Int. j. adv. multidisc. res. stud. 2026; 6(2):861-874

Received: 10-02-2026
Accepted: 20-03-2026

International Journal of Advanced Multidisciplinary Research and Studies

ISSN: 2583-049X

Modelling the Export-Growth Nexus in India an Autoregressive Distributed Lag Approach

[1] A Prasanna, [2] Dr. A Prasanna, [3] M Mohamed Asif

[1] Department of Mathematics, Jamal Mohamed College (Autonomous), Tirchy-20, India
[2] Assistant Professor of Mathematics, Jamal Mohamed College (Autonomous), Tirchy-20, India
[3] Assistant Professor of Economics, Jamal Mohamed College (Autonomous), Tirchy-20, India

Corresponding Author: **A Prasanna**

Abstract

This study re-examines the relationship between exports and economic growth in India by separating short-run dynamics from long-run equilibrium relationships. Set against India's shift from an inward-looking, state-led model to a liberalised and globally integrated economy, the analysis emphasises how trade structure and import dependence shape growth. Using quarterly data from 2005Q3–2025Q2 and the ARDL bounds testing approach, the study tests whether exports act as a sustained engine of growth. Results confirm stable long-run relationships among GDP, exports, and imports. However, exports do not show a positive long-run effect on growth; their association with GDP turns negative when imports are included. Imports, in contrast, have a positive and significant long-run impact, highlighting the role of imported capital goods, intermediate inputs, and energy in supporting productivity and capacity. In the short run, both exports and imports positively influence output, indicating that trade supports cyclical growth even if long-run drivers differ. Overall, India's growth appears more import-supported and domestically driven than export-led.

Keywords: Export-Growth Nexus, ARDL, Imports, Trade Liberalisation, Short-Run Dynamics, Long-Run Relationship, Economic Growth

1. Introduction

India has emerged as one of the fastest-growing large economies in the contemporary global economic landscape. Recent projections indicate that this growth momentum is likely to persist over the medium term. The World Bank (2024) [19] projects that India will grow at an average rate of approximately 6.7 per cent during the financial years 2026 and 2027, significantly exceeding the projected global growth rate of 2.7 per cent. Real GDP growth is also estimated at around 6.4 per cent for the financial year 2025. According to the Global Economic Prospects report, this performance reflects a combination of structural and cyclical factors, including the expansion of the services sector, gradual recovery in manufacturing activity, sustained public investment, large-scale infrastructure creation, and reforms in taxation, regulation, and governance.

While these recent growth outcomes position India favourably among major economies, they represent only the latest phase of a long and uneven process of economic transformation. India's current growth profile cannot be understood without reference to the historical conditions under which the economy evolved and the policy choices that shaped its development trajectory over time. At the time of independence in 1947, India inherited an economy that was predominantly agrarian, structurally weak, and deeply shaped by the legacy of colonial rule. National income and per capita income levels were low, industrial capacity was limited, and large sections of the population faced widespread poverty, unemployment, illiteracy, and poor health outcomes.

Agriculture absorbed nearly 85 per cent of the workforce, yet productivity remained low due to subsistence-oriented farming practices, outdated technology, inadequate irrigation, and weak institutional support. Industrial activity was narrow in scope, with modern manufacturing sectors—such as automobiles, chemicals, and capital goods—largely absent. The colonial economy had prioritised the extraction of raw materials and the import of finished goods, leaving behind limited domestic industrial capabilities. Investment in physical infrastructure, education, technical skills, and healthcare was minimal, constraining both productive capacity and human capital formation.

1.1 Post-Independence Development Strategy and Growth Experience (1950–1990)

In the decades following independence, India faced the challenge of transforming an economy that was structurally underdeveloped, externally dependent, and socially fragmented. The central objective of economic policy during this period was not merely to raise output, but to restructure the economy in a manner that would reduce vulnerability to external shocks, expand domestic productive capacity, and promote long-term self-sustaining growth. Against this backdrop, India adopted a strategy of planned economic development, with the state assuming a central role in guiding investment, allocating resources, and shaping the direction of structural change.

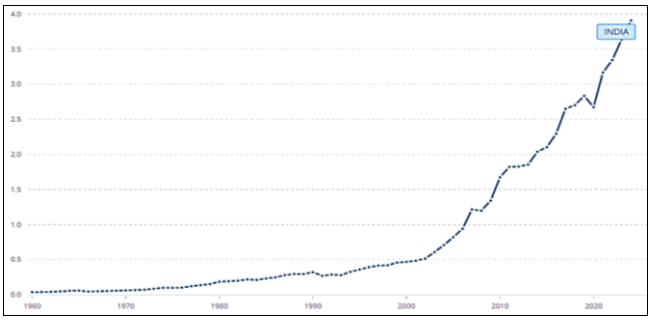
Formal economic planning began with the First Five-Year Plan in 1951, although the intellectual foundations of planning had been laid earlier through a range of proposals developed during the late colonial and immediate post-colonial period. Initiatives such as the National Planning Committee (1938), the Bombay Plan (1944), the Gandhian Plan (1944), the People's Plan (1945), and the Sarvodaya Plan (1950) reflected diverse ideological perspectives, yet converged on a shared concern with economic growth, industrialisation, and social development. These early debates shaped India's post-independence policy framework by emphasising the need for state intervention to overcome market failures, mobilise scarce resources, and address widespread poverty and inequality.

The development strategy pursued between 1950 and 1990 was characterised by a predominantly inward-looking orientation. Import substitution industrialisation formed the core of this approach, with the objective of reducing dependence on foreign goods by promoting domestic production. The policy framework relied on industrial licensing, quantitative restrictions on imports, high tariff barriers, and extensive regulation of private investment. The public sector played a leading role in establishing heavy industries, infrastructure, and basic capital goods production, while the private sector operated within a tightly controlled regulatory environment.

Over this period, India achieved a measure of macroeconomic stability and gradual structural transformation. Average annual GDP growth remained close to 3.5 per cent between 1950 and 1990, a pace that came to be characterised as modest but steady. Population growth of around 2 per cent per annum, however, significantly diluted the impact of output expansion on living standards, limiting per capita income growth to approximately 1 per cent per year. While this growth performance was sufficient to prevent large-scale economic collapse, it fell short of the rapid industrialisation and income convergence observed in several other developing economies during the same period.

Despite relatively modest growth outcomes, the post-independence development strategy contributed to important structural changes. Domestic savings as a share of Net National Product increased gradually, reflecting improvements in income levels, institutional development, and financial intermediation. Tax revenues also improved, strengthening the fiscal capacity of the state and enabling greater public investment. The expansion of public sector enterprises laid the foundation for industrial capabilities in sectors such as steel, power, heavy machinery, and transport, which were viewed as essential for long-term development but unattractive to private investors due to high capital requirements and long gestation periods.

Gross Domestic Product (GDP, Current US$) — India



Source: Country official statistics; National Statistical Organizations and/or Central Banks; OECD National Accounts; World Bank (WB) staff estimates

Figure 1, which presents India's Gross Domestic Product measured in current US dollars, captures the gradual expansion of economic scale during this period. However, the figure also underscores the limitations of relying solely on aggregate output measures to assess growth performance. The observed increase in GDP reflects both real expansion and nominal effects, and does not, by itself, shed light on the underlying drivers of growth or the contribution of external trade to economic expansion.

The 1980s marked a partial departure from the earlier growth experience. During this decade, GDP growth accelerated to around 5.5 per cent per annum, suggesting a degree of dynamism absent in previous decades. This acceleration was supported by increased public expenditure, moderate liberalisation measures, and improvements in agricultural performance. At the same time, growth during the 1980s was accompanied by growing macroeconomic imbalances. Fiscal deficits widened, balance of payments pressures intensified, and reliance on external borrowing increased. These vulnerabilities exposed the limits of the existing development strategy and underscored the need for structural reform.

Importantly, the growth experience of the pre-1991 period highlights the complex relationship between state intervention, trade policy, and economic performance. While inward-looking policies helped build domestic industrial capacity and reduce dependence on certain imports, they also constrained export competitiveness by limiting access to technology, imported inputs, and international markets. The emphasis on self-reliance, combined with regulatory rigidities, restricted firms' ability to achieve economies of scale and adapt to changing global demand conditions.

Taken together, the post-independence growth experience up to 1990 reveals a development path characterised by gradual progress, structural transformation, and persistent constraints. While the state-led strategy succeeded in establishing a basic industrial and institutional foundation, it also generated inefficiencies and external imbalances that ultimately necessitated a shift in policy orientation. These historical conditions provide an essential context for understanding India's subsequent transition toward trade liberalisation and greater integration with the global economy, and they frame the broader debate on the role of exports in supporting economic growth.

1.2 Trade Performance and Export Structure before Economic Reforms

India's trade performance in the decades preceding the economic reforms of the early 1990s was shaped by the broader inward-looking development strategy adopted after independence. Foreign trade was not viewed as a primary engine of growth, but rather as a complementary activity to domestic industrialisation. The central objective of trade policy during this period was to conserve foreign exchange, reduce external dependence, and support import substitution by protecting domestic industries from international competition.

Between 1950 and 1991, the volume and value of India's foreign trade expanded gradually. However, this expansion was uneven and structurally constrained. Imports grew consistently faster than exports, resulting in persistent trade deficits throughout much of the period. While the absolute value of exports increased over time, India's share in world trade remained modest, reflecting limited export competitiveness and a narrow export base. Trade outcomes during this phase were therefore characterised not by dynamic integration into global markets, but by cautious and regulated engagement.

The structure of trade policy played a central role in shaping these outcomes. India relied heavily on quantitative restrictions, high tariff barriers, and licensing requirements to regulate imports. These controls were intended to protect domestic producers, manage balance of payments pressures, and prioritise the allocation of scarce foreign exchange toward essential imports such as capital goods, intermediate inputs, and energy. While this approach helped support domestic industrial development in certain sectors, it also imposed significant constraints on export performance.

Export composition during the pre-reform period was dominated by primary and low value-added products. Agricultural commodities such as tea, rice, spices, cotton, and jute accounted for a substantial share of exports, along with traditional manufactured goods such as textiles and leather products. These exports were typically characterised by low income elasticity of demand, limited scope for technological upgrading, and vulnerability to price fluctuations in international markets. As a result, export earnings were often volatile and insufficient to offset the growth of imports.

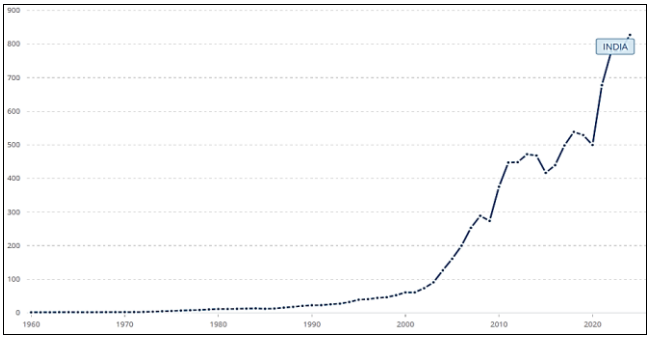
Industrial exports began to emerge gradually in the later decades of this period, particularly during the 1980s. Engineering goods, basic chemicals, and pharmaceuticals started to appear in India's export basket, reflecting some progress in industrial capability and diversification. However, these developments remained limited in scale and scope. Export growth in industrial products was constrained by restricted access to advanced technology, limited economies of scale, and inadequate integration with global production networks.

The industrial licensing system further weakened export competitiveness. Firms faced strict controls on capacity expansion, product diversification, and investment decisions, which reduced incentives to innovate and respond to international market signals. Import controls restricted access to high-quality intermediate inputs and capital equipment, raising production costs and limiting productivity growth. As a result, many domestic firms remained oriented toward protected domestic markets rather than competing internationally.

Trade relations during this period were also shaped by geopolitical and institutional factors. A significant share of India's trade was conducted through bilateral arrangements, particularly with the Soviet Union and Eastern European economies. These arrangements often involved non-convertible currencies and administered prices, which insulated trade from global market conditions but also limited exposure to competitive pressures. Engagement with other regions, including Africa, Latin America, and parts of East Asia, remained relatively limited.

Despite these constraints, the pre-reform trade regime did contribute to certain developmental objectives. By regulating imports and promoting domestic production, India was able to reduce dependence on selected manufactured goods and establish basic industrial capabilities. However, these gains came at the cost of limited export dynamism and weak integration into the global economy. Export growth was not sufficiently strong or diversified to serve as a sustained source of foreign exchange or as a catalyst for broader productivity gains.

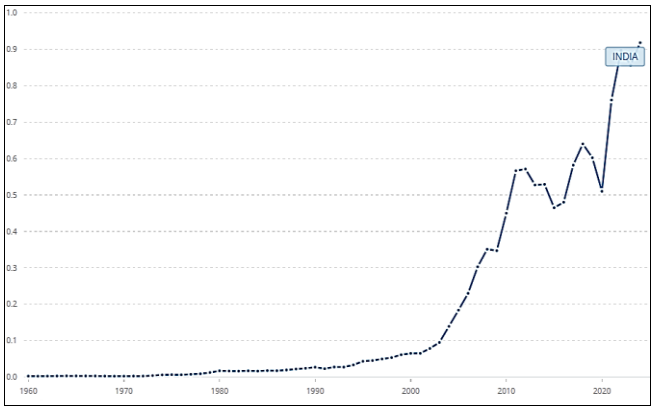
Exports of Goods and Services (Current US$) — India



Source: Country official statistics; National Statistical Organizations and/or Central Banks; OECD National Accounts; World Bank (WB) staff estimates

The figure depicts the value of India's exports of goods and services measured in current US dollars. The data are compiled from country official statistics, national statistical organizations and/or central banks, national accounts data files of the Organisation for Economic Co-operation and Development (OECD), and staff estimates of the World Bank (WB).

Imports of Goods and Services (Current US$) — India



Source: Country official statistics; National Statistical Organizations and/or Central Banks; OECD National Accounts; World Bank (WB) staff estimates

Figures depicting the evolution of exports and imports of goods and services in current US dollars illustrate this pattern clearly. While both exports and imports exhibit an upward trend over time, the persistent gap between them highlights the structural imbalance in India's trade account. The expansion of trade volumes did not translate into a decisive improvement in export competitiveness or a narrowing of external imbalances.

By the late 1980s, the limitations of the prevailing trade policy framework had become increasingly apparent. Persistent trade deficits, rising external debt, and vulnerability to external shocks exposed the fragility of the inward-looking model. These pressures culminated in a balance of payments crisis in the early 1990s, which ultimately necessitated a fundamental reorientation of trade and industrial policy.

The trade performance and export structure of the pre-reform period therefore provide a critical context for understanding India's subsequent shift toward liberalisation and outward orientation. They also frame the central question addressed in this study: whether increased openness and export expansion in the post-reform period translated into a stable and sustained contribution to economic growth, or whether the role of exports remained limited relative to other growth drivers.

1.3 Liberalisation, Export Expansion, and Growth Volatility

The economic reforms initiated in the early 1990s marked a decisive turning point in India's development strategy. Triggered by a severe balance of payments crisis, these reforms represented a departure from the inward-looking, state-led framework that had guided economic policy for over four decades. Trade liberalisation, deregulation, and a gradual opening of the economy to foreign capital altered the structure of incentives faced by firms and reshaped India's engagement with global markets.

Trade policy reforms formed a central component of this transition. Quantitative restrictions on imports were progressively dismantled, tariff rates were reduced, and the exchange rate regime was reformed to improve external competitiveness. These measures aimed to integrate domestic producers with international markets, enhance efficiency through competition, and facilitate access to imported inputs and technology. The reform process was gradual rather than abrupt, reflecting concerns about adjustment costs and macroeconomic stability, but it nevertheless transformed the trade environment in which Indian firms operated.

In the years following liberalisation, India experienced a noticeable improvement in growth performance. During the 1990s, GDP growth averaged around 6 per cent per annum, representing a clear acceleration relative to the pre-reform period. Growth momentum strengthened further in the early 2000s, with GDP growth exceeding 8 per cent during the period 2003–08. This phase was characterised by rising investment, expansion in services, and increased integration with global trade and financial markets.

Export performance improved alongside this growth acceleration. The removal of trade barriers and increased openness created new opportunities for firms to access external markets. India's exports of goods and services expanded rapidly, both in absolute terms and relative to GDP. The composition of exports also changed significantly. While traditional exports such as textiles and agricultural commodities continued to play a role, there was a marked increase in exports of engineering goods, pharmaceuticals, chemicals, and information technology services. This diversification reflected improvements in industrial capability, skill formation, and integration into global value chains.

At the same time, the liberalisation process altered the structure of imports. Greater openness facilitated access to capital goods, intermediate inputs, and energy resources, supporting industrial expansion and productivity growth. Imports became increasingly important for sustaining domestic production, particularly in manufacturing and infrastructure-intensive sectors. This shift highlights the growing role of import-intensive production processes in India's post-reform growth trajectory.

The table below depicts the ten largest partner countries importing India's total merchandise exports in 2024, measured as their percentage share in India's aggregate exports. The figure is based on ITC calculations using data from the Directorate General of Commercial Intelligence and Statistics (DGCI&S).

Major Destination Markets for India's Total Exports Share, 2024	
United States of America	18.3
United Arab Emirates	8.5
Netherlands	5.6
Singapore	3.6
China	3.4
United Kingdom	3.2
Saudi Arabia	2.8
Bangladesh	2.6
Germany	2.4
Italy	1.9
South Africa	1.9

Source: ITC calculations based on Directorate General of Commercial Intelligence and Statistics (DGCI&S)

Despite these positive developments, post-reform growth has not been uniform or uninterrupted. The period since liberalisation has been marked by episodes of volatility arising from both external and domestic factors. Global economic shocks—such as the Asian financial crisis, the global financial crisis of 2008–09, and disruptions associated with the COVID-19 pandemic—have periodically slowed growth and exposed vulnerabilities in trade-dependent sectors. Fluctuations in global demand, commodity prices, and financial conditions have had pronounced effects on export performance and overall economic activity.

The table below presents the ten largest partner countries supplying India's total merchandise imports in 2024, measured as their percentage share in India's aggregate imports. The figure is based on ITC calculations using data from the Directorate General of Commercial Intelligence and Statistics (DGCI&S).

Share of the Top Ten Partner Countries in India's Total Imports Share, 2024	
China	15.5
Russian Federation	9.1
United Arab Emirates	8.6
United States of America	6.1
Saudi Arabia	4.2
Iraq	4.2
Indonesia	3.4
Switzerland	3.1
Korea, Republic of	3
Singapore	2.9

Source: ITC calculations based on Directorate General of Commercial Intelligence and Statistics (DGCI&S)

Domestic factors have also contributed to growth volatility. Structural constraints, including infrastructure bottlenecks, regulatory rigidities, and stress in the banking sector due to rising non-performing assets, have periodically dampened investment and growth. Policy uncertainty and adjustment costs associated with structural reforms have further influenced growth outcomes. As a result, while the post-reform period is characterised by higher average growth, it is also marked by greater exposure to cyclical fluctuations.

The interaction between export expansion and growth volatility raises important questions regarding the role of external demand in sustaining long-term growth. While exports expanded rapidly during high-growth phases, periods of global slowdown revealed the limits of relying on external markets as a stable growth engine. At the same time, the increasing importance of imports suggests that growth dynamics may be closely tied to domestic demand and import-supported production rather than export expansion alone.

Growth outcomes, however, have varied across periods. Slowdowns occurred in response to global financial disturbances, domestic policy constraints, rising non-performing assets in the banking sector, and the COVID-19 pandemic. These fluctuations bring renewed attention to the role of exports in supporting sustained economic growth.

India's movement from a relatively closed economy to a more open and globally integrated one has brought the export–growth relationship into sharper focus. Exports are frequently viewed as a potential driver of economic growth, yet empirical evidence for India remains inconclusive. Existing studies point to export-led growth, growth-led exports, bidirectional causality, or the absence of a stable relationship.

Taken together, the post-liberalisation experience underscores the complexity of the relationship between trade openness, export performance, and economic growth. Liberalisation has been associated with higher growth and greater export diversification, yet it has also increased exposure to global volatility and reinforced the importance of imports in sustaining production. These dynamics suggest that the contribution of exports to growth may vary across periods and depend on broader structural conditions.

This historical context motivates a careful empirical examination of the export–growth relationship for India that explicitly distinguishes between short-run dynamics and long-run equilibrium relationships, and that accounts for the role of imports alongside exports. Understanding these interactions is essential for assessing whether export expansion has served as a sustained driver of growth or whether its role has been more limited and contingent on broader domestic and external conditions.

India's transition from a relatively closed, state-led economy to a more open and globally integrated one has fundamentally altered the context in which economic growth unfolds. Trade liberalisation and export expansion have become central elements of the post-reform growth narrative, and exports are frequently viewed as a potential engine of sustained economic expansion. This view is particularly prominent in policy discussions, where export growth is often associated with higher productivity, technological upgrading, employment generation, and improved balance of payments performance.

However, the historical experience outlined in the preceding sections suggests that the relationship between exports and economic growth in India is neither straightforward nor uniform over time. While export performance improved markedly following liberalisation, growth outcomes have been shaped by a broader set of structural and macroeconomic factors, including domestic demand conditions, public investment, services sector expansion, and the increasing role of import-intensive production processes. Periods of rapid export growth have coincided with strong economic performance, yet episodes of global slowdown and domestic stress have revealed vulnerabilities associated with external dependence.

Against this backdrop, the role of exports in India's growth process warrants careful and systematic examination. A central motivation for this study arises from the persistent ambiguity surrounding the export–growth nexus in the Indian context. Despite decades of empirical research, there remains no clear consensus on whether exports have acted as a sustained driver of economic growth, whether growth has instead stimulated export expansion, or whether the relationship is characterised by mutual interaction or weak long-run association. This lack of agreement reflects differences in time periods studied, methodological approaches employed, variable definitions adopted, and the extent to which complementary factors—such as imports—are explicitly incorporated into the analysis.

An additional motivation stems from the evolving structure of India's trade. Post-reform growth has been accompanied by significant changes in both export composition and import dependence. The diversification of exports toward engineering goods, pharmaceuticals, and services suggests potential channels through which exports could influence growth. At the same time, the growing importance of imported capital goods, intermediate inputs, and energy resources highlights the role of imports in sustaining domestic production and investment. Ignoring this dual structure risks overstating the contribution of exports or mischaracterising the mechanisms through which trade interacts with economic growth.

This study is therefore motivated by the need to reassess the export–growth relationship for India in a manner that is both historically grounded and methodologically disciplined. Rather than presuming exports to be an autonomous engine of growth, the analysis seeks to examine how exports and economic growth are related over time, and whether this relationship differs between the short run and the long run. Particular emphasis is placed on distinguishing transitional dynamics from equilibrium relationships, given the volatility observed in India's growth experience and the susceptibility of trade flows to external shocks.

The scope of the study is deliberately focused. It concentrates on the macroeconomic relationship between economic growth, exports, and imports for India over a defined time period, without extending into sectoral or regional disaggregation. This aggregate approach allows for a clear examination of long-term relationships while avoiding the additional complexity introduced by industry-specific or firm-level heterogeneity. At the same time, by incorporating imports alongside exports, the study recognises the structural interdependence between external trade and domestic production.

Importantly, this study does not seek to advance normative claims regarding trade policy or to prescribe specific export promotion strategies. Instead, its objective is to provide an empirically grounded assessment of the nature of the export–growth nexus in India, informed by the country's historical experience and structural characteristics. By clarifying whether exports have played a sustained growth-supporting role, or whether their influence has been episodic and contingent on broader domestic conditions, the study aims to contribute to a more nuanced understanding of India's growth process.

The remainder of the paper is organised as follows. Section 2 reviews the theoretical and empirical literature on the export–growth relationship, with particular attention to evidence from India and other developing economies. Section 3 describes the data and outlines the econometric methodology employed in the analysis. Section 4 presents the empirical results, distinguishing between short-run dynamics and long-run relationships. Section 5 discusses the findings in light of India's structural and historical context, and Section 6 concludes with a summary of key insights and their broader implications.

2. Literature Review

Theoretical Background: Export-Led Growth versus Growth-Led Exports

The relationship between exports and economic growth has long occupied a central position in development economics, particularly in the context of developing economies seeking sustained growth and structural transformation. Two broad and competing explanations dominate this debate: the Export-Led Growth (ELG) hypothesis and the Growth-Led Exports (GLE) hypothesis. These perspectives differ fundamentally in how they conceptualise the direction of influence between external trade and domestic economic performance.

The export-led growth hypothesis posits that expansion in exports acts as a catalyst for overall economic growth. From this perspective, exports are not merely a component of aggregate demand but serve as a mechanism through which economies improve efficiency and productivity. Export expansion is argued to enhance resource allocation by directing production toward sectors in which a country has a comparative advantage. Access to larger international markets allows firms to exploit economies of scale, improve capacity utilisation, and reduce average production costs. In addition, engagement with foreign markets exposes domestic producers to international competition, which may induce technological upgrading, innovation, and improvements in managerial practices. Export earnings also generate foreign exchange, easing balance-of-payments constraints and enabling the import of capital goods and intermediate inputs essential for growth.

In contrast, the growth-led exports hypothesis reverses the direction of causality. This view holds that economic growth precedes and stimulates export expansion rather than being driven by it. Rising output, income, and productivity enhance a country's productive capacity and competitiveness, enabling firms to penetrate external markets more effectively. Improvements in infrastructure, human capital, and technological capability—often associated with broader economic development—strengthen export performance as a consequence of growth rather than its cause. In this framework, exports respond endogenously to domestic growth dynamics, and treating them as an independent engine of growth may overstate their role.

The coexistence of these two perspectives reflects the complexity of the export–growth relationship. In practice, exports and economic growth may reinforce each other, leading to bidirectional interactions rather than a clear unidirectional causal link. Moreover, the strength and direction of this relationship are likely to vary across countries, stages of development, and policy regimes. Structural characteristics such as production composition, trade openness, institutional quality, and reliance on imported inputs further condition how exports interact with growth.

2.1 International Empirical Evidence on the Export–Growth Nexus

A substantial body of empirical literature has examined the relationship between exports and economic growth across countries using both cross-country and time-series frameworks. Early empirical studies were largely motivated by the export-led growth hypothesis, particularly in the context of developing economies seeking external demand as a means of overcoming domestic market constraints.

Ekanayake (1999) [6] provides one of the widely cited early cross-country time-series examinations of the export–growth relationship in Asian developing economies. Employing cointegration and causality analysis, the study reports strong long-run support for the export-led growth hypothesis in several countries, including India, Indonesia, Korea, Pakistan, the Philippines, Sri Lanka, and Thailand. Importantly, the findings indicate bidirectional causality between exports and economic growth for many of these economies, suggesting that exports and growth may reinforce each other over time rather than exhibiting a purely unidirectional relationship. At the same time, the absence of export-led growth in Malaysia highlights the heterogeneity of outcomes even among relatively similar developing economies. The study also notes that short-run causal effects are generally weak, pointing to the importance of long-run dynamics in understanding the export–growth relationship.

Marin (1992) [13] adopts a broader comparative perspective by examining both industrialised and developing economies. Rather than focusing narrowly on exports and GDP alone, the study emphasises productivity performance and trade orientation. The results suggest that outward-oriented trade regimes tend to be associated with better productivity outcomes, and that exports, productivity, and terms of trade often move together over the long run. However, the evidence does not uniformly support the export-led growth hypothesis across all countries. This finding underscores an important theme in the literature: favourable export

performance may coincide with growth without necessarily acting as its primary causal driver.

More recent studies have explored the export–growth relationship in resource-rich and region-specific contexts. Kalaitzi and Chamberlain (2017, 2020) [10, 11], focusing on Gulf Cooperation Council (GCC) countries and the United Arab Emirates, employ VAR, Johansen cointegration, and Dynamic Ordinary Least Squares (DOLS) techniques to examine both short-run and long-run relationships. Their findings reveal evidence of export-led growth in the short run for certain countries, while long-run relationships are often weak or statistically insignificant. This pattern is particularly pronounced in economies with a high dependence on fuel exports, where export revenues are driven by price fluctuations rather than volume expansion or productivity gains. These results highlight the importance of export composition and structural characteristics in shaping the export–growth nexus.

Evidence from other regions further illustrates the lack of consensus. Dumitriu *et al*. (2011) [4], analysing Romania using cointegration techniques, report a long-run relationship with unidirectional causality running from exports to GDP, lending support to the export-led growth hypothesis. Abou-Stait (2005) [1], in a study of Egypt, finds a positive association between exports and economic growth in the post-reform period, suggesting that trade liberalisation may strengthen the growth impact of exports. In contrast, Baig (2009) [2], examining Pakistan, reports limited support for export-led growth and emphasises the dominant role of domestic market development in driving economic performance.

Taken together, international empirical evidence suggests that the export–growth relationship is highly context-dependent. While some countries exhibit patterns consistent with export-led growth, others display growth-led exports, bidirectional causality, or weak long-run relationships. Differences in economic structure, export composition, policy regimes, and stages of development appear to play a crucial role in shaping outcomes.

2.2 India-Specific Empirical Evidence

The empirical literature on India presents an especially diverse set of findings regarding the relationship between exports and economic growth. Early studies largely focused on identifying long-run relationships and causal directions using cointegration and Granger causality frameworks.

Pandey (2006) [15] finds evidence of cointegration between exports and GDP and reports a positive causal relationship using the Engle–Granger approach and error correction models. The results lend support to the export-led growth hypothesis, suggesting that export expansion has contributed to India's economic growth. Similarly, Singh (2004) [17] identifies a positive association between exports and industrial production and reports bidirectional causality, indicating mutual reinforcement between exports and growth.

However, subsequent studies raise important doubts about the dominance of export-led growth in India. Mishra (2011) [14], employing Johansen cointegration and Vector Error Correction Models (VECM), finds that exports and real GDP are cointegrated but reports causality running from GDP to exports rather than the reverse. This finding supports the growth-led exports hypothesis and suggests that export expansion may be a consequence of domestic economic growth. Sharma and Panagiotidis (2003) [16], using VAR models and impulse response analysis, similarly observe that export shocks do not generate significant responses in economic growth, further questioning the ELG hypothesis in the Indian context.

Other studies emphasise the distinction between short-run and long-run dynamics. Kumari and Malhotra (2014) [12] find no evidence of a long-run equilibrium relationship between exports and GDP per capita, although short-run Granger causality provides limited support for export-led growth. Venkatraja (2015) [18] reports short-run unidirectional causality from exports to GDP but cautions against interpreting this as evidence of sustained export-led growth. Ganesh Kumar (2015) [7] identifies bidirectional causality, highlighting the coexistence of both ELG and GLE mechanisms.

More recent contributions extend the analysis by incorporating additional macroeconomic variables and employing alternative econometric techniques. Durairaj (2014) [5] and Datta and Lahiri (2018) [3], using the ARDL bounds testing approach, find evidence of long-run relationships among exports, foreign direct investment, and economic growth in India. While exports play a role in growth dynamics, the short-run causal patterns differ across studies, reflecting sensitivity to model specification and sample period. Guntukula (2018) [8] also reports bidirectional causality between exports and economic growth, suggesting that neither ELG nor GLE alone adequately characterises India's experience. In contrast, Javed and Farhat (2022) [9] reject the export-led growth hypothesis and find stronger support for growth-led exports using Johansen cointegration and VAR techniques.

The existing literature indicates that the relationship between exports and economic growth is neither uniform nor straightforward. Empirical evidence supports export-led growth in some contexts, growth-led exports in others, while several studies report bidirectional interactions or statistically insignificant relationships. These divergent findings suggest that the export–growth nexus is sensitive to country-specific structural characteristics, sample periods, and econometric methodologies. In the Indian context, this lack of clear consensus is particularly pronounced, reflecting the economy's evolving trade structure, varying growth regimes, and exposure to both domestic and external shocks. This ambiguity underscores the need for further empirical analysis using econometric approaches capable of distinguishing between short-run adjustments and long-run equilibrium relationships. Many earlier studies focus on one dimension of the relationship while overlooking the other, or rely on methodologies that impose restrictive assumptions on the time-series properties of the data.

Against this background, the present study examines the relationship between exports and economic growth in India by explicitly accounting for both short-run dynamics and long-run relationships within a unified empirical framework. To this end, the analysis employs the Autoregressive Distributed Lag (ARDL) approach, which allows for variables with mixed orders of integration and provides a coherent error-correction representation of the export–growth relationship. By adopting this framework, the study seeks to clarify how exports and economic growth have interacted over time in the Indian economy, without imposing a priori assumptions regarding the direction of causality.

3. Data and Methodology

3.1 Data Description and Sources

This study employs quarterly time-series data for India covering the period from the first quarter of 2005 to the second quarter of 2025. The choice of this period is motivated by both data availability and economic relevance. The post-2005 period captures a phase of deeper global integration of the Indian economy, encompassing sustained growth, episodes of global and domestic shocks, and structural changes in trade and production patterns. Using quarterly data allows for a finer examination of short-run dynamics while retaining sufficient observations to analyse long-run relationships.

All data used in the analysis are sourced from the CEIC Database, compiled primarily from the World Bank and official national sources. To ensure consistency and economic interpretability, all variables are expressed in real terms and measured in constant Indian rupees. This avoids distortions arising from inflation and nominal price movements, which are particularly relevant when analysing long-run relationships.

The variables employed in the analysis are defined as follows:

Variable	Definition	Frequency	Source
Real GDP (GDP)	Real Gross Domestic Product at constant prices (INR)	Quarterly	CEIC / World Bank
Exports (X)	Real exports of goods and services at constant prices (INR)	Quarterly	CEIC / World Bank
Imports (M)	Real imports of goods and services at constant prices (INR)	Quarterly	CEIC / World Bank

All variables are transformed into their natural logarithms prior to estimation. Logarithmic transformation helps stabilise variance, reduce heteroskedasticity, and allows estimated coefficients to be interpreted as elasticities in the long run.

3.2 Model Framework and Specification

The empirical analysis is structured around two related models designed to examine the export–growth relationship in India. The first is a baseline model focusing on exports and economic growth, while the second augments this framework by explicitly incorporating imports. This sequential approach is adopted to assess whether the role of exports remains robust once import dependence is taken into account.

3.2.1 Baseline Export–Growth Model

The baseline model examines the long-run relationship between real GDP and real exports. In its long-run form, the relationship can be expressed as:

$$\ln GDP_t = \alpha_0 + \alpha_1 \ln X_t + \varepsilon_t$$

Where $\ln GDP_t$ denotes real output and $\ln X_t$ represents real exports. A positive long-run coefficient on exports would be consistent with the export-led growth hypothesis, although such an interpretation is treated cautiously given the potential for reverse causality and omitted variable bias.

3.2.2 Augmented Export–Import–Growth Model

To account for the role of imports in the growth process, the baseline specification is extended to include real imports:

$$\ln GDP_t = \beta_0 + \beta_1 \ln X_t + \beta_2 \ln M_t + u_t$$

Including imports is particularly important in the Indian context, where growth and export performance are closely linked to the availability of imported capital goods, intermediate inputs, and energy. The coefficient on imports is theoretically ambiguous: imports may support growth by facilitating production and technological upgrading, or they may exert a negative effect if they crowd out domestic output. This ambiguity is resolved empirically rather than imposed a priori.

3.3 Econometric Methodology: ARDL Framework

To examine both short-run dynamics and long-run relationships, the study employs the Autoregressive Distributed Lag (ARDL) modelling approach. The ARDL framework is particularly well suited for the present analysis for several reasons. First, it allows the inclusion of variables that are integrated of order zero, I(0), or order one, I(1), without requiring them to be integrated of the same order. Second, it performs well in samples of moderate size, which is relevant given the quarterly frequency of the data. Third, it enables the simultaneous estimation of short-run dynamics and long-run equilibrium relationships within a single, coherent framework.

Although formal unit root tests are conducted to ensure that none of the variables is integrated of order two, the ARDL approach does not require pre-testing for unit roots as a strict prerequisite. What is essential is that the variables are not I(2), as this would invalidate the bounds testing procedure.

The presence of a long-run relationship among the variables is tested using the ARDL bounds testing approach to cointegration. This involves estimating an unrestricted error-correction model and testing the joint significance of the lagged level variables using an F-test. The computed F-statistic is then compared with the critical bounds provided by Pesaran *et al*. If the statistic exceeds the upper bound, the null hypothesis of no long-run relationship is rejected.

Once cointegration is established, the ARDL model is reparameterised into an error-correction form. For the baseline model, the error-correction representation can be written as:

$$\Delta \ln GDP_t = \sum_{i=1}^{p} \phi_i \Delta \ln GDP_{t-i} + \sum_{j=0}^{q} \theta_j \Delta \ln X_{t-j} + \lambda ECT_{t-1} + \varepsilon_t$$

Where the error-correction term (ECT) captures deviations from the long-run equilibrium. The coefficient λ measures the speed at which short-run disequilibria are corrected. A negative and statistically significant coefficient indicates convergence toward the long-run equilibrium.

An analogous specification is estimated for the augmented model that includes imports. In both cases, short-run coefficients reflect immediate and lagged adjustment effects, while long-run coefficients capture equilibrium relationships.

Lag lengths in the ARDL models are selected using standard information criteria to balance model fit and parsimony. After estimation, a range of diagnostic tests is conducted to assess model adequacy. These include tests for serial correlation, functional form misspecification, and parameter stability. Stability of the estimated coefficients is further

examined using cumulative sum (CUSUM) and cumulative sum of squares (CUSUMSQ) tests.

The analysis carefully distinguishes between short-run dynamics and long-run relationships. Short-run coefficients are interpreted as adjustment effects rather than long-term elasticities, while long-run coefficients are discussed only when cointegration is confirmed.

3.4 Mathematical Formulation and Contribution to the Methodology

My contribution to this study lies in the mathematical formulation of the econometric methodology. In empirical economic analysis, once the relevant variables are identified, an essential step is to represent the economic relationships in mathematical form. As a student of mathematics, I focused on expressing these relationships using clear linear equations and difference-equation structures so that the model remains logically consistent and mathematically transparent.

The analysis begins by treating each economic variable as a time-dependent quantity. Let real output, exports, and imports be denoted by Y_t, X_t, and M_t, respectively, where the subscript $t = 1,2,3,\cdots$ represents discrete time periods. Mathematically, each variable is viewed as a sequence of real numbers indexed by time.

Step 1: Linear Representation of Economic Relationships

The simplest representation of the relationship between output and exports is written as a linear equation:

$$Y_t = \alpha + \beta X_t$$

Where α is a constant term and β measures the linear effect of exports on output. This equation represents a basic linear function and serves as the starting point of the empirical model.

To account for the role of imports, the model is extended to a multiple linear form:

$$Y_t = \alpha + \beta X_t + \gamma M_t$$

In this equation, output depends simultaneously on exports and imports. Each coefficient represents a separate linear contribution, holding the other variable constant. This formulation follows standard principles of multivariable linear functions.

Step 2: Dynamic Structure Using Lagged Terms

Economic relationships adjust over time rather than instantaneously. To capture this mathematically, lagged values of the variables are introduced. This leads to a linear difference equation:

$$Y_t = \alpha + \beta_1 Y_{t-1} + \beta_2 Y_{t-2} + \gamma_1 X_{t-1} + \delta_1 M_{t-1}$$

This equation represents a finite-order linear recurrence relation, where current output depends on past output and past trade variables. Each lag term captures delayed adjustment effects over time.

Step 3: First Differences and Short-Run Changes

To analyse changes rather than levels, first differences are defined. The change in output is written as:

$$\Delta Y_t = Y_t - Y_{t-1}$$

This transformation allows the model to focus on short-run movements in output while separating them from long-run relationships.

Step 4: Long-Run Equilibrium Relationship

The long-run relationship among the variables is treated as an equilibrium condition. In equilibrium, output is expressed as a linear combination of exports and imports:

$$Y = \theta_1 X + \theta_2 M$$

This equation represents the steady-state solution of the system, where variables move together in fixed proportions over time.

Step 5: Error-Correction and Adjustment Mechanism

Deviations from long-run equilibrium are measured by the equilibrium error:

$$E_{t-1} = Y_{t-1} - \theta_1 X_{t-1} - \theta_2 M_{t-1}$$

The adjustment toward equilibrium is modelled using a simple linear correction rule:

$$\Delta Y_t = \lambda E_{t-1}$$

Here, λ is the adjustment coefficient. If $\lambda < 0$, the system converges back toward equilibrium over time. The magnitude of λ determines the speed of convergence, reflecting basic stability properties of linear difference equations.

Step 6: Short-Run Dynamic Adjustments

Short-run dynamics are further captured by including lagged differences:

$$\Delta Y_t = a + b\Delta Y_{t-1} + c\Delta X_t + d\Delta M_t$$

These terms represent temporary fluctuations around the equilibrium path and do not affect the long-run solution of the system.

From a mathematical perspective, the complete model can be understood as a linear dynamic system composed of:

1. A steady-state equilibrium relationship,
2. A convergence mechanism governed by a linear adjustment coefficient, and
3. Short-run dynamics described by difference equations.

My contribution lies in systematically translating economic concepts into linear equations and difference-equation structures. By applying elementary mathematical ideas such as linear functions, sequences, equilibrium conditions, and convergence the econometric methodology is given a clear and logically coherent mathematical foundation. While no new mathematical theory is introduced, this formulation demonstrates how basic mathematics plays a central role in structuring and interpreting applied econometric models.

4. Empirical Results

4.1 Baseline ARDL Results: GDP and Exports

This subsection reports the empirical findings from the

baseline ARDL model examining the relationship between real GDP and real exports in India. The analysis proceeds in three stages: testing for cointegration, interpreting long-run coefficients, and analysing short-run dynamics through the error-correction mechanism.

4.1.1 ARDL Bounds Test for Cointegration

Prior to interpreting long-run coefficients, the existence of a stable long-run relationship between real GDP and exports is examined using the ARDL bounds testing approach. The computed F-statistic is **3.896**, which exceeds the upper bound critical value at the 5 per cent significance level (**I(1) = 3.51**). This result leads to the rejection of the null hypothesis of no levels relationship.

Accordingly, the findings indicate the presence of a long-run equilibrium relationship between exports and economic growth in India over the sample period. This validates the use of an error-correction representation and permits interpretation of both long-run and short-run coefficients.

Table 1: ARDL Estimation Results — Model 1 (Baseline GDP–Exports Model)

Panel A: Short-Run Dynamics		
Variable	**Coefficient**	**p-value**
ΔlnGDP	1.49	0.00***
ΔlnGDP(−1)	0.24	0.24
ΔlnGDP(−2)	0.7	0.00***
ECM(−1)	−0.14	0.00***
Panel B: Long-Run Coefficient Estimates		
Variable	**Coefficient**	**p-value**
lnEXP	−0.14	0.01***
Constant	0.02	0.89
Panel C: Cointegration and Diagnostic Tests		
Diagnostic Test	**Value**	**p-value**
ARDL Bounds F-Statistic	3.9	—
ECM(−1)	−0.14	0.00***
LM Test (Serial Correlation)	0.5	0.61
Ramsey RESET Test	2.16	0.15
CUSUM	Stable	—
CUSUMSQ	Stable	—
Adjusted R^2	0.52	—
Notes:		
Critical upper bound I(1) = 3.51 (k = 1).		
*** denotes significance at the 1% level.		

4.1.2 Long-Run Relationship between Exports and Economic Growth

The estimated long-run coefficients reveal a **negative and statistically significant relationship** between exports and real GDP. Specifically, the coefficient on real exports is **–0.14**, significant at the 1 per cent level. This indicates that, holding other factors constant within the bivariate framework, increases in exports are associated with a decline in real GDP in the long run.

This finding does **not** support the export-led growth hypothesis for India over the period under study. Instead, it suggests that export expansion has not functioned as a long-run engine of economic growth. The constant term is statistically insignificant, indicating that long-run output dynamics are largely explained by the included variables rather than a deterministic trend.

It is important to emphasise that this result does not imply that exports are harmful in a mechanical sense. Rather, it indicates that export growth, when examined in isolation from other structural factors, does not exhibit a positive long-run association with economic growth. This outcome is consistent with strands of the literature that find growth-led exports or weak long-run export effects, particularly in economies where growth is driven by domestic demand or import-intensive production structures.

4.1.3 Short-Run Dynamics and Error-Correction Mechanism

Short-run dynamics are examined through the error-correction representation of the ARDL model. The estimated error correction term is **–0.14** and statistically significant at the 1 per cent level. This confirms the presence of a stable adjustment mechanism toward long-run equilibrium following short-run disturbances.

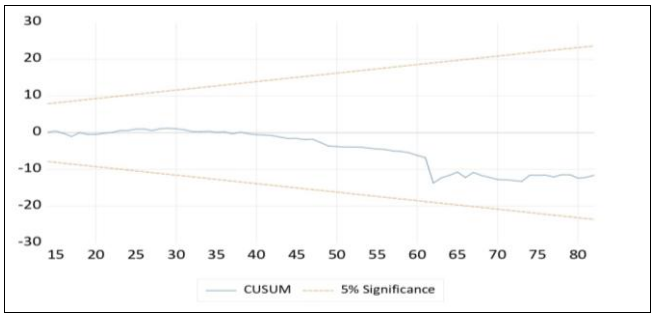
The magnitude of the coefficient implies that approximately **14 per cent of the deviation from long-run equilibrium is corrected within one quarter**, indicating a relatively slow but stable adjustment process. This gradual convergence suggests that shocks to GDP and exports have persistent effects before the system returns to equilibrium.

Short-run coefficients reveal strong inertia in output dynamics. The contemporaneous change in GDP and its second lag are both positive and statistically significant, indicating that short-run growth is largely driven by internal momentum rather than export movements. The first lag of GDP growth is statistically insignificant, suggesting that adjustment effects are not uniform across lags.

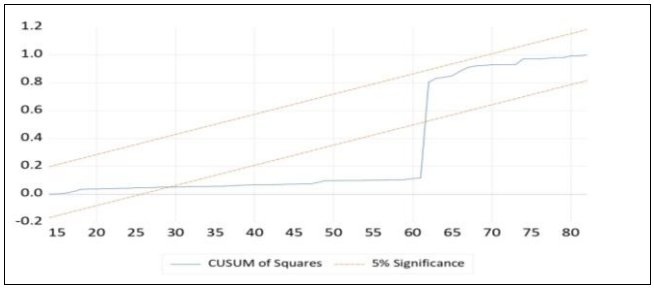
Notably, exports do not exhibit a statistically significant short-run effect on GDP in this specification. This reinforces the view that export activity does not play a dominant role in driving short-term growth fluctuations within the baseline model.

4.1.4 Diagnostic Tests and Model Adequacy

Standard diagnostic tests indicate that the estimated ARDL model is statistically well specified. The Lagrange Multiplier (LM) test fails to reject the null hypothesis of no serial correlation, confirming that residuals are not auto correlated. The Ramsey RESET test also indicates no evidence of functional form misspecification.



This graph represents a CUSUM test at 5 percent of Significance.



This graph represents a CUSUM of Squares test at 5 percent of Significance.

Taken together, these diagnostics suggest that the estimated results are not driven by econometric artefacts such as serial correlation or incorrect functional form. Consequently, the observed negative long-run relationship between exports and GDP reflects an underlying economic association rather than a technical failure of the model.

Table 2: ARDL Estimation Results — Model 2 (Augmented GDP–Exports–Imports Model)

Panel A: Short-Run Dynamics		
Variable	**Coefficient**	**p-value**
ΔlnGDP	−0.34	0.00***
ΔlnGDP(−1)	−0.38	0.00***
ΔlnGDP(−2)	−0.20	0.00***
ΔlnEXP	0.09	0.01***
ΔlnIMP	0.22	0.00***
ECM(−1)	−0.12	0.00***
Panel B: Long-Run Coefficient Estimates		
Variable	**Coefficient**	**p-value**
lnEXP	−0.11	0.01***
lnIMP	0.14	0.00***
Constant	0.26	0.00***
Panel C: Cointegration and Diagnostic Tests		
Diagnostic Test	**Value**	**p-value**
ARDL Bounds F-Statistic	13.23	—
ECM(−1)	−0.12	0.00***
LM Test (Serial Correlation)	0.67	0.52
Ramsey RESET Test	0.04	0.84
CUSUM	Stable	—
CUSUMSQ	Stable	—
Adjusted R^2	—	—
Notes:		
Critical upper bound I(1) = 5.00 (k = 2).		
*** denotes significance at the 1% level.		

4.2 Augmented ARDL Results: GDP, Exports, and Imports

This subsection reports the results from the augmented ARDL model that incorporates imports alongside exports in explaining India's economic growth. The inclusion of imports allows the analysis to move beyond a purely bivariate export–growth framework and examine whether the role of exports remains robust once trade-related production dependence is taken into account.

4.2.1 Cointegration Results

The ARDL bounds test strongly confirms the existence of a long-run relationship among real GDP, exports, and imports. The computed F-statistic is **13.23**, which substantially exceeds the upper bound critical value at the 1 per cent significance level (**I (1) = 5.00** for k = 2). This provides unambiguous evidence against the null hypothesis of no levels relationship.

The presence of cointegration validates the estimation of long-run coefficients and supports the use of an error-correction representation to analyse short-run dynamics.

4.2.2 Long-Run Relationships

The estimated long-run coefficients reveal a clear and economically meaningful pattern. Real exports are associated with a **negative and statistically significant** effect on real GDP, with a coefficient of **–0.11**. In contrast, real imports exhibit a **positive and statistically significant** relationship with economic growth, with a coefficient of **0.14**.

These results indicate that, once imports are explicitly accounted for, export expansion does not act as a long-run driver of economic growth in India over the sample period. Instead, long-run growth appears to be supported by imports, consistent with an import-intensive production structure. Imports—particularly of capital goods, intermediate inputs, and energy—may facilitate domestic production, investment, and productivity improvements, thereby supporting sustained growth.

The negative long-run coefficient on exports should not be interpreted as evidence that exports are inherently detrimental to growth. Rather, it suggests that export expansion, when examined independently of the import content embedded in production and trade, does not generate a positive long-run growth effect. This finding highlights the importance of considering the structure of trade and the role of imported inputs when assessing the growth impact of exports.

4.2.3 Short-Run Dynamics and Adjustment Process

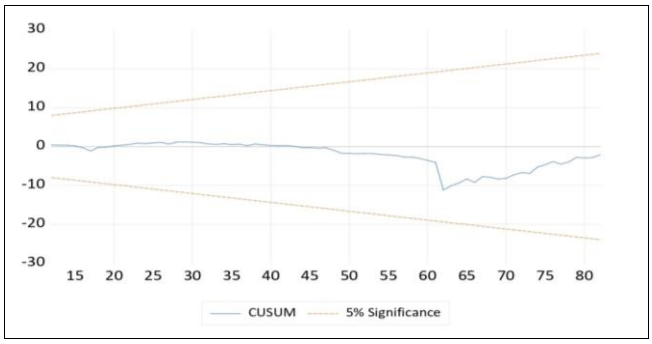
Short-run dynamics are examined through the error-correction representation of the augmented ARDL model. The error correction term is **–0.12** and statistically significant at the 1 per cent level, confirming stable convergence toward the long-run equilibrium. The magnitude of this coefficient implies that approximately **12 per cent of short-run disequilibrium is corrected within one quarter**, indicating gradual but steady adjustment following shocks.

Short-run coefficients reveal several important features. First, lagged changes in GDP are negative and statistically significant, indicating mean-reverting behaviour in short-run growth dynamics. Second, both exports and imports exert **positive and statistically significant** effects on GDP in the short run. A rise in exports is associated with an immediate increase in output, while imports also contribute positively to short-run growth.

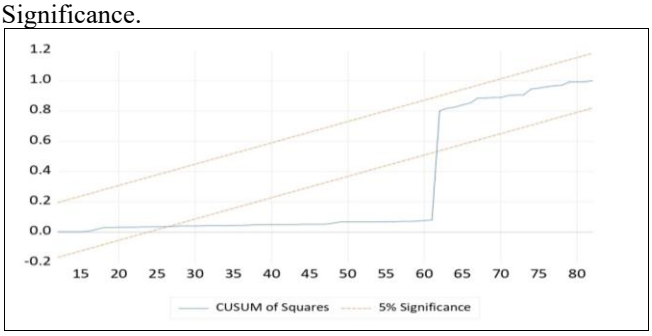
This contrast between short-run and long-run effects is notable. While exports stimulate growth in the short run, their long-run association with GDP is negative once imports are controlled for. Imports, on the other hand, support growth in both the short run and the long run. This pattern suggests that export activity may generate temporary demand or utilisation effects, whereas sustained growth depends more critically on access to imported inputs and production capacity.

4.2.4 Diagnostic Tests and Model Stability

The augmented ARDL model performs well on standard diagnostic tests. The LM test indicates no evidence of serial correlation in the residuals, and the Ramsey RESET test fails to reject the null hypothesis of correct functional form. Stability tests based on CUSUM and CUSUMSQ statistics confirm that the estimated parameters remain stable over the sample period.



This graph represents a CUSUM test at 5 percent of Significance.



This graph represents a CUSUM of Squares test at 5 percent of Significance.

These diagnostic results suggest that the estimated relationships are not driven by model misspecification or instability, lending credibility to the empirical findings.

5. Discussion

The empirical results of the augmented ARDL model provide a nuanced view of the relationship between exports, imports, and economic growth in India over the period 2005Q3–2025Q2. The findings underscore the importance of distinguishing between short-run dynamics and long-run equilibrium relationships, a distinction that has often been blurred in earlier empirical studies on the export–growth nexus.

Short-Run Dynamics: Trade as a Cyclical Support Mechanism

The short-run estimates indicate that both exports and imports exert a positive and statistically significant effect on real GDP growth. Specifically, increases in exports are associated with short-term expansions in output, consistent with the view that export demand can provide temporary stimulus to domestic production through higher capacity utilisation, improved cash flows, and linkage effects across sectors. This short-run export effect aligns with earlier findings that report transitory support for the export-led growth hypothesis in India (Venkatraja, 2015; Kumari & Malhotra, 2014) [18, 12].

Imports also display a positive short-run impact on GDP, suggesting that import-intensive production processes play an important role in sustaining short-term growth. This result is consistent with the structure of the Indian economy, where intermediate inputs, capital goods, energy products, and technology imports are integral to industrial output and services-sector expansion. Similar short-run import effects have been reported in multivariate trade–growth studies for India and other developing economies (Durairaj, 2014; Datta & Lahiri, 2018) [5, 3].

The error correction term is negative and highly significant, indicating that deviations from long-run equilibrium are corrected at a rate of approximately 12 per cent per quarter. This relatively moderate speed of adjustment suggests that while the economy responds to short-run shocks, the process of reversion to long-run equilibrium is gradual, reflecting structural rigidities and adjustment costs inherent in a large and diversified economy such as India.

Long-Run Relationship: Absence of Export-Led Growth

In contrast to the short-run results, the long-run coefficients present a markedly different picture. Exports exhibit a negative and statistically significant long-run association with real GDP, while imports show a positive and significant long-run relationship with economic growth. These findings do not support the export-led growth hypothesis for India in the long run.

The negative long-run export coefficient suggests that sustained export expansion has not translated into proportional long-term growth gains. This result resonates with several India-specific studies that have rejected the ELG hypothesis and instead found evidence in favour of growth-led exports or weak export–growth linkages (Sharma & Panagiotidis, 2003; Mishra, 2011; Javed & Farhat, 2022) [16, 14, 9]. One plausible explanation lies in the composition of India's exports, where a significant share consists of low- to medium-value-added products and services that may generate limited productivity spillovers over time. Additionally, export growth driven by cost competitiveness rather than technological upgrading may fail to deliver durable growth effects.

The positive long-run coefficient on imports highlights the structural role of import dependence in India's growth process. Imports of capital goods, intermediate inputs, and energy appear to support productivity, capacity expansion, and technological diffusion over the long run. This finding is consistent with studies emphasising the growth-enhancing role of imports in developing economies, particularly where domestic production relies heavily on imported technology and inputs (Ganesh Kumar, 2015; Guntukula, 2018) [7, 8]. Similar patterns have been documented in other developing-country contexts, including Nigeria and selected GCC economies, where growth is found to be import-supported rather than export-driven (Afolabi *et al*., 2017; Kalaitzi & Chamberlain, 2017 [10]).

Taken together, the results suggest a trade–growth relationship characterised by short-run export responsiveness but long-run structural dependence on imports. In the short run, exports act as a stabilising and demand-supporting mechanism, particularly during phases of global expansion. However, over the long run, growth appears to be driven more by domestic demand and import-enabled production than by sustained export expansion.

This pattern helps reconcile the mixed empirical evidence reported in the literature. Studies relying on short sample periods or focusing on short-run dynamics are more likely to find support for export-led growth, while those emphasising long-run relationships often arrive at more sceptical conclusions (Kumari & Malhotra, 2014 [12]; Sharma & Panagiotidis, 2005). By explicitly separating these two dimensions within an ARDL framework, the present study

clarifies that the export–growth relationship in India is time-horizon dependent.

The strong cointegration results and stable diagnostics lend credibility to the estimated long-run relationships. Importantly, the use of the ARDL bounds testing approach allows for mixed integration orders and avoids the restrictive assumptions associated with Johansen cointegration and VAR-based frameworks used in much of the earlier literature (Pandey, 2006; Singh, 2004) [15, 17]. This methodological advantage is particularly relevant given the structural breaks, policy regime shifts, and external shocks that characterise India's post-reform growth trajectory.

The findings align more closely with the growth-led exports and import-supported growth narratives than with the traditional export-led growth hypothesis. This does not imply that exports are irrelevant for India's growth, but rather that their role is conditional, indirect, and largely short-run in nature. The results reinforce arguments that trade policy alone cannot serve as a substitute for broader structural reforms aimed at enhancing productivity, technological capability, and domestic value addition (Jung & Marshall, 1985; Pack, 1988).

6. Conclusion and Summary

This study set out to re-examine the relationship between exports and economic growth in India by explicitly distinguishing between short-run dynamics and long-run equilibrium relationships. Using quarterly data spanning the period from 2005Q3 to 2025Q2 and employing the Autoregressive Distributed Lag (ARDL) framework, the analysis sought to clarify the nature of the export–growth nexus in an economy that has become increasingly integrated into global trade while remaining structurally dependent on domestic demand and imported inputs.

The empirical results provide a clear and internally consistent set of findings. First, the ARDL bounds testing procedure confirms the existence of stable long-run relationships between economic growth and trade variables in both the baseline and augmented specifications. This establishes that exports, imports, and GDP are linked over time and that short-run deviations from equilibrium are systematically corrected.

Second, the baseline GDP–exports model reveals that exports do not exert a positive long-run influence on economic growth. Instead, the long-run coefficient on exports is negative and statistically significant, while short-run export effects are weak or absent. This result does not support the export-led growth hypothesis for India over the period under study and suggests that export expansion, when considered in isolation, has not functioned as a sustained engine of long-term growth.

Third, the augmented model incorporating imports provides a more informative representation of India's growth process. While exports continue to exhibit a negative long-run association with GDP, imports display a positive and statistically significant long-run effect on economic growth. At the same time, both exports and imports contribute positively to short-run growth dynamics. This combination of results points to a growth process in which trade plays an important but asymmetric role: exports provide short-term support to output, whereas imports—particularly of capital goods, intermediate inputs, and energy—support long-run growth by enhancing productive capacity and efficiency.

The presence of a negative and statistically significant error-correction term across specifications indicates stable adjustment toward long-run equilibrium, although the speed of adjustment is gradual. This suggests that structural changes in trade patterns or growth drivers take time to translate into long-run outcomes, reflecting the size and complexity of the Indian economy.

Taken together, the findings help reconcile the mixed evidence reported in the existing literature. Studies that focus on short-run dynamics or earlier periods are more likely to find support for export-led growth, while analyses that emphasise long-run relationships in the post-reform period tend to report weaker or absent export effects. By explicitly separating short-run and long-run mechanisms within a unified ARDL framework, this study shows that the export–growth relationship in India is neither uniform nor monotonic across time horizons.

Importantly, the results do not imply that exports are irrelevant to India's development process. Rather, they suggest that export expansion alone is insufficient to generate sustained long-run growth in the absence of complementary domestic factors and import-enabled production structures. India's growth experience during the period under study appears to be shaped more by domestic demand and import-supported capacity building than by export-led expansion.

The contribution of this study lies in providing a disciplined re-assessment of the export–growth nexus for India using high-frequency data and an econometric framework capable of capturing both short-run adjustments and long-run equilibria. By avoiding a priori assumptions about causality and by explicitly incorporating imports into the analysis, the paper offers a more nuanced understanding of how trade interacts with economic growth in the contemporary Indian context.

While the analysis is deliberately focused on aggregate relationships, future research could extend this framework by examining sectoral export composition, the role of services exports, or the interaction between trade, investment, and productivity at a more disaggregated level. Such extensions would further enrich understanding of the channels through which trade influences growth, without presuming exports to be an automatic engine of development.

7. References

1. Abou-Stait F. Are exports the engine of economic growth? An application of cointegration and causality analysis for Egypt, 1977-2003 (Economic Research Working Paper No. 76). African Development Bank, 2005.
2. Baig MA. Investigating the export and economic growth nexus: A time series analysis. Pakistan Business Review. 2009; 11(2):318-339.
3. Datta K, Lahiri A. FDI inflow, export and economic growth relationship in India: An ARDL-bound cointegration approach. Economic Affairs. 2018; 63(2):533-545. Doi: https://doi.org/10.30954/0424-2513.2.2018.33
4. Dumitriu R, Stefanescu R, Nistor C. Exports as an engine for the economic growth: The case of Romania. Annals of the University of Galati: Economics and Applied Informatics. 2011; 17(2):45-52.

5. Durairaj K. Foreign direct investment, export and economic growth in India: An application of ARDL model. International Journal of Economics and Business Research. 2014; 8(2):168-185.
6. Ekanayake EM. Export and economic growth in Asian developing countries: Cointegration and error-correction models. Journal of Economic Development. 1999; 24(2):43-56.
7. Ganesh Kumar. Export-led growth hypothesis: Further econometric evidence from India. Economic Affairs. 2015; 60(2):279-288. Doi: https://doi.org/10.5958/0976-4666.2015.00029.7
8. Guntukula R. Exports, imports and economic growth in India: Evidence from cointegration and causality analysis. Theoretical and Applied Economics. 2018; 25(2):221-230.
9. Javed M, Farhat S. Export-led growth (ELG) hypothesis: Evidences from India. FOCUS WTO. 2022; 24(2):1-10.
10. Kalaitzi AS, Chamberlain TW. The validity of the export-led growth hypothesis: Some evidence from the GCC. International Trade Journal. 2017; 31(1):1-29.
11. Kalaitzi AS, Chamberlain TW. Merchandise exports and economic growth: Multivariate time series analysis for the United Arab Emirates. Journal of Applied Economics. 2020; 23(1):163-182. Doi: https://doi.org/10.1080/15140326.2020.1722384
12. Kumari D, Malhotra N. Export-led growth in India: Cointegration and causality analysis. International Journal of Research in Commerce, Economics & Management. 2014; 4(6):12-18.
13. Marin D. Is the export-led growth hypothesis valid for industrialized countries? Review of Economics and Statistics. 1992; 74(4):678-688.
14. Mishra PK. The dynamics of relationship between exports and economic growth in India. International Journal of Economic Sciences and Applied Research. 2011; 4(2):53-70.
15. Pandey AK. Export and economic growth in India: Causal interpretation. Journal of Indian Economic Review. 2006; 41(1):1-15.
16. Sharma A, Panagiotidis T. An analysis of exports, growth and causality in India: Some empirical evidence (1971-2001). Review of Development Economics. 2003; 7(3):456-468.
17. Singh G. Causality between export and economic growth: A case study of India. Indian Journal of Economics. 2004; 85(336):63-74.
18. Venkatraja B. Testing the export-led growth hypothesis for India: An econometric analysis. International Affairs and Global Strategy. 2015; 37:1-10.
19. World Bank. Global economic prospects. World Bank, 2024.