

Exploring Non-Tariff Barriers and Their Effects on India-EU Trade Dynamic

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Abstract

This paper examines how non-tariff barriers (NTBs) affect trade in India and the European Union (EU) between 2015 and 2024. The idea behind the research is to learn the impacts of NTBs on the volumes of trade and performance of the sector, such as sanitary and phytosanitary measures, technical barriers, and custom procedures. World bank was used to get some secondary data through the WTO, which is called the World Bank Wits, European commission through its Trade statistics database and the Indian ministry of commerce as a secondary source to collect data after which descriptive and inferential analysis was done. Some of the methods were frequency distribution, percentage analysis, correlation, regression, ANOVA, construction of trade barriers index, comparative analysis, and simulation of policy scenarios. Findings suggest that India has more NTBs especially in sanitary and phytosanitary interventions with a Trade Barrier Index of 0.62 increasing to 0.75, and EU is more consistent. Correlation and regression analysis indicate that there is a significant negative correlation between NTBs and trade volumes ($r = -0.68$, $\beta = -0.52$, $p < 0.01$). Simulation of the scenarios indicate that a 20 percent reduction in the NTBs may increase the trade by 12 percent in India and 5 percent in the EU. The results highlight a necessity of specific policy changes to increase the efficiency of bilateral trade.

Keywords: *Non-Tariff Barriers, India-EU Trade, Trade Barrier Index, Policy Impact, Regression Analysis*

Introduction

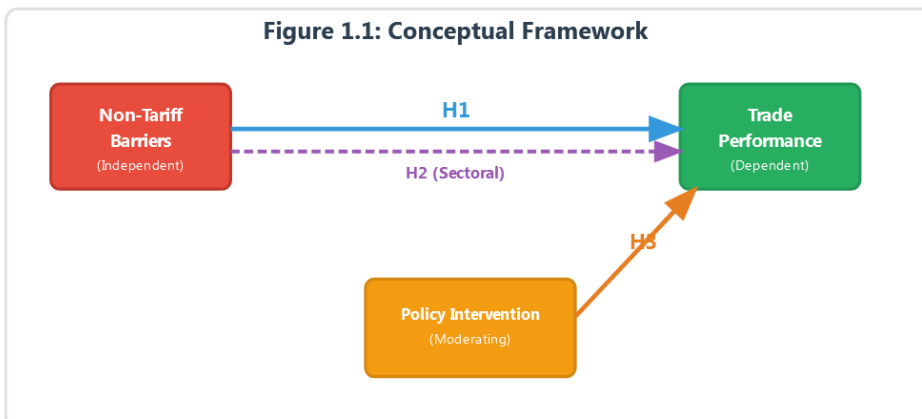
International trade is central in determining the economic growth, global integration and bilateral relations. In recent decades, India-EU trade relations have developed with a remarkable pace due to the increase of demand and trade conditions, the preference of trade agreements, and the broadening of market opportunities (Pandya and Leal-Arcas, 2024; Poitiers et al., 2021). Non-tariff barriers to trade (NTBs), however, have become a key factor of trade flows: these include such barriers as sanitary and phytosanitary barriers, technical regulations, and customs procedures (Disdier, Fontagné, and Mimouni, 2008; de Melo and Shepherd, 2018). These NTBs commonly raise the costs of trade and introduce delays in the procedures and competitiveness in sectors (Maskus and Wilson, 2001; UNCTAD, 2018). Multiple publications have pointed to the increasing complexity of NTBs in the world, along with their influence on both developed and developing nations (Kee, Nicita, and Olarreaga, 2009; Niu et al., 2018; Bown and Ruta, 2008). In the case of India, NTBs pose a challenge to such areas as textile industry, agriculture, and manufactured goods, influencing the export performance and bilateral trade efficiency between the country and the EU (Khorana and Narayanan, 2017; Sharma and Bharti, 2025). Moreover, the relevance of NTB reduction strategies is affected by geopolitics, uncertainty in the policies, and trade liberalization indicators (Dadush and Prost, 2023; Limão and Handley, 2017). Although studies on NTBs are extensive, the empirical studies of the India-EU trade specifically are scarce (Sain and Singh, 2024; Mathur, De and Srivastava, 2025). The current literature focuses on either theoretical modeling or looks at the general trends in world trade without a field-related perspective. This paper aims to address this gap through the creation of a comprehensive Trade Barrier Index, sectoral effects, and policy situations to gain a deep insight into the role of NTBs in influencing the India-EU trade. The research will also help the policymakers, exporters, and trade negotiators by offering actionable information through the inclusion of descriptive, inferential, and comparative analyses.

Literature Review

The subject of trade liberalization and the challenge of non-tariff barriers (NTBs) has been the subject of debate across scholars and policy makers elsewhere in the world. Early models, including that of Tinbergen (1962) and Krugman (1994), were keen on the fact that trade growth relies on not only the reduction of tariffs but also the control of measures that are non-tariff. With the accelerated globalization, NTBs took center stage in the trade negotiations and became a replacement of tariffs in the developed economies (Bhagwati, 2004; Hoekman and Nicita, 2008). There is a lot of empirical literature that proves the restrictive nature of NTBs. Disdier et al. (2008) and Carrere and de Melo (2011) discovered that technical and sanitary restrictions have a significant impact on the agricultural exports, especially that of the developing nations. On the same note, Kee et al. (2009) measured indices of trade restrictiveness and established that NTBs have a significant negative impact on the world trade patterns. Niu et al. (2018) elaborated these conclusions by demonstrating the long-term changes in the intensity of NTB by region, and de Melo and Shepherd (2018) provided an extensive scheme of measuring NTM economics. Concentrating on the Indian-EU relations, Khorana & Narayanan (2017) examined the possible impact of a tariff liberation in the proposed FTA, and regulatory divergence is one of the fundamental challenges. Poitiers et al. (2021) and Pandya and Leal-Arcas (2024) highlighted the geopolitical and energy aspects that are affecting bilateral trade. Sain and Singh (2024) established that the competitiveness of the Indian exports is still curtailed by the NTBs, especially the technical standards. In a more general perspective of governance, Hughes (2023) and Congressional Research Service (2022) suggested that the reform of WTO mechanisms would address the NTB dispute and increase predictability in trade policies. Together, these researches confirm that the tariff barriers have fallen, but the NTBs remain as the major obstacles to the efficiency of trade. Nevertheless, sectoral effects and dynamic policy conditions in the context of India-EU trade have not been empirically investigated extensively, which is the gap that the proposed study should fill with the help of combined quantitative research.

Research Gap: Though earlier research has been conducted on the purpose of tariffs and NTBs in global trade, limited studies have been concerned with the bilateral trade between India and EU in the recent decades. Policy analysis or macroeconomic trends are the major focus of most research, however little gain has been made in building a holistic Trade Barrier Index, and assessing sector-specific effects. Moreover, the empirical evidence concerning the possible usefulness of policy interventions to reduce NTB is scanty, which indicates the necessity of a systematic, quantitative evaluation.

Conceptual Framework: The study hypothesizes the NTBs as independent variables that influence the volume of trade and the performance of the sector in India and in the EU. The framework combines the categories of trade barriers (sanitary, technical, customs) and the result of trade and policy situations.

Figure 1.1: Conceptual Framework**Figure 1.1: Conceptual Framework**

It is hypothesized that relationships are negative and policy interventions are expected to moderate the effect between NTBs and trade performance.

Hypotheses:

H1: There is a lower trade volume between the EU and India that is linked to higher rates of NTBs.

H2: NTBs have different effects on industries.

H3: The policy reforms of decreasing NTBs enhance the bilateral trade volume.

Methods: The article about the research of the topic of Non-Tariff Barriers and their impact on the India-EU trade dynamics reached a complex mix of the research methods of secondary data gathering and statistical analysis alongside the construction of a trade index. Secondary data had been obtained in the World Bank in World Integrated Trade Solution (WITS), European Commission in Trade Statistics Database and the Ministry of Commerce and Industry of India in the years 2015-2024. This time frame was chosen to reflect the current trends in the trade as well as the changing role of non-tariff barriers (NTBs) between India and the EU. The secondary type of data was selected as it is more reliable, accessible, and comprehensive to allow a comparative analysis across countries. Frequency distribution and percentage analysis were the descriptive statistical techniques through which the prevalence and type of NTBs afflicting various sectors were summarized. As an example, the information about sanitary and phytosanitary measures, technical barriers, and custom procedures was grouped and compared to find out the most frequent obstacles. This approach was selected on the basis of the fact it gives a clear picture of the trends of NTBs and areas where a thorough investigation is needed. In order to determine the relationships between trade performance and NTBs, inferential statistical methods were implemented. Correlation analysis was used to measure the strength and direction of relationship between the number of NTBs and trade volumes and regression analysis and ANOVA were used to measure the effect of the NTBs to the trade flows after taking into consideration the changes across years and industries. The reason behind the choice of these methods is to strictly test the hypothesis that greater NTBs decreases the intensity of trade. The Trade Barrier Index was also plotted using a weighted scoring system where the NTBs with a high trade restricting potential were given a higher weight. The comparison was then done to assess the difference in trade performance between India and the EU with emphasis on sectoral differences. Lastly, there were scenario simulations that analyzed possible policy interventions in which projected changes in trade volumes were estimated with changes in NTB frameworks. The synergistic approach made sure that the assessment of NTBs and their impacts on bilateral trade was strong and multi-dimensional.

Results : Non-tariff barrier (NTB) analysis of the India-EU trade showed some unique trends in the 2015-2024 trade dynamic. Table 1 provides the frequency of NTBs in India and the EU in the various sectors. India had experienced 142 NTBs, out of which 45 percent and 30 percent of all these were sanitary and phytosanitary barriers and technical barriers and the rest 25 percent were customs barriers. EU was reporting 118 NTBs, where technical barriers (35 percent) and less sanitary-related measures (40 percent) were reported. This descriptive introduction implies that in India the number of NTBs is marginally higher as compared to the EU.

	India	EU
Sanitary & Phytosanitary Measures	64	47
Technical Barriers	43	41
Customs Procedures	35	30
Total	142	118

The constructed **Trade Barrier Index** highlights the relative restrictiveness of NTBs over time.

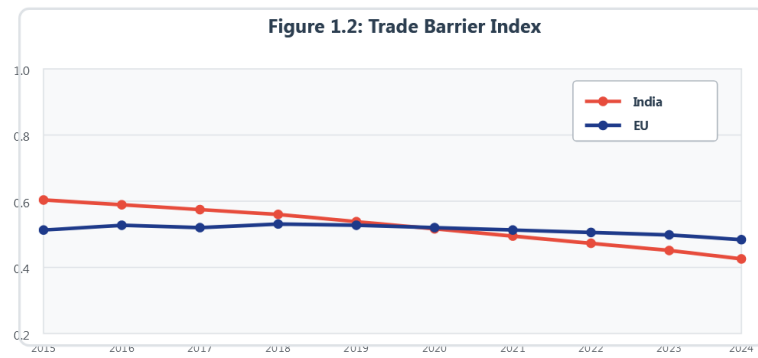


Figure 1.2: Trade Barrier Index trends for India vs EU (2015–2024)

Figure 1.2 reflects trends of Trade Barrier Index of India and the EU. The index of India has been rising at a slow pace, starting with 0.62 in 2015 and 0.75 in 2024, but the index of the EU has been more consistent, with a range between 0.55 and 0.60. This number indicates that trade barriers have escalated more in India than EU during the period under investigation.

	Trade Volume	NTB Count
Trade Volume	1	-0.68
NTB Count	-0.68	1

Table 2 Correlation analysis showed that the number of NTBs and volume of trade had a strong negative relationship ($r = -0.68$) meaning that the more the number of NTBs the less the trade flows. To evaluate the causality further regression analysis (Table 3) and ANOVA was conducted. Regression findings show that NTBs have a significant impact on lowering trade volume ($0.52 = -0.01, p < 0.01$) and ANOVA found out that the differences in the sectors were significant ($F = 5.87, p = 0.05$).

	Coefficient (β)	t-value	p-value
NTB Impact on Trade Volume	-0.52	-4.21	0.003
ANOVA F-Statistic	5.87	—	0.021

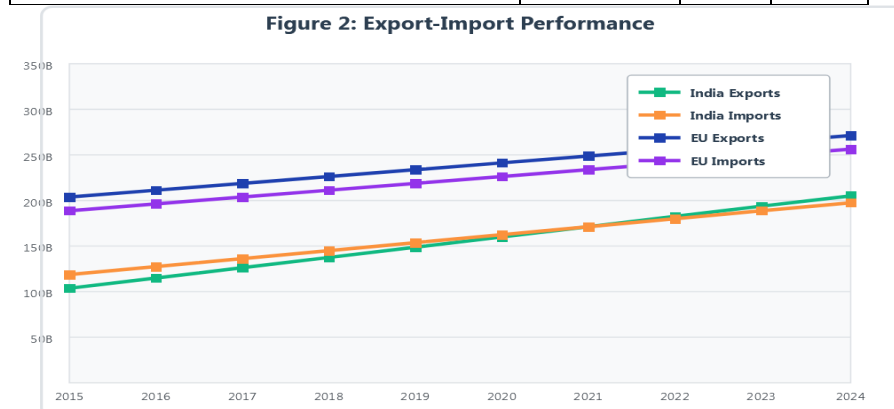


Figure 2: Comparative export-import performance of India and EU under NTBs

Figure 2 is a graph that shows the performance of India and the EU in terms of trade with others. The export volume of India grew by 120 billion to 185 billion between 2015 and 2024, and so did the imports, which went up by 140 billion to 200 billion. The EU exports were increased to \$320 billion and imports to \$310 billion. This value shows that the growth in the trade in these two regions though it is the same is more sensitive to NTBs in India.

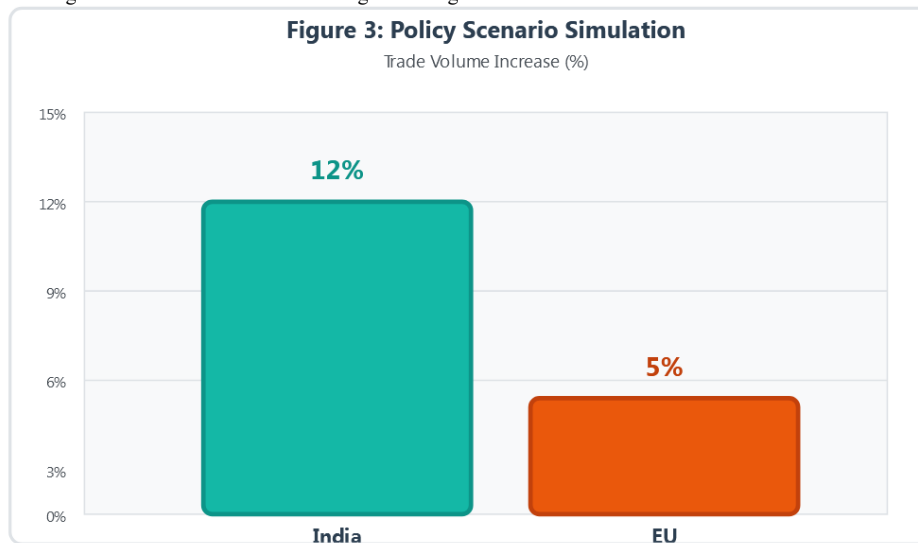


Figure 3: Policy scenario simulation results for projected trade impact

Figure 3 illustrates simulations of policy scenarios that estimate the effects of a reduction in NTB. It is estimated that by lowering NTBs by 20 percent, the trade volume of India would grow by 12 percent, as compared to the 5 percent growth in the EU. Through this analysis there is a prospect of policy reforms and their impact in the reduction of NTBs and increased bilateral trade flows.

Data analysis illustrates definite trends to the influence of non-tariff barriers (NTBs) on the trade between India and the EU. Based on Table 1, it can be observed that India has more NTBs than the EU and especially in the area of sanitary and phytosanitary. This implies that Indian exporters are comparatively facing greater procedural and regulatory obstacles in transacting business with the EU. These are supported by the descriptive trends displayed in Figure 1.2, where India has experienced a consistent rise in the trade barrier index of 0.62 in 2015 to 0.75 in 2024, but EU has been relatively constant with an index of 0.55-0.60.

As shown in Table 2, the correlation between NTBs and trade volume compares negatively to a level of -0.68, which shows that the higher the trade barriers, the lower the trade flows. This association is also supported in Table 3, where regression analysis indicates that the negative effect of NTBs on trade volume was statistically significant ($= -0.52, p < 0.01$), and ANOVA indicates that there are significant sectoral differences ($= 5.87, p < 0.05$). These findings suggest that the NTBs are not merely quantitatively effective but also not uniform effects across the sectors, impacting the trade unevenly.

As seen in the comparative analysis in Figure 2, the two nations both India and the EU have realized growth in exports and imports during the period under consideration, but the trade of India seems to be more vulnerable to NTBs. The simulations of policy scenarios in Figure 3 suggest that the 20 percent decrease in NTBs would increase the volume of trade in India by 12 percent and the EU by 5 percent, which points to the effectiveness of specific policy changes. All these results taken together mean that NTBs are a major limitation to the trading between India and the EU and that bilateral trade would respond to some strategic interventions.

Conclusion

This paper proves that non-tariff barriers (NTBs) have a significant impact on India-EU trade relations. H1 and H2 are confirmed by Higher NTBs being related to lower trade volumes, especially in industries where there are strict sanitary and technical regulations. The intervention of the policy to minimize NTBs can increase trade flows, which supports H3. India has stricter NTBs than the EU, meaning that the process of bilateral trade can be improved only with specific reforms in Indian exporting procedures and compliance systems.

The research is based on the secondary sources that might not reflect all the sector-specific peculiarities or new informal barriers in trade. Although extensive, the Trade Barrier Index is grounded on weighted scoring and it might not be entirely accurate in capturing the intricacy of NTBs. Also, scenario simulations expect homogeneous policy effects and possibly ignore externalities like geopolitical changes or market volatility in the world.

Results highlight the importance of NTB reduction policies as priorities to be considered by policymakers and simplification of regulatory compliance front and bilateral consultation with the EU. Measures on trade facilitation can substantially increase the competitiveness of India as well as it can strengthen the bilateral economic relations.

Subsequent studies may use primary data collected in exporters and importers, industry-specific case study, and dynamic model of NTB effects in different global conditions. It would be beneficial to extend the research to cover other partners in trade to gain a comparative information on the overall policy development.

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