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Export-led Growth (ELG) Hypothesis: Evidences from India

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The role of export in economic growth is highly debated, particularly after globalization gaining momentum.The results of different studies are inconclusive. In India, the export promotion efforts were started in the 1980s with easing out of the trade restrictions and procedural simplifications and providing incentives to export industries. This study analyses the export-led growth hypothesis in India based on the export data from 1980 to 2017. The study uses the Johansen co-integration test to determine the long-run relationship between exports and growth of GDP. The impulse response function of the Vector Auto Regressive (VAR) Model has been used to access the short-run dynamics. The Granger causality test has been applied to check the causal relationship between export and GDP. The result of our study does not find the export-led growth hypothesis valid in India. Conversely, in India's case, the growth in GDP led to the growth of exports.

Keywords: Exports, Export-led Growth, Co-integration, Granger Causality, India, Reform.

JEL Classification*:* F10; F14; 040

1. Introduction

THE role of export in economic growth has gained significance, particularly after the wave of globalization sweeping across the world. More and more economies are now recognizing the importance of international trade in the growth process. This stimulated the studies based on the correlation between export sector and economic growth on a fairly wide scale. The justification of growth through export lies in the belief that international trade helps in economic growth by (i) Promoting specialization to get the benefits from the comparative advantage, (ii) Full capacity utilization where domestic demand is insufficient (iii) Advantages of larger economies of scale due to the huge market size and (iv) Rise in investment and technological change and reduction in inefficiencies (Anwar and Sampath, 2000). Various eminent economists have considered exports as an engine of economic growth, but the empirical findings on export lead growth hypotheses remained dubious. The issue is more relevant in developing countries where the results of export-led growth are inconclusive partly because of the changing trade policies in the wake of globalization. As far as Indian economy is concerned, the role of export in economic growth began to be debated after the economic reform of 1991. The main focus of the reform was liberalization and replacing import substitution policies with export promotion policies to foster the process of economic growth and development. Although complete economic reform was undertaken only in 1991, export promotion efforts started in the 1980s under the worsening BOPs situation. In this backdrop, this study empirically analyzes the correlation between export and India's economic growth from 1980 to 2017.

2. Review of Literature

2.1 International Trade and the Economic Growth

The initial work on the link between trade and economic growth can be traced back to the classical period with the writings of Adam Smith, David Ricardo, and J.S. Mill during the first half of

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the 19th century. Since then, the justification for free trade, the role it can play in specialization, productivity gains and raising the living standard are well documented in economic literature.

However, in the last decade, endogenous growth theory set the fresh air blowing through economic growth literature. The models developed by the endogenous growth theorists have emphasized on a number of variables, namely degree of openness (or trade openness), real exchange rate, tariffs, terms of trade and export performance, to validate the hypothesis that open economies grow more rapidly than closed economies.

The endogenous growth theory establishes a nexus between trade and economic growth, but trade is the only single variable that enter the growth equation. In contrast, the supporter of export-led growth advocates, trade is the chief engine of growth. They support their argument by the growth of East Asian economies that were able to achieve and sustain high growth by opening up their economies to free trade and global competition.

The development of extensive literature on trade and growth is also the result of the shift in policy from import substitution to export promotion. By the 1980s, this strategy acquired so much popularity that it became a "conventional wisdom" in the developing world. It was largely accepted that more open countries grow faster than the less open ones. The argument got support from Latin American countries that were less opened and suffered a low growth rate.

More and more governments followed export stimulation using diverse mechanisms and instruments, for instance, subsidies and tax exemptions.

2.2 Export and Economic Growth

Discussion on the export lead growth started in the 1970s and the studies can be divided into two groups. One set of studies includes those that support the idea that exports lead to economic growth and the other set of studies negate the ELG hypothesis. The potential causes of the different conclusions are different model specifications, the difference in the time covered, and the different definitions of the variables used. Balassa (1978) studied eleven developing countries and concluded that export promotion policies are more favourable for economic growth than import substitution policies. Dadora (1991) stated that the economic growth of the export-oriented countries would be greater than the economies which export less. Dalia Marin (1992) found that an outward-looking regime favours increased productivity for both developed and developing economies. Giles and Williams (2000) confirmed that export will help to divert the production in comparative advantageous products and reap the economies of scale to reach the foreign market. Wernerheim (2000) by using co-integration and causality tests found a bi-directional causality between exports and economic growth. Jun (2007) found unidirectional causality running from export to GDP. The study of Maneschiold (2008) also found a positive relationship between export and economic growth.

In the Indian context, Bhat (1995), by using the co-integration technique, found supportive evidence for ELG. Chandra (2003) identified a positive relationship between exports and economic growth. Jim Love and Ramesh Chandra (2004) found a bi-directional causality between export and economic growth. Pardhan (2004) and Ray (2011), using co-integration and Error Correction Model, supported the ELG hypotheses. Urvashi Dhawan and Bagala Biswal (2010) found short-run causality from export to GDP. Kuar and Sindhu (2012), using the multivariate framework, concluded in favour of export-led growth.

Studies that did not support and hold up the ELG hypothesis comprise Jung and Marshal (1985). They studied export, growth, and causality in developing countries. Sengupta and Espana (1994) and Sachs and Warner (1995) concluded that ELG is not supported in developing countries due to their dependence on primary exports. Panas and Vamvoukas (2002) did not detect evidence in support of export-led growth. Reppas and Christopoulos (2005) studied the nexus between export and economic growth for twenty-two African countries and invalidated the ELG.

In India's case, Ghatak and Price (1997), using co-integration and VECM, rejected export-led growth. Asafu-Adjaye and

Chakraborty (1999), Natrag, Sahoo and Kamia (2001), Anwer and Sampath (2001), Abhijit Sharma and Theodore Panagiotidis (2005), Zulqarnain and Wasim (2010) are the studies that refuted the ELG hypothesis in India.

3. GDP and Export Growth Trends in India

Figure 1 shows the annual growth rate of export and GDP from 1980 to 2017. It is worth noticing that spikes in the downward direction are more severe than upward. The growth rate of GDP and exports has followed the same pattern since 1980. From the mid-1980s, the GDP growth rate started rising on account of the reform introduced at that time. The growth of exports followed the GDP path. The growth rate of GDP and export went negative from 1996 to 97. This was on account of the East Asian Crises. The next big setback to the growth rate occurred in the global recession of 2008-09, when both the curves touched the negative five per cent growth rate. Recovery from the global crises pushed the growth rate of GDP and exports to more than 15 per cent till 2011, when the Eurozone crises halted the upward after that, slow global demand and slow growth rate of the world economy restricted the growth rate of the Indian economy.

As the GDP growth rate and export growth rate are highly correlated, it is difficult to say which causes the other. Both the curves followed a seesaw pattern with upward and downward trends coinciding. The question that arises here is whether the GDP growth rate impacted the growth of exports or *vice versa*. It is precisely this question that we will attempt to answer in this study

4. The Methodology of the Study

The study uses the time series of India's exports and GDP, extracted from the world development indicators. The time series used are at constant prices with base 2010. The researcher applied the log transformation of the series to counter the problem of heteroscedasticity (Gujarati, 1995).

The Augmented Dickey-Fuller test has been applied to check the order of the integration of the variables. To check the long-run relationship between exports and GDP, Johansen co-integration test has been used. The Granger causality test has been used to determine the direction of causality between export and the growth of GDP.

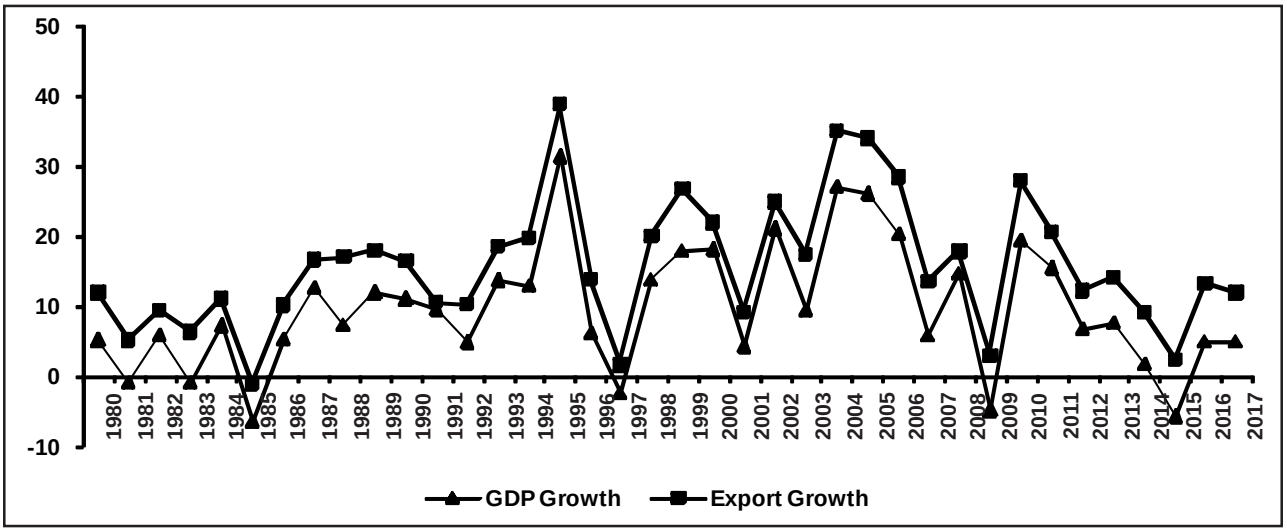
4.1 Unit Root Testing

Before co-integration analysis, it is important to check the order of the integration of the variables. The augmented Dickey-Fuller test (ADF) is applied to check the order of the integration of the concerned variables. The general form of the ADF is;

$$\Delta LY_t = \beta_1 + \beta_2 t + \beta_3 LY_{t-1} + \sum_{i=0}^{m} \alpha_i LY_{t-1} + \varepsilon_t \quad ...1$$

FIGURE 1

EXPORT AND GDP GROWTH RATE (ANNUAL PERCENTAGE)



Source: World Development Indicators, World Bank.

Where ΔLY_t are the lagged values of the logged dependent variable, ε_t is the pure white noise error term, and m is the lag length determined empirically. In our case, m = 9 is based on the SIC criteria.The stationarity of the series depends on α. If $\alpha < 1$ series is said to be stationary and if $\alpha=1$, then the series is non-stationary.

The result of the Unit Root test shows that the null hypotheses of the unit root are accepted for both the variables at the level and rejected at first difference. Variables are integrated of the same order ($I(1)$) and qualify for the co-integration testing to see the long-run relationship between them.

4.2 Johansen Co-integration Test

Johansen co-integration test is used to determine the long-run relationship between the variables. Two non-stationary time series is said to be co-integrating if their linear combination is stationary. Johansen co-integration test takes its roots from the VAR model and can be estimated as follows.

Consider a VAR of order p

$$Y_t = A_1 Y_{t-1} + \cdots + A_p Y_{t-p} + B_{x-t} + \varepsilon_t \quad ...2$$

Where Y_t is a K- vector of $I(1)$ variable, xt is a d-vector of deterministic variable and ε_t is the vector of innovation. The above VAR model can be rewritten as

$$\Delta Y_t = \Pi Y_{t-1} + \sum_{i=1}^{p-1} \Gamma_i \Delta Y_{t-1} + B_{xt} + \varepsilon_t \quad ...3$$

$$\Pi = \sum_{i=1}^{p} A_i - I, \ \Gamma = -\sum_{j=i+1}^{p} A_j \quad ...4$$

Here the rank of Π is a determining factor for the co-

TABLE 1

RESULTS OF UNIT ROOT TEST AT LEVEL

Null Hypothesis: LNEXP has a unit root		T- statistics	Prob.*
Augmented Dickey-Fuller test statistics		0.310016	0.9757
Test critical values	1% level	-3.621023	
	5% level	-2.943427	
	10% level	-2.610263	
Null Hypothesis: LNGDP has a unit root		T- statistics	Prob.*
Augmented Dickey-Fuller test statistics		2.490503	1.000
Test critical values	1% level	-3.621023	
	5% level	-2.943427	
	10% level	-2.610263	

TABLE 2

RESULTS OF UNIT ROOT TEST AT FIRST DIFFERENCE

Null Hypothesis: D (LNEXP) has a unit root		T- statistics	Prob.*
Augmented Dickey-Fuller test statistics		-4.817930	0.0004
Test critical values	1% level	-3.626784	
	5% level	-2.945842	
	10% level	-2.611531	
Null Hypothesis: D(LNGDP) has a unit root		T- statistics	Prob.*
Augmented Dickey-Fuller test statistics		-4.965474	0.0003
Test critical values	1% level	-3.626784	
	5% level	-2.945842	
	10% level	-2.611531	

*Significant at five per cent level.

integration among the variables. When Π= 0, then there is no linear relationship with Y_t. If Π = 1, then there is a linear combination among the variables. Π > 1 implies that there is co-integrating vector between the variables. Johansen proposes two likelihood ratios of the significance of the co-relation: The Trace Statistics and the Maximum Eigenvalue Test.

Trace Statistics

$$J_{trace} = -T \sum_{i=r+1}^{n} Ln(1-\hat{\lambda}_i) \quad ...5$$

Where T is the number of observations or sample size and $\hat{\lambda}_i$ is the i^{th} canonical co-relation. The null hypothesis is that there is *r* co-integrating vectors against the alternative hypothesis of *n* co-integrating vectors.

Maximum Eigenvalue

$$J_{max} = -T\, Ln(1-\hat{\lambda}_{r+1}) \quad ...6$$

These statistics compare the *r* co-integrating vectors. It examines the hypothesis of *r* co-integrating vectors against the alternate hypothesis of *r+1* co-integrating vectors.

The result shows that the trace statistics at the 5 per cent level is below the critical value which led to the acceptance of the null hypothesis of no co-integration between exports and GDP in the long-run. The maximum eigenvalue is less than the critical value at the 5 per cent level, which implies that the null hypothesis of no co-integration cannot be rejected. The analysis suggests that there is no long-run association between exports and GDP.

For the short-run dynamics, we estimate the following bivariate VAR model and analyse the impulse response function

$$LNGDP = \alpha + \sum_{i=1}^{k} \beta i\ LNGDP_{t-i} \sum_{j=1}^{k} \phi_j\ LNEXP_{t-j} + \mu_{1t} \quad ...7$$

$$LNEXP = \gamma + \sum_{i=1}^{k} \beta_i LNGDP_{t-i} \sum_{j=1}^{k} \phi_j\ LNEXP_{t-j} + \mu_{2t} \quad ...8$$

Where μ_{1t} and μ_{2t} are the error terms called an impulse, shock, or innovation in VAR terminology. *k* is the number of lag length to be determined empirically. In our case, *k* is based on SIC and AIC.

From the impulse response function under the VAR environment, we can observe GDP behaviour when one standard deviation shock is given to exports and *vise-versa*. When one standard deviation shock is applied to export, GDP increases up to two years and after that, begins to decline. After the third year, shock dies and GDP remains stable in the long-run. On the other hand, when one standard deviation shock is applied to GDP, export initially increases upto two years and then fall down, but after the third year, exports continue to increase upto six years when the shock begins to die gradually. From the impulse response function, it is clear that export does not affect GDP in the long-run, which again rejects the export-led growth hypothesis in India. The impulse response function confirmed that GDP growth led to export growth in India.

TABLE 3

RESULT OF THE JOHANSEN CO-INTEGRATION TEST

Unrestricted co-integration Rank test (Trace)				
Hypothesised		Trace	0.05	
No. of CE(s)	Eigenvalue	Statistic	critical value	Prob
None	0.274572	11.64536	15.49471	0.1748
At most 1	0.011663	0.410587	3.841466	0.5217
Unrestricted co-integration Rank test (Maximum Eigenvalue)				
Hypothesised		Maximum	0.05	
No. of CE (s)	Eigenvalue	Eigen statistic	critical value	Prob
None	0.27457	11.23477	12.26460	0.1428
At most 1	0.011663	0.410587	3.841466	0.5217

4.3 Granger Causality Test

Granger causality test includes use of F-Test to predict whether lagged information on a variable Y provides any statistically significant information about another variable X in the presence of lagged values of X. To test whether exports Granger cause GDP or GDP Granger cause exports or causality runs in both directions we proceed to test the following regression model

$$DLNEXP_t = \sum_{i=1}^{m} \alpha_i\ DLNEXP_{t-i} + \sum_{j=1}^{m} \beta_j\ DLNGDP_{t-j} + U_{1t} \quad ...9$$

$$DLNGDP_t = \sum_{i=1}^{m} \gamma_i\ DLNPDI_{t-i} + \sum_{j=1}^{m} \theta_j\ DLNEXP_{t-j} + U_{2t} \quad ...10$$

Where *D* stands for the differenced variables and *LN* denotes the logarithm, *t* denotes the trend or time variable, and it is

assumed that the error term U_{1t} and U_{2t} are uncorrelated, m is the number of lag to be introduced in the independent variables. As the granger causality test is sensitive to the number of lags, we performed the test at lag 1, lag 2, lag 3, and lag 4. In all the cases, the same results were obtained as presented in Table 4 at lag 2 on AIC criteria.

The result of the Granger causality test shows that the hypothesis that "GDP does not Granger causes exports" is rejected and the hypothesis that exports does Granger causes GDP is accepted. This implies that there is a unidirectional causality running from GDP to exports. Again, the results reject the export-led growth in India and highlight the importance of economic growth in the promotion of exports.

The policy implication of the study is that the government should focus on the economic and political stability in the country, which will lead to a higher growth rate of GDP and, consequently, better export performance. Focusing exclusively on the export promotion policies will be of little use for the promotion of export promotion without a stable economy.

5. Conclusion

The role of exports in economic growth is a much-debated subject and findings remain inconclusive. Different periods covered, different model specifications and different variables are the reasons for the ambiguity. In this study, we analysed the export-led growth in India from 1980 to 2017. The study found no evidence of export-led growth in India. Johansen co-integration test does not establish any long-run relationship between exports and growth of GDP. The impulse response function from the VAR model shows that it is the GDP which leads to the growth of export in the long-run rather than the other wayround. These results are further confirmed by the Granger causality test, which shows a unidirectional causality running from GDP to exports. Our study supports the

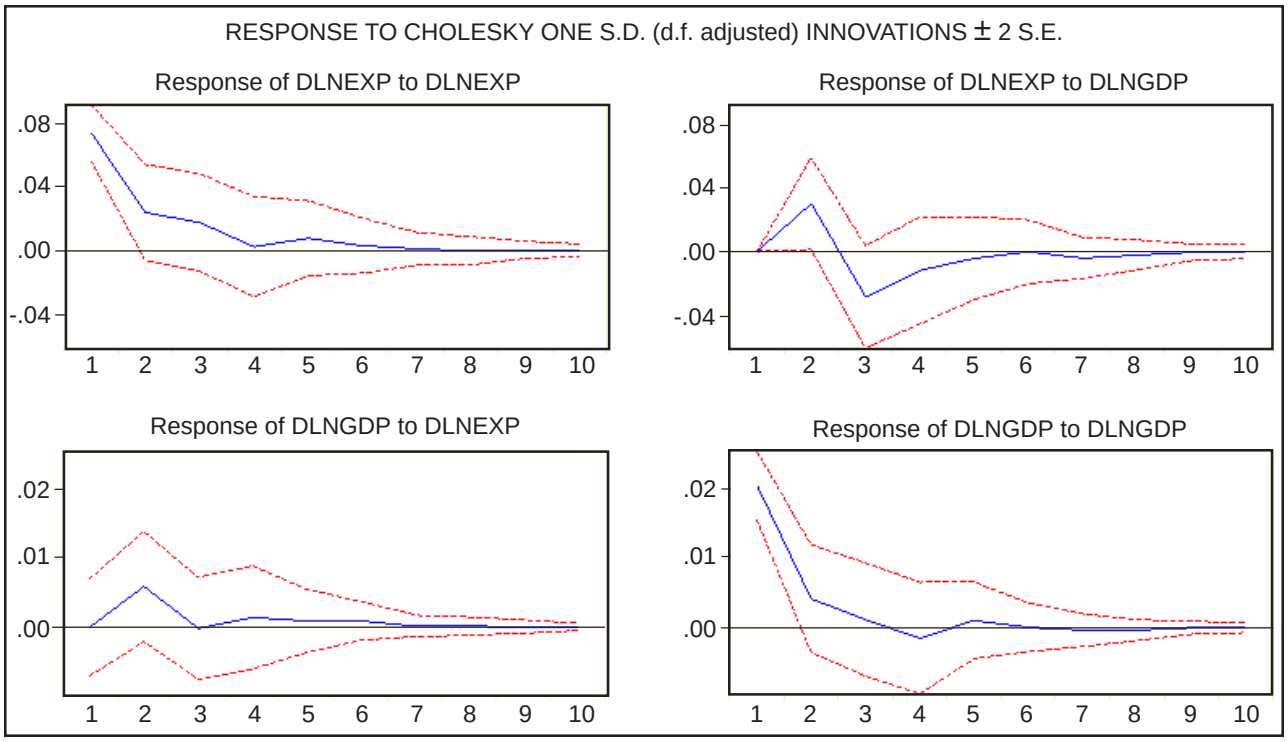
TABLE 4

RESULTS OF THE PAIRED WISE GRANGER CAUSALITY TEST

Null Hypothesis:	Obs.	F-Statistic.	Prob.
DLNGDP does not Granger cause DLNEP	35	6.42036	0.0048
DLNEXP does not Granger cause DLNGDP		1.30300	0.2867

FIGURE 2

IMPULSE RESPONSE FUNCTION OF THE VAR MODEL



growth-led export hypothesis and demonstrates the importance of political and economic stability in achieving higher GDP growth and higher export growth.

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