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Is It Time to Recalibrate Protectionism?

The Case of the Indian Steel Industry

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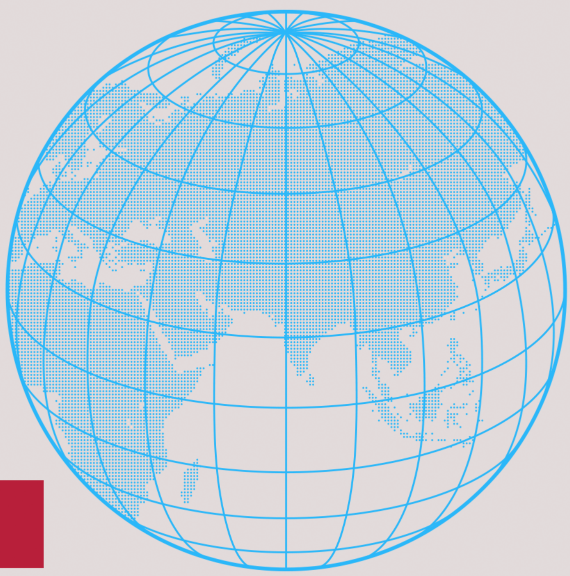

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Is It Time to Recalibrate Protectionism?
The Case of the Indian Steel Industry

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Abbreviations

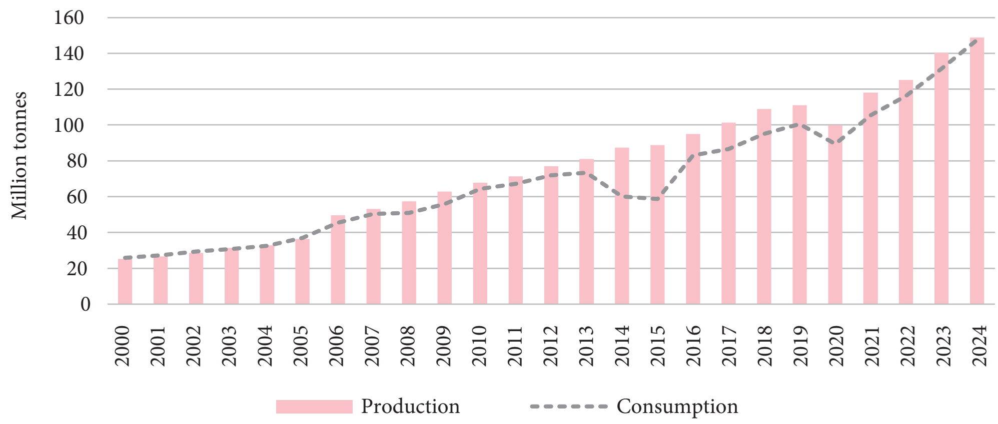
AVE	Ad Valorem Equivalent
CEPA	Comprehensive Economic Partnership Agreement
CGE	Computable General Equilibrium
DMI&SP	Domestically Manufactured Iron & Steel Products
ERP	Effective Rate of Protection
EV	Equivalent Variation
FTA	Free Trade Agreement
FY	Financial Year
GDP	Gross Domestic Product
GTAP	Global Trade Analysis Project
HRC	Hot-Rolled Coil
MFN	Most Favoured Nation
NTM	Non-Tariff Measure
QCO	Quality Control Order
ROW	Rest of the World
TFP	Total Factor Productivity

Executive Summary

The Indian Steel Growth Story

The Indian steel growth story has been one of success. In the past two decades, the domestic steel industry has risen in the ranks and gone from the ninth-largest steel industry in the world to the second-largest globally, next only to China. This industry, fuelled by India's ever-expanding hunger for steel to feed its growing manufacturing and infrastructure industries, has grown at 7% on average over the last two decades.

Figure ES–1: Growth of the Indian Steel Industry



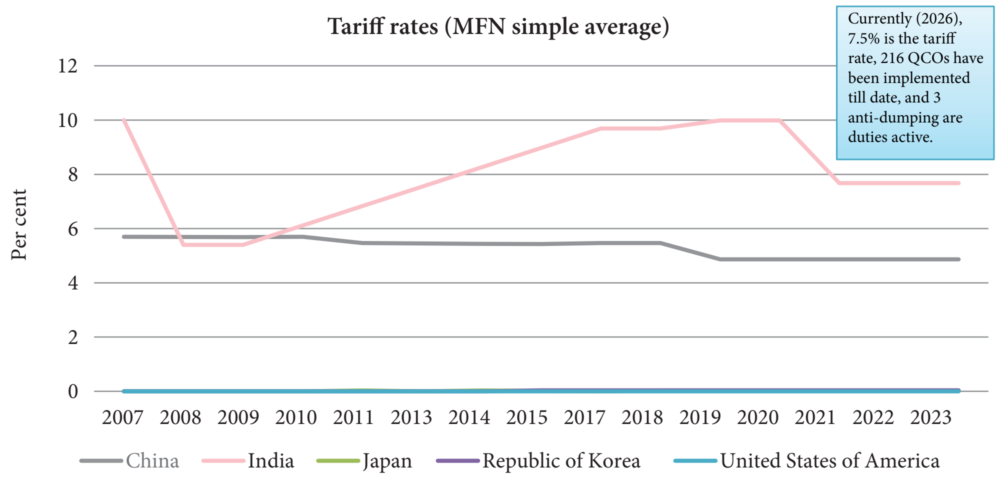
Source: World Steel Association (n.d.); Ministry of Steel (n.d.).

However, this story is still not as rosy as it seems. The per-capita consumption of steel in India, at 97.7 kg, was much lower than the world average of 221 kg and China's 635 kg in FY24 (Ministry of Steel, 2025). The growth outlook for steel demand in India remains robust, projected to reach 192 million tonnes by 2030, despite the lower per-capita consumption.

A Protected Industry

The steel industry has been protected for quite some time. Tariffs were slashed during the 2000s but were reinstated after 2015. The industry is also further shielded from foreign steel through Quality Control Orders (QCOs) and anti-dumping duties. Furthermore, the industry sees competitive advantages over its counterparts in other countries through abundant, cheap iron ore inputs and lower labour costs. Despite these advantages, Gupta and Sachdeva (2026) have shown that the Indian steel industry is still behind global peers like China and Japan in pricing and export competitiveness. At the same time, the profits that the large Indian steel firms make are higher than the global average. Steel protection in India is thus a combination of tariffs and non-tariff measures (NTMs), and any assessment of liberalisation must keep both in view.

Figure ES–2: Tariffs on Steel, 2007–2023



Source: International Trade Centre (n.d.).

Note: Tariff rates for Japan, the Republic of Korea, and the United States coincide at zero throughout the period and therefore appear as a single overlapping line at 0%.
MFN = Most Favoured Nation.

Study Objective and Approach

The question of what would happen if the protection provided to the steel industry were reduced is a difficult one to answer. Steel is a key input to several downstream industries, many of which could benefit from cheaper steel in order to expand their output. Hence, the net impact on India's Gross Domestic Product (GDP) stemming from reduced protection to steel is ambiguous and requires much closer inspection.

This study aims to investigate the impact of a reduction in steel tariffs on the Indian economy, particularly unpacking its effect on the GDP, domestic steel sector, and other downstream sectors that consume steel. For the analysis, Computable General Equilibrium (CGE) modelling is used, which considers all sectors in the economy and the interlinkages between them, providing a more holistic picture of the impacts of reducing the protection currently provided to the steel industry.

Key Findings

The results from the simulations (which have reduced tariffs by 10–90%) show that India's GDP increases by 0.007% (or US$237 million). Although steel output falls, the impact is minimal (1% overall output reduction, with a 90% cut in tariffs on steel). The trade balance improves, and aggregate exports rise by 0.1% (US$612 million) when 90% of steel tariffs are reduced. Employment also gets a boost, fuelled by expansion in downstream sectors like machinery, automotive, electronics, and others, which can use the now cheaper steel to increase output, reduce prices, and export more. Welfare improves overall. The results look promising when we account for the business-as-usual growth that happens in the steel industry. They show that even when tariffs on steel are halved, the steel industry's growth remains largely unaffected, and it can sustain its growth.

The findings from this study suggest that reduced protection to the steel industry can generate gains for the Indian economy without undermining the standing of the domestic steel industry. It must be stressed that these gains are modest in absolute terms. In this study, we liberalise only tariffs while the substantial protection embedded in NTMs (216 QCOs and active anti-dumping duties) remains in place across simulations. The implication of this is that the gains from reducing tariffs alone while retaining NTMs are limited. Unlocking the full benefit from liberalisation requires recalibrating both tariff and non-tariff protection.

Key Takeaways and Way Forward

This study points to four conclusions for policymakers:

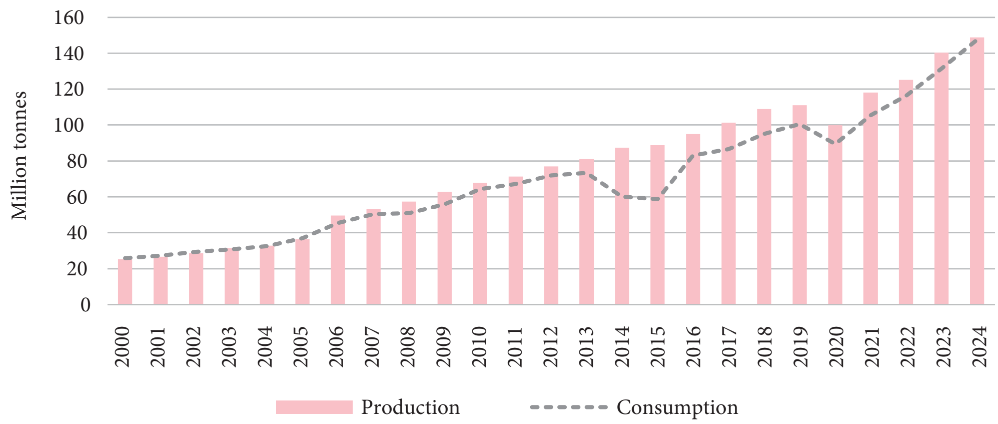
- Tariff liberalisation is net positive for India. Reducing steel tariffs raises GDP (+0.007%, or US$237 million), aggregate exports (+0.1%, or US$612 million at a 90% cut), and overall welfare, with employment gains led by downstream steel-consuming sectors such as machinery, automotive, and electronics.
- The domestic steel industry remains resilient. Even when tariffs are halved, the industry sustains its growth trajectory; output falls only marginally (about 1% under a 90% tariff cut).
- The gains are modest by design. Only tariffs are liberalised in this analysis—the substantial protection embedded in NTMs (216 QCOs and active anti-dumping duties) remains in place across every simulation, capping the upside.
- The way forward is to recalibrate both tariff and non-tariff protection. Reducing tariffs alone results in limited gains. A phased, calibrated easing of both tariff and non-tariff barriers rather than just tariff cuts could unlock greater liberalisation benefits for the whole economy.

1. Introduction

India has been a stalwart in the global steel industry, rising in the ranks to become the second-largest steel producer over the last two decades, up from ninth (World Steel Association, 2025). This commodity is an essential input to automotive, infrastructure, and construction, among many other sectors, and the pivotal role this sector plays in the economy has assured robust growth for this industry at 7% on average over the last two decades. Per-capita consumption of steel in India, however, remains low compared to the world average. Per-capita consumption of finished steel in India was 97.7 kg during FY24, much below the world per-capita consumption of 221 kg, and even further below China's 635 kg (Ministry of Steel, 2025). Despite this, the growth outlook for the demand for steel in India remains positive, projected to reach 192 million tonnes by 2030 (BigMint, 2025; Organisation for Economic Co-operation and Development [OECD], 2025).

India's steel production is primarily dominated by Hot-Rolled Coils (HRCs). In FY25, India produced 146.56 million tonnes of finished steel, of which 54.12 million tonnes were HRC (Narayan, 2025). HRC steel is used in a variety of applications, including construction (flyovers, beams, roofing sheets), the production of vehicles for chassis, frames, and bodies, and in oil and gas pipelines and tubes.

Figure 1: Growth of the Indian Steel Industry



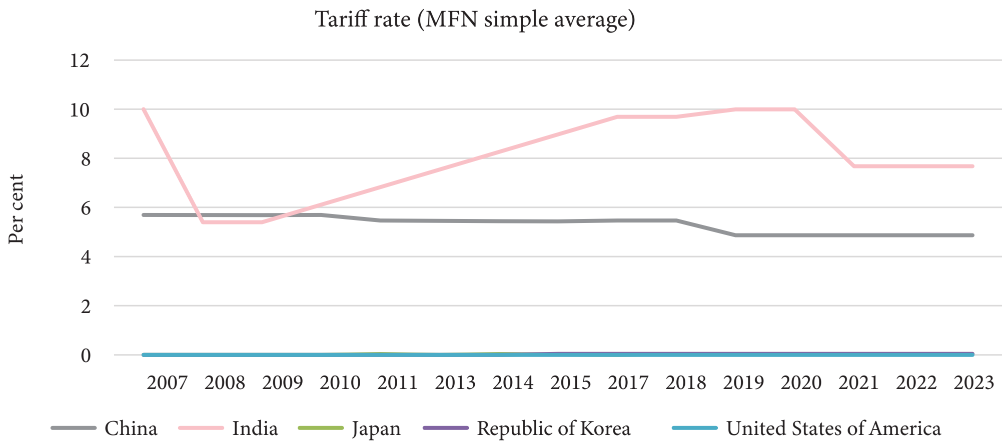
Source: World Steel Association (n.d.); Ministry of Steel (n.d.).

1.1 Protection for the Indian Steel Industry

The Indian steel industry has been protected for quite some time. The protection warranted for the steel industry is not limited to the more upfront and visible tariffs—it includes more often overlooked barriers like QCOs and anti-dumping duties as well. Together, these NTMs and tariffs cushion the Indian steel industry from the invasion of foreign competition into the domestic market.

The stance on protectionism for the steel industry has evolved over time in India. Tariffs were slashed during the 2000s (Figure 2) but then slowly began to be reinstated after 2015. This reinstatement of tariffs was accompanied by additional protection provided in the form of NTMs. In total, 216 QCOs have been implemented to date (Prabhakar, 2025), and three anti-dumping duties are active as of 2026. Gupta and Sachdeva (2026) show that this has led to the steel industry lagging behind global peers like China and Japan in terms of pricing and export competitiveness, despite Indian companies raking in profits higher than the global average. One could argue that this protectionism is pivotal to the survival of the Indian steel industry, especially if the industry is at a natural disadvantage over its global peers due to higher domestic costs of production. However, in reality, this argument may not hold as much merit. Saraswat and Bansal (2016) note in their NITI Aayog report that costs per tonne in India for steel manufacturers, around US$320–340 per tonne, are far below those of countries like China and Japan at US$400 per tonne, and well below the global average of US$390 per tonne. This low cost of production is aided by the abundant availability of cheap labour and raw materials, particularly iron ore in India, but the industry needs a push to be able to adequately capitalise on its inherent strengths and become an even larger global player. A more in-depth account of the protection provided to the Indian steel industry has been covered by Gupta and Sachdeva (2026).

Figure 2: Tariffs on Steel, 2007–2023



Source: International Trade Centre (n.d.).

Note: Tariff rates for Japan, the Republic of Korea, and the United States coincide at zero throughout the period and therefore appear as a single overlapping line at 0%.
MFN = Most Favoured Nation.

In this context, it is important to remember that steel is ultimately an intermediate input—there are several downstream sectors reliant on this industry for their own production, which is then ultimately delivered to final consumers, such as vehicles and construction. An inefficient steel industry producing more costly steel is likely to burden the downstream sectors, overpowering the gains (if any) that this industry may have had due to protectionism. Ultimately, the end-consumers in the country bear the burden of expensive steel in the form of higher prices paid for goods, as costs are ultimately passed on to consumers.

Table 1: Industries That Are the Largest Steel Consumers in India

Industry	FY22 (in %)
Construction	42
Manufacture of basic iron and steel + casting of iron and steel*	26
Manufacture of transport	5

Source: Ministry of Statistics and Programme Implementation—Supply and Use Tables—data for 2022–2023.

*Note: * includes manufacture of pig iron, sponge iron, hot-rolled and cold-rolled products of steel, railway track materials of steel, steel wires, manufacture of other basic iron and steel n.e.c., manufacture of tubes, pipes, hollow profiles and other iron and steel castings, and castings of ferrous metals.*

1.2 Learnings From the Past: The Impact of Liberalisation

Topalova and Khandelwal (2011) studied the 1990s liberalisation reforms and found that reduced protectionism as part of the 1990s liberalisation had a profound impact on firms' productivity through two major channels—firstly, competitive pressure due to reduced tariffs on output, and secondly, access to better-quality, cheaper inputs due to reduced input tariffs. However, it was the second channel that exerted the stronger influence on productivity improvements. Particularly, reduced protection to industries that were typically "import-competing" input industries helped fuel productivity growth the most. The reduced tariffs further caused a "disciplining effect," where firms were forced to become more efficient to compete with foreign counterparts.

Further evidence for trade liberalisation's impact on firm productivity comes from Nataraj (2011). Following the 1990s reform-led trade liberalisation, the manufacturing sector's efficiency improved as the least efficient firms were forced to exit the market. However, the findings varied when it came to the impact liberalisation had on large and small firms. Small and medium firms were found to benefit from a reduction in tariffs on final goods, as they were exposed to competition and forced to raise efficiency. Large firms, on the other hand, benefitted greatly from access to cheaper inputs enabled by input tariffs. It is these large firms that ultimately fuel the country's growth, being four to eight times more productive than smaller firms (Gupta & Sachdeva, 2022). Hence, there is a lot to be gained from enabling these firms to access cheaper inputs and harnessing their productivity to feed the country's growth engine. Paul and Das (2012) took matters a step further, investigating the relationship between exports and output in India during the period 1960–2009, specifically as spurred by the liberalisation and reforms. The study found a unidirectional causality from exports to output. The authors suggested that the dismantling of the licence-raj system and the trade reforms unlocked growth by harnessing exports as an engine.

On the other hand, there are some studies claiming that liberalisation has had the opposite impact. Balakrishnan et al. (2000) found evidence for a lack of growth in Total Factor Productivity (TFP) after the reforms. On the contrary, they found evidence for a statistically significant decline in TFP over the study period (1988–1998). Their findings remained consistent across different datasets as well. Even in sectors that were heavily liberalised, productivity growth did not take place. The authors pointed out that a possible reason for this result could be that their study period may have been too close to the reforms, as well as inadequate policy. They emphasised that, along with overarching macroeconomic policies, appropriate emphasis should also be placed on improving microeconomic foundations to boost productivity. Goldar and Kumari (2003) also found evidence that TFP had declined during the 1990s. It had fallen from 1.89% per annum to 0.69% in the 1990s. However, their findings implied that this decline in TFP was not due to the import liberalisation at all—the reductions in the Effective Rate of Protection (ERP) were found to exert positive influences on productivity. Instead, the slowdown observed in TFP during the period was the impact of investment booms post the liberalisation. The new investments took time to reach potential output and had a gestation period. There was underutilisation of capacity till the gestation period was over. Additionally, the slowdown in the growth of agriculture had reduced the demand for industrial products and exerted influence on productivity, leading to further underutilisation of capacity.

1.3 How Did the Steel Industry Fare During Liberalisation?

The steel industry was also not isolated from the impacts of liberalisation, which reverberated throughout the country. Tata Steel, on its website, mentioned that the steel industry was one of the foremost sectors to be opened, following which investments flowed into the domestic steel sector. The prediction at the time was that steel was a 'sunset sector'—doomed to failure as its allegedly more competitive foreign counterparts gained access to the Indian market. However, the story that followed was different. Tata Steel aimed to reduce costs and improve its net realisation through a series of initiatives centred around modernisation and restructuring, which was a turning point in its history. It then went on to clinch the number one spot in the list of world-class steel companies as per the World Steel Dynamics in 2001 (Tata Steel Limited, 2009).

This success story was not unique to Tata Steel. As evidenced by Mangla (2023), the TFP of the iron and steel industry grew at 1.4% per annum during the period of 1991–2001, the first decade after the reforms. However, this productivity growth declined and became negative in the decade following this (2002–2012). The author posited that the growth in productivity could be attributed mainly to declines in input tariffs, output tariffs, and the ERP.

On the other hand, Ray and Pal (2009) find that liberalisation has had an adverse impact specifically on the capacity utilisation of the iron and steel industries. On average, the rate of capacity utilisation declined from 0.78 to 0.72 during the period 1991–2003 (a drop of 7.3%). The growth rate of capacity utilisation fell to 1.13% (a drop of 3.54%). The main reason for this was an increase in imports from countries like China and Ukraine. The growth of actual output, therefore, lagged behind the growth in capacity utilisation, which expanded due to increased investments post the abolition of the licence-raj. The authors recommended providing stimulus to domestic demand, tapping into global markets, and more industry consolidation to improve capacity utilisation.

As made evident through the literature, the question of what would happen if we slashed the protection provided to the steel sector is not easily answered. Would the domestic steel industry lose its growth momentum and its current standing as the second-largest steel producer in the world? Which sectors would benefit the most from access to cheaper steel, and would their growth and expansion be enough to counter the losses in the GDP due to any retraction of the steel industry? And how would the end consumers be impacted—would they now be better off than they previously were? The net impact on India's GDP, as implied by these questions, is ambiguous and requires much closer inspection. To attempt to answer some of these questions and concerns, we have utilised CGE modelling, which considers all the sectors in the economy and the interlinkages between them, providing us with a more holistic picture of the impacts of a reduction in the protection currently provided to the steel industry.

This study aims to investigate the impact of a reduction in steel tariffs on the Indian economy, particularly its effect on the GDP, domestic steel sector, and other downstream sectors that consume steel. The second section of this paper lays out the methodology used. This is followed by a detailed discussion of the results from the simulations and their implications. The concluding section then examines the broader policy implications and presents recommendations based on the results.

2. Methodology

2.1 The Global Trade Analysis Project Model

We have used CGE modelling to simulate scenarios of interest in this study. The specific CGE model that has been used is the Global Trade Analysis Project (GTAP) model. This model is a multi-region, multi-sector, comparative static model and has been documented extensively in Hertel (1997). The model operates on assumptions of perfect competition, profit maximisation by producers, and utility maximisation by consumers. Another major pillar of this model is the Armington elasticities—the elasticity of substitution between domestic goods and foreign goods (Burfisher, 2016).

This model has been selected for its wide applicability and past use. The GTAP model has, in the past, been employed to study several trade and tariff policy-relevant questions, answering questions that have been deemed too complex for standard econometrics or partial equilibrium models to address; typically, these models allow us to simulate scenarios of interest and gauge the theoretical impacts of policies prior to implementing them. In the past, the GTAP model has been employed to study several policy questions relevant to India's growth and welfare in the context of trade. Some examples of studies and policy questions that have utilised the GTAP model are as follows. GTAP has been used for gauging the welfare impact of Free Trade Agreements (FTAs) such as the India–Japan Comprehensive Economic Partnership Agreement (CEPA) (Bhattacharyay & Mukhopadhyay, 2013). They found that both countries stand to gain by way of increased exports and welfare. Opportunities for unlocking exports for India through an FTA with ASEAN were also investigated (Dawani & Narayanan, 2024). A complete liberalisation of trade between India and ASEAN was expected to increase India's GDP by 0.18%, with GDP gains for many other member countries like Vietnam and Thailand noted as well. Even questions and issues specific to the steel sector have been addressed, such as the implications of tariff rate quotas by the US on its imports (Lee & van der Mensbrugghe, 2003) and analysing the overseas investment of iron and steel industries in China through FDI (Tsigas & Yuan, 2017). Lee and van der Mensbrugghe found that although the US saw marginal welfare gains in 2002 and 2003, these were expected to decline in the next two years due to domestic steel prices rising. Tsigas and Yuan find that China's 'One Belt One Road' initiative in five Central Asian states (such as Kyrgyzstan and Turkmenistan) leads to welfare gains for all states when they reduce investment barriers on China by 50%. The authors opine that reduced investment barriers in China can also help manage its excess capacity while providing welfare and growth to other states.

2.2 Study-Specific Adjustments to the GTAP Model

Prior to discussing the simulation results, it is important to call out some adjustments made to the model.

First, the 145 countries in the model have been grouped into two: (a) the Rest of the World (ROW), which includes all 144 countries except India, and (b) India. This is done to simplify our analysis since the primary country of interest for this study is India.

Second, the sector "Iron & Steel" in the model has been split into "Iron" and "Steel" sectors separately. Since Iron includes products like pig iron, sponge iron, etc., which are often used as inputs into steel, the results of the study will be more accurate if both these sectors are separated prior to simulating tariff reductions on the sector. The splitting of the sectors has been carried out after calculating the shares of trade flows of Iron & Steel, respectively, in the total Iron & Steel sector for both ROW and India. The shares are shown in Table 2 (see Table A–2 in the Appendix for the Harmonized System codes used), and the shares assumed while splitting, which are rounded off to the nearest tenth, are shown in Table 3.

Table 2: Share of the Steel Sector in the Combined GTAP Sector "Iron & Steel"

Region	Share of Steel in Exports (2024) (%)	Share of Steel in Imports (2024) (%)
India	79	65
ROW	82	81

Source: World Bank (n.d.); authors' calculations.

Note: ROW = Rest of the World.

Table 3: Assumed Share of Iron and Steel Sectors for the Split

	Export (%)		Import (%)	
Region	Iron	Steel	Iron	Steel
India	20	80	30	70
ROW	20	80	20	80

Source: Authors' analysis.

Note: ROW = Rest of the World.

Lastly, two standard assumptions of the model, namely full employment and a fixed exchange rate regime, have been relaxed only for India, by way of changes to the closure. We have allowed for unemployment in the Indian economy by making the real wage variable exogenous instead of the quantity of labour employed, which was earlier exogenous, for both skilled and unskilled labour. For modelling the assumption of a floating exchange rate regime, we have made the ratio of the trade balance to the GDP exogenous, in place of the savings rate, allowing savings to adjust. Both these changes help model the reality of India's economy better. A separate scenario where no adjustments in the model's closure were made has also been run, for reference. Selected results from those simulations are in Table A–3 in the Appendix. The several simulations we have run in the course of formulating our study also help us in determining the robustness of our results since we have experimented with several different types of closures and shocks.

For the purposes of this study, the latest version of the GTAP database containing 2023 data has been used. The tariff rate in this database for the Indian steel sector is 2.76%, which is a weighted average of the tariffs on steel products. We have used the weighted average tariff (weighted by import shares of steel trade by country) here to account for the fact that India has FTAs with countries like Japan and levies a 0% tariff on steel trade with such countries. The weighted average tariff helps capture the protection of the steel industry after accounting for such agreements. Several simulations in which tariffs have been slashed by different percentages (between 10% and 90%) have been run.

2.3 A Note on Non-Tariff Measures

It is important here to mention that we have not run simulations where we have accounted for other forms of protectionism—NTMs. Quantifying NTMs is a far more technical process that requires econometric estimation of their ad valorem equivalents (AVEs) and is beyond the scope of this study. Furthermore, the debate around the best and most accurate methodology remains robust and is highly contested. Incorporating NTMs would risk shifting the analytical focus of this paper from its central policy question to a methodological debate on AVE estimation, which is beyond the scope of this study. Instead, we have chosen to conduct our simulations solely using tariffs as a measure of protectionism.

As a result, the simulations presented here should be interpreted as a conservative lower bound on the gains from reducing protectionism in the Indian steel sector. If we undertake the exercise of quantifying NTMs, the rate of protection we would model would be higher, and the subsequent results would be much larger in magnitude. Not including NTMs in our measure of protectionism might result in our simulations showing a smaller impact, but these simulations should be treated as merely an illustration of the expected direction in which variables of interest (such as GDP of the country and aggregate exports) will move after a reduction in steel protectionism. Evidence from the literature also confirms that the impact of reductions in NTMs (as expressed in their AVEs) is expected to be directionally similar to that of a reduction in tariffs (Fontagné et al., 2015; UNCTAD & World Bank, 2018; Cadot et al., 2018). There has been evidence proving that NTMs (like QCOs and anti-dumping duties) smother trade just like tariffs. A UNCTAD working paper (Nicita & Koloskova, 2025) found that reducing the costs associated with NTMs significantly impacted global trade and welfare. They used the GTAP model and an accompanying database called the GTAP Satellite database that has the AVEs of border costs associated with NTMs (border costs include the administrative and regulatory costs of enforcing NTMs). It was found that NTMs distort trade flows covering nearly 70% of world trade. A 50% reduction in these costs led to an increase in global GDP by 0.4%, according to the study results.

3. Simulation Results

3.1 Impact on the Domestic Steel Sector

Table 4 presents the results from the steel tariff cuts. The impact on variables such as sectoral output, sectoral exports and imports, and steel prices has been compiled.

Table 4: Impact of Tariff Reductions on the Domestic Steel Sector

Change in Tariff (%)	Tariff Rate (%)	Change in Steel Output (US$ million)	Change in Steel Imports (US$ million)	Steel Exports (US$ million)	Price of Domestic Steel	Price of Imported Steel
−10	2.5	−86 (-0.1%)	86.7 (0.6%)	2.2 (0.02%)	−0.0035	−0.25
−25	2.1	−215 (-0.3%)	216.8 (1.5%)	5.6 (0.05%)	−0.0088	−0.625
−50	1.4	−431 (-0.6%)	433.5 (3%)	11.1 (0.1%)	−0.017	−1.25
−75	0.7	−646 (-0.8%)	650.3 (4.5%)	16.9 (0.15%)	−0.02	−1.87
−90	0.3	−775 (-1%)	780.3 (5.4%)	20 (0.18%)	−0.03	−2.25

Source: Authors' simulations using the GTAP model.

Note: The figures in the parentheses show the percentage change from the baseline values in the model.

Essentially, with a tariff cut of 90%, when the tariff is 0.3% on steel, domestic steel output falls by 1%, or US$775 million. This fall in output is almost perfectly offset by imports, which rise by US$780 million. Domestic steel output is increasingly substituted in favour of foreign imported steel, which is now cheaper. However, despite almost completely dismantling the tariffs, the Indian steel sector output does not crash. It is reassuring to see that the output only faces a 1% decline. The Indian steel sector is able to withstand and compete against the threat of cheaper imports. Metal and metal products have been found to have typically lower import-domestic substitution elasticities than other sectors (Feenstra et al., 2014). In reality, there are examples one can draw from to lend weight to this theoretical result. For example, the Government of India has recently introduced a "Melt & Pour Rule" under the revised Domestically Manufactured Iron & Steel Products (DMI&SP) Policy in 2025. This rule mandates that any steel used in government projects must be manufactured in India from scratch using raw materials; essentially, the steel must be 'melted & poured' in India (The Economic Times, 2025). The Government of India uses approximately 25–30% of the total steel used in construction, which itself is 65% of India's total steel consumption (India Brand Equity Foundation, 2025), making it a large consumer of steel. The preference for domestic steel is made explicit by policies such as this one. Hence, despite the reduction in tariffs, one can be reassured that domestic steel cannot be completely substituted with imports, and there will still be enough demand to keep the industry thriving; domestic producers will be forced to offer more competitive pricing to compete with foreign players.

Domestic steel prices also decline marginally, lending a push to steel exports from India. This marginal decline of 0.03% in steel prices may be a very conservative estimate, as the model assumes perfect competition with zero profits, leaving little room for producers to slash prices. However, the Indian steel market is dominated by large players who are profitable (Gupta & Sachdeva, 2026) and have more leeway to cut prices. For example, when the Government of India cut steel duties in 2004, steel makers in India lowered their prices by Rs 560–1,000 per tonne, fearing that orders would now be shifted to foreign manufacturers (The Times of India, 2004). In 2004, steel prices were on average Rs 24,000 per tonne; therefore, the rate cut provided relief of around 2–4% in prices for domestic steel consumers (Saha, 2006).

3.2 Impact on India's Economy

Table 5: Impact of Tariff Reductions on Macroeconomic Variables in India

Change in Tariff (%)	Tariff Rate (%)	Real GDP Change (US$ million)	Aggregate Exports (US$ million)	Aggregate Imports (US$ million)	Change in Price Index	Change in Skilled Labour Employment	Change in Unskilled Labour Employment
−10	2.5	26.5 (0.001%)	68 (0.012%)	86.72 (0.007%)	−0.1%	0.001%	0.001%
−25	2.1	66 (0.002%)	169.4 (0.029%)	216.78 (0.017%)	−0.3%	0.002%	0.003%
−50	1.4	132 (0.004%)	340.3 (0.059%)	433.51 (0.034%)	−0.7%	0.003%	0.005%
−75	0.7	198.25 (0.005%)	510.4 (0.088%)	650.25 (0.05%)	−1.0%	0.004%	0.008%
−90	0.3	237.25 (0.007%)	612.5 (0.106%)	780.3 (0.06%)	−1.2%	0.005%	0.010%

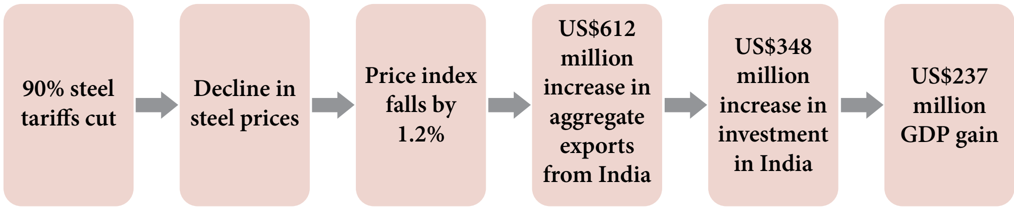
Source: Authors' simulations using the GTAP model.

Note: The figures in the parentheses show the percentage change from the baseline values in the model.

When tariffs on steel are cut by 10%, India is likely to see an increase in GDP by around US$26.5 million, or 0.001% of GDP. This increases when tariffs are cut by 90%, to gains of around 0.007% of GDP, or US$237 million. This cut in tariffs proves to be a boost to overall exports from the nation, with aggregate exports rising by US$612.5 million. Although aggregate imports also see a rise, it is still less than the change in exports, leading to a gain in the trade balance.

Essentially, although the steel sector is hit lightly with the 1% drop in output that we saw earlier, with these cuts in tariffs, other sectors across the economy now have access to cheaper steel. Resources released from the steel sector due to the drop in production are now absorbed into more productive sectors in which India has a comparative advantage, and these sectors also employ more workers from the unemployed labour force, boosting employment and reducing unemployment rates for both the skilled and unskilled labour force. Part of the increase in output, from sectors other than steel, is exported due to more competitive prices stemming from the decline in input prices. Allocative efficiency leads to an increase in output in other sectors. Aggregate exports of the country increase, raising GDP. Furthermore, this provides a valuable push to investments, which are required to finance the new wave of output and export expansions. This multiplier effect finally leads to the increase we see in GDP of US$237 million.

Figure 3: How Tariff Reductions in Steel Lead to US$237 Million in GDP Gain



Source: Authors' simulations using the GTAP model.

Figure 3 summarises the transmission mechanism by which lower steel tariffs lead to a net gain to GDP. With a 90% reduction in tariffs on steel, domestic steel prices now see a decline of 0.03%, and imported steel prices fall even more steeply by 2.25%. This reduces prices for steel as an input for several downstream sectors that are, in turn, able to reduce their prices and become more competitive. They can now expand their output and export more. This leads to a positive change in the aggregate exports from the Indian economy, which is also financed by a fresh surge of investments.

Table 6 also decomposes the changes in GDP to show the real drivers of the change. As discussed above, the changes to GDP are driven by exports and investment. It is worth noting that both government spending and consumption see a decline. The decline in government spending stems from the drop in tariff revenues due to the steel cuts. This, in turn, impacts the income that households receive. Additionally, a part of domestic consumption is now sacrificed to serve the export market as firms and sectors in India become more export-oriented. This reallocation of output increasingly to exports crowds out domestic consumption. This is essentially what is reflected as a drop in consumption as per the model. The decrease in consumption observed in these simulations reflects the model's design, not a realistic forecast. The model assumes households depend entirely on government spending and capital returns for their income. Since both sources decline due to tariff reduction, household income drops, which causes the model to show lower consumption. However, this mechanical relationship between income and consumption is a limitation of the model structure, not an actual economic outcome which we can expect with certainty.

Additionally, the welfare of households increases by large margins. There is an almost 80% increase in the welfare of consumers with a 90% reduction in tariffs. Welfare, measured as Equivalent Variation (EV) to capture the change in household purchasing power and well-being, is typically considered a better measure of the impact of these simulations on consumers for several reasons. Firstly, consumption represents only 50% of final demand in the model. Welfare, on the other hand, accounts for benefits accrued to consumers through the consumption of public goods. It also accounts for changes in disposable income and prices that affect the household's standard of living. Lastly, since we have made changes to the standard assumptions of the model (as discussed in Section 2.2), private consumption falls as it is treated as a 'shock absorber'—a variable that adjusts simply to absorb all other changes in the economy. However, welfare is not disturbed by changes to these assumptions (Hertel & Tsigas, 1996).

Table 6: Decomposition of Changes to the GDP

Change in Tariff (%)	Tariff Rate (%)	Exports (US$ million)	Imports (US$ million)	Investment (US$ million)	Consumption (US$ million)	Government Spending (US$ million)
–10	2.48	68.1	–54.2	38.7	–22.4	–3.8
–25	2.07	170.1	–135.4	96.8	–56.0	–9.6
–50	1.38	340.3	–270.8	193.5	–111.9	–19.1
–75	0.69	510.5	–406.2	290.3	–167.9	–28.7
–90	0.28	612.6	–487.4	348.3	–201.5	–34.4

Source: Authors' simulations using the GTAP model.

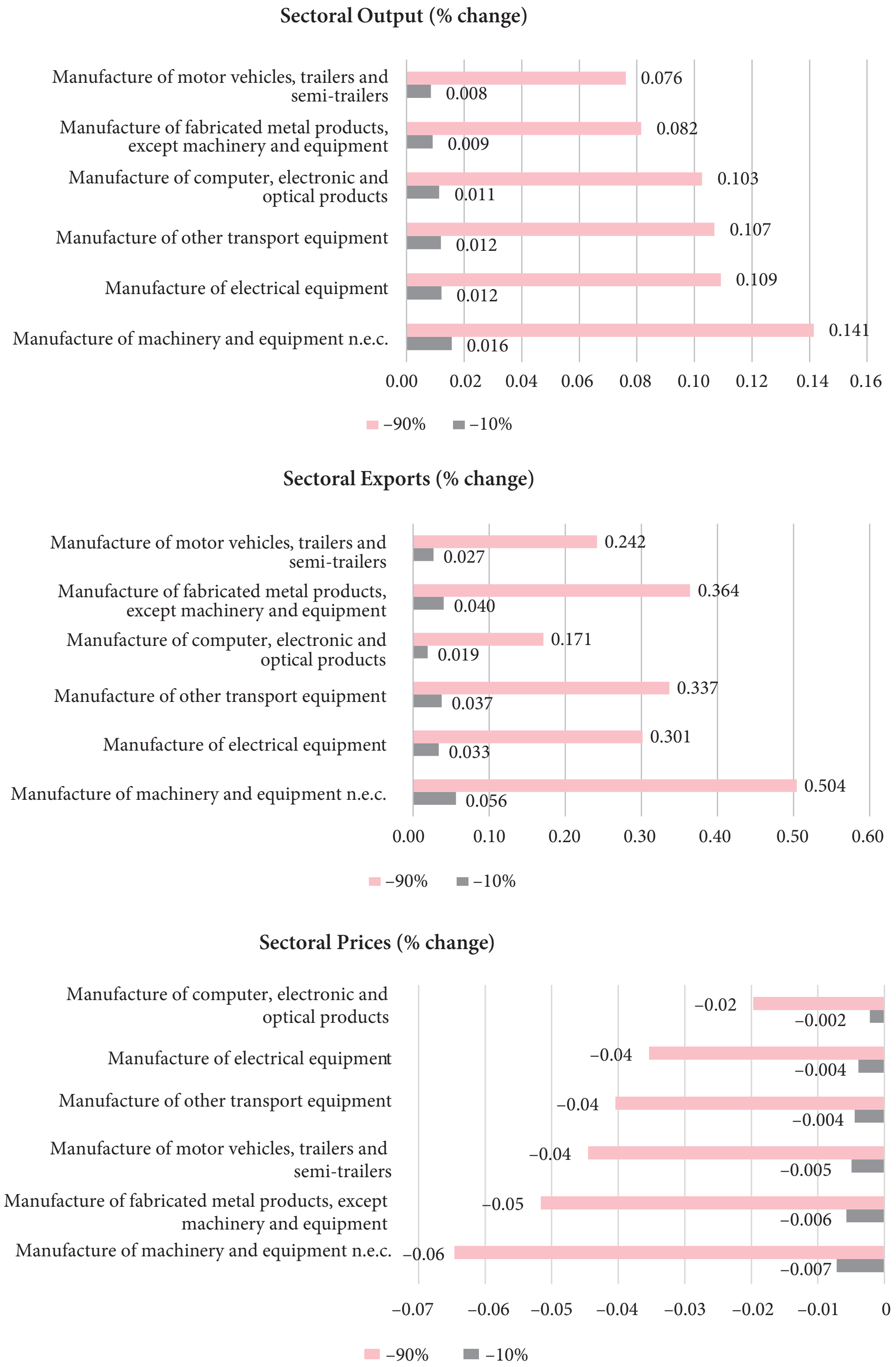
Table 7: Change in Welfare (Equivalent Variation)

Change in Tariff (%)	Tariff Rate (%)	Change in Welfare (EV) (%)
–10	2.484	8.75
–25	2.07	21.88
–50	1.38	43.77
–75	0.69	65.6
–90	0.276	78.8

Source: Authors' simulations using the GTAP model.

Note: 'Welfare' in this study, measured as EV, differs fundamentally from GDP growth and requires careful interpretation. While GDP measures the total value of goods and services produced in the economy, welfare measures the change in household purchasing power and well-being. Specifically, EV answers: "How much additional income would households need, at baseline prices, to be as well off as they are after the tariff reduction?" A positive EV indicates households are better off.

Figure 4: Changes in Downstream Sectors' Output, Exports, and Prices



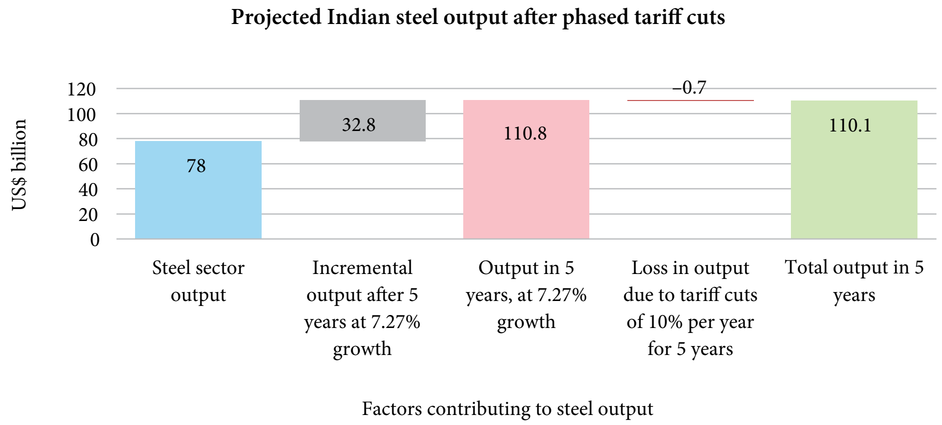
Source: Authors' simulations using the GTAP model.

Several sectors that stand to gain from access to cheaper inputs are shown in Figure 4. The machinery and equipment sector is the largest gainer, increasing its output by 0.14% and exports by 0.5% in the scenario where steel tariffs are dismantled by 90%.

3.3 What If We Implement a Phased Reduction in Tariffs?

The results discussed in Section 3.1 show that the output in the Indian steel sector is likely to fall by 1% with a 90% dismantling of tariffs. However, we have not yet accounted for the regular growth that happens in the steel industry. The GTAP model, being static, does not account for the growth that happens in any industry or economy. The model can be best explained as a thought experiment, trying to understand what the world would be like if the tariffs had been reduced in the same year and with all the other circumstances remaining the same (Global Trade Analysis Project, n.d.). To illustrate a situation where we have accounted for tariff cuts, along with the growth of the steel industry, we have devised the following projection (Figure 5).

Figure 5: Steel Growth Remains Resilient Even With Lower Tariffs



Source: Authors' simulations using the GTAP model.

We assume that the total planned reduction in tariffs on steel is 50%, and that it is planned to be phased out at 10% each year for the next 5 years. The domestic steel sector's output prior to the tariff cuts is US$78 billion. If the steel sector grows at ~7.27% each year, in five years the industry's output will be US$110.8 billion, *ceteris paribus*. However, our simulations have found that with a 50% tariff cut, the output loss will be -0.6% (~US$0.7 billion). This implies that the total industry output when tariffs are phased out will be approximately US$110.1 billion. The industry's growth and output remain resilient despite lower tariffs, while other sectors gain from access to cheaper inputs. The industry does not lose out and is still able to grow despite reduced protection.

4. Conclusion and Recommendations

This paper has assessed the economy-wide impact of reductions in steel tariffs by India. Steel has, in the past, been viewed as a strategic sector warranting protection that functions as a crucial input to several other downstream sectors like construction, machinery, vehicles, and infrastructure. Hence, policies related to the growth of the steel industry are likely to cause rippling effects through the economy and have a far-reaching impact beyond the steel sector itself.

However, to spur further growth for the country, the time is ripe to reconsider the protection this industry has. Our simulations show that even an almost complete dismantling of tariffs on steel imports does not lead to a collapse in sectoral output. Domestic steel output falls only by 1% with a 90% reduction in steel tariffs, which is a relatively modest contraction given the magnitude of liberalisation. This indicates that tariff protection is not the primary driver of the sector's long-term expansion and that Indian steel producers retain the capacity to remain viable under greater competitive pressure. If tariff cuts are executed in a phased manner, we can ensure sustained growth for the steel sector while boosting the growth of the nation overall. Evidence from several studies suggests that exposure to cheaper inputs and import competition enhances productivity, implying that long-term gains from steel tariff liberalisation may be larger than what the GTAP model predicts, as it does not account for changes in productivity (Nataraj, 2011; Topalova & Khandelwal, 2011).

The reallocation of resources from protected steel production to more competitive and export-oriented activities results in higher allocative efficiency, aggregate exports and investments. As a result, India's GDP grows in all scenarios of tariff reduction, with GDP growth positively correlated with the tariff reduction. India's share in global exports improves as well, reinforcing that lower input costs generate competitive gains. Welfare in the country also improves significantly, registering large improvements in consumers' standard of living.

This analysis leads to a few broad policy implications:

First, economic growth is more closely linked to competitively priced steel rather than to the level of domestic steel production. Policies that lower input costs for downstream industries can hence generate greater growth as compared to policies that are aimed at only protecting upstream producers. There is the potential to spur more growth if both tariffs and NTMs for the steel industry are reined in. The gains estimated from reduced protection in this study are likely conservative.

Second, at the time of this study, India is also set to sign several FTAs, which will become the cornerstones of its trade policy and shape the future trajectory of India's export and global trade ambitions. These include FTAs with the European Union (EU), Chile, Peru, and the USA. The EU FTA would provide us with a strategic opportunity to gauge the impact of access to cheaper steel on the Indian economy—Germany is one of the top producers of specialised steel in the world, which India currently lags in producing. While negotiating the terms for these FTAs, it would be key for policymakers to balance our vision for access to potential export markets with the need for access to critical inputs required to feed our growing industries and improve our domestic infrastructure.

Lastly, the gains from reduced protectionism as described in this study will take a few years to materialise. In the meantime, it is important to provide support to the industry through other channels**.** Phased implementation (as described in Section 3.3), combined with targeted investments in technology and efficiency, can cushion the adjustment period. Aligning these policies with the overarching goals of downstream competitiveness, export expansion, 'Make in India' objectives, and global value chain integration ensures economy-wide benefits while sustaining India's steel industry.

To conclude, the results from this study suggest that it is imperative to revisit the degree of protectionism that is currently provided to the Indian steel industry—which includes NTMs and tariffs alike—to maintain the growth and momentum that this industry has moving forward. Tariff reduction in a phased manner, along with similar reductions in NTMs like QCOs and anti-dumping duties, along with a continued focus on improving the scale, technology, and efficiency of steel production, can support India's macro growth objectives. The Indian steel industry is inherently resilient enough to withstand a possible influx of foreign competition. The push provided to the industry from reduced protection might prove to be the catalyst that spurs further growth not just for the steel industry, but for other sectors reliant on steel.

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Appendices

Appendix 1: Study-Specific Regional Aggregation in the GTAP Model

Table A–1: Regional Aggregation

Serial No.	Code	Description	Aggregation
1	AUS	Australia	ROW
2	NZL	New Zealand	ROW
3	CHN	China	ROW
4	HKG	Hong Kong	ROW
5	JPN	Japan	ROW
6	KOR	Korea	ROW
7	MNG	Mongolia	ROW
8	TWN	Chinese Taipei	ROW
9	BRN	Brunei Darussalam	ROW
10	KHM	Cambodia	ROW
11	IDN	Indonesia	ROW
12	LAO	Lao PDR	ROW
13	MYS	Malaysia	ROW
14	PHL	Philippines	ROW
15	SGP	Singapore	ROW
16	THA	Thailand	ROW
17	VNM	Viet Nam	ROW
18	AFG	Afghanistan	ROW
19	BGD	Bangladesh	ROW
20	IND	India	India
21	NPL	Nepal	ROW
22	PAK	Pakistan	ROW
23	LKA	Sri Lanka	ROW
24	CAN	Canada	ROW
25	USA	United States of America	ROW
26	MEX	Mexico	ROW
27	ARG	Argentina	ROW

Serial No.	Code	Description	Aggregation
28	BOL	Bolivia	ROW
29	BRA	Brazil	ROW
30	CHL	Chile	ROW
31	COL	Colombia	ROW
32	ECU	Ecuador	ROW
33	PRY	Paraguay	ROW
34	PER	Peru	ROW
35	URY	Uruguay	ROW
36	VEN	Venezuela (Bolivarian Republic of)	ROW
37	CRI	Costa Rica	ROW
38	GTM	Guatemala	ROW
39	HND	Honduras	ROW
40	NIC	Nicaragua	ROW
41	PAN	Panama	ROW
42	SLV	El Salvador	ROW
43	DOM	Dominican Republic	ROW
44	HTI	Haiti	ROW
45	JAM	Jamaica	ROW
46	PRI	Puerto Rico	ROW
47	TTO	Trinidad and Tobago	ROW
48	AUT	Austria	ROW
49	BEL	Belgium	ROW
50	BGR	Bulgaria	ROW
51	HRV	Croatia	ROW
52	CYP	Cyprus	ROW
53	CZE	Czech Republic	ROW
54	DNK	Denmark	ROW
55	EST	Estonia	ROW
56	FIN	Finland	ROW
57	FRA	France	ROW
58	DEU	Germany	ROW
59	GRC	Greece	ROW
60	HUN	Hungary	ROW

Serial No.	Code	Description	Aggregation
61	IRL	Ireland	ROW
62	ITA	Italy	ROW
63	LVA	Latvia	ROW
64	LTU	Lithuania	ROW
65	LUX	Luxembourg	ROW
66	MLT	Malta	ROW
67	NLD	Netherlands	ROW
68	POL	Poland	ROW
69	PRT	Portugal	ROW
70	ROU	Romania	ROW
71	SVK	Slovakia	ROW
72	SVN	Slovenia	ROW
73	ESP	Spain	ROW
74	SWE	Sweden	ROW
75	GBR	United Kingdom	ROW
76	CHE	Switzerland	ROW
77	NOR	Norway	ROW
78	ALB	Albania	ROW
79	SRB	Serbia	ROW
80	BLR	Belarus	ROW
81	RUS	Russian Federation	ROW
82	UKR	Ukraine	ROW
83	KAZ	Kazakhstan	ROW
84	KGZ	Kyrgyzstan	ROW
85	TJK	Tajikistan	ROW
86	UZB	Uzbekistan	ROW
87	ARM	Armenia	ROW
88	AZE	Azerbaijan	ROW
89	GEO	Georgia	ROW
90	BHR	Bahrain	ROW
91	IRN	Iran	ROW
92	IRQ	Iraq	ROW
93	ISR	Israel	ROW

Serial No.	Code	Description	Aggregation
94	JOR	Jordan	ROW
95	KWT	Kuwait	ROW
96	LBN	Lebanon	ROW
97	OMN	Oman	ROW
98	PSE	Palestinian Territory	ROW
99	QAT	Qatar	ROW
100	SAU	Saudi Arabia	ROW
101	SYR	Syrian Arab Republic	ROW
102	TUR	Turkey	ROW
103	ARE	United Arab Emirates	ROW
104	DZA	Algeria	ROW
105	EGY	Egypt	ROW
106	MAR	Morocco	ROW
107	TUN	Tunisia	ROW
108	BEN	Benin	ROW
109	BFA	Burkina Faso	ROW
110	CMR	Cameroon	ROW
111	CIV	Côte d'Ivoire	ROW
112	GHA	Ghana	ROW
113	GIN	Guinea	ROW
114	MLI	Mali	ROW
115	MRT	Mauritania	ROW
116	NER	Niger	ROW
117	NGA	Nigeria	ROW
118	SEN	Senegal	ROW
119	TGO	Togo	ROW
120	AGO	Angola	ROW
121	CAF	Central African Republic	ROW
122	TCD	Chad	ROW
123	COG	Congo	ROW
124	COD	Democratic Republic of the Congo	ROW
125	GNQ	Equatorial Guinea	ROW
126	GAB	Gabon	ROW

Serial No.	Code	Description	Aggregation
127	STP	Sao Tome and Principe	ROW
128	BDI	Burundi	ROW
129	COM	Comoros	ROW
130	ETH	Ethiopia	ROW
131	KEN	Kenya	ROW
132	MDG	Madagascar	ROW
133	MWI	Malawi	ROW
134	MUS	Mauritius	ROW
135	MOZ	Mozambique	ROW
136	RWA	Rwanda	ROW
137	SDN	Sudan	ROW
138	TZA	Tanzania	ROW
139	UGA	Uganda	ROW
140	ZMB	Zambia	ROW
141	ZWE	Zimbabwe	ROW
142	BWA	Botswana	ROW
143	SWZ	Eswatini	ROW
144	NAM	Namibia	ROW
145	ZAF	South Africa	ROW

Source: GTAP 12 database.

Note: ROW = Rest of the World.

Appendix 2: Mapping of Harmonized System Codes in the Combined "Iron & Steel" Sector to the Separate "Iron" & "Steel" Sectors

Table A–2: Harmonized System Codes for Iron and Steel

HS Code	Description	Sector
2618	Granulated slag (slag sand) from the manufacture of iron or steel	Iron
2619	Slag, dross (other than granulated slag), scalings and other waste from the manufacture of iron or steel	Iron
7201	Pig iron and spiegeleisen in pigs, blocks or other primary forms	Iron
7202	Ferro-alloys	Iron
7203	Ferrous products obtained by direct reduction of iron ore and other spongy ferrous products, in lumps, pellets or similar forms; iron having a minimum purity by weight of 99.94%, in lumps, pellets or similar forms	Iron
7204	Ferrous waste and scrap; remelting scrap ingots of iron or steel	Steel
7205	Granules and powders, of pig iron, spiegeleisen, iron or steel	Steel
7206	Iron and non-alloy steel in ingots or other primary forms (excluding iron of heading 7203)	Steel
7207	Semi-finished products of iron or non-alloy steel	Steel
7208	Flat-rolled products of iron or non-alloy steel, of a width of 600 mm or more, hot-rolled, not clad, plated or coated	Steel
7209	Flat-rolled products of iron or non-alloy steel, of a width of 600 mm or more, cold-rolled (cold-reduced), not clad, plated or coated	Steel
7210	Flat-rolled products of iron or non-alloy steel, of a width of 600 mm or more, clad, plated or coated	Steel
7211	Flat-rolled products of iron or non-alloy steel, of a width of less than 600 mm, not clad, plated or coated	Steel
7212	Flat-rolled products of iron or non-alloy steel, of a width of less than 600 mm, clad, plated or coated	Steel
7213	Bars and rods, hot-rolled, in irregularly wound coils, of iron or non-alloy steel	Steel
7214	Other bars and rods of iron or non-alloy steel, not further worked than forged, hot-rolled, hot-drawn or hot-extruded, but including those twisted after rolling	Steel

HS Code	Description	Sector
7215	Other bars and rods of iron or non-alloy steel	Steel
7216	Angles, shapes and sections of iron or non-alloy steel	Steel
7217	Wire of iron or non-alloy steel	Steel
7218	Stainless steel in ingots or other primary forms; semi-finished products of stainless steel	Steel
7219	Flat-rolled products of stainless steel, of a width of 600 mm or more	Steel
7220	Flat-rolled products of stainless steel, of a width of less than 600 mm	Steel
7221	Bars and rods, hot-rolled, in irregularly wound coils, of stainless steel	Steel
7222	Other bars and rods of stainless steel; angles, shapes and sections of stainless steel	Steel
7223	Wire of stainless steel	Steel
7224	Other alloy steel in ingots or other primary forms; semi-finished products of other alloy steel	Steel
7225	Flat-rolled products of other alloy steel, of a width of 600 mm or more	Steel
7226	Flat-rolled products of other alloy steel, of a width of less than 600 mm	Steel
7227	Bars and rods, hot-rolled, in irregularly wound coils, of other alloy steel	Steel
7228	Other bars and rods of other alloy steel; angles, shapes and sections, of other alloy steel; hollow drill bars and rods, of alloy or non-alloy steel	Steel
7229	Wire of other alloy steel	Steel
7301	Sheet piling of iron or steel, whether or not drilled, punched, or made from assembled elements; welded angles, shapes, and sections, of iron or steel	Steel
7302	Railway or tramway track construction material of iron or steel: rails, check-rails and rack rails, switch blades, crossing frogs, point rods and other crossing pieces, sleepers (cross-ties), fish-plates, chairs, chair wedges, sole plates (base plates), rail clips, bedplates, ties and other material specialized for jointing or fixing rails	Steel
7303	Tubes, pipes and hollow profiles, of cast iron	Iron
7304	Tubes, pipes and hollow profiles, seamless, of iron (other than cast iron) or steel	Steel

HS Code	Description	Sector
7305	Other tubes and pipes (for example, welded, riveted or similarly closed), having circular cross-sections, the external diameter of which exceeds 406.4 mm, of iron or steel	Steel
7306	Other tubes, pipes and hollow profiles (for example, open seam or welded, riveted or similarly closed), of iron or steel	Steel
7307	Tube or pipe fittings (for example, couplings, elbows, sleeves), of iron or steel	Steel

Source: Frigård and Kollberg (2025); Kelly and Green (2019).

Appendix 3: Selected Results from Simulations with No Closure Changes (Standard Model Assumptions)

Table A–3: Selected Results from Simulations with Standard Assumptions

Change in Tariff (%)	Real GDP Change (%)	Real GDP Change (US$ million)	Steel Sector Output— Change (%)
–10	0.0003%	10.45	–0.11%
–25	0.0007%	26.25	–0.28%
–50	0.0014%	52.75	–0.56%

Source: Authors' simulations using the GTAP model.

About the authors

Aparna Preethan is a former Research Analyst at the Centre for Social and Economic Progress (CSEP), where her work focused on the macroeconomic and sectoral impacts of trade protection and industrial policies. She holds a Master's degree in Economics with a specialisation in Environment and Resource Economics from the TERI School of Advanced Studies and a Bachelor's degree from Christ University, Bengaluru. Her Master's thesis analysed the impact of prominent economic policy tools (namely subsidies, tariffs, and productivity enhancements) on virtual water flows through primary crop trade in India.

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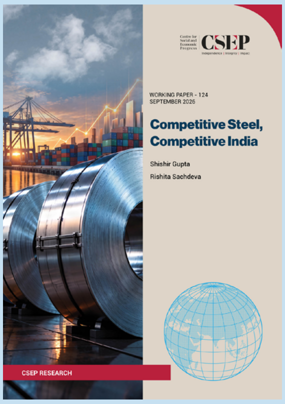
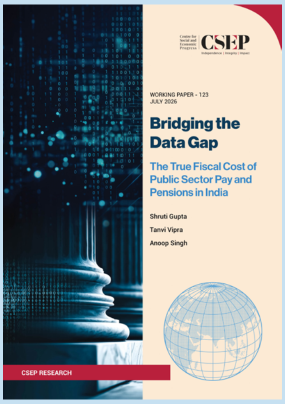
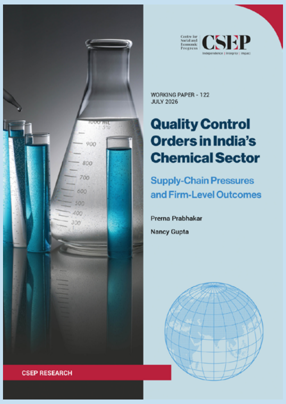
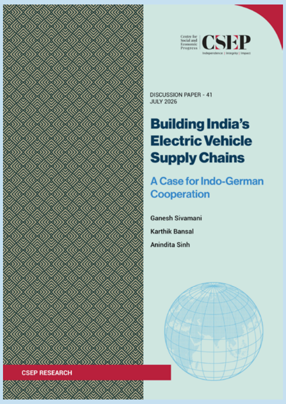
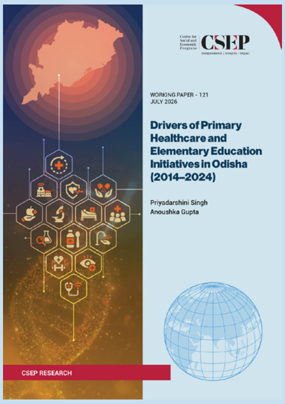
Other publications

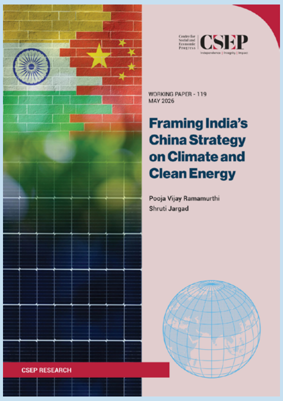


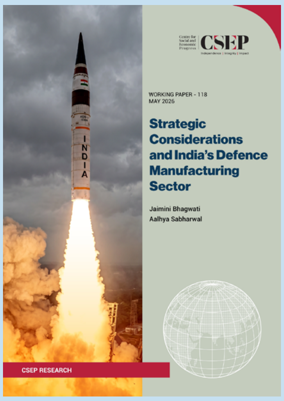


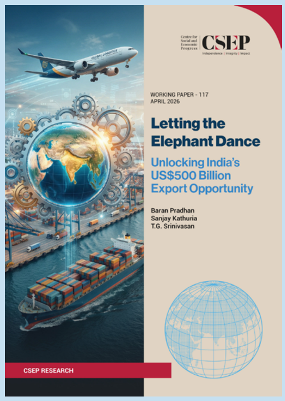


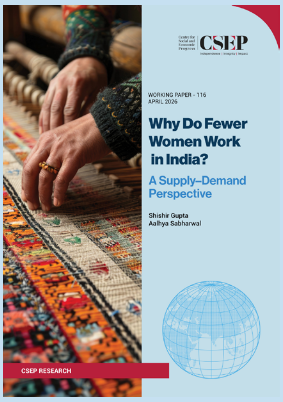


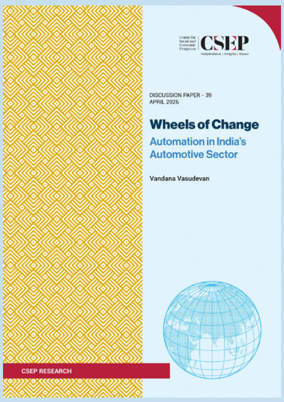


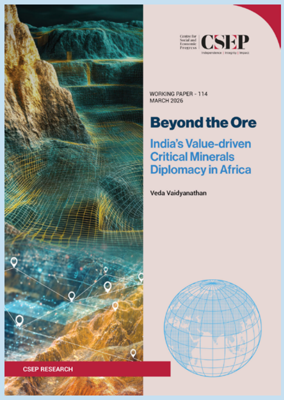












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