



An Empirical Assessment of Central and State Government Initiatives in India's Toy Manufacturing Sector

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Abstract

Between 2014-15 and 2025-26, India moved from being a heavy net importer of toys to a modest net exporter. This paper asks how much of that change can be attributed to the policy package introduced from 2020 onwards: the threefold rise in basic customs duty, compulsory certification under the Toys (Quality Control) Order, the National Action Plan for Toys, cluster programmes such as SFURTI and the Koppal Toy Cluster, and artisan support under PM Vishwakarma. Using secondary data from DGCI&S, the Ministry of Commerce and Industry, the Press Information Bureau, the Annual Survey of Industries and UN Comtrade (via FICCI-KPMG), the study applies exponential trend regression, the Cuddy-Della Valle instability index, interrupted time series (segmented) regression, the Chow test, Welch's t-test, the Mann-Whitney U test, correlation and elasticity analysis, the Grubel-Lloyd index, the Hirschman-Herfindahl index and a contribution-to-growth decomposition. Exports of toys, games and sports requisites (HS-95) grew at a compound rate of 8.58 per cent a year in dollar terms and 12.00 per cent in rupee terms during 2015-16 to 2024-25. However, the segmented regression and the Chow test ($F = 0.335$, $p = 0.728$) find no statistically significant break in the export trend at 2020-21. The policy effect is visible instead on the import side, in the trade balance, which turned from a deficit of Rs. 1,445 crores in 2014-15 to a surplus of about Rs. 1,346 crores in 2025-26, and in the composition of exports, where toys proper raised their share of HS-95 exports from 43.6 to 60.9 per cent. The findings suggest that recent gains rest more on import compression than on a shift in export dynamism, and that benefits have reached organised producers faster than traditional artisans. The paper closes with suggestions for moving from protection to productivity.

Keywords: Toy industry; Industrial policy; Import substitution; Quality Control Order; National Action Plan for Toys; Interrupted time series; Grubel-Lloyd index; India

JEL Classification: F13, F14, L52, L67, O25

1. Introduction

Toys occupy an unusual place in industrial policy. They are cheap, labour-intensive goods whose production can be organised in a village workshop or in a fully automated moulding plant, and for that reason they have long served as an entry point for countries trying to build a manufacturing base. China's rise as the world's toy factory in the 1990s and 2000s is the best-known example. India, by contrast, entered the twenty-first century with a rich craft tradition in toys but a weak industrial base, and through the 2000s and 2010s its market was increasingly supplied from abroad. By 2014-15 India was importing toys worth about Rs. 2,033 crores while exporting only about Rs. 588 crores (Press Information Bureau [PIB], 2022b).

From 2020 the Government of India changed course. In February 2020 the basic customs duty on toys was raised from 20 to 60 per cent, and in March 2023 to 70 per cent (PIB, 2026). The Toys (Quality Control) Order made certification by the Bureau of Indian Standards (BIS) compulsory from 1 January 2021. A National Action Plan for Toys, coordinated by the Department for Promotion of Industry and Internal Trade (DPIIT) and involving 14 ministries, set out 21 action points. Cluster programmes were extended to toys, the Government of Karnataka launched a 400-acre toy cluster at Koppal, and traditional doll and toy makers were brought under the PM Vishwakarma scheme in 2023. Official releases have since reported that toy imports fell by about 70 per cent and exports rose by about 61 per cent between 2018-19 and 2021-22 (PIB, 2022a), and that India recorded a trade surplus in toys of about 152 million US dollars in 2025-26 (PIB, 2026).

These figures have been widely cited as evidence that the policy worked. Yet a sharp improvement in the trade balance is consistent with more than one story. It may reflect genuine gains in the competitiveness of Indian producers. It may equally reflect the fact that a tariff of 60 to 70 per cent, combined with consignment-level testing of imports, simply made foreign toys expensive and slow to clear. The two stories carry very different policy implications, and separating them requires more than a comparison of two end-points. Existing writing on the Indian toy sector is largely descriptive (FICCI & KPMG, 2021; Yadav & Tripathi, 2022), and the few quantitative studies predate the policy package (Sunny & Sund, 2014).

This paper attempts that separation using the longest consistent official series now available. Its contribution is threefold. First, it brings together scattered official data on toy trade, quality certification, factory employment and cluster development into one analytical frame, with all values expressed in Indian rupees at annual average exchange rates. Second, it applies a set of quantitative techniques, including trend and instability analysis, interrupted time series regression and structural break testing, that allow the post-2020 period to be compared formally with the trend that preceded it. Third, it relates the national findings to the position of traditional artisans and to the Koppal Toy Cluster, which is the setting of the larger doctoral study from which this paper is drawn.

The rest of the paper is organised as follows. Section 2 reviews the relevant literature. Section 3 states the objectives and hypotheses. Section 4 describes the data and methods. Section 5 outlines the policy instruments under study. Section 6 presents the data analysis, and Section 7 discusses the results. Section 8 lists the main findings, Section 9 offers suggestions, and Section 10 concludes.

2. Review of Literature

2.1 Industrial Policy, Protection and Import Substitution

The case for selective industrial policy in developing economies has been restated in recent years after a long period of scepticism. Rodrik (2008) argued that the relevant question is no longer whether governments should support particular sectors, but how they should design and discipline that support so that it encourages learning rather than rent-seeking. Harrison and Rodríguez-Clare (2010) reviewed the empirical evidence and concluded that tariff protection on its own has a weak record in raising productivity, whereas policies that address specific coordination failures, such as missing infrastructure or certification capacity, are more promising. Juhász et al. (2024) reached a broadly similar conclusion: the newer evidence is more favourable to industrial policy, but outcomes depend heavily on the instruments chosen and on state capacity. A central implication for the present

study is that a fall in imports following a tariff increase is not, by itself, evidence of a more capable domestic industry.

A second strand of work deals with clusters. Porter (1998) argued that geographic concentrations of linked firms raise productivity through shared suppliers, specialised labour and the rapid spread of knowledge. Schmitz and Nadvi (1999) showed, mainly with evidence from developing countries, that the benefits of clustering are not automatic and depend on joint action among firms and on links to outside buyers. Work on global value chains adds that the governance of buyer-supplier relations shapes whether small producers can upgrade (Gereffi et al., 2005; Kaplinsky & Morris, 2001). These ideas underlie the cluster-based approach of the National Action Plan for Toys and of State toy parks.

2.2 The Toy Industry and Toy Trade

Quantitative work on the Indian toy industry is limited. Sunny and Sund (2014) estimated labour, capital and total factor productivity for 2008-09 to 2011-12 and found that technology was the main source of productivity growth, but that a large share of units had closed as cheap Chinese toys captured the market. The National Productivity Council (2017) reported that toy imports in 2014-15 were nearly six times exports and that about 90 per cent of imports came from China. FICCI and KPMG (2021) described the industry as fragmented and import-dependent and identified weak design capability, limited testing infrastructure and poor brand building as its main constraints. Yadav and Tripathi (2022) reviewed the sector in the context of Atmanirbhar Bharat and pointed to low capital, limited technology and inadequate infrastructure as structural weaknesses, while noting an opportunity for eco-friendly handmade toys. Agarwal and Gupta (2026) examined the determinants of India's rising share in world toy trade after the policy changes of 2020.

International evidence is useful for interpreting the role of quality regulation. Beamish and Bapuji (2008) analysed two decades of toy recalls in the United States and found that most were caused by design flaws originating with the brand owners rather than by manufacturing faults in Asian factories. Their work suggests that safety regulation works best when it addresses design and materials throughout the value chain, not only at the border. Yazıcı (2020) studied the Turkish and world toy industries and found rising demand for wooden and environmentally friendly toys, a trend relevant to traditional Indian crafts. On the demand side, Al Kurdi (2017) and Richards et al. (2020) found that parents weigh safety, educational value and the child's interest when choosing toys, while Gardner et al. (2012) cautioned that many developmental claims made in toy marketing are not supported by evidence.

2.3 Craft Clusters and Traditional Toy Makers

Studies of craft producers in India consistently report low earnings, dependence on intermediaries and weak access to formal support. Liebl and Roy (2003) traced long-run trends in craft employment and output and attributed many of the sector's problems to the dispersed location of craftspeople, low education and limited information. Solanki (2008), surveying artisans across fifteen clusters, identified outdated technology, lack of training, inadequate finance and poor marketing as the main barriers. Ghouse (2012) ranked the problems of handicraft exporters and found infrastructure, market awareness and raw material costs at the top. Majeed and Swalehin (2021), evaluating government craft policies in Jammu and Kashmir, found that the benefits of many schemes did not reach their intended beneficiaries.

Studies of Karnataka's wooden toy clusters are directly relevant. Ranganathan (2018), studying price setting at Channapatna, found that artisans who identified strongly with their craft charged below-market prices to buyers who appreciated it. Rangaswamy et al. (2018) showed that Channapatna wooden toys required much less energy over their life cycle than PVC toys made in China. Krishnan (2021) documented artisans' dependence on middlemen and their limited awareness of government schemes, and reported earnings of around Rs. 300 a day. Gautam et al. (2024), in one of the very few studies to cover Kinnal in Koppal District, identified competition from machine-made products, scarcity of suitable timber and lack of financial and health support as common problems in both clusters.

2.4 Research Gap

Three gaps emerge from this review. First, no study has formally tested whether the post-2020 policy package changed the trajectory of India's toy trade, as opposed to its level. Second, the composition of export growth across product groups, and the concentration of trade partners, has not been analysed with standard trade indices. Third, the national evidence has not been related to the position of traditional artisans, who are formally exempted from the Quality Control Order but may not be reached by the cluster and investment model. The present paper addresses the first two gaps with quantitative analysis and draws out the implications for the third.

3. Objectives and Hypotheses

The paper has the following objectives:

- To document the Central and State Government initiatives for promoting toy manufacturing in India since 2014.
- To analyse the growth, instability and composition of India's toy trade before and after the policy package of 2020.
- To test whether the policy package produced a statistically significant change in the level or trend of exports.
- To assess changes in the trade balance, intra-industry trade and market concentration, and to draw policy implications, including for traditional artisans.

The following null hypotheses were tested:

Table 1: Hypotheses and Statistical Tests

Code	Null Hypothesis	Technique
H01	There is no significant trend in India's exports of toys, games and sports requisites (HS-95) during 2015-16 to 2024-25.	Exponential trend regression (t-test on slope)
H02	There is no significant change in the level of exports immediately after the policy package (2020-21).	Segmented regression (level-change coefficient)
H03	There is no significant change in the growth trend of exports after the policy package.	Segmented regression (slope-change coefficient); Chow test
H04	Mean annual exports do not differ between the pre-policy and post-policy periods.	Welch's t-test; Mann-Whitney U test
H05	There is no significant association between imports and exports of toys and games during 2001-2020.	Pearson and Spearman correlation; log-log regression

Source: Formulated by the authors.

4. Research Methodology and Methods

4.1 Research Design and Data Sources

The study follows an analytical research design based on secondary data. Four data sets were assembled. The first is the annual series of India's exports under HS chapter 95 (toys, games and sports requisites) for 2015-16 to 2024-25, together with export values at the four-digit level for selected years, published by the Directorate General of Commercial Intelligence and Statistics (DGCI&S, 2025). This is the longest consistent official annual series available for the post-2014 period, and it covers ten years, five before and five after the policy package. The second is the long-run series of India's imports and exports of toys and games for 2001 to 2020, compiled from UN Comtrade in FICCI and KPMG (2021). The third consists of official figures for the narrower toy group (HS 9503 to 9505) for selected financial years from 2014-15 to 2025-26, taken from PIB releases and replies in Parliament (PIB, 2022a, 2022b, 2023a, 2024, 2026). The fourth comprises supplementary indicators on BIS

licences, quality conformity, factory employment (Annual Survey of Industries, NIC 324), the source and destination structure of trade, and cluster programmes, drawn from the same official sources and from State Government policy documents.

4.2 Period of Study and Phases

For the main analysis, the period 2015-16 to 2024-25 is divided into two phases of equal length. Phase I (2015-16 to 2019-20) is treated as the pre-policy period and Phase II (2020-21 to 2024-25) as the post-policy period, since the duty increase took effect in February 2020 and compulsory certification in January 2021. The long-run series (2001-2020) is divided into two decades, 2001-2010 and 2011-2020, to trace the build-up of import dependence.

4.3 Conversion into Indian Rupees

Trade values are originally reported in US dollars. They have been converted into rupees at the annual average exchange rate of the Reserve Bank of India for each financial year, and at the annual average official rate for calendar years. Since the rupee depreciated from about Rs. 47 per dollar in 2001 to about Rs. 88 per dollar in 2025-26, growth rates in rupee terms include an exchange-rate component. All trend and break tests are therefore run on both the dollar series and the rupee series, and the dollar series is treated as the cleaner measure of real trade performance. The rates used are given in Table 2.

Table 2: Annual Average Exchange Rates Used

Financial Year	Rs. per US\$	Financial Year	Rs. per US\$
2014-15	61.14	2020-21	74.20
2015-16	65.46	2021-22	74.51
2016-17	67.07	2022-23	80.36
2017-18	64.45	2023-24	82.79
2018-19	69.89	2024-25	84.58
2019-20	70.88	2025-26	88.31

Source: Reserve Bank of India, Handbook of Statistics on Indian Economy.

4.4 Analytical Techniques

The following quantitative techniques were applied. Computations were carried out in Python using the statsmodels and SciPy libraries.

(a) Compound annual growth rate. The growth rate was estimated from the exponential trend function, which is linearised by taking logarithms:

$$\ln Y_t = a + b \cdot t + u_t \quad CAGR (\%) = [exp(b) - 1] \times 100$$

where Y_t is the value in year t , t is the time trend, and the significance of b is tested with the usual t -statistic.

(b) Instability index. Year-to-year fluctuation around the trend was measured with the Cuddy-Della Valle index (Cuddy & Della Valle, 1978), which corrects the coefficient of variation for the presence of trend:

$$CDVI = CV \times \sqrt{1 - \bar{R}^2}$$

where CV is the coefficient of variation in per cent and $\bar{R}^2$ is the adjusted coefficient of determination of the trend equation.

(c) Interrupted time series (segmented) regression. Following Wagner et al. (2002) and Bernal et al. (2017), the effect of the policy package on the level and trend of exports was estimated as:

$$\ln Y_t = \beta_0 + \beta_1 \cdot T_t + \beta_2 \cdot D_t + \beta_3 \cdot (T_t - 5) \cdot D_t + \varepsilon_t$$

where T_t runs from 1 to 10, D_t equals 1 from 2020-21 onwards and 0 otherwise, β_2 measures the immediate change in level and β_3 the change in the trend slope after the intervention. A counterfactual path was obtained by extending the Phase I trend into Phase II.

(d) Chow test. The stability of the trend equation across the two phases was tested with the Chow (1960) F-statistic:

$$F = [(S - S_1 - S_2) / k] / [(S_1 + S_2) / (n - 2k)]$$

where S is the residual sum of squares of the pooled regression, S_1 and S_2 those of the two sub-period regressions, k the number of parameters and n the number of observations.

(e) Tests of difference. Mean exports in the two phases were compared with Welch's t-test, which does not assume equal variances, and with the non-parametric Mann-Whitney U test, which is more suitable for small samples.

(f) Correlation and elasticity. Pearson's r and Spearman's ρ were computed between imports and exports for 2001-2020, and a double-log regression of exports on imports gave the elasticity of exports with respect to imports.

(g) Trade indices. The export-import ratio (X/M), the normalised trade balance, $(X - M)/(X + M)$, and the Grubel-Lloyd index of intra-industry trade (Grubel & Lloyd, 1975) were calculated:

$$GL = 1 - |X - M| / (X + M)$$

GL takes values between 0 (trade entirely one-way) and 1 (exports equal to imports).

(h) Concentration and composition. The Hirschman-Herfindahl index, $HHI = \sum s_i^2$, with shares s_i in per cent, was used to measure the concentration of import sources and export destinations (Hirschman, 1964). The contribution of each four-digit product group to the total increase in exports was computed as $\Delta X_i / \Delta X \times 100$.

4.5 Limitations of the Method

The analysis has three limitations. First, the HS-95 export series includes sports goods (HS 9506), which were not targeted by the toy policy; the composition analysis in Section 6.6 addresses this partly by separating the toy groups. Second, ten annual observations give limited statistical power, so a non-significant result should be read as an absence of evidence of a break rather than as proof that no effect exists. Third, the post-policy period overlaps with the COVID-19 pandemic and with tariff changes in the United States, India's largest export market, which may have influenced trade independently of Indian policy.

5. The Policy Package: An Overview

Table 3 sets out the principal Central and State Government instruments introduced for the toy sector, arranged in chronological order.

Table 3: Chronology of Major Policy Instruments for the Toy Sector

Year	Instrument	Level	Main Provisions
2014	Make in India	Central	Investment promotion; 100% FDI through automatic route
Feb 2020	Basic customs duty raised from 20% to 60%	Central	Protection against low-priced imports
Feb 2020	Toys (Quality Control) Order notified	Central	BIS certification compulsory from 1 January 2021; exemption for registered artisans and GI users
2020	National Action Plan for Toys	Central	14 ministries; 21 action points
2020-21	SFURTI toy clusters	Central (MSME)	18-19 clusters in seven States; about 11,749 artisans

Year	Instrument	Level	Main Provisions
Jan 2021	Koppal Toy Cluster (foundation)	Karnataka	About 400 acres; announced investment Rs. 4,000-5,000 crore; 25,000-30,000 jobs targeted
Feb 2021	India Toy Fair; Toycathon	Central	Promotion and design innovation
Mar 2023	Basic customs duty raised to 70%	Central	Further protection
Sep 2023	PM Vishwakarma	Central (MSME)	Traditional doll and toy makers among 18 trades; toolkit of Rs. 15,000; loans at 5%
2025	Toy Manufacturing Policy	Tamil Nadu	First dedicated State toy policy; capital and payroll subsidies
2025-26	Union Budget toy scheme	Central	Scheme to make India a global toy hub; clusters, skills, artisans and MSMEs

Source: PIB (2022b, 2023b, 2024, 2025, 2026); Government of Tamil Nadu (2025); Invest India (2020).

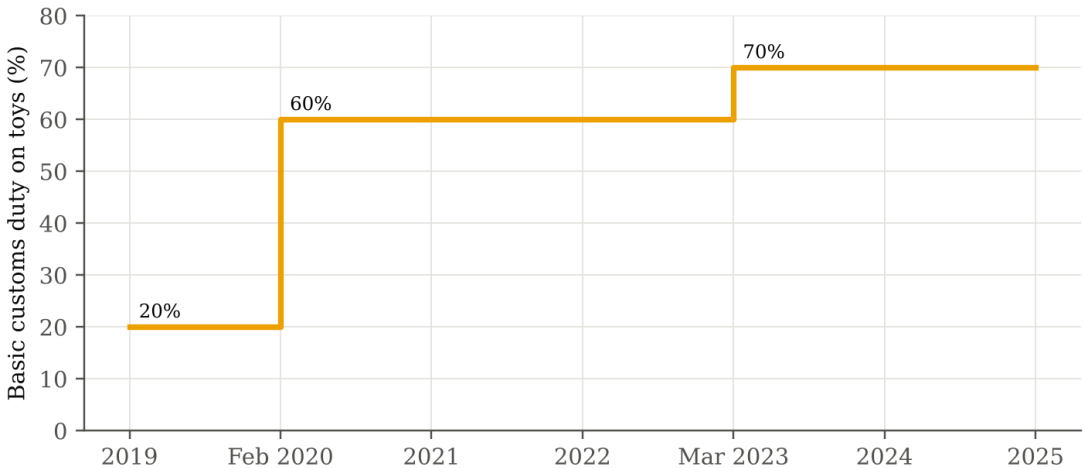


Figure 1: Basic Customs Duty on Toys (HS 9503), 2019 to 2025

Source: PIB (2026).

The package combines a strong border element (tariffs and quality control at entry) with domestic capability measures (clusters, skills, design and credit). The analysis that follows asks which of these two elements is reflected in the trade data.

6. Data Analysis

6.1 Trend in Exports of Toys, Games and Sports Requisites

Table 4: India's Exports under HS-95, 2015-16 to 2024-25

Sl. No.	Year	Exports (US\$ Million)	Exports (Rs. Crore)	Annual Growth in Rs. (%)	Share in India's Total Exports (%)
1	2015-16	289.56	1,895.5	-	0.11
2	2016-17	294.96	1,978.3	4.37	0.11
3	2017-18	305.83	1,971.1	-0.37	0.10
4	2018-19	417.43	2,917.4	48.01	0.13
5	2019-20	404.15	2,864.6	-1.81	0.13
6	2020-21	402.44	2,986.1	4.24	0.14
7	2021-22	546.09	4,068.9	36.26	0.13
8	2022-23	520.69	4,184.3	2.83	0.12

Sl. No.	Year	Exports (US\$ Million)	Exports (Rs. Crore)	Annual Growth in Rs. (%)	Share in India's Total Exports (%)
9	2023-24	523.24	4,331.9	3.53	0.12
10	2024-25	570.95	4,829.1	11.48	0.13

Source: DGCI&S (2025). Rupee values and growth rates computed by the authors.

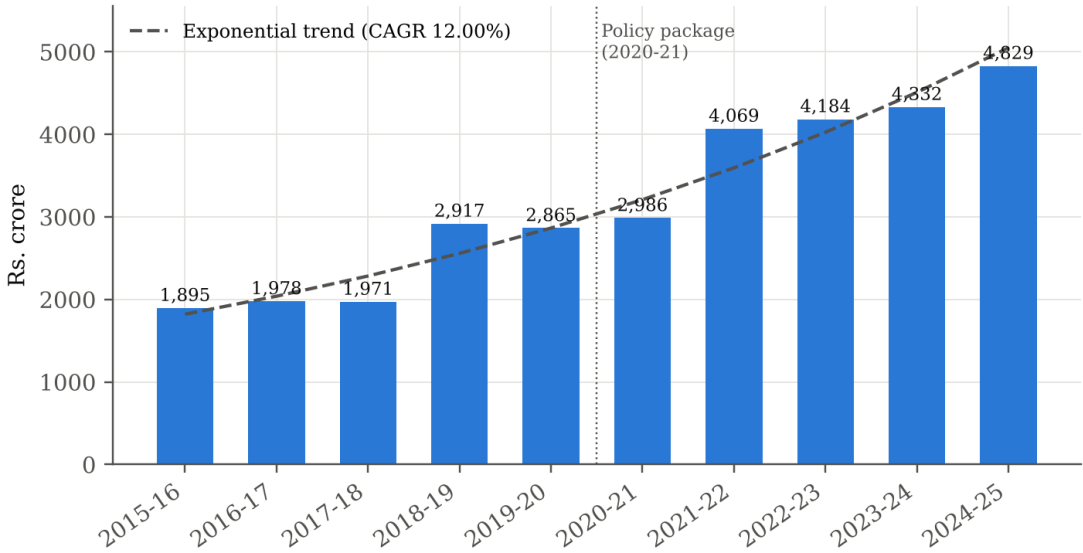


Figure 2: India's Exports under HS-95 with Exponential Trend (Rs. Crore)

Source: Table 4.

Exports under HS-95 rose from about Rs. 1,895 crore in 2015-16 to about Rs. 4,829 crore in 2024-25, an increase of about 155 per cent in rupee terms and 97 per cent in dollar terms. Growth was uneven. Two large jumps stand out, in 2018-19 (36.5 per cent in dollar terms) and 2021-22 (35.7 per cent), separated and followed by years of near-stagnation. The first jump came before the policy package and is attributed by DGCI&S (2025) to intensive participation by the Sports Goods Export Promotion Council in international fairs. Despite the growth, the sector's share in India's total merchandise exports stayed between 0.10 and 0.14 per cent throughout, showing that toys remain a very small item in the export basket.

6.2 Growth and Instability

Table 5: Descriptive Statistics, Growth and Instability of HS-95 Exports

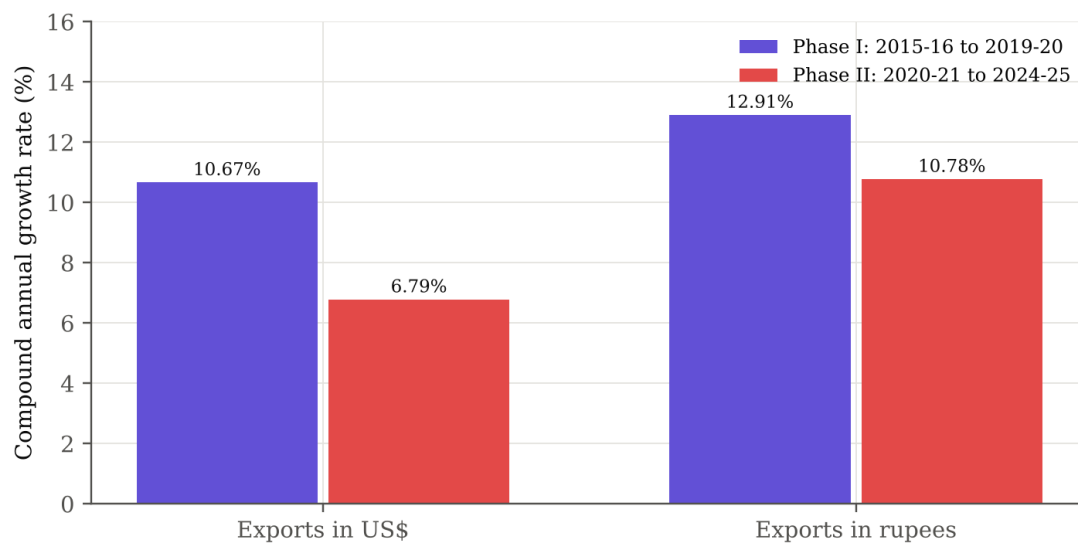
Indicator	Overall (2015-16 to 2024-25)	Phase I (2015-16 to 2019-20)	Phase II (2020-21 to 2024-25)
Mean (US\$ million)	427.53	342.39	512.68
Mean (Rs. crore)	3,202.71	2,325.37	4,080.06
Standard deviation (Rs. crore)	1,085.34	517.71	676.79
Coefficient of variation, US\$ (%)	25.28	18.37	12.66
CAGR, US\$ (%)	8.58	10.67	6.79
CAGR, Rs. (%)	12.00	12.91	10.78
Cuddy-Della Valle index, US\$	8.59	9.55	9.49
Cuddy-Della Valle index, Rs.	8.77	11.97	8.33

Source: Computed by the authors from Table 4.

Table 6: Exponential Trend Regression Results for HS-95 Exports

Series	Constant (a)	Slope (b)	t-value	p-value	R ²	F	CAGR (%)
Overall, US\$	5.5749	0.0823	8.36	<0.001	0.897	69.89	8.58
Overall, Rs.	7.3935	0.1134	11.24	<0.001	0.940	126.25	12.00
Phase I, US\$	-	-	3.44	0.041	0.797	-	10.67
Phase II, US\$	-	-	2.03	0.136	0.578	-	6.79
Phase I, Rs.	-	-	3.29	0.046	0.783	-	12.91
Phase II, Rs.	-	-	3.59	0.037	0.811	-	10.78

Note: Dependent variable is the natural logarithm of exports; t is the time trend. Source: Computed by the authors.

**Figure 3: Compound Annual Growth Rate of HS-95 Exports by Phase**

Source: Tables 5 and 6.

The trend regression for the full period is highly significant in both currencies ($t = 8.36$ for the dollar series and 11.24 for the rupee series, $p < 0.001$), so H_01 is rejected. Exports grew at a compound rate of 8.58 per cent a year in dollar terms and 12.00 per cent in rupee terms; the difference of about 3.4 percentage points reflects depreciation of the rupee. The Durbin-Watson statistics (2.37 and 2.54) do not indicate serious positive autocorrelation.

The phase-wise comparison is more revealing. In dollar terms, the growth rate was higher before the policy package (10.67 per cent) than after it (6.79 per cent), and the Phase II trend is not statistically significant ($p = 0.136$). Average exports were clearly higher in Phase II, but much of that higher level had already been reached by 2018-19. Relative variability, measured by the coefficient of variation, fell from 18.37 to 12.66 per cent, but once the trend is removed, the Cuddy-Della Valle index is almost identical in the two phases (9.55 and 9.49). In other words, the policy period has not been associated with either faster or more stable growth of exports in dollar terms.

6.3 Testing for a Policy Break

Table 7: Interrupted Time Series (Segmented) Regression: HS-95 Exports

Variable	Coefficient	Standard Error	t-value	p-value
Constant (β_0)	5.5186	0.1028	53.70	<0.001
Time trend (β_1)	0.1014	0.0310	3.27	0.017
Level change after 2020-21 (β_2)	0.0099	0.1277	0.08	0.941
Trend change after 2020-21 (β_3)	-0.0357	0.0438	-0.82	0.446
R ² / Adjusted R ²	0.908 / 0.861			
F-statistic (p-value)	19.64 (0.0017)			
Durbin-Watson	2.67			

Note: Dependent variable is $\ln(\text{exports in US\$ million})$, $n = 10$. Source: Computed by the authors.

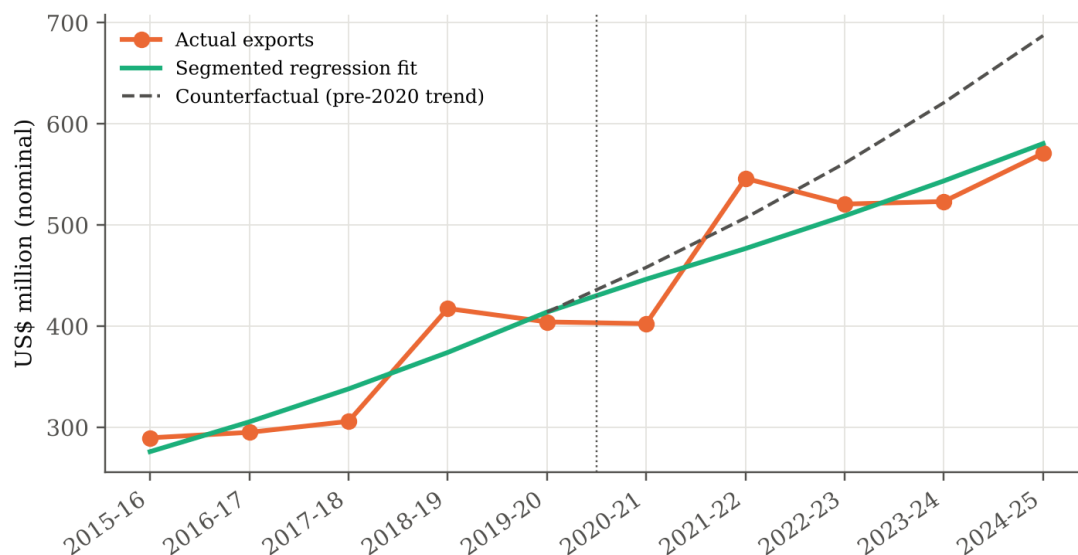


Figure 4: Actual, Fitted and Counterfactual HS-95 Exports (US\$ Million)

Source: Computed by the authors from DGCI&S (2025).

The segmented regression explains about 91 per cent of the variation in log exports, and the model as a whole is significant ($F = 19.64$, $p = 0.0017$). However, all of the explanatory power comes from the underlying time trend ($\beta_1 = 0.1014$, $p = 0.017$), which implies a pre-policy growth rate of about 10.7 per cent a year. The level-change coefficient is close to zero ($\beta_2 = 0.0099$, $p = 0.941$), and the trend-change coefficient is negative but not significant ($\beta_3 = -0.0357$, $p = 0.446$). H_{02} and H_{03} therefore cannot be rejected.

Figure 4 makes the point visually. Had exports simply continued along their Phase I trend, they would have reached about 687 million US dollars by 2024-25, compared with an actual value of 571 million. Actual exports in Phase II fell below the counterfactual in every year except 2021-22. This should not be read as evidence that the policy reduced exports, because the Phase I trend was inflated by the one-off jump of 2018-19 and because the pandemic disrupted trade in 2020-21. It does show that the post-2020 export performance of HS-95 products was in line with, not above, the trend already established before the policy package.

Table 8: Structural Break and Difference Tests

Test	Statistic	Degrees of Freedom	p-value	Decision
Chow test for structural break at 2020-21	F = 0.335	(2, 6)	0.728	Do not reject H03
Welch's t-test, mean exports Phase II vs Phase I	t = 4.214	Welch-adjusted	0.0029	Reject H04
Mann-Whitney U test (one-tailed)	U = 23	n ₁ = n ₂ = 5	0.0159	Reject H04

Source: Computed by the authors.

The Chow test confirms the absence of a structural break (F = 0.335, p = 0.728). At the same time, both the parametric and non-parametric tests show that mean exports in Phase II were significantly higher than in Phase I (Welch's t = 4.21, p = 0.0029; U = 23, p = 0.0159), so H04 is rejected. The two results are consistent: exports were higher after 2020 because they were on a rising path, not because the path itself shifted.

6.4 Long-Run Trade Pattern, 2001 to 2020

Table 9: India's Trade in Toys and Games, 2001 to 2020

Sl. No.	Year	Imports (Rs. Crore)	Exports (Rs. Crore)	Trade Balance (Rs. Crore)	X/M Ratio	GL Index
1	2001	108.1	96.7	-11.4	0.90	0.945
2	2002	96.7	65.1	-31.6	0.67	0.805
3	2003	103.9	62.9	-41.0	0.61	0.754
4	2004	136.9	77.0	-59.9	0.56	0.720
5	2005	218.3	99.2	-119.1	0.45	0.625
6	2006	349.3	110.1	-239.2	0.32	0.479
7	2007	354.0	76.9	-277.1	0.22	0.357
8	2008	217.6	126.6	-91.0	0.58	0.736
9	2009	498.6	162.7	-335.9	0.33	0.492
10	2010	828.2	215.8	-612.4	0.26	0.413
11	2011	1,255.9	274.4	-981.5	0.22	0.359
12	2012	1,494.7	473.5	-1,021.2	0.32	0.481
13	2013	1,919.2	548.5	-1,370.7	0.29	0.445
14	2014	1,906.0	706.7	-1,199.3	0.37	0.541
15	2015	2,353.0	889.1	-1,463.9	0.38	0.548
16	2016	2,211.6	1,010.7	-1,200.9	0.46	0.627
17	2017	2,189.3	1,269.8	-919.5	0.58	0.734
18	2018	2,681.6	1,633.8	-1,047.8	0.61	0.757
19	2019	2,614.0	1,579.5	-1,034.5	0.60	0.753
20	2020	2,885.5	1,482.7	-1,402.8	0.51	0.679

Source: FICCI and KPMG (2021), based on UN Comtrade; rupee values and indices computed by the authors.

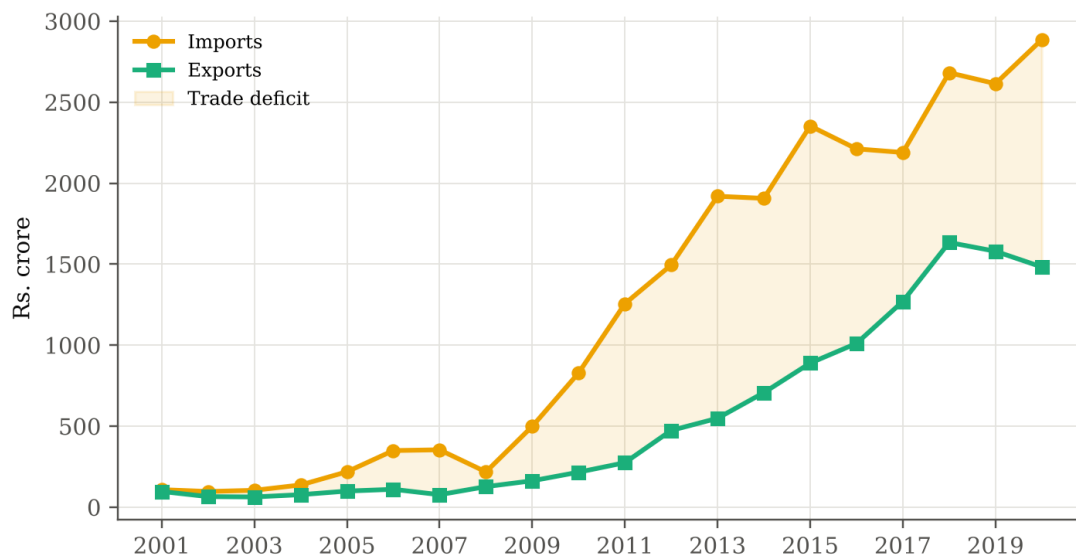


Figure 5: India's Imports and Exports of Toys and Games, 2001 to 2020 (Rs. Crore)

Source: Table 9.

Table 10: Growth and Instability of Toy Imports and Exports, 2001 to 2020

Indicator	Imports 2001- 2010	Imports 2011- 2020	Imports 2001- 2020	Exports 2001- 2010	Exports 2011- 2020	Exports 2001- 2020
CAGR, US\$ (%)	25.69	3.90	19.29	11.61	15.55	18.37
t-value of trend	6.98	5.55	11.88	4.27	8.67	18.03
R ²	0.859	0.794	0.887	0.695	0.904	0.948
Coefficient of variation (%)	78.44	12.69	73.39	43.35	41.18	89.40
Cuddy-Della Valle index	31.23	6.11	25.35	25.41	13.54	21.04

Note: All trend coefficients significant at the 1 per cent level. Source: Computed by the authors.

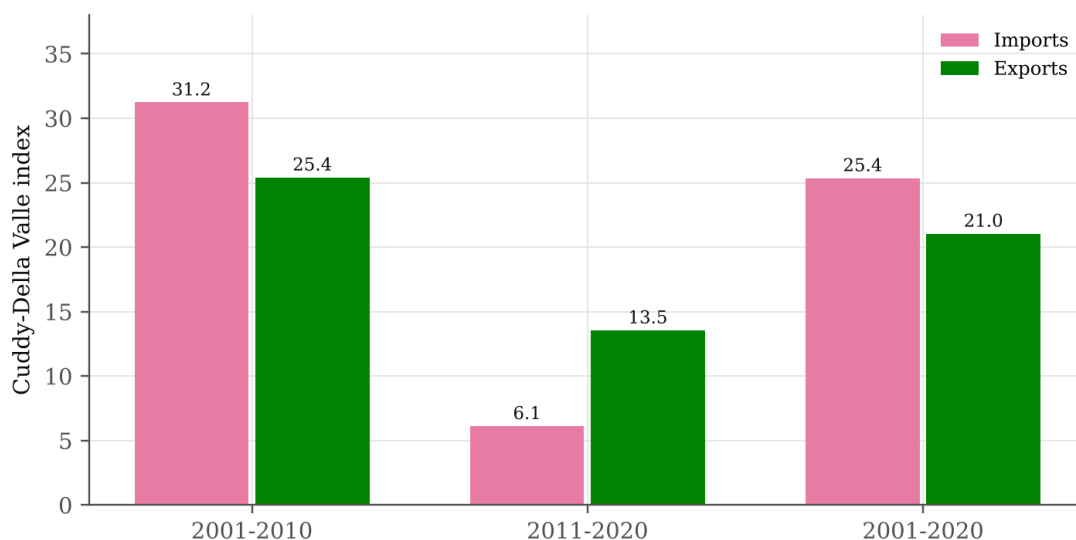


Figure 6: Instability of Toy Imports and Exports by Decade (Cuddy-Della Valle Index)

Source: Table 10.

The long-run series shows how import dependence was built up. Imports grew at 25.69 per cent a year in dollar terms during 2001-2010, roughly twice the growth rate of exports (11.61 per cent), and this growth was very

unstable (CDVI = 31.23). In the second decade the position changed: import growth slowed to 3.90 per cent a year and became much more stable, while exports accelerated to 15.55 per cent a year. The export-import ratio, which had fallen from 0.90 in 2001 to 0.22 in 2007 and 2011, recovered to about 0.60 by 2018-2019. This finding is important for interpreting the post-2020 data. The correction in India's toy trade began around 2014, several years before the duty increase, and the policy package accelerated a process that was already under way.

Table 11: Correlation and Elasticity between Imports and Exports, 2001 to 2020

Statistic	Value	p-value	Interpretation
Pearson correlation (r)	0.906	<0.001	Strong positive linear association
Spearman rank correlation (ρ)	0.973	<0.001	Strong positive monotonic association
Elasticity of exports w.r.t. imports	0.863	<0.001	1% rise in imports associated with 0.86% rise in exports
R ² of log-log regression	0.870	-	Goodness of fit

Source: Computed by the authors.

H05 is rejected. Imports and exports moved closely together over 2001-2020 ($r = 0.906$; $\rho = 0.973$), and the elasticity of exports with respect to imports was 0.863. Part of this co-movement reflects common trends in income and trade, but it is also consistent with the view that the Indian toy industry relies on imported inputs, so that exports and imports rise together. The Grubel-Lloyd index averaged 0.613 over the period (Figure 7), indicating a moderate level of two-way trade. It fell sharply between 2001 and 2011 as trade became one-way (imports) and then recovered.

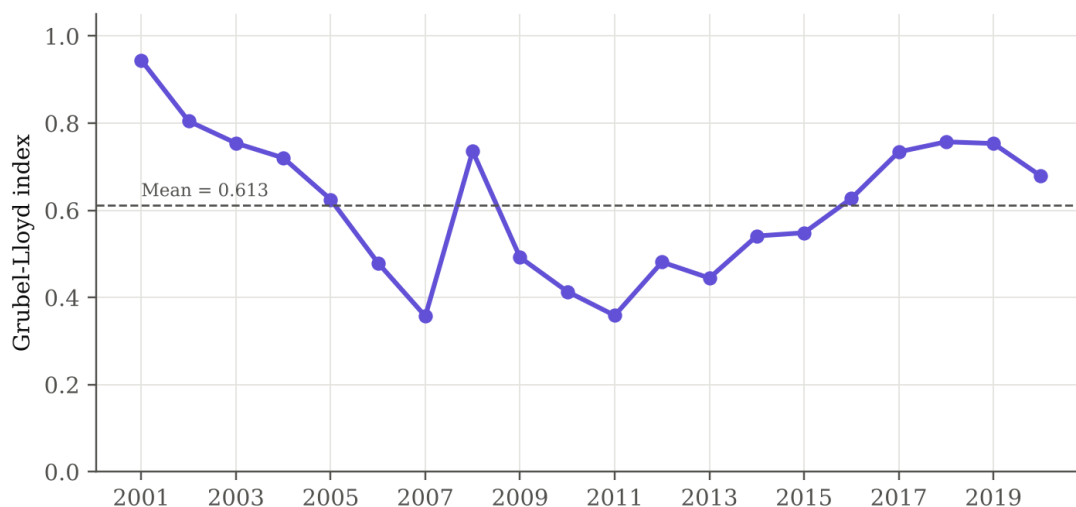


Figure 7: Grubel-Lloyd Index of Intra-Industry Trade in Toys and Games, 2001 to 2020

Source: Table 9.

6.5 Trade Balance and Intra-Industry Trade in Toys (HS 9503 to 9505)

Table 12: Trade Indicators for Toys (HS 9503 to 9505), Selected Years

Sl. No.	Year	Exports (Rs. Crore)	Imports (Rs. Crore)	Trade Balance (Rs. Crore)	X/M Ratio	Normalised Trade Balance	GL Index
1	2014-15	588.0	2,033.2	-1,445.2	0.29	-0.551	0.449
2	2017-18	984.2	2,357.0	-1,372.8	0.42	-0.411	0.589
3	2018-19	1,422.3	2,597.8	-1,175.5	0.55	-0.292	0.708
4	2021-22	2,433.7	817.5	1,616.2	2.98	0.497	0.503

Sl. No.	Year	Exports (Rs. Crore)	Imports (Rs. Crore)	Trade Balance (Rs. Crore)	X/M Ratio	Normalised Trade Balance	GL Index
5	2022-23	2,619.7	1,277.7	1,342.0	2.05	0.344	0.656
6	2025-26	3,397.3	2,051.4	1,345.9	1.66	0.247	0.753

Source: PIB (2022a, 2022b, 2023a, 2026); Lok Sabha reply of the Ministry of Commerce and Industry (July 2026); imports for 2017-18 derived from the reported deficit. Rupee values and indices computed by the authors.

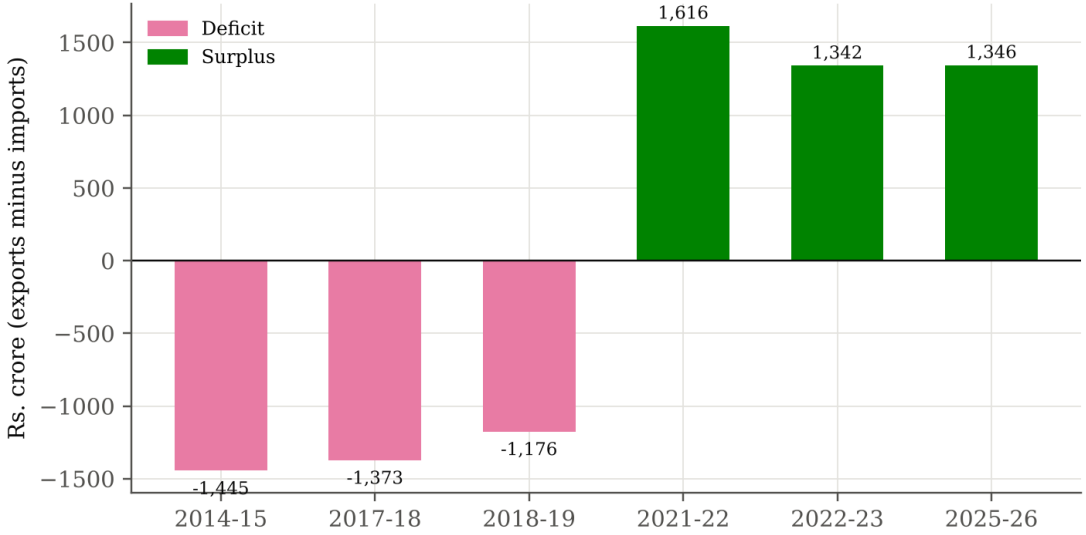


Figure 8: Trade Balance in Toys (HS 9503 to 9505), Selected Years (Rs. Crore)
Source: Table 12.

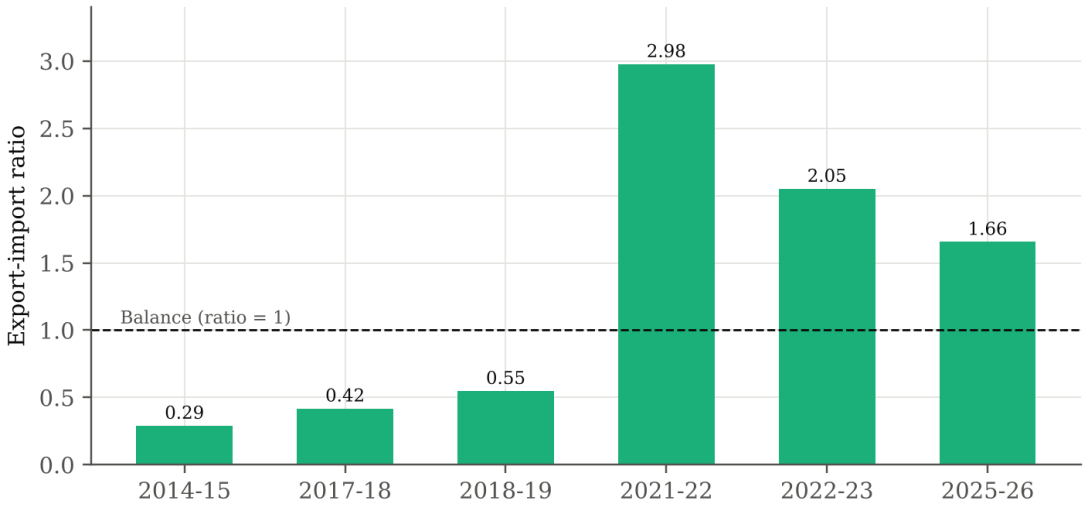


Figure 9: Export-Import Ratio for Toys (HS 9503 to 9505), Selected Years
Source: Table 12.

The narrower toy group, which was the direct target of the duty increase and the Quality Control Order, shows a much sharper change than HS-95 as a whole. The normalised trade balance moved from -0.551 in 2014-15 to +0.497 in 2021-22, and the export-import ratio from 0.29 to 2.98. The turning point lies between 2018-19 and 2021-22, which coincides with the policy package. Imports fell from about Rs. 2,598 crores to Rs. 818 crores over these three years, a decline of nearly 69 per cent in rupee terms, and imports from China fell from about Rs. 1,666 crores in 2019-20 to Rs. 313 crores in 2022-23 (DPIIT data cited in PIB, 2024).

Two features of the later years deserve attention. First, imports recovered after 2021-22, reaching about Rs. 2,051 crores in 2025-26, so that the export-import ratio fell back to 1.66. Second, as a result, the Grubel-Lloyd index rose from 0.503 in 2021-22 to 0.753 in 2025-26. In other words, after an initial phase of import compression,

India's toy trade has moved towards more two-way exchange, which is the normal pattern for differentiated manufactured goods (Grubel & Lloyd, 1975). The surplus remains, but it is narrowing in relative terms.

6.6 Composition of Export Growth

Table 13: Composition and Sources of Growth of HS-95 Exports, 2015-16 and 2024-25

HS Code	Product Group	2015-16 (Rs. Crore)	2024-25 (Rs. Crore)	Share 2015-16 (%)	Share 2024-25 (%)	CAGR, US\$ (%)	Contribution to Growth (%)
9503	Toys, dolls, models and puzzles	427.9	1,433.3	22.57	29.68	11.16	36.99
9504	Video game consoles and table games	87.5	317.3	4.61	6.57	12.16	8.59
9505	Festive and carnival articles	310.5	1,188.3	16.38	24.61	12.82	33.07
9506	Sports and exercise equipment	951.7	1,664.1	50.21	34.46	3.42	18.25
9507	Fishing tackle	61.3	87.5	3.24	1.81	1.10	0.34
9508	Amusement rides and travelling shows	56.6	138.6	2.98	2.87	7.37	2.75
	Total HS-95	1,895.5	4,829.1	100.00	100.00	7.84	100.00

Note: CAGR computed from end-point values. Source: DGCI&S (2025); computed by the authors.

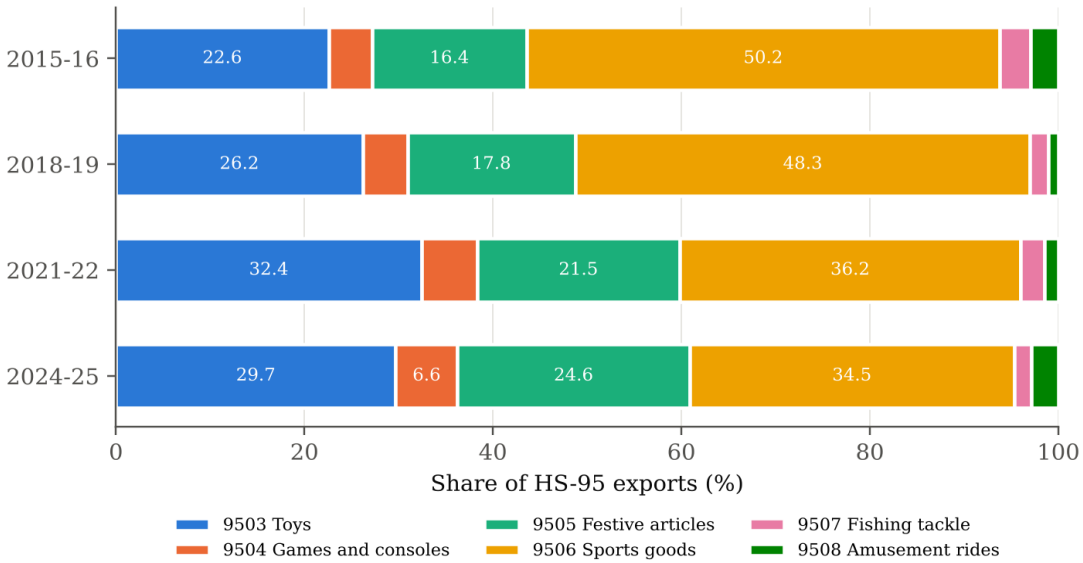


Figure 10: Composition of HS-95 Exports by Four-Digit Product Group (%)

Source: DGCI&S (2025).

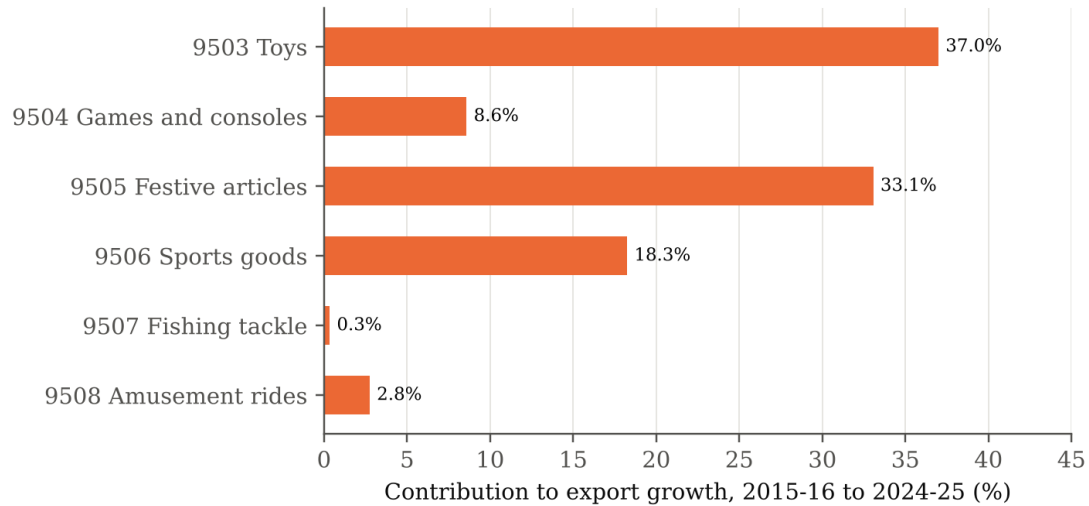


Figure 11: Contribution of Product Groups to Growth of HS-95 Exports, 2015-16 to 2024-25
Source: Table 13.

The composition analysis supports a more favourable reading of the policy than the aggregate series. In 2015-16, sports goods (HS 9506) made up half of HS-95 exports, and the three toy groups (HS 9503 to 9505) only 43.6 per cent. By 2024-25 the toy groups accounted for 60.9 per cent. Their combined exports grew at 11.91 per cent a year, against 3.42 per cent for sports goods. Toys proper (HS 9503) and festive articles (HS 9505) together contributed about 70 per cent of the total increase in exports over the decade. The aggregate HS-95 series therefore understates the growth of toys, because it is weighed down by the slow-growing sports goods segment.

There is, however, a caution. Exports of toys proper (HS 9503) peaked at 177.04 million US dollars in 2021-22 and fell to 169.46 million in 2024-25, even in nominal terms. The surge in toy exports was concentrated in the first two years after the policy package and has not been sustained since. The continued growth of the HS 9505 group is driven mainly by articles for Christmas festivities, which were India's single largest HS-95 export item in 2024-25 (DGCI&S, 2025).

6.7 Concentration of Trade Partners

Table 14: Concentration of India's Toy Trade Partners

Measure	Import Sources (2020-21)	Export Destinations (2020-21)
Largest partner	China (71.1%)	United States (33.5%)
Share of top three partners (%)	79.5	52.8
Hirschman-Herfindahl index (named partners)	5,110	1,400
Degree of concentration	Highly concentrated (HHI above 2,500)	Unconcentrated (HHI below 1,500)

Note: HHI computed from named partners only and is therefore a lower bound. Source: Ministry of Commerce and Industry; computed by the authors.

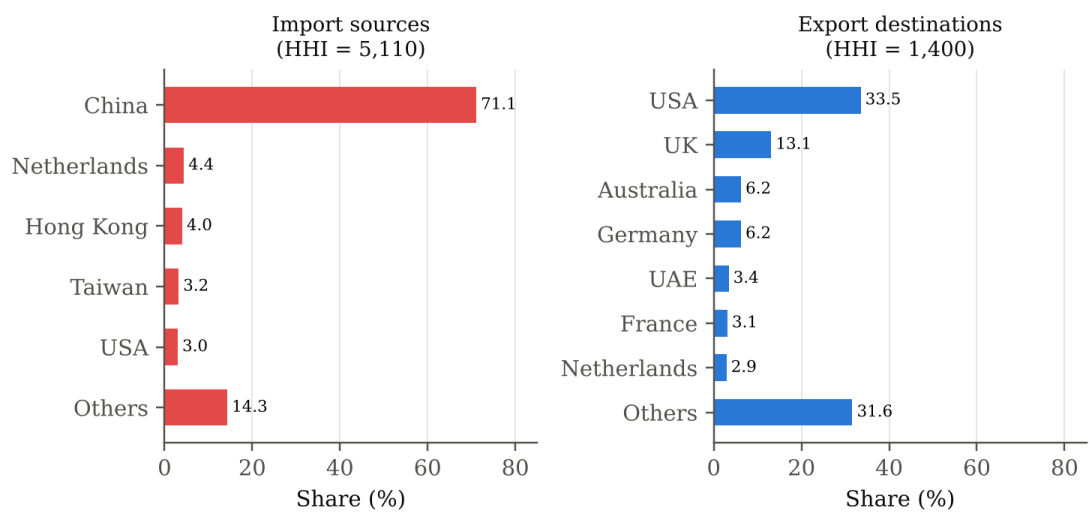


Figure 12: Partner Shares in India's Toy Imports and Exports, 2020-21 (%)

Source: Ministry of Commerce and Industry.

Even as a lower bound, the import HHI of 5,110 indicates extreme dependence on a single supplier, while the export HHI of 1,400 indicates a diversified set of markets. The policy package reduced China's share of India's toy imports from 84 per cent in 2019-20 to 62 per cent in 2022-23 (PIB, 2024), which would lower the import HHI substantially. On the export side, DGCIS (2025) reports that the share of the United States in HS-95 exports rose from 22.4 per cent in 2015-16 to almost 38 per cent in 2024-25, partly because American buyers sought alternatives to Chinese suppliers. Export concentration is therefore rising, which exposes Indian exporters to changes in US trade policy.

6.8 Other Outcome Indicators

Table 15: Supplementary Outcome Indicators of the Policy Package

Indicator	Base Value	Latest Value	Change	Source
BIS licences, domestic manufacturers	1,454 (Jan 2024)	1,786 (May 2026)	+22.8%	PIB (2024, 2026)
BIS licences, foreign manufacturers	36 (Jan 2024)	56 (May 2026)	+55.6%	PIB (2024, 2026)
Toys conforming to BIS norms	33% (2019)	95% (2025)	+62 percentage points	Lok Sabha reply (2026)
Employment in registered toy factories (NIC 324)	8,685 (2018-19)	17,693 (2023-24)	+103.7% (CAGR 15.29%)	PIB (2026)
Toy imports from China	Rs. 1,665.7 crore (2019-20)	Rs. 313.4 crore (2022-23)	-81.2%	PIB (2024)
China's share of toy imports	84% (2019-20)	62% (2022-23)	-22 percentage points	PIB (2024)
Toy exports, HS 9503 to 9505	Rs. 984.2 crore (2017-18)	Rs. 3,397.3 crore (2025-26)	CAGR 12.24% (US\$)	PIB (2026)

Indicator	Base Value	Latest Value	Change	Source
SFURTI toy clusters	-	18 clusters; about 11,749 artisans	-	PIB (2022b, 2026)
Koppal Toy Cluster units	More than 100 (target)	3 operating (Dec 2023)	Well below target	Press reports

Source: As indicated; rupee values computed by the authors.

The supplementary indicators show clear progress on quality and on the organised factory sector. Conformity of toys with BIS standards rose from 33 to 95 per cent, and employment in registered toy factories doubled within five years, a compound growth rate of 15.29 per cent. On the other hand, the Koppal Toy Cluster, the most ambitious State-level project, had only three units in operation by the end of 2023 against a target of more than 100, and DGCI&S (2025) observed that Koppal, despite being identified as an export hub for plastic and electronic toys, had not yet shown a significant rise in exports.

7. Results and Discussion

The results can be summarised in the hypothesis-testing framework of Table 16 and then interpreted.

Table 16: Summary of Hypothesis Testing

Code	Null Hypothesis	Test Result	Decision
H01	No significant trend in HS-95 exports	$t = 8.36, p < 0.001$	Rejected
H02	No level change after 2020-21	$\beta_2 = 0.0099, p = 0.941$	Not rejected
H03	No trend changes after 2020-21	$\beta_3 = -0.0357, p = 0.446$; Chow $F = 0.335, p = 0.728$	Not rejected
H04	No difference in mean exports between phases	Welch $t = 4.21, p = 0.0029$; $U = 23, p = 0.0159$	Rejected
H05	No association between imports and exports, 2001-2020	$r = 0.906, p < 0.001$	Rejected

Source: Tables 6, 7, 8 and 11.

Three main results emerge. The first is that the policy package is clearly associated with a sharp fall in imports and a reversal of the trade balance in the toy group directly targeted by the measures. This is consistent with the official account (PIB, 2022a, 2026). The size and timing of the change, a fall of about two-thirds in imports between 2018-19 and 2021-22, and the specific collapse of imports from China, point strongly to the duty increase and to consignment-level quality testing as the main causes. These are border measures, and their effect was immediate.

The second result is that there is no statistical evidence that the package changed the trajectory of exports. The segmented regression and the Chow test both fail to find a break at 2020-21, and growth in dollar terms was faster in the five years before the package than in the five years after. Some of this is explained by special factors, notably the jump of 2018-19 and the pandemic year of 2020-21, and the short series limits the power of the tests. Even allowing for this, the evidence does not support the claim that the policy has created a step change in India's export competitiveness. This finding fits the view of Harrison and Rodríguez-Clare (2010) that protection tends to change the composition of domestic supply more readily than it raises productivity, and it echoes concerns raised in the Indian debate that the surplus is partly a product of tariff walls.

The third result is that the policy has nonetheless changed the composition of trade in a favourable direction. The share of toys proper and festive articles in HS-95 exports rose from under half to more than three-fifths, and the

long-run data show that the correction of import dependence began around 2014, before the package, and was accelerated by it. Taken with the rise in BIS conformity and the doubling of factory employment, this suggests that a modern toy manufacturing segment is taking shape, concentrated in organised units. The rising Grubel-Lloyd index after 2021-22 also suggests that Indian producers are becoming part of two-way trade in differentiated toys and components, which is what one would expect if they are integrating into global value chains (Gereffi et al., 2005).

The position of traditional toy makers is less clear. The Quality Control Order exempts registered artisans and GI users, which protects crafts such as Kinnal and Channapatna from certification costs. But the main growth instruments, the large toy parks and the cluster incentives, are designed for factory production of plastic and electronic toys. The Koppal Toy Cluster, located in the same district as the GI-registered Kinnal craft, has no reported link with traditional artisans and has fallen well short of its own targets. Studies of Channapatna and Kinnal continue to report low earnings, dependence on middlemen and limited awareness of schemes (Gautam et al., 2024; Krishnan, 2021). The benefits of the policy package appear to have reached organised producers faster than the artisanal segment, which is consistent with earlier findings on the uneven reach of craft schemes (Majeed & Swalehin, 2021; Solanki, 2008).

8. Major Findings

- India's exports of toys, games and sports requisites (HS-95) grew at 8.58 per cent a year in dollar terms and 12.00 per cent in rupee terms during 2015-16 to 2024-25, reaching about Rs. 4,829 crore, but their share in total exports remained between 0.10 and 0.14 per cent.
- Growth in dollar terms was faster in the pre-policy phase (10.67 per cent) than in the post-policy phase (6.79 per cent), and instability around the trend was virtually unchanged (CDVI 9.55 and 9.49).
- Segmented regression and the Chow test ($F = 0.335$, $p = 0.728$) found no significant break in the level or trend of HS-95 exports at 2020-21, although mean exports were significantly higher in the later phase.
- Over 2001-2020, toy imports grew at 19.29 per cent and exports at 18.37 per cent a year; import growth slowed sharply in 2011-2020 (3.90 per cent), showing that the correction of import dependence predates the 2020 package.
- Imports and exports were strongly correlated ($r = 0.906$), with an export elasticity of 0.863 with respect to imports, consistent with reliance on imported inputs.
- In the toy group (HS 9503 to 9505), the trade balance moved from a deficit of about Rs. 1,445 crore in 2014-15 to a surplus of about Rs. 1,346 crore in 2025-26; the export-import ratio peaked at 2.98 in 2021-22 and fell to 1.66 by 2025-26 as imports recovered.
- The Grubel-Lloyd index for toys rose from 0.503 in 2021-22 to 0.753 in 2025-26, indicating a shift from one-way to two-way trade.
- The share of toy groups in HS-95 exports rose from 43.6 to 60.9 per cent; toys proper and festive articles contributed about 70 per cent of export growth, but exports of toys proper (HS 9503) have declined since 2021-22.
- Import sources were extremely concentrated (HHI at least 5,110, China 71.1 per cent in 2020-21), while export destinations were diversified (HHI 1,400), though the US share has risen to nearly 38 per cent.
- Quality conformity rose from 33 to 95 per cent and registered factory employment doubled between 2018-19 and 2023-24, but the Koppal Toy Cluster has fallen well short of its targets, and traditional artisans have gained mainly through exemptions rather than growth-oriented support.

9. Suggestions and Policy Implications

- **Move from protection to productivity.** Since export dynamism has not improved significantly, the 70 per cent duty should be treated as a temporary measure. A time-bound schedule for reducing it, linked to measurable gains in productivity and design, would encourage firms to invest rather than rely on protection.
- **Reduce dependence on imported inputs.** The strong co-movement of exports and imports points to input dependence. A component and mould development programme, with common tool rooms in toy clusters, would raise domestic value added, especially in electronic toys.
- **Diversify export markets.** The rising share of the United States increases exposure to American trade policy. Export promotion under the new trade agreements with the UAE, Australia, EFTA, the UK and others should be used actively to build presence in alternative markets.
- **Review and reorient large clusters.** The performance of the Koppal Toy Cluster should be reviewed against its targets, and incentives linked to actual employment and output. Cluster managements should be required to create supplier and training links with local craft producers.
- **Bring traditional artisans into the growth agenda.** A SFURTI cluster for Kinnal and other GI crafts not yet covered, wider registration of artisans with DC (Handicrafts) and under PM Vishwakarma, and support for design, packaging and e-commerce would allow artisans to share in the growing demand for safe, eco-friendly toys.
- **Improve data.** A consistent annual series for HS 9503 to 9505 trade, an official estimate of the domestic toy market and a periodic census of toy units, including household units, are needed for proper evaluation of the policy.

10. Conclusion

This paper set out to assess whether the Central and State Government initiatives introduced from 2020 have transformed India's toy manufacturing sector. The evidence supports a qualified answer. The package succeeded in compressing imports, especially from China, and turned a long-standing trade deficit in toys into a surplus. It improved the quality of toys sold in the country and coincided with a doubling of employment in organised toy factories and a favourable shift in the composition of exports towards toys proper. These are real gains.

At the same time, the formal tests find no significant break in the trajectory of exports, the improvement in the trade balance has narrowed as imports have recovered, and the largest State cluster has not met its targets. The gains so far owe more to the border element of the policy than to its capability-building element. Whether the industry can sustain its position when protection is eventually reduced will depend on investment in productivity, design, components and skills, and on whether the benefits of the policy are extended to the traditional producers who have been the custodians of India's toy-making heritage.

The study is limited by the short post-policy period, the inclusion of sports goods in the longest annual series and the overlap with the pandemic and with external tariff changes. Future research could use monthly or product-level trade data, firm-level data from the Annual Survey of Industries, and primary surveys of toy makers in clusters such as Koppal, Channapatna and Kinnal to estimate the effect of individual instruments with greater precision.

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