity, broad basing and rationalization. It is pertinent to note that in the process of reaching to the global market, India should also explore and penetrate her domestic market. Else, economic downfall of the global market will severely impact the domestic economic growth sustainability.

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Annexure:1.

Actual & log values of GDP per capita & Export per capita during 1970-2013.

Year	Actual Values in US $		Log Values	
	GDP/capita	Export/capita	GDP	Export
1970	111	4.3	4.70953	1.458615
1971	116	4.3	4.75359	1.458615
1972	124	5.1	4.820282	1.629241
1973	144	6.2	4.969813	1.824549
1974	159	7.8	5.068904	2.054124
1975	161	9.2	5.081404	2.219203
1976	159	10.8	5.068904	2.379546
1977	180	11.7	5.192957	2.459589
1978	204	13	5.31812	2.564949
1979	220	15	5.393628	2.70805
1980	264	16.4	5.575949	2.797281
1981	276	16.6	5.620401	2.809403
1982	275	16.7	5.616771	2.815409
1983	294	17.4	5.68358	2.85647
1984	284	18.2	5.648974	2.901422
1985	290	15.5	5.669881	2.74084
1986	311	16.4	5.739793	2.797281
1987	336	19.2	5.817111	2.95491
1988	364	22.3	5.897154	3.104587
1989	353	25	5.866468	3.218876
1990	376	26.7	5.929589	3.284664
1991	327	27.9	5.78996	3.328627
1992	322	28.8	5.774552	3.360375
1993	308	30.6	5.7301	3.421
1994	347	34.5	5.849325	3.540959
1995	386	42.1	5.955837	3.740048
1996	400	42	5.991465	3.73767
1997	427	46	6.056784	3.828641
1998	422	47	6.045005	3.850148
1999	442	51.6	6.09131	3.943522
2000	449	59.4	6.107023	4.084294
2001	456	58.2	6.122493	4.063885
2002	469	67.9	6.150603	4.218036
2003	541	82	6.293419	4.406719
2004	644	113	6.467699	4.727388
2005	743	143.3	6.610696	4.96494
2006	829	174.7	6.72022	5.16307
2007	1041	212.7	6.947937	5.359883
2008	1102	260.1	7.004882	5.561066
2009	1124	225.4	7.024649	5.417877
2010	1414	310.2	7.254178	5.737217
2011	1581	377.3	7.365813	5.933041
2012	1530	367.1	7.333023	5.905634
2013	1548	384.1	7.344719	5.950903