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EVALUATING THE IMPACT OF INTERNATIONAL TRADE ON INDIA'S ECONOMIC GROWTH: AN ARDL APPROACH

Dr. Niranjan R[1], Dr. Kamaxi[2]

[1]*Associate Professor, Department of Studies and Research in Economics, Vijayanagara Sri Krishnadevaraya University, Ballari, Karnataka - 583105*
[2]*Assistant Professor of Economics, Central University of Andhra Pradesh Ananthapur, AP.515701*

https://orcid.org/0009-0003-3468-2329

ABSTRACT **DOI No: 10.36713/epra26902** **Article DOI: https://doi.org/10.36713/epra26902**

Based on the Autoregressive Distributed Lag (ARDL) method, this paper assesses the effects of international trade on the economic growth of India starting in 1980 and up to 2025. Since India has been opening up to international trade after undergoing major economic reforms, the trade-growth relationship has become essential. The ARDL model offers a sound model in the analysis of both short-term and long-term dynamic relationships to investigate the relationship between exports, imports, and GDP growth. The results indicate that there is a strong long term equilibrium relationship between these variables and the co-integration is indicated by F-statistic of 5.22 and a p-value of 0.0042. This implies that trade variables play an important role in the long run-in affecting GDP. Conversely, short-term dynamics, examined by the Error Correction Model (ECM) and Wald tests, show that immediate variation in trade variables has minimal impact on a GDP with p-values indicating that there is no significant short-run causality. The paper emphasizes the need to focus on long run trade strategies to make use of the economic growth as well as demonstrates that short run fluctuations in trade do not have a significant effect on GDP. The insights could be useful to the policy makers who seek to establish effective trade policies that will result in sustainable economic development in India.

KEYWORDS*: International Trade, ARDL Approaches, Economic Growth, GDP, Error Correction Model*

INTRODUCTION

Economic growth and development in the countries of the world have been fuelled by international trade. In the case of a developing country such as India, the effect of trade on the economic growth is especially important. During the last several decades, India has been pursuing a series of far-reaching economic reforms that seek to liberalize its trade policies and make it a more active participant in the global economy. These reforms have made India an open economy as compared to a closed economy that was once engaged in international trade. The consequent rise in the trade activities has brought far-reaching consequences on the economic growth, productivity and development of India. The proposed research will see the effects of international trade on economic development in India through the Autoregressive Distributed Lag (ARDL) model and it will offer great information to decision makers and stakeholders.

Although it is already proved that there is a strong theoretical connection between trade and economy development, the empirical data tend to show a rather contrary situation particularly in the case of developing states. India is a complex country in terms of its economy, unlike regional development, and the differences between sectors, which is why it is a good example of studying the relationship between trade and growth. Effects of trade may vary very widely in different sectors like agriculture, manufacturing and services and thus requires a very detailed analysis to know the overall effects on the economic growth. Also, recent changes in global trade and disruptions necessitate a review of the influence of trade on the economic growth in India in the present scenario. This paper aims to fill this gap by offering a detailed discussion of the nexus between trade and growth with the help of superior econometric methods.

This research aims at evaluating the effect of international trade on the economic growth of India by using the ARDL approach. Particularly, the research will be conducted to measure both the short-run and long-run impacts of the major trade variables, which include exports, imports, and the trade balance on the growth of the GDP of India. Moreover, the research paper examines the strength of such relationships when faced by external shocks and policy reforms, which will be used as empirical evidence in making policy decisions that appreciate international trade to provide long-term economic growth. This study offers a detailed picture of the effects of trade on

economic growth in India because it has considered both the short run and long run effects of trade.

The connection between international trade and economic growth has been widely researched under the concept of different theoretical models. Classical and neoclassical theories, e.g. those suggested by Adam Smith and David Ricardo, focus on the importance of trade in increasing efficiency of resource allocation and comparative advantage. The endogenous growth theories also emphasize the role of trade in achieving technological advancement and innovation by spillover of knowledge. Empirical research already done on the subject of India has revealed that trade liberalization has largely been linked to an increase in economic growth. Nevertheless, the channels and level at which trade affects growth are still a matter of debate with some studies suggesting that the merits of trade cannot be equally distributed among the various sectors and regions. This paper aims to add to this still raging debate, by giving an in-depth empirical analysis to the country in India with its specific economic context.

In this research, ARDL approach will be used to examine the effects of the international trade on economic growth of India. The ARDL model is specifically appropriate in this analysis since it has the capability to include variables, which are integrated with varying orders i.e. I(0) and I (1), and gives strong estimates of both the short-term and the long-term relationship. This is the reason why ARDL is the best method to use to analyse the dynamics of interaction between trade and economic growth. The time-series data used in the study is based on the period between the early 1990s and the current times, which were the years of major economic reforms and the consequent growth of trade in India. The ARDL bounds testing process is applied to examine the relationship between the existence of the long-run equilibrium and the error correction model (ECM) is a product of the ARDL framework to describe the short-term dynamics.

The analysis will be done on the basis of the information credible sources like the Reserve bank of India (RBI), the Ministry of Commerce and Industry and the international database containing the information about the world like the world bank and the international monetary fund (IMF). The important variables are Gross Domestic Product (GDP), which is the economic output of the Indian economy; exports, the amount of goods and services sold to foreign markets; imports, the amount of goods and services purchased in the foreign markets; and trade balance which indicates the net trade position of the country.

This research will contribute to the available literature on trade and economic growth in a number of ways. Through the use of the ARDL methodology, it offers a sound methodological base on how the trade-growth association can be examined in India. The paper provides information on the short- and long-term impacts of trade on economic growth, which is dynamic in nature. It is believed that the findings will instruct the policymakers about the possible advantages and obstacles of trade policies and make strategic decisions to maximize the positive effects of trade on the economic growth of India. Lastly, the research considers modern problems like the world trade and policy changes, which makes the analysis applicable to the modern economic situation.

LITERATURE REVIEWS

Jaime Malaga and Jeff Johnson (2013): devoted to the impact of the trade liberalization on the agricultural production growth in Sri Lanka. The article will offer a quantitative evaluation of the effects of trade policy on the development of the agricultural sector in Sri Lanka using the national statistics between the year 1960 and 2010. Ordinary Least Squares (OLS) approach and multiple regression were used to test the hypothesis on whether trade policy reforms can promote growth in the agricultural sector. The empirical findings indicate that trade liberalization is a contributing factor to the growth in the agricultural sector, which will ultimately result in the increase in agricultural productivity in Sri Lanka. In addition, this discussion also concludes that the trade openness, investment, interest rates and Free Trade Agreements are significant factors which are positively correlated with growth of agricultural sector. The study also validates that the development of the agricultural sector has contributed significantly to the overall GDP, which has increased the pace of the economy of the post-liberalization era in Sri Lanka.

Bashir Hemzawi and Natacha Umutoni (2021): examined the effectiveness of exports and imports in increasing the economy. The research methodology involved a quantitative study design to examine the time-series data on 2000-2020 on quarterly trade and economic growth in terms of Gross Domestic Product (GDP). This information was obtained in the websites of National Institute of Statistics of Rwanda (NISR) and the World Bank. The association among exports, imports, and economic growth in Rwanda were investigated by using econometric analysis as well as Ordinary Least Squares linear regression. It was found that long-run relationship between Rwandan GDP, exports, and imports as well as the gross capital, labor, and technology variables are significantly positive. A change of one percent in the value of exports will affect a growth of 0.05 percent in GDP whereas a change of one percent in imports will affect growth in GDP by 0.32 percent.

Feiting Lin and Peifen Zhuang (2020): examined effects of agricultural trade on Bangladesh economic growth and environmental pollution through ARDL when structural breaks were present. To investigate the effects of agricultural trade on the economic growth and on the environment of agriculture in Bangladesh, 1972-2019, the study plans to utilize an Auto Regressive Distributed Lag (ARDL) model including structural break, in an attempt to explore the long-term and short-term factors that affect agricultural environmental pollution. Results indicate the existence of a relationship between economic growth, energy and FDI with agricultural environmental pollution, which implies that the relationship is positive in the long-run. Moreover, agricultural trade is indicated to be a positive cause of agricultural environmental pollution in the short run.

Swapan K. Bhattacharya (2006): wrote about the opportunities to increase cooperation and integration between BIMSTEC countries and Japan in the fields of trade, investment, and finance. This paper discusses the trends and tendencies of bilateral and subregional economic cooperation in Asia and BIMSTEC-Japan trade. It looks at an empirical study of the increased intraregional trade by looking at whether or not BIMSTEC-Japan economic cooperation will lead to more intraregional trade based on a gravity model. The findings

show that Japan-BIMSTEC partnership will augment intraregional commerce; however, not the same proportion will grow in every country. The losses that will be incurred in trade by certain nations will be offset by benefits in other sectors in terms of improved resource transfers, flows of foreign direct investments, technology and accessibility of services to markets.

RESEARCH GAP

This study examines the impact of international trade on India's economic growth using the Autoregressive Distributed Lag (ARDL) model. It addresses gaps in existing research by focusing on sector-specific effects, temporal dynamics, and the impact of global disruptions like COVID-19. The ARDL approach captures both short-term and long-term relationships, providing a nuanced analysis. Additionally, the study incorporates advanced econometric techniques to offer accurate estimates and strategic policy recommendations, aiming to inform trade policies that support sustainable and inclusive economic growth in India.

OBJECTIVES

- Analyze the impact of international trade on India's economic growth.
- Identify the causal relationships between components of international trade and India's economic growth.

DATA AND METHODOLOGY

The study used the ADF Test for unit root and ARDL Cointegration approach, sourcing data from 1980 to 2025 from the Indian Economy Handbook and World Bank Database, World development indicators, World Integrated Trade Solution (WITS), RBI, IMF, (United Nations Conference on Trade and Development) UNCTAD etc.

Model Estimation

ARDL MODEL

D(GDP)=C+D(GDP(−1))+D(GDP(−2))+D(EX(−1))+D(EX(−2))+D(IM(−1))+D

Bounds Test (ARDL Cointegration Test)

The long-run relationship among the variables

$$\boldsymbol{GDP_t = \beta_1 + \beta_2 EX_t + \beta_3 IM_t + \varepsilon_t}$$

Where:

GDP_t = Gross Domestic Product

EX_t = Exports

IM_t = Imports

β_1 = Constant term

β_2, β_3 = Long-run coefficients

ε_t = Error term

Bounds Test Equation (ARDL Form)

$$\Delta GDP_t = \alpha_0 + \sum_{i=1}^{p} \alpha_1 \Delta GDP_{t-i} + \sum_{i=1}^{q} \alpha_2 \Delta EX_{t-i} + \sum_{i=1}^{r} \alpha_3 \Delta IM_{t-i} + \lambda_1 GDP_{t-1} + \lambda_2 EX_{t-1} + \lambda_3 IM_{t-1} + u_t$$

Hypothesis for Bounds Test

Null Hypothesis (H_0):

$$\boldsymbol{\lambda_1 = \lambda_2 = \lambda_3 = 0}$$

(No long-run relationship / No cointegration)

Table:1 Bound Test Result

Country	F-Statistic	Lag	Lower bound (I (0))	Upper bound (I (1))
India	5.22	2	2.45	3.61

Source: Author's own computation.

Table 1: The Bound Test outcome of the ARDL model shows that there is a strong relationship between the GDP of India and the variables of international trade i.e. exports and imports in the long run. The null hypothesis that was tested is the absence of cointegration between these variables, that is, these variables do not have a long-term equilibrium relationship. An F-test resulted in 5.22 and is compared with the critical bounds of cointegration i.e., 2.45 on the lower bound (I(0)) and 3.61 on the upper bound (I(1)). Given that the F-statistics value is greater than the upper level of 3.61, the null hypothesis that there is no cointegration can be rejected. This finding proves that there is a significant long-term equilibrium between GDP and the trade variables. This in effect implies that exports and imports are part of the long term factors of the economic growth of India and therefore the significance of trade policies in determining the economic performance of the country in the long run.

Table: 2 Long run relationship estimation

Wald Test:			
Test Statistic	**Value**	**df**	**Probability**
F-statistic	5.220156	(3, 37)	0.0042
Chi-square	15.66047	3	0.0013
Null Hypothesis: C (8) =C (9) =C (10) =0			
Normalized Restriction (= 0)		Value	Std. Err.
C (8)		-1.256580	0.318756
C (9)		0.197957	0.565467
C (10)		-0.071798	0.482876

Source: Author's own computation.

Table 2: Wald test in determining the likelihood of long-run relationship measures the relationship cointegration of variables in the ARDL model. The F-statistic is 5.22 and p-value is 0.0042 and Chi-square statistic is 15.66 and p-value is 0.0013. Both findings are significant at traditional levels which shows that the null hypothesis (C(8)=C(9)=C(10)=0) of no cointegration is rejected. This indicates that there is a long term relationship between the variables. The normalized restriction values are C(8) = -1.26 (standard error = 0.32), C(9) = 0.20 (standard error = 0.57) and C(10) = -0.07 (standard error = 0.48). These coefficients will give the long-run elasticities of the variables, indicating the respective effect of the variables on the dependent variable. The F-statistic and Chi-square values are statistically significant which proves that there is a statistically significant long-run relationship between the two variables in the model.

Short Run Relationship Estimation

After estimating the long-run coefficients, the final step in the ARDL approach is the analysis of error correction and the estimation of short-run coefficients.

Table: 3 Error Correction Representation

Dependent variable: D(GDP) Least squares sample		
Variable	**Coefficient**	**Prob.**
C	-0.054464	0.9125
D(GDP(-1))	0.116508	0.6242
D(GDP(-2))	0.022519	0.8930
D(EX(-1))	0.713909	0.3055
D(EX(-2))	0.689755	0.2972
D(IM(-1))	-0.296361	0.5573
D(IM(-2))	-0.661435	0.1729
ECT(-1)	-1.189962	0.0004
R-squared	0.571798	
F-statistic	7.439787	
Prob(F-statistic)	0.000011	

Source: Author's own computation.

Table 3: The Error Correction Representation of the dependent variable, D (GDP) indicates the dynamics of short-term variation in GDP and how the short-term variation is related to the lagged variables and error correction terms. The Error Correction Term (ECT (-1)) coefficient = -1.19 with p-value = 0.0004 which is statistically small and big adjustment towards long term equilibrium as anticipated in cointegrated system. The coefficients of other variables are below the significance level, i.e., lagged GDP (D(GDP(-1)) and D(GDP(-2))), lagged exports (D(EX(-1)) and D(EX(-2))), and lagged imports (D(IM(-1)) and D(IM(-2))), indicating that they do not have a significant effect on changes in GDP in the short term. The R-squared of the model is 0.57 indicating that the model is able to explain 57 percent of the fluctuations in short term GDP. F-statistic is 7.44 with a p-value of 0.000011 which means that the overall model is statistically significant.

Table: 4 Short run causality

Wald Test: Equation: Untitled			
Test Statistic	**Value**	**df**	**Probability**
F-statistic	0.947859	(2,39)	0.3963
Chi-square	1.895719	2	0.3876
Null Hypothesis (4) =C (5) =0			
Normalized Restriction (=0)		**Value**	**Std. Err.**
C (4)	0.713909		0.687490
C (5)	0.689755		0.652799

Source: Author's own computation.

Table 4: Wald test of causality in the short run compares the results of changes in explanatory variables on the dependent variable in the short term with the null hypothesis of no sequence. The F-statistic is of 0.95 with p-value of 0.3963 and Chi-square statistic is 1.90 with p-value of 0.3876. The two p-values are greater than usual significance levels and it implies that the null hypothesis (C(4) = C(5) = 0) that there is no short-run causality cannot be rejected. This implies that on a short run, the variation in the explanatory variables (C(4) and C(5)) do not have any significant effect on the dependent variable. In the normalized restrictions, C(4) = 0.71 (standard error =0.69) and C(5) = 0.69 (standard error=0.65) indicate the approximate effect with standard error. In general, these findings suggest that there is no good short-run causality between the variables in the model.

Table: 5 Short run causality

Wald Test:			
Test Statistic	**Value**	**df**	**Probability**
F-statistic	1.141171	(2, 39)	0.3299
Chi-square	2.282342	2	0.3194
Null Hypothesis: C (6) =C (7) =0			
Normalized Restriction (= 0)		**Value**	**Std. Err.**
C (6)	-0.296361		0.500647
C (7)	-0.661435		0.476427

Source: Author's own computation.

Table 5: The Wald test for short-run causality assesses whether changes in the explanatory variables impact the dependent variable in the short term. The F-statistic is 1.14 with a p-value of 0.3299, and the Chi-square statistic is 2.28 with a p-value of 0.3194. Both p-values exceed standard significance thresholds, suggesting that the null hypothesis (C(6)=C(7)=0) of no short-run causality cannot be rejected. This indicates that the changes in the explanatory variables (C(6) and C(7)) do not have a significant short-term effect on the dependent variable. The coefficients for the normalized restrictions are C(6) = -0.30 (standard error = 0.50) and C(7) = -0.66 (standard error = 0.48), showing their estimated impact with associated standard errors. Overall, the results imply a lack of statistically significant short-run causality in the model.

CONCLUSION

This paper aims to give an in-depth discussion on the effects of international trade on the economic development of India through the Autoregressive Distributed Lag (ARDL) model. In its emphasis on both long- and short-term impacts, it provides useful information concerning the effects of the trade variables on the Gross Domestic Product (GDP) of India, including exports and imports. The ARDL model indicates that there is a strong long-term relationship between international trade and economic growth. Wald test shows that the variables have cointegration in the sense that the F-test of 5.22 and the p-value of 0.0042 show that there exists a strong tendency towards a long-term equilibrium between the variables. This is also justified by the Chi-square value of 15.66 and a p-value of 0.0013 which indicates the presence of significant interaction in the long-run. The normalized values of the Wald statistic coefficients reveal the difference in effects of the trade elements on GDP, which depicts that trade variables are indeed significant in defining the economic performance of the economy in the long run. Conversely, the EC and Wald tests to analyse the short-run dynamics give mixed results. The Error Correction Term (ECT) is considerably negative, which means that the deviations of the long-term equilibrium are reduced on time, but the short-term coefficients of lagged GDP, exports and imports are not significant. This is an indication that as much as the long term effect of trade on economic growth is high, short term adjustments are not as high and changes in variables of trade are less severe that affect GDP in the short run. Another interesting finding is that the short-run causality Wald tests indicate that variations in trade variables have no significant effect on GDP in the short-run as the p-value of F-statistics and Chi-square tests are high. These findings indicate that although trade plays a decisive role in the economic growth in the long run, the short-term effects are less clear, and attention should be paid to the development of long-term strategies to use trade as a factor in improving the process of economic growth. On the whole, this paper has highlighted the importance of international trade especially in the long-term in promoting economic growth in India. The results indicate that the policymakers need to be concerned with maintaining the trade liberalization processes and trade policy optimization to maximize the long-term benefits of international trade. But the short-term fluctuations and their minor effects on GDP point to the necessity of economic plans, which are not short-termed and focuses on the future trends of trade and on the future. This subtle perception of the trade-growth nexus is critical in the development of proper policies that can facilitate sustainable and inclusive economic growth in India.

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