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Mapping US Tariff Shock at Product Level and Assessing the Transmission Effects of the Supply Chain : A Case of Indian Textile Industry

Sunitha Raju[1], Sabeer V C[2] and Ninad Shah[3]

ABSTRACT

With India facing highest US reciprocal tariff of 50%, this paper estimates the *Direct* and *Indirect effects* of the tariff shock on Indian Textile industry. Using a CES demand model, we estimate the counterfactual demand under 50% and 25% tariff scenarios, structured into two stages. In the *first stage,* we quantify the tariff induced import changes of 656 textile products at HS 6-digit level and decompose into *Direct Tariff effect* and *Third country tariff effect* (Indirect). In the *second stage,* we quantify the transmission effect along the supply chain using I-O tables. Our analysis shows that US textile imports from India would decline by over US$ 6.6 billion under 50% tariff. Apparel and Made-ups face the largest losses. Given the inter-industry linkages, first-order indirect effects are US$ 4.6 billion, including US$ 1.4 billion within the textile sector. Chemicals, agriculture, and trade services account for roughly 40% of these upstream losses. The alternative 25% tariff scenario results in a decline of US$ 2.1 billion in US textile imports, implying that the punitive tariff accounts for the additional US$ 4.5 billion. We conclude that India should negotiate for 25% or lower tariff and focus on alternate markets.

JEL Classification: F13, F14, F17, O24
Keywords: Trade policy, Tariffs, Indian textiles, Partial equilibrium, Supply chain

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1. Introduction

The global disruption brought in by US Reciprocal tariffs, once again, brings into focus the globalisation debate underlining the risks of fragmentation of production across geographies and the concentration of input suppliers in the global supply chains. During Covid, with supply disruptions/shortages, diversifying input suppliers and building resilient supply chains led many countries to incentivise domestic manufacturing (through onshoring) as a preferred mechanism, potentially altering the organisation of global supply chains. Substituting foreign suppliers with domestic suppliers entails a complex web of interactions between consumer preferences, firm profits and government policy tools (tax/subsidies) driven by the correspondence between social cost and private benefits[1]. In this framework, the trade-off between lower costs of offshoring and lower risks of onshoring are best addressed when the policy tools aim at consumer subsidy with no interference in supply chain organisation. Alternatively, the policy may aim at subsidies for supply chain diversification but no bias for home versus foreign sourcing (Grossman et.al, 2023). Thus, in a given country context, the optimal policy for resilient supply chains is subtle.

Unlike supply disruptions, the tariff induced demand shock, affects industry organisation through firm level responses that can have adverse impact on supply chain management. Steep increase in tariffs not only affects consumers but also imposes adjustment costs on the producers. Firms' responses to tariff shocks and tariff uncertainty can take different forms depending on firm characteristics, product factors and tariff uncertainty (Miller et al, 2025). There can be *Adjustment costs* wherein operations are shifted to lower tariff regions (Vengattil, 2025), tariff engineering (Treisman, 2025) or higher *Transaction costs* by adjusting their supply bases with outcomes ranging from high unit costs and quality issues (Chae et al, 2019, Holmes & Singer, 2018). These shifts in Buyer-Supplier relations and transaction levels can have ripple effect throughout the supply chain. Tariff protection to targeted industries under Trump 1.0 had

[1] Disruptions lead to input shortages that results in price increase and/or production loss in the downstream industries due to non-availability of inputs. Consumers inability to purchase goods is translated into loss of *consumer surplus*. Firms' response to address such shortages would be to either invest in diversification of suppliers or shift to domestic suppliers. Considering national welfare, the potential distortions in these private sourcing decisions would be: (i) consumer surplus externality will drive firms to accept extra risk of foreign sourcing; (ii) Business stealing externality drives firms to set prices to maximise profits or higher mark-ups under imperfect market structure; (iii) consumption distortions arise when prices of differentiated product exceed marginal cost. Thus, the social cost of supply chain disruptions arises from the loss of consumer surplus while higher markups reflect the cost and availability of inputs with dampened competition (Grossman et.al 2023)

a negative impact on firm value of domestic producers with mixed financial effects on firms in their supplier and customer industries (Rogers et.al, 2024).

In view of these direct and indirect effects of tariff increases, our analysis focuses on the tariff induced import changes at industry level and their transmission effects along the value chain from an exporting country perspective. The current US Reciprocal tariff policy builds on differential tariffs across exporting countries. This shift from *product specific* to *country specific* tariff policy distorts the competitive landscape wherein tariff differentials drive relative prices and thereby the consumption and production determinants. Since the current tariff policy also aims at building domestic manufacturing, the competitive position of domestic producers versus exporters change depending on the product's end-use, i.e., intermediate versus final use. Taking the example of steel, auto parts tariff versus tariff on car imports, Baldwin clearly underlines the shift in competitive position between domestic producers and foreign exporters and the resultant supply chain complexities (Baldwin 2025). Further, these dimensions of tariff effects vary significantly across industries/sectors.

Against this background, we analyse the impact of US tariffs on Indian Textile and Apparel exports, quantify the transmission effects to the upstream/downstream industries and underline the challenges for supply chain management. We chose Textile/Apparel sector for our analysis for *two* reasons. *One,* India is a major global exporter and is amongst the top five exporting countries to the US. In 2024, India exported US$ 10.3 billion of Textile/Apparel (T&A) to US with high export dependency on US. The share of T&A in India's world exports was 8.21% in 2023-24 (Ministry of Textile, 2023-24). And *Two*, The supply chain of Apparel/Textile is largely domestic. About 90% of the inputs (Fibres, Yarn, Fabrics) are sourced domestically and major apparel producers have within firm vertical integration. As such, the adverse supply chain effects of tariff rise are easily observable and quantifiable.

Our analytical framework is structured into two stages. In the first stage, we simulate U.S. import demand for Indian textile products under a counterfactual tariff rate of 50% and 25%. Drawing on product-level tariff elasticity estimates at the HS-6-digit level obtained from Fontagné et al. (2022), we employ a Constant Elasticity of Substitution (CES) demand model. This framework treats imports from India and other suppliers as imperfect substitutes and allows us to compute changes in relative prices, driven by tariff differentials. A CES composite price index is constructed based on the tariff-inclusive prices of India's competitors in the US market, using baseline data from 2023. This allows us to estimate counterfactual U.S. import demand for Indian textiles in 2025, isolating the demand-side effect of tariff-induced price changes. The difference between the simulated and baseline demand provides a product-level estimate of the change in U.S. import demand for Indian exports due to the altered tariff landscape.

In the second stage, we translate these demand changes into domestic economic impacts on upstream industries that supply to India's textile and apparel value chain. Using India's Input–Output (I–O) tables integrated with gross trade data, we assess how shifts in export demand affect these upstream sectors. This enables us to estimate changes in domestic output across the industries.

2. Textile Industry Structure and Trade

Textiles and Apparel (T&A) is India's traditional sector with long exporting history. India's share in global trade is 3.9% with USA and EU accounting for 47% of global exports of T&A. The importance of this sector is reflected in its high share in India's overall exports and its employment potential (both direct and indirect). In 2023-24, T&A exports had a share of 7.8% in India's overall exports and provided direct employment to 45 million and indirect to 100 million (Ministry of Textiles, 2023-24).

Given a large market size of US$165 billion in 2022-23[2], the industry is largely unorganised and dominated by MSMEs especially for Handloom sector. The export orientation of MSMEs is limited, mainly catering to the domestic demand while large firms are primarily export oriented (USITC,2024). Considering India's pre-dominance across the value chain (see Figure 1 in annexure 2), in firm vertical integration is present among the large firms. Further, the industry organisation around clusters, especially vertically integrated clusters, is also a format for integrating MSMEs into the value chain/exports and to overcome infrastructure and logistics constraints. This model of industrial organisation is encouraged by the State (Ministry of Textiles) by providing schemes for cluster development- PM-MITRA, TCDS (Integrated Textile Parks, Comprehensive Power loom, Knitwear and Silk Mega Cluster, Power Tex India Scheme) besides providing support for Skilling (Samarth Scheme) and Technology. Additionally, 10 Mega clusters for Handlooms have also been planned (Ministry of Textiles, 2024).

The market size of Indian T&A increased from US$79 billion in 2010-11 to US$165 billion in 2022-23 and is projected to increase to US$350 billion by 2030-31. Of this the Domestic market contributes to about 76% while exports share is 24%. Within the domestic market, Apparel accounts for 74% followed by Technical textiles at 20% and Home textiles at 6%. Under the Export segment, Apparel accounts for 41% and Textiles at 59%. Globally, Apparel is the largest traded category with a share of 57%, followed by Home textiles and Fabric (Wazir Advisors, 2023).

[2] This is based on the estimate of Wazir Advisors, Annual Report on Indian Textile &Apparel Industry,2023 . The National Textile Committee has estimated the overall market size at US$152 billion in 2021. This estimate was based on National Household Survey,2020 by National Textile Committee (Annual Report, CIITI, 2023-24)

Table 1 details the product-wise textile exports[3] of India to US and the World. As evident from the table, US is the major market for India accounting for 28% of world textile exports in 2024. Apparel is India's major export product both for the US and the world. In 2024, the share of Apparel in India's total exports to US was 49.5% followed by Made-ups at 39.9% and Fabric, Yarn and Fibre together accounted for 6%. At the global level, even while Apparel and Made-ups accounted for a high share, Fabric, Yarn and Fibre together accounted for 30.9% of the of the world textile exports. This implies that India's exports to the US are mainly for Final end-use while for other markets, textile exports have a broader product base with Final and Intermediate use.

Between 2010 and 2024, structural shifts in product exports is evident for World exports but not for US exports. In the US, the share of Made-ups increased marginally at the expense of Apparel. However, for the world exports, the share of Made-ups and Apparel increased while the share of Fibre, Yarn and Fabric decreased from 42.9% to 30.9%. Thus, India is shifting towards the exports of Final or higher value-added textile products.

This is also evident in the CAGR for product exports in the US and World especially for the period 2010-2019. The negative CAGR during 2021-2024 across products (except for Apparels) in both US and World reflects subdued recovery after COVID and global rearrangement following the first trade war between US and China. The significant negative CAGR (2021-24) for Fibres seems more on account of the policy push towards Man-made Fibres (MMF)[4]. Globally, India is a top exporter of Spun Yarn (Natural fibre) with a global share of 29% and occupies third place in Spun Yarn (MMF) at 8% and second place in Filament Yarn (MMF).

Table 2 details the top export destinations for India's textile products. India's major export destinations for Apparel and Made-ups (value-added and final use products) are mainly developed countries. For Fibre, Yarn and Fabric (intermediate use), India's major export destinations are developing countries with Bangladesh having the highest share.

India's export dependency on the US market is high for Apparels and Made-ups but has a relatively low share in US total imports (Table 3). The details on India's competitors for these products in the US market are also given in Table 3. For both these product groups, India faces

[3] Product wise categorisation of HS tariff lines is based on concordance drawn between CPC 2.1 and HS22 wherein 6 digit HS lines were aggregated and the product level exports derived.

[4] MMF are of two types: Synthetic (made from crude oil) and Cellulosic (made from wood pulp). The main varieties of synthetic fibres are polyester, acrylic and that of Cellulosic are viscose fibre, modal etc. As India's textile exports are largely dominated by cotton textiles, to diversify product base, promoting MMF became necessary to align with the growing global demand for synthetic apparels. The Ministry set up Textile Advisory group for developing the value chain and exports. QCO for import of viscose staple fibre was issued and PLI scheme was introduced in 2022-23 to promote the production of MMF Apparel, MMF Fabric and products of Technical textiles (Ministry of Textiles, 2024)

competition from China, Vietnam and Bangladesh wherein India's market share is relatively lower than these countries. However, with regard to Yarn and Fabric, India has a higher share in US's imports but India's dependency on US is low. This is because India exports these products to developing countries as a result in a broader export market base is (See Table 2). It is interesting to note that India exports these intermediates to Bangladesh, China, Turkey and competes with them in Apparels and Made-ups. These market dynamics are closely related to the tariffs and non-tariff barriers faced by India relative to these countries in the US market.

Table 4 details the weighted average effective tariff faced by India and main competitors in the US market. Compared to an overall average MFN tariff level of 3.3% in the US[5], T&A imports faced a higher average tariff. The tariff on Apparel, Final value added good, was higher than the tariff on intermediates (Fibre, Yarn, Fabric). Given this structure of tariff, the variation is tariff between India and competing countries is significant across product groups. In the case of Fibre, S Korea and Germany had lower tariff than India while China and Vietnam had a higher tariff than India. This is also the case for Fabric. In the case of Yarn, India's tariff is the highest when compared to competitors like China and Turkey and Canada and Mexico had a zero tariff. For Apparel, which is the largest export product of India, tariff is high but lower than most competitors. These tariff differentials are important to underline as the current Reciprocal tariffs are stacked on to these existing tariffs.

3. Empirical strategy and Data Sources

3.1 Quantifying Reciprocal Tariff Effects

For estimating changes in U.S. demand for Indian apparel and textile exports under alternative tariff scenarios, we adopt a partial equilibrium Constant Elasticity of Substitution (CES) demand framework that allows us to account for both India-specific and third-country tariff changes. The HS 6-digit elasticity estimates provided by Fontagné et al. (2022) form the empirical foundation of our simulation from which we derive product-level tariff elasticities and apply it in a CES framework to simulate trade responses to tariff changes.

Given the methodological variation in trade elasticity estimation, we rely on the product-level elasticity values provided by Fontagné et al. (2022) for two key reasons. *First,* their estimates are derived from a rich panel dataset of bilateral applied tariffs and import flows at the HS-6-digit level, covering 152 importing and 189 exporting countries over the period 2001-2016. The estimation framework captures variation in trade flows across countries and products, allowing for heterogeneity in substitution patterns at the product level. Importer and exporter fixed effects control for unobserved country-specific factors, including multilateral resistance and income effects. Although the model does not explicitly incorporate firm-level data, the

[5] World Tariff Profiles 2024, WTO.
https://www.wto.org/english/res_e/publications_e/world_tariff_profiles24_e.htm

product-level dimension permits elasticities to reflect differences in substitutability that may arise from underlying firm heterogeneity across exporting countries. *Second*, to mitigate potential measurement errors in unit values, the elasticities are estimated using FOB (free-on-board) import values. This ensures that tariff elasticities are not confounded with transportation cost elasticities, both of which are components of variable trade costs. A structural gravity model is estimated separately for each product to recover the elasticity parameters.

3.1.1 CES Demand Function

We assume that U.S. importers allocate their textile demand across countries according to a constant elasticity of substitution (CES) function. On this basis, the demand for Indian products is specified as:

$$D^{\text{IND}} = A \cdot \left(\frac{P^{\text{IND}}}{P^{\text{ROW}}} \right)^{-\sigma} \tag{1}$$

Where:

- D^{IND} denotes U.S. demand for Indian textile products,
- A is a Scaling parameter (e.g., initial demand level or normalization constant),
- $P^{\text{IND}}$is the Price of Indian product,
- P^{ROW} is the CES price index of competing suppliers from the rest of the world, and
- σ is the elasticity of substitution across suppliers

In this framework, U.S. import demand for Indian products depends on India's price relative to the price index of competing suppliers and the degree of substitutability between sources (Armington, 1969; Hallren, & Riker, 2017; Weinstein, 2016)

3.1.2 Equation for Counterfactual Demand

To assess the impact of a hypothetical tariff shock on U.S. import demand from India, we simulate a counterfactual demand scenario using the CES framework from Section 2.1.1. The change in demand (ΔD^{IND}) is expressed as:

$$\Delta D^{\text{IND}} = D_{\text{cf}}^{\text{IND}} - D_{\text{base}}^{\text{IND}} \tag{2}$$

Where:

- $D_{\text{cf}}^{\text{IND}}$ is the counterfactual demand after the tariff-induced price change and,
- $D_{\text{base}}^{\text{IND}}$ is the observed (baseline) demand for Indian textiles.

The counterfactual demand is calculated as:

$$D_{\text{cf}}^{\text{IND}} = D_{\text{base}}^{\text{IND}} \cdot \left(\frac{\frac{P_{\text{cf}}^{\text{IND}}}{P_{\text{cf}}^{\text{ROW}}}}{\frac{P_{\text{base}}^{\text{IND}}}{P_{\text{base}}^{\text{ROW}}}} \right)^{-\sigma} \quad (3)$$

Where:

- $P_{\text{cf}}^{\text{IND}}$: Price of Indian exports to the US in the counterfactual scenario
- $P_{\text{cf}}^{\text{ROW}}$: CES composite price index of imports from all other suppliers in the counterfactual scenario
- $P_{\text{base}}^{\text{IND}}$: Price of Indian exports to the US in the baseline year
- $P_{\text{base}}^{\text{ROW}}$: CES composite price index of imports from all other countries in the baseline year.
- σ : Elasticity of substitution across suppliers.

The CES composite price index P^{ROW} is constructed as:

$$P_{\text{CES}}^{1-\sigma} = \sum_i s_i \cdot P_i^{1-\sigma} \quad (4)$$

with

$$s_i = \frac{X_i}{\sum_j X_j} \quad (5)$$

Where:

- s_i : Market share of exporter iii in total U.S. imports in the baseline period
- P_i : Price of imports from exporter i
- X_i : Value of U.S. imports from exporter i

This formulation enables us to simulate a change in India's tariff-inclusive export price, relative to the CES composite price index of its competitors, that affects U.S. demand under a given elasticity[6].

2.1.3 Tariff-Based Counterfactual Demand: Modified CES Formulation

To empirically simulate the impact of U.S. tariff changes on import demand for Indian textiles, we implement a modified version of the CES demand function developed in Sections 2.1.1 and 2.1.2. This specification incorporates ad valorem tariff rates directly into the import price structure, under the following simplifying assumptions:

[6] The elasticity parameter is taken from Fontagné et al. (2022). Details are discussed in Section 1.5

1. Constant pre-tariff prices**:** All exporters, including India, are assumed to set constant pre-tariff prices normalized to unity:

$$P_{\text{pre}}^{\text{IND}} = P_{\text{pre}}^{i} = 1 \tag{6}$$

2. Full Tariff Pass-Through: Tariff changes are fully reflected in post-tariff import prices paid by U.S. buyers. Exporters do not absorb any portion of the tariff.
3. No Supply-Side Response: Tariff changes do not induce exporters to change their prices or output in response (i.e., prices are exogenous and fixed).

Given these assumptions, the counterfactual U.S. demand for Indian textile imports is expressed as:

$$D_{\text{cf}}^{\text{IND}} = D_{\text{base}}^{\text{IND}} \cdot \left(\frac{\frac{1+\tau_{\text{cf}}^{\text{IND}}}{P_{\text{cf}}^{\text{ROW}}}}{\frac{1+\tau_{\text{base}}^{\text{IND}}}{P_{\text{base}}^{\text{ROW}}}} \right)^{-\sigma} \tag{7}$$

Where:

- $D_{\text{cf}}^{\text{IND}}$: Simulated U.S. demand for Indian textiles under the counterfactual tariff scenario
- $D_{\text{base}}^{\text{IND}}$: Observed U.S. demand for Indian textiles in the baseline year
- $\tau_{\text{base}}^{\text{IND}}$, $\tau_{\text{cf}}^{\text{IND}}$: Ad valorem tariff rates on Indian textile exports in the baseline and counterfactual scenarios, respectively
- $P_{\text{base}}^{\text{ROW}}$, $P_{\text{cf}}^{\text{ROW}}$: CES composite price indices for all competing suppliers (excluding India) in the baseline and counterfactual scenarios
- σ : Elasticity of substitution across exporters

The CES price index reflects the tariff-inclusive prices of all exporters other than India, weighted by their baseline market shares. It is defined as:

$$P_{\text{ROW}}^{1-\sigma} = \sum_{i \neq \text{IND}} s_i \cdot (1+\tau_i)^{1-\sigma} \tag{8}$$

which implies that the CES price index can be expressed as:

$$P_{\text{ROW}} = \left(\sum_{i \neq \text{IND}} s_i \cdot (1+\tau_i)^{1-\sigma} \right)^{\frac{1}{1-\sigma}} \tag{9}$$

Accordingly, the baseline CES price index is:

$$P_{\text{base}}^{\text{ROW}} = \left(\sum_{i \neq \text{IND}} s_i^{\text{base}} \cdot \left(1+\tau_i^{\text{base}}\right)^{1-\sigma} \right)^{\frac{1}{1-\sigma}} \tag{10}$$

and the counterfactual CES price index is:

$$P_{\text{cf}}^{\text{ROW}} = \left(\sum_{i \neq \text{IND}} s_i^{\text{base}} \cdot \left(1 + \tau_i^{\text{cf}}\right)^{1-\sigma} \right)^{\frac{1}{1-\sigma}} \tag{11}$$

Note that the market shares s_i^{base} are fixed at their baseline values and are calculated as:

$$s_i^{\text{base}} = \frac{X_i^{\text{base}}}{\sum_{j \neq \text{IND}} X_j^{\text{base}}} \tag{12}$$

- s_i^{base} : U.S. import share of exporter i (excluding India[7]) in the baseline year
- τ_i^{base} , τ_i^{cf} : ad valorem tariff rate applied to exporter i in the baseline and counterfactual scenarios.
- $\sum_{j \neq \text{IND}} X_j^{\text{base}}$: Total U.S. textile imports from all countries other than India in the baseline year.

This formulation enables us to isolate the demand-side effects of India-specific tariff changes by holding other exporters' market shares and pre-tariff prices constant. Thus, we can simulate how changes in India's relative price - driven by tariff policy - alter its share in the U.S. textile import market under a given elasticity of substitution.

2.1.4 Decomposition of Counterfactual Demand

The counterfactual US demand for Indian textile imports is expressed in Equation (7) which can be simplified as

$$D_{\text{cf}}^{\text{IND}} = D_{\text{base}}^{\text{IND}} \cdot \left(\frac{1 + \tau_{\text{cf}}^{\text{IND}}}{1 + \tau_{\text{base}}^{\text{IND}}} \cdot \frac{P_{\text{base}}^{\text{ROW}}}{P_{\text{cf}}^{\text{ROW}}} \right)^{-\sigma} \tag{13}$$

$D_{\text{cf}}^{\text{IND}}$: represents the full counterfactual demand under a CES framework, accounting for both the change in own tariffs (Price Effect) and the change in competitors' tariffs (Quantity shift Effect).

$D_{\text{cf}}^{\text{IND}}$ is a decreasing function of $1 + \tau_{\text{cf}}^{\text{IND}}$ (Own tariff) and increasing function of $P_{\text{cf}}^{\text{ROW}}$ (Competitors' tariff). Therefore it can be decomposed into Price Effect (due to change in India's Tariff) and Quantity Effect (due to change in Competitor's tariff).

[7] Excluding India from the CES price index ensures that India's own tariff-induced price change does not mechanically influence the denominator of the demand function used to calculate its export demand. This isolates the effect of India's relative price change on its market share. At the same time, allowing the CES price index to incorporate tariff changes for other countries captures the shifting competitiveness landscape caused by global tariff adjustments. While this introduces some interaction across countries, the framework remains a **partial equilibrium** one, as it does not model the full system-wide adjustments typical of a general equilibrium setting.

The Direct Tariff Effect (Price Effect) captures the impact of changes in the exporting (India, in this case) country's own tariff, holding competitors' tariffs constant. It is computed as the difference between the partial counterfactual demand and the base-year demand.

$$\text{Price Effect } = D_{\text{base}}^{\text{IND}} \cdot \left(\frac{1+\tau_{\text{cf}}^{\text{IND}}}{1+\tau_{\text{base}}^{\text{IND}}}\right)^{-\sigma} - D_{\text{base}}^{\text{IND}} \tag{14}$$

Price Effect isolates the effect of own tariff change while keeping competitors' tariff constant.

Here,

$$\text{Partial } D_{\text{cf}}^{\text{IND}} = D_{\text{base}}^{\text{IND}} \cdot \left(\frac{1+\tau_{\text{cf}}^{\text{IND}}}{1+\tau_{\text{base}}^{\text{IND}}}\right)^{-\sigma} \tag{15}$$

denotes the partial counterfactual demand, which holds competitors' tariffs fixed at their base-year levels while allowing India's own tariff to vary.

The Third-country Tarff Effect (Quantity Effect) captures the impact of competitors' tariffs while holding the exporting country's own tariff constant. It is calculated as the residual difference between the full and partial counterfactual demand estimate.

$$\text{Quantity Effect} = D_{\text{cf}}^{\text{IND}} - D_{\text{base}}^{\text{IND}} \cdot \left(\frac{1+\tau_{\text{cf}}^{\text{IND}}}{1+\tau_{\text{base}}^{\text{IND}}}\right)^{-\sigma} \tag{16}$$

3.1.4 Important Caveats

The CES-based counterfactual framework developed in this paper provides a tractable and theoretically coherent method for isolating the demand-side effects of bilateral U.S. tariff changes on Indian textile exports. The core strength of this approach lies in the Armington-type demand system, which permits substitution among foreign suppliers in response to relative price changes while holding constant the market shares and export prices of non-Indian countries. The assumptions of full tariff pass-through and fixed behaviour of competitors facilitate a transparent estimation of the tariff-induced reallocation of U.S. import demand.

However, some caveats accompany this approach. First, the model assumes that tariffs are fully passed through to U.S. import prices, with foreign exporters absorbing none of the additional cost. In practice, pass-through is often incomplete and varies across products, depending on market power, contractual arrangements, and supply chain frictions (Feenstra,1989). As a result, the estimated demand reallocation may serve as an upper bound.

Second, the framework abstracts from any supply-side or policy responses. It does not account for exporters altering their prices, adjusting product quality, or responding through other strategic margins. Nor does it incorporate any offsetting policies adopted by exporting-country governments (Hallren, & Riker, 2017). This restriction limits the applicability of the results to

short-run scenarios, where such adjustments are minimal, and may understate dynamic responses over time.

Third, the model does not estimate or calibrate the Armington elasticity, which governs the substitutability between imported and domestic goods (Ahmad et al, 2020). By effectively assuming that U.S. buyers do not reallocate demand toward domestic textiles, the framework may overlook longer-run shifts in sourcing behaviour, especially where domestic supply is flexible.

Fourth, the market shares of all non-Indian suppliers are held fixed at their baseline levels in the CES composite price index. This rules out any competitive behaviour, including price responses, reallocation of market shares, or entry and exit by third-country exporters (Hallren, & Riker, 2017).

Despite these simplifications, the CES framework provides internally consistent, widely recognized, and policy-relevant first-order estimates of tariff-induced shifts in import demand. Even though it abstracts from general equilibrium feedbacks and dynamic adjustments, the framework provides a transparent and tractable foundation for partial-equilibrium analysis of trade policy shocks, serving as a useful benchmark before engaging more complex modelling environments.

3.1.5 Required Data for the Estimation

Table 5 lists the variables for which data are required to simulate counterfactual U.S. demand for Indian textiles at the HS-6 product level, along with their descriptions and respective data sources. The year 2023 is used as the base year for both U.S. import data and tariffs, reflecting the latest available data across major trading partners.

3.2 Quantifying Transmission Effects

To examine how changes in U.S. import demand for Indian textile products - arising from counterfactual tariff changes - propagate through India's domestic economy, we adopt a backward-linkage approach using India's Input-Output (IO) table. This framework enables us to estimate the ripple effects across domestic industries that supply intermediate inputs to the textile sector.

3.2.1 Mapping Export Demand Changes to IO Sector

In the first stage, we simulate the change in U.S. import demand for Indian textile products at the HS-6-digit product level under a counterfactual tariff scenario.

Let the change in Indian exports of product i to the U.S. be defined as:

$$\Delta X_{i,\mathrm{cf}}^{\mathrm{IND}} = X_{i,\mathrm{cf}}^{\mathrm{IND}} - X_{i,\mathrm{base}}^{\mathrm{IND}} \tag{17}$$

Where $X_{i,\text{cf}}^{\text{IND}}$ denotes counterfactual value of exports from India to the United States for product i at the HS-6-digit level, and $X_{i,\text{base}}^{\text{IND}}$ represents the corresponding base-year export value.

To assess the transmission of this external shock to domestic upstream industries, we map each HS-6 product i to its corresponding Input-Output (IO) sector s, using a concordance between the Harmonized System (HS) classification and India's National Industrial Classification (NIC) used in India's IO tables. This study focuses on two IO industries: **Textiles & Ginning** and **Apparel**, which are the main contributors to India's textile exports. Since many HS-6 products are not uniquely attributable to just one of these industries, we aggregate them into a single **"Textile Aggregate"** sector.

Let I_s denote the set of HS-6 products mapped to IO sector s. The total export demand change for sector *s* is computed as:

$$\Delta X_s = \sum_{i \in I_s} \Delta X_{i,\text{cf}}^{\text{IND}} \tag{18}$$

This aggregation yields a sector-level export demand shock that forms the basis for the subsequent analysis tracing its transmission through domestic production linkages.

3.2.2 Tracing First-Round Indirect Effects

To estimate how export demand shocks in the textile aggregate sector affect its immediate upstream suppliers, we focus on first-order indirect effects using technical input coefficients from India's IO table. This approach avoids the need for the full Leontief inverse and provides a tractable approximation of immediate transmission.

Let $\boldsymbol{A}$ denote the 63×1 vector of technical input coefficients of textile aggregate sector. Each element a_{is} in vector **A** represents the input from sector i required to produce one unit of output in textile aggregate sector s, defined as:

$$a_{is} = \frac{z_{is}}{y_s} \tag{19}$$

where:

- z_{is} is the value of inputs from sector i used in in producing output in sector s.
- y_s is the total output of sector s.

From *Section 2.2.1*, we obtain the export demand shock as a **scalar** value for the textile aggregate sector, denoted ΔX. The corresponding (first-round indirect) output response of upstream sectors is then given by:

$$\Delta Y = \mathrm{A} \cdot \Delta X \tag{20}$$

Here, ΔY is a 63×1 column vector representing the required changes in output - either increases or decreases - across upstream sectors resulting from changes in intermediate input demand by the textile aggregate sector. This captures only the first-order indirect effect on output in the immediate input suppliers, without accounting for higher-order propagation through the production network.

This simplified backward-linkage approach offers a transparent and tractable method to quantify how external demand shocks – in this case Trump Tariff on textiles - transmit through domestic production linkages within the Indian economy.

4. Quantifying Tariff shock on Textile Exports

To quantify the effects of the proposed US reciprocal tariffs on Indian T&A exports, we construct country-specific tariff rates by combining the reciprocal tariffs with the existing applied tariffs. For partner countries without a specified tariff rate, we apply a uniform assumed increase of 10 percent. Adding the announced or assumed tariff increase to the 2023 applied tariffs yields the effective counterfactual tariff rates at the HS-6 product level for each exporting country (see annexure 1 for details). We analyse two tariff simulations: a 25 percent tariff announced on July 30, 2025, and a 50 percent tariff announced on August 27, 2025.

These tariff simulation exercises are carried out at HS 6-digit level and the results are aggregated for *Two scenarios*. In *Scenario 1*, the product scope covers all the 656 HS-6-digit T&A exported to the US and the results are presented as per the value chain product groups. In *Scenario 2*, the product scope covers all 656 HS (6 digit) T&A exports to the US and the results are pooled at HS (2 digit) chapters. For each *Scenario*, the analysis covers the estimation of change in aggregate import demand which is further decomposed into change in import demand due to change in India's tariff (Direct tariff effect) and change in Competitors' tariff (Third country tariff effect).

4.1 Tariff Simulation at 50% Tariff

Tables 6(a) and 6(b) presents the results of *Scenario 1*. A 50% tariff on India will result in US$ 6.6 billion or a -67.8% fall in US import demand for Indian T&A. This negative effect is highest for Fibre (-95.8%), followed by Yarn (-87.5%) and Fabrics (-82.9%). However, in absolute values, Made-ups and Apparel account for US$ 5.7 billion or 85% fall in the T&A exports to the US.

The decomposition of the total tariff effect into *Direct* and *Third country* effect presents interesting results (Table 6(b)). Across product groups, the negative direct tariff effect is high especially for Made-ups, Apparel and Fabrics. Even though tariff has increased for both India and competing countries, the increase for India was significantly higher, hence positive quantity shifts are limited. In terms of value, quantity shifts are highest for Made-Up at US$

519 million followed by Apparel at US$ 510 million. As such, the direct tariff effect is high especially for Made-ups and Apparels. Further, with tariff differentials being significant, India's cost advantage relative to competitors is muted as evident in the AUV (Average Unit value) differentials (Table 7). Across product groups, India's AUV is lower than most competing countries except for China. But, with India's tariff being higher relative to the competitors, China, Vietnam and Bangladesh will have significant market share gains for Apparel and Pakistan, Mexico and China for Made-ups (see Table3). Thus, these tariff differentials are adversely influencing the competitive landscape in the US market.

In *Scenario 2,* the impact of tariff is analysed at the HS(2-digit) chapter level and the results are detailed in Tables 8(a) and 8(b). As evident, there is high variation in the fall in import demand across HS chapters. The fall in import demand for Fibres, both natural and Man-made (HS 53,54,55) is significantly high at over 90% while it is relatively low for Apparel (not knitted- HS 62) at 46%. Between these, the fall in import demand ranges between 65% and 74% for Textile fabrics (HS59), Knitted fabric (HS 60) and Knitted Apparel (HS 61). In absolute value terms, HS 61,62,63,57 account for US$ 5.6 billion fall in import demand or 85% of total import demand. Secondly, the positive third country effect is limited for HS 61,62,63,57 resulting in high tariff effect (US$ 5.6 billion).

These variations in tariff effect across HS chapters are better understood when the market share and AUV differentials between India and competing countries are analysed. For products with significant tariff effect (HS 53,55), India's market share is higher than that of competing countries, namely, Korea, Belgium, Italy, Turkey (Table 9). However, AUV differentials between India and competing countries vary. For HS53, India's AUV is higher than competing countries while it is lower for HS55 (Table 10). Thus, the direct tariff effect is significant for these products. For Apparel (HS61,62) and Fabrics (HS59, HS60), India's market share is lower than competing countries and AUV differentials between India and competing countries is high thereby suggesting niche product exports by India.

The limited third country tariff effect for Apparel (HS61,62) and Made-ups (HS63) is due to India's cost disadvantage relative to China. For these products, China market share ranges between 22-52% while it is 4.8-7.0% for India (Table 9) with significant AUV differentials (Table 10). When the tariffs on India are higher relative to China and AUV differentials are high (HS61), the possibility of quantity shifts due to tariff differentials reduces. However, with lower AUV differentials, the quantity shifts increase (HS62). Therefore, it would seem that the positive third country impact on the exports of Apparel and Made-ups (HS 61-63) to the US is driven by tariff and AUV differentials with China. In the case of Carpets (HS 57), India's market share is higher than the competitors (Turkey, China) but the positive third country effects are driven by India's lower AUV relative to major competitors (Table 10). Considering that Apparels Made-ups and Carpets (HS 61-63,57) account for 87% of India's T&A exports to the US, the direct tariff effect of 50% is muted largely on account of India's lower AUV

relative to competing countries. As such, the 50% tariff on India does not lead to significant market gains for these countries.

4.2 Tariff Simulation With 25% Tariff

Assuming the withdrawal of 25% punitive tariff (for purchase of oil from Russia), this section estimates the *Direct* and *Indirect effects* of 25% Reciprocal tariff on the Indian T&A exports to the US. Tables 11(a) and 11(b) quantify the effects of the tariff shock under *Scenario 1* with results aggregated over broad product groups.

With 25% tariff, the negative demand effect is about US$2.1 billion translating to a 21.6 per cent fall in imports across product groups. In absolute terms, the fall in import demand is highest for Made-ups (US$ 921million) followed by Apparel (US$ 788 million). These two product groups account for 81% fall in the import demand. The fall in import demand for Fabric followed by Fibre and Yarn are significant when compared to the base year (2023) demand (see Table 11(a)).

Decomposing this effect of tariff into *Direct* and *Indirect effects* underlines two important observations. *One*, the effect of tariff on aggregate Textiles and across product groups is significantly muted by the positive Third country effects (Indirect). This implies that following the tariff differentials between India and competing countries (see end note 6), quantity shifts from competing countries' exports to Indian exports are evident. This is particularly significant for Made-ups followed by Apparel and Fabrics (Table 11(b)). And *two*, the tariff and Third country effects for Fibre and Yarn are relatively low.

The high Indirect effects for Apparel, Made-ups and Fabric are on account of structural shift in the US textile industry and the growing dependence on imports. The quantity index of intermediate use by Textile mills in the US declined from 89.15 in 2021 to 79.67 in 2023. The industry value-added of Textile mills & Textile product mills decreased by -2.2% and for Apparel & Leather, increased by 1.2% between 2022 and 2023 (BEA, 2024). These trends imply a shift from domestic production to imports. Thus, tariff differentials among competing countries have a stronger impact on India's T&A exports to US.

India's major competitors for these products are China, Vietnam, Bangladesh, Indonesia, Pakistan, Mexico, Turkey, all having a higher share than India (see Table 9). Further, India's price competitiveness in the US market is higher as compared to most competitors. A comparison of AUV of imports from India vis-à-vis the main competitors (see Table 10) shows that except for China, all the other competitors have a higher unit value. This is also true for Fabrics where China has a higher market share than India at 19.2% (Table 3). Thus, higher quantity shifts for Made-ups, Apparels and Fabrics underline India's gain on account of competitiveness.

In *Scenario 2,* the impact of tariff shock is analysed at the HS chapter (2-digit) level, and the results are detailed in Tables 12(a) and 12(b). The impact of tariff (in percentage terms), is high for Fibres (HS 53-55) and Silk (HS 50) and low for Fabrics, Apparel and Made-Ups (HS 58-63). This differential impact of tariff is primarily due to variation in the Third country effects. The decomposition of the Tariff effect detailed in Table 12(b) shows significant Third country effects for Fabrics (HS 59), Apparel (HS 61-62) and Made-Ups (HS 63) but low for Fibres especially vegetable textile fibre (HS 53).

These variations in the Third country effects are driven by India's market share and AUV differentials relative to the competing countries. For vegetable fibres (HS 53), India's market share is high relative to the competing countries (Table 9) which points to India's dominant market position. Further, with India's AUV being lower than that of the competing countries, India was able to retain its market share. In the case of MMF (HS 54,55), India's market share is comparable with other competitors but the differences in AUV are significant (see Table 10).

Apparels (HS 61, 62) account for 46.6% of US import demand. The overall tariff effect is muted on account of strong third country effects which are driven by market share, tariff and AUV differentials of India vis-à-vis the main competitors. In the case of HS 61 & 62, the market share of the main competitors, China, Vietnam and Bangladesh is much higher than India (Table 9). However, India's AUV is much higher than China but lower than Vietnam and Bangladesh (Table 10). Thus, it would seem that competitiveness and tariff differentials together determine the overall effect of the tariff shock.

Carpets and Made-Ups (HS 57, 63) account for 40.6% of the import demand and exhibit a strong third country effect. In the case of HS 57, India's market share is high relative to the competitors (Turkey, China, Egypt). In the case of HS 63, India's market share is low relative to China. Therefore, the strong quantity shifts to India seem to be driven by AUV and tariff differentials.

5. Quantifying Value Chain Effects

The transmission effect of the demand shock, following the tariff increase, is closely related to the structure of the Indian textile industry. The textile industry has a wide product scope covering hand spun and woven traditional textiles based on handlooms in cottage industry. Alongside, there are capital intensive modern mill sector and synthetic fibre manufacturing units. Between these two spectrums, there are decentralised power loom, knitting and garment sectors. Thus, one segment of the industry is Organised, efficient and competitive while the other segment is unorganised, labour intensive and not efficient. Table 13 brings out these dimensions of the textile value chain in India underlining the fragmented, unorganised, cotton focussed, obsolete technology and SME dominated Textile industry. Process 1 characterises the

unorganised textile units while Process 2 characterises the organised units. Large firms dominate in spinning, processing , apparel and retailing.

Even though small firms co-exist with large firms in the Textile industry, textile exports are dominated by large firms. However, the impact of US tariff shock, affects all producers in textile industry and is transmitted through many domestic suppliers as detailed in Table 13. With nearly 70% of sectoral value derived from intermediate inputs, first-order indirect effects are substantial, totalling US$ 4.6 billion, including US$ 1.4 billion within the textile sector. The direct effect of tariff is a fall in exports to US amounting to US$6642 million while the indirect effect on the upstream industries is US$ 1418 million (Table 14), As only 24% of the textile production is exported and 76% caters to the domestic demand in India, the indirect effect is muted.

Even with this strong domestic orientation and limited indirect effect, it is important to underline that over 70% of first order tariff shock (US$ 3.3 billion) is concentrated in 4 industries, namely, Ginning (Fibre), Chemicals, Cotton production(agriculture) and Trade (Table 15). As Ginning and Cotton are primarily used in Textile industry, the estimated demand fall need to be absorbed by these industries[8]. However, this is not the case for Chemicals and Trade as they have many use industries. The use of Chemicals in Textile accounts for 8.9% of the Chemical output value and that for Trade is 2.5%. Therefore, the effect of tariff shock on textiles for these industries will be relatively lower.

It is important to highlight the significance of the role of Trade in the Textile industry. As retailing has high fixed cost, E-Commerce has facilitated the growing B2C relationships. While the tariff shock may not affect the domestic B2C costs, it will have an adverse impact on exports. As this platform facilitates small producers to export, adverse action by these big retailers will impact the small producers/exporters. During Trump 1.0 US-China trade war, retailers reduced their margins to stem the rise in consumer prices. Contrary to their expectations, China did not reduce export prices as they diversified their export markets (Cavollo, Gopinath et al, 2021). In the current context, India may not be able to exert such pressure on the retailers as India's export dependence on US market is high. Under such conditions, the retailers may not be willing to reduce their margins but can force the producers/exporters to reduce export prices.

6. Conclusions

The US Reciprocal Tariffs has brought in a shift from *Product specific* to *Country Specific* Tariff policy. This shift has distorted the existing competitive landscape wherein tariff

[8] These two industries account for 67.7% of the inter-industry consumption and 21.35% of the value of output. For these industries, export account for 21.2% of the value of output. Exports of cotton (ginning) account 15.65% and apparel accounts for 36.92% of the value of output (India I-O table 2019-20).

differentials are driving relative prices and affecting Consumption and Production determinants. In this country-industry framework, Indian textile exports decline by over US$ 6.6 billion under 50% tariff. As India's tariff is higher than the competing countries, the Third country effects are limited. Product groups, Apparel and Made-ups, face the largest losses. These losses decline to US$ 2.1 billion under 25% tariff due to significant Third country effects. These quantity shifts from competing countries are high when India's price (proxy AUV) is lower relative to competing countries. Equally important are the tariff differentials with China. As India's exports to US are primarily final goods, product differentiation and competitiveness seem to drive these quantity shifts which, in turn, determined the tariff effect (see end note 6). These market dynamics differ for intermediate products (Fabrics, Yarn). Here, the quantity shifts are relatively lower and are largely driven by price/unit value differentials.

As nearly 70% of sectoral value is derived from intermediate inputs, first-order indirect effects for Textile industry are substantial, totalling US$ 4.6 billion, including US$ 1.4 billion within the textile sector. Chemicals, agriculture, and trade services (E-Commerce) account for roughly 40% of these upstream losses.

The indirect effect of these tariffs are captured in the estimates of the transmission effects along the supply chain. Given India's strong domestic orientation and relatively lower indirect effect, 70% of the tariff shock is concentrated in four supplying industries. Of them, two are primarily dependent on textile industry (Ginning &Agriculture) and therefore, have a significant direct effect. For the other two industries (Chemicals and Trade), the indirect effect is low as their share in total use industries is low. However, with the growing significance of E-Commerce, for both domestic and export sales, these big retailers can exercise their market power by making the small producers lower prices.

Given these dimensions, firm resilience and supply chain management framework can be effective for managing this demand risk management. For the exporting firms within an industry, the decision to export or not is shaped by the fixed costs associated with distributing the product in that market. While product differentiation brought in by upgraded technologies confers market power, the scale economies help the firms to amortise the market related fixed costs. These firm level relationships are particularly relevant for Final goods transactions (Antras, 2020).

Adapting this framework to firms' response to tariffs underlines the following: (i) Firms traits (like firm size, existing position in production network, supply base complexity, industry); (ii) Product traits (production relative to global demand, institutional factors- ease of doing business) together determine the adjustment costs and transaction costs. Within this, the exporters' response can be a mix of the following: reduce export price, shift production location, alternate destination markets, tariff engineering, transhipment procedures (Miller 2025).

Under these tariff induced market dynamics, India should strive to negotiate for 25% or lower tariff with US. Simultaneously, India should explore market diversification. For example, under India-UK CETA, our estimates show an increase of US$ 960 million as additional textile exports to UK, largely accounted by Apparel and Made-ups. Similar opportunities exist in other regional blocs which India should effectively capitalise. Secondly, efforts for drawing a Revival package should not merely aim at compensating the tariff induced losses but focus on subsidies/support policies (like export compliance, competitive credit) that improve the competitiveness of Indian textile exports and develop a conducive ecosystem.

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Table 1: India's Exports to US and World: Textile Product Groups

Product Groups	Export to US (million USD)				Export to World (million USD)			
	2010	2024	CAGR (2010-19) (%)	CAGR (2021-24) (%)	2010	2024	CAGR (2010-19) (%)	CAGR (2021-24) (%)
Fibre	57.06	182.43	8.46	-5.03	4260.27	2505.07	-4.01	-20.82
Yarn	44.22	104.28	4.94	-4.77	3668.98	4415.50	0.59	-9.94
Fabric	204.26	360.54	4.58	-10.08	3703.19	4241.90	1.99	-3.90
Apparel	2787.12	5101.33	5.08	2.10	10604.03	15475.95	4.85	0.59
Made-ups	1793.67	4110.03	7.43	-4.91	4331.19	8161.90	5.44	-3.48
nec.	58.96	445.57	13.70	2.48	559.16	1338.47	6.96	0.59
Total Textiles	4945.29	10304.18	6.13	-1.60	27126.83	36138.78	3.03	-4.48

Source: Authors' calculations using data from WITS
Note: nec. includes textiles not elsewhere classified (nec), silk waste, silk-worm cocoons for reeling, linoleum etc.

Table 2: India's Top Export Destinations for Textile Products

Product Group	Export Markets of India	Average Exports to World (2022-24) (million USD)
Fibre	Bangladesh (30.38%), Turkey (11.39%), China (7.79%), United States (7.04%), Vietnam (4.65%)	2582.21
Yarn	Bangladesh (33.29%), China (8.48%), Turkey (6.29%), Egypt (5.04%), Portugal (3.48%)	4489.50
Fabric	Bangladesh (16.98%), Sri Lanka (11.57%), UAE (8.68%), United States (8.43%), Senegal (3.47%)	4467.48
Apparel	United States (33.26%), UK (8.96%), UAE (7.76%), Germany (5.71%), Netherlands (4.28%)	15550.04
Made-Ups	United States (50.05%), UK (4.67%), Germany (4.27%), UAE (3.80%), Australia (3.32%)	7851.51
Nec.	United States (29.42%), Italy (6.10%), UAE (5.76%), China (4.54%), Bangladesh (3.04%)	1271.98

Source: Authors' calculations using data from WITS
Notes: Figures in brackets represent the share of India's exports to each market.

Table 3: India's Export Dependency and Competitors in US Market

Product Group	Export Dependency (Average 2022-24)	India's Share in US Imports (Average 2022-24)	Competitors share in US Imports (Average 2022-24)
Fibre	7.04%	India (8.33%)	Korea Rep. (13.71%), China (9.69%), Germany (8.21%), Vietnam (7.34%)
Yarn	2.32%	India (13.57%)	Turkey (19.65%), Canada (8.98%), Mexico (8.73%), China (7.17%)
Fabric	8.43%	India (16.34%)	China (19.23%), Korea Rep. (9.72%), Italy (6.82%), Pakistan (5.74%)

Apparel	33.26%	India (5.77%)	China (22.11%), Vietnam (17.96%), Bangladesh (9.05%), Indonesia (5.43%)
Made-Ups	50.05%	India (19.57%)	China (45.56%), Pakistan (7.26%), Mexico (6.32%), Turkey (5.37%)
Nec.	29.42%	India (8.72%)	China (15.65%), Mexico (10.95%), Canada (8.66%), Japan (6.63%)

Source: Authors' calculations using data from WITS

Note: $Export\ Dependency = \frac{India's\ Export\ of\ Product\ Group\ to\ US}{India's\ total\ Export\ of\ Product\ Group}$

Table 4: Weighted Average of Effective Tariff imposed by US on India and Competing Countries

Product Group	Weighted Average Tariff by US on India (2023)	Weighted Average Tariff by US on Competing Countries (2023)
Fibre	India (4.69%)	Korea, Rep. (0.00%), China (6.31%), Germany (3.90%), Vietnam (5.22%)
Yarn	India (8.11%)	Turkey (7.14%), Canada (0.00%), Mexico (0.00%), China (6.67%)
Fabric	India (5.25%)	China (10.58%), Korea, Rep. (0.00%), Italy (9.18%), Pakistan (8.39%)
Apparel	India (12.14%)	China (13.09%), Vietnam (13.63%), Bangladesh (11.74%), Indonesia (13.09%)
Made-ups	India (7.22%)	China (6.81%), Pakistan (8.14%), Mexico (0.00%), Turkey (2.57%)
Nec	India (2.75%)	China (3.07%), Mexico (0.00%), Canada (0.00%), Japan (1.91%)

Source: Authors' calculations using data from ITC MarketAccessMap and WITS

Notes: 1. Effective tariff rate is Most Favoured Nation (MFN) Tariff rate or Preferential Tariff rate, whichever is lower

2. $weight_{ij} = \frac{M_{ij}^{US}}{\sum_{i=1}^{n} M_{ij}^{US}}$;

where M_{ij}^{US} is import of good i from country j by US and n is number of products (at 6-digit HS code) under a given product group.

Table 5: Variables and Data Sources for Simulating Counterfactual U.S. Demand

Variable and Data Sources (HS-6 Digit Level)			
Si. No.	**Variable**	**Description**	**Source**
1	$D_{\text{base}}^{\text{IND}}$, X_i^{base}	U.S. imports of each HS-6 product from all countries, including India	UN COMTRADE (accessed via WITS)
2	τ_i^{base}	Ad valorem applied tariff rate by the United States on all exporters	ITC Market Access Map
3	τ_i^{cf}	Counterfactual tariff rate announced by the United States on all exporters[9]	BBC News
4	σ	Product-level Tariff Elasticity	Fontagné et al. (2022)

[9]Details of Counterfactual tariff rate used in the study is provided in Annexure 1.

Table 6(a)- *Scenario 1 (Tariff Simulation at 50%)*: Change in U.S. Import Demand for Indian Textile Product Groups

Textile Product Group	Base Year Import Demand	Counterfactual Import Demand	Change in Import Demand	% Change in Import Demand	No. of HS 6 Products	Percent of HS 6 Products
	in million US$					
apparel	4566.84	1931.77	-2635.07	-57.70	188	28.66
fabrics	459.38	78.39	-380.99	-82.94	213	32.47
fibre	182.08	7.68	-174.40	-95.78	38	5.79
made-up	4005.30	988.05	-3017.25	-75.33	77	11.74
nec	491.18	136.76	-354.42	-72.16	66	10.06
yarn	91.15	11.36	-79.79	-87.54	74	11.28
Total	**9795.92**	**3154.01**	**-6641.92**	**-67.80**	**656**	**100**

Note: a negative sign implies a decline in demand.

Table 6(b)- *Scenario 1 (Tariff Simulation at 50%)*: Decomposition of Change in U.S. Import Demand for Indian Textile Product Groups

Textile Product Group	Total Tariff Effect	Direct Tariff Effect	Third-country Tariff Effect
	Million US$		
apparel	-2635.07	-3144.76	509.70
fabrics	-380.99	-425.22	44.23
fibre	-174.40	-180.35	5.95
made-up	-3017.25	-3536.66	519.41
nec	-354.42	-434.77	80.35
yarn	-79.79	-86.25	6.46
Total	**-6641.92**	**-7808.02**	**1166.10**

Table 7: Average Unit Value Analysis: India versus Competing Countries

Product Group	Average Unit Value for India in US (2022-24) (US$ per unit)	Average Unit Value for Competitors in US (2022-24) (US$ per unit)
Fibre	India (49.68)	Korea, Rep. (27.95), China (18.32), Germany (70.96), Vietnam (15.25)

Yarn	India (25.03)	Turkey (68.22), Canada (44.81), Mexico (25.06), China (23.60)
Fabric	India (29.83)	China (14.02), Korea, Rep. (32.88), Italy (54.08), Pakistan (16.44)
Apparel	India (21.81)	China (14.55), Vietnam (22.15), Bangladesh (29.93), Indonesia (24.82)
Made-ups	India (12.04)	China (9.27), Pakistan (26.34), Mexico (38.24), Turkey (28.43)
Nec	India (30.25)	China (29.86), Mexico (34.80), Canada (50.94), Japan (82.90)

Source: Authors' calculations using data from WITS

Notes: 1. The parenthesis show average unit value for corresponding product group during 2022-24.

2.Unit values for each product under a product-group is calculated by dividing the import values by import quantity. Average unit value of a product group is derived by taking an average across the individual average unit values of all the products under that product group

Table 8(a)- *Scenario 2 (Tariff Simulation at 50%):* Change in U.S. Import Demand for Indian Textile HS 2 Chapters

HS2 Product Code	HS Chapter Description	Base Year Import Demand	Counterfactual Import Demand	Change in Import Demand	% Change in Import Demand	No. of HS 6 Products	Percent of HS 6 Products
		in million US$					
50	Silk	9.92	0.67	-9.25	-93.26	8	1.22
51	Wool, fine/coarse animal hair	6.59	0.11	-6.48	-98.38	19	2.90
52	Cotton	111.05	23.30	-87.75	-79.02	99	15.09
53	Other vegetable textile fibres	77.46	8.88	-68.58	-88.54	18	2.74
54	Man-made filaments	274.35	26.09	-248.26	-90.49	62	9.45
55	Man-made staple fibres	178.38	17.49	-160.89	-90.19	81	12.35
56	Wadding, felt, nonwovens	206.55	35.11	-171.44	-83.00	30	4.57
57	Carpets and other textile floor coverings	1052.46	273.52	-778.95	-74.01	19	2.90
58	Special woven fabrics; tufted textile fabrics	57.71	16.69	-41.02	-71.07	33	5.03
59	Impregnated, coated textile fabrics	262.67	92.81	-169.87	-64.67	21	3.20

60	Knitted or crocheted fabrics	70.61	18.39	-52.21	-73.95	28	4.27
61	Apparel, knitted or crocheted	2144.33	646.17	-1498.16	-69.87	98	14.94
62	Apparel, not knitted or crocheted	2422.51	1285.60	-1136.91	-46.93	90	13.72
63	Other made-up textile articles	2921.33	709.18	-2212.15	-75.72	50	7.62
Total		**9795.92**	**3154.01**	**-6641.92**	**-67.80**	**656**	**100**

Table 8 (b)- *Scenario 2 (Tariff Simulation at 50%):* Decomposition of Change in U.S. Import Demand for Indian Textile HS 2 Chapters

HS2 Product Code	HS Chapter Description	Total Tariff Effect	Direct Tariff Effect	Third-country Tariff Effect
		in million US$		
50	Silk	-9.25	-9.78	0.53
51	Wool, fine/coarse animal hair	-6.48	-6.54	0.05
52	Cotton	-87.75	-99.88	12.13
53	Other vegetable textile fibres	-68.58	-73.91	5.33
54	Man-made filaments	-248.26	-265.40	17.15
55	Man-made staple fibres	-160.89	-170.76	9.88
56	Wadding, felt, nonwovens	-171.44	-195.54	24.10
57	Carpets and other textile floor coverings	-778.95	-924.72	145.77
58	Special woven fabrics; tufted textile fabrics	-41.02	-50.60	9.58
59	Impregnated, coated textile fabrics	-169.87	-222.32	52.46
60	Knitted or crocheted fabrics	-52.21	-61.98	9.77
61	Apparel, knitted or crocheted	-1498.16	-1673.41	175.25
62	Apparel, not knitted or crocheted	-1136.91	-1471.36	334.45
63	Other made-up textile articles	-2212.15	-2581.81	369.66
Total		**-6641.92**	**-7808.02**	**1166.10**

Table 9: Market Share of India's Competitors in US Import Demand (HS 2 Digit)

HS Chapter	India's Share in US Imports (Average 2022-24)	Competitors in US Market (Average 2022-24)
50	India (17.58%)	China (23.40%), Korea, Rep. (23.13%), Italy (18.37%)
51	India (2.56%)	Peru (15.58%), Italy (15.14%), Mexico (11.10%)
52	India (14.63%)	Pakistan (24.19%), Korea, Rep. (14.86%), China (6.84%)
53	India (35.56%)	Belgium (13.52%), Italy (8.40%), China (6.90%)
54	India (13.68%)	China (13.42%), Korea, Rep. (9.52%), Turkey (7.92%)
55	India (11.04%)	Korea, Rep. (10.81%), Thailand (9.25%), China (9.18%)
56	India (7.74%)	China (21.52%), Germany (7.68%), Mexico (6.74%)

57	India (34.83%)	Turkey (24.97%), China (12.45%), Egypt, Arab Rep. (4.20%)
58	India (8.35%)	China (29.95%), Taiwan, China (17.30%), Mexico (7.42%)
59	India (9.00%)	Mexico (13.81%), China (12.98%), Canada (11.82%)
60	India (14.14%)	China (25.21%), Korea, Rep. (15.81%), Israel (11.95%)
61	India (4.85%)	China (22.30%), Vietnam (17.79%), Cambodia (5.55%)
62	India (6.97%)	China (21.86%), Vietnam (18.19%), Bangladesh (13.73%)
63	India (16.86%)	China (52.29%), Pakistan (8.96%), Mexico (6.83%)

Source: Authors' calculations using data from WITS

Table 10: Average Unit Value Analysis: India versus Competing Countries

HS 2-digit	HS Chapter Description	Average Unit Value for India in US (2022-24) (US$ per unit)	Average Unit Value for Competitors in US (2022-24) (US$ per unit)
50	Silk	India (89.13)	China (64.66), Korea, Rep. (208.40), Italy (152.88)
51	Wool, fine/coarse animal hair	India (151.77)	Peru (63.97), Italy (67.68), Mexico (29.32)
52	Cotton	India (15.34)	Pakistan (10.10), Korea, Rep. (52.36), China (19.32)
53	Other vegetable textile fibres	India (32.90)	Belgium (23.56), Italy (81.89), China (10.72)
54	Man-made filaments	India (17.18)	China (13.84), Korea, Rep. (21.14), Turkey (19.36)
55	Man-made staple fibres	India (22.15)	Korea, Rep. (37.19), Thailand (34.13), China (12.62)
56	Wadding, felt, nonwovens	India (7.51)	China (6.24), Germany (21.56), Mexico (10.18)
57	Carpets and other textile floor coverings	India (15.88)	Turkey (48.33), China (14.84), Egypt, Arab Rep. (33.98)
58	Special woven fabrics; tufted textile fabrics	India (47.24)	China (16.67), Taiwan, China (32.34), Mexico (71.77)
59	Impregnated, coated textile fabrics	India (51.43)	Mexico (23.23), China (11.16), Canada (30.75)
60	Knitted or crocheted fabrics	India (18.68)	China (8.17), Korea, Rep. (13.13), Israel (316.38)
61	Apparel, knitted or crocheted	India (17.50)	China (11.29), Vietnam (17.30), Cambodia (20.26)
62	Apparel, not knitted or crocheted	India (26.20)	China (17.88), Vietnam (27.15), Bangladesh (41.72)
63	Other made-up textile articles	India (10.52)	China (7.27), Pakistan (10.23), Mexico (36.44)

Source: Authors' calculations using data from WITS

Note: 1. The parenthesis show average unit value for corresponding 2-digit HS code during 2022-24.
2. Unit values for each product is calculated by dividing the import values by import quantity. Average unit value of a 2-digit HS code is derived by taking an average across the individual average unit values of all the products at 6-digit HS code under that 2-digit HS code.

Table 11 (a) - *Scenario 1 (Tariff Simulation at 25%)*: Change in U.S. Import Demand for Indian Textile Product Groups

Textile Product Group	Base Year Import Demand	Counterfactual Import Demand	Change in Import Demand	% Change in Import Demand	No. of HS 6 Products	Percent of HS 6 Products
	in million US$					

apparel	4566.84	3778.89	-787.95	-17.25	188	28.66
fabrics	459.38	301.50	-157.87	-34.37	213	32.47
fibre	182.08	73.24	-108.84	-59.77	38	5.79
made-up	4005.30	3084.09	-921.21	-23.00	77	11.74
nec	491.18	387.51	-103.67	-21.11	66	10.06
yarn	91.15	55.41	-35.74	-39.21	74	11.28
Total	**9795.92**	**7680.64**	**-2115.28**	**-21.59**	**656**	**100**

Table 11 (b) - *Scenario 1 (Tariff Simulation at 25%)*: Decomposition of Change in U.S. Import Demand for Indian Textile Product Groups

Textile Product Group	Total Tariff Effect	Direct Tariff Effect	Third Country Tariff Effect
	Values in Million US$		
apparel	-788	-1636	848
fabrics	-158	-337	179
fibre	-109	-169	60
made-up	-921	-2585	1663
nec	-104	-341	237
yarn	-36	-71	35
Total	**-2115**	**-5138**	**3023**

Table 12 (a) - *Scenario 2 (Tariff Simulation at 25%)*: Change in U.S. Import Demand for Indian Textile HS 2 Chapters

HS2 Product Code	HS Chapter Description	Base Year Import Demand	Counterfactual Import Demand	Change in Import Demand	% Change in Import Demand	No. of HS 6 Products	Percent of HS 6 Products
		in million US$					
50	Silk	9.92	4.67	-5.25	-52.95	8	1.22
51	Wool, fine/coarse animal hair	6.59	1.44	-5.15	-78.08	19	2.90
52	Cotton	111.05	78.80	-32.25	-29.04	99	15.09
53	Other vegetable textile fibres	77.46	46.92	-30.55	-39.43	18	2.74

54	Man-made filaments	274.35	141.48	-132.86	-48.43	62	9.45
55	Man-made staple fibres	178.38	89.43	-88.95	-49.87	81	12.35
56	Wadding, felt, nonwovens	206.55	141.24	-65.31	-31.62	30	4.57
57	Carpets and other textile floor coverings	1052.46	750.98	-301.48	-28.65	19	2.90
58	Special woven fabrics; tufted textile fabrics	57.71	50.06	-7.65	-13.26	33	5.03
59	Impregnated, coated textile fabrics	262.67	229.95	-32.72	-12.46	21	3.20
60	Knitted or crocheted fabrics	70.61	58.21	-12.39	-17.55	28	4.27
61	Apparel, knitted or crocheted	2144.33	1591.93	-552.40	-25.76	98	14.94
62	Apparel, not knitted or crocheted	2422.51	2186.96	-235.55	-9.72	90	13.72
63	Other made-up textile articles	2921.33	2308.56	-612.77	-20.98	50	7.62
Total		**9795.92**	**7680.64**	**-2115.28**	**-21.59**	**656**	**100**

Table 12(b) – *Scenario 2 (Tariff Simulation at 25%)*: Decomposition of Change in U.S. Import Demand for Indian Textile HS 2 Chapters

HS2 Codes	HS Chapters (Description)	Total Tariff Effect	Direct tariff Effect	Third Country Tariff Effect
		Values in Million US$		
50	Silk	-5.25	-8.96	3.71
51	Wool, fine/coarse animal hair	-5.15	-6.20	1.05
52	Cotton	-32.25	-75.31	43.06

53	Other vegetable textile fibres	-30.55	-67.13	36.58
54	Man-made filaments	-132.86	-231.45	98.59
55	Man-made staple fibres	-88.95	-145.71	56.76
56	Wadding, felt, nonwovens	-65.31	-165.29	99.98
57	Carpets and other textile floor coverings	-301.48	-721.81	420.33
58	Special woven fabrics; tufted textile fabrics	-7.65	-36.76	29.11
59	Impregnated, coated textile fabrics	-32.72	-164.30	131.58
60	Knitted or crocheted fabrics	-12.39	-40.88	28.49
61	Apparel, knitted or crocheted	-552.40	-862.40	310.00
62	Apparel, not knitted or crocheted	-235.55	-773.54	537.99
63	Other made-up textile articles	-612.77	-1838.29	1225.52
	Total	**-2115.28**	**-5138.03**	**3022.75**

Table 13: Process and Structure of Indian Textile Sector

Process 1	Procurement of Raw Material, ginning and extrusion of fibre	Spinning	Weaving/ Knitting	Processing	Apparel making	Distribution/ Retailing
Process 2	Ginning and cleaning machines	Spinning mills	Weaving and knitting units	Processing units	Apparel design and making	Outlets/ Stores
Output	MMF, Cotton, Jute, Silk, Wool	Yarn	Fabric	Processed Fabric	Garment	
Units		1,135 small and 1,564 large scale	Handlooms- 3.9 million Power-looms- 1.8 million	2100	7700	
Remarks	Fairly large, organised & financially strong	Large capacity fragmented	Weak and unorganized	Some large players	Fragmented consolidating	Fairly organized

Source: Adapted from AJNIFM, 2022 Report
http://texmin.nic.in/sites/default/files/GST%20Guidelines%20Textiles.pdf

Table 14: Output Loss in the Indian Textile Sector Due to Trump-Era Tariffs on U.S. Imports

Sector	**Effect of Export Demand Shock (Values in Million US$)**

	Direct Effect	First Order Indirect Effect	Total Effect (Direct + Indirect)
Textile	-6641.916	-1417.980	-8059.897

Note: The textile sector here aggregates two textile-related industries from the Indian Input–Output Table: Textiles & Ginning, and Apparel.

Table 15: Impact of the US Tariff Shock on the Upstream Industries (Backward linkages) for Indian Textiles

Si. No	Industry	Input Coefficients (Textile Aggregate)	First Order Indirect Effect (decline in Million US$)	% of Total First Order Indirect Effect
1	Textiles & Ginning	0.206	1366.380	29.65
2	Chemicals	0.106	703.803	15.27
3	Agriculture	0.089	593.794	12.88
4	Trade	0.085	562.672	12.21
5	Other Manufacturing	0.046	306.315	6.65
6	Electricity	0.035	234.773	5.09
7	Construction	0.033	221.284	4.80
8	Financial Services	0.020	129.855	2.82
9	Road Transport	0.018	117.305	2.55
10	Apparel	0.008	51.600	1.12
11	Coal Mining	0.008	50.745	1.10
12	Transport Support Services	0.005	35.704	0.77
13	Insurance	0.004	29.694	0.64
14	Petroleum Refining	0.003	22.605	0.49
15	Rail Transport	0.003	21.446	0.47
16	Transport Equipment	0.003	21.203	0.46
17	Rest of The Economy	0.021	139.801	3.03
	Total	**0.694**	**4608.978**	**100.00**

Note: The "Textile Aggregate" combines two industries from the Indian Input–Output Table: (i) Textiles & Ginning and (ii) Apparel.

Annexure 1: Tariff Assumptions and Competitor Countries in the Simulation

For the simulation exercise, we compiled newly announced country-specific tariff rates from the BBC News[10]. For countries where no specific rate was announced, we assumed a uniform tariff increase of 10 percent. These rates - whether announced or assumed - are applied as increments over the existing applied tariffs.

The base-year (2023) tariff data for each HS 6 Product in textile sector were sourced from the *ITC Market Access Map*[11]. By adding the announced or assumed tariff increase to the 2023 applied tariffs, we constructed the effective counterfactual tariff rates for each HS-6 product, specific to each exporting country.

All competing countries exporting textiles to the U.S. market are included in the simulation analysis. This ensures a comprehensive assessment of the relative tariff changes faced by India vis-à-vis its global competitors.

While the simulation is conducted at the HS-6 product level within the textile sector, Table A1 summarizes two key elements: (i) the recently announced country-specific tariffs, and (ii) the simple average of the resulting effective tariff rates across HS-6 textile products. These figures are reported for India and its major competitors in the U.S. textile market to provide a broader perspective on the country-level tariff structure.

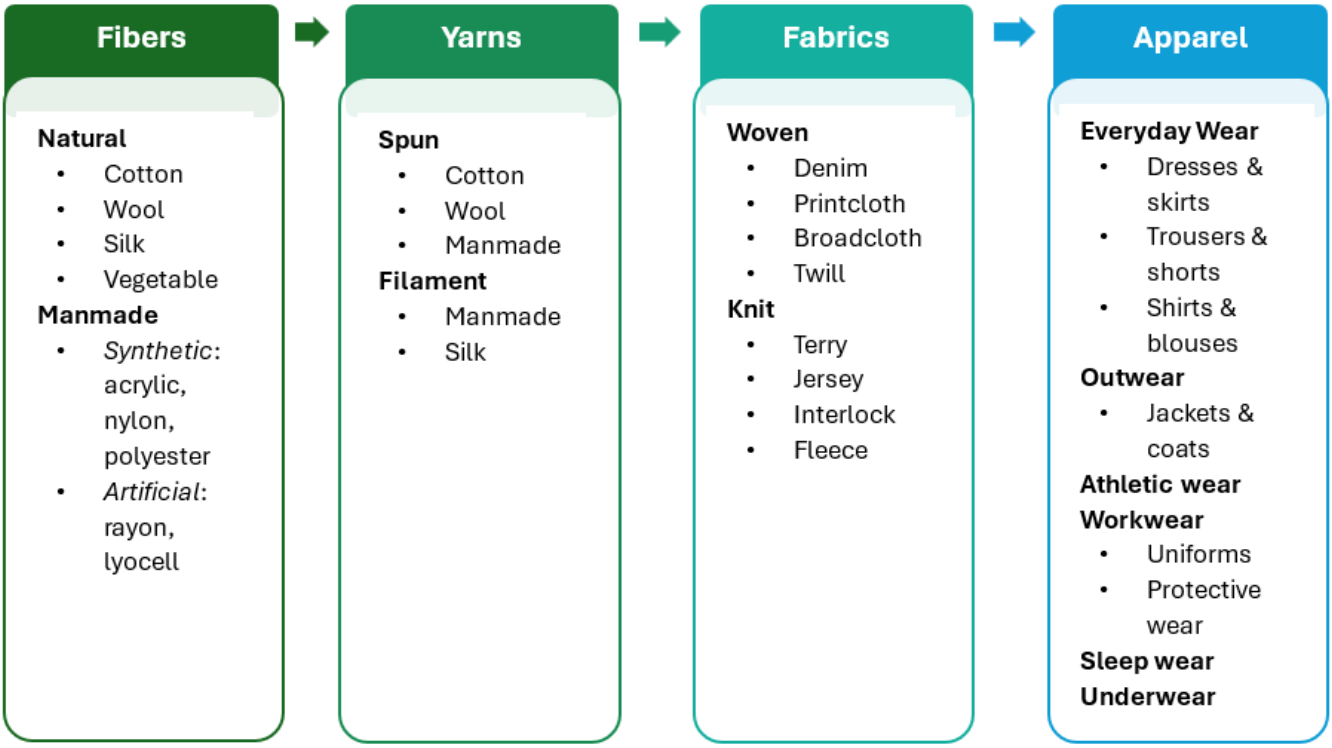
Table A1- Tariff Rates for India and Major Competing Countries in the U.S. Textile Market

Counterfactual Tariff Rates for India and Major Competing Countries in the U.S. Textile Market		
Exporter Countries	**Announced tariff Rates**	**Average Effective Reciprocal tariff**
India	50.00% (25%)	58.95 (33.95%)
Bangladesh	20.00%	29.98%
China	30.00%	38.96%
Italy	15.00%	23.99%
Cambodia	19.00%	29.41%
Pakistan	19.00%	28.41%
Vietnam	20.00%	29.31%

[10] https://www.bbc.com/news/articles/c5ypxnnyg7jo
[11] https://www.macmap.org/

Annexure 2: Textile Value Chain

Figure 1: Textile Value Chain



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