Indian Council for Research on
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SUMMARY FOR POLICYMAKERS

Unpacking India's Scrap Steel Trade Dynamics

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Introduction

India, as the world's second-largest steel producer, plays a central role in global steel supply and acts as a key driver for its industrial growth. With crude steel production projected to more than double from 111 million tonnes (MT) in 2019–20 to 227 MT by 2030 and further increase to 489 MT by 2050 (Hall et al., 2020), steel remains indispensable to India's infrastructure and economic development. However, the sector's high carbon intensity of 2.6 metric tons of CO_2 per ton of crude steel in 2020 poses significant sustainability challenges, particularly amid demand projected to grow at 8 percent annually in 2024 and 2025 (S&P Global, 2024).

Scrap steel emerges as a critical lever to decouple steel industrial growth from emissions. As part of its "green steel initiative", the Indian government aims to increase the share of scrap in steelmaking to 50 percent by 2047. Steel production via electric arc furnace (EAF) and induction furnace (IF) routes using scrap can reduce carbon emissions by 1.5 metric tons per ton of scrap used and cut energy consumption by 75 percent, compared to traditional blast furnace methods using virgin iron ore (World Steel Association; Material Recycling Association of India[1]). Despite these environmental and economic benefits, scrap currently constitutes only 20 percent of India's steelmaking feedstock, constrained by limited domestic availability of approximately 25 Million Metric tons (MMt) annually (S&P Global, 2024).

As per the Ministry of Commerce and Industry, Government of India, in 2023, India's ferrous scrap imports rose to 40.4 percent, i.e., 11.76 MMt, compared to the previous year, and were more than double the 2013 levels, highlighting growing reliance on imports alongside fragmented domestic scrap collection and recycling systems. As the world's second-largest scrap importer, India sources scrap primarily from developed countries like the USA, UK, and EU, many of which are now restricting exports to prioritize their own decarbonization goals.

Globally, the availability of scrap for trade is expected to tighten significantly by 2030, as major exporting countries consume more scrap domestically. For instance, the Boston Consulting Group (BCG)[2] projects that by 2030, the EU scrap exports could decline by 25 percent. In 2021 alone, 76 export restrictions reduced global scrap exports by nearly 8 percent (5.5 MMt) (OECD, 2023). Export taxes of up to 40 percent and 15 percent, imposed primarily by China and Russia, respectively, have been key in restricting scrap exports. With the UK and USA alone accounting for nearly one-third of global scrap steel trade, the concentration of supply reinforces India's vulnerability to such policy shifts.

The convergence of rising domestic demand and tightening global supply drives a looming deficit. A BCG analysis projects that the current global scrap steel surplus of 9 MMt will shift to a 15 MMt deficit by 2030. For India, this mismatch, coupled with high import dependence and weak domestic scrap

[1]Available at https://mrai.org.in/theindustry/ferrousmetals.html. Accessed on 22nd May, 2025.

[2]Available at https://www.bcg.com/publications/2024/shortfalls-in-scrap-will-challenge-steel-industry. Accessed on 22nd May, 2025.

collection and recycling systems, poses significant risks of supply disruptions, higher input costs, and setbacks in achieving its decarbonization goals.

Against this backdrop, there is a critical need to understand the potential economic impacts of scrap steel export restrictions by key supplier countries. ICRIER's ***Samriddhi*** trade model, built on the Global Trade Analysis Project (GTAP) Circular Economy (CE) 11 database and the GTAP-Power Model, employs a robust analytical framework. The model provides disaggregated and comprehensive sectoral insights into the iron and steel industry, distinguishing between primary and secondary production, casting, and recycling processes, thereby enabling a nuanced evaluation of the evolving global trade dynamics and their impact on India's steel sector.

Policy Relevance and Research Questions

With global scrap availability tightening by 15 percent in 2030, higher import-dependent nations like India may face severe economic vulnerabilities. This decline risks derailing growth at a time of surging demand, placing India at a critical crossroads between economic growth and sustainable development. There is an urgent need for the policy discourse to highlight the fallout of rising scrap export restrictions and the pressing need to scale up domestic recycling infrastructure.

In the face of intensifying non-tariff barriers and climate-linked trade instruments such as the Carbon Border Adjustment Mechanism (CBAM), hard-to-abate sectors like steel are under unprecedented pressure to decarbonize. Scrap steel is central to this transition, yet India's constrained access to quality scrap remains a critical bottleneck.

This study provides two key insights for policymakers: the impact of export restrictions on sectoral growth and the identification of alternative import sources. More importantly, this study underscores the urgent need to leverage these alternative sources as an interim cushion, facilitating a deliberate, phased expansion of India's domestic scrap recycling capacity. This approach is essential to meet the government's ambitious goal of 50 percent scrap usage in steelmaking by 2047, while ensuring industrial stability and economic resilience.

Research Questions

Building on the mentioned narrative that scrap steel serves as a key strategic lever to drive steel industrial growth alongside meeting decarbonization goals, the study aims to capture the dynamics of export restrictions on scrap steel and quantify their impact on India's steel sector and the broader economy.

1. What are the global trade patterns in iron and steel scrap, and what role does India play in them?
2. How does an export ban by leading exporters of scrap to India impact the output and international trade of the country's iron and steel sector?
3. What are the implications of an export ban on India's iron and steel recycling industry?

Key Takeaways from the Trade Analysis

To gain deeper insights, an in-depth trend and geographical analysis using the World Integrated Trade Solution (WITS) database, developed by the World Bank was undertaken for the period 2012 to 2023. The key findings from the analysis are summarized below:

1. **Global Scrap Trade Declining in Volume:** Despite stable trade values, global scrap steel exports have fallen from 100 MT in 2012 to 69 MT in 2023, indicating shrinking cross-border flows, especially when intra-EU trade is excluded.

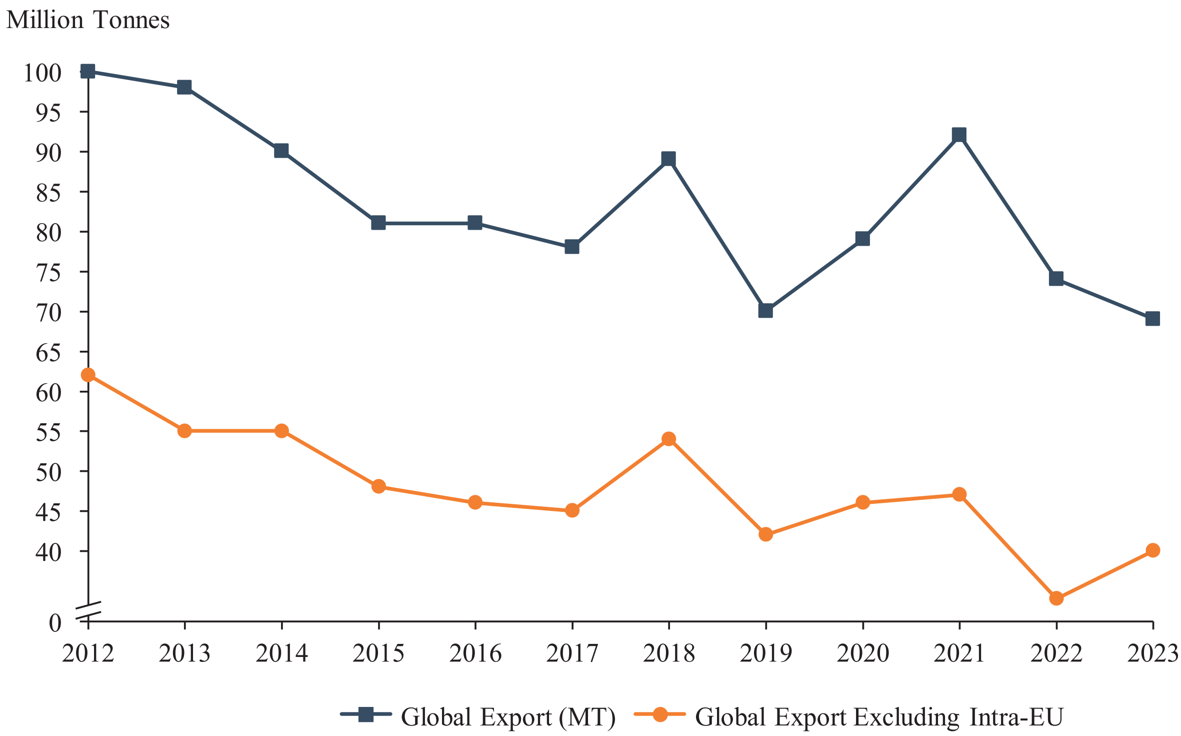
2. **India is the World's Second-Largest Scrap Importer:** Alongside Türkiye, India accounted for 50 percent of global scrap imports in 2023, yet scrap contributes only 20 percent to India's steel production, highlighting the under-utilisation of secondary steelmaking.

3. **High Concentration of Import Sources:** Over 70 percent of India's scrap steel imports (by volume and value) originate from just 10 countries, notably the EU, USA, and UK. This concentration poses risks to supply stability and price shocks.

4. **Domestic Scrap Supply is Growing but Imports Still Crucial:** Domestic scrap availability increased from 20 MT in 2018 to 25 MT in 2024, aided by policies such as the Steel Scrap Recycling Policy (2019) and Vehicle Scrappage Policy (2021). However, imports still meet 25 percent of total scrap demand.

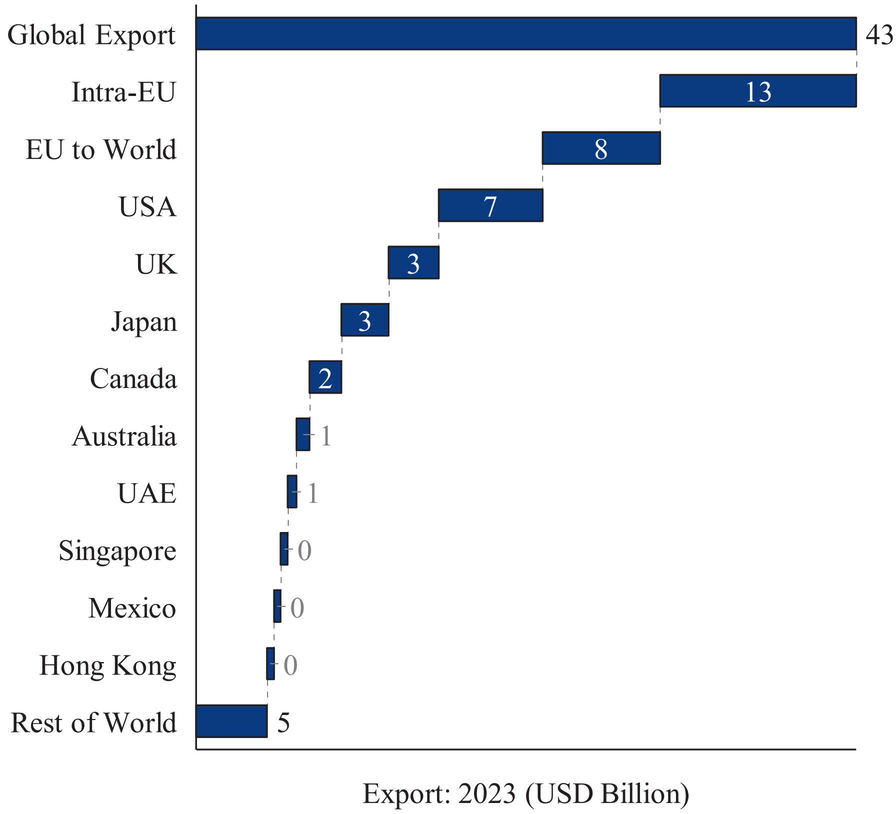
5. **Widening Iron & Steel Trade Deficit:** In 2023, India's iron and steel trade deficit stood at USD 7 billion, driven by faster import growth than exports. While exports peaked at 5.3 percent of India's export basket in 2021, import dependence remains persistent.

Figure 1: Scrap Steel Trade: Export Volume



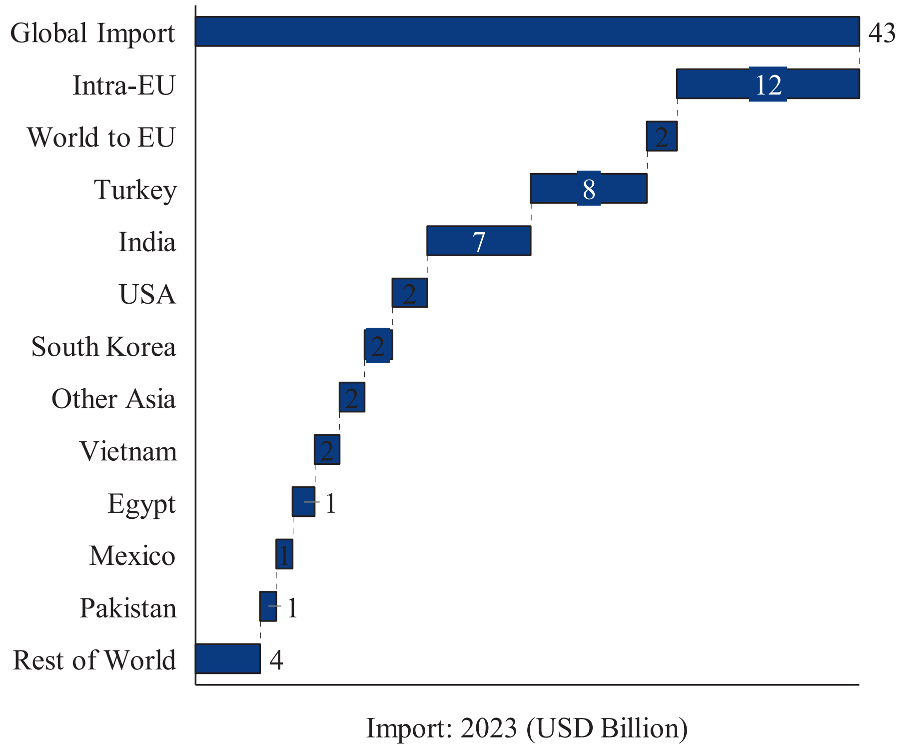
Source: Authors' analysis using WITS, World Bank

Figure 2: Top 10 Global Exporters of Scrap Steel



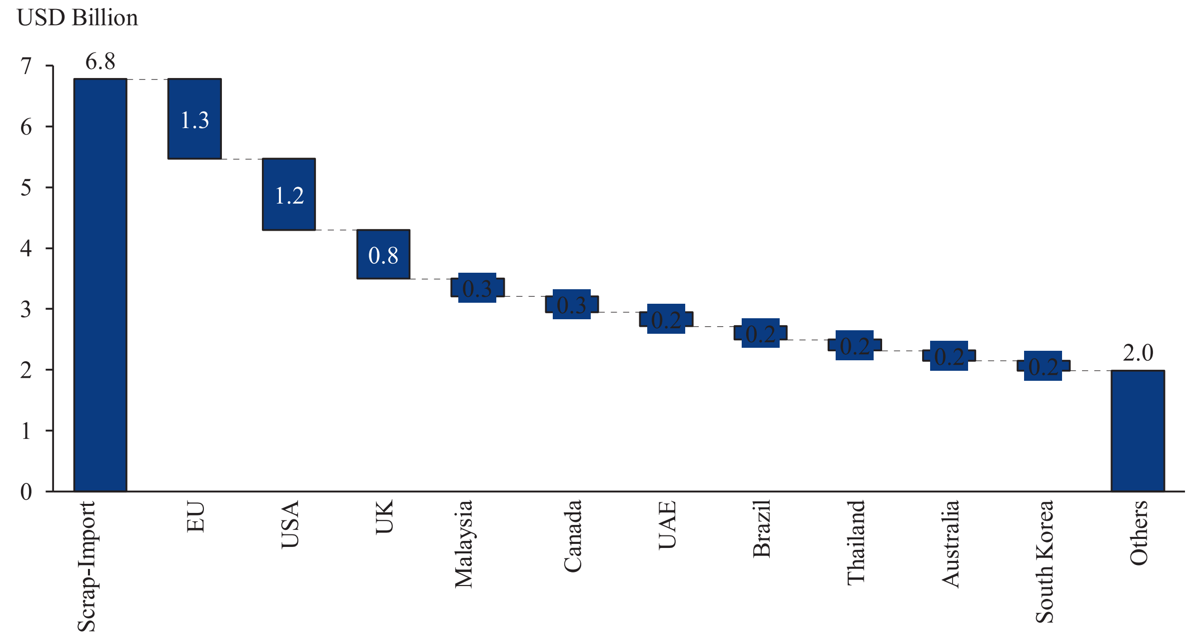
Source: Authors' analysis using WITS, World Bank

Figure 3: Top 10 Global Importers of Scrap Steel



Source: Authors' analysis using WITS, World Bank

Figure 4: Top 10 Suppliers of Scrap Steel to India – Value Terms

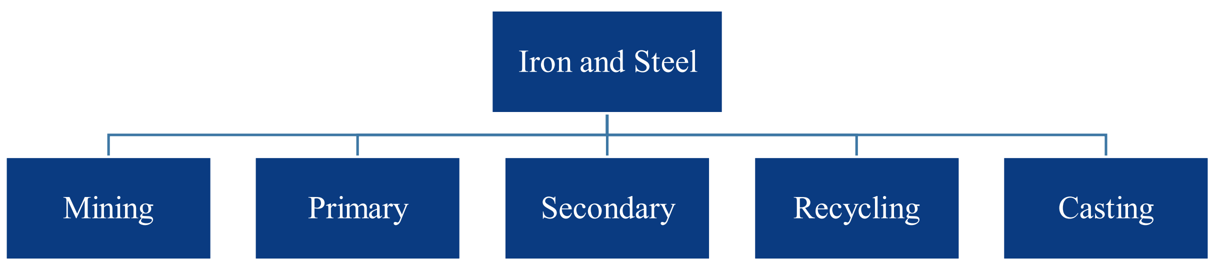


Source: Authors' analysis using WITS, World Bank

Methodology

To assess the impact of a potential export ban on ferrous scrap from India's key suppliers, this study employs the ICRIER ***Samriddhi*** Global Trade Model, a computable general equilibrium (CGE) model grounded in the GTAP-CE and the GTAP-Power framework. The GTAP-CE database, released in April 2023, is a specialized extension of the standard GTAP 11 dataset. It includes detailed sectoral disaggregation for key materials, such as iron, copper, aluminium, and plastics, and explicitly distinguishes between primary and secondary production processes, alongside a dedicated recycling sector. These features are essential for modelling the transition to a circular economy, as they enable a realistic representation of material loops and the role of recovered resources in industrial production.

Figure 5: Iron and Steel Value Chain Sectors



Source: Authors' Construction

The iron and steel value chain is captured through five key sectors in the GTAP-CE database: iron ore mining, primary steel, secondary steel, iron and steel recycling, and casting. The model also integrates the GTAP-Power framework, which allows for technological differentiation in electricity generation—a critical input in steelmaking—across sources such as coal, wind, nuclear, and hydro, and accounts for load factor variations. For modelling ease and policy relevance, the full database (99 sectors and 160 regions) has been aggregated to 29 sectors and 20 regions, with regional groupings aligned with India's major scrap suppliers identified through trade analysis.

The policy scenario simulates a complete ban on scrap exports from the EU, UK, USA, and UAE to India. This is implemented in the model by endogenizing the export tax variable in the scrap steel sector for these countries. The export tax is allowed to adjust automatically to reach the level required to drive exports to zero, effectively simulating a ban without manually fixing trade quantities or prices. This approach enables a nuanced analysis of how such a ban would affect India's scrap availability, the competitiveness of secondary steel, and broader economy-wide trade and production outcomes.

Insights from Modelling Analysis

The modelling analysis, based on a scenario where major trading partners ban scrap steel exports to India, reveals key impacts on domestic industrial output and trade patterns.

1. **Output Effects**

- Among the various segments within the iron and steel sector, the recycling industry records the highest growth, 14 percent, driven by an output increase of USD 196 million. This surge reflects a domestic push to compensate for the supply shortfall caused by export bans from key supplier countries.
- Despite the fact that the secondary steel production, which uses scrap as input, has a 25 percent share of imported inputs, there is a marginal contraction of 0.38 percent.
  - ♦ This limited contraction suggests that domestic scrap and scrap sourced from other countries (outside the ban) play a cushioning role in stabilizing supply.
- Recycling industry output declines marginally in countries imposing the ban, and in addition, there is increased export to other parts of the world, such as South Asia (except India), Sub-Saharan Africa, and Southeast Asia. So, essentially, the reduced export of scrap by the key exporters results in trade diversion with some domestic absorption of scrap through increased domestic secondary steel production.
- In terms of the percentage change, the recycling sectors in Oceania (5.34 percent) and Sub-Saharan Africa (3.7 percent) expand the most. However, the Middle East (USD 70 million) and South-East Asia (74 Million USD) are some of the other regions that witness a significant absolute increase in recycling industry output.

2. **Trade Impacts**

- India's scrap steel imports decline by 8 percent; together, the four countries imposing the ban account for USD 500 million worth of scrap, which is nearly 50 percent of scrap imports. Among the countries imposing the ban, the UAE's restriction contributes the most to the decline, i.e., 5.5 percent, followed by the UK (3.87 percent), the USA (3.76 percent), and the EU (1.18 percent).

- The drop in imports from key suppliers is partially offset by increased sourcing from Sub-Saharan Africa (9.49 percent), Southeast Asia (6.73 percent), the Middle East (7.49 percent), and Oceania (4.82 percent), indicating emerging trade diversification.

Figure 6: Change in Output of India's Iron and Steel Sectors (%)

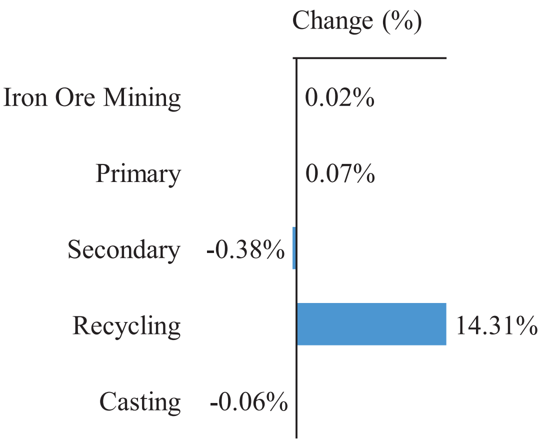
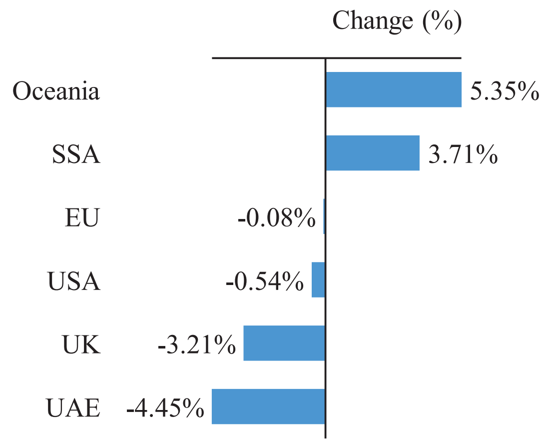


Figure 7: Cross-Country Impact on Recycling Output (%)



*Source: Authors' analysis using ICRIER **Samriddhi** Global Trade Model*

Figure 8: Iron & Steel: Export and Import Changes (%)

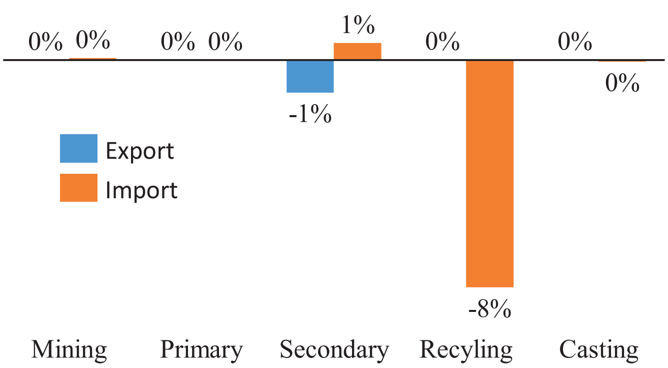
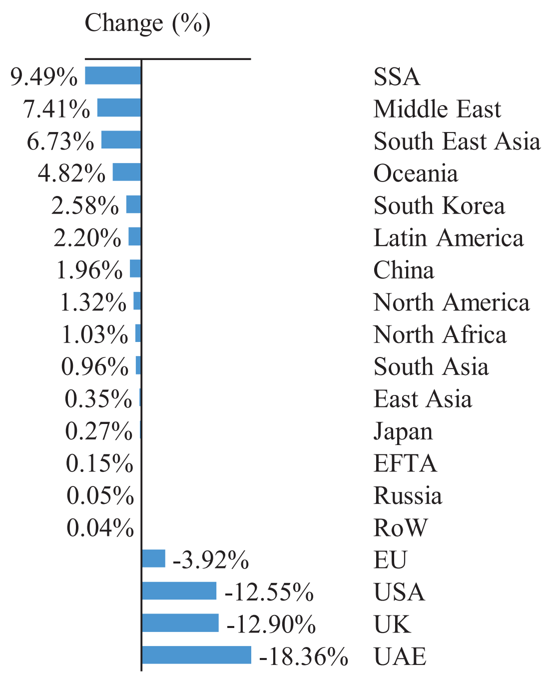


Figure 9: Dissecting the Fall in Recycled Steel Imports (%)



*Source: Authors' analysis using ICRIER **Samriddhi** Global Trade Model*

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