Export-Led Growth in India: A Bounds Testing Approach

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The Journal of Developing Areas, Volume 52, Number 1, Winter 2018, pp. 1-14 (Article)

Published by Tennessee State University College of Business
DOI: *https://doi.org/10.1353/jda.2018.0000*

The Journal of Developing Areas
Volume 52 No. 1 Winter 2018

EXPORT-LED GROWTH IN INDIA: A BOUNDS TESTING APPROACH

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ABSTRACT

Neoclassical economic theory suggests there is a positive relationship between economic growth and growth in exports. An increase in exports leads to an increase in income due to the multiplier effect of production. This paper examines whether the Export-Led Growth (ELG) hypothesis is valid for India. Though the existing literature on this field is extensive, the results are ambiguous. Past studies have suffered from various methodological drawbacks. Early studies were hampered by a lack of time series data. The next stage used OLS analysis and simply assumed causation rather than testing for it. A third stage of investigations tested for Granger causality using the standard tests which was not applicable due to the presence of cointegrated variables. Therefore this paper re-investigates the ELG hypothesis for India; taking advantage the longer time series now available, with annual data from 1980 to 2013, and using more sophisticated tests. The paper tests for the presence of a long run relationship between exports and economic growth using the more robust autoregressive distributive lag (ARDL) bounds test for cointegration developed by Pesaran et al. (2001). The paper then tests for causality between exports and GDP using the Todo and Yamamoto (1995) and Dolado Lutkepohl (1996) (TYDL) causality test. The advantage of the latter test is that it indicates the direction of causality. The results indicate that exports have no significant long run impact on economic growth. While in the long run the result exhibits no relationship between exports and economic growth, the short run model is highly significant. Furthermore, the results indicate that capital formation, imports, real exchange rate and terms of trade are significant and have an impact on economic growth in the long and short run. The short run dynamics further indicate that the Indian economy recovers from a shock is relatively quickly. In addition, the causality test results show that there is a significant unidirectional causal relationship from GDP to exports but no causality is found from exports to GDP. Thus, the results show no support for the ELG hypothesis and indicate that India has not directly benefited from the trade reforms implemented in 1991. The findings suggest that to improve and sustain long run economic growth the government should target policies that further enhance domestic demand and capital accumulation.

JEL Classifications: C32, F43, 047
Keywords*:* Exports, Economic Growth, India, ARDL model, Causality
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INTRODUCTION

Based on neoclassical theory, one could simply construe a positive relationship between exports and economic growth, where an increase in exports would lead to a rise in income due to the well known "multiplier effect of production". While there is a widespread body of literature in this field the results have been inconclusive. The studies of the export lead growth (ELG) hypothesis can be classified into four main groups. The original studies in this field used a cross-sectional framework mainly due to the lack of time-series data (Emery 1967; Kravis 1970; Michaely 1977; Bhagwati 1978). Although, these papers found a positive relationship between exports and GDP in the long run they had major methodological shortcomings.

In order to solve the drawbacks of the previous works, the ELG hypothesis was re-investigated using OLS method (Balassa 1978; Tyler 1981; Feder 1983). The methodology used in these papers was to apply the neoclassical production function in testing the ELG hypothesis. Results found in these papers supported the ELG hypothesis but one major drawback of such studies was that they simply assumed the existence of causality rather than testing for it.In order to rectify the problem associated with the earlier findings, new studies implemented the Granger (1969) causality test to analyze the ELG hypothesis (Jung & Marshall 1985; Chow 1987). Using time series data these papers attempted to show the existence of ELG in developing countries but failed to do so. The main shortcoming of such studies was that they ignored the fact that if the variables followed an I(1) process and are cointegrated, a standard Granger test would be inapplicable.

Bahamani-Oskooee & Alse (1993) show that if the variables were cointegrated, then a general causality test would be invalid. The study proposed that including the error correction terms in applying the Granger causality test might lead to a more viable conclusion. There is vast literature on the ELG hypothesis using this method (Ekanayake 1999; Love & Chandra 2005; Bahamani-Oskooee & Economidou 2009). Despite the existence of various studies that have used the recent technique, the results have been mixed and do not provide any clear results in support of the ELG hypothesis. The inconclusive results are mainly due to a number of methodological. First, many of these studies have used a bivariate framework in their analysis and may suffer from misspecification. Second, the results found by using the Johansen technique cannot be trusted due to the low power of the test. Due to the methodological drawbacks found in previous works and the inconclusive results in testing for the ELG hypothesis in India a re-investigation into this topic is warranted. Therefore, the present study re-examines the hypothesis for India using the more recent ARDL bounds testing approach to cointegration. The paper further tests for causality between exports and growth using the TYLD causality model.The motivation behind using India for testing the ELG hypothesis is due to the high level of growth exhibited by the country in the recent years. The trade liberalization reform in 1991 makes it an interesting case study for analyzing the ELG hypothesis.

LITERATURE REVIEW

Focusing specifically on India, we observe that evolution of the literature is similar to that of other countries. The original studies testing the ELG hypothesis in India were conducted before trade liberalization and were unable to find evidence of a conclusive relationship between exports and economic growth for example, (Jung and Marshall 1985, Aksoy and Tang 1992 and Rashid 1995). Economists concluded that the methodologies used in the past studies were unreliable and the results found of “no causality” between exports and growth was invalid, since most of the data used was non-stationary and cointegrated. This led to extensive literature in the field that attempted to re-investigate the ELG hypothesis.

Ghatak and Price (1997) investigated the ELG hypothesis for India using a time-series framework during the period 1960-1992. The authors applied a cointegration procedure with error correction modeling and found a long run relationship between the variables. One major drawback of this study was that it failed to include imports, which may have led to biased results in analyzing the hypothesis. Dhawan and Biswal (1999) re-investigated the ELG hypothesis for the period 1961-1993. Their model included terms of trade and employed the Johansen cointegration method. The results showed a bi-directional causality from exports to GDP. However the small sample size may have led to biased conclusions.

Chandra (2003) used the same method as Dhawan and Biswal (1999) modified by adding terms of trade to the model. The rationale behind inclusion was that terms of trade had an influence on export earnings. The results indicated that there was a long run relationship between exports and economic growth. A major flaw with this study was that it simply assumed a causal relationship existed between exports and economic growth. Dash (2009) investigated the relationship between exports and growth using quarterly data after the liberalization period of 1991. The results showed a unidirectional relation between exports and output growth. Furthermore, the study claimed that using data on India before liberalization was the main cause for the mixed results in previous literature. Pradhan (2010) aimed to understand the importance of exports in growth after the opening of the Indian economy. The main objective of this paper was to find whether trade openness had a major impact on growth and if so in what direction. Although, the study found evidence of a positive direction between trade openness and growth, it failed to control for imports in its analysis. Paul and Das (2012) re-examined the export-output relationship for India over the 1960- 2009 period. While the study found evidence of a relationship, it could not show that the variables were cointegrated in the long run. Hence, the study concluded that although no significant long run relationship existed, the evidence of impulse response could not be neglected.

Kumari and Malhotra (2014) tested the ELG hypothesis for India using data from 1980 to 2012. The study applied the Johansen cointegration technique and the Granger causality procedure and found no evidence of long run relationship. One of the major criticisms of this paper was that it used a bivariate framework, which may have led to a misspecification problem. There are various drawbacks in the previous studies conducted for India: a) the early studies have failed to account for causality between the variables; b) the studies which have accounted for causality have failed to test for stationarity and cointegration; c) studies which tried to rectify this issue have used the Johansen cointegration technique which has various shortcoming in itself and therefore, the results found would be unreliable. In light of these observations, this study aims to eliminate these drawbacks in testing for the ELG hypothesis.

DESIGN AND DATA

This section presents the analytical framework and the data used for examining the relationship between exports and economic growth.

Design

Starting from the original production function, an additional variable is included in the model to test for the relationship between exports and growth:

$$Y = f(K, L, X) \tag{1}$$

where Y is gross income in the economy where capital (K) and labor (L) are the inputs, and X is the exports of goods and services. Starting from equation (1), we argue that including imports (M) is essential for understanding the relationship for India. Riezman et al. (1996) found that imports have crucial effects on growth and exports in an economy and not including the variable in the analysis may lead to biased results.In the next step, net trade is subtracted from GDP, which is used as a measurement for the gross income (Y). The real exchange rate (RER) and terms of trade (TOT) affect both export and import and are included in the model to avoid problems of misspecification. Hence equation (1), can be re-written as:

$$GDP_{net\ of\ trade} = f(K, L, X, M, RER, TOT) \tag{2}$$

Nature and Source of Data

The choice of dataset is of crucial importance in testing for the ELG hypothesis in India. Since India was mainly an import substituting country, using data before the 1980s would lead to biased results. On the other hand, an exclusion of data between 1980 and 1991 would be inappropriate as by the 1980s, the country was trading high volumes of exports in technological and manufacturing commodities, which triggered the introduction of the liberalization policy of 1991 (Rodrik & Subramanian, 2004). Therefore, annual time series data has been collected from the World Bank database from 1981 to 2013. The data for GDP, exports, imports and capital formation are at 2005 constant USD prices. The terms of trade was calculated as the percentage ratio of exports to the import values measured relative to the base year (2000). The data for real exchange rate was calculated by converting the official exchange rate in local currency in terms of USD by using the GDP deflators for India and US. Furthermore for the period analyzed, the data for labor was unavailable. Given this limitation, we follow the practice of earlier studies (Ghatak and Price 1997, Dash 2009 and Paul and Das 2012) and omit the variable from the model.

METHODOLOGY

The ELG hypothesis is tested empirically in two stages. First we test for the existence of a long run relationship between GDP and exports. Second we undertake a Granger causality test. A contribution of this paper is application of more reliable tests than those in earlier studies. The ARDL approach with bounds testing developed by Pesaran & Pesaran (1997), Pesaran & Shin (1999) and Pesaran et.al (2001) is used to test for a long run or cointegrated relationship. Recent studies of the ELG hypothesis used the Johansen (1988) and Johansen & Juselius (1990) cointegration procedure, which has drawbacks. First, the Johansen technique requires a large sample size to give efficient results.

Second, it requires that all the variables in the model testing for cointegration are integrated of the same order. Compared to other techniques, the ARDL model is more efficient since the model can test for a long run relationship regardless of the time-series properties of the data. Furthermore, it allows the variables to have different optimal lags in contrast with techniques of the past, which requires that all the variables have the same number of lags in the model. The only limitation of the ARDL model is that it cannot accommodate any variables which follow an I(2) process.

The ARDL model can also be used to test for Granger causality, however it does not indicate the direction of causality. Consequently we have used the TYDL approach, developed by Toda and Yamamoto (1995) and Dolado and Lutkepohl (1996), for the Granger causality test. The TYDL test is appropriate in this study as the Wald test statistic used in the conventional Granger causality test is not valid when the times series are non-stationary. In addition, the TYDL test does not depend on unit root and cointegration tests which may suffer from pre-testing bias (Toda and Yamaoto 1995).

Cointegration Procedure

The ARDL model to test if a long run relationship exists between the variables is specified in the simple OLS form:

$$Y_t = c_i + \theta t + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \beta_4 x_4 + \beta_5 x_5 + \mu_t \quad (3)$$

Where, $\mu_t$denotes the error term, β_i *(i=1.... 5)* and c_i are the intercept terms and θ is the coefficient for the linear trend in the model. Starting from the traditional ARDL model we can formulate the Conventional Vector Error Correction Model (VECM):

$$Y_t = c_i + \theta t + \beta_1 y_{t-1} + \beta_p y_{t-p} + \alpha_0 x_t + \alpha_1 x_{t-1} + \alpha_q x_{t-q} + \mu_t \quad (4)$$

Where, x_t is the vector of all explanatory variables, μ_t is the random disturbance term, c_i denotes a (k+1) vector of the intercept terms and θ denotes a (k+1) vector of the coefficients for the trend variable. β_p and α_q are the respective coefficients for the dependent and independent variables, where p and q are the respective lags. Therefore, moving from equation (4), the conditional VECM for the bounds testing procedure with can be represented as:

$$\Delta Y_t = c_i + \theta t + \pi_1 y_{t-1} + \pi_2 x_{(t-1)} + \sum_{i=1}^{p} \emptyset_i \, \Delta Y_{t-i} + \sum_{i=1}^{q} \delta_i \, \Delta x_{t-i} + \mu_t \quad (5)$$

Where, Δ is the first difference operator and is x_t the vector of all the explanatory variables. c_i denotes a (k+1) vector of the intercept terms and θ denotes a (k+1) vector of the coefficients for the trend variable. $\pi_i \;\; i = 1 \ldots 6$ is the coefficient of the lagged variables at levels, $\emptyset_i(i = 1 \ldots p)$ and $\delta_i \, (\, i = 1 \ldots . q)$ signifies the coefficient of the first difference of the lagged variables. On the basis of equation (5) we can derive the equation of interest:

$$\Delta GDP_t = c_i + \theta t + \pi_1 GDP_{t-1} + \pi_2 EX_{(t-1)} + \pi_3 IMP_{(t-1)} + \pi_4 K_{(t-1)} + \pi_5 RER_{(t-1)} + \pi_6 TOT_{(t-1)} + \sum_{i=1}^{p} \rho_i \, \Delta GDP_{t-i} + \sum_{j=1}^{q} \delta_j \, \Delta EX_{t-j} + \sum_{k=1}^{q} \emptyset_k \, \Delta IMP_{t-k} + \sum_{l=1}^{q} \varphi_l \, \Delta K_{t-l} + \sum_{m=1}^{q} \gamma_m \, \Delta RER_{t-m} + \sum_{n=1}^{q} \psi_n \, \Delta TOT_{t-n} + \mu_t \quad (6)$$

Where, $\pi_i's$ are the coefficients for the long run multipliers for the model and the coefficient of the difference terms are the short run multipliers of the model. The first step in the formulation of the ARDL model is selecting an appropriate lag length for p and q. Before the selection is made, an estimation of a maximum lag length (k_{max}) is necessary. Since the data in this case is annual, a k_{max} of 2 has been chosen (Narayan, 2005). The appropriate order of the ARDL model was selected using the AIC, SBC and HQ criteria. The next step is to estimate equation (6) using OLS in order to test for a long run relationship between the variables. Where, the null hypothesis states no long run relationship, against the alternative of a long run relationship exists between the variables. Therefore, to test for the long run relationship a joint F test was conducted. The test provides two asymptotic critical values bounds, a lower bound value at I(0) and an upper bound value at I(1). If the F-statistics is greater than the upper bound critical value, the null hypothesis of no long run relationship is rejected. The long run condition ARDL model can be represented as:

$$GDP_t = c_i + \sum_{i=1}^{p} \theta_1 \, GDP_{t-i} + \sum_{i=1}^{q} \theta_2 \, EX_{t-i} + \sum_{i=1}^{q} \theta_3 \, IMP_{t-i} + \sum_{i=1}^{q} \theta_4 \, K_{t-i} + \sum_{i=1}^{q} \theta_5 \, RER_{t-i} + \sum_{i=1}^{q} \theta_6 \, TOT_{t-i} + \mu_t \quad (7)$$

Where, all the variables have been previously defined. The final step in the ARDL model requires the estimation of the VECM to find the short run effect if a long run relationship is found previously:

$$\Delta GDP_t = \beta_O + \sum_{i=1}^{p} \theta_i \, \Delta GDP_{t-i} + \sum_{j=1}^{q} \delta_j \, \Delta EX_{t-j} + \sum_{k=1}^{q} \emptyset_k \, \Delta IMP_{t-k} + \sum_{l=1}^{q} \varphi_l \, \Delta K_{t-l} + \sum_{m=1}^{q} \gamma_m \, \Delta RER_{t-m} + \sum_{n=1}^{q} \psi_n \, \Delta TOT_{t-n} + \eta ECT_{t-1} + \mu_t \quad (8)$$

Where, η is the coefficient of the error correction term (ECT). The ECT can be defined as:

$$ECT_t = GDP_t - \beta_O - \sum_{i=1}^{p} \theta_i \, \Delta GDP_{t-i} - \sum_{j=1}^{q} \delta_j \, \Delta EX_{t-j} - \sum_{k=1}^{q} \emptyset_k \, \Delta IMP_{t-k} - \sum_{l=1}^{q} \varphi_l \, \Delta K_{t-l} - \sum_{m=1}^{q} \gamma_m \, \Delta RER_{t-m} - \sum_{n=1}^{q} \psi_n \, \Delta TOT_{t-n} \qquad (9)$$

Where, ECT shows the speed at which the model converges to its equilibrium.

***Ca*usality Procedure**

The study applies TYDL approach developed by Toda & Yamamoto (1995) and Dolado & Lutkepohl (1996) in testing for causality between exports and growth. The main reason to apply the TYDL approach is to overcome issues of using a standard causality test. In cases, where the variables are cointegrated using the standard Wald test in testing for causality would be inappropriate and lead to misleading results (see, Zapata and Rambaldi 1997). The TYDL procedure uses an augmented lag length VAR of order k with d_{max} extra lags. Where, d_{max} represents the maximum order of integration for the series. Thus, the required VAR (k + d_{max}) can be estimated. The next step involves setting up the VAR model in levels irrespective of the order of integration of the variables. Using this model, the optimal lag length k can be determined by use of AIC, SBC and HQ criteria. The final step is to setup the VAR model with the order of (k + d_{max}):

$$V_t = c + \beta_1 V_{t-1} + \beta_2 V_{t-2} + \cdots \ldots\ldots + \beta_k V_{t-k} + \beta_k V_{t-k+d_{max}} + \varepsilon_t \qquad (9)$$

Where, V_t is equal to GDP, EX, IMP, RER, K and TOT. c is a (6*1) vector of the constant, $b's$ are (6*6) matrix of the coefficients and ε_t is the white noise parameter. The optimal lag order for the VAR model is to $(k + d_{max})$ is the order of integration. This provides us with a VAR model of order of p, where p equals to $k + d_{max}$.
The final step involves using equation (9) in testing for Granger causality by employing a modified Wald test (MWALD). The approach uses a chi-square distribution with the null hypothesis being, the nth element V_t does not Granger-cause the ith element of V_t.

RESULTS

Unit Root Tests

Before testing the long run and causal relationship between the variables, a test for unit roots is essential. The results for both the ADF test and PP unit root test are summarized below (Tables 1 and 2).

TABLE 1. ADF TEST

Variables	In Levels		In First Difference		Integration
	Model A	Model B	Model A	Model B	I (1)
GDP	1.4334	-1.3022	-4.5727***	-4.8764***	I (1)
EX	1.531	-2.935	-4.9975***	-5.2746***	I (1)
K	0.7314	-1.8512	-5.4835***	-5.5165***	I (1)
IMP	0.669	-2.1368	-5.3453***	-5.4498***	I (1)
RER	-2.5796	-1.3188	-4.4049***	-4.7958***	I (1)
TOT	-1.7562	-2.692	-6.6614***	-6.6614***	I (1)

Notes: All the tests are run using the Akaike Information criterion (AIC)... Model A is with a constant term. Model B represents constant with linear trend term. (***), (**) and (*) denotes 1%, 5% and 10% level of significance, respectively.

TABLE 2. PHILLIP PERRON TEST

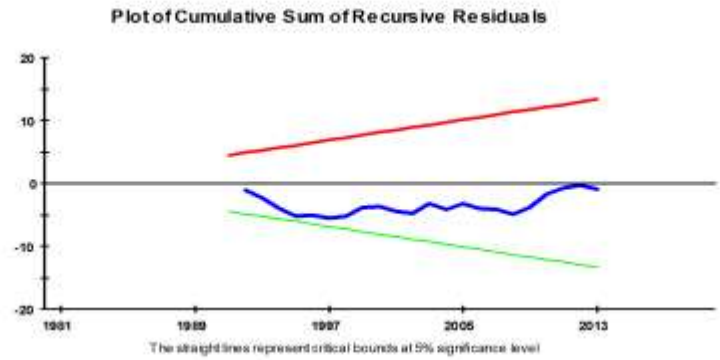
Variables	In Levels		In First Difference		Integration
	Model A	Model B	Model A	Model B	I (1)
GDP	1.3864	-1.3363	-4.5727***	-4.8873***	I (1)
EX	1.4886	-3.2918*	-4.9705***	-5.2630***	I (1)
K	0.7654	-1.8679	-5.4914***	-5.5167***	I (1)
IMP	0.7341	-2.1333	-5.3474***	-5.4499***	I (1)
RER	-2.4318	-1.3573	-4.3876***	-4.7958***	I (1)
TOT	-1.5222	-2.6007	-6.8986***	-6.8638***	I (1)

Notes : All the tests are run using the Newly-West bandwidth. Model A is with a constant term and Model B represents constant with linear trend term. (***), (**) and (*) denotes 1%, 5% and 10% level of significance, respectively.

Bound Testing Procedure to Cointegration

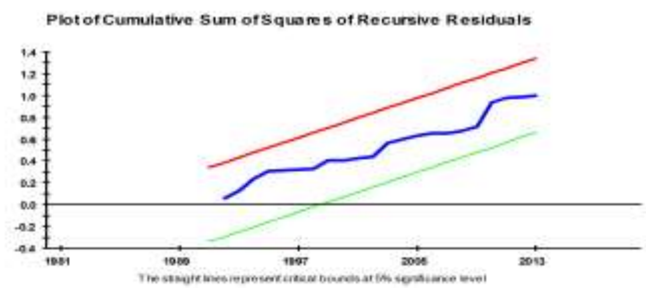
Since none of the variables is found to be I(2), the next step was to formulate the ARDL model to test for cointegration. For this purpose, a conditional VECM was derived using the AIC, SBC and HQ criteria. The conditional VECM selected for bounds testing procedure was found to have a lag order of 1. Before applying the bounds testing procedure, the underlying conditional VECM model was further tested for various diagnostic tests. The results indicated that the model passed all the diagnostic tests at the 5 % significance level. The model was further tested for stability using the CUSUM test and the results indicated that the model was stable (Figures 1 and 2).

FIGURE 1. PLOT OF CUSUM FOR UECM



Source: Computed from E-Views

FIGURE 2. PLOT OF CUSUM OF SQUARES FOR UECM



Source: Computed from E-Views

This process provided the necessary model for conducting a bounds test procedure. Hence, a joint F-test was conducted for the first lag of the level variables with GDP as the dependent variable. The results from the application have been summarized in Table 3. The computed F- statistic of 6.7607 from the Wald test is higher than the upper bound critical value at 5% of 5.253 from the Narayan (2005) table. Hence, we could reject the null hypothesis of no cointegration, implying that GDP and its corresponding independent variables are cointegrated.

TABLE 3. BOUNDS TESTING PROCEDURE TO COINTEGRATION

Dependent Variable	k	F-stats	Upper Critical Bound Values		
			1%	5%	10%
GDP	5	6.7607	7.242	5.253	4.412

Notes: Asymptotic critical values have been obtained from Case V: Unrestricted Intercept and Unrestricted Trend from Narayan (2005). k is the number of regressors for the dependent variable in the model.

Once a long run relationship is established equation (6) is estimated using the following ARDL (1,1,0,0,0,1) specification for GDP, EX IMP, RER and TOT respectively. The next step involved normalizing the results obtained in equation (7) to obtain the long run model (Table 4).

TABLE 4: ESTIMATED LONG RUN COEFFECIENTS USING THE ARDL APPROACH

Regressor	Coefficient	S.E.	T-ratio
EX	-0.1322	0.0537	-2.4602
IMP	0.1217	0.0444	2.7408**
K	0.1882	0.0825	2.2811**
RER	-0.1265	0.0493	-2.5665***
TOT	0.1256	0.0413	-2.5665***
TREND	0.03523	0.0067	5.2317***
C	18.8271	2.0177	9.3308***

Notes: The long run model is based on equation (8) with ARDL (1,1,0,0,1) specification using AIC and SBC criterion with GDP as the dependent variable. (***), (**) and (*) denotes 1%, 5% and 10% level of significance, respectively.

While, the ARDL model provides evidence that a long run relationship exists between GDP and its regressors, the model failed to indicate any long run relationship between exports and GDP. Thus, it provides no support for the ELG hypothesis in India.
Having estimated the long run model, the next step was to determine the short run dynamics of the ARDL model. For this purpose, equation (8) was estimated by using the lag of the error term from the long run model (Table 5). The equilibrium error correction coefficient (ecm) is highly significant and suggests that approximately 68.25 % of the disequilibria from the previous year's shock converges back to the long run equilibrium in the current year. This shows that in India, the adjustment speed toward equilibrium from a shock is relatively fast.

TABLE 5. ERROR CORRECTION REPRESENTATION OF THE ARDL MODEL

Regressor	Coefficient	S.E.	T-ratio
EX	-0.0758	0.0356	-2.1276**
IMP	0.0831	0.027	3.0789***
K	0.1285	0.0512	2.5084**
RER	-0.0864	0.0391	-2.2066**
TOT	-0.0006	0.024	-0.0241
TREND	0.024	0.0064	3. 7630***
ECM(-1)	-0.6825	0.0755	-9.0396***

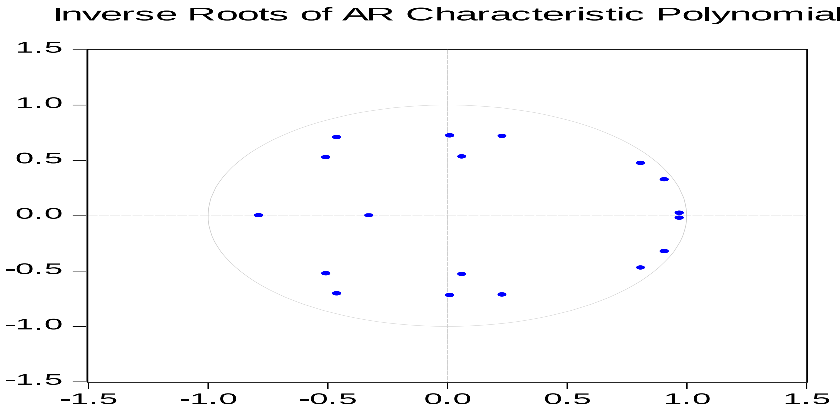
R-squared	0.875	Mean Dept. Var.	0.0611
Adj. R-squared	0.8621	S.D Dept. Var.	0.0252
S.E	0.0105	AIC	99.4126
S.S.R	0.0025	SBC	91.93
F-stat	22.9972	Durbin-Watson Stat.	2.012

Notes : (***), (**) and (*) denotes 1%, 5% and 10% level of significance, respectively. The short run model is based on equation (8) with ARDL (1,1,0,0,1) specification using AIC and SBC criterion where, Δ is the difference operator and the dependent variable is ΔGDP

Granger Causality Testing

The first step in performing the TYDL approach was the selection of the appropriate lag order (k) for the model. Therefore, the model was setup in a VAR framework and selected the appropriate lag order using the AIC, SBC and HQ criteria. The results showed that the SBC and HQ criteria suggested a lag order of 1, while the AIC criteria suggested a lag order of 3. Since the dataset used in this study is of a short span, a lag order of 1 was chosen to avoid problems of over parameterization. The next step involved estimating the order of integration (d_{max}) using the unit root tests (Table 1 and 2). This procedure provided us with the necessary parameters to estimate equation (9) for the VAR of order □, where is equal to $(k + d_{max})$ and equals to 2. A serial correlation LM test and inverse roots test for the Autoregressive (AR) polynomial (Figure 3) were then carried out. The results indicate that the model did not have any problem of serial correlation and was dynamically stable.

FIGURE 3. TEST FOR DYNAMIC STABILITY



Source: Computed from E-Views

The next step was to perform a MWALD test in order to test for Granger causality (Table 6). For the causality of main interest, the results revealed a unidirectional causality from GDP to exports at the 5 % critical value, but failed to find any causality from exports to GDP. Hence, the Granger-causality test provided no further supporting evidence for the ELG hypothesis in India.

TABLE 6: TYDL GRANGER CAUSALITY TEST RESULTS

Regressors	Dependent Variables					
	GDP	EX	IMP	K	RER	TOT
GDP	-	8.9473**	0.5076	1.8624	1.7436	3.5082
EX	3.0735	-	7.8341**	2.4269	0.1285	5.9229***
IMP	0.2073	0.835	-	0.8153	1.5865	6.0439**
K	0.1627	3.0221	0.9646	-	0.3182	8.8676**
RER	0.7319	0.6296	1.8541	0.8812	-	3.7926
TOT	7.0935**	5.5202***	6.196***	2.6312	0.2158	-

Notes: The results are found using a MWALD test with Chi-square distribution. . (***), (**) and (*) denotes 1%, 5% and 10% level of significance, respectively.

CONCLUSIONS

The purpose of this paper was to test the ELG hypothesis for India. Using time series data the study analyzed whether exports are a source of economic growth in the country. The results provide no evidence to support of the ELG hypothesis. The causality test results show evidence of a unidirectional causal relationship from GDP to exports but failed to provide any substantial evidence of a causal relationship from exports to GDP. In contrast, the study found evidence supporting the GLE hypothesis that is that economic growth causes an increase in export in the country. Some policy implications can be drawn directly from the empirical results. The finding that exports do not lead to economic growth is of main importance. This suggests that the government should undertake policies other than export enhancement to induce further economic growth in India. The study found a high positive significant relationship between gross capital formation and growth. Therefore, policies that lead to a boost in capital investment could enhance growth in the county. The Indian government can encourage investment by further privatization and by creating a stable economic environment, which is conducive to increased investment. There are two principal limitations in this study that should be acknowledged. The first is the small sample size. The second is related and concerns the selection of the lag length in the ARDL model. While the AIC, SBC and HQ criteria were used in the lag selection process, the sample size imposed a limit on the number of lags that could be used in practice. These limitations provide a further scope for research and in the future the use of a larger sample size in testing the ELG hypothesis may provide more definitive results.

ENDNOTE

* We are grateful to an anonymous referee whose comments helped in improve the quality of this paper.

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