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Sanctions and Shifts: India–Russia Trade in the Wake of U.S.-Led Western Measures

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Abstract:
The U.S.-led Western sanctions on Russia have triggered a strategic reorientation in its global trade partnerships, with increased engagement across the Global South and BRICS[1] Nations. This paper examines the evolving India–Russia bilateral trade landscape post-2022, highlighting how alternative payment systems and institutional support have facilitated continued trade despite geopolitical constraints. Using a partial equilibrium SMART[2] Model, the study simulates trade potential across primary and secondary sectors, revealing notable gains and diversification. The findings underscore how sanctions have inadvertently accelerated South–South cooperation and reshaped trade flows in favour of emerging economies.

Keywords: U.S.-led sanctions, India–Russia trade, South–South cooperation, alternative payment systems, BRICS, SMART.

1 : Introduction

The imposition of U.S.-led Western sanctions on Russia in 2022 has precipitated profound realignments in global trade patterns, compelling Moscow to recalibrate its economic partnerships. Russia's strategic pivot toward the Global South and fellow BRICS members, particularly India, exemplifies how geopolitical constraints can catalyse new avenues of economic cooperation. Despite escalating financial restrictions and diplomatic frictions, India–Russia bilateral trade has not only withstood external pressures but has exhibited notable expansion, underscoring the resilience engendered by adaptive payment mechanisms and strengthened institutional frameworks.

This study examines the dynamics underpinning this resilience through three interrelated lenses. First, it documents and analyses the marked increase in India–Russia bilateral trade since 2022 as a precise instance of South–South and BRICS-oriented realignment, identifying which sectors and product flows expanded and why. Second, it highlights the mechanisms that enabled this expansion despite sanctions—such as alternative payment arrangements (e.g., rupee–rouble settlements and barter), logistical rerouting, and regulatory facilitation by both governments. Third, it employs a partial-equilibrium SMART model to quantify the effects of the 2022 sanctions through the concepts of trade creation and trade diversion, using 2021 and 2023 as reference points to capture structural shifts in India's trade patterns with Russia.

[1] BRICS is an intergovernmental group originally formed by Brazil, Russia, India, China, and South Africa, now expanded to 11 member states including Saudi Arabia, Egypt, UAE, Ethiopia, Indonesia, and Iran.

[2] SMART is a specialized partial equilibrium modeling tool integrated into WITS, developed by the World Bank.

This dual-year comparison enables a nuanced assessment of how sanctions-induced disruptions have altered India's import and export composition.

By integrating institutional analysis with quantitative modelling, the paper makes three key contributions. It elucidates how sanctions have inadvertently accelerated South–South cooperation, reshaping the global trade architecture beyond the notional cascading effects of 'sanctions'. It provides policymakers with actionable insights on leveraging alternative payment systems to mitigate sanction-induced bottlenecks. Ultimately, it identifies high-potential product groups for bilateral trade between India and Russia, thereby charting a roadmap for sustainable and diversified growth in India–Russia trade and commerce.

The paper is structured as follows: Section 1 presents the introduction; Section 2 provides a detailed literature review; Section 3 outlines the methodology; Section 4 presents the data analysis and simulation results; Section 5 discusses the policy implications; and Section 6 concludes with directions for future research.

2 : Review of the Literature

The comprehensive review of the existing literature is summarised and organised as follows:

India acts as a stabilising force in the South Asian and Indo-Pacific regions by not fully siding with any single major power. This approach allows India to influence regional geopolitics more effectively, counterbalancing Chinese assertiveness while engaging with the US on mutual interests (Ferguson, 2012). India's autonomy supports its soft power projection, allowing it to assert itself as a leader in the Global South. This enhances its diplomatic leverage and reputation on the global stage, positioning India as an advocate for multipolarity and increased South-South cooperation (Taim, 2024).

India's strategic autonomy has fostered strong ties with the US, driven by shared democratic values and growing defence and economic cooperation. Initiatives like the Quadrilateral Security Dialogue (Quad[3]) demonstrate India's willingness to collaborate on security issues, particularly in the Indo-Pacific region, while maintaining decision-making independence (Aydın-Düzgit et al., 2025). Strategic autonomy enables India to address its complex relationship with China pragmatically. While India remains vigilant about China's regional aspirations and their implications for Indian security, it continues to engage diplomatically and economically, recognising China's crucial role as a significant trade partner (Le Hoang et al., 2024). India's strategic autonomy enables it to balance relations between the US and China. It allows India to engage with both powers to secure economic, technological, and security benefits while avoiding the pitfalls of aligning too closely with one against the other (Murphy, 2017). With the US as a significant technology and investment partner and China being a critical trade partner, India's strategic autonomy ensures diversified economic ties that bolster national growth and resilience. This economic strategy enables India to maximise gains from both relationships without compromising its autonomy (Trinh & Huyen Ho, 2024). Overall, India's strategic autonomy enables it to navigate complex international relationships effectively, striking a balance between engagements with the US and China to maximise national interests while maintaining regional stability and a strong global standing.

India has an international image as a fast-growing economy and a major player in international forums such as BRICS, the Commonwealth, and the United Nations, being recognised for its economic and strategic neutrality that allowed it to engage with diverse international partners. Whereas Russia's

[3] Quad refers to the Quadrilateral Security Dialogue (QSD), an informal strategic forum between India, the United States, Japan, and Australia.

engagement on international platforms prior to the imposition of sanctions was marked by its significant geopolitical influence, particularly in the energy and military sectors. It was a key player within structures like the G8[4], BRICS, the Shanghai Cooperation Organisation (SCO), and had significant leverage in its dealings with Europe due to its massive energy reserves (Yalcin et al., 2025). The imposition of Western sanctions in response to Crimea's annexation in 2014 significantly altered its international standing, reducing its influence within the global community and leading to its expulsion from the G8 (now G7[5]) (Connolly, 2018). India's relationship with Russia was underscored by strong historical ties, particularly in defence cooperation, and it often acted as a balancing power in international forums, leveraging its Non-Aligned Movement[6] heritage (Yalcin et al., 2025).

India's foreign policy is characterised by strategic autonomy, enabling it to maintain balanced relations with powerful nations across diverse geopolitical divides. Despite Western sanctions on Russia, India continues to engage with Russia, leveraging their historic partnership, particularly in defence and strategic sectors (Yalcin et al., 2025). By maintaining neutrality, India aims to safeguard its strategic interests while ensuring continued access to Russian defence technologies and natural resources, crucial for its national security and energy needs.

The Indo-Russian relationship is geopolitically significant, as both countries navigate their roles amid growing Western influence in Asia. India's policy decision to continue engaging with Russia reflects its intent to balance relations and prevent undue geopolitical tensions in the region, fostering greater multipolarity (Zuev et al., 2024). India's defence cooperation with Russia is a legacy of Cold War-era relations, marked by contracts for military equipment and the sharing of technology. This historical cooperation has reinforced India's reliance on Russia for defence supplies, shaping its cautious stance amid international sanctions pressure. Russia remains a key energy partner for India. The historical partnership has enabled India to pivot towards Russian energy supplies, particularly in oil and gas, providing a buffer amid global supply chain disruptions caused by the sanctions (Aalto & Forsberg, 2015). This diversification is critical in maintaining energy security and supporting economic growth.

Empirical studies show that comprehensive U.S. sanctions lead to significant trade reductions with sanctioned nations, yet can simultaneously increase trade between these nations and other global players, such as the EU[7] and Japan. This suggests a shift in trade dynamics and possible trade diversion to non-sanctioning countries, such as India (Yang et al., 2004). Sanctions have a severe impact on various sectors, notably agriculture, as evidenced by a substantial decline in Russia's agrifood trade following the 2014 sanctions, primarily with the EU. This highlights that while sanctions aim to alter government actions, they often have a significant impact on industry-specific trade, producers, and consumers (Larch et al., 2024). Despite sanctions, Russia continues to maintain its trade and financial structures, albeit under strain. High oil prices and an absence of sanctions typically favour Russian autonomy as a geo-economic player (Aalto & Forsberg, 2015). However, the rise in country risk due to sanctions affects Western-Russian trade, showcasing the complexity of international transactions in geopolitically tense environments (Crozet & Hinz, 2020).

[4] G8 are a group of nations which includes the G7 nations plus Russia.

[5] G7 Nations: Canada, France, Germany, Italy, Japan, the United Kingdom, and the United States.

[6] The Non-Aligned Movement (NAM) is an international forum of 121 countries that are not formally aligned with or against any major power bloc. It was founded in 1961 in Belgrade, Yugoslavia, during the Cold War.

[7] The European Union (EU) is a political and economic union of 27 European countries, created to promote integration, peace, stability, and prosperity across the continent.

The Global Sanctions Database indicates that Western sanctions have hurt trade between Russia and the countries imposing them. However, Russia's trade with non-Western countries, such as India, has seen reduced bilateral trade costs, potentially offsetting some of the sanction effects (Yalcin et al., 2025). Sanctions as policy tools often have unintended consequences, such as damage incurred by the imposers themselves, termed as "friendly fire", seen during the Western-Russia trade conflict initiated in 2014 (Crozet & Hinz, 2020). Faced with Western sanctions, Russia has been forging stronger economic ties with neutral parties like India, Turkey, and China. This reorientation is pivotal in neutralising the impact of sanctions on its economy. Turkey and China have emerged as key partners, with their roles evolving significantly since the imposition of harsh sanctions in 2022-23. This reflects how geopolitical pressuring may realign trade preferences and partnerships (Zuev et al., 2024).

Russia responded to the sanctions by pivoting its economic and geopolitical focus towards Asia, particularly deepening its ties with China, India, and other non-Western countries. This strategic realignment has been pivotal in minimising the impact of sanctions on its economy (Kozyrskaya et al., 2023). Internally, Russia intensified state support to key sectors, bolstering its domestic industries while implementing policy measures to sustain its economic performance amidst decreased Western engagement. It has orchestrated various fiscal and policy manoeuvres to keep its economic machinery active, despite facing trade and investment constraints (Aalto & Forsberg, 2015).

India’s balanced diplomatic stance has allowed it to navigate tensions while avoiding confrontation with Western powers, thus maintaining its economic benefits from its relations with both Russia and Western countries (Connolly, 2018). India has capitalised on the geopolitical vacuum created by Western countries reducing their ties with Russia to strengthen its own strategic and economic relationships with Moscow. This includes enhanced cooperation in defence, energy, and technology sectors (Yalcin et al., 2025).

India's strategic autonomy and economic imperatives have led to a substantial reorientation of its trade relationship with Russia, despite mounting pressure from U.S.-led Western sanctions (Fomin & Kryuchkova, 2025). This geopolitical recalibration, characterised by an "inclusive alignment" approach, has enabled India to navigate complex international relations while simultaneously securing its energy needs and fostering new trade arrangements (Nath, 2014). This includes a significant redirection of Russian oil exports towards India, profoundly altering global energy trade patterns (Tavadyan & Tavadyan, 2025). This redirection has been particularly evident in the oil sector, where the 2022 embargo and price cap on Russian oil exports compelled Russia to accept significant discounts, notably a $32/bbl reduction on its Urals crude by March 2023 relative to January 2022 (Kilian et al., 2025). This significant price reduction was primarily driven by the increased logistical expenses associated with redirecting Russian crude to more distant markets, alongside a strengthened negotiating position for India (Kilian et al., 2025). Moreover, the shift in Russia's export strategy, particularly from Baltic Sea ports, further accentuated the discounts required to secure new buyers, even as the overall volume of redirected crude exports to nations such as India, China, and Turkey increased (Babina et al., 2023).

In summary, the existing literature provides valuable insights into the sanctions that have introduced numerous challenges to global trade. However, most studies focus either on aggregate trade flows or on broad cross-country comparisons, leaving a limited understanding of commodity-level variations in responsiveness to tariff changes within a single reform episode. Additionally, the interaction between tariff cuts, structural constraints, and sector-specific trade outcomes remains insufficiently explored. This gap becomes particularly evident in contexts where tariff reforms were uneven across sectors and where non-tariff and structural rigidities may have shaped the observed trade patterns. The present study seeks to fill

this gap by providing a detailed, commodity-specific analysis of trade creation, diversion, and efficiency effects, thereby offering a more nuanced understanding of how tariff reforms translate into actual trade outcomes.

3 : Methodology of the research paper

The SMART model, an ex ante partial equilibrium framework developed collaboratively by UNCTAD and the World Bank, is employed to assess the effects of reducing tariffs. A prerequisite for using a partial equilibrium model is that the sector in question must not have significant connections with other sectors in the economy. The World Bank's World Integrated Trade Solution (WITS) software provides various databases on trade flows and policy instruments, with the SMART model being one of the analytical tools available for simulation. This model examines both India's importing market and its export market in Russia, simulating the effects of tariff reductions on trade creation and diversion for both countries. The default assumption in the SMART model is infinite elasticity of export supply, meaning that export supply curves are flat and world prices for each variety are determined externally. However, the model allows for the use of finite export supply elasticities, which means that increased demand from the importing country can lead to price increases in exporting countries. Generally, tariff reductions result in both positive quantity and price effects. The SMART model is based on the Armington assumption, which posits that similar products from different countries are imperfect substitutes for each other.

Two methodologies, namely Trade Creation and Trade Diversion indices, are employed in analysing data in this paper. The details are given below.

3.1: Trade creation

The trade creation effect is the increased demand in country "j" for commodity "i" from exporting country "k" resulting from the price decrease associated with the assumed complete transmission of price change when tariff or non-tariff distortions are reduced or eliminated. $TC_{ijk} = M_{ijk}.E_m.\ dt_{ijk}$ where, TC_{ijk} = Trade creation M_{ijk} = Import dt_{ijk} = Reduction in tariff E_m = Elasticity of import demand with respect to domestic price

3.2: Trade diversion

Following standard practice, the term trade diversion is used to account for the tendency of importers to substitute goods from one source to another in response to a change in the import price of supplies from one source but not from the alternative source. Thus, if prices fall in one of the overseas countries, then there will be a tendency to purchase more goods from that country and less from countries whose exports are unchanged in price. Trade diversion can also occur not because of a change in the export price per se, but because of the introduction or elimination of preferential treatment for goods from one (or more) sources, while treatment for goods from other sources remains unchanged. $TD_{ijk} = TC_{ijk}.\ (M_{nij}/V_{ij})$ where, V_{ij} = Production of i goods in j country (here, supply from domestic firms) M_{nij} = Import of i goods from non-member country "n"

4 : Analysis of Data

India's longstanding historical ties with Russia, rooted in the Soviet era, have exerted a profound and enduring influence on its contemporary foreign policy decisions, particularly in the context of sanctions imposed on Russia. These deep-rooted relations—nurtured over decades through strategic cooperation, economic exchanges, and defence partnerships—continue to shape India's external engagements and policy responses to evolving global power configurations. The persistence of these linkages underscores

the depth of mutual trust and shared strategic interests that have withstood geopolitical transformations since the Cold War era.

The study titled **"Sanctions and Shifts: India–Russia Trade in the Wake of U.S.-Led Western Measures"** investigates the geopolitical and economic ramifications arising from the sanctions imposed predominantly by the US-led Western nations on Russia, and the subsequent implications for India–Russia bilateral trade. Existing academic literature highlights that these sanctions have served as a catalyst for realignment within the global economic order, compelling both countries to explore alternative mechanisms for trade continuity and diversification.

Central to this discourse is India's doctrine of strategic autonomy, which enables it to balance relations among major powers such as the United States, China, and Russia without aligning exclusively with any bloc. This principle has been instrumental in enabling India to maintain robust economic and strategic ties with Russia, despite external pressures, thereby reinforcing its independent decision-making in global diplomacy.

The imposition of Western sanctions has consequently reshaped the contours of India–Russia trade, generating both challenges and opportunities. From an Indian perspective, these developments are analysed through the lenses of trade creation and trade diversion**.** Such an approach enables an assessment of how sanctions have influenced the composition, direction, and intensity of bilateral trade flows between the two nations, revealing the adaptive strategies that underpin India's pursuit of economic resilience and foreign policy equilibrium in an increasingly polarised international environment.

The following is the analysis for the year 2021, which is prior to the sanction, with India as the reporting economy in the primary sectors, which are classified as per the SITC[8] Revision 1:

Table 4.1

SITC Revision 1 classification of commodities	Trade Total Effect in 1000 USD	Trade Creation Effect in 1000 USD	Trade Diversion Effect in 1000 USD	Old Simple Duty Rate	New Simple Duty Rate
0	4308.963	1589.154	2719.809	43.94	10.26
1	431.53	139.714	291.816	93.33	12.9
2	28220.445	17953.71	10266.734	8.19	4.51
3	3996.272	1877.817	2118.454	4.77	3.4

[8] **the Standard International Trade Classification (SITC)**, a system developed by the United Nations (UN) to classify goods in international trade statistics, where as per SITC Revision 1:
0 -- Food and live animals
1 -- Beverages and tobacco
2 -- Crude materials, inedible, except fuels
3 -- Mineral fuels, lubricants and related materials
4 -- Animal and vegetable oils and fats

4	105911.972	54738.656	51173.312	20.92	7.95

Interpretation of Trade Effects and Tariff Changes :

The above table presents trade impact metrics and tariff adjustments across five commodity groups classified under SITC Revision 1. The analysis reveals several key patterns:

1. Trade Responsiveness to Tariff Reduction - Animal and vegetable oils and fats, which are Commodities clubbed under code 4 of SITC revision 1, exhibit the highest trade total effect ($105.9 million), with nearly equal contributions from trade creation ($54.7 million) and diversion ($51.2 million). The substantial tariff cut from 20.92% to 7.95% suggests strong elasticity in this sector. Crude materials, inedible except for fuels, which fall under commodity code 2, also exhibit significant responsiveness, with a total effect of $28.2 million, driven primarily by trade creation ($17.9 million). The tariff reduction from 8.19% to 4.51% aligns with this growth.

2. High Tariffs with Low Trade Volume - Commodities under code 1 (Beverages and tobacco) had the highest initial tariff (93.33%) but generated only $431.5k in total trade effect, indicating low demand or structural barriers despite a steep tariff cut to 12.9%. Food and live animals also had a high initial tariff (43.94%) and a modest trade effect ($4.3 million), with diversion ($2.7 million) exceeding creation ($1.6 million), suggesting reallocation of existing trade flows.

3. Balanced Trade Effects - Commodity 3 (Mineral fuels, lubricants and related materials) shows a relatively balanced trade response, with $3.9 million total effect split between creation ($1.9 million) and diversion ($2.1 million). The modest tariff reduction from 4.77% to 3.4% may explain the limited impact.

The graphical representation of the above analysis is presented below for better clarity.

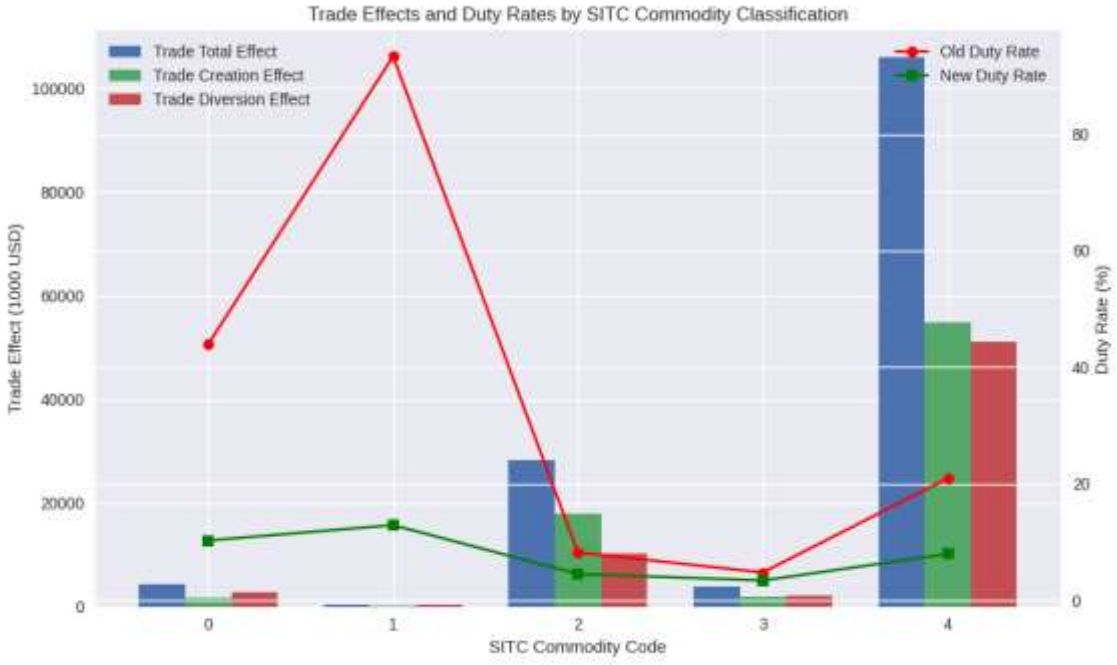


Figure 4.1: Visual Analysis of Trade Effects and Tariff Reforms by SITC Revision 1 Commodity Classification (Codes 0–4)

The above chart visualises trade effects and duty rates for the primary sector, which are otherwise coded as codes 0–4 under SITC revision 1. It utilises grouped bars for trade metrics and line plots for tariff changes. It integrates bar graphs for trade effects (total, creation, and diversion) and line graphs for old and new simple duty rates, offering a multidimensional perspective on the impact of tariff reforms.

1. Trade Effects Overview:

- **Trade Creation Dominance**: Across all categories of commodities, trade creation consistently exceeds trade diversion, indicating that tariff reforms have led mainly to welfare-enhancing outcomes. Commodity 4 (Animal and vegetable oils and fats) shows the highest trade creation effect, followed by Commodity 2 (Crude materials, inedible, except fuels), suggesting strong responsiveness in primary and intermediate goods.
- **Trade Diversion Patterns**:
  - Commodity 1 (Beverages and tobacco) is an outlier, where trade diversion surpasses trade creation, implying potential inefficiencies or substitution away from optimal trade partners.
  - Commodity 3 (Mineral fuels, lubricants and related materials) also shows a relatively high diversion effect, though trade creation remains substantial.

2. Duty Rate Adjustments:

- **Magnitude of Tariff Cuts**:
  - The graph reveals steep reductions in duty rates across all categories, with commodity 1 experiencing the most dramatic decline—from 110% to 13.12%—highlighting a significant liberalisation effort in a previously protected sector.
  - commodity 0 (Food and live animals) also underwent a significant cut (from 36.18% to 9.68%), likely aimed at improving food affordability and import competitiveness.
- **Post-Reform Uniformity**:
  - The new duty rates converge within a narrower band (3.07% to 13.12%), suggesting a harmonisation strategy to reduce tariff dispersion and simplify trade policy.

3. Summary of Key Observations

SITC Code	Highest Trade Creation	Largest Duty Cut	Trade Diversion > Creation
4	✅		
1		✅	✅
0			

This matrix highlights commodities under code 4 as the most trade-responsive category, commodity 1 as the most liberalised but least efficient in terms of trade creation, and commodity 0 as a strategic target for food-related tariff reform.

Table 4.2

SITC Revision 1 classification of	Trade Total Effect in 1000 USD	Trade Creation Effect in 1000 USD	Trade Diversion Effect in 1000 USD	Old Simple Duty Rate	New Simple Duty Rate

commodities					
5	90225.294	68348.466	21876.83	8.53	5.38
6	180828.694	117096.168	63732.53	9.7	5.82
7	12900.619	7581.852	5318.767	8.02	4.95
8	12890.842	9265.034	3625.808	13.85	6.93
9	1641.824	1621.617	20.207	10	6.15

Interpretation of Trade Effects and Tariff Adjustments by SITC Revision 1 Classification[9]:

This table presents a comparative analysis of trade effects and tariff adjustments across five commodity groups classified under SITC Revision 1 codes 5 through 9. The variables include total trade effect, trade creation and diversion effects (in thousand USD), and changes in simple duty rates before and after policy reform.

1. Trade Effects Overview

- **Aggregate Trade Impact**: Commodity 6 (Manufactured goods classified chiefly by material) exhibits the highest total trade effect at approximately USD 180.83 million, followed by Commodity 5 (Chemicals) at USD 90.23 million. These figures suggest that tariff reforms had the most pronounced impact on intermediate and industrial inputs.
- **Trade Creation vs. Diversion**:
  - Across all categories, trade creation exceeds trade diversion, indicating net welfare gains and improved allocative efficiency post-reform.
  - Commodities 5 and 6 show substantial trade creation effects (USD 68.35 million and USD 117.10 million, respectively), reinforcing their responsiveness to tariff liberalisation.
  - Commodity 9 (Commodities and transactions not classified elsewhere) shows minimal trade diversion (USD 20.21 thousand), suggesting limited substitution effects or marginal trade volume.

2. Tariff Adjustments:

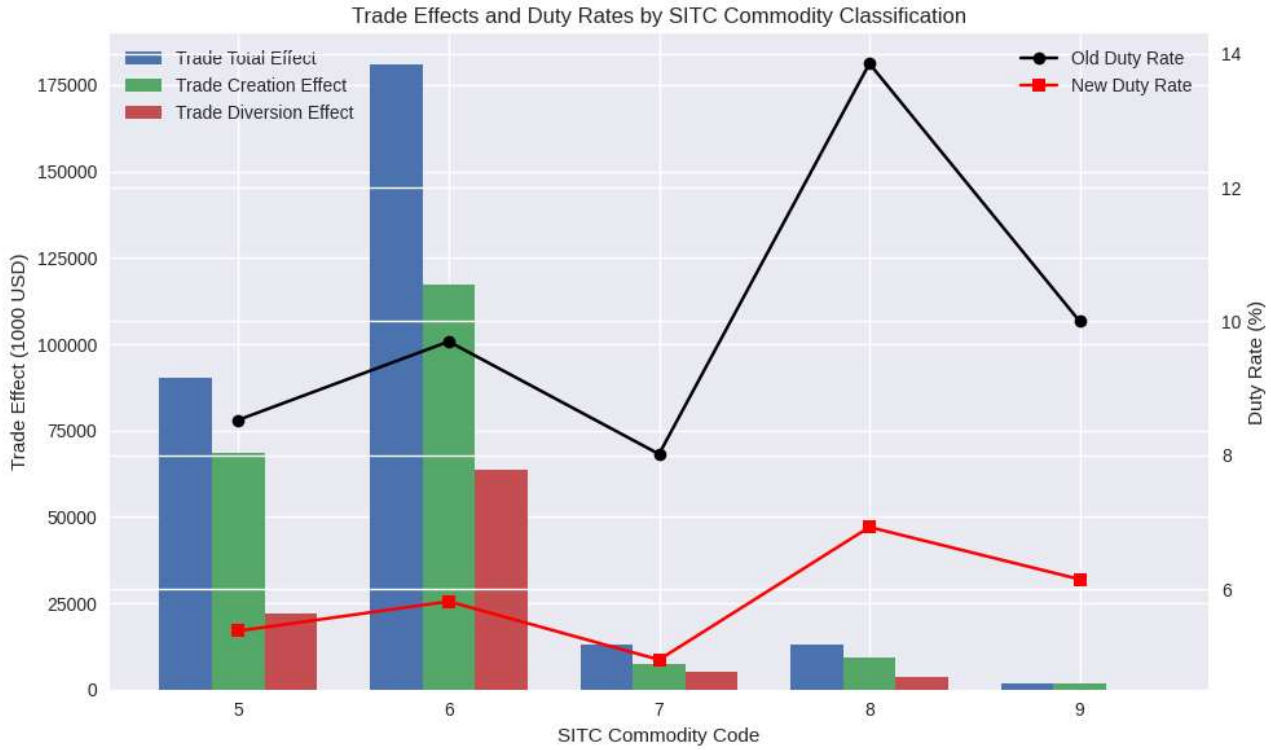
- All categories experienced a reduction in simple duty rates, with the most significant drop observed in Commodity 8 (Miscellaneous manufactured articles), from 13.85% to 6.93%.
- Commodities 6 and 5 also saw notable reductions, aligning with their high trade creation effects and suggesting a strong elasticity of import demand.

[9] **the Standard International Trade Classification (SITC)**, a system developed by the United Nations (UN) to classify goods in international trade statistics, where as per SITC Revision 1:
5 -- Chemicals
6 -- Manufact goods classified chiefly by material
7 -- Machinery and transport equipment
8 -- Miscellaneous manufactured articles
9 -- Commod. & transacts. Not class. Accord. To kind

3. Comparative Insights:

SITC Revision 1 Code	Highest Trade Creation	Largest Duty Cut	Lowest Diversion
6	✅		
8		✅	
9			✅

This comparative matrix highlights Commodity 6 as the most trade-responsive category, Commodity 8 as the most liberalised in tariff terms, and Commodity 9 as the least affected by diversionary pressures.



The above picture presents the graphical representation of trade effects and duty rates for Commodities 5–9, as per the SITC Revision 1 codes. The chart uses grouped bars for trade metrics and overlayed lines for tariff changes.

Chart Description:

- **Grouped Bars**:
  - Trade Total Effect
  - Trade Creation Effect
  - Trade Diversion Effect
- **Overlayed Line Plots**:
  - Old Duty Rate (black circles)
  - New Duty Rate (red squares)

This dual-axis format enables the simultaneous comparison of trade dynamics and tariff shifts across different commodity groups.

Interpretation : This visualisation highlights the impact of tariff reductions on trade flows across five SITC Revision 1 commodities' classifications:

- Commodity 6 (Manufactured goods) shows the highest trade total effect at $180.8 million, with substantial trade creation ($117.1 million) and diversion ($63.7 million). The duty rate dropped from 9.7% to 5.82%, suggesting strong responsiveness to tariff cuts.
- Commodity 5 (Chemicals) also exhibits a significant trade response, with $90.2 million total effect, primarily driven by trade creation ($68.3 million). The tariff reduction from 8.53% to 5.38% aligns with this growth.
- Commodity 8 and 7 (Miscellaneous and Machinery) show moderate trade effects, but Commodity 8 had a larger tariff drop (from 13.85% to 6.93%), indicating potential for future trade expansion.
- Commodity 9 (Commodities not elsewhere classified) had minimal trade diversion ($20K) and a small total effect ($1.6 million), despite a tariff cut from 10% to 6.15%, suggesting low elasticity or limited trade volume.

Research Implications

- Trade creation dominates across all categories, indicating that tariff reductions primarily stimulated new imports rather than shifting existing trade routes.
- Higher initial tariffs (e.g., Commodity 8 and 9) do not always correlate with larger trade effects, pointing to the importance of commodity-specific demand and supply factors.
- The chart supports policy arguments for targeted tariff reforms, especially in sectors with high responsiveness like chemicals and manufactured goods.

The following table is the analysis for the year 2023 with India as the reporting economy:

SITC Revision 1 classification of commodities	Trade Total Effect in 1000 USD	Trade Creation Effect in 1000 USD	Trade Diversion Effect in 1000 USD	Old Simple Duty Rate	New Simple Duty Rate
0	3163.977	2642.49	521.487	36.18	9.68
1	1397.066	475.004	922.062	110	13.12
2	23699.812	13626.5	10073.31	8.25	4.77
3	12083.459	4885.192	7198.267	4.2	3.07
4	230136.928	135121.2	95015.78	17.75	7.35

This table presents a disaggregated analysis of trade effects and tariff adjustments for India in 2023, categorised by SITC Revision 1 commodity codes 0 through 4. The data captures the impact of tariff reforms on trade flows, distinguishing between trade creation and diversion effects, and quantifying changes in simple duty rates.

1. Trade Effects Analysis:

- **Aggregate Trade Impact**:
  - Commodity 4 (Animal and vegetable oils and fats) recorded the highest total trade effect at USD 230.14 million, followed by Commodity 2 (Crude materials, inedible, except fuels) at USD 23.70 million. These figures suggest a strong responsiveness of primary commodities to tariff liberalisation.

- Commodity 0 (Food and live animals) and Commodity 1 (Beverages and tobacco) show relatively low trade effects, indicating limited elasticity or smaller trade volumes.

- **Trade Creation vs. Diversion**:
- Trade creation dominates in Commodity 4 and Commodity 2, with creation effects of USD 135.12 million and USD 13.63 million respectively, suggesting welfare-enhancing outcomes and improved resource allocation.
- Commodity 1 is an outlier, where trade diversion (USD 922.06 thousand) exceeds trade creation (USD 475.00 thousand), implying potential inefficiencies or substitution away from more efficient sources.

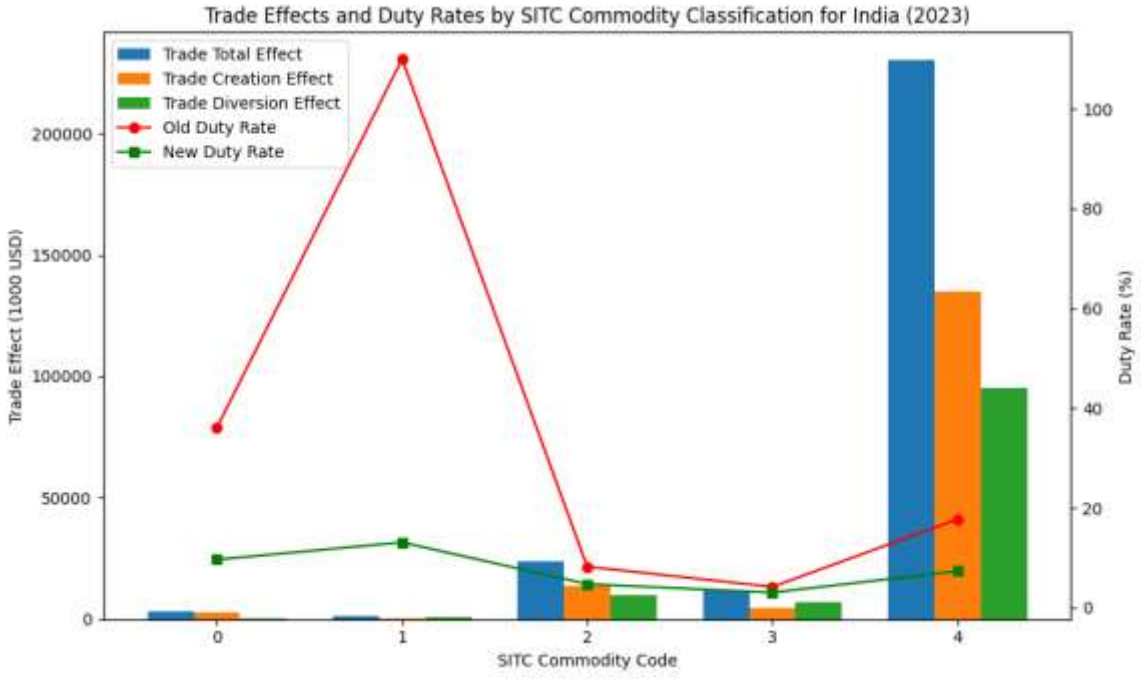
2. Tariff Adjustments:

- All categories experienced significant reductions in simple duty rates, with the most dramatic decline in Commodity 1—from 110% to 13.12%—reflecting aggressive liberalisation in the beverages and tobacco sector.
- Commodity 0 also saw a steep reduction from 36.18% to 9.68%, potentially aimed at improving food security and lowering import costs.
- Commodity 3 (Mineral fuels, lubricants, and related materials) had the lowest initial duty rate (4.2%), reduced further to 3.07%, indicating marginal liberalisation in an already low-tariff sector.

3. Comparative Summary

SITC Code	Highest Trade Creation	Largest Duty Cut	Trade Diversion > Creation
4	✅		
1		✅	✅
0			

This matrix highlights Commodity 4 as the most trade-responsive category, Commodity 1 as the most liberalised in tariff terms but with adverse diversion effects, and Commodity 0 as a key target for food-related tariff reform.



The above chart is the graphical presentation of trade effects and duty rates for commodities with SITC Revision 1 codes 0–4 (India, 2023). The chart uses grouped bars for trade metrics and overlaid lines for tariff changes.

Chart Description

- **Grouped Bars**:
  - Trade Total Effect
  - Trade Creation Effect
  - Trade Diversion Effect
- **Overlayed Line Plots**:
  - Old Duty Rate (red circles)
  - New Duty Rate (green squares)

This dual-axis format enables a clear comparison of trade dynamics and tariff shifts across commodity groups.

Interpretation

This visualisation illustrates the impact of tariff reforms on trade flows across five SITC commodity classifications in India for 2023:

- Commodity 4 (Manufactured goods) shows the highest trade total effect at $230.1 million, with substantial trade creation ($135.1 million) and diversion ($95 million). The duty rate dropped from 17.75% to 7.35%, indicating strong responsiveness to tariff cuts.
- Commodity 2 (Crude materials) also exhibits a significant trade response, with $23.7 million total effect, driven by both creation ($13.6 million) and diversion ($10 million). The tariff reduction from 8.25% to 4.77% aligns with this growth.
- Commodity 3 (Minerals and fuels) shows a moderate trade effect ($12 million) with a relatively small tariff drop (4.2% to 3.07%), suggesting limited elasticity.
- Commodity 0 and 1 (Food and live animals, Beverages and tobacco) had lower trade volumes but very high initial tariffs—especially Commodity 1 at 110%, reduced to 13.12%. Despite this, trade creation remained modest, implying either low demand or structural barriers.

Research Implications

- Trade creation dominates across most categories, indicating that tariff reductions primarily stimulated new imports rather than shifting existing trade routes.
- High initial tariffs (e.g., Commodity 1) do not guarantee significant trade effects, pointing to the importance of commodity-specific demand and supply factors.
- The chart supports policy arguments for targeted tariff reforms, especially in sectors with high responsiveness like manufactured goods and crude materials.

SITC Revision 1 classification of commodities	Trade Total Effect in 1000 USD	Trade Creation Effect in 1000 USD	Trade Diversion Effect in 1000 USD	Old Simple Duty Rate	New Simple Duty Rate
5	295010.8	268546.7	26464.05	8.04	5.25
6	254969.4	170684.3	84285.04	9.56	5.78

7	106206.1	98610.82	7595.312	8.31	5.11
8	12146.91	8165.754	3981.155	14.06	7.05

The table above presents a quantitative assessment of trade effects and tariff reforms across four commodity groups, classified under SITC Revision 1 codes 5 through 8. The analysis focuses on trade creation and diversion effects (in thousands of USD) and the corresponding changes in simple duty rates, providing insights into the efficiency and impact of trade liberalisation policies.

1. Trade Effects Analysis

- **Total Trade Impact**:
  - Commodity 5 (Chemicals and related products) recorded the highest total trade effect at USD 295.01 million, followed by Commodity 6 (Manufactured goods classified chiefly by material) at USD 254.97 million. These figures suggest that intermediate and industrial inputs were most responsive to tariff reforms.
  - Commodity 7 (Machinery and transport equipment) also showed a significant trade effect (USD 106.21 million). At the same time, Commodity 8 (Miscellaneous manufactured articles) had the lowest impact (USD 12.15 million), indicating relatively lower trade volumes or elasticities.
- **Trade Creation vs. Diversion**:
  - Trade creation dominates across all categories, with Commodity 5 and Commodity 7 showing particularly high creation-to-diversion ratios (e.g., 268.55 vs. 26.46 and 98.61 vs. 7.60 respectively), implying net welfare gains and improved resource allocation.
  - Commodity 6 exhibits a relatively high trade diversion effect (USD 84.29 million), suggesting that while liberalisation stimulated imports, a substantial portion may have substituted existing trade partners rather than expanding overall consumption.

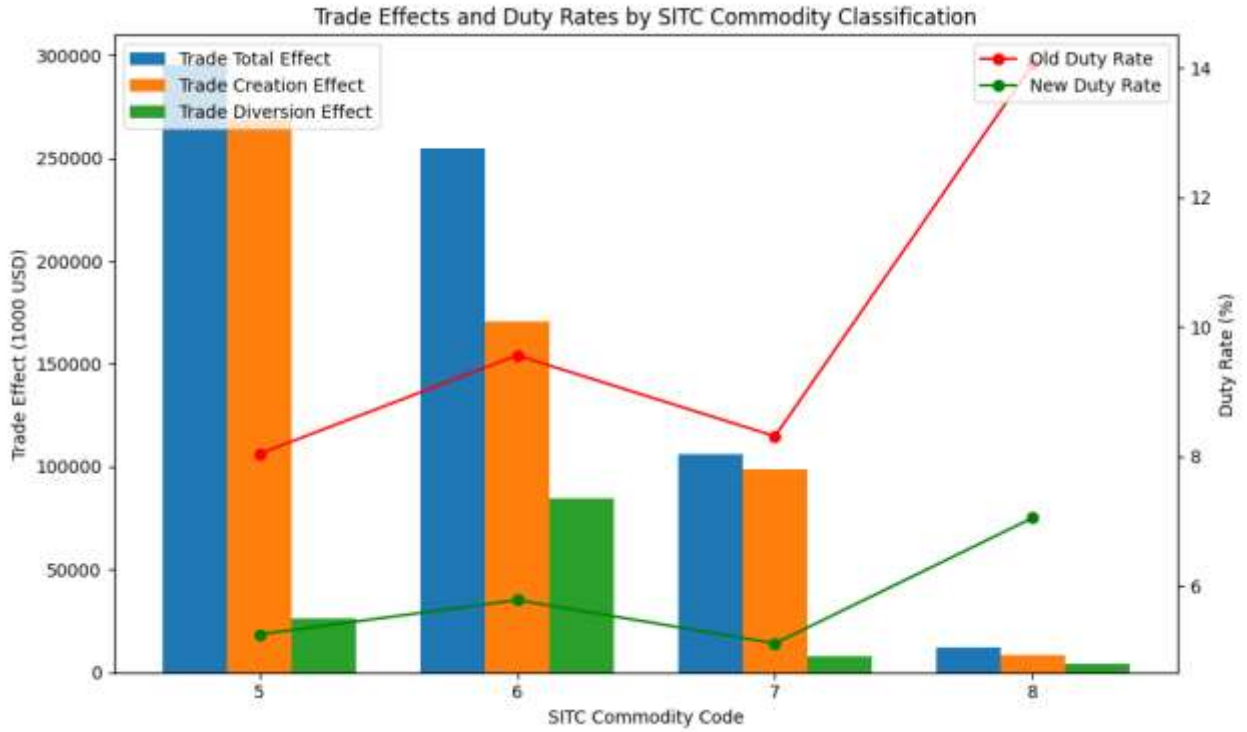
2. Tariff Adjustments

- **Duty Rate Reductions**:
  - All categories experienced notable reductions in simple duty rates, with Commodity 8 undergoing the steepest cut—from 14.06% to 7.05%—reflecting a policy shift toward liberalising consumer goods.
  - Commodity 6 and Commodity 5 saw moderate reductions (from 9.56% to 5.78% and 8.04% to 5.25%, respectively), aligning with their high trade responsiveness.
  - The uniform decline in duty rates indicates a broad-based liberalisation strategy aimed at reducing protectionist barriers and enhancing market access.

3. Comparative Summar

SITC Revision 1 commodity Code	Highest Trade Creation	Largest Duty Cut	High Diversion Risk
5	✅		
8		✅	
6			✅

This matrix highlights Commodity 5 as the most trade-responsive category, Commodity 8 as the most liberalised in tariff terms, and Commodity 6 as a category with notable diversionary pressures.



The above chart shows trade effects (total, creation, diversion) as grouped bars for SITC codes 5–8, with old and new duty rates overlaid as line plots.

- **Grouped bars** compare:
  - Trade Total Effect
  - Trade Creation Effect
  - Trade Diversion Effect
- **Line plots** show:
  - Old Simple Duty Rate (red)
  - New Simple Duty Rate (green)

This dual-axis format enables us to visually compare how trade dynamics and tariff changes vary across different commodity groups.

This graph presents a dual-axis visualisation of trade effects and tariff adjustments across four commodity groups classified under SITC Revision 1 codes 5 through 8. The bar graphs represent the total trade effect, trade creation effect, and trade diversion effect (in thousands of USD), while the line graphs depict changes in old and new simple duty rates (in percentage). This integrated format enables a comparative assessment of trade responsiveness to tariff reforms.

1. Trade Effects Overview

- **Trade Creation Dominance**:
  - All four commodities exhibit higher trade creation than diversion, indicating net welfare gains and improved allocative efficiency following tariff reductions.
  - Commodity 5 (Chemicals and related products) shows the highest trade creation effect, exceeding USD 268,000 thousand, followed by Commodity 6 (Manufactured goods) and Commodity 7 (Machinery and transport equipment), suggesting strong responsiveness in industrial inputs and capital goods.

- **Trade Diversion Patterns**:
  - Commodity 6 displays the highest trade diversion effect, suggesting that a significant portion of increased imports may have substituted existing trade partners rather than expanding overall consumption.
  - Commodity 8 (Miscellaneous manufactured articles) shows the lowest trade effects overall, indicating limited trade volume or lower elasticity.

2. Tariff Adjustments:

- All categories experienced a reduction in simple duty rates, with Commodity 8 undergoing the steepest cut—from 14.06% to 7.05%—reflecting a liberalisation push in consumer goods.
- Commodity 5 and Commodity 6 saw moderate reductions (from 8.04% to 5.25% and 9.56% to 5.78%, respectively), aligning with their high trade responsiveness.
- The post-reform duty rates converge within a narrower band (5.11% to 7.05%), suggesting a harmonisation strategy aimed at reducing tariff dispersion.

3. Comparative Summary

SITC Code	Highest Trade Creation	Largest Duty Cut	High Diversion Risk
5	✅		
8		✅	
6			✅

This matrix highlights Commodity 5 as the most trade-responsive category, Commodity 8 as the most liberalised in tariff terms, and Commodity 6 as a category with notable diversionary pressures.

5 : Policy Implications

The findings from this research paper reveal several important implications for tariff reform, sectoral responsiveness, and overall trade efficiency, which can be briefly summarised under the following categories:-

1. **Sector-Specific Responsiveness and Targeted Liberalisation:** The analysis shows that trade creation is strongest in sectors with moderate initial tariffs and substantial tariff reductions (e.g., commodities 2 and 4). This indicates that calibrated liberalisation—rather than uniform tariff cuts—can maximise welfare gains. Conversely, sectors with very high pre-reform tariffs (commodities 0 and 1) did not exhibit proportionately high trade responsiveness, suggesting that tariff policy alone is insufficient. These sectors require complementary reforms such as improved infrastructure, streamlined regulatory procedures, and enhanced market access in order to realise the full benefits of liberalisation.
2. **Need for Commodity-Specific Policy Design:** The wide variation in responsiveness across commodities underscores the importance of commodity-specific analysis for trade policy formulation. High tariff cuts do not uniformly translate into strong trade effects, as seen in the disproportionately high diversion effect in commodity 1 and the relatively muted trade outcomes in commodities 0 and 1. Policymakers must therefore avoid one-size-fits-all tariff strategies and instead design reforms that account for sectoral bottlenecks, non-tariff barriers, and domestic supply constraints.

3. **Efficiency Gains from Tariff Liberalisation:** A positive correlation between declining duty rates and rising trade creation effects across most categories supports the premise that tariff liberalisation enhances allocative and economic efficiency. The predominance of trade creation over diversion indicates that the reforms were generally welfare-enhancing, reducing protectionist distortions and encouraging competitive import flows. The uniform decline in duty rates also reflects a deliberate policy shift toward a more open and efficient trade regime, particularly benefiting essential and intermediate goods.
4. **Addressing Trade Diversion and Structural Rigidities:** Certain anomalies in trade diversion patterns—most notably in commodity 6 and commodity 1—highlight the need for deeper structural assessment. High diversion in these sectors may indicate market distortions, sourcing shifts, or competitiveness issues among domestic or regional suppliers. Policy responses may include strengthening domestic value chains, negotiating supplier diversification strategies, or addressing sector-specific inefficiencies.
5. **Alignment with Long-Term Strategic and Welfare Goals:** In some categories, such as commodity 8, steep tariff reductions despite low trade volumes suggest alignment with broader policy objectives, including consumer welfare improvement, harmonisation with international trade norms, or fostering future sectoral development. These choices indicate that tariff reforms were not solely driven by current trade volumes but by strategic long-term considerations.
6. **Overall Welfare Assessment:** Across the dataset, the strong dominance of trade creation relative to diversion confirms that tariff reforms were beneficial to national welfare. The reduction of excessively high pre-reform tariffs (especially in commodities 0 and 1) corrected earlier protectionist biases and mitigated distortions in consumer prices and import sourcing. The post-reform structure, therefore, represents a more rational, efficiency-enhancing tariff regime.

Overall, the evidence affirms that well-sequenced and sector-sensitive tariff reforms can yield substantial welfare gains while minimising distortions. The findings therefore support a continued commitment to calibrated trade liberalisation complemented by structural reforms to maximise long-term efficiency and competitiveness.

6 : Directions for Future Research

Future research may build on the present analysis in several meaningful ways. First, examining firm-level or industry-level microdata could provide deeper insights into how tariff reforms affect productivity, competitiveness, and sourcing behaviour within specific sectors. Second, incorporating non-tariff barriers, logistics performance indicators, and domestic supply-side constraints would help isolate the determinants of limited responsiveness observed in certain commodities. Third, future studies could employ dynamic or panel-based models to capture long-term adjustment effects, including technology adoption, substitution patterns, and structural changes in import demand. Additionally, exploring the country-of-origin dimension of trade diversion, particularly for commodities showing atypical diversion spikes, would shed light on geopolitical or regional trade dynamics. Finally, comparing similar tariff reforms across countries or regional blocs could strengthen the evidence base and situate the results within a broader international context.

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