Does Handloom Export from India Face a Structural Break?

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Abstract: *This study investigates the presence of a structural break in India's handloom export trajectory with special reference to the trade relationship with the United States and some of the European countries. Considering recent changes in US tariff policies, disruptions caused by the Covid-19 pandemic, associated transformations in global supply chains, and changes in consumer behavior, this study uses the Chow test and Boyce's kinked exponential growth model to evaluate the handloom export dynamics of India. Using the secondary data, the study identifies a statistically significant structural break during 2019, coinciding with the pandemic and exacerbated by transformations in trade relations with the US and some of the mature Western markets. The kinked growth model identifies the stagnant growth pattern in the pre-covid period and a sharp decline after the break. The study brings out the vulnerability in our traditional trade relations with some of the Western markets and calls for developing new strategic trade relationships focusing on diversification. The study also indicates the importance of institutional support and policy realignment to protect the vulnerable but socioeconomically and culturally important handloom sector*

Keywords: Structural Break, Kinked Growth, Handloom Exports, Tariff, Trade Diversification, New Trade Policy

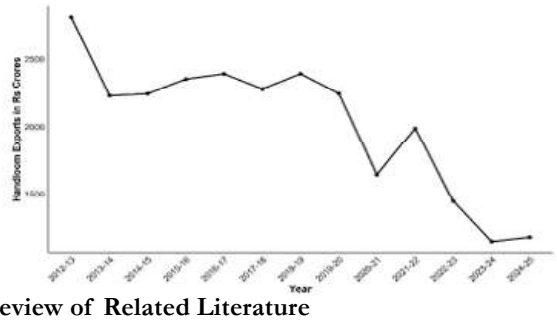
INTRODUCTION

Recent changes in the United States tariff policies have created considerable ambiguity in the international trade scenario (Boer, L., & Rieth, M.,2024). The increase in US tariff rates leads to varying repercussions for countries based on their dependence on exports to the US. Because targeting varies across commodity groups, the implications will not be symmetric across global supply chains. After the Covid-19 pandemic, there was a significant decline in Indian handloom exports to the US and some countries in Europe, revealing the structural transformations occurring in some mature markets and related global supply chains (Choudhary R.K., & Mishra S.K., 2025). The current turmoil caused by the US tariff war deepening the crisis already getting unearthed is reflected in the shifts in international trade relations and consumer behavior in key international markets. In this context, the present study attempts to investigate the possibility of a structural break in US trade relations with India, with special reference to handloom exports.

Some earlier studies identified significant changes in trade flows over the period but confirmed no structural breaks in Indian exports during the pre-COVID period (Jamir, I.,2024). However, an evaluation of the pre and post covid periods reflects a different possibility, although a declining trend is visible after 2012-13. The declining trend reflects the challenges faced by the global economy in general and the conditions prevailing in the domestic textile sector during the period. Following the global financial crisis of 2008, consumer demand in key export markets, such as the United States and the European Union, which constitute a significant portion of India's handloom trade, remained subdued (Kumar, R., & Chadha, R.,2021). The European Union's decision to revoke India's preferred duty status in January 2014 exacerbated the situation. The impact of US trade policies during Mr. Trump's administration, especially the removal of Indian exports from the generalized system of preferences on traditional industries like textiles, is already visible (Shahini, E., & E. Shahini. ,2025). Studies have shown that SMEs are more affected by rising costs (Dasgupta, S.,2022). This has rendered Indian handloom products less competitive than those from neighboring Bangladesh and Sri Lanka. Export data from this period illustrates the severity of the contraction: shipments to the US declined by over 49%, from Rs. 1,306 crore in 2012–13 to Rs. 667 crore in 2013–14. Exports to several European nations, including Belgium, Cyprus, Romania, and Slovakia, declined by 19–45%.

People in both domestic and international markets choose quick and automated fashion solutions over handloom products. These problems significantly affect the textile sector in India. The percentage of handloom output fell from 23 percent in 1995–96 to less than 10 percent in the financial year of 2014–15, as power looms and mill-based production became more common. The decline in exports was also caused by unfavorable conditions within the country that specifically affected the handloom industry, including rising costs, supply chain bottlenecks, and technological constraints, in addition to increased quality standards in international markets. These changes demonstrate how transformations in international market scenarios impact small domestic businesses, even as they experience significant expansion in overall economic activities. This also indicates the importance of adopting new technologies, making the required changes in standard practices, and using modern marketing strategies to boost India's handloom production and exports (Deb, J., 2025).

Figure 1 Handloom Exports from India during 2012-13 to 2024-25 in Rs Crores.



Review of Related Literature

An analysis of India's handloom exports to 20 major countries over the last six years, from FY 2019–20 to FY 2024–25, shows the drastic transformations occurring in the foreign markets of Indian handlooms (figure.2). The United States remains the largest importer of Indian handlooms. However, there has been a drastic reduction in US imports over the years compared to the export figure of FY 2021–22, during which India exported handlooms worth Rs. 783.91 crores. It then dropped significantly to Rs. 464.61 crore in FY 2022–23 ("40.7%) and again to Rs. 331.56 crore by FY 2024–25 ("28.6% over two years). The data show that the downturn continued after the Covid-19 pandemic. In contrast, demand from the United Arab Emirates is rising quickly, going from Rs. 25.2 crore in FY 2020–21 to Rs. 179.91 crore in FY 2024–25 an increase of more than 613%. This rise could be due to positive developments in trade relations between the two countries and an increase in consumer demand.

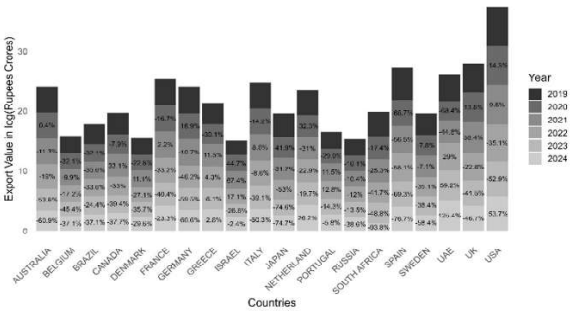


Figure. 2 Handloom Exports from India to Major 20 Countries after Covid-19 Pandemic

It is challenging that demand from several European countries is decreasing. From FY 2021–22 to FY 2024–25, the demand from the UK reduced from Rs.170.45 crore to Rs.65.6 crore (-61.5%), and exports to Germany decreased from Rs.88.22 crore to Rs.34.74 crore (-60.6%). Trade with France also faced a similar crunch, with a 40.5% reduction over the same period. Spain and Italy, two popular tourist destinations in southern Europe, also show substantial reductions in handloom imports from India. Spain's share declined from Rs.238.3 crore in FY 2019–20 to Rs.55.64 crore in FY 2024–25 (-76.6%), and Italy's imports reduced from Rs.77.74 crore to Rs.38.62 crore (-50.3%). However, we observed mixed responses from a few other countries during the same period. Exports to the Netherlands steadily climbed from Rs.39.66 crore in FY 2020–21 to Rs.73.88 crore in FY 2024–25, an increase of 86.3%. In contrast, demand from South Africa dropped from Rs. 58.08 crore in FY 2019–20 to Rs.3.58 crore in FY 2024–25 (-93.8%). Exports to Brazil and Israel are not very large, but their trends have changed. Brazil's imports reached a record high of Rs.26.95 crore in FY 2019–20 but then dropped to Rs.16.95 crore. Israel's import volume increased to Rs.10.71 crore in FY 2024–2025 after declining in FY 2023–2024.

The general trend indicates a structural transformation in India's handloom export markets (Sadhna *et al* 2024). While the trends show declining shares in the matured Western and US markets, new avenues, such as the UAE and the Netherlands, are being developed and offering new promise for Indian handloom exports (Meena, A., 2024). These transformations require careful intervention in international relations and the development of strategic foreign trade policies tailored to evolving foreign market conditions.

The structural transformation in Indian handloom export markets is much deeper than the general disruptions caused by the covid-19 pandemic (Naik *et al*, 2025). It also indicates a long-lasting directional shift in India's foreign trade relations, the emergence of new markets, the need for market innovation, and the establishment of new trading partners.

METHODOLOGY

We apply two models of generalized fluctuation tests to verify the structural breaks.

Consider a common specification of the regression equation Generalized fluctuation tests can be set based on model e

$$y_i = x_i^T \beta_i + u_i \qquad i = 1,2,3,\ldots\ldots,n \qquad (1)$$

F tests

Based on the regression model (1) we specify

where i0 is the change point in the interval(k,n-k).

$$\beta_i = \begin{cases} \beta_A (1 \le i \le i_0 \\ \beta_B (i_0 < i \le n \end{cases}$$

The Chow test (Chow, Gregory, C., 1960) static based on two sub-samples can be represented as

$$F_{i0} = \frac{\hat{u}^T\hat{u} - \hat{e}^T\hat{e}}{\hat{e}^T\hat{e}/(n-2k)} \qquad (2)$$

Where $\hat{e} = (\hat{u}_A, \hat{u}_B)^T$ are the residual from the full model and $\hat{u}$ are from the restricted model.
The F test can be extended for multiple periods or possible break points in a given time range $[\underline{i}\,\bar{i}]$.

Boyce's kinked exponential model (Boyce, J.K.,1986)

We denote the kink points as k_1, km_{-1} and subperiod dummy variables as D_1,, D_m.The generalized kinked exponential model for *m* subperiods and *m-1* kinks can be represented as

$$\begin{aligned} lnY = \alpha_1 + \beta_1 &\left(D_1 t + \sum_{j=2}^{m} D_j k_1 \right) \\ &+ \beta_2 \left(D_2 t + \sum_{j=2}^{m} D_j k_1 + + \sum_{j=3}^{m} D_j k_2 \right) \\ &+ \cdots \\ &+ \beta_i \left(D_i t + \sum_{j=i}^{m} D_j k_{i-1} + + \sum_{j=i=1}^{m} D_j k_i \right) \\ &+ \cdots + \beta_m (D_m t - D_m k_{m-1}) + \varepsilon_t \quad (3) \end{aligned}$$

The equation can be estimated using ordinary least squares, and β's gives the exponential growth rates for the subperiods. If $\beta i \neq \beta j$ we expect a kink in the trend line. To maintain the curvature of the transitions and direct estimation (without transforming the data), we can also use the nonlinear regression version of the piecewise exponential growth model.

We estimated both versions to validate the results. We used R 4.5.1 and its libraries for the estimation and creation of the plots.

Data

This study uses secondary data collected from various sources. These include the Directorate General of Commercial Intelligence and Statistics (DGCIS, 2025), Export Promotion Council for Handlooms (HEPC,2025), and Reserve Bank of India (RBI ,2025).

RESULTS

Table.1 Chow Test for Structural Break in Handloom Export Trend (2019 Q1)

Statistic	Value
F-statistic	103.78
p-value	$< 2 \times 10^{-16}$
RSS (Full Model)	1,43,436.23
RSS (pre-2019)	9,280.35
RSS (post-2019)	15,808.62
Sample Size (Pre-2019)	27
Sample Size (Post-2019)	21
Number of Parameters (k)	2
Degrees of Freedom	$df_1 = 2$, $df_2 = 44$

The Chow test result confirms the structural break in the total handloom exports from India during 2019, starting with the heavy impact of the Covid-19 pandemic (see table1). The estimated F-statistic (87.493) is significant at the one percent level (p-value: 4.643451e-16). The structural break is clearly depicted in Figure 3.

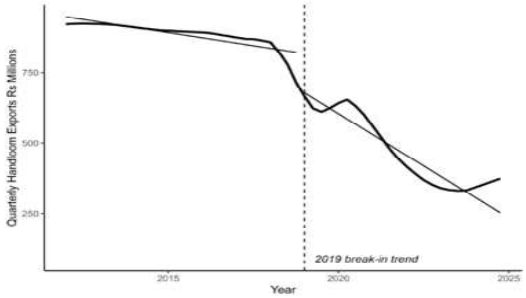


Figure.3 Structural Break based on Chow Break Point Test

Kinked Exponential Growth Rate (Kink at 2019)

We estimated the Kinked Exponential Growth Model to compute and compare the growth rates of pre and post covid periods of total handloom exports from India to understand the dynamics of the structural break identified from the Chow breakpoint test in further detail.

Table. 1 OLS Regression Result- Kinked Exponential Growth Model

Variable	Estimate	Std. Error	t-value	p-value
Intercept	6.3454	0.0226	281.16	< 0.001
Quarter Index	0.00077	0.00141	0.55	0.59
Post-Kink Dummy	−0.12987	0.03296	−3.94	0
Post-Kink Time	−0.03239	0.00249	−13.00	< 0.001
Model Statistics				
Multiple R^2: 0.9546		Adjusted R^2: 0.95		
F-statistic 308.5 (df = 3, 44), p < 0.001				
Notes:				
Dependent variable: log-transformed handloom export values.				
post_kink is a binary indicator for quarters after 2019 Q1.				

The F-statistic (308.5) of the estimated model (the log-linear kinked regression model) is statistically significant at the one percent level (p=0.000), indicating the overall validity of the model (see Table 1). A very high adjusted R^2 (0.95) shows that the model could explain around 95 percent of the variation in handloom exports during the period. The coefficients of the kink (1990: Q1) pre- and post-periods confirm the structural transformations that occurred during the period. Before the kink, the estimated coefficient is statistically insignificant (p-value=0.59), indicating stagnant growth during the pre-kink period. At the kink, exports experienced an immediate level drop of roughly 13%, as indicated by the significant negative coefficient of the post-kink dummy. Following this break, the model estimates show a sustained and statistically significant quarterly decline of about 3.19%, which indicates a steep 12% annual contraction. Moreover, it confirms a prolonged downturn in handloom exports after the covid-19pandemic. The variable, which tracks the number of quarters since the structural break, enables the model to isolate this post-kink trajectory, confirming that the decline was not just a one-time shock but a persistent trend that continued to decline.

The estimation of the nonlinear model (the piecewise exponential growth model) using nlmLM also provides similar robust results, confirming the structural

transformations during the period. The computed pseudo-R^2 for the model is 0.928, which suggests that around 93 percent of the variation in the handloom export data can be explained by this model. According to the results, the pre-kink trajectory is nearly flat (b1=-0.002), but the post-kink portion shows a sharp drop (b2=-0.037), which explains the impact of the covid-19 pandemic.

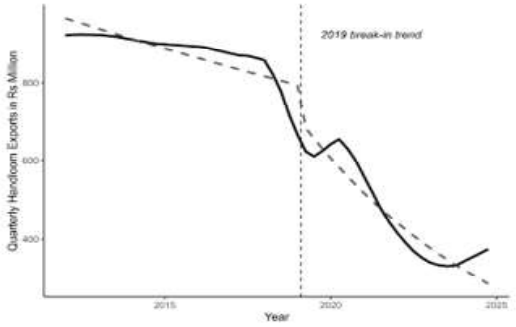


Figure.4 Structural Break based on the Kinked Growth Model

The Boyce kinked exponential growth model shows that the path of handloom exports changed significantly from 2019 onwards (see figure 4). Before the kink, exports faced only a small quarterly drop of about 0.2%, which means that flows were maintaining their natural momentum during the pre-covid period. After the kink, the model predicts a sharp drop of approximately 3.74% per quarter, indicating that the structure has changed significantly. If we evaluate the change over a year, we can approximate the growth rate of –0.81% before the kink and a sharp drop of –13.88% thereafter. This significant change shows how the handloom export scenario worsened after the covid pandemic in India. The results indicate that the kinked exponential growth model is a very effective tool for describing the drastic changes that occurred after the covid-19 pandemic, and it confirms the structural break in the long-term trend of India's handloom exports.

The reliance on the US and some Western countries could be shifted by focusing on other friendly nations in the Middle East, Africa, and Southeast Asia, where there are naturally fewer barriers for Indian goods, making them more competitive (Singh, V. K., &Gautam, A., 2021). Moreover, studies reveal that institutional support, such as export incentives, knowledge dissemination, and strategies, significantly determines export outcomes in the handloom industry and its export performance (Mudoi, D.K., &Tamuli, D., 2025). Institutional support, such as tariff reimbursement, GST refunds, and marketing incentives, is necessary for local exporters to facilitate this transformation and access alternative markets (Srivastava, A., & Reddy, V.,2023). Moreover, India's flagship Make in India effort must be strategically connected to export diversification by enhancing domestic value chains, particularly in handloom and handicraft products, as women and other vulnerable social groups have significant dependencies on these traditional sectors.

CONCLUSION

Based on empirical evidence, this study confirms that a structural break occurred in 2019 regarding India's handloom exports. The stagnant pre-covid export behavior and sharp fall in the later period reveal structural changes in trade relations. The study identifies a number of issues, such as the withdrawal of preferential treatment from the US and some Western European countries, transformations in global supply chains, and changes in consumer behavior, which could have played a significant role in the deceleration in handloom exports in the post-pandemic period.

The study also presumes that the transformations have disproportionately impacted small and medium enterprises and marginalized artisan communities, revealing the fragility of traditional export-dependent industries. To counter the impact of these transformations, India must recalibrate its export strategy by fostering trade relations with emerging markets in the Middle East, Africa, and Southeast Asia. Equally important is providing robust institutional support, such as tariff reimbursements, GST refunds, and targeted marketing incentives, to empower handloom exporters. Aligning these activities with the Make in India initiative can strengthen the domestic value chain and ensure inclusive growth. By promoting diversification and resilience, India can protect the handloom sector, which is of socioeconomic and cultural significance.

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