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Export-led-growth Hypothesis: Further Econometrics Evidence from India

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ABSTRACT

Over the last three decades the role of export in the process of economic growth has been the subject of debate among economists. The recent policy of liberalization, privatization and globalization and growth process of developed and developing countries further helped fuel this debate. The main questions in this debate are whether an outward oriented trade policy is preferable to an inward oriented trade policy in stimulating economic growth. There are two types of hypothesis that are build up in this debate: Export-led Growth (ELG) hypothesis and Growth-led Export (GLE) hypothesis. This paper investigates the relationship between GDP and exports in India for the period of 1980-2009. To achieve the objective of this study, Granger Causality Test has been applied. The test results support that there is bilateral causality between GDP and exports. This study suggests that export promotion policy is pursued consistently with an emphasis on inclusive and sustainable growth. This study supports the view that export is an engine of growth.

Keywords: Economic growth, international trade, export, and causality.

It is widely accepted that economic growth is an extremely complex process which depends on many factors such as accumulation of human and physical capital, political conditions, price fluctuations, technical progress, distribution of wealth and income, trade, foreign trade policy, foreign policy and geographical characteristics. Among these factors foreign trade policy or international trade has played an important role in the development process of both developed and developing countries. In the process of economic growth all countries are interdependent because they are suppliers of different resources, which are required for economic growth. Now, trade is not only desirable but also inevitable because countries have to cater to the growing needs of their economies. By and large, all countries, developed and developing, are significantly involved in international trade, but the difference is that developing countries are often exporters of primary goods whereas developed countries are exporters of manufactured goods ranging from capital goods to consumer durable goods. But in modern times there are several exceptions.

Accepting the importance of international trade in the process of economic growth, it has been labeled as an engine of economic growth. There are varied differences regarding the role of import and export in the economic growth. Therefore, from time to time various countries implement the policy of import substitutions and export promotion. During the 1950s and 1960s, a large number of countries including India adopted the import substitutions policy. But later on most of the countries adopted export promotion policy to overcome the crisis developed due to implementation of the import substitutions policy and to increase the rate of economic growth.

Over the last three decades the role of export in the process of economic growth has been the subject of debate among economists. The recent policy of liberalization, privatization and globalization and growth process of developed and developing

countries further helped fuel this debate. The main questions in this debate are whether an outward oriented trade policy is preferable to an inward oriented trade policy in stimulating economic growth. There are two types of hypothesis that are build up in this debates: Export-led Growth (ELG) hypothesis and Growth-led Export (GLE) hypothesis. The ELG hypothesis postulates that export expansion is one of the main determinants of growth. It holds that the overall growth of countries can be generated not only by increasing the amount of labour and capital within the economy, but also by expanding exports. According to its advocates, export can perform as an engine of growth. ELG hypothesis confirms that due to export expansion there is better allocation of scarce resources, generation of greater capacity utilization and creation of economies of scale. It also helps increase labour productivity, attracts foreign investment and increases foreign earnings. All these aid in avoiding production bottlenecks, improving efficiency and promoting investment and thus leading to higher rates of economic growth. Furthermore, exports provide foreign exchange that can be used for more imports of intermediate goods and technology which in turn raise more export and thus stimulate economic growth. (Jung and Marshall, 1985; Ram, 1987; Bhagwati, 1988; Fosu, 1990).

In contrast to the ELG hypothesis the GLE hypothesis shows that a rapid economic growth may lead to the enhancement of skills and technology which further leads to an efficient allocation of resources, creates a comparative advantage and permits the utilization of economies of scale. Once economies of scale are realized, the cost of exportable goods will decline and thus exports become more competitive in world markets. Higher output growth can stimulate higher investment, a part of which can be used for increasing exports capacity. Thus, the achievement of a certain degree of development may be a prerequisite for the country to expand its exports (Chow, 1987 and Moschos, 1989). Bi-directional causality between exports and economic growth is also an interesting prospect of this relationship. Helpman and Krugman (1985) postulate that exports may rise from the realization of economies of scale due to productivity gains; the rise in exports may further enable cost reduction, which may result in further productivity gains. According to Bhagwati (1988) increased trade produce more income which facilities more trade, thus creating a virtues circle. However, there is also a possibility for no casual relationship between export and economic growth (Pack 1988).

Thus there are four types of relationship that may exist between export and economic growth as follows: export-led growth, growth-led export, bi-directional causal relationship or feedback and non-causality between them.

Review of Literature

There is extensive literature focusing on the causal relationship between trade and economic growth. These literatures emphasize the benefits of outward oriented trade policy of export promotion over the disadvantages of inward-oriented trade policies of import substitution. While some studies found evidence in support of the ELG hypothesis others found evidence in support of the GLE hypothesis while several empirical evidences indicate bi-directional causal relationship.

Earlier empirical studies (Kravis, 1970; Michaely, 1977; Heller and Porter, 1978 and Balassa, 1978) analysed the relationship between export and economic growth in a bi-variate correlation modeling framework. Later, several cross country studies (Tyler, 1981; Feder, 1982; Kavoussi, 1984; Balassa, 1985; Ram, 1985; Moschos, 1989; Fosu, 1990 and Lussier, 1993) investigate export and growth nexus within neoclassical growth modeling framework by using ordinary least squares method. These studies, in general, find that export is an important factor in determining economic growth and also show the advantages of the export promotion strategy in comparison with the import substitution policy. Though, results from earlier studies using simple bi-variate correlation modeling and ordinary least squares have significant limitations. However, with recent advancements in econometrics and time series modeling techniques, emphasis has been given to the time series analysis to determine a long run relationship between export and economic growth and the direction of causality, if such a relationship exists. There has been an increase in country-specific studies focusing on the nexus between trade and economic growth and also analysis of the important methodological issues of non-stationary data of these studies. (Medina-Smith, 2001 and Awokus, 2008).

Empirical evidence from various studies examine the ELG hypothesis and GLE hypothesis shows mixed result, while some studies supporting the existence of ELG hypothesis (Michaely, 1977; Jung and Marshal, 1985; Medina-smith, 2001; Federici and Marconi, 2002; Awokuse, 2003; and Siliverstovs, and Herzer, 2006) and many others have rejected this hypothesis and supported GLE hypothesis (Ahmad and Kwam, 1991; Richards, 2001; and Love and Chandra, 2005). Simultaneously, some studies show a bi-directional causality between export and economic growth (Dutt and Ghosh, 1994; Lee and Cole, 1994; Sharma and Dhakal, 1994; Thornton, 1997; and Anwar and Sampath, 2001). Moreover, many studies even fail to find any long term relation between exports and economic growth (Afxentiou and Serletis, 1991; Jin, 1995; Al-Yousif, 1997 and Sharma and Panagiotidis, 2005). Some studies also find that the effect of export on economic growth depends on the level of development of the country concerned and the composition of export itself (Michaely, 1977; Tyler, 1981; Kavoussi, 1985; and Dodaro, 1993).

Hence it is highly pertinent to give a brief review (chronological) of the studies done in this field and it is useful to identify the areas which need further research. Jung and Marshall (1985) examined granger causality test between exports and economic growth for 37 developing countries and found evidence in support for ELG hypothesis only for Indonesia, Egypt, Costa Rica and Ecuador over the period of 1950-1981. Chow (1987) using the Sim causality test in bi-variate model, investigated the causal relationship between exports of manufactured goods and manufacturing output growth in eight Newly Industrialized Countries (NICs) and found strong bi-directional causality between these variables for most of the NICs for the period of 1960-1980. Afxentiou and Serletis (1991) examined causality between real gross net product and real export growth for 16 industrial countries for the period of 1950-1985 and found no systematic relationship between these variables, while bidirectional causality was reported only for USA and Norway. Bahmani-Bahmani and Alse (1993) re-examine the causal relationship between exports and economic growth using error correction mechanism for eight Less Developed Countries (LDCs). They found bi-directional causality between export and economic growth for all the countries of their sample and concluded that the export promotion strategy would contribute to economic growth in LDCs and vice-versa. Berg and Schmidt (1994) investigated the ELG hypothesis for 17 Latin American countries and found co integration in 11 countries. They also found a positive and significant effect of export on economic growth in Colombia and Peru but no significant effect was found in Argentina.

Dutt and Ghosh(1996) using error correction mechanism found support for ELG hypothesis for Israel, Mexico, Philippines, Switzerland and Turkey. The GLE hypothesis is supported for Pakistan and USA. On the other hand, bi-directional causality was found only for Colombia, France and Morocco. They also concluded that export growth-economic growth causality structure is economic specific and attempts at generalization are inappropriate. Mallick (1996) examined long run and short run relationship between growth of income and exports for India over the period of 1950-51 to 1991-92 and found the existence of strong co-integration. The direction of Granger Causality find from income growth to exports growth. Xu (1996) used bi-variate granger causality tests and error correction model to examine export and economic growth relationship and found support for the ELG hypothesis in Colombia but not for Argentina. This study also rejects the ELG hypothesis for India for the period of 1960-1990.

Sinha (1996) investigated the relationship between openness of economy and economic growth in India and find the bi-directional causality between these variables. This implies that both exports and imports contribute to economic growth in the long run. Ghatak and Price (1997) study indicates that real export growth granger-caused by non-export real GDP for the period 1960-1992 in India. Marjit and Raychaudhari (1997) found GDP granger caused export growth for India over the period 1951 to 1994.

Islam (1998) developed a multivariate error correction model to test the causality between exports and growth in 15 Asian countries over the period 1967-1991. The error correction model is tested only for India, Bangladesh, Fiji, Nepal and Sri Lanka. The result of causality test indicates that export expansion cause growth in two-third of the sample countries. This study also indicates that a country with a large public sector, higher level of economic development and which is less vulnerable to external economic shocks is more likely to reap the benefits

of export promotion strategies. Dhawan and Biswal (1999) investigated the ELG hypothesis for India using a vector autoregressive model by considering the relationship between real GDP, real exports and terms of trade over the period 1961-1993. They found a long-run equilibrium relationship between these three variables and the causal relationship flows from the real GDP and terms of trade to exports. Asafu-Adjaye et al. (1999) used the similar framework as Dhawan and Biswal (1999) and found no evidence in support of the ELG hypothesis in the case of India for the period 1960-1994. Ahmed et al. (2000) investigated the relationship between export, economic growth and foreign debt for Bangladesh, India, Pakistan and Sri Lanka and rejected the ELG hypothesis for all countries except for Bangladesh.

Medina-Smith (2001) investigates the ELG hypothesis for Costa Rica for the period of 1950-1997 and found this hypothesis to be valid. However the empirical results show that physical investment and population mainly drove Costa Rica's overall economic performance from 1950 onwards. Nidugala (2001) finds empirical evidence in support of the ELG hypothesis and revealed that growth of manufactured exports had a significant positive relationship with GDP growth, while the growth of primary exports had no such influence. Chandra (2002) finds bi-directional causality between income and exports. However the causality from income to exports is stronger than that from exports to income. Howard (2002) study shows that there is unidirectional causality from exports to GDP growth and bi-directional causality between exports and imports and imports and GDP growth in the economy of Trinidad and Tobago. Sharma and Panagiotidis (2005) re-examine the ELG hypothesis for India over the period 1971-2001and do not find any support for that hypothesis for India. Awokuse (2005) re-examines the ELG hypothesis for South Korea. This analysis focused on the dynamic causal relationship between exports, output growth, capital or investment, terms of trade, foreign output shock using quarterly data over the period of 1963-2001. Empirical evidence from causality test based on the two alternative approaches used in the study indicates that the causal link between real exports and real GDP growth is bi-directional.

Seliverstoves and Herzer (2006) examine the ELG hypothesis for Chile over the period of 1960-2001 and try to remove the problem of specification bias associated with earlier studies. Their results support the ELG hypothesis for Chile and at the same time point out the differentiated impact of manufactured and primary exports on the economic growth. Afzal (2006) find a strong and stable relationship between economic growth and export and bi-directional causality between manufactured exports and economic growth for Pakistan economy. Dash and Kumar (2007) empirically verify the ELG hypothesis for five south Asian countries including India, using panel data for the period of 1991-2005. They find that there exists a long run equilibrium relationship between GDP and other explanatory variables and causality is running from exports to GDP growth, supporting ELG hypothesis. This study supports the view that an export is the engine of growth under liberalized trade regime. Awokuse (2008) re-examines the relationship between trade and economic growth in Argentina, Colombia and Peru and provides empirical support for both ELG hypothesis and Import-Led Growth (ILG) hypothesis, but ILG hypothesis is stronger. In some cases, there is also evidence for reverse causality from GDP growth to exports and imports. Over all, this study shows that the strength of the effect of imports on growth is relatively stronger than the effect of exports. Afzal and Hussain (2010) investigate the relationship between economic growth, exports and imports in Pakistan for the period of 1990-2008. They finds economic growth and exports are not co-integrated suggesting the absence of long-run relationship. Causality in granger's sense is absent between economic growth and exports as well as between imports and economic growth. Zang and Baimbridge (2012) investigate the relationship between economic growth and exports, imports for South Korea and Japan by constructing a Vector Auto regression Model. They find evidence of bi-directional causality between imports and economic growth for both countries and over the period Japan seems to experience ELG, while GDP growth in South Korea has a negative effect on exports growth.

From the above review of literature, it is clear that the results of these studies are mixed but it suggests in general that the level of development is an important factor in determining the export-growth nexus. Furthermore, the results of different studies are clearly sensitive to the variables included in

relationship, theoretical approach used and even on the period chosen and econometric methodology employed.

Methodology

The basic objective of this study is to examine the nexus between exports and economic growth and test the ELG hypothesis for Indian economy over the period of 1980-2009. Instead of using the gross value of the real GDP and exports, we used their annual growth rates and the economic growth/ growth is measured by the annual growth rate of GDP and exports include export of both goods and services. The data we have used in this analysis are annual, and are obtained from the United Nations Conference on Trade and Development (UNCTAD) statistics. The study period is limited to 1980-2009 because of the non- availability of consistent data outside the period.

Unit Root Test

Prior to testing for a causal relationship between the time series variables, the first step is to test their stationarity in order to avoid any spurious relationship between them. A series is said to be stationarity if its mean and variance are time invariant. We applied the Dickey-Fuller (DF) / Augmented Dickey-Fuller (ADF) test to investigate the same. The DF test assumed that the error term (u) is uncorrelated but in case they are correlated a test is developed by Dickey and Fuller known as the ADF test. The formula of this test is as follows:

$$Yt = \rho Yt\text{-}1 + ut \quad (1)$$

$$-1 \leq \rho \leq 1$$

Where, Yt is a variable of interest and ut is white noise error term.

This test follows the calculation of t-statistics (tau-statistics) which is tested under the null hypothesis: Ho: ρ=1 (that is we have unit root or time series under consideration is non-stationary) against an alternative hypothesis: Ha: ρ≠1.

Subtract $Yt\text{-}1$ from the both side of equation-1

$$Yt - Yt\text{-}1 = \rho Yt\text{-}1 - Y\,t\text{-}1 + ut$$

$$\Delta Yt = (\rho\text{-}1)\, Y\,t\text{-}1 + ut$$

$$\Delta Yt = \delta Y\,t\text{-}1 + ut \quad (2)$$

Where δ = (ρ-1) and Δ is the first difference operator.

In practice, therefore instead of estimating equation-1, we estimate equation-2 and test the null hypothesis that δ=0. (If δ=0, then ρ=1)

Null hypothesis Ho: δ=0

Alternative hypothesis Ha: δ≠0

Though if ut are correlated the DF test is to be modified by adding, as an additional lagged value of the dependent variable ($\Delta Yt\text{-}1$) which then it become ADF, which is as follows:

$$\Delta Yt = \beta 1 + \beta 2t + \delta Y\,t\text{-}1 + \alpha i \sum \Delta Y\,t\text{-}1 + \varepsilon i \quad (3)$$

Where t is time trend, εi is white noise error term and $\beta 1$, $\beta 2$, δ and αi are the parameters, which are to be estimated. In this case still the null hypothesis are same as in DF test and ADF test follows the same asymptotic distribution as the DF statistic. Technically if the computed value of the tau-statistics exceeds the (Mackinnon) critical tau-values, the null hypothesis must be rejected and vice-versa.

It is an important question in time series data analysis whether each variable is stationary in levels or stationary after first differencing. If the time series in levels are found to be non-stationary and stationary only after its first differencing, its means they are integrated to an order of 1 i.e. I(1). Thus, if the data series are stationary after first differencing then it may be necessary to test for co-integration.

Granger Causality Test: In order to find the objective of the study the Granger Causality Test involves estimation the following pair of regression.

$$GDPt = \sum_{i=1}^{n} \alpha i Expt - i + \sum_{j=1}^{n} \beta j GDPt - j + ul t$$

$$Expt = \sum_{i=1}^{n} \lambda i Expt - i + \sum_{j=1}^{n} \delta j GDPt - j + u2t$$

The null hypothesis (Ho) in each case is that the variable under consideration does not granger cause the other variable. Then null hypothesis tested against the alternative hypothesis and we apply the F-test which follows the F-distribution. If the computed F-value exceeds the critical F-value at the chosen level of significance, we rejected the null hypothesis and vice versa. The Granger causality test depends critically on the number of lagged terms introduced

in the model. Therefore, model select lag length on Automatic based on Schwarz information criterion.

Table 1. Result of ADF Unit Root Test in the Level Form of the GDP

Null Hypothesis: GDP has a unit root Exogenous: Constant Leg Length: 0 (Automatic based on SIC, MAXLAG =7)		
	t-statistic	p-values*
Augmented Dickey-Fuller test statistic	-4.172894	0.0030
Test critical values: 1% level	-3.679322	
5% level	-2.967767	
10 % level	-2.622989	

* Mackinnon (1996) one-sided p-values.

Table 2. Result of ADF Unit Root Test in the Level Form of the Export

Null Hypothesis: Export has a unit root Exogenous: Constant Leg Length: 0 (Automatic based on SIC, MAXLAG =7)		
	t-statistic	p-values*
Augmented Dickey-Fuller test statistic	-4.588822	0.0010
Test critical values: 1% level	-3.679322	
5% level	-2.967767	
10 % level	-2.622989	

*Mackinnon (1996) one-sided p-values.

Results and Discussion

In order to achieve the objective of present study we apply "Granger Causality test" for GDP and Export. But before examining the causality by Granger Causality test it is necessary that the data are examined for stationary or non-stationary. For this purpose we use ADF test. Table 1 and Table 2 shows the results of this test. The test is based on the null hypothesis that a unit root exists in the variable. The ADF test reveals that all the variables in this study are stationary in level form. Therefore, one important condition for Granger Causality Test is satisfied namely GDP and Export is stationary.

Table 3. Results of Granger Causality Test between GDP and Export

Null Hypothesis	No. of Lags	F-statistic*	Decision
Export does not Granger Cause GDP	1	8.44858	Reject
GDP does not Granger Cause Export	1	8.87547	Reject
Export does not Granger Cause GDP	2	7.00815	Reject
GDP does not Granger Cause Export	2	4.35713	Reject
Export does not Granger Cause GDP	3	4.02234	Reject
GDP does not Granger Cause Export	3	5.26956	Reject
Export does not Granger Cause GDP	4	2.41283	Do not Reject
GDP does not Granger Cause Export	4	3.60534	Reject
Export does not Granger Cause GDP	5	1.40477	Do not Reject
GDP does not Granger Cause Export	5	2.79890	Reject
Export does not Granger Cause GDP	6	1.34174	Do not Reject
GDP does not Granger Cause Export	6	2.04699	Do not Reject
Export does not Granger Cause GDP	7	0.88816	Do not Reject
GDP does not Granger Cause Export	7	1.82354	Do not Reject

Note:* at 5 % level of significance.
Sources: Granger Causality Test between GDP and Export

The results of Granger Causality test have been presented in Table 3. The Granger Causality test depends critically on the number of lagged terms introduced in the model. Table 3 shows the results of the Granger Causality test using different lags from one to seven and in each case the null hypothesis is

that Export does not granger cause GDP and vice-versa. These results show that up to three lags we reject the both null hypothesis and find there is bilateral or feedback causality between GDP and Export. However at lag four and five we find only unidirectional causality that is causality from GDP to Export. On the other hand at this lags there is no reverse causation from Export to GDP. Whereas at lags six and seven we accept the null hypothesis thereby indicating that at this level there is no causality between GDP and Export. These results reinforce the point earlier that the outcome of the Granger Causality test is sensitive to the number of lags introduced in the model.

Conclusion and suggestions

The basic objective of this study is to examine the causality between growth of GDP and Export in India. To fulfill this first it is found that GDP and export are stationary in level form by using ADF test followed by Granger causality test. It is clear from the review of literature that the relationship between these two variables depends upon a variety of factors. Therefore, mixed results have been found in various studies. The present study also shows somewhat similar results. In this study bidirectional causality has been found between GDP and export which support export-led growth as well as growth-led export hypothesis. Thus, in India on one side where the GDP increases by increasing export on the other side there is a positive impact of export on economic growth by increasing GDP.

Hence, in India, to enhance the export, some essential development is required and the export promotion policy should be promoted seriously and consistently. So there should be rapid development of some basic infrastructure in the country. Those areas have to be explored from where more and more export can take place. Simultaneously this export should not lead to any negative impact on domestic consumption. Further there will be no shortage of goods and services in domestic market; otherwise it will produce harmful consequences on growth process of an economy. It is clear from the facts that though by increasing export, GDP increases but if simultaneously in any economy, economic inequality, unemployment and poverty increase then only a fraction of people are benefited from this growth. This kind of growth economy promotes only export while ignoring other important areas of economy. Hence this growth is neither inclusive nor sustainable. There is also a fear that if all developing countries follow export promotion policy it will result in the price of their exports being driven down in the world market which leads to unfavorable consequence on the growth process of economy. Therefore, it is possible that the growth which is achieved by increasing export will be unstable because in this condition the development of an economy is more dependent on the world's economy and a small disturbance in the world's economy leads to the harmful impact on the country's growth process. Therefore, export promotion policy should be framed by keeping in view its long and short term repercussion instead of blindly promoting export for economic growth.

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