Steel Under Siege: Understanding the Impact of Dumping on India

by Anirban Sanyal and Sanjay Singh ^

India's steel sector faced significant headwinds due to cheap imports and dumping from major global steel producers during 2023-24 and 2024-25. This article analyses the impact of cheap imports on India's domestic production and consumption of steel using structural vector autoregression and panel data regression models. Empirical estimates indicate that steel imports have seen a surge largely driven by lower import price of steel with adverse implications for domestic steel production. Further, price elasticity of India's steel imports varies in the range of (-) 0.73 to (-) 1.01.

Introduction

India is a major consumer of finished steel with the consumption demand scaling new heights in the recent period. Steel-intensive construction and infrastructure development in India are the key contributors to the rising demand for steel. During 2022-23 to 2024-25, India's steel consumption grew more than 13 per cent in FY: 2022-23 and FY: 2023-24. The consumption growth clocked 11.5 per cent on YoY basis in FY: 2024-25[1]. The domestic steel production grew at 9.3 per cent and 12.5 per cent in the previous two financial years but the production growth slowed to 6.8 per cent in FY 2024-25. The high consumption growth was facilitated through cheaper imports.

Moderate price in the global market, excess capacity across major steel producing countries like China, Japan, Vietnam *etc.* led to dumping[2] of cheap steel which dampened domestic steel production.[3] With sluggish economic growth anticipated in China and other major steel-producing and consuming regions, cross-border trade in steel is increasingly being redirected towards high-growth markets, like India. Further, the imposition of new tariffs on steel imports by the US enhances the threat of dumping.

Against this backdrop, this article empirically validates and estimates the impact of cheap imports on India's domestic production and consumption of steel. Additionally, the elasticity of steel imports with regard to its import prices is also estimated to understand the sensitivity of the global prices on India's steel import intensity. The article uses monthly data from April 2013 till March 2025[4]. Unit value index (UVI)[5] of iron and steel imports has been used to instrument the import intensity of steel and evaluate the impact of dumping. Further, the elasticity of steel imports is derived using destination-wise imports of iron & steel and corresponding UVI under a panel data regression framework. The findings suggest that the lower price of imported steel increased steel imports which facilitated to meet the growing consumption demand of steel, and domestic production got adversely affected. Lastly, the panel regression estimates using destination-wise imports data shows a high and significant elasticity of import

^ The authors are Assistant Adviser and Director, respectively, in the Department of Statistics and Information Management, Reserve Bank of India. Views expressed in the article are those of the authors and do not reflect the views of the Reserve Bank of India.

[1] According to CRISIL's Market Intelligence and Analytics report (2025), India is projected to surpass other major steel-consuming economies in 2025, with demand growth estimated at 8-9 per cent.

[2] Steel dumping refers to the export of steel by one country to another at prices lower than its domestic market or production cost, often due to subsidies or overproduction. In recent times, India has faced significant challenges from steel dumping, particularly from countries, like, China, Thailand, Vietnam, South Korea, and Russia, which have flooded the Indian market with cheap steel. This practice threatened the domestic steel industry by undercutting local producers and leading to reduced profitability across the sector.

[3] According to ICRA (2024), in 2024-25, India's domestic steel industry's capacity utilisation may have dropped below 80 per cent for the first time in four years, as cheaper imports flood the market.

[4] The analysis uses the domestic steel production data from the Eight Core Industries which is available from April 2012 onwards. Accordingly, the YoY growth rate of domestic production is derived from April 2013 onwards.

[5] The unit value index of imports measures changes in the average cost of imported goods.

price on India's steel imports suggesting a strong impact of global price movements on India's steel imports.

The rest of the article is organised as follows – Section 2 outlines the empirical framework; Section 3 discusses the data and stylised facts. The findings are discussed in Section 4. Section 5 summarises the findings and major policy implications.

2. Empirical Framework

The linkage between global price changes and import intensity can be viewed through the firms' optimal factor allocations under a nested production function framework where steel is used as an input. The requirement of steel is met through domestic sourcing and imports. Mathematically, India's steel consumption is modelled through the production framework of a small open economy model proposed by Gali and Monacelli (2005). In this framework, a two stage production function is assumed – in the first stage, intermediate goods (such as steel) are procured from home country and abroad (*i.e.,* imports); in the second stage, the aggregated intermediate goods basket is used to produce the final good. The first stage of the production process is represented as follows:

$$M_t = (M_t^H)^{\alpha}(M_t^F)^{1-\alpha} \quad \dots (1)$$

where, M_t is the intermediate goods bundle used in the second stage, M_t^H represents intermediate goods sourced from home country and M_t^F represents imported intermediate goods. The domestically produced and imported intermediate goods are aggregates of various goods using a constant elasticity of substitution aggregator, *i.e.*,

$$M_t^H = [\int_0^1 M_t^H(j)^{\frac{\sigma-1}{\sigma}}dj]^{\frac{\sigma}{\sigma-1}} \text{ and}$$

$$M_t^F = [\int_0^1 M_t^F(j)^{\frac{\eta-1}{\eta}}dj]^{\frac{\eta}{\eta-1}} \quad \dots (2)$$

where, $\frac{1}{\sigma}$ and $\frac{1}{\eta}$ are the elasticities of substitution of domestic and foreign produced varieties of intermediate goods. α is the production share of home-produced intermediate goods. $\alpha > \frac{1}{2}$ denotes home-bias.

The second stage of the production process involves production of final goods using standard Cobb-Douglas production function:

$$Y_t = A_t\left[L_t^{\gamma}K_t^{1-\gamma}\right]^{\beta}[M_t]^{1-\beta} \quad \dots (3)$$

where, Y_t is the final goods produced, L_t is the labour demand and K_t is the capital used. β is the share of labour – capital, whereas γ is the labour share in the nested production function of labour and capital. A_t is the total factor productivity. The firm is a price taker in the intermediate goods market.

Following the profit maximization of the firm, the optimal factor allocations of the intermediate goods is given by[6]:

$$M_t^H(u) = (1-\beta)\alpha\left(\frac{P_t^H(u)}{P_t^H}\right)^{-\sigma}\frac{MC_t}{P_t^H}\,Y_t \quad \dots (4)$$

$$M_t^F(u) = (1-\beta)(1-\alpha)\left(\frac{P_t^F(u)}{P_t^F}\right)^{-\eta}\frac{MC_t}{\epsilon_t P_t^F}\,Y_t \quad \dots (5)$$

where, $P_t^H(u)$ $[P_t^F(u)]$ is the price of the domestic [foreign produced] intermediate goods of variety 'u', P_t^H (P_t^F) is the aggregate price of the home (foreign)-produced intermediate goods bundle, ϵ_t is the suitable exchange rate and MC_t is the marginal cost of home-produced final goods. P_t^H and P_t^F are derived as:

$$P_t^H = [\int_0^1 P_t^H(u)^{1-\sigma}du]^{\frac{1}{1-\sigma}} \text{ and}$$

$$P_t^F = [\int_0^1 P_t^F(u)^{1-\eta}du]^{\frac{1}{1-\eta}} \quad \dots (6)$$

Producers prefer imported steel over domestically-produced steel as the intermediate input for production owing to its lower price in the global market. While this eases marginal cost pressures for

[6] These conditions can be derived by maximizing profit. The optimal factor allocations are the shares of the output, and the allocation of various varieties is derived from the constant elasticity of substitution (CES) aggregator. Here, the assumption is that the foreign intermediate goods are invoiced in producer currency.

the producers, domestic steel production is adversely impacted as the demand of domestic produced steel moderates and domestic producers react to lower demand through market clearing conditions.

A structural vector autoregression (SVAR) model is used to analyse the impact of steel imports on India's domestic steel production and consumption. As indicated earlier, the UVI of iron & steel imports is used as an external instrument following Olea, Stock and Watson (2021), while the endogenous variables in the model are volume growth of steel imports, wholesale price index (WPI) of steel[7], domestic steel production and steel consumption. The variables are transformed into YoY growth rates for the SVAR estimates.[8]

In the second part of the analysis, the import elasticity is estimated using a panel data regression framework with steel import destinations as the cross-sectional unit. Here, the reduced form panel regression follows the Ricardian trade framework and can be expressed as follows:

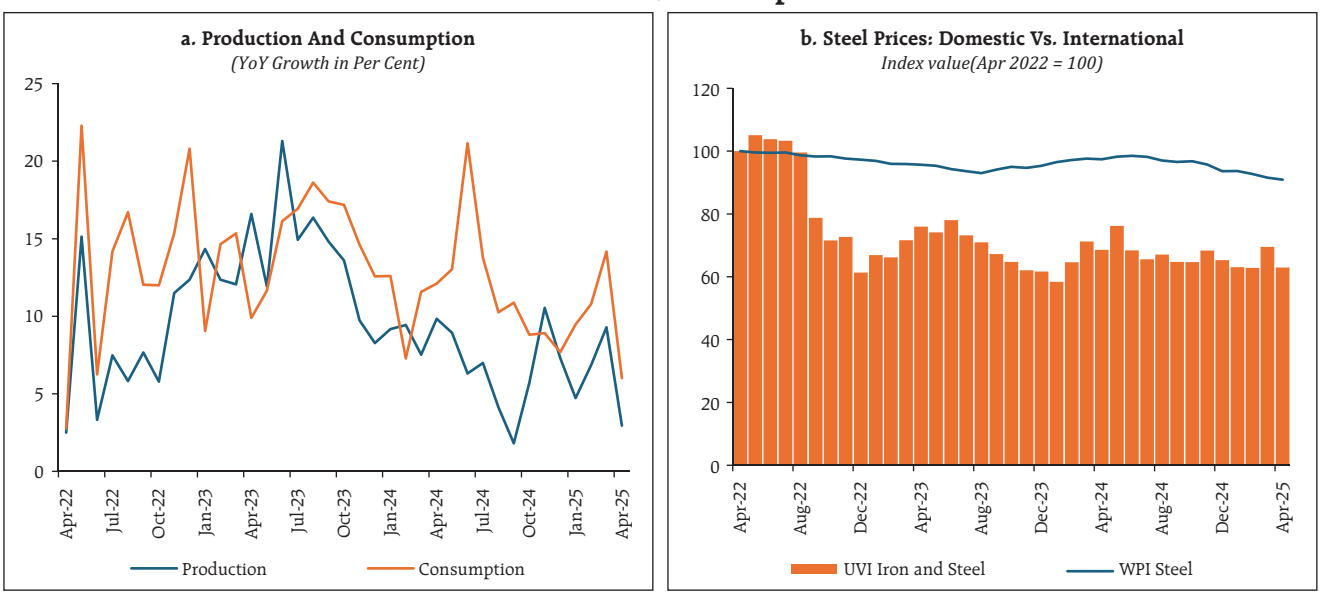
$$\log\left(M_t^{(F,i)}(u)\right) = \theta_1 log UVI_t^i(u) + \theta_2 X_t + FE + \eta_t$$

where, $M_t^{F,i}(u)$ is steel imports from destination 'i', $UVI_t^i(u)$ is the unit value index of imports from country 'i', X_t is the vector of macroeconomic controls which includes lagged values of consumption growth, domestic production and input cost pressure and η_t is the residual term. Fixed effects, namely, source country and time effects, are used to absorb the unobserved heterogeneity.

3. Data and Stylised Facts

The empirical analysis is carried out using monthly data from April 2013 to April 2025. India's steel consumption grew by 12.9 per cent on average (average of monthly growth rates) since April 2022 till November 2024. The gap between domestic consumption and production widened since 2022 (Chart 1a). Steel prices eased since April 2022 both in the domestic and global fronts. The UVI of imported iron and steel moderated sharper than WPI-steel (Chart 1b).

Chart 1: Steel Production, Consumption and Prices



[7] Derived by aggregating the price indices of various steel products.

[8] The optimal lag length for the SVAR model is arrived at using Hannan-Quinn (HQ) and Bayesian information criteria.

India imported steel products to supplement its consumption demand. India's iron and steel imports expanded by 10.7 per cent in the first half of 2024-25 and recorded a contraction in second half of 2024-25 mainly on account of safeguard duties. India recorded a high growth of 22.0 per cent in its steel imports in 2023-24 fuelled by softer steel prices in the international market (Chart 2).

India imports nearly 45 per cent of steel from the top 5 destinations namely Korea Republic (South) (import share 14.6 per cent), China (import share 9.8 per cent), USA (import share 7.8 per cent), Japan (import share 7.1 per cent) and the United Kingdom (import share 6.2 per cent)[9]. Imports increased from China, Japan, South Korea, Indonesia and Vietnam during 2024-25 (Chart 3a). UVI declined or remained unchanged across all major import destinations, barring USA and South Korea (Chart 3b).

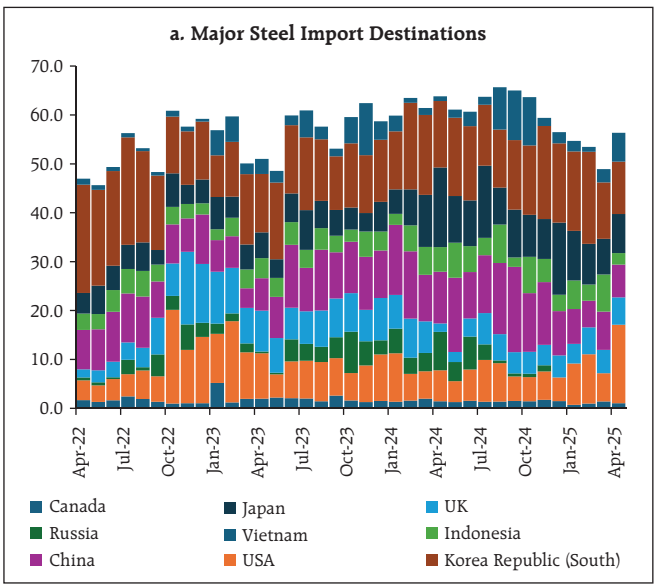
Chart 2: India's Iron And Steel Imports (Volume)

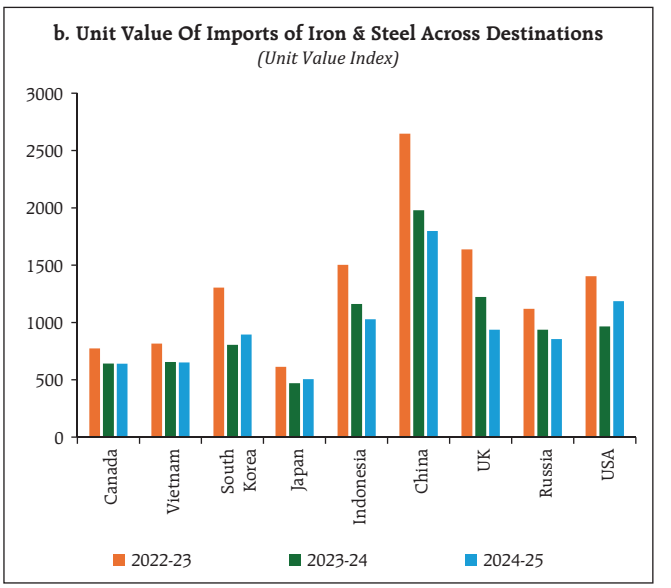
(In '000 tonnes, YoY growth in per cent)

4. Empirical Findings

The SVAR model estimates the endogenous time dynamics among imports, domestic prices, domestic production and final consumption of steel. However, the import intensity can be influenced by other factors such as the global price of steel. Hence, the UVI of iron & steel imports is used as an external instrument in the econometric framework to gauge import intensity driven by import prices. With an

Chart 3: Major Import Destinations and Unit Value Index of India's Steel Imports





[9] The share is average share over April 2022 till August 2024.

Table 1: Impact of UVI on the Steel Imports

	Model 1	Model 2	Model 3	Model 4
Dependent variable: Import growth in steel (YoY Growth)				
(Intercept)	0.82 (3.32)	0.87 (3.38)	-4.57 (3.18)	-0.41 (3.38)
UVI	-0.57 *** (0.12)	-0.57 *** (0.12)	-1.41 *** (0.18)	-1.33 *** (0.18)
Steel consumption growth (-1)		0.01 (0.05)	0.07 (0.05)	0.07 (0.05)
WPI of steel products (-1)			2.60 *** (0.45)	2.97 *** (0.45)
COVID				-26.11 ** (8.65)
R^2	0.14	0.14	0.31	0.36
Adj. R^2	0.13	0.13	0.30	0.34
F-Stat	21.7***	10.9***	20.2***	18.3***

Notes: 1. The above estimates are derived using OLS with HAC Type -3 adjustments.
2. COVID is a time dummy, which takes value '1' for April 2020 to July 2021 otherwise '0'.
3. Figures in parentheses are robust standard errors.
4. All variables are transformed in YoY growth except COVID.
5. *: $p < 0.1$, **: $p < 0.05$, ***: $p < 0.01$

easing in UVI, the import intensity is expected to increase. In order to check the relation between UVI and imports, growth in the import volume was regressed over UVI controlling for factors such as domestic consumption growth and prices. The coefficient of UVI is negative and significant, which supports the hypothesis pertaining to the price channel (Table 1).[10]

Following the validation of UVI as an instrument for import growth, the SVAR model is estimated with UVI as an external instrument. The assessment of the UVI impact is carried out through the impulse response functions. One standard deviation (SD) of negative shock on UVI increases the import volume. Higher imports at a cheaper price reduces the demand for domestically produced steel, thereby moderating its domestic price[11]. The domestic production of steel moderates with a lag of 8-10 months as the domestic producers struggle to match up with the lower price of imported steel. The domestic consumption of steel, on the other hand, improves with a lag of 5-7 months, owing to cheaper steel imports leading to a drop in the price of final goods (Chart 4).

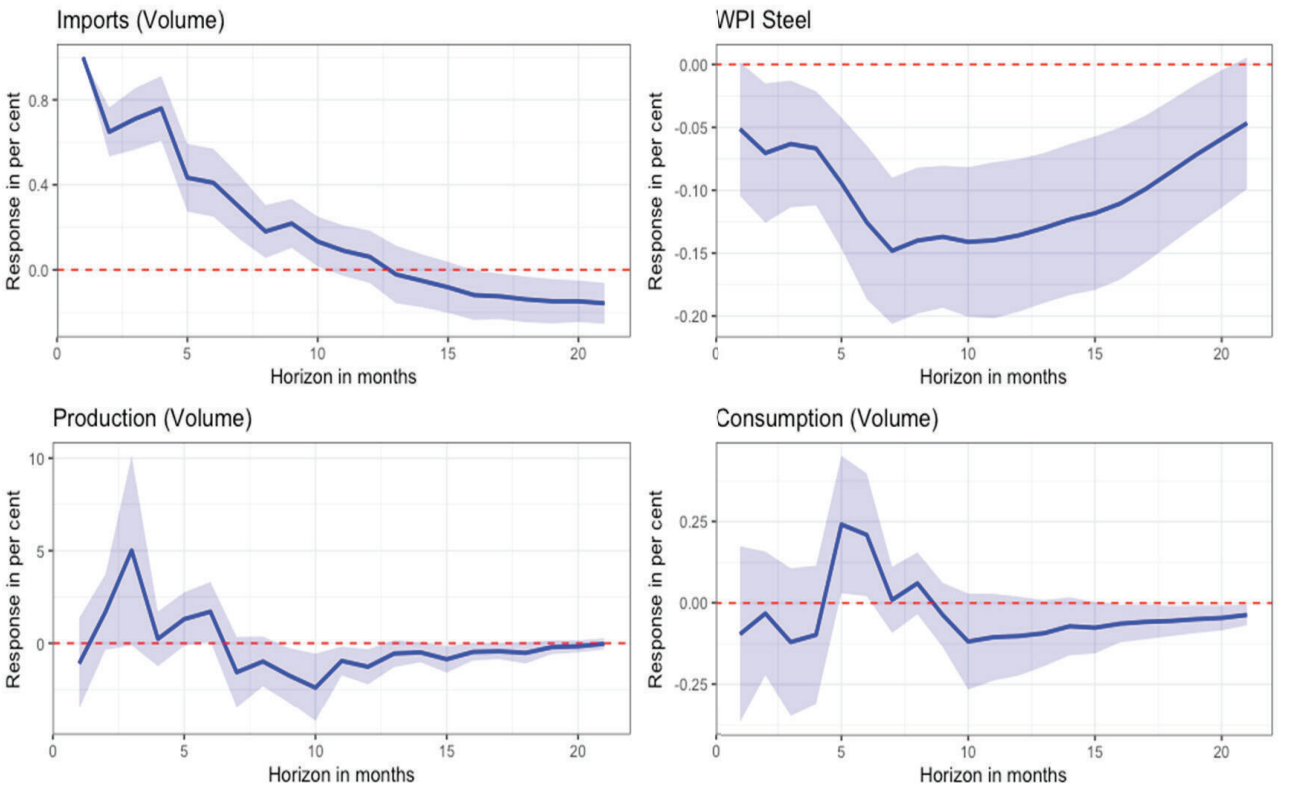
Next, the import price elasticity of steel based on UVI is validated using the destination-wise detailed data on steel imports spanning over same time period. Lagged values of consumption growth, domestic production and input cost pressure are used as additional controls to factor in domestic macroeconomic developments. Alternate estimation methods are used, *viz.*, OLS regression, mean group estimate, panel data fixed effects and random effects. Unlike the SVAR model, the import elasticity is derived through the effects of the log of UVI on log values of imports. This specification is used to derive the elasticity from the estimated coefficient i.e. the coefficient indicates the change in log imports in response to unit change in log UVI which is the import elasticity.

The estimates show a negative and significant elasticity of UVI on imports, *i.e.*, when the UVI goes up, the import intensity of steel goes down. The average price elasticity of steel imports is estimated to vary within 0.78 – 1.01. Further, the consumption growth provides the impetus for imports, whereas domestic production dampens import intensity. Higher interlinkages through input-output channels within the sector are absorbed within the aggregate impact (Table 2).

[10] The F-statistic of the regression estimates are higher in magnitude and are statistically significant, thus satisfying the criteria of a good instrument. This follows Angrist and Pischke (2009) and Wooldridge (2010).

[11] The moderation in the domestic prices is driven by the lower import prices and demand moderation in the domestic front.

Chart 4: Impulse Response of One SD Negative Shock to UVI



A robustness of the coefficients is validated using inverse hyperbolic sine (asinh) transformation[12]. Using the asinh transformation, the estimates fall in similar lines. The average price elasticity stands in the range 0.73 – 0.89 (Table 3).

Table 2: Panel Regression Estimates Estimating Import Price Elasticity of Steel

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	log(Imports)		log(Imports)		log(Imports)		log(Imports)	
log(UVI)	-0.825***	-0.779***	-1.423***	-1.101***	-0.940*	-0.924*	-0.939**	-0.923*
	(0.081)	(0.087)	(0.125)	(0.302)	(0.415)	(0.487)	(0.414)	(0.486)
Δ Consumption (-1)		0.006		0.004***		0.007		0.007*
		(0.004)		(0.001)		(0.004)		(0.004)
Δ WPI Steel (-1)		-0.003		-0.001		-0.001		-0.001
		(0.002)		(0.001)		(0.004)		(0.002)
Δ Production(-1)		-0.009		-0.005**		-0.010		-0.010*
		(0.006)		(0.002)		(0.006)		(0.006)
Constant	16.059***	15.772***	20.313***	18.124***	16.804***	16.707***	16.800***	16.703***
	(0.545)	(0.584)	(0.508)	(2.187)	(2.804)	(3.271)	(2.823)	(3.248)
	OLS		Mean Group		Fixed Effect		Random Effect	

[12] Asinh transformation is widely used in the trade literature to adjust for the zero trade values as the monthly imports may be zero for some trade partners for some months. However, one of the major criticism of using the inverse hyperbolic sine transformation is that it induces extra skewness in the distribution (Bellemare and Wichman, 2020). However, it may be noted here that the distribution share of India's steel imports remained steady over time which reduced the chances of higher skewness in imports distribution.

Table 3: Panel Regression Estimates for Price Elasticity with Asinh Transformation

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	asinh(Imports)		asinh(Imports)		asinh(Imports)		asinh(Imports)	
log(UVI)	-0.805***	-0.729***	-1.416***	-1.004***	-0.904*	-0.894*	-0.901**	-0.881*
	(0.080)	(0.083)	(0.121)	(0.291)	(0.411)	(0.479)	(0.410)	(0.413)
Δ Consumption (-1)		0.004		0.005***		0.006		0.006*
		(0.004)		(0.001)		(0.004)		(0.004)
Δ WPI Steel (-1)		-0.003		-0.001		-0.001		-0.001
		(0.002)		(0.001)		(0.004)		(0.002)
Δ Production(-1)		-0.010*		-0.005**		-0.011*		-0.010*
		(0.006)		(0.002)		(0.006)		(0.006)
Constant	17.324***	17.005***	21.933***	19.574***	18.149***	18.041***	18.144***	18.036***
	(0.601)	(0.644)	(0.513)	(2.391)	(3.092)	(3.608)	(3.108)	(3.583)
	OLS		Mean Group		Fixed Effect		Random Effect	

5. Conclusion

In recent times, India's steel sector has encountered challenges due to increased imports and competitive pricing from major steel-producing countries. These factors have affected domestic market share, lowered capacity utilisation, and added pressure on domestic producers. The pricing strategies of exporting nations remain a concern for the steel industry. Addressing these challenges calls for a balanced approach, including policy support and initiatives to enhance the competitiveness of India's steel production through innovation, cost efficiency, and sustainable practices.

The findings from aggregate and panel data analyses indicate that a lower UVI for steel import increases import intensity at the expense of domestic production. Recently, India's key import partners have reduced the UVI of steel products, driving higher import growth. This surge in imports has been primarily fuelled by lower import prices of steel, which in turn has adversely impacted domestic steel production. The average import price elasticity is found to be in the range of (-) 0.73 to (-) 1.01 based on alternate model specifications.

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