



Export, Economic Growth and Causality – A Case for India

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1. Introduction

The process of economic growth is a complex phenomenon. It depends on certain micro and macro-economic variables such as the price level, distribution of income, level of human and physical capital formation, legal and political framework, standard of living of the people, the level of trade, geography, so on and so forth. Among the variables, the role of trade and its policy on economic growth has been a major concern in both business and economic research. Given the availability of scarce resources, different countries have achieved different levels of economic growth. A series of empirical studies on the role of trade on economic growth has been conducted on a number of divergent research methodologies for different time periods and countries. The favourable arguments of trade on the economy dates back to the classical school of economic thought, starting with Adam Smith, followed by Ricardo, Torrens and Mills and so on. According to the export-led growth (ELG) hypothesis, trade is concern as the main engine of economic growth. The advocates of the ELG hypothesis address the Southeast Asian countries as a good example as they are successful in achieving high and sustained rate of economic growth because of their free market and outward-bound economies. To say, the strategy behind export-led growth is that exporting firms tend, on average, to be more productive over time due to economies of scale, dynamic learning, technological spill overs and competitive pressures. The growth of the exporting sector promotes a proper reallocation of resources from the non-trade sector to export sector itself, which being relatively more productive and raises the overall productivity of the country. On the other hand, endogenous growth model considers trade as only one of the variables in the growth equation. Although some economists seem to generally agree that exports benefit economic growth, others did not find much support to the export led economic growth. So, these numerous studies could not come to any firm conclusions of the role of trade on economic growth. The main objective of the present study is to examine the nature of relationship between real GDP and total exports in the economy during

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the period under study. A hypothesis that export increases the level of GDP is formulated.

2. A Brief Review Of Literature

Various studies have investigated export and economic growth relationship using different methods. Most of the cause/effect analysis show, however, no uniform relationship between exports flows and real output. The majority of countries that have achieved remarkable success and sustained rapid growth have made export promotion an important component of their economic policies. These economies pursued export promoting rather than import-substitution policies and hence put the weight of good wisdom behind the export-led-growth strategy. On the other hand, a number of countries that follow export-led policies have experienced low growth rates. It is time again, therefore, to examine the validity of the export-led-growth strategy in the context developing country like India.

Ukpolo (1998) studied about the Granger-causality relationship between exports and economic growth for the South African economy during the period 1964 -1993. Real GDP and real exports were taken as variables for study. Exports and economic growth were found to be co-integrated, which confirm the existence of a long run relationship between the two variables. The findings showed that economic growth Granger-causes export growth, but fail to support the export-led hypothesis that export growth causes economic growth for the South African economy for the period under study.

In a different perspective, Plumper & Graff (2001) investigated the causal relationship of competitive advantage in strategic sectors to economic growth. A sample of 90 countries for the period 1980-1990 was selected for the analysis. The study was based on the neo-classical production function, which relate real output to the factors of production. The production function expressed GDP as a function of three factors of production namely, labor, physical capital and human capital. Regression results indicated that contrary to the neoclassical economics, export specialization mattered for economic performance. In other words, the findings indicated that an increase in the level of technology used for export trade would increase the growth rate of an average country at about 0.8 per cent, with a given average natural growth rate of an industrialized country was about 2 per cent, which is not a negligible effect.

Awokuse (2003) experimented the validity of export-led-growth hypothesis for Canada by using the Granger-causality test for the period 1961 to 2004. Empirical results supported the unidirectional causality that exports precede changes in real GDP, thus supporting the ELG hypothesis.

Using the conditional causality technique, Beko (2003) explored the nature of the relationship between exports and real output in Slovenia for the period 1992-99. Bidirectional causality between GDP and various export variables in the total manufacturing industry is found and even supported at the sectoral level too. This bidirectional causality reflects the growing importance of intra-industry trade and suggested that capacity creation and export promotion.

By applying time series methods Ngoc (2003) examined the long-run impact of exports on gross domestic product (GDP) growth in Vietnam for the period 1975-2001. The null hypothesis that export growth does not Granger cause economic growth is not rejected. This indicated that there was no strong econometric evidence to suggest that exports are an engine of economic growth and development for Vietnam. But it does not imply that exports do not play an important role in the Vietnamese economy. The export sector has contributed to a certain extent to economic growth and development, but their contributions are the traditional ones associated with primary producing and small, dependent trading countries.

In the Indian context, based on the export-led-growth hypothesis, Chandra (2010) examined the relationship between export growth and output growth of India for the period 1970-71 to 2009-10. Observation on India's exports of goods and services, real GDP, gross domestic capital formation, real effective exchange rate and the World GDP were taken. The Granger causality test found the direction of causality from export growth to GDP growth. On the other hand, there was no reverse causation from GDP growth to export growth. The result showed that exports can better predict the GDP than simply by the past history of GDP and hence supported the validity of ELG hypothesis.

Rubio & Roldan (2012) analyzed the relationship between trade and economic growth under the export-led growth hypothesis for the eight EU members for 1996-2009. The causality test found some support for the case of only Czech Republic, while no significant causality in any direction was found in the remaining cases.

3. Trends Of GDP And Exports Of The Indian Economy

Economic growth has been volatile but on the average the economy expanded over the period. Table 1 shows the rate of growth of real GDP and total exports of goods and services of India to the rest of the world. After economic liberalization, Indian economy experienced fair rate of GDP growth, from 1.4 percent in 1991-92 to 5.4 percent in 1992-93 and reached the level of 8 per cent in 1996-97. However, GDP growth rate decelerated significantly in the financial years 1997-98, 2000-01 and 2002-03 at below 5 per cent growth rate. This was attributable to a sharp fall in the rate of agriculture production and a deceleration in the growth of industry. But from 2003-04 onwards, the growth in GDP is maintained to the level of 8.4 percent till 2010-11 and marginally fell down to 6.5 per cent in the financial year 2011-12. On the other hand, growth rate of exports also increased over the years although there are low

growth rate in some of the periods. The available data shows that both the GDP and exports growth rates show a gradual increase over the period even though there are fluctuations in some financial years. So, the pertinent question here is whether growth of export has any impact on the growth of GDP. In this context, a study of the relationship between growth and exports would be meaningful.

Table 1:
Growth rate of real GDP and total exports during 1990-91 to 2011-12.

Year	Annual Growth rate of GDP	Annual Growth of exports	Year	Annual Growth rate of GDP	Annual Growth of exports
1990-91	5.3	17.7	2001-02	5.5	2.7
1991-92	1.4	35.3	2002-03	4.0	22.1
1992-93	5.4	21.9	2003-04	8.1	15.0
1993-94	5.7	29.9	2004-05	7.0	27.9
1994-95	6.4	18.5	2005-06	9.5	21.6
1995-96	7.3	28.6	2006-07	9.6	25.3
1996-97	8.0	11.7	2007-08	9.3	14.7
1997-98	4.3	9.5	2008-09	6.7	28.2
1998-99	6.7	7.4	2009-10	8.4	0.6
1999-00	7.6	14.2	2010-11	8.4	35.1
2000-01	4.3	27.6	2011-12	6.5	27.7

Source: Handbook of Statistics on the Indian Economy, RBI 2011-12.

5. Model Estimation and Interpretation Of Results

5.1 Data And Methodology

The data for the current study are compiled from the Handbook of Statistics on the Indian Economy, published annually by the Reserve Bank of India. The study period covers from the financial year 1990-91 to 2011-12. The variables taken are the GDP (Gross Domestic Product) at factor cost on constant prices 2004-05 and the values of total exports of goods and services over the period. All the variables are measured in terms of rupee billions. The Granger causality test is widely used in testing the cause and effect analysis between two variables in different field of research. The Granger causality test assumes that the information relevant to the prediction of the respective variables, GDP and total export is contained solely in the time series data on these variables. A test of causality is conducted in the present study in order to examine the nature of relationship between the real GDP and the total exports of goods and services. According to this test, a variable Y is caused by the variable X, if Y can be predicted better from the past values of Y and X than from past values of Y alone.

Before the causality test, a test of stationarity of each individual variable and the unit root test of the variables together is examined. The standard Augmented Dickey-Fuller test for stationarity and Johansen's co-integration test are used.

5.2 A Test of Unit Root

In order to see whether the time series is stationary, the Augmented Dickey-Fuller test is used. Table 2 summarizes the results of unit root tests on levels and first differences of the variables. The Augmented Dickey-Fuller test for stationarity is based on the regression model with the constant term. The model of unit root test in each case is based on the following regression equation:

$$Y_t = \beta_0 + \beta_1 Y_{t-1} + \mu_t \quad (1)$$

i.e., an AR model with the constant term.

Taking the first difference operator of equation (1) yields

$$\Delta Y_t = \beta_0 + \delta Y_{t-1} + \mu_t \quad (2)$$

Where, Y_t is the time series, μ_t is the white noise error term with zero mean and constant variance. The null and alternative hypotheses for the existence of the unit root are:

$H_0: \delta = 0$ (i.e., the time series is non-stationary)

$H_1: \delta \neq 0$ (i.e., the time series is stationary)

Table 2: Results of Augmented Dickey-Fuller test for the variables.

<i>ln Export</i>	Test statistic	1 % critical	5 % critical	10 % critical	Result
At level	-0.338410	-3.7856	-3.0114	-2.6457	Do not Reject
At first difference	-5.475973*	-3.8067	-3.0199	-2.6502	Reject Null Hypothesis
<i>ln GDP</i>					
At level	2.756609	-3.7856	-3.0114	-2.6457	Do not Reject
At first difference	-3.968231*	-3.8067	-3.0199	-2.6502	Reject Null Hypothesis

*, ** significant at 1 per cent and 5 per cent level respectively.

The time series become stationary after taking first difference, at 5 percent for the *lnGDP* variable and at 1 per cent level for the *lnExport* variable. Now proceeds for the test of co-integration between the variables to see if there is a long-run relationship between the real GDP and the total exports of goods and services.

5.3 Johansen's Co-integration Test

The co-integration test is reported in table 3 and indicates that the test statistics of 54.92443 and 8.061062 exceed the critical values of 20.04 and 6.65 respectively at the 1 per cent level of significance and so the null hypothesis of no co-integrating vectors is rejected at lags interval of 1 to 4. The co-integration test confirms that the variables are co-integrated and have long-run relationship over the period.

Table 3: Results of Johansen’s Co-integration Test:

Test assumption : Linear deterministic trend in the data				
Lags interval: 1 to 4				
Hypothesized no. of CE(s)	Eigen Value	Likelihood Ratio	5 per cent Critical Value	1 per cent Critical Value
None **	0.936497	54.92443	15.41	20.04
At most 1 **	0.377605	8.061062	3.76	6.65

*(**) denotes the rejection of the hypothesis at 5% (1%) significance level.

Note: LR test indicates two co-integrating equations at the 5 per cent level of significance.

5.4 Granger Causality Test

The test involves estimating the following pair of regression equations:

$$GDP_t = \sum_{i=1}^n a_i \text{ Export}_{t-i} + \sum_{j=1}^n \beta_j GDP_{t-j} + \mu_{1t} \quad (3)$$

$$\text{Export}_t = \sum_{i=1}^n a_i GDP_{t-i} + \sum_{j=1}^n \beta_j \text{ Export}_{t-j} + \mu_{2t} \quad (4)$$

Table 3: Results of Pair-wise Granger Causality Test

Direction of causality	N number of lags	F-statistic	Probability	Decision Rule
<i>lnGDP</i> does not Granger cause <i>lnEXPT</i>	1	10.4633	0.00460	Reject
<i>lnExport</i> does not Granger cause <i>lnGDP</i>	1	13.7281	0.00162	Reject

The results relating to the existence of Granger causal relationships between exports and the gross domestic product appear in table 4. Both the hypotheses are rejected and concluded that there is a bi-directional causality between the total exports and GDP of the economy. The F-table value at 5 per cent level is 4.3512 and is far less than the computed F-statistic for both the equations, and hence both the hypotheses are

rejected. Also, from the probability values are very low for both the equations, less than 0.05. Hence, empirical study also supported the hypothesis of export-led growth.

6. Conclusion

Using the Granger causality test this paper explored the nature of the relationship between exports and real output. The empirical findings suggest the presence of bilateral causality between GDP and export of the economy. The finding is plausible and consistent with expectation that increasing trade stimulates economic growth. This supports the earlier export-led growth hypothesis. It shows that export sector has major contributing role in economic growth and development of the economy. For a developing country, like India the role of exports is inevitable not only to earn foreign currency to pay for imports but also for improving the living standards of the people. The government has to know in advance which sector has gainful effects from trade so that it can suggest what to export and where to trade the products in order to achieve high and sustainable growth in the country's future economic performance. By maintaining the growth rate of total exports, the economy can be able to reap the benefits from the comparative cost advantage from the respective trade partners rather than going for offsetting the strategies adopted by the trade partners. Thus, the externalities associated with exports impacted a significant contribution in productivity of income of the Indian economy.

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