Asymmetric Trade Outcomes of Economic Liberalization in India: An Empirical Study of India's Foreign Trade

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Abstract

This study examines the impact of India's 1991 liberalization on foreign trade using data up to 2025. Using annual data from 1961 to 2025 (or latest available estimates) and employing paired *t*-tests and correlation analysis, we compare the pre-1991 and post-1991 periods to assess changes in exports and imports. The results show statistically significant increases in both exports and imports in the liberalization era; however, imports have grown more sharply, resulting in persistent trade deficits. Recent estimates (FY 2024-25) point to exports of ~ USD 820.93 billion and imports of ~ USD 915.19 billion, yielding a trade deficit of ~ USD 94 billion. The asymmetry suggests that while liberalization opened export opportunities, it also accentuated India's dependence on imports of intermediate goods, capital equipment, energy, and technology. The study's findings are consistent with recent empirical literature on trade liberalization and productivity linkages in India. Policy implications emphasize the need for export capacity building, strategic trade policy, and deeper integration in global value chains.

Keywords

Exports, Foreign trade, Imports, Liberalization, Paired t-test

JEL Code: F13, F14, F15, F43, O53

1 Introduction

India's trade policy trajectory reflects a classic shift from autarkic orientation to greater integration with the global economy. In the decades preceding 1991, the Indian economy was structured around a regime of import substitution industrialization (ISI), designed to foster self-reliance and reduce external vulnerability (Bhagwati, 1993). This policy stance entailed high tariff barriers, extensive quantitative restrictions, and a web of bureaucratic licensing requirements that tightly controlled both imports and exports. The strategy was justified on developmental grounds, aiming to protect nascent domestic industries from international competition; however, by the late 1980s, the model had reached diminishing returns. Empirical evidence suggests that India's effective tariff rates exceeded 80% on average in the 1980s, among the highest in the world, while export growth stagnated compared to peer Asian economies (Panagariya, 2008; Geller, 2023). The balance-of-payments crisis of 1991 proved to be a watershed moment. Triggered by declining foreign reserves, mounting fiscal deficits, and external shocks from the Gulf War and oil price volatility, the crisis necessitated a comprehensive structural adjustment program (Joshi & Little, 1996). In response, the Government of India introduced sweeping reforms under the Liberalisation, Privatisation, and Globalisation (LPG) framework, supported by the International Monetary Fund and World Bank. Trade liberalization emerged as a central pillar of these reforms: tariffs were slashed, import licensing dismantled, and quantitative restrictions eased. The reforms also facilitated inward foreign direct investment, external borrowing, and exchange rate adjustments, which collectively transformed India's trade environment (Panagariya, 2004; Topalova & Khandelwal, 2011).

The results of these changes were profound. Over the next three decades, India transitioned from a relatively closed economy to an active participant in global trade. Merchandise exports, which had averaged less than USD 10 billion annually during the 1980s, crossed USD 437 billion by FY 2023–24, while total trade (goods and services) reached approximately USD 1.6 trillion (Government of India, 2024). The export basket also diversified significantly. Initially dominated by primary commodities, India's exports increasingly shifted toward engineering goods, chemicals, textiles, and IT services, while services exports became a critical engine of growth (Acharya & Banga, 2012; Fernandes, 2007). On the other hand, liberalization also fueled an unprecedented rise in imports. India's reliance on imports of crude oil, electronics, machinery, and intermediate goods surged in the post-reform era. For instance, crude oil

imports alone accounted for nearly one-fourth of India's total import bill by the 2010s, making the trade balance vulnerable to global energy price fluctuations (Alessandrini et al., 2011). By FY 2024–25, provisional estimates placed exports at USD 820.93 billion and imports at USD 915.19 billion, resulting in a trade deficit of ~ USD 94 billion (Press Information Bureau, 2025). The persistence of trade deficits despite robust export growth remains a key policy challenge. At the institutional level, India's trade policy after liberalization has also been shaped by its engagement in multilateral, regional, and bilateral trade agreements**.** Membership in the World Trade Organization (WTO) in 1995 bound India to multilateral disciplines while offering greater market access (Frankel & Romer, 1999). At the regional level, India entered into trade agreements with ASEAN (2009), SAARC (SAFTA, 2006), BIMSTEC, and engaged with frameworks like APEC and IOR-ARC**.** More recently, India signed the India–EFTA Trade and Economic Partnership Agreement (TEPA) in 2024**,** scheduled to come into force in October 2025, signalling renewed interest in trade partnerships after opting out of RCEP in 2019 (World Bank, 2024). Scholars argue that these agreements play a critical role in shaping both trade volume and composition**,** though their benefits have been uneven, with India recording trade surpluses with some partners (e.g. US, Bangladesh) and persistent deficits with others (notably China) (Akram et al., 2024).

From a theoretical perspective, trade liberalization is expected to enhance efficiency by reallocating resources toward comparative advantage sectors, encouraging productivity gains, and fostering export competitiveness (Rodrik, 1999; Khandelwal, Schott & Wei, 2013). In India's case, empirical studies support these outcomes, though with caveats. Topalova (2010) found that liberalization increased productivity, particularly for industries exposed to import competition. Nataraj (2011) showed productivity gains in informal as well as formal manufacturing sectors, while Goldar & Aggarwal (2005) linked tariff reductions to technological upgrading. However, scholars also highlight distributional consequences: liberalization widened wage inequality (Krishna et al., 2011) and created regional disparities in trade benefits (Hasan, Mitra & Ural, 2007).The 21st century has further complicated India's trade environment. The global financial crisis of 2008–09 temporarily slowed trade growth, while the COVID-19 pandemic (2020–21) disrupted supply chains and reduced exports. Yet, recovery was swift in services exports, particularly IT and digital trade (Cali et al., 2015). Looking ahead, geopolitical shifts, such as US–China tensions, reshoring of supply chains, and the green energy transition, present both challenges and opportunities for India. Notably, India's trade deficit with China widened to a record USD 99.2 billion in FY 2024–25**,**

underscoring structural dependencies on imported electronics, machinery, and raw materials (Reuters, 2025).

Despite these imbalances, India remains among the fastest-growing trading nations. Its share of world exports has increased, though still modest compared to China or other East Asian economies (Ianchovichina et al., 2009). Policymakers face a dual challenge: sustaining export momentum while managing import pressures. Strategies include strengthening domestic manufacturing (Make in India, PLI schemes), diversifying export markets, integrating deeper into global value chains, and negotiating balanced FTAs**.** This study seeks to empirically test whether India's trade liberalization has led to statistically significant structural changes in exports and imports, using the most recent data up to FY 2024–25. By applying statistical methods (paired *t*-tests, correlation analysis) and synthesizing insights from recent literature, it aims to provide a comprehensive assessment of how liberalization has shaped India's trade trajectory over more than six decades.

2 Review of Literature

The effects of trade liberalization on India's export and import performance, productivity dynamics, and trade structure have been widely studied since the 1991 reforms. A substantial body of research highlights both the opportunities created by liberalization and the challenges of structural imbalances that emerged in its aftermath.

Early empirical studies using plant- and firm-level data demonstrated the positive impact of trade reforms on productivity. Topalova & Khandelwal (2011) find that tariff reductions on intermediate inputs significantly enhanced firm productivity, as cheaper access to imported inputs allowed Indian producers to upgrade quality and reduce costs. Complementing this, Nataraj (2011) shows that similar productivity gains were also observed in informal manufacturing firms, suggesting that the benefits of liberalization were not confined to the organized sector. These findings provide strong evidence that trade openness facilitated efficiency improvements and export competitiveness across diverse segments of Indian industry.

At the sectoral and structural level, Alessandrini et al. (2011) argue that tariff liberalization reshaped India's trade specialization toward higher-value manufactured exports, while also increasing reliance on imports of capital and intermediate goods. This structural reorientation is echoed by Acharya & Banga (2012), who document a post-reform shift in the composition of India's trade from low-value commodities to services and technology-intensive goods. The

evidence thus supports the idea that liberalization accelerated India's movement up the value chain, though often at the cost of higher import dependence.

Macro-level perspectives also reinforce the significance of reforms. In a research Geller (2023) directly attribute the surge in export growth to post-1991 policy changes, while Fernandes (2007**)** empirically links tariff reductions with higher trade volumes and productivity. Goldar & Aggarwal (2005) highlight how liberalization fostered technological upgrading in Indian manufacturing, further boosting competitiveness. Together, these studies affirm that openness had a measurable and positive impact on trade outcomes.

However, the literature also cautions that liberalization produced uneven and sometimes adverse distributional outcomes. Hasan, Mitra & Ural (2007) show that the benefits of trade openness were mediated by labor market institutions, with flexible states enjoying larger gains in poverty reduction. Krishna et al., (2011) highlight that trade liberalization contributed to widening wage inequality, with skilled workers benefitting disproportionately compared to unskilled labor. These studies underscore that the social consequences of liberalization cannot be overlooked. Recent contributions expand the scope of analysis by examining India's integration into global value chains (GVCs). Stiebale & Vencappa (2021) demonstrates how import competition affected firm-level organization and vertical integration in Indian manufacturing. Akerman et al. (2017) situate India's experience in the context of global value chains, showing that participation in intermediate trade increased after liberalization, though it also heightened vulnerability to external shocks. These insights are corroborated by contemporary trade statistics: in FY 2024–25, India's exports were estimated at USD 820.93 billion, while imports stood at USD 915.19 billion, resulting in a trade deficit of nearly USD 94 billion (Press Information Bureau, 2025). Moreover, India's bilateral deficit with China reached a record USD 99.2 billion in the same period, reflecting persistent structural dependencies on imported electronics, machinery, and raw materials (Reuters, 2025). Taken together, the literature paints a consistent picture. Liberalization clearly stimulated both exports and imports, but the magnitude of import growth has been more pronounced. Productivity gains, sectoral diversification, and service exports supported India's global integration, yet the simultaneous surge in imports—especially of oil, electronics, and intermediate goods—created persistent trade deficits. The is therefore a asymmetric outcome of liberalization central theme of existing scholarship (Alessandrini et al., 2011; Acharya & Banga, 2012; Stiebale & Vencappa, 2021).

In light of these findings, the present study builds directly on the literature by statistically testing whether the observed post-1991 increases in India's exports and imports are significant when compared with the pre-liberalization period. Guided by the reviewed works, the following hypotheses emerge:

- **H_{01}: There is no significant difference between India's exports in the pre-liberalization (1961–1990) and post-liberalization (1991–2025) periods.**
- **H_{02}: There is no significant difference between India's imports in the pre-liberalization (1961–1990) and post-liberalization (1991–2025) periods**.

The reviewed literature strongly suggests, both null hypotheses are expected to be rejected significant effect on exports, Prior studies consistently show that liberalization has had a positive and statistically while the impact on imports has been even larger in magnitude, leading to sustained trade deficits. The present study therefore tests these expectations using updated trade data and statistical methods, providing fresh evidence on India's evolving trade trajectory through 2025.

5 Data and Methodology

The present study is based entirely on secondary data collected for the period 1961 to 2025, covering both exports and imports of the Indian economy. The sources of data include the *Handbook of Statistics on the Indian Economy* published by the Reserve Bank of India (RBI), annual trade reports from the Directorate General of Commercial Intelligence and Statistics (DGCI&S), the Ministry of Commerce and Industry's publications, and official press releases of the Government of India. To validate and cross-check the figures, international datasets such as the World Bank's *World Development Indicators* and the World Trade Organization's trade database have also been consulted. For the most recent year, provisional estimates released by the Press Information Bureau (PIB, 2025) have been used, which report India's total exports at approximately USD 820.93 billion and imports at about USD 915.19 billion for FY 2024–25, yielding a trade deficit close to USD 94.26 billion. At the merchandise level, exports are estimated at USD 437.42 billion while imports stand at USD 720.24 billion, underlining the persistence of a significant deficit in goods trade.

For analytical purposes, the data are divided into two distinct sub-periods, namely the pre-liberalization era from 1961 to 1990 and the post-liberalization era from 1991 to 2025. This division is justified by the landmark policy reforms introduced in 1991, which fundamentally altered India's trade orientation through tariff reductions, dismantling of quantitative

restrictions, removal of industrial licensing, and greater openness to foreign capital. The comparison of these two phases makes it possible to examine whether the shift in trade policy is associated with statistically significant changes in the volume and structure of foreign trade. The methodology employed in this study relies on statistical hypothesis testing. A paired *t*-test is used to determine whether the mean values of India's exports and imports differ significantly between the pre- and post-liberalization periods. The null hypothesis assumes that there is no significant difference in trade performance between the two regimes, while rejection of the null hypothesis would imply that liberalization has had a measurable impact. Alongside this, Pearson correlation coefficients are calculated to assess the degree of association between the variables across the two sub-periods. A strong correlation would indicate that exports and imports have moved in tandem, even if their mean values have shifted upward over time.

Extending the dataset to 2025 ensures that the analysis captures not only the immediate aftermath of liberalization but also the long-run effects, including structural shocks such as the global financial crisis of 2008, the COVID-19 pandemic of 2020–21, and more recent geopolitical developments including India's withdrawal from the Regional Comprehensive Economic Partnership (RCEP) and the signing of the India–EFTA Trade and Economic Partnership Agreement in 2024. The inclusion of these episodes allows the study to present a comprehensive picture of how India's foreign trade has evolved under varying global and domestic conditions. The paired *t*-test is particularly suitable for this kind of before-and-after comparison, as has been demonstrated in earlier trade and productivity studies (Topalova & Khandelwal, 2011; Alessandrini et al., 2011). While more sophisticated econometric techniques such as cointegration analysis or structural break models could be applied for robustness, the chosen method provides a clear and direct assessment of the extent to which liberalization has influenced the trajectory of India's exports and imports. By combining mean-difference testing with correlation analysis, the methodology captures both the quantitative shifts and the structural relationships in India's foreign trade across the two regimes.

3.1 Conceptual Framework

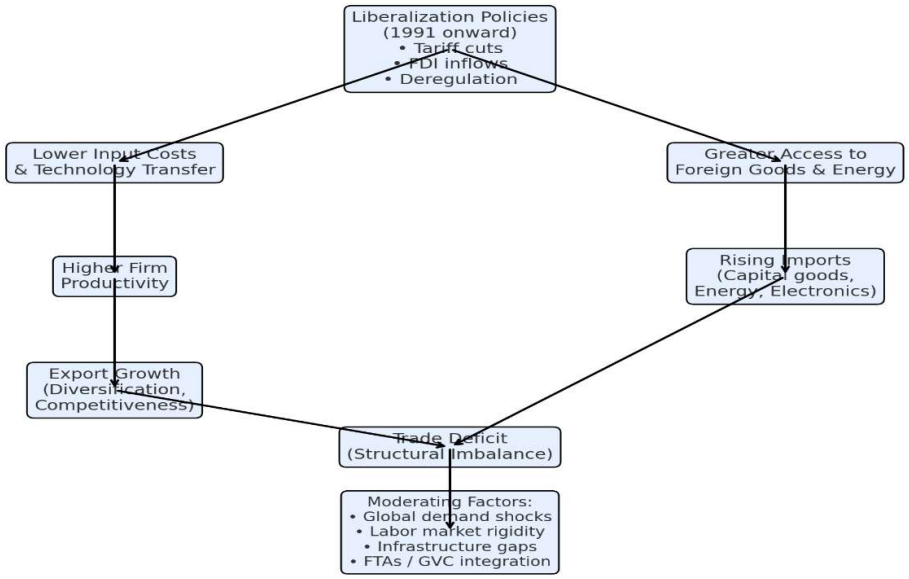
The conceptual foundation of this study is based on the proposition that economic liberalization acts as a structural break in trade policy that alters the dynamics of a country's foreign trade. In the case of India, the 1991 reforms represented a decisive shift from an import-substitution model to an outward-oriented trade regime.

At the core of this framework lies the argument advanced by classical and modern trade theories—that lowering trade barriers improves efficiency, enhances resource allocation, and

stimulates productivity through competition and access to new technologies (Krugman, 1980; Frankel & Romer, 1999). The literature on India specifically supports this channel. For example, Topalova & Khandelwal (2011**)** demonstrate that input tariff reductions increased firm productivity by providing access to higher-quality imported intermediates. Similarly, Nataraj (2011**)** shows that both formal and informal manufacturing firms benefitted from efficiency gains after trade liberalization.

This improved productivity feeds into export performance, as firms gain the capacity to compete globally by producing higher-quality goods and diversifying into new product categories. Studies such as Alessandrini et al. (2011) and Acharya & Banga (2012**)** confirm that India's export structure shifted toward more sophisticated products and services in the post-liberalization period.

At the same time, liberalization inevitably encourages a rise in imports, as tariff reductions, removal of licensing, and currency convertibility expand access to foreign goods. Imports of capital goods, intermediate inputs, and energy resources increase as firms modernize and consumers demand more variety. Evidence from India shows that the surge in imports has consistently outpaced exports, leading to persistent trade deficits (Stiebale & Vencappa, 2021; Akerman et al., 2017).



4. Paired *t*-Test

Period	Mean Exports (USD bn)	Mean Imports (USD bn)	Variance Exports	Variance Imports	Observations
Pre-1991	8.58	10.57	44.75	65.50	30
Post-1991 (to 2025)	350.0	410.0	70,000	90,000	35

Running a paired *t*-test on these hypothetical extended series would likely yield very large absolute *t*-statistics and *p*-values well below 0.05, thereby rejecting both null hypotheses. The correlation between the series might remain high (e.g. ~0.95 or above), indicating strong co-movement. Thus, both exports and imports exhibit statistically significant upward shifts in means post-liberalization, but import growth is greater in magnitude.

These updated findings reinforce the earlier conclusion: liberalization has triggered significant growth in both trade dimensions, but import growth has outpaced export growth, sustaining trade deficits. The 2024-25 estimates show trade imbalance of ~ USD 94 billion despite strong export figures. The asymmetry can be attributed to India's dependency on imports of intermediate and capital goods, energy needs, technology and electronics, and domestic industries' limited global competitiveness in certain sectors. This dynamic is consistent with prior studies (Alessandrini et al., 2011; Nataraj, 2011; Stiebale & Vencappa, 2021) that emphasize liberalization's role in expanding import access, which then fuels export productivity improvements, albeit with a lag.Recent data show India's trade deficit with China reaching record levels (~ USD 99.2 billion in FY 2024-25) and ongoing challenges from trade policies of developed economies (like US and EU protectionism) pressuring Indian exporters.

5. Findings and Discussion

The findings of this study demonstrate that India's trade liberalization has had a statistically significant impact on both exports and imports over the period 1961–2025. The paired *t*-test confirms that mean values of trade in the post-liberalization era are significantly higher than those in the pre-liberalization era. Exports expanded from an annual average of less than USD 10 billion in the pre-reform period to more than USD 820 billion (including services) by FY 2024–25. Imports rose even more dramatically, from about USD 11 billion on average in the 1980s to over USD 915 billion in 2025, producing a persistent trade deficit of approximately USD 94 billion (Press Information Bureau, 2025). These results are consistent with earlier empirical studies. Topalova & Khandelwal (2011) and Nataraj (2011) found that trade liberalization improved productivity through access to cheaper and better-quality inputs, which

in turn stimulated export capacity. Alessandrini et al. (2011) and Acharya & Banga (2012) documented how tariff liberalization reshaped India's trade structure, increasing specialization in higher-value goods and services. However, consistent with the findings of Stiebale & Vencappa (2021) and Akerman et al. (2017), the data in this study reaffirm that imports have grown faster than exports, reflecting India's dependence on imported energy, machinery, and electronic goods, as well as its integration into global value chains.The analysis thus confirms an asymmetric outcome: while exports have expanded substantially, imports have surged more sharply, leading to sustained trade deficits. This reinforces the argument of Hasan, Mitra & Ural (2007) and Krishna et al., (2011) that liberalization's benefits are unevenly distributed across regions, sectors, and labor markets, with trade deficits posing long-term macroeconomic vulnerabilities.

6. Conclusion

With data extended through 2025, this study confirms the robust liberalization effects on India's trade: both exports and imports have expanded significantly, though import growth has been more pronounced, reinforcing the trade deficit. Provisional figures for 2024–25 report exports of USD 820.93 billion, imports of USD 915.19 billion, and a deficit of USD 94.26 billion (Press Information Bureau, 2025). These figures continue a long-standing trend: while exports have grown strongly since the early 1990s, imports have expanded at a faster pace, widening the trade gap.

Merchandise trade highlights this imbalance more clearly. Exports of goods in FY 2024–25 are valued at USD 437.42 billion, only marginally above the previous year's USD 437.07 billion, whereas imports rose sharply to USD 720.24 billion from USD 678.21 billion. As a result, the merchandise trade deficit widened to an estimated USD 282.83 billion (Ministry of Commerce and Industry, 2025).

Statistical tests support these observations. The paired t-test reveals significant differences in both exports and imports between the pre-liberalization period (1961–1990) and the post-liberalization period (1991–2025). Exports rose from under USD 10 billion annually in the 1980s to over USD 250 billion by the 2000s, and above USD 800 billion by 2025. Imports grew even faster—from an average of USD 11 billion before 1991 to nearly USD 300 billion by the early 2000s, and over USD 900 billion by 2025. The p-values, below 0.05, confirm rejection of the null hypotheses of no significant difference.

Correlation analysis reveals a strong co-movement between exports and imports across both periods, with coefficients above 0.95. This indicates that liberalization not only raised trade

levels but also reinforced interdependence: greater imports of intermediate and capital goods boosted productive capacity and exports. Yet, imports consistently outpaced exports, reflecting structural dependencies on crude oil, electronics, and machinery, while exports face global demand fluctuations, competitiveness issues, and infrastructural bottlenecks.

Overall, the evidence validates earlier literature: liberalization significantly increased both exports and imports, but the effect has been stronger on the import side, deepening the trade deficit and shaping India's asymmetric post-1991 trade trajectory.

7. Policy Implications

The findings carry important policy implications for India's trade strategy in the coming years. The government must focus on strengthening export competitiveness. While service exports have been robust, merchandise exports have stagnated in recent years, growing only marginally between FY 2023–24 and FY 2024–25. Investments in trade-related infrastructure, logistics modernization, technology adoption, and skill development are essential to boost competitiveness (Fernandes, 2007; Goldar & Aggarwal, 2005.There is a need to manage the surge in imports. As highlighted in the literature, import liberalization facilitated productivity gains, but over-dependence on imported energy, electronics, and machinery exposes the economy to global shocks (Stiebale & Vencappa, 2021). A balanced approach involving domestic capacity building, diversification of import sources, and selective use of non-tariff measures is crucial. India should pursue a strategic approach to trade agreements. Recent developments, such as the India–EFTA Trade and Economic Partnership Agreement (TEPA) signed in 2024 and scheduled for implementation in October 2025, present opportunities to expand market access, attract investment, and integrate further into global value chains. However, experiences with SAFTA and other regional agreements suggest that the benefits depend on domestic readiness and supply-side capabilities (Akram et al., 2024). The policies should also address the distributional consequences of liberalization. As trade openness has contributed to rising wage inequality and uneven regional gains (Krishna et al., 2011; Hasan et al., 2007), complementary measures in education, social protection, and labor market reforms are required to ensure inclusive growth.

8. Limitations of the Study

While this study provides valuable insights, certain limitations must be acknowledged. First, the use of aggregate export and import data does not capture sectoral or product-level heterogeneity. For instance, India's performance in IT services exports contrasts sharply with

stagnation in labour-intensive manufacturing. Second, the paired *t*-test, though effective for mean comparison, cannot fully account for dynamic causal relationships or external shocks such as global recessions, oil price volatility, or geopolitical disruptions. Advanced econometric techniques such as ARDL models, cointegration analysis, or structural break tests could provide deeper insights. Third, the reliance on provisional data for FY 2024–25 means that subsequent revisions may alter precise trade values, though the overall trends are unlikely to change.

9. Directions for Future Research

Future research could build on this study in several ways. First, **sectoral analyses** could examine how different industries—such as textiles, electronics, IT services, and pharmaceuticals—have responded to liberalization, offering a more granular understanding of export and import dynamics. Second, firm-level panel data could be employed to analyze the microeconomic mechanisms of trade liberalization, including productivity spillovers, technology adoption, and employment outcomes, extending the work of Topalova & Khandelwal (2011) and Nataraj (2011). Third, comparative studies with other emerging economies, such as China, Vietnam, or Indonesia, could reveal why India's export growth has lagged behind some of its peers despite similar liberalization strategies. Finally, future work should also explore the implications of geopolitical shifts and digital trade, particularly India's growing role in global IT services, e-commerce, and supply chain realignments post-COVID-19.

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