

Easy to Apply Analytical Frameworks for FTAs: Facilitating Evidence Based Stakeholders Discussions

WORKING PAPER
CRIT/CWS Working Paper Series No. 78



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November 8, 2024¹

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¹ Cite this paper as: Banerjee. P, Sharma. P, Babbar. R (2024), "Easy to Apply Analytical Frameworks for FTAs: Facilitating Evidence Based Stakeholders Discussions", Working Paper Series, No: 78, Centre for WTO Studies, Centre for Research in International Trade, Indian Institute of Foreign Trade.

Easy to Apply Analytical Frameworks for FTAs: Facilitating Evidence Based Stakeholders Discussions

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Abstract

All major economies over the years have transitioned from trade restrictive policies to actively engaging in Free Trade Agreements. While the Uruguay round of the WTO played its part in trade liberalization for goods, most of the subsequent progress in countries making binding commitments on tariff elimination or reduction have come through Free Trade Agreements. The literature has shown that such binding commitments have played a major role in deepening of global value-chains (GVCs) and fostering trade and investment linkages that lead to such deepening of GVCs. But trade liberalization through tariff reduction has consequences. It can lead to trade diversion away from the most efficient import sources, provide a sudden demand shock to a domestic sector of industry leaving thousands without jobs. If such an industry is concentrated in a specific sub-region of a country, it can have long-term impact on poverty and development outcomes in that region extending to two or more generations. It might lead to a demise of specific industries providing key intermediates that leave national supply-chain vulnerable in the longer-run due to dependence on imports. For developing countries trying to move-up the value-chain, such decisions are even more complicated, requiring strategic foresight to balance short-term protection needs in key sectors that would lead to economies of scale and longer-term competitiveness.

Thus, modern-day FTAs requires well-considered inputs from both industries and policy makers that minimize short-term negative consequences and optimize longer-term gains. The paper introduces simple analytical methods that are easy to understand and use by concerned stakeholders that help look at a wide range of possible factors that influence trade liberalization choices to enable evidence based objective decision making. These analytical methods are intuitive and are customizable to specific sectoral or regional contexts. While standard analysis of trade based on partial or general equilibrium, or gravity models can provide critical insights, a less technical and more intuitive approach would be useful for a wider range of stakeholders. The paper provides such simple analytical approaches for both Pre and Post Facto Analysis of FTAs. The Pre Facto analysis includes a Vulnerability Index to identify major sensitive products, categorizing them as vulnerable or non-vulnerable for specific trading partners. The Post Facto Analysis section evaluates the agreement's performance after implementing using trend analysis.

Keywords: Free Trade agreements, Impact Assessment, Vulnerability Index, Trend Analysis

Acknowledgement

We sincerely thank Shri L. Satya Srinivas, Additional Secretary of the Ministry of Commerce and Industry, for his invaluable insights and the initial inspiration that shaped this paper. Our gratitude also goes to Dr. Aishwary Gupta, a consultant at APEDA, for his significant contributions. Additionally, we appreciate Mr. Satwik Gupta, student from Dayal Bagh Educational Institute, Agra, for his dedicated support as an intern, which was essential to the successful completion of this work.

Table of Content

I. Introduction: The Importance of Sector and Product Specific Understanding for Free Trade Negotiations 5-10

Pre-FTA Analysis

II. Vulnerability Index: A Multi-Factor Perspective of Product-Level Sensitivity to Trade Liberalization 10-42

- *Methodology*
- *Economic Logic Underlying the Application of Vulnerability Indicators (VIs)*
- *Analysis, Observations, and Results*
- *Conclusion: Pre-FTA Analysis*

Post-FTA Analysis

III. Trend Analysis 43-66

- *Utilization and Import Surges*
- *Methodology, Estimation, and Forecast*
- *India-UAE, CEPA, Import Side Analysis*
- *India-UAE, CEPA, Export Side Analysis*
- *India-Korea, CEPA, Import Side Analysis*
- *India-Korea, CEPA, Export Side Analysis*
- *Conclusion: Post-FTA Analysis*

IV. Policy Recommendation and Conclusion..... 67-69

- *Final Observation*
 - *Developing Shared Understanding and Approach Facilitating Debate and Efficient Trade-Offs*
 - *Synchronization Between Trade and Industrial Policy*
 - *Effective Monitoring is Essential to Optimal Use of FTAs*

V. References..... 70-71

VI. Annexure I, II, and III72-74

VII. About the Authors.....75

I. Introduction: The Importance of Sector and Product Specific Understanding for Free Trade Negotiations

By definition, a Free Trade Agreement (FTA) is a treaty or contract between two or more countries in which they mutually agree upon reducing trade barriers that includes the reduction or elimination of tariffs. FTAs have the potential to allow expansion of international trade by allowing countries to specialize in goods and services, thereby increasing productivity and efficiency. Binding tariff commitments typically provide greater certainty to businesses to invest in specific sectors or supply-chains leading to the deepening of GVCs without the risk of sudden increases in applied tariffs on key imported inputs needed for their industrial or commercial operations.

But trade liberalization can have a serious impact on specific sectors of the economy due to sudden or very severe exposure to foreign competition, leading to the decline of that entire sector and the loss of livelihoods associated with it. Since factors of production are not fully mobile and fungible across sectors, especially in the short to medium term, such shocks can have serious implications for both workers and investors. If the impacted industry is clustered in a specific region of the country, this can lead to serious negative economic consequences for the regional economy, with the effects of such trade induced de-industrialization lasting up to two or more generations.

The impact of trade liberalization can also differ by the scale and size of economic actors involved. For example, medium or smaller players might have thrived in a county in certain niche industries due to policy decisions over time, but tariff elimination in those sectors can expose these small and medium players to very large producers having massive economies of scale and therefore posing serious challenges to these small and medium domestic actors.

As developing countries try to move up the value chains to create middle-class livelihoods for most of their working demographic, there are strategic trade-offs that need to be made. Certain sectors need to be protected and supported by industrial policy in the short term for it to grow the economies of scale and technology absorption capacity that would allow longer-term competitiveness.

For large developing economies seeking FDI in strategic sectors where technology and skill spillovers from such FDI will allow the development of industrial eco-systems that support the industries of the future, strategic decisions to protect certain sectors in the short term might create much stronger incentives for prospective lead global players to invest in the economy to access the large domestic market, which they otherwise could have served through exports.

But protecting certain sectors that serve as key intermediates to other product groups can lead to a situation of ‘inverted duties’ with the value-added downstream product being made less competitive due to expensive imports resulting from continued high duties being charged on the upstream intermediate goods needed for its production. This will result in the value-added downstream product being exposed to more competition due to tariff elimination from the FTA and, at the same time, facing increased competitive pressure due to continued high tariffs being levied on the intermediate items it requires for its production.

In other words, tariff liberalization has multiple and varied implications across sectors in the short-term, and such short-term impacts often determine the longer to medium term pathways by creating a specific set of incentives or disincentives for businesses to invest or take risks. Thus, it is no surprise that stakeholders across businesses (and civil society) have a keen interest in FTA negotiations with a view to ensuring that their interests are protected.

But even more interestingly, different arms of the government might have different and often conflicting priorities vis-à-vis an FTA given their specific objectives. For example, a Ministry charged with the development of a specific sector might require cheaper imports of steel or man-made fibers and see tariff elimination in these areas in their interest. On the other hand, Ministry overseeing Steel or Petrochemical sectors might perceive that very choice to be a threat to the sectors they are responsible for. Thus, interest group dynamics are critical to trade policy outcomes.

Olson (1971) had demonstrated the importance of interest groups in public policy making. A key observation by Olson was that smaller groups with focused objectives were more likely to succeed in acting collectively to influence policymaking compared to larger groups with greater variation in their objectives. Thus, specific sectoral or regional interests have an important and influential role to play in policy-making, including trade policy choices for FTAs.

The influence of sectoral interests and lobbying in the sphere of trade policy has been well documented by Grossman and Helpman (2002), Hall and Deardorff (2006), Drope and Hansen (2004), Eckhardt and Poletti (2016), Dur (2008) and Dur et al. (2022), among others. The structure of decision making within government and ability to influence key decision makers also have role to play in final outcomes from trade negotiations.

Ehlich (2008) examined how delegation of trade negotiations to the President of the United States reduced the access and influence lobbyists had compared to when decision making was with the US House of Representatives, and it was this institutional change rather than any change of preferences that led to US policy becoming more pro-trade liberalization.

Different sectoral interests can also be antagonistic vis-à-vis each other. Even the interests of small and medium enterprises might differ from the larger firms within the same sector. Such divergent interests of large industries and medium and smaller firms within the same broad sector, as has been documented by Park and Hwang (2023).

In many cases two large dominant firms in the same sector might have different interests given the nature of their supply-chains. A firm that is vertically integrated in its domestic operations will have a very different set of interests compared to a firm that sources inputs from contract manufacturers and depends upon an international supply-chain or has expanded operations through horizontal integration (i.e., acquisition) of firms located outside the country. Banerjee (2007) and Roy, Banerjee and Mahanta (2013) have documented how sectoral trade interests have had effective and sustained influence on trade policy outcomes in India, including for FTA negotiations.

The trade policy choices in terms of which sectors to protect and which to liberalize, and the sequence of such liberalization (whether tariff reduction should be immediate or staggered over a period of time) are key to economic outcomes and can be the result of economic prioritization, effective lobbying by interest groups or both. These choices will determine the nature of sectoral growth and employment, the depth of integration with GVCs including the nature and scope of value-addition activities, investment choices by domestic and foreign businesses, the pathways to technology acquisition or dependency, and the nature of export competitiveness and import dependency in the longer-run.

Modern FTAs require that a very large proportion of tariff lines (90% or more) are liberalized. India's most ambitious FTAs have not liberalized more than 85% of its tariff lines, but the

country would face increasing pressure in the future to move towards more ambitious coverage. This essentially means that the available choices of which products (and sectors) to protect, or which products to provide some temporary protection, would be limited to a very few tariff lines.

Thus, sectoral prioritization and the choice of extending protection (through exclusion from tariff liberalization) or providing some transition time before tariff liberalization takes effect would have to be very targeted and reflect the strategic longer-term interests of the country. With this critical requirement in mind, the authors feel that there is a need for an analytical framework that is relatively simple to understand and use, and which can serve as a basis for conversation between stakeholders and policymakers representing a wide array of interests and policy priorities.

Computable General Equilibrium (CGE) models that seek to provide macroeconomic implications of shocks to the system, for e.g., due to tariff reduction from FTAs miss out on a lot of sector and product specific nuance. This is due to limitations on having the kind of comprehensive and up to date data required to analyse economy wide effects covering trade, production and consumption at a detailed sectoral level. There is also the complexity of modelling a large number of sector and region-specific contexts.

Customization of such models to reflect the full gamut of contextual factors in an economy is a skill and resource intensive exercise. The wider stakeholder community are unable to use and apply such models and would often be equally challenged in effectively interpreting the results of such analysis given their technical complexity, and therefore they are less likely to be convinced by its results.

Such scepticism is also not fully without legitimate cause. Given the resource intensive nature of developing CGE models, most researchers typically use ‘off the shelf’ readymade CGE models such as the popularly available GTAP (Global Trade Analysis Project). Off the shelf models like GTAP are very generic in nature and therefore subject to many simplifying assumptions that do not fully and effectively reflect the objective reality of a given economy or specific sectoral conditions.

While partial equilibrium analysis can account for sector and even product specific impacts of trade liberalization, it is difficult to model in multiple competing factors and assumptions that reflect the true complexity of tariff liberalization and the trade-offs between sectoral interests

(both inter and intra-sector) as well as short vs. longer term priorities. The assumptions of such partial equilibrium models are also subject to data limitations. Finally, while less complex compared to economy wide general equilibrium models, applying and interpreting them also require familiarity with relatively complex methodologies and technical skills.

The methodologies discussed subsequently in this paper is an attempt to develop an approach that is much more intuitive, easy to apply and interpret and largely customizable by users. The assumptions in the model can be tweaked very easily depending on the understanding of a specific stakeholder of the current context of their sector. These approaches allow customization specific to a wide range of policy objectives and priorities or the importance of a specific economic indicator. Most importantly, this approach can be extended to include ever increasing number of economic and political-economic factors or policy priority related nuances.

We believe that a wide range of stakeholders would find these approaches a useful tool to analyse the potential impact of trade liberalization prior to an FTA, or the post FTA impact on their sectors. These approaches provide an evidence-based methodology that can be easily customized to reflect the objectives and outcomes important to individual stakeholders. In a sense then, the application of this methodology by different stakeholders would reflect the different assumptions of different groups. This should not be seen as a short-coming, since the application of a common approach differentiated only by its contextualization provides the basis for further discussions and debate among competing interests, which is the essence of public policy decision making in a democracy like India.

It is our hope that the relative simplicity of its use and customization shall lead to its widespread adoption, allowing different stakeholders adopt a common analytical framework that facilitates a dialogue between them based on commonly understood concepts and terminology. This will in turn enable them to better represent their specific concerns, and in doing so allow more objective and productive exchange of views using this common framework leading to more efficient trade policy choices. Hopefully it will also be able to drive stakeholders towards a shared understanding of which sectors are more deserving of short- or longer-term protection, and which need to be liberalized based on data and evidence.

The work of policymakers does not stop once a FTA has been negotiated and has come into force. Neither do the challenges to individual sectors and stakeholders arising from a constantly changing economic environment. It is therefore important to have a similarly easy to

understand and customizable tool for the evaluation of the impact of an FTA. It is especially important to estimate an FTAs actual impact against initial expectations or projections from that agreement. This can help determine whether the FTA has achieved its objectives and what precautionary adjustments are needed. The sections that follow presents analytical tools that are easy to understand, customize and use for both pre and post FTA analysis.

Pre-FTA Analysis

II. Vulnerability Index: A multi-factor perspective of product level sensitivity to trade liberalization

To meet the requirement of WTO (Article 24), FTAs between countries are required to cover substantial trade. While ‘substantial’ has remained subject to interpretation, i.e., there is no clarity whether this is interpreted has liberalizing substantial majority of tariff lines (which might exclude a few of the lines where actually most of trade takes place), or tariff lines accounting for most of the trade.

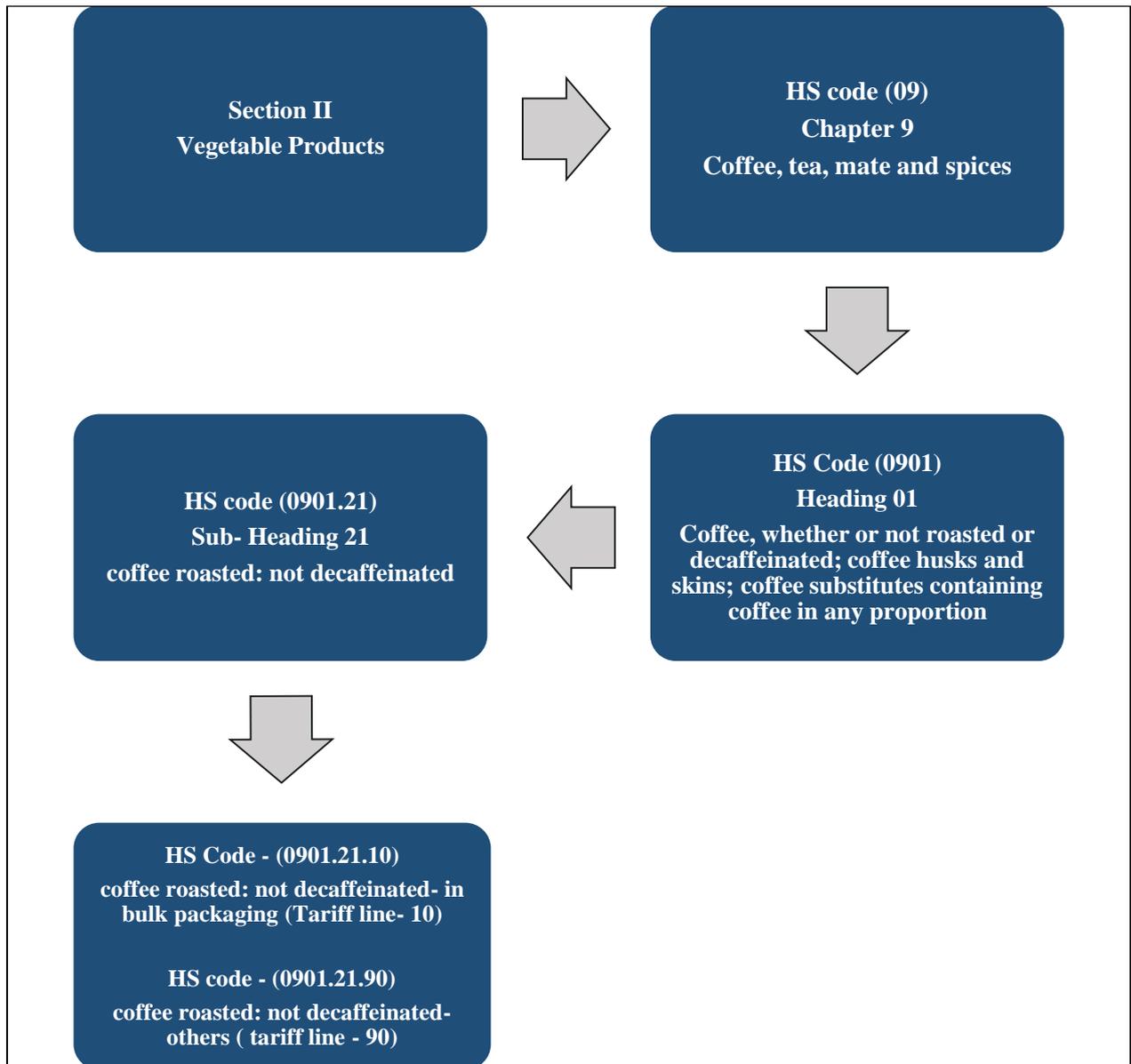
However, over time FTA partners have come to expect that a significant number of total tariff lines will be liberalized, either at the time of entry into force of the FTA, or over a agreed period of time. In operational terms, this means that countries can typically chose to keep no more than 10% to 20% of tariff lines pertaining to specific products out of the FTA commitments, i.e., not extend any tariff reduction under the FTA to imports from the FTA partner country for those lines.

It is therefore imperative that countries use this flexibility in a manner that is optimal. This would require the eco-system of stakeholders to identify those sectors that are most vulnerable to import competition from the FTA partner in question, and therefore continue to have tariff protection.

The analysis is aimed towards identifying the degree of vulnerability for specific products with respect to imports from a particular country/country. Tariff lines are the most precise level of product description being used by a country. In the case of India, tariff lines are defined at the HS 8 level of disaggregation. Products are globally defined in a harmonized manner up to the

HS 6 level of disaggregation by World Customs Organization (WCO). The table below shows a demonstrative example of the manner in which the classification of products becomes narrower and more precisely defined as we increase the level of disaggregation.

Figure 1: Detailed example of HS Classification



However, it is not always necessary that a country will have its tariff lines at the 8- digit level of disaggregation as some countries have their Tariff lines at 10 – digit level and 12- digit level

as well. The disaggregation at the tariff line level is as per the discretion of the Country. In our analysis, we shall be defining products at the tariff-line level in India, i.e., at HS 8-digit level code².

Methodology

Product level vulnerability is defined as a function of number of factors that should influence the decision whether to open up a particular product to import competition or whether to keep it excluded from tariff liberalization. These factors are a combination of issues of trade competitiveness and policy-based concerns that reflect national or sectoral priorities. While the examples we use subsequently to explain our approach takes into account certain factors, other factors can be included, while others excluded given the specific context of the challenges and policy objectives that the analysis would like to explore. In other words, this approach is an open system that can be continuously improved based on experience, new insights and availability of new data.

Each of the factors, or vulnerability indicators (VI), represents a specific area of concern or priority and supported by its own economic reasoning. A vulnerability score is assigned to each product at the tariff line level basis a scoring system based on this economic reasoning. The scoring system assigns higher scores for higher vulnerability to tariff liberalization. Each vulnerability indicator (VI) is assigned certain weights³ to calculate the final vulnerability score for each product tariff line, i.e., the final vulnerability score for a product is the weighted sum of all the scores for all vulnerability indicators.

These weights can be changed based on context to allow for scenario building. For example, greater weight can be given to the vulnerability indicator that captures the level of market dominance enjoyed by FTA partner country for that product, or whether that product is a natural resource. Of course, this distribution of weights to be given to different Vulnerability Indicators is driven by the relative importance that a particular indicator may assume during an analysis depending on the nature of the partner country, geopolitical context, or the socio-economic issues that are considered most important in that specific context.

² However, some indicators would be considered at the HS 6 or sub-heading level given data limitations.

³ This is highly subjective in nature considering the purpose for the analysis and Partner Country selected for the analysis.

But this ability to change weights can therefore allow for an exploration of multiple scenarios based on economic or even political-economic considerations. Based on the pattern of weights assigned to each of the VIs, the final Vulnerability score is calculated to identify the number of Vulnerable product lines after selecting a cut off value³. Product Lines⁴ with a Vulnerability score equal to at least the cut off value determined are finally regarded as the identified Vulnerable product lines.

Economic Logic Underlying the Application of Vulnerability Indicators (VIs)

In our example, the vulnerability score is a combination of 17 VIs that can be generalized to an extent when used for the identification of Vulnerable and Non-Vulnerable product lines with respect to different partner countries. As indicated earlier, the list of such VIs can be extended or reduced depending on the circumstance and focus of the analysis concerned. We provide a brief description of the VIs used in our examples and the associated economic reasoning.

1. Given Country's Customs Duty/Tariff Rates

MFN Tariff rates or customs duties are the duties levied on imports when they enter a country's territory. A higher custom duty on a product typically indicates that the policy makers in that country consider the product more vulnerable to competition and thus have protected domestic industry with a higher level of domestic protection. It follows that higher the applied rate of MFN customs duty, more vulnerable the product. A maximum score of 5 is assigned to indicate the most sensitive product lines in terms of their very high tariff rates, and lower scores are assigned to products with lower applied rates.

Vulnerability Indicator (VIs) Number	Generic Vulnerability Indicator (VI)	Vulnerability Indicator (VIs)	Scoring Parameter
1	Given Country's Custom Duty Rates/Tariff rates	India's Customs Duty/Tariff Rates	$< 7.5\% = \text{Score of } 1$ $(7.5\% - 15\%) = \text{Score of } 2$ $(15\% - 30\%) = \text{Score of } 3$ $\geq 30\% = \text{Score of } 4$ Non-Ad-Valorem Duties = Score of 5

⁴ For greater certainty, the number of Vulnerable product lines is likely to change if the circumstances of the analysis will change i.e., if the cut off value is changed, it is likely to give us certain permutations of the number of Vulnerable Lines or if there is an increase or decrease in the number of VIs chosen for the analysis, it is also likely to lead to different results.

2. Given Country's reliance on China as one of its Top 3 Suppliers

This indicator has been included as a VI to determine the extent of a country's import dependence on China. If China is in the top 3 as a source of imports for a given product line, providing preferential market access to the FTA partner by reducing tariffs might help reduce dependence on China as a source of imports, and the FTA partner can emerge as an alternative source of imports. In essence it allows diversification of the import basket to help facilitate greater supply-chain resilience. In this case, higher the import dependence on China, lower is the VI score vis-à-vis the FTA partner.

Vulnerability Indicator (VIs) Number	Generic Vulnerability Indicator (VI)	Vulnerability Indicator (VIs)	Scoring Parameter
2	Given Country's reliance on China as one of its Top 3 Suppliers	India's reliance on China as one of its Top 3 Suppliers	Product Lines where China is one of India's Top 3 Suppliers, then those products have been assigned a score of (-3).

3. Given Country's reliance on its existing FTA Partners as one of the Top 3 Suppliers

This indicator has been included as a VI to determine a country's dependence on its FTA partner countries (i.e., those countries with whom FTAs have already been signed by the given country) as one of its Top 3 Suppliers. If tariff concessions have already been given to existing FTA partners and these countries have cornered a large share of India's import market, it makes sense to foster healthy competition and allow other FTA partners the same privilege. In this case, higher the share of FTA partners in India's import basket, lower is the VI score vis-à-vis the FTA partner.

Vulnerability Indicator (VIs) Number	Generic Vulnerability Indicator (VI)	Vulnerability Indicator (VIs)	Scoring Parameter
3	Given Country's reliance on its FTA Partners as one of the Top 3 Suppliers	India's reliance on its FTA Partners⁵ as one of the Top 3 Suppliers	Product Lines where India's FTA Partners are one of India's Top 3 Suppliers, then those products have been assigned a score of (-3)

4. Partner Country as one of Given Country's Top 5 Suppliers

This VI essentially indicates the importance of the partner country in the given country's import profile. It makes sense to assign a considerably higher vulnerability score to those products for which the given country would have a higher import volume from the partner country as reduction or elimination of tariffs can possibly lead to import surges. This indicator is measured through as combination of two factors considered together namely – Given Country's Import volume from the Partner Country is greater than a cut off value selected based on the bilateral trade data points; and Partner Country is one of the Top 5 Suppliers to Given Country.

Vulnerability Indicator (VIs) Number	Generic Vulnerability Indicator (VI)	Vulnerability Indicator (VIs)	Scoring Parameter
4	Partner Country as one of India's Top 5 Suppliers	South Africa as one of India's Top 5 Suppliers	<p>Combination of 2 factors taken together in this indicator –</p> <p>India's Imports from South Africa at HS 8-Digit level of disaggregation (averaged from 2020-2022) \geq 0.2 USD Million; and South Africa is one of the Top 5 Suppliers to India</p> <p>If both these conditions are fulfilled, then those product lines have been assigned a score of 2</p>

⁵ India's previous FTA Partners considered here include Australia, UAE, Japan, Korea, Mauritius, Singapore, ASEAN and Malaysia.

5. Share of partner country in global exports

This VI examines the global exports share of the Partner Country and product lines with a share equal to at least 50% are considered as highly vulnerable. A larger global market share of the Partner Country in a particular product line demonstrates the probable strength a country in exporting those products. This VI is essentially a proxy to capture whether the partner country is a dominant player in the global market for that product line. It stands to reason that if this is the case, a tariff reduction due to FTA can potentially lead to an import surge.

$$\text{Global Export share} = \frac{X_{ij}}{X_{wj}}$$

where,

X_{ij} = Partner's Country export to world of commodity j

X_{wj} = World exports to world of Commodity j

Vulnerability Indicator (VIs) Number	Generic Vulnerability Indicator (VI)	Vulnerability Indicator (VIs)	Scoring Parameter
5	Partner Country's Global Export Share	South Africa's Global Export Share	(0% - 10%) = Score of 1 (10% - 20%) = Score of 2 (20% - 40%) = Score of 3 (40% - 50%) = Score of 4 ≥ 50% = Score of 5

6. Product Category⁶

Products fall into four categories: consumer goods, capital goods, intermediate goods, and raw materials. Since natural resources and intermediate goods support domestic production and help develop competitiveness through backward integration with global value-chains, these categories of goods are accorded a lower VI score. On the other hand, capital goods, and even more so consumer goods, are more likely to compete with the country's domestic industry.

⁶ Of course, capital goods are essential to production, so an added caveat in the scoring is that in case of product lines that where share of imports as percentage of domestic production is greater than 75%, i.e., the country remains dependent on imports, and there is no PLI scheme for such products, capital goods are given the same low score accorded to natural resources (i.e., considered an essential import).

Vulnerability Indicator (VIs) Number	Generic Vulnerability Indicator (VI)	Vulnerability Indicator (VIs)	Scoring Parameter
6	Product Category	Product Category	Raw Materials = Score of (-3) Intermediate Goods = Score of 1 Capital Goods = Score of 2 Consumer Goods = Score of 5

7. Partner Country's Tariff Rates

If the partner country has a high level of tariff protection for a particular production line, it indicates that policymakers in the partner country consider this sector to be vulnerable to competition. In other words, the partner country is not competitive in this sector. Thus, products with higher applied duties in partner country are accorded a lower VI score.

Vulnerability Indicator (VIs) Number	Generic Vulnerability Indicator (VI)	Vulnerability Indicator (VIs)	Scoring Parameter
7	Partner Country's Tariff Rates	South Africa's Tariff Rates	Non-Ad-Valorem Duties = Score of 1 ≥ 30% = Score of 1 (15% - 30%) = Score of 2 (5% < 15%) = Score of 3 < 5% = Score of 4

8. High-Technology Products

Product lines that are categorized as High Technology Products have been assigned a score of 0. The assumption is that the country needs to import key technologies and therefore increasing imports is not a concern. But this is conditional on the level of import dependence and PLI. If the high-technology products are competing with domestic industry (i.e., share of imports as a percentage domestic production is lesser than 75%), or it is a sector where PLI scheme exists, it is given a score of 5. This is because the broad policy objective would be to ensure that domestic capabilities are developed for high-technology products that represent industries of the future where the country would like to developed economies of scale and become competitive. Tariff barriers in the short to medium term will not only protect existing domestic players giving them the space to grow, it is also likely to induce tariff jumping FDI as foreign

player seek access to domestic markets, creating opportunities for technology transfers and spillovers.

Vulnerability Indicator (VIs) Number	Generic Vulnerability Indicator (VI)	Vulnerability Indicator (VIs)	Scoring Parameter
8	High Technology Products	High Technology Products	Product lines that are categorized as High Technology Products and where India has provided domestic production linked incentive scheme (PLI) have been assigned a score of 5 Product lines that are categorized as High Technology Products have been assigned a score of 0

9. Compound Annual Growth Rate (CAGR) of the Global Import Basket⁷

Compound annual growth rate, or CAGR of global import demand for that specific product is higher, it implies that the demand for that product is going up. Products have been given a greater Vulnerability Score based on their higher CAGR value since they represent product lines that will drive future import demand and developing domestic capabilities in these product lines to the extent possible would help the country emerge as a more successful and competitive economy with a higher share of the global export basket that responds to the global import demand. Short to medium term protection might help grow economies of scale and competitiveness, as well as attract tariff jumping FDI from players interested in the domestic market

⁷ It is imperative to highlight that two VIs namely CAGR of the Global Import Basket and the Scoring of trade values of the Global Import Basket have both been included in this analysis even though they appear to be identical to each other. There is a fundamental difference between the two indicators as the CAGR of the Global Import Basket is basically a scoring indicator for High growth product lines while the scoring of trade values of the Global Import Basket is a scoring parameter for products which have high trade values. Therefore, both these indicators have been used in the analysis as part of the 'High Value, High Growth' combination of products. Product Lines which exhibit both High trade values (indicative of high global demand) and High Growth have been assigned higher vulnerability scores. Further, it is important to include both of these indicators because there may be a situation when a product may exhibit high trade values but may not have high growth as well or vice versa and therefore, the inclusion of both these indicators separately has ensured that such cases are also given their due consideration in identifying product vulnerabilities.

Vulnerability Indicator (VIs) Number	Generic Vulnerability Indicator (VI)	Vulnerability Indicator (VIs)	Scoring Parameter
9	Compound Annual Growth Rate (CAGR) of the Global Import Basket⁸	Compound Annual Growth Rate (CAGR) of the Global Import Basket⁹	<p>< 1% = Score of 1</p> <p>(1% - 5%) = Score of 2</p> <p>(5% < 10%) = Score of 3</p> <p>(10% < 14%) = Score of 4</p> <p>≥ 14% = Score of 5</p>

10. Product lines under Given Country’s Domestic Production Incentive Scheme

This VI has been included to ensure that the impact of domestic production incentive schemes of a country on their importing capacity and sensitivities is adequately recognized in this methodology. Domestic production incentive schemes on different products are introduced by countries to drive domestic economies of scale and competitiveness in sectors of strategic interest. Tariff liberalization through FTAs in these sectors prior to their having attained such scale and competitiveness can pose a plausible threat to the emergence of that industry for which schemes have been rolled out and public money invested. Since such schemes often target FDI, the ability to attract tariff jumping FDI driven by the attractiveness of the domestic market might also be compromised. Therefore, product lines where the given country is providing such schemes have been assigned a higher Vulnerability Score.

Vulnerability Indicator (VIs) Number	Generic Vulnerability Indicator (VI)	Vulnerability Indicator (VIs)	Scoring Parameter
10	Product Lines under a Given Country’s Domestic Production Support Scheme or Export Incentive Scheme (if any)	Product Lines under India’s Production Linked Incentive (PLI) Scheme	Product lines where India has provided incentives under the PLI Scheme have been assigned a score of 5

⁸ This has been calculated on World Imports from World at HS 6-Digit level of disaggregation averaged from 2020-2022

⁹ This has been calculated on World Imports from World at HS 6-Digit level of disaggregation averaged from 2020-2022

11. Global Import Basket^{10,11}

This VI has been used to incorporate the effect of globally demanded products on domestic sensitivities when it comes to providing market access concessions through an FTA. That is, products with higher trade value are fast growing products with a potential expected increase in future demand, and such products become important for any country from an export perspective and not from an import perspective. Therefore, product lines with a higher trade value (indicative of higher global demand) have been assigned a higher score of vulnerability.

Vulnerability Indicator (VIs) Number	Generic Vulnerability Indicator (VI)	Vulnerability Indicator (VIs)	Scoring Parameter
11	Global Import Basket ¹²	Scoring of trade Values under Global Import Basket ¹³	<p>< 1000 USD Million = Score of 1</p> <p>(1000 USD Million - 5000 USD Million) = Score of 2</p> <p>(5000 USD Million - 10000 USD Million) = Score of 3</p> <p>(10000 USD Million – 197527.88 USD Million¹⁴) = Score of 4</p> <p>≥ 197527.88 USD Million² = Score of 5</p>

12. Elasticity

Products with higher price elasticity of demand would be vulnerable to small changes in price due to tariff concessions. Three categories of elasticities have been established for products: those that are extremely elastic are the most vulnerable, those that are less elastic are mildly vulnerable, and those that are inelastic are not sensitive at all.

¹⁰ This has been calculated on World Imports from World at HS 6-Digit level of disaggregation averaged from 2020-2022

¹¹ It is imperative to highlight that two VIs namely CAGR of the Global Import Basket and the Scoring of trade values of the Global Import Basket have both been included in this analysis even though they appear to be identical to each other. There is a fundamental difference between the two indicators as the CAGR of the Global Import Basket is basically a scoring indicator for High growth product lines while the scoring of trade values of the Global Import Basket is a scoring parameter for products which have high trade values. Therefore, both these indicators have been used in the analysis as part of the ‘High Value, High Growth’ combination of products. Product Lines which exhibit both High trade values (indicative of high global demand) and High Growth have been assigned higher vulnerability scores. Further, it is important to include both of these indicators because there may be a situation when a product may exhibit high trade values but may not have high growth as well or vice versa and therefore, the inclusion of both these indicators separately has ensured that such cases are also given their due consideration in identifying product vulnerabilities.

¹² This has been calculated on World Imports from World at HS 6-Digit level of disaggregation averaged from 2020-2022

¹³ This has been calculated on World Imports from World at HS 6-Digit level of disaggregation averaged from 2020-2022

¹⁴ 208034.37 USD Million is equivalent to 1% of total average trade (World Imports from World averaged for 2020-2022).

Vulnerability Indicator (VIs) Number	Generic Vulnerability Indicator (VI)	Vulnerability Indicator (VIs)	Scoring Parameter
12	Elasticity	Elasticity	Elasticity < 0 = Score of 0 (0 < Elasticity < 1) = Score of 1 Elasticity > 1 = Score of 5

13. Business Cycle

This VI has been used an indicator representative of fluctuations in global demand for a product line using the economic concepts of standard deviation, coefficient of variation and Mean (Average). A higher value of standard deviation and subsequently, the coefficient of variation means that there is a relatively higher level of global fluctuations/variations in the demand for that product. Since tariff liberalization can result in greater dependence on imports to meet domestic demand, opening up these sectors will typically result in getting exposed to uncertainty and fluctuations of the global market

Vulnerability Indicator (VIs) Number	Generic Vulnerability Indicator (VI)	Vulnerability Indicator (VIs)	Scoring Parameter
13	Business Cycle	Business Cycle	For product lines where Standard deviation > Mean and the coefficient of Variation ≥ 100% = Score of 3 For product lines where standard deviation < Mean and the coefficient of Variation < 100% = Score of 0

14. Export Intensity

Export Intensity¹⁵ helps to establish whether a country is exporting more than it normally would to another trading partner. It can be calculated on an aggregate bilateral level with the following formula:

$$ex_{ij} = \frac{\text{Share of imports of country } j \text{ from country } i}{\text{Share of } j \text{ in total world imports}}$$

¹⁵ This has been calculated using the formula given in the attached file.
https://www.tips.org.za/files/basic_templates/Trade%20Indicator%20Guide.pdf

$$ex_{ij} = \frac{\frac{X_{ij}}{X_i}}{\frac{M_j}{(M_w - M_i)}}$$

X_{ij} = total exports of country i to country j

X_i = total exports of country i

M_i, M_j = total imports of i and j

M_w = total world trade

The result will show how the share of country i exports imported by country j compares to the share of country j imports in total world trade, in other words, how it compares to the share of total world exports imported by j. This indicator has been used to illustrate the relationship between the Partner country's imports and exports from India in relation to the overall share of global commerce. This VI shows a relative productive strength of the given country as it has already acquired a share in the partner country's imports. The Vulnerability Score is 0 for products where the Export Intensity is more than 1. This indicates that the partner country is already importing more from the given country and therefore, those products can be considered as less vulnerable for the given country. 5 is the maximum score allotted to this VI.

Vulnerability Indicator (VIs) Number	Generic Vulnerability Indicator (VI)	Vulnerability Indicator (VIs)	Scoring Parameter
14	Export Intensity	Export Intensity	Value of Export Intensity > 1 = Score of 0 Value of Export Intensity < 1 = Score of 5

15. Transaction Velocity in the Given Country

This VI measures transaction velocity by looking at the number of customs declarations for import or Bills of Entry (BoE) filed by importers of the given country at the national tariff line of the given under the parent HS 6-Digit product code. A higher number of BoEs for a particular product is representative of the fact that a larger number of people from the trading community are already importing the product and the effects of a plausible liberalization through the proposed trade agreement is likely to be distributed over a larger set of importers in the given country. The scoring of 0 and -1 has been used for this VI.

Vulnerability Indicator (VIs) Number	Generic Vulnerability Indicator (VI)	Vulnerability Indicator (VIs)	Scoring Parameter
15	Transaction Velocity in the Given Country	India's Transaction Velocity	Number of Bills of Exchange filed at HS 8-Digit tariff/product line ≥ 1000 = Score of (-1) Number of Bills of Exchange filed at HS 8-Digit tariff/product line < 1000 = Score of 0

16. Transaction Width in the Given Country

This VI measures transaction width by looking at the number of Import Exporter Code (IEC) Holders that are importing a particular product at the national tariff line of the given under the parent HS 6-Digit product code. If a particular product is already being imported by a higher number of traders, it is clearly indicative of the given country's dependence on imports for that product and therefore, such products would be relatively less sensitive as the elimination or reduction of duties on such products might help in maintaining cost efficiency of procuring the product to fulfill domestic needs. The scoring of 0 and -1 has been used for this VI.

Vulnerability Indicator (VIs) Number	Generic Vulnerability Indicator (VI)	Vulnerability Indicator (VIs)	Scoring Parameter
16	Transaction Width in the Given Country	India's transaction Width	Number of Unique Importer-Exporter Code (IEC) Holders who filed for the Bills of Exchange ≥ 500 = Score of (-1) Number of Unique Importer-Exporter Code (IEC) Holders who filed for the Bills of Exchange < 500 = Score of (0)

17. Given Country's Import Dependence

This VI measures the share of imports as percentage of domestic production in the given country as an indication of sensitivity of a product depending on the given country's import volume relative to domestic production levels. If the given country has a higher dependence on

imports for that product relative to levels of domestic production, it makes sense to treat the product as less vulnerable. The score range for this VI is (-5) to 0.

Vulnerability Indicator (VIs) Number	Generic Vulnerability Indicator (VI)	Vulnerability Indicator (VIs)	Scoring Parameter
17	Given Country's Import Dependence	India's Import Dependence	$\geq 10\%$ = Score of (-5) High $3 - 10 = -3$ (medium) $1 - 3$ (excluding 1) = -1 (low) $\leq 1\%$ = score 0

Demonstrated Example of applying this methodology

An example has been worked out in order to demonstrate how the vulnerability index is applied as an analytical tool. With respect to the following VI's, we consider the country whose product lines are being identified as the 'Given Country' namely India while the partner country with respect to whom the analysis has been carried out, will be considered the 'Partner Country' namely South Africa for this Analysis.

- Given country- **India.**
- Partner Country- **South Africa**

Since India has been identified as the 'Given Country', India's Vulnerable and Non-Vulnerable product lines at HS 8-Digit level of disaggregation have been identified with respect to South Africa as the partner country. For the identification of India's Vulnerable and Non-Vulnerable product lines, these 17 VIs have been customized to cater to the analysis of India and South Africa. The scoring parameters for the entire analysis have remained the same.

Range of scores used for Vulnerability Analysis

Vulnerability of a product line increases as the score assigned to a product line increases from (-5) to 5.

Analysis, Observations and Results:

All of India's HS 8-Digit product lines have been assigned scores under the 17 VIs and those 17 VIs have been further given/assigned some weights. The analysis has been carried out for two different scenarios where the weights attached to the different VIs have been distributed

in different ways. The use of different weights is to illustrate just one of the ways this approach is customizable. Annexures 2 and 3 have included the tables on distribution of weights to these 17 VIs under the different scenarios.

Final Weighted Vulnerability Scores of each product line are calculated using the weights assigned to the VIs used in the analysis and summed together for all 17 of the VIs. Based on the final scores, the different categories of scores have been christened in the following manner to identify the extent and degree of a product line's Vulnerability. Three categories of Vulnerable Product Lines have been formed for carrying out this analysis –

- Non-Vulnerable Product Lines/Product Lines with Low Degree of Vulnerability.
- Product Lines with Medium degree of Vulnerability and
- Product Lines with High Degree of Vulnerability.

Scenario – 1¹⁶:

As we have mentioned before, to demonstrate the results of the Vulnerability Analysis, the example of India and South Africa has been illustrated through two different scenarios demonstrate the relative ease of using, interpreting, and customizing this methodology for the identification of sensitive or vulnerable product lines. For our scenario 1, an attempt has been made to identify the relatively more important VIs.

Economic or Political Logics used to assign weights¹⁷

From an FTA perspective, the duty structure of partner countries assumes a great deal of importance as a higher duty structure is representative of a higher level of protection accorded to the domestic sector in a country thus, highlighting the nature of their sensitivities. This automatically calls for a higher individual weight to be assigned to the indicator of India's custom duty structure. It makes sense for the indicator of India's custom duty structure to be accorded a higher weight because we are concerned about the extent of vulnerability/sensitivity of our more protected sectors and product lines especially for sectors that could be of interest to the respective partner countries like South Africa, in this case.

¹⁶ It may be highlighted that in identifying the product lines under different categories of Vulnerabilities, Ex-outs in India's tariff lines have been included in the analysis and that product lines under chapter 98 have not been categorised under any of the three categories of Vulnerable Product Lines.

¹⁷ To reiterate, this is an illustrative example. Actual determination of weights by practitioners be based on multiple factors depending on the key economic and political considerations of the practitioners in question

With respect to other VIs like CAGR of global imported products, the VI is an indication of increasing global demand for those products and therefore, it becomes necessary for countries to develop their productive strength in such products. At the same time, products where India is currently strategizing and developing its domestic capacities has also been considered as an important indicator that needs to be assigned a higher weight in assessment of vulnerable product lines. In essence, India, as it should, is also focusing on providing protection to sectors or industries or product lines that are likely to have huge demand in the future, by initiating relevant support through its industrial and foreign trade policy initiatives.

It is also a known understanding that one of the benefits that emerging countries draw post the signing and implementation of their trade agreements includes a boost in inward Foreign Direct Investment (FDI) from a myriad of developed and developing countries that can subsequently expand export capacity and productive competitiveness in the potential sectors that will drive global demand in future. Such an improvement in the productive capacity and competitiveness for products of future global demand in India's FTA partner countries is likely to adversely affect Indian market as well as India's policy initiatives of supporting domestic productive strength for such products, thus, highlighting the need to assign higher weights to these two indicators during this vulnerability analysis.

Additionally, the indicator of India's import dependence has also been accorded a higher individual weight for this simulation exercise of vulnerability index (with respect to South Africa as the partner country) because products where India has a higher import dependence are areas where India needs to work towards the development and maintenance of integrated supply chains and that can be done by enhancing trade relationships through the preferential route. In such a scenario, the various scores assigned are negative because such products where India has a higher import dependence are not less sensitive for India.

Based on the above considerations, we have identified these 4 VIs that seem to play a more important role in identification of sensitive or vulnerable product lines. These are:

1. India's customs duty structure
2. Compound Annual Growth Rate of global imports
3. Product lines under India's domestic production incentive scheme that is, Production Linked Incentive Scheme (PLI)

4. India's Import Dependence.

These 4 VIs have been accorded a higher importance out of the 17 VIs¹⁸ and they have been assigned higher individual weights of 12.5% each. The remaining 13 VIs have been grouped together and assigned a cumulative weight of 50%. A table representing the weights assigned to the different VIs in case of scenario-1 has been enclosed in the Annexure-2 below for explicit reference.

The table below shows a summarized account of product lines being categorized into the three categories of vulnerability.

Table 1: Categorization of Product Lines under different categories of Vulnerability of India with respect to South Africa under scenario - 1

Different Categories of Vulnerable Product Lines	Range of weighted vulnerability scores under different categories of vulnerable product lines	Number of HS 8-Digit tariff lines of India under different categories of vulnerable product lines	Percentage of HS 8-Digit tariff lines under different categories of vulnerable product lines
Low degree of Vulnerability	(-1.875) - 4.5	2437	19.08%
Medium Degree of Vulnerability	4.5 - 8.5	7985	62.50%
High Degree of Vulnerability	≥ 8.5	2353	18.42%
Total Range of Weighted Vulnerability Scores for all product lines = (-1.875) – 14.5			

Source: Author's Assessment

After assigning the revised weights to these 17 VIs, the total range of weighted vulnerability scores ranges from (-1.875) at the lowest end and goes up to a maximum weighted score of 14.5 for a particular HS 8-Digit product line. These weighted vulnerability scores have further been divided into three categories that help us to segregate product lines as Vulnerable or Non-Vulnerable.

¹⁸ It is important to note that while our example we are customizing weights based on the context of one specific bilateral relationship-India-South Africa, certain vulnerability indicators may be of prime importance irrespective of the partner country chosen. For instance, the duty structure of the countries.

Table 2 above indicates that most lines have been categorized under medium degree of Vulnerability (62.50% of India’s 12775 HS 8-Digit tariff/product lines). This category of product lines is important from an FTA negotiations perspective in the sense that unless there are any pressing or extremely significant sensitivities associated to these products (as the requisite Stakeholders would highlight), these lines should be considered for tariff concessions in FTAs. In other words, product lines falling under low or medium degree of vulnerability should be considered for tariff concessions unless the stakeholders (i.e., concerned line Ministry, industry or farmer associations, lead firms or cooperatives etc.) can bring forward compelling, factual, and scientific evidence to argue for the same.

The threshold cut off value chosen to segregate highly vulnerable product lines and product line with medium or low degree of vulnerability has been chosen keeping in mind the fact that the percentage of tariff lines/product lines categorized as highly vulnerable should be limited to no more than 16% - 20% keeping in mind the need to prioritize product lines for exclusion, i.e., keep them protected from tariff elimination. Approximately 18.42% of India’s product lines has been categorized as highly vulnerable/sensitive for India with respect to South Africa.

Having identified/segregated product lines into different categories of vulnerability, based on their weighted final vulnerability scores, the table below shows the distribution/ of the highly vulnerable product lines as per scenario-1 into the different scoring parameters of the 17 VIs.

Table 2: Distribution of highly vulnerable product lines into different scoring parameters as per scenario-1

Key Performance Indicators (KPIs) / Vulnerability Indicators (VIs)	Number of HS 8-Digit Highly Vulnerable tariff lines under each score for different indicators as per Scenario-1								
	Scores allotted to different Indicators								
	-5	-3	-1	0	1	2	3	4	5
India's duty Ranking (01.01.2024) - BCD					231	1135	292	621	74
China Supplier Score		363							
FTA supplier Score		324							

Key Performance Indicators (KPIs) / Vulnerability Indicators (VIs)	Number of HS 8-Digit Highly Vulnerable tariff lines under each score for different indicators as per Scenario-1								
	Scores allotted to different Indicators								
	-5	-3	-1	0	1	2	3	4	5
South Africa's Supplier Score						46			
South Africa's Global Export Share score					2302	15	17	2	17
Product Category		39			722	326			1266
South Africa's Duty Ranking					215	435	357	1345	
High Tech scoring				91					75
CAGR Scoring (Global Imports)					512	382	598	348	512
PLI									314
World Imports from World Scoring					1001	589	222	447	94
Elasticity					29				2214
Export Intensity				334					2011
Business Cycle Scoring				2343			10		
BoE Scoring			127	1393					
IECs Scoring			41	1478					
India's import dependence (import/Production) - Scoring	928	278	299	693					

Source: Author's Assessment

As we have already identified 2353 highly vulnerable product lines in Table 2 above, we have further attempted to highlight the distribution of vulnerability scores across the 17 VIs for these 2353 highly vulnerable product lines. In essence, this table reflects which vulnerability

indicators (and therefore the economic factors) that are driving the vulnerability for these 2353 lines identified as highly vulnerable.

What can be noticed here is that the distribution of entire 2353 highly vulnerable product lines is being driven by the following 5 VIs – India’s effective duty ranking, South Africa’s global export share, India’s Import Product classification, scoring of trade values under global Import Basket and scoring of Business cycle. Further, for VIs like South Africa’s duty ranking and scoring of CAGR on global imports, the distribution of 2352 highly vulnerable product lines can be seen in the table above.

Moving forward, we now look at the sectoral classification of product lines based on their degree of vulnerability to understand and identify whether there are any generic sectoral vulnerabilities that can be seen or if it’s a distributed across the different categories of vulnerability.

Table 3: Sectoral classification of product lines based on their degree of vulnerability.

Sections	Number of HS 8-Digit Tariff lines under different categories of Vulnerable Product Lines			Total number of tariff lines under different categories of Vulnerable Product Lines
	Low degree of Vulnerability	Medium Degree of Vulnerability	High Degree of Vulnerability	
SECTION I (01-05) Live Animals and Animal Products	133	337	69	539
SECTION II (06-14) Vegetable Products	176	404	79	659
SECTION III (15) Animal or Vegetable Fats & Oil	8	67	51	126
SECTION IV (16-24) Prepared foodstuffs, beverages, spirits and vinegar, tobacco and	59	167	208	434

Sections	Number of HS 8-Digit Tariff lines under different categories of Vulnerable Product Lines			Total number of tariff lines under different categories of Vulnerable Product Lines
	Low degree of Vulnerability	Medium Degree of Vulnerability	High Degree of Vulnerability	
manufactured tobacco substitutes				
SECTION V (25-27) Mineral Products	58	241	64	363
SECTION VI (28-38) Products of Chemical or allied industries	366	1452	591	2409
SECTION VII (39-40) Plastics, Rubber and articles thereof	156	390	52	598
SECTION VIII (41-43) Raw Hides, Skins, Leather and associated articles	26	96	12	134
SECTION IX (44-46) Wood and articles of Wood	127	133	22	282
SECTION X (47-49) Pulp of Wood, Paper and Paperboard and articles	31	163	78	272
SECTION XI (50-63) Textile and Textile Articles	319	1454	229	2002
SECTION XII (64-67) Footwear, Headgear, Umbrellas etc	17	82	6	105
SECTION XIII (68-70) Articles of stone, plaster, cement, asbestos, mica or similar materials; ceramic	60	155	46	261

Sections	Number of HS 8-Digit Tariff lines under different categories of Vulnerable Product Lines			Total number of tariff lines under different categories of Vulnerable Product Lines
	Low degree of Vulnerability	Medium Degree of Vulnerability	High Degree of Vulnerability	
products; glass and glassware				
SECTION XIV (71) Gems and Jewellery	24	72	44	140
SECTION XV (72-83) Base Metals and its articles	267	842	194	1303
SECTION XVI (84-85) Nuclear and Electrical Machinery and parts	384	1117	250	1751
SECTION XVII (86-89) Vehicles; aircraft; vessels & associated transport equipment	72	409	270	751
SECTION XVIII (90-92) Optical, photographic, Medical, surgical apparatus, parts etc	52	236	58	346
SECTION XIX (93) Arms and ammunition, parts	1	13	6	20
SECTION XX (94-96) Miscellaneous manufactured articles	74	142	22	238
SECTION XXI (97, 98) Works of art, collectors' pieces and antiques	27	13	2	42
Grand Total	2437	7985	2353	12775

Source: Author's Assessment

The table above shows the sectoral categorization of the product lines as per different categories of vulnerabilities for scenario-1. Sectors like products from chemical and allied industries (Section-VI); Vehicles, aircrafts and associated transport equipment (Section-XVII); Nuclear and Electrical Machinery (Section-XVI); Textiles and textile articles (Section XI); Prepared foodstuffs, beverages, spirits and vinegar, tobacco and manufactured tobacco substitutes (Section-IV) and Base Metals and its articles (Section-XV) contain a relatively higher number of highly vulnerable product lines (ranging from 194 to 591). The remaining 15 sections have less than 100 highly vulnerable product lines distributed to each of them.

As we have already seen before, a majority of product lines have been categorized under medium degree of vulnerability. It may be highlighted here that there are 3 sections namely Textiles and textile articles (Section XI); products from chemical and allied industries (Section-VI) and Nuclear and Electrical Machinery (Section-XVI) wherein more than 1000 product lines are categorized under medium degree of vulnerability. Even the Base Metals and its articles (Section-XV) section has a majority of its product lines categorized under medium degree of vulnerability.

Having looked at sections that have a higher number of product lines categorized under high and medium degree of vulnerability, there are sectors like Works of art, collectors' pieces and antiques (Section XXI) and Wood and articles of Wood (Section IX) have a majority of their products categorized under low degree of vulnerability. This implies that these two sectors do not appear to be vulnerable for India as per scenario-1 of the analysis, with respect to South Africa as the partner country.

Scenario – 2¹⁹:

The results of the Vulnerability Analysis are likely to change as the circumstances of carrying out the analysis will change. Therefore, for this scenario of the analysis, the VIs has been assigned different weights based on their relative importance. Therefore, 3 indicators namely:

1. India's customs duty structure

¹⁹ It may be highlighted that in identifying the product lines under different categories of Vulnerabilities, Ex-outs in India's tariff lines have been included in the analysis and that product lines under chapter 98 have not been categorised under any of the three categories of Vulnerable Product Lines.

2. Product lines under India’s domestic production incentive scheme that is, Production Linked Incentive Scheme (PLI)
3. India’s Import Dependence

Have been assigned a cumulative weight of 40% in this scenario. Further, 3 other indicators namely

1. South Africa’s global export share
2. Business cycle impact
3. Export Intensity

Have been assigned a cumulative weight of 20% in this scenario. All the other remaining 11 VIs have been grouped together when assigning them the remaining cumulative weight of 40%. A table representing the weights assigned to the different VIs in case of scenario-2 has been enclosed in the Annexure-3 below for explicit reference. The table below shows a summarized account of product lines being categorized into the three categories of vulnerability.

Table 4: Categorization of Product Lines under different categories of Vulnerability of India with respect to South Africa under scenario – 2

Different Categories of Vulnerable Product Lines	Range of weighted vulnerability scores under different categories of vulnerable product lines	Number of HS 8-Digit tariff lines of India under different categories of vulnerable product lines	Percentage of HS 8-Digit tariff lines under different categories of vulnerable product lines
Low degree of Vulnerability	(-2.6) - 0.8	2231	17.46%
Medium Degree of Vulnerability	0.8 - 4.2	8098	63.39%
High Degree of Vulnerability	≥ 4.2	2446	19.15%
Total Range of Weighted Vulnerability Scores for all product lines = (-2.6) – 9.2			

Source: Author’s Assessment

It is interesting to see that changing the weights assigned to the different VIs, has resulted in changing the range of final weighted scores of the different product lines. While the range of final weighted scores in scenario-1 was between (-1.875) to 14.5, there is an incremental difference in the range of final weighted scores of scenario-2 which is ranging between (-2.6)

to 9.2. A majority of lines in scenario-2 have also been categorized under medium degree of Vulnerability (63.39% of India’s 12775 HS 8-Digit tariff/product lines). Approximately 19.15% of India’s product lines has been categorized as highly vulnerable/sensitive for India with respect to South Africa.

We can see a very subtle difference in the percentages of highly vulnerable product lines extracted through scenario-1 (18.42%) and scenario-2 (19.15%) and a similar subtle difference in the percentages can be noticed for product lines under low and medium degree of vulnerability too. The table below shows the distribution of the highly vulnerable product lines as per scenario-2 into the different scoring parameters of the 17 VIs.

Table 5: Distribution of highly vulnerable product lines into different scoring parameters as per scenario-2

Key Performance Indicators (KPIs) / Vulnerability Indicators (VIs)	Number of HS 8-Digit Highly Vulnerable tariff lines under each score for different indicators as per scenario-2								
	Scores allotted to different Indicators								
	-5	-3	-1	0	1	2	3	4	5
India's duty Ranking (01.01.2024) - BCD					100	730	244	1160	212
China supplier score		307							
FTA supplier score		384							
South Africa's Supplier Score Final						25			
South Africa's Share Score					2409	13	15	2	7

Key Performance Indicators (KPIs) / Vulnerability Indicators (VIs)	Number of HS 8-Digit Highly Vulnerable tariff lines under each score for different indicators as per scenario-2								
	Scores allotted to different Indicators								
	-5	-3	-1	0	1	2	3	4	5
(Global Export Share)									
Product Classification		82			507	321			1522
South Africa's Duty Ranking					325	667	330	1046	
High Tech scoring				89					109
CAGR Scoring (Global Imports)					724	425	494	226	499
PLI									589
World Imports from World _Scoring					1237	548	194	380	87
Elasticity					130				1742
Export Intensity				634					1596
Business Cycle Scoring				2360			86		
BoE Scoring			89	1291					
IECs Scoring			35	1344					
India's import dependence (import/Production) - Scoring	371	196	355	1200					

Source: Author's Assessment

Therefore, the classification of 2446 highly vulnerable product lines across the different scoring parameters ranging from the lowest score of (-5) to the maximum score of 5 has been represented in the table above.

What can be noticed here is that the distribution of entire 2446 highly vulnerable product lines is applicable on the following 4 VIs – India’s duty ranking, South Africa’s global export share, scoring of trade values under global Import Basket and scoring of Business cycle.

Table 6: Sectoral classification of product lines based on their degree of vulnerability.

Sections	Number of HS 8-Digit Tariff lines under different categories of Vulnerable Product Lines			Total number of tariff lines under different categories of Vulnerable Product Lines
	Low degree of Vulnerability	Medium Degree of Vulnerability	High Degree of Vulnerability	
SECTION I (01-05) Live Animals and Animal Products	7	316	216	539
SECTION II (06-14) Vegetable Products	34	436	189	659
SECTION III (15) Animal or Vegetable Fats & Oil		44	82	126
SECTION IV (16-24) Prepared foodstuffs, beverages, spirits and vinegar, tobacco and manufactured tobacco substitutes	13	160	261	434
SECTION V (25-27) Mineral Products	42	291	30	363
SECTION VI (28-38) Products of Chemical or allied industries	496	1498	415	2409
SECTION VII (39-40) Plastics, Rubber and articles thereof	208	342	48	598
SECTION VIII (41-43)	27	99	8	134

Sections	Number of HS 8-Digit Tariff lines under different categories of Vulnerable Product Lines			Total number of tariff lines under different categories of Vulnerable Product Lines
	Low degree of Vulnerability	Medium Degree of Vulnerability	High Degree of Vulnerability	
Raw Hides, Skins, Leather and associated articles				
SECTION IX (44-46) Wood and articles of Wood	81	190	11	282
SECTION X (47-49) Pulp of Wood, Paper and Paperboard and articles	50	193	29	272
SECTION XI (50-63) Textile and Textile Articles	239	1395	368	2002
SECTION XII (64-67) Footwear, Headgear, Umbrellas etc	11	81	13	105
SECTION XIII (68-70) Articles of stone, plaster, cement, asbestos, mica or similar materials; ceramic products; glass and glassware	42	190	29	261
SECTION XIV (71) Gems and Jewellery	24	97	19	140
SECTION XV (72-83) Base Metals and its articles	310	900	93	1303
SECTION XVI (84-85) Nuclear and Electrical Machinery and parts	494	1122	135	1751
SECTION XVII (86-89)	32	270	449	751

Sections	Number of HS 8-Digit Tariff lines under different categories of Vulnerable Product Lines			Total number of tariff lines under different categories of Vulnerable Product Lines
	Low degree of Vulnerability	Medium Degree of Vulnerability	High Degree of Vulnerability	
Vehicles; aircraft; vessels & associated transport equipment				
SECTION XVIII (90-92) Optical, photographic, Medical, surgical apparatus, parts etc	74	246	26	346
SECTION XIX (93) Arms and ammunition, parts		11	9	20
SECTION XX (94-96) Miscellaneous manufactured articles	39	185	14	238
SECTION XXI (97, 98) Works of art, collectors' pieces and antiques	8	32	2	42
Grand Total	2231	8098	2446	12775

Source: Author's Assessment

Our two examples using different weights are meant to demonstrate an important point, i.e., simple tweaking of weights can lead to important differences in terms of which specific sectors show greater degree of vulnerability in terms of the number of product lines belonging to them get categorized as more vulnerable.

Sectors like products from chemical and allied industries; Vehicles, aircrafts and associated transport equipment; Textiles and textile articles; Prepared foodstuffs, beverages, spirits and vinegar, tobacco and manufactured tobacco substitutes and Nuclear and Electrical Machinery have a relatively higher number of highly vulnerable product lines under both scenario-1 and scenario-2.

However, additional to the above sectors, in case of Base Metals and its articles also, a majority of lines are categorized under high degree of vulnerability in scenario-1 while this sector does not have a very high number of product lines under high degree of vulnerability under scenario-2. On the other hand, under scenario-2, additionally products from Live Animals and Animal Products and Vegetable Products also have a higher number of product lines under high degree of vulnerability.

As we have already seen before, a majority of product lines have been categorized under medium degree of vulnerability. It may be highlighted here that there are 3 sections namely products from chemical and allied industries (Section-VI); Textiles and textile articles (Section XI) and Nuclear and Electrical Machinery (Section-XVI) wherein more than 1000 product lines are categorized under medium degree of vulnerability. Even the Section on Base Metals and its articles (Section-XV) has a majority of its product lines categorized under medium degree of vulnerability. The case of sectoral classification of product lines under medium degree of vulnerability is same for both the scenarios.

It may be pointed out that there appears no particular sectors as per the results of scenario-2 that could be considered as generically less vulnerable that is, none of the sectors mentioned above have a majority of their product lines covered under low degree of vulnerability unlike the case of scenario-1, where we had two such sectors whose majority of lines were covered through low degree of vulnerability.

Conclusion: Pre FTA-Analysis

Vulnerability Analysis is a simple, effective, and intuitive methodology. It can be put to use by policy makers as part of a preparatory analysis before starting formal negotiations for a trade agreement. It can also be used by important stakeholders as a pre-emptive exercise that is likely to help them identify their own vulnerabilities with respect to different partner countries.

When it is a policy maker trying to seek advantage of carrying out a Vulnerability analysis for identification of vulnerable product lines, it is likely to be the identification of the given country's generic vulnerabilities, with no specific focus on any particular sector. On the other

hand, stakeholders from the private sector including those representing agricultural interest would use customized versions of the analysis with specific focus on a particular sector.

Negotiators and stakeholders can also have different economic logic or factors that drive their specific negotiating objectives or concerns. This methodology is open to the possibility of including such variations while doing the analysis. The application of different scores assigned to different vulnerability indicators, or distribution of the weights assigned to the different vulnerability indicators allow for customization that addresses such differences in negotiating concerns or threat perceptions and concerns.

Since the broad negotiations require informed dialogue between negotiators who need to take an overall understanding, and the validation or mandate for this overall undertaking from sector specific stakeholders, this methodology provides a common platform to develop a shared understanding based on data. Since the political economy of negotiations requires understanding and addressing the intuitive interests or concerns of individual stakeholders, a common methodology and shared understanding are therefore essential to any multi-sectoral and multi entity dialogue leading to a broadly agreed outcome. The ability to move towards this agreed outcome which is optimal in terms of national interest while at the same time has been arrived at through a comprehensive dialogue with stakeholders is critical to ensuring efficient outcomes from trade negotiations in goods. It also provides much greater confidence to negotiators to effectively bargain with their counterparts.

Such intuitive concerns cannot be assuaged by complicated models that provide an overall view of welfare gain or loss. Even sectoral understanding derived from such models through their identification of increased import competition or loss of producer welfare does not address the intuitive concerns of stakeholders. To most stakeholders, such models are ‘black boxes’ whose assumptions might not be in-sync with their more practical understanding of business and trade dynamics, not to mention issues of interplay of power in value-chain by lead firms or political economy of trade and/or differences in power dynamic and leverage available to industries or governments in different countries.

This exercise of identification and categorization of product lines based on the extent of vulnerability as suggested by data analysis is therefore only the first, but a very important step

of work in a pre-FTA situation. Such categorization can help establish the roadmap for the given country to carry out relevant stakeholder consultations with the requisite ministries, industry and export promotion councils or bodies on their opinion regarding the level of vulnerability or sensitivity on different product lines with respect to the concerned partner country.

Finally, we need to include some disclaimers related to the methodological approach in this paper. If we look at the results extracted from the analysis, threshold cut off values for the identification of highly vulnerable lines may have been set at different weighted scores, but the final percentage of highly vulnerable lines extracted from each of the two scenarios ranges close to 20% of India's total tariff lines/product lines.

As mentioned before, FTAs are signed between countries with an aim to cover substantial trade and in doing so, countries may keep approximately 10-20% of its tariff lines/product lines out of the domain of the said FTA. It is important to mention here that since there is no explicit and clear definition of what encompasses the concept of substantial trade, countries tend to draw their own understanding, perspective, and their own idea of what constitutes substantial trade.

This brings us to highlight the fact that this analysis includes an element of subjectivity inherently incorporated into it because the cut off thresholds to be chosen to categorize vulnerable product lines into three different categories of vulnerability are subjectively chosen as per the perspective and understanding of the person who is performing/doing the analysis and is also driven by the purpose with which the analysis is being performed²⁰.

Finally, there is always scope for further improvisation in the analysis and the same applies to this analysis too. If we get the option of accessing additional transactional level of data, then that gives us additional scope of adding value to the analysis even further.

²⁰ The cut off threshold to categorize product lines into high degree of vulnerability in the illustrative analysis were chosen to be such that it should yield approximately 20% of India's tariff lines under the category of highly vulnerable product lines. Threshold values considered requires such subjective decision making given the diversity of scenarios that negotiators would have to consider, for example, the kind of partner country being looked at, political or strategic considerations that may derive tariff concessions percentages, if any. Several such factors may affect the cut off threshold values chosen to categorize product lines into different categories of vulnerability.

Post-FTA Analysis

III. Trend Analysis

Monitoring the impact of an FTA once it has signed and implemented remains a critical concern for policymakers around the world. Policymakers are most concerned about two extreme but opposite outcomes from an FTA. They want to monitor the extent of utilization of FTA tariff preferences by exporters. Since the primary objective of market access through tariff reduction achieved in an FTA is to ensure exporters use this preferential advantage to increase their market share in partner country, this becomes the definitional metric of FTA success in the area of goods. The second concern is about sudden import surges from the partner country due to elimination/reduction of tariffs. These sudden surges might arise due to a number of reasons. It could be due to significant shift in relative import price of the product due to a tariff advantage, thereby displacing all other suppliers and domestic producers. Depending on the situation, this would represent drastic levels of trade diversion or replacement of domestic suppliers or both. These represent potential structural challenges in the longer-run, and can also lead to immediate political and social impacts that need to be addressed. These surges could also be a result of routing of third country exports through the FTA partner, either because of ineffective application of rules of origin, or even malpractices in the partner country by its trading community.

In either case, such surges have serious short and longer term ramifications, and therefore need to be studied, and addressed. We will briefly discuss some salient issues related to utilization and import surges.

Utilization

FTAs provide a notional advantage to partner countries in each other's goods markets. These advantages might include, but are not limited to:

- a. Allowing imports at zero or reduced rates of duty compared to imports from non-FTA partners.
- b. FTAs might include special arrangements such as Mutual Recognition of product standards or of conformity assessment with those standards. Essentially FTA partners

agree to accept certification and assessments of product quality issued by each other's agencies making it much easier to export to each other's markets.

Often the literature on FTAs points out that actual utilization of FTAs by trade remains low. According to a recent book titled *Free Trade Agreements, India and the world* by V.S Seshadri, suggest that FTAs should not remain underutilised i.e., the utilization of preferential exports/imports over total exports/imports to full extent. While it may seem counter-intuitive, there are several reasons why traders might not fully utilise the benefits of lower duties and other facilitative measures offered by FTAs. One significant reason of the transaction cost to utilize FTA benefits, i.e., getting the proper documentation to meet rules of origin requirement (ROO) might be relatively high or complicated. The ROO requirements might not be suitable and difficult to meet given the nature of business with significant backward integration with non-FTA countries that prevents meeting the local value-addition/production transformation requirements. In many cases, the difference between MFN applied rates and preferential FTA rates might be so marginal that it might not be worth the trouble to claim FTA benefits.

Import Surges

The other extreme situation is that preferential access to markets provides such a strong competitive advantage to FTA partner that it results in a massive import surge from that country. Such a surge can have two negative implications for the country concerned. Such a surge might cause serious injury to domestic industry, making several firms unviable thus leading to loss of employment and output. It could also drive out imports from other countries and come to dominate the market for that product. In other words, this can cause massive trade diversion that would make supply-chains very vulnerable in the medium to longer-run due to dependency on a single country (i.e., the FTA partner). These two outcomes are not mutually exclusive and in fact can be mutually reinforcing. These surges also pose a potential risk of Rerouting, when a third country, which may have an excess capacity of goods, routes their goods through an FTA between two other countries to exploit these commitments. Such violations undermine the intent of the FTA, as they allow a non-FTA partner to gain preferential market access. This leads to unfair competition and defeats the purpose of FTAs by disrupting local markets.

The idea of this analysis is to determine the trends in trade value, whether it exceeds the expectations and to further explore the possible reasons, such as third-country routing. While

analyzing FTA utilization can be difficult due to limited data, this paper has focused on finding easy methods to identify the surges resulting from FTAs. A simple trend analysis is used, comparing expected import and export growth with actual trade value after the FTA. This can help policymakers understand how the agreement is working in practise and highlights areas for potential improvement.

Methodology

Trend analysis is based on a statistical method called the least square approach to find the best line that fits the data points. It helps to predict how one factor behaves based on the past trends. The method is used to see the patterns that is either the data points are increasing or decreasing or may have remained same. For our paper, this approach is focused on the years after an FTA was implemented to see how tariff reductions affected trade between two countries. In other words, the methodology compares the expected value of imports and exports, if it has followed the business-as-usual trend based on the historical data, and the actual trade values. If there is a big difference between the expected and the actual values, it indicates that the fundamental factors underlying the imports of that product have changed, and therefore there is need for further investigation behind these causes. Further, to confirm that increase in imports is linked to FTA benefits, products with rise in demand are analyzed. This compares how fast these imports are growing compared to imports from other countries for the home country. At the same time, it looks at how the partner country's exports of the same products are growing worldwide.

Estimation and Forecast

The study adopts a dual-phase approach, segregating the examination into pre-FTA and post-FTA periods to comprehensively grasp the impact on exports and imports value induced by the free trade agreement. While forecasting import and export values, the years are split into pre- and post-FTA periods. For example, the India-Korea CEPA was signed in 2009 and came into effect in 2010. In this analysis, the pre-FTA years (2000-2009) are used to observe trends and the post-FTA years (2010-2020) are used to analyse changes. For the India-UAE CEPA, the pre-FTA years are from 2017-2021, and the post-FTA year is 2022, with forecasts made in different sectors. This basic method is applied to examples to show how exactly the approach works.

i. India-UAE, CEPA

The analysis focuses on impact of changes to India’s trade with UAE after initiation of the Free Trade Agreement (FTA) in 2022. To project India's export and imports values to and from the UAE in 2022, historical data from the past five years has been considered. The predictions are based on the trend that is further based on the concept of business as usual²¹ (BAU). The difference between the actual values of 2022 and the forecasted values derived from this historical trend have been thoroughly scrutinized.

The formula for deviations:

$$\text{Deviations} = [(\text{Actual Value of 2022} - \text{Predicted value of 2022}) / \text{Actual Value of 2022}] * 100$$

We have organized the data where the differences are either very large or where the actual trade amounts are much higher than expected, showing significant increases in a country's imports or exports. Additionally, the analysis highlights those tariff lines with the biggest changes, indicating major shifts in trade due to changes in the economy.

Our analysis is contingent upon the subsequent implementation of the Free Trade Agreement (FTA), for which the tariff lines are mapped with the tariff concessions²² agreed upon by both countries. Once the classification of tariff concessions has been completed for each tariff line, these lines are then sorted into sections (sectors) and further categorized into bands based on the deviation value.

Table 7: shows how the bands are structured following to effectively categorize²³ the deviations:

Category	Deviation Bandwidth
1. Expected Deviations	(<10%)

²¹ Business as usual suggests that there has been no impact of the policy shocks i.e., FTA does not lead to an improvement in India’s ability to further penetrate the foreign market .

²² Tariff concessions in India-UAE, CEPA has the following categories: TEI: Tariff elimination immediate, TR: Tariff reduction over a period/phased, EXC: Excluded from FTA.

²³ The categorization of deviations is highly subjective and may vary according to the results.

Category	Deviation Bandwidth
2. Modest Deviations	(10%-25%)
3. Significant Deviations	(25%-50%)
4. High Deviations	(50%-75%)
5. Very High Deviations	(75%-100%)
6. Extremely High Deviations	(>100%)

◆ *Imports side Analysis*

Table 8: Sectors Identified Within Bands That Experienced a Surge in India’s Imports from the UAE Post-FTA²⁴

Sections	Description	Expected Deviations (<10%)	Extremely High Deviations (>100%)	High Deviations (50%-75%)	Modest Deviations (10%-25%)	Significant Deviations (25%-50%)	Very High Deviations (75%-100%)
SECTION II (06-14)	Vegetable Products	1		1		1	3
SECTION IV (16-24)	Prepared Foodstuffs, Beverages, Spirits and Vinegar, Tobacco and Manufactured Tobacco Substitutes		2	4	4	2	10
SECTION IX (44-46)	Wood And Articles of Wood; Wood Charcoal; Cork and Articles of Cork; Manufactures of Straw, Of Esparto or Of Other Plaiting Materials; Basket ware and Wickerwork.						1
SECTION V(25-27)	Mineral Products	2	2	6	4	6	8
SECTION VI(28-38)	Products Of the Chemical or Allied Industries	3	14	10	9	4	25
SECTION VII(39-40)	Plastics And Articles Thereof, Rubber and Articles Thereof	1	4	6	2	7	10

²⁴ The above table is shared in Annexure as excel link with identified HS 6 Codes for the respective sectors.

Sections	Description	Expected Deviations (<10%)	Extremely High Deviations (>100%)	High Deviations (50%-75%)	Modest Deviations (10%-25%)	Significant Deviations (25%-50%)	Very High Deviations (75%-100%)
SECTION VIII(41-43)	Raw Hides and Skins, Leather, Furskins & Articles Thereof; Saddlery and Harness; Travel Goods, Handbags and Similar Containers; Articles of Animal Gut (Other Than Silk-Worm Gut)	1		3	2	2	4
SECTION X(47-49)	Pulp Of Wood or Of Other Fibrous Cellulosic Material; Recovered (Waste and Scrap) Paper Or Paperboard; Paper And Paperboard & Articles Thereof	1	2	6	1		3
SECTION XI (50-63)	Textile & Textile Articles		2	1	3		9
SECTION XII (64-67)	Footwear, Headgear, Umbrellas, Sun Umbrellas, Walking-Sticks, Seat-Sticks, Whips, Riding-Crops and Parts Thereof, Prepared Feathers and Articles Made Therewith; Artificial Flowers; Articles of Human Hair		1			1	1
SECTION XIII (68-70)	Articles Of Stone, Plaster, Cement, Asbestos, Mica or Similar Materials; Ceramic Products; Glass and Glassware		4	4	1	2	13
SECTION XIV (71)	Natural Or Cultured Pearls, Precious or Semi-Precious Stones, Precious Metals Clad with Precious Metal and Articles Thereof; Imitation Jewellery; Coin	1	1	4	1		4
SECTION XV (72-83)	Base Metal & Articles of Base Metal	7	7	12	9	12	25

Sections	Description	Expected Deviations (<10%)	Extremely High Deviations (>100%)	High Deviations (50%-75%)	Modest Deviations (10%-25%)	Significant Deviations (25%-50%)	Very High Deviations (75%-100%)
SECTION XVI (84-85)	Machinery And Mechanical Appliances; Electrical Equipment and Parts Thereof; Sound Recorders and Reproducers, Television Image and Sound Recorders and Reproducers, And Parts and Accessories of Such Articles	1	9	20	8	22	54
SECTION XVII (86-89)	Vehicles; Aircraft; Vessels & Associated Transport Equipment		2				4
SECTION XVIII (90-92)	Optical, Photographic, Cinematographic, Measuring, Checking, Precision, Medical or Surgical Instruments and Apparatus; Clocks and Watches; Musical Instruments; Parts and Accessories Thereof	1	1	3	3	1	12
SECTION XX (94-96)	Miscellaneous Manufactured Articles	1	1	5		1	9
Grand Total		20	52	85	47	61	195

Source: Author's Assessment

Table 8 shows the sectors in India that saw increased imports from the UAE after the FTA. The table lists the tariff concessions for various categories, illustrating how these sectors performed post-FTA. This suggests that the increases may be attributed to the bilateral agreement between the two countries.

To explore in depth the significant increase in imports from the UAE to India, we investigate whether this surge is due to shifts caused by FTA concessions or by changes in the global demand and supply dynamics. We delved into the concepts of demand and supply on a global scale to determine the underlying factors driving these changes.

➤ **Demand Analysis:**

To begin with, we analyzed the demand side by examining India's imports from the world. Using data from 2018 to 2022, we calculate the Compound Annual Growth Rate

(CAGR) of India's imports. This analysis will help us understand whether the demand in India has increased, decreased, or remained constant over this period. The interpretation of the CAGR results is as follows:

- **Increasing CAGR:** Indicates growing demand in India.
- **Constant or Declining CAGR:** Suggests that India's demand from the world has not increased, implying that any increase in imports from UAE may be due to supply side factors.

➤ **Supply Analysis:**

Next, we focused on the supply side by analyzing the CAGR of UAE's exports to the World from 2018 to 2022. This will help us determine the impact of FTA on UAE's export growth. The interpretation of the CAGR results is as follows:

- **Increasing CAGR:** Suggests that other factors, such as increased production capacity, have driven the growth in UAE's exports.
- **Constant or Declining CAGR:** Indicates that the impact of FTA concessions has shifted the supply from UAE to India rather than an overall increase in global exports.

By comparing the demand and supply side CAGRs, we categorize the results where both the **CAGRs $\leq 0\%$** , i.e., if both the demand-side and supply side growth rates are zero or negative, it strongly supports the hypothesis that the surge in imports from UAE is primarily due to FTA concessions. Given that neither India's overall import demand nor UAE's export capacity has increased, the surge in imports from the UAE to India is likely due to a shift in trade patterns rather than a global increase in demand or supply. This shift can be attributed to the FTA concessions, which make UAE goods more competitive in the Indian market compared to goods from other countries.

To further confirm the impact of FTA on increase in imports, we analyzed the tariff reductions between both the countries by looking at how specific cuts in tariff relates to the rise in imports, we can verify the influence of the FTA on these surges. We can confirm the FTA's impact in all the cases where reductions in tariffs have resulted in import increases beyond what would typically be expected.

The table below provides detailed explanation of imports surges from the UAE to India, broken into 31 specific product lines. Each line represents a distinct category of goods where a significant increase in imports has been observed. The primary factor contributing to these surges is the Free trade agreement between these nations.

Table 9: Impact of Free Trade Agreement on Import Surges: Detailed Analysis of 31 Product Lines from UAE to India in highlighted sectors

HS-6 Digit	Description	2022 TL	Actual Value 2022 (IN imports from UAE) (USD Million)	Predicted Value 2022 (USD Million, DGCIS)	% Deviation	Tariff Concessions	CAGR UAE exports to the World 2018-2022 (1000 USD, WITS)	CAGR India's imports from the world 2018-2022 (1000 USD, WITS)
381190	Oxidation and gum inhibitors, viscosity improvers, anti-corrosive preparations, other prepared additives for mineral oils or liquids used as mineral oils (including gasoline), n.e.c. in heading no. 3811	38119000	0.01	0.005	50%	TEI	-12%	-10%
901839	Medical, surgical instruments and appliances; catheters, cannulae and the like	90183920	0.02	0.008	60%	TEP over 5 years	-5%	-3%
844399	Printing machinery; parts and accessories, n.e.c. in item no. 8443.91	84439990	0.01	0.004	60%	TEI	-24%	-2%
490110	Printed matter; in single sheets, whether or not folded	49011010	0.08	0.028	65%	TEI	-9%	-6%
902720	Chromatographs and electrophoresis instruments	90272000	0.88	0.299	66%	TEI	-67%	0%
710239	Diamonds; non-industrial, (other than unworked or simply sawn, cleaved or bruted), but not mounted or set	71023910	36.1	11.759	67%	TEP over 10 years	-23%	-6%
251910	Magnesium carbonate (magnesite); natural	25191000	0.05	0.016	68%	TEP over 5 years	-22%	-21%
842131	Machinery; intake air filters for internal combustion engines	84213100	0.02	0.005	75%	TEP over 7 years	-28%	0%
848299	Bearings; parts, (other than balls, needles and rollers)	84829900	0.12	0.028	77%	TEI	-14%	-1%
200559	Vegetable preparations; beans, (not shelled),	20055900	0.04	0.009	78%	TEI	-3%	-10%

HS-6 Digit	Description	2022 TL	Actual Value 2022 (IN imports from UAE) (USD Million)	Predicted Value 2022 (USD Million, DGCIS)	% Deviation	Tariff Concessions	CAGR UAE exports to the World 2018-2022 (1000 USD, WITS)	CAGR India's imports from the world 2018-2022 (1000 USD, WITS)
	prepared or preserved otherwise than by vinegar or acetic acid, not frozen							
850110	Electric motors; of an output not exceeding 37.5W	85011019	0.01	0.002	80%	TEP over 5 years	-2%	-2%
271490	Bitumen and asphalt, natural; asphaltites and asphaltic rock	27149030	0.16	0.022	86%	TEI	-18%	-13%
701919	Glass fibres; (including glass wool), slivers, yarns and threads	70191900	0.2	0.021	90%	TEI	-7%	-45%
570241	Carpets and other textile floor coverings; woven, (not tufted or flopped), of wool or fine animal hair, of pile construction, made up, n.e.c. in item no. 5702.10 or 5702.20	57024110	0.02	0.002	90%	TEI	-29%	-4%
271490	Bitumen and asphalt, natural; asphaltites and asphaltic rock	27149010	0.07	0.006	91%	TEI	-18%	-13%
560394	Nonwovens; whether or not impregnated, coated, covered or laminated, not of man-made filaments, (weighing more than 150g/m ²)	56039400	0.08	0.002	98%	TEI	-22%	-9%
850110	Electric motors; of an output not exceeding 37.5W	85011020	0.09	0.002	98%	TEP over 5 years	-2%	-2%
291439	Ketones; aromatic, (without other oxygen function), excluding phenylacetone (phenylpropan-2-one)	29143990	0.01	0	100%	TEP over 5 years	-100%	-7%
410210	Skins; raw, of sheep or lambs, fresh, or salted, dried, limed, pickled or otherwise preserved, (but not tanned, parchment-dressed or further prepared), with wool on	41021010	0.08	0	100%	TEI	-11%	-31%
420310	Apparel; articles of apparel, of leather or of composition leather	42031090	0.01	0	100%	TEI	-39%	-18%
680990	Plaster articles or articles of compositions based on	68099000	0.01	0	100%	TEI	-12%	-7%

HS-6 Digit	Description	2022 TL	Actual Value 2022 (IN imports from UAE) (USD Million)	Predicted Value 2022 (USD Million, DGCIS)	% Deviation	Tariff Concessions	CAGR UAE exports to the World 2018-2022 (1000 USD, WITS)	CAGR India's imports from the world 2018-2022 (1000 USD, WITS)
	plaster; n.e.c. in heading no. 6809							
691200	Ceramic tableware, kitchenware, other household articles and toilet articles; other than of porcelain or china	69120090	0.01	0	100%	TR	-16%	-4%
700711	Glass; safety glass, toughened (tempered), of size and shape suitable for incorporation in vehicles, aircraft, spacecraft or vessels	70071100	0.02	0	100%	TEI	-33%	-18%
731990	Sewing and knitting needles, bodkins, crochet hooks, embroidery stiletos and similar articles, for use in the hand, not elsewhere specified or included, of iron or steel	73199000	0.01	0	100%	TEI	-15%	-12%
820220	Tools, hand; band saw blades	82022000	0.02	0	100%	TEP over 5 years	-1%	-1%
830241	Mountings, fittings and similar articles; of base metal, suitable for buildings	83024190	0.18	0	100%	TEP over 5 years	-5%	-1%
902480	Machines and appliances; for testing the hardness, strength, compressibility, elasticity or other mechanical properties of materials other than metals	90248099	0.03	0	100%	TEI	-68%	-5%
790111	Zinc; unwrought, (not alloyed), containing by weight 99.99% or more of zinc	79011100	0.68	-0.006	101%	TEP over 5 years	-19%	-6%
330510	Hair preparations; shampoos	33051090	0.05	-0.002	104%	TEI	-2%	0%
282612	Fluorides; of aluminium	28261200	2.14	-0.537	125%	TEI	-6%	-1%
382440	Cements, mortars or concretes; their prepared additives	38244090	0.01	-0.141	1510%	TEI	-4%	-12%

Source: Author's Assessment

After establishing that the increase in imports was influenced by FTA using the criteria mentioned, we conducted a further analysis of Rules of Origin (RoO). RoO is a set of regulations used to determine the national source of a product. Understanding the true origin of imported products is essential because it helps ensure that the benefits of the FTA are given only to eligible products from partner country, in this case, the UAE. By determining the origination of products, we can protect local businesses from unfair competition. If products from other countries are being imported under the guise of UAE origin to exploit lower tariffs, it could harm domestic manufacturers.

This analysis is important for two main reasons:

- It allows Indian authorities to take up potential ROO violations with partner countries through bilateral discussions and detailed investigations.
- On the longer term, based on this analysis, evidence-based decision can be taken whether there is a need to implement stricter Rules of Origin regulations. Stricter RoO can prevent misuse of the FTA benefits and ensure that only genuinely eligible products enjoy the tariff concessions. This can further help in safeguarding domestic players from dominance by foreign markets.

To uncover the potential violations of RoO, we undertook a 3-step exercise.

1. Shortlisting sectors where import surges due to the FTA were evident.
2. Subsequently, we identified the top 10 exporters in the world for the sectors with constant growth rate and checked whether the UAE featured in this list of top 10 exporting countries.
3. Sectors where the UAE was not listed among the top 10 exporters were flagged as potential violations of RoO.

The economic logic behind this approach is straightforward: if the UAE is not a major global exporter in each of these sectors, a significant surge in imports from the UAE in that sector likely indicated that goods may be routed through the UAE to exploit FTA concessions. Table 10 highlights the similar sectors where UAE can possibly violate the regulations complied by the world trade organizations and requires further investigation. This method leverages trade data to identify anomalies that suggest the misuse of FTA provisions. By focusing on sectors where the UAE is not a dominant exporter, we highlight red flags that warrant further

investigation. This ensures that the benefits of the FTA are restricted to legitimate UAE-origin products, safeguarding the integrity of domestic markets, and fostering fair competition. The exercise highlights the importance of robust RoO regulations in maintaining fairness of FTAs, ensuring that they serve their intended purpose without being undermined by regulatory loopholes.

Table 10: Potential High-Risk Sectors for Import Surges Post-FTA with High Likelihood of Rules of Origin Violations

Sectors	Description of Sectors	Top 1st Exporting Country (2022)	Top 2nd Exporting Country (2022)	Top 3rd Exporting Country (2022)	Top 4th Exporting Country (2022)	Top 5th Exporting Country (2022)	Top 6th Exporting Country (2022)	Top 7th Exporting Country (2022)	Top 8th Exporting Country (2022)	Top 9th Exporting Country (2022)	Top 10th Exporting Country (2022)
SECTION VI(28-38)	Products Of the Chemical or Allied Industries	Germany - 20.9	China- 13.6	South Korea- 8.4	US- 8.8	Thailand-8.2	Netherlands-5.8	Singapore- 5.5	Belgium- 5.5	Spain-5.2	Saudi Arabia- 4.4
SECTION V(25-27)	Mineral Products	USA 22.1%	Mexico 17.9%	Netherlands 7.2%	Malaysia 6.9%	UK 6.7%	South Africa 4.4%	Poland 4%	Belgium 3.6%	Norway 3.1%	Canada 3.1%
SECTION V(25-27)	Mineral Products	Qatar 12.9%	Kazakhstan 11.4%	Canada 11%	USA 7.1%	India 6.5%	Russian Federation 6	Oman 4.6%	Kuwait 4.6%	Iran 4.4%	Zambia 4.3%
SECTION V(25-27)	Mineral Products	Qatar 12.9%	Kazakhstan 11.4%	Canada 11%	USA 7.1%	India 6.5%	Russian Federation 6	Oman 4.6%	Kuwait 4.6%	Iran 4.4%	Zambia 4.3%
SECTION XVIII (90-92)	Optical, Photographic, Cinematographic, and other articles	USA 19.1%	Ireland 15.6%	Netherlands 12.9%	Mexico 8.5%	China 6.9%	Germany 6.1	Costa Rica 5.1	Belgium 3.1	Malaysia 3.1	Japan 2.7
SECTION XV (72-83)	Base Metal & Articles of Base Metal	Canada 14.6%	USA 12.5%	UK 11.9%	France 9.3%	Japan 7.1%	Poland 5.2%	Germany 5.1%	Mexico 3.9	Belgium 3.4	Australia 3.1%
SECTION XV (72-83)	Base Metal & Articles of Base Metal	USA 18.6	Germany 17.3	Sweden 12.1	UK 9	China 8.9	France 7.9	Japan 7.6	Italy 7	Netherlands 2.5	India 2
SECTION VI(28-38)	Products Of the Chemical or Allied Industries	China 32.9	France 11.7	USA 8.6	UK 8	Netherlands 7.9	Germany 5.6	Spain 3.8	India 3.6	Iran 3.3	Italy 1.9
SECTION XVI (84-85)	Machinery And Mechanical Appliances; Transport Vehicles	USA 19.6	China 11.8	Germany 11	Italy 10.7	Japan 10.6	Belgium 5.4	Singapore 4.5	UK 4.1	Netherlands 2.9	South Korea 2.3
SECTION V(25-27)	Mineral Products	China 58.5	Spain 18.2	Turkiye 5	Russia 1.9	Serbia 1.9	Pakistan 1.8	Guatemala 1.8	Slovakia 1.7	Ireland 1.4	USA 1
SECTION X(47-49)	Pulp Of Wood or Of Other Fibrous Cellulose	USA 36.6	UK 9.8	France 6.5	Netherlands 5.9	Japan 4.4	Italy 3.4	Canada 3	Belgium 2.5	Australia 2.4	Poland 2.4
SECTION XVI (84-85)	Machinery And Mechanical Appliances; Transport Vehicles	China - 23.7	Switzerland - 9.3	Germany - 9.2	Japan - 5.2	France - 4.8	Vietnam - 4.7	Mexico - 4.5	USA - 4.5	Thailand - 3.5	Hong Kong, China - 3.4
SECTION VII(39-40)	Plastics And Articles Thereof, Rubber and other articles	Germany - 15	South Korea - 13.4	Netherlands - 12	Belgium - 11.8	USA - 11.4	Malaysia - 6.5	Japan - 5.8	Thailand - 5.1	Chinese Taipei - 4	China - 3.6
SECTION VI(28-38)	Products Of the Chemical or Allied Industries	Indonesia - 42.5	Malaysia - 21.1	Netherlands - 9.2	Belgium - 4.8	India - 3.6	Germany - 3.5	Argentina - 1.9	Spain - 1.9	Thailand - 1	USA - 0.9
SECTION XVI (84-85)	Machinery And Mechanical Appliances; Transport Vehicles	China - 23.7	Switzerland - 9.3	Germany - 9.2	Japan - 5.2	France - 4.8	Vietnam - 4.7	Mexico - 4.5	USA - 4.5	Thailand - 3.5	Hong Kong, China - 3.4
SECTION V(25-27)	Mineral Products	China- 46.5	Netherlands-5.2	Germany- 4.8	Turkey- 4.7	Brazil-4	USA-3.9	Israel-3.6	Slovakia- 3.6	Spain-3.5	Japan-3.3
SECTION V(25-27)	Mineral Products	Australia- 14.8	Bolivia- 12.7	USA-11.2	Peru- 10.8	Sweden-4.1	Turkey- 3.8	Belgium- 3.8	South Africa-3.7	Russian Federation- 3.7	Chile-3
SECTION V(25-27)	Mineral Products	Australia- 38.7	Chile-12.2	Germany-10.2	Netherlands-8.9	USA- 7.4	Belgium- 2.8	South Africa- 2.5	Chinese taipei- 2	France- 1.5	Japan- 1.5
SECTION V(25-27)	Mineral Products	Russian Federation- 4	China-8.7	Indonesia- 5	Vietnam- 4.9	Belgium- 3.1	Peru-2.4	South Africa-1.9	USA-1.7	Germany-0.7	Lao PDR- 0.7
SECTION VI(28-38)	Products Of the Chemical or Allied Industries	China- 33.3	USA-17.5	Vietnam-11.8	South Korea-7	Brazil- 5.7	Italy-4.3	Hungary-2.6	Japan-2.1	Malaysia- 2.1	Thailand-1.9
SECTION V(25-27)	Mineral Products	Netherlands- 28.5	Belgium- 15.8	Russian Federation- 15.8	USA- 5.6	Denmark- 4.7	UK- 4.6	Sweden-4.4	Germany-4.4	Estonia-3.7	France- 3.4
SECTION XVI (84-85)	Machinery And Mechanical Appliances; Transport Vehicles	Chinese taipei- 54.1	Netherlands- 6.4	Poland- 5.9	China- 5.4	Mexico- 3.9	Italy- 3.8	Israel- 3.2	Philippines- 2.8	South Korea- 2.7	Portugal- 2.3
SECTION VII(28-38)	Products Of the Chemical or Allied Industries	Morocco - 27.8%	China - 24%	Saudi Arabia - 22.2%	Russian Federation - 11.4%	USA - 4.2%	Australia - 3.4%	Tunisia - 2.4%	Turkiye - 1%	Vietnam - 0.8%	Belgium - 0.8%

Source: Author's Assessment

◆ **Exports side Analysis**

The export side analysis of the model, specifically India's exports to the UAE, has been further categorized by revealed comparative advantage (RCA) to understand the impact of FTA concessions. RCA measures a country's relative efficiency in producing specific goods compared to the world average. By calculating RCA, we can identify sectors where India holds a competitive edge. Analyzing RCA allows us to determine if post-FTA export surges are aligned with India's strengths. If export growth is observed in sectors with high RCA, it indicates that FTA concessions have enabled India to capitalize on its competitive advantages.

This suggests that trade policies are effectively leveraging India’s strengths, leading to increased market penetration in the UAE. Alternatively, if export surges occur in sectors with low RCA, it might imply diversification efforts or the influence of other factors, such as demand shifts in the UAE or strategic trade policies. However, sustained growth in high RCA sectors post-FTA would confirm the benefit of the trade agreement in strengthening sectors where India excels, thereby enhancing overall trade performance and economic gains.

RCA²⁵ matrix is calculated by:

$$RCA_{ij} = (X_{ij}/X_i)/(X_{wj}/X_w)$$

where,

X_{ij} = India’s Exports of commodity j to the world

X_{wj} = World Exports of commodity j.

X_i = Total Exports of India.

X_w = Total World Exports as an indication of Global Exports.

Table 11: Identified sectors with export surge and decline post FTA, with Revealed comparative advantage.²⁶

Sections	Description	Surge in Exports Post-FTA with RCA >1 (No. of HS 6 digit lines)	Decline in exports Post-FTA with RCA >1 (No. of HS 6 digit lines)	Grand Total
SECTION I (01-05)	Live Animals, Animal Products	16	9	25
SECTION II (06-14)	Vegetable Products	51	27	78
SECTION III (15)	Animal Or Vegetable Fats and Oils and Their Cleavage Products; Prepared Edible Fats; Animal or Vegetable Waxes	5	2	7
SECTION IV (16-24)	Prepared Foodstuffs, Beverages, Spirits and Vinegar, Tobacco and Manufactured Tobacco Substitutes	19	9	28
SECTION IX (44-46)	Wood And Articles of Wood; Wood Charcoal; Cork and Articles of Cork; Manufactures of Straw, Of Esparto or Of Other Plaiting Materials; Basket ware and Wickerwork.	6	1	7
SECTION V(25-27)	Mineral Products	19	12	31
SECTION VI(28-38)	Products Of the Chemical or Allied Industries	165	87	252

²⁵ In this analysis, the Revealed Comparative Advantage (RCA) is calculated for the year 2022. An RCA greater than 1 is considered to represent export strength.

²⁶ The above table is shared in Annexure with identified HS 6 Codes for the respective sectors.

Sections	Description	Surge in Exports Post-FTA with RCA >1 (No. of HS 6 digit lines)	Decline in exports Post-FTA with RCA >1 (No. of HS 6 digit lines)	Grand Total
SECTION VII(39-40)	Plastics And Articles Thereof, Rubber and Articles Thereof	25	9	34
SECTION VIII(41-43)	Raw Hides and Skins, Leather, Furskins & Articles Thereof; Saddlery and Harness; Travel Goods, Handbags and Similar Containers; Articles of Animal Gut (Other Than Silk-Worm Gut)	9	6	15
SECTION X(47-49)	Pulp Of Wood or Of Other Fibrous Cellulosic Material; Recovered (Waste and Scrap) Paper Or Paperboard; Paper And Paperboard & Articles Thereof	16	6	22
SECTION XI (50-63)	Textile & Textile Articles	202	87	289
SECTION XII (64-67)	Footwear, Headgear, Umbrellas, Sun Umbrellas, Walking-Sticks, Seat-Sticks, Whips, Riding-Crops and Parts Thereof, Prepared Feathers and Articles Made Theewith; Artificial Flowers; Articles of Human Hair	6	1	7
SECTION XIII (68-70)	Articles Of Stone, Plaster, Cement, Asbestos, Mica or Similar Materials; Ceramic Products; Glass and Glassware	16	14	30
SECTION XIV (71)	Natural Or Cultured Pearls, Precious or Semi-Precious Stones, Precious Metals Clad with Precious Metal and Articles Thereof; Imitation Jewellery; Coin	9	2	11
SECTION XV (72-83)	Base Metal & Articles of Base Metal	84	42	126
SECTION XVI (84-85)	Machinery And Mechanical Appliances; Electrical Equipment and Parts Thereof; Sound Recorders and Reproducers, Television Image and Sound Recorders and Reproducers, And Parts and Accessories of Such Articles	100	54	154
SECTION XVII (86-89)	Vehicles; Aircraft; Vessels & Associated Transport Equipment	17	7	24
SECTION XVIII (90-92)	Optical, Photographic, Cinematographic, Measuring, Checking, Precision, Medical or Surgical Instruments and Apparatus; Clocks and Watches; Musical Instruments; Parts and Accessories Thereof	9	6	15
SECTION XX (94-96)	Miscellaneous Manufactured Articles	12	4	16
Grand Total		786	385	1171

Source: Author's Assessment

Table 11 illustrates that following the signing of the Comprehensive Economic Partnership Agreement (CEPA), some sectors saw increase in exports while others saw a decrease. The sectors which experienced surges in exports from India are Textile & Textile Articles, Products of the Chemical or Allied Industries and Machinery and Mechanical Appliances. Sectors which did not respond well to the benefits of FTA despite having RCA >1 are Vehicles; Aircraft;

Vessels & Associated Transport Equipment, Base Metal & Articles of Base Metal and Vegetable Products. To leverage the benefits of the FTA from sectors with a Revealed Comparative Advantage greater than 1, India should focus on identifying and addressing the barriers that might affect the industries from taking the advantage.

ii. India-Korea, CEPA

The analysis for this Free Trade Agreement (FTA) is centred around the period of 2010-2020, which marks the years of the FTA's proper establishment. This time span provides a more accurate understanding of the impact of tariff concessions, as at most tariff eliminations are phased over an 8-year period. Consequently, this period enables a more precise identification of sectors that experienced surges in exports and imports as compared to the above model. In this model we exercised similar shocks, and filters of positive deviations, then categorising within the bands and mapping of tariff concessions as previously done in the model above. The import surges are recognised and further categorised under tariff concessions. A detailed table of identified sectors can be utilised to understand the impact.

Building on the economic logic from the India-UAE Model, the India-Korea RP model was examined on the same grounds, and the respective results are presented below.

Table 12: Identified sectors that experienced surges in imports post FTA

Sections	Description	Expected Deviations (>10%)	Extremely High Deviations (>100%)	High Deviations (50%-75%)	Modest Deviations (10%-25%)	Significant Deviations (25%-50%)	Very High Deviations (75%-100%)
SECTION II (06-14)	Vegetable Products		1	1			
SECTION IV (16-24)	Prepared Foodstuffs, Beverages, Spirits and Vinegar, Tobacco and Manufactured Tobacco Substitutes						1
SECTION VI(28-38)	Products Of the Chemical or Allied Industries	1	2	1		2	
SECTION VII(39-40)	Plastics And Articles Thereof, Rubber and Articles Thereof		1	3		1	
SECTION VIII(41-43)	Raw Hides and Skins, Leather, Furskins & Articles Thereof;		1				

Sections	Description	Expected Deviations (>10%)	Extremely High Deviations (>100%)	High Deviations (50%-75%)	Modest Deviations (10%-25%)	Significant Deviations (25%-50%)	Very High Deviations (75%-100%)
	Saddlery and Harness; Travel Goods, Handbags and Similar Containers; Articles of Animal Gut (Other Than Silk-Worm Gut)						
SECTION X(47-49)	Pulp Of Wood or Of Other Fibrous Cellulosic Material; Recovered (Waste and Scrap) Paper Or Paperboard; Paper And Paperboard & Articles Thereof				1	1	
SECTION XI (50-63)	Textile & Textile Articles	1	15	3	2	2	5
SECTION XIII (68-70)	Articles Of Stone, Plaster, Cement, Asbestos, Mica or Similar Materials; Ceramic Products; Glass and Glassware	1	1	1	1	1	
SECTION XIV (71)	Natural Or Cultured Pearls, Precious or Semi-Precious Stones, Precious Metals Clad with Precious Metal and Articles Thereof; Imitation Jewellery; Coin		1				
SECTION XV (72-83)	Base Metal & Articles of Base Metal		4				3
SECTION XVI (84-85)	Machinery And Mechanical Appliances; Electrical Equipment and Parts Thereof; Sound Recorders and Reproducers, Television Image and Sound Recorders and Reproducers, And Parts and Accessories of Such Articles		15	4	3	4	5
SECTION XVII (86-89)	Vehicles; Aircraft; Vessels & Associated Transport Equipment						1
SECTION XVIII (90-92)	Optical, Photographic, Cinematographic, Measuring, Checking, Precision, Medical or Surgical Instruments and Apparatus; Clocks and Watches; Musical Instruments; Parts and Accessories Thereof		6	2			2
SECTION XX (94-96)	Miscellaneous Manufactured Articles				1		
Grand Total		3	47	15	8	11	17

Source: Author's Assessment

Table 12 suggests that several sectors mentioned above have experienced an upward trend in India's imports from Korea RP post FTA. The deviations include extremely high and high

deviations in Vegetables Products and Products of the Chemical or Allied Industries. Textile saw numerous deviations across all the bands, indicating a substantial increase in imports. Significant deviations were also observed in Plastics and Articles Thereof, Machinery and Mechanical Appliances, and Optical Photography Instruments. These findings indicate an increased demand for these sectors in India following the FTA.

Table 13: Impact of Free Trade Agreement on Import Surges: Detailed Analysis of 35 Product lines from Korea RP to India in highlighted sectors

Sectors	Sector Description	HS 6-Digit	Deviation	CAGR Korea exports to the World (2018-2022)	CAGR India's imports from the world (2018-2022)
SECTION VI(28-38)	Products Of the Chemical or Allied Industries	283711	53%	-4%	-8%
SECTION VI(28-38)	Products Of the Chemical or Allied Industries	291732	65%	-25%	-20%
SECTION VI(28-38)	Products Of the Chemical or Allied Industries	294110	69%	-26%	-4%
SECTION VI(28-38)	Products Of the Chemical or Allied Industries	300439	57%	-3%	-9%
SECTION VI(28-38)	Products Of the Chemical or Allied Industries	320411	85%	-3%	-6%
SECTION VI(28-38)	Products Of the Chemical or Allied Industries	320420	172%	-2%	-8%
SECTION VII(39-40)	Plastics And Articles Thereof, Rubber and Articles Thereof	391290	71%	-28%	-3%
SECTION X(47-49)	Pulp Of Wood or Of Other Fibrous Cellulosic Material; Recovered (Waste and Scrap) Paper Or Paperboard; Paper And Paperboard & Articles Thereof	481910	92%	0%	-3%
SECTION X(47-49)	Pulp Of Wood or Of Other Fibrous Cellulosic Material; Recovered (Waste and Scrap) Paper Or Paperboard; Paper And Paperboard & Articles Thereof	490810	72%	-22%	-3%
SECTION XI (50-63)	Textile & Textile Articles	540754	105%	-2%	-10%
SECTION XI (50-63)	Textile & Textile Articles	540772	96%	-17%	0%
SECTION XI (50-63)	Textile & Textile Articles	550510	130%	-2%	-14%

Sectors	Sector Description	HS 6-Digit	Deviation	CAGR Korea exports to the World (2018-2022)	CAGR India's imports from the world (2018-2022)
SECTION XI (50-63)	Textile & Textile Articles	560394	66%	-2%	-9%
SECTION XI (50-63)	Textile & Textile Articles	580429	67%	-9%	-18%
SECTION XI (50-63)	Textile & Textile Articles	580710	355%	-9%	-3%
SECTION XI (50-63)	Textile & Textile Articles	580790	263%	-11%	-3%
SECTION XI (50-63)	Textile & Textile Articles	590310	50%	-5%	-9%
SECTION XIII (68-70)	Articles Of Stone, Plaster, Cement, Asbestos, Mica or Similar Materials; Ceramic Products; Glass and Glassware	700992	94%	0%	-4%
SECTION XV (72-83)	Base Metal & Articles of Base Metal	721240	95%	-1%	-1%
SECTION XV (72-83)	Base Metal & Articles of Base Metal	761090	89%	-5%	-12%
SECTION XV (72-83)	Base Metal & Articles of Base Metal	780110	67%	-2%	-18%
SECTION XV (72-83)	Base Metal & Articles of Base Metal	790120	57%	-3%	-12%
SECTION XV (72-83)	Base Metal & Articles of Base Metal	810110	59%	-4%	-2%
SECTION XVI (84-85)	Machinery And Mechanical Appliances; Electrical Equipment and Parts Thereof; Sound Recorders and Reproducers, Television Image and Sound Recorders and Reproducers, And Parts and Accessories of Such Articles	841239	77%	-1%	-5%
SECTION XVI (84-85)	Machinery And Mechanical Appliances; Electrical Equipment and Parts Thereof; Sound Recorders and Reproducers, Television Image and Sound Recorders and Reproducers, And Parts and Accessories of Such Articles	843149	64%	-3%	-3%
SECTION XVI (84-85)	Machinery And Mechanical Appliances; Electrical Equipment and Parts Thereof; Sound Recorders and Reproducers, Television Image and Sound Recorders and Reproducers, And Parts and Accessories of Such Articles	847170	104%	-53%	-2%
SECTION XVI (84-85)	Machinery And Mechanical Appliances; Electrical Equipment and Parts Thereof; Sound Recorders and Reproducers,	847180	94%	-1%	-2%

Sectors	Sector Description	HS 6-Digit	Deviation	CAGR Korea exports to the World (2018-2022)	CAGR India's imports from the world (2018-2022)
	Television Image and Sound Recorders and Reproducers, And Parts and Accessories of Such Articles				
SECTION XVI (84-85)	Machinery And Mechanical Appliances; Electrical Equipment and Parts Thereof; Sound Recorders and Reproducers, Television Image and Sound Recorders and Reproducers, And Parts and Accessories of Such Articles	848291	86%	-7%	-2%
SECTION XVI (84-85)	Machinery And Mechanical Appliances; Electrical Equipment and Parts Thereof; Sound Recorders and Reproducers, Television Image and Sound Recorders and Reproducers, And Parts and Accessories of Such Articles	853339	112%	-29%	-14%
SECTION XVI (84-85)	Machinery And Mechanical Appliances; Electrical Equipment and Parts Thereof; Sound Recorders and Reproducers, Television Image and Sound Recorders and Reproducers, And Parts and Accessories of Such Articles	853661	77%	-8%	-4%
SECTION XVIII (90-92)	Optical, Photographic, Cinematographic, Measuring, Checking, Precision, Medical or Surgical Instruments and Apparatus; Clocks and Watches; Musical Instruments; Parts and Accessories Thereof	900659	78%	-9%	-17%
SECTION XVIII (90-92)	Optical, Photographic, Cinematographic, Measuring, Checking, Precision, Medical or Surgical Instruments and Apparatus; Clocks and Watches; Musical Instruments; Parts and Accessories Thereof	902990	93%	-27%	-17%
SECTION XVIII (90-92)	Optical, Photographic, Cinematographic, Measuring, Checking, Precision, Medical or Surgical Instruments and Apparatus; Clocks and Watches; Musical Instruments; Parts and Accessories Thereof	903110	85%	-27%	-9%
SECTION XVIII (90-92)	Optical, Photographic, Cinematographic, Measuring, Checking, Precision, Medical or Surgical Instruments and Apparatus; Clocks and Watches; Musical Instruments; Parts and Accessories Thereof	903210	91%	-11%	-2%
SECTION XX (94-96)		950790	77%	0%	-1%

Source: Author's Assessment

Table 13 highlights that post-FTA, India's imports from Korea RP increased significantly across 35 product lines despite of a general decline in Global exports from Korea RP and

India’s imports in these sectors. Also increases were seen in Products of the Chemical or Allied Industries, Textile, and Machinery and Mechanical Appliances with deviations exceeding 50%. These surge is attributed to the FTA’s tariff reductions and improved trade facilitation, which enhanced the competitiveness of Korean products and stimulated demand in the Indian market.

Table 14: Potential High-Risk Sectors for Import Surges Post-FTA with High Likelihood of Rules of Origin Violations in India-Korea RP

Sectors	Sector Description	Top 1st Exporting Country (2022)	Top 2nd Exporting Country (2022)	Top 3rd Exporting Country (2022)	Top 4th Exporting Country (2022)	Top 5th Exporting Country (2022)	Top 6th Exporting Country (2022)	Top 7th Exporting Country (2022)	Top 8th Exporting Country (2022)	Top 9th Exporting Country (2022)	Top 10th Exporting Country (2022)
SECTION VI(28-38)	Products Of the Chemicals	Italy (17.9%)	Germany (14.5%)	Switzerland (10.6%)	Belgium (10.6%)	France (10.6%)	Austria (7.6%)	USA (4.7%)	UK (3.6%)	Netherlands (3.5%)	Canada (2.5%)
SECTION VI(28-38)	Products Of the Chemicals	China (24.8%)	Switzerland (14.5%)	India (11%)	Germany (10.6%)	Spain (6.6%)	USA (6.2%)	Belgium (4.9%)	Brazil (4.9%)	Taipei (3.8%)	Netherlands (3.5%)
SECTION VII(39-40)	Plastics And Articles Thereof	USA (28.9%)	China (14.5%)	Germany (12.1%)	Ireland (10.2%)	India (6%)	Taipei (5.4%)	Japan (4.2%)	Thailand (4.2%)	Netherlands (3.5%)	Belgium (2%)
SECTION X(47-49)	Pulp Of Wood or Of Other Fibrous Cellulosic Material	China (15.7%)	USA (12%)	Germany (11.1%)	Poland (5.8%)	Italy (5.1%)	Austria (3.6%)	Netherlands (3.6%)	Spain (3.1%)	Belgium (3%)	Turkiye (2.9%)
SECTION XI (50-63)	Textile & Textile Articles	Belgium (21.1%)	USA (11.5%)	Morocco (7.7%)	Netherlands (7.7%)	UK (4.7%)	Germany (4.7%)	Turkiye (4.4%)	Japan (4.1%)	India (3.2%)	Italy (2.8%)
SECTION XIII (68-70)	Articles Of Stone, Plaster, Cement, Concrete Or Other Building Materials	China (72.2%)	Viet Nam (2.1%)	Germany (2.1%)	Poland (2.6%)	India (2.3%)	Italy (2.2%)	USA (1.9%)	Netherlands (1.9%)	Belgium (1.1%)	Spain (1.1%)
SECTION XV (72-83)	Base Metal & Articles of Base Metal	China (31.5%)	Germany (12.1%)	Poland (5.7%)	Austria (4.8%)	Canada (3.7%)	Netherlands (3.7%)	Viet Nam (3.1%)	Italy (3.1%)	Turkiye (2.8%)	USA (2.8%)
SECTION XVI (84-85)	Machinery And Mechanical Appliances	China (23.6%)	Thailand (19.1%)	USA (9.5%)	Hong Kong (8.7%)	Mexico (4.4%)	Netherlands (4.4%)	Philippines (4.4%)	Ireland (3.9%)	Germany (3.8%)	Singapore (3.4%)
SECTION XVI (84-85)	Machinery And Mechanical Appliances	Hong Kong (24.4%)	China (24.4%)	Taipei (8.4%)	Malaysia (6.5%)	USA (6.3%)	Netherlands (6.3%)	Mexico (4.1%)	Germany (2.8%)	Viet Nam (2.8%)	Czech Republic (2.1%)
SECTION XVI (84-85)	Machinery And Mechanical Appliances	China (25.4%)	Germany (13.1%)	Japan (9.3%)	USA (6.6%)	Poland (6.2%)	Italy (6.2%)	Spain (3.6%)	India (3.1%)	Slovakia (2.7%)	Thailand (2.6%)
SECTION XVI (84-85)	Machinery And Mechanical Appliances	USA (20.2%)	Belgium (13.1%)	Thailand (7.7%)	Germany (6.6%)	Malaysia (5.4%)	Estonia (4.8%)	China (4.1%)	France (3.3%)	Italy (3.2%)	Turkiye (3%)
SECTION XVI (84-85)	Machinery And Mechanical Appliances	China (58.1%)	Italy (7.1%)	USA (5%)	Germany (4.8%)	Mexico (3.8%)	UK (2.6%)	Japan (2.1%)	Poland (1.5%)	Spain (1%)	Netherlands (1%)
SECTION XVIII (90-99)	Optical, Photographic, Cinematographic, Apparatus, Equipment, Kits And Components	Hong Kong (16.1%)	Viet Nam (16.1%)	China (9.9%)	Thailand (8.7%)	Singapore (8.7%)	Netherlands (8.7%)	USA (4.3%)	Japan (2.6%)	Poland (1.8%)	France (1.8%)
SECTION XVIII (90-99)	Optical, Photographic, Cinematographic, Apparatus, Equipment, Kits And Components	Germany (16.1%)	Mexico (10.7%)	Hong Kong (10.7%)	Slovakia (8.7%)	Japan (7.7%)	China (7.1%)	Philippines (7.1%)	France (3.9%)	USA (2.8%)	Switzerland (2.6%)
SECTION XVIII (90-99)	Optical, Photographic, Cinematographic, Apparatus, Equipment, Kits And Components	China (17.6%)	Germany (12.1%)	Mexico (10.8%)	USA (6%)	Italy (5.8%)	France (5.2%)	Hong Kong (5.2%)	Malaysia (4.9%)	Czech Republic (4.9%)	Taipei (2.5%)

Source: Author’s Assessment

The table above, reveals that these significant import surges from Korea RP in sectors such as Products of Chemical or Allied Industries, Plastics and Articles Thereof, Textiles, and Machinery and Mechanical Appliances post-FTA, despite global export declines and reduced imports from other countries. The surges especially in sectors where Korea RP is not the sole major exporter, suggest potential RoO violations. This indicates that goods from non-FTA countries might be minimally processed or transhipped through Korea to exploit tariff benefits, raising concerns about the integrity of the FTA and highlighting high-risk sectors for RoO circumvention.

Further, the export surges and decline are synchronised with sectors identified to have RCA >1 to see how well the FTA was in favour with Indian manufacturers. The RCA of Indian exports is calculated for 2020.

Table 15: Identified sectors with export surge and decline post FTA, with Revealed comparative advantage.

Sections	Description	Surge in exports post FTA with RCA >1 (No. of HS 6 digit lines)	Decline in exports post FTA with RCA >1 (No. of HS 6 digit lines)
SECTION I (01-05)	Live Animals, Animal Products	-	1
SECTION II (06-14)	Vegetable Products	6	2
SECTION IV (16-24)	Prepared Foodstuffs, Beverages, Spirits and Vinegar, Tobacco and Manufactured Tobacco Substitutes	1	2
SECTION V (25-27)	Mineral Products	9	4
SECTION VI (28-38)	Products Of the Chemical or Allied Industries	41	27
SECTION VII (39-40)	Plastics And Articles Thereof, Rubber and Articles Thereof	2	-
SECTION VIII(41-43)	Raw Hides and Skins, Leather, Furskins & Articles Thereof; Saddlery and Harness; Travel Goods, Handbags and Similar Containers; Articles of Animal Gut (Other Than Silk-Worm Gut)	5	2
SECTION X(47-49)	Pulp Of Wood or Of Other Fibrous Cellulosic Material; Recovered (Waste and Scrap) Paper Or Paperboard; Paper And Paperboard & Articles Thereof	1	-
SECTION XI (50-63)	Textile & Textile Articles	27	25
SECTION XII (64-67)	Footwear, Headgear, Umbrellas, Sun Umbrellas, Walking-Sticks, Seat-	2	2

Sections	Description	Surge in exports post FTA with RCA >1 (No. of HS 6 digit lines)	Decline in exports post FTA with RCA >1 (No. of HS 6 digit lines)
	Sticks, Whips, Riding-Crops and Parts Thereof, Prepared Feathers and Articles Made Theewith; Artificial Flowers; Articles of Human Hair		
SECTION XIII (68-70)	Articles Of Stone, Plaster, Cement, Asbestos, Mica or Similar Materials; Ceramic Products; Glass and Glassware	5	3
SECTION XIV (71)	Natural Or Cultured Pearls, Precious or Semi-Precious Stones, Precious Metals Clad with Precious Metal and Articles Thereof; Imitation Jewellery; Coin	1	5
SECTION XV (72-83)	Base Metal & Articles of Base Metal	6	3
SECTION XVI (84-85)	Machinery And Mechanical Appliances; Electrical Equipment and Parts Thereof; Sound Recorders and Reproducers, Television Image and Sound Recorders and Reproducers, And Parts and Accessories of Such Articles	7	8
SECTION XVII (86-89)	Vehicles; Aircraft; Vessels & Associated Transport Equipment	-	1
SECTION XVIII (90-92)	Optical, Photographic, Cinematographic, Measuring, Checking, Precision, Medical or Surgical Instruments and Apparatus; Clocks and Watches; Musical Instruments; Parts and Accessories Thereof	1	1

Sections	Description	Surge in exports post FTA with RCA >1 (No. of HS 6 digit lines)	Decline in exports post FTA with RCA >1 (No. of HS 6 digit lines)
SECTION XX (94-96)	Miscellaneous Manufactured Articles	1	2
Grand Total		115	88

Source: Author's Assessment

Table 15 reveals that post-FTA, India's exports to Korea RP saw significant changes. Sectors like Products of the chemical or Allied Industries and Textile experienced both substantial export surges. Mineral Products and Machinery & Mechanical Appliances showed considerable increases in exports. While Vegetable Products and Raw Hides and Skins, Leather sectors saw more surges than declines, sectors such as Live Animals, Animal Products, Natural or Cultured Pearls, and Vehicles primarily experienced declines. The need to focus on sectors underperforming despite the benefits requires enhancing industry capabilities, improving market access.

Conclusion: Post FTA Analysis

The methodology proposed by our paper is a straightforward and adaptable methodology that stands out for its simplicity and ease of use. By employing trend analysis on two FTA models, our methodology demonstrates its versatility across diverse country scenarios. Computable General Equilibrium (CGE) Models can be challenging for end-users to interpret while our approach offers a clear and accessible alternative for both industry professionals and policymakers. The establishment of an FTA Monitoring Committee, as previously suggested by Finance Minister Nirmala Sitharaman, can further enhance the effectiveness of this methodology by providing annual reports that track FTA performance. This systemic approach not only bridges the gap between sophisticated economic models and practical application but also supports evidence-based policy formation. By improving data collection processes, particularly in merchandise trade documentation, we can address current data limitations and offer more accurate evaluation of FTA utilization. Ultimately, our methodology of post-Facto analysis empowers stakeholders to make informed decisions, ensuring the economic gains from

trade agreements are fully realized and that industries can better leverage the concessions available to them.

IV. Policy Recommendation and Conclusion

The Pre- and Post- Facto Analysis, i.e., the vulnerability index and trend analysis presented in this research paper highlights a pragmatic approach to identify and address sector specific vulnerability in trade negotiations and agreements. These methodologies, grounded in a straightforward and intuitive analysis, serve as a vital tool for both policymakers and stakeholders.

The vulnerability index offers a preparatory framework for understanding potential vulnerabilities in various product lines before formal trade agreement negotiations commence. By assessing vulnerability through the assignment of scores and weights to different indicators, the analysis enables the identification of a country's generic vulnerabilities as well as sector-specific concerns. This dual focus allows for customized applications of the methodology, tailoring it to specific sectors or partner countries as needed. Such flexibility is crucial in adapting the analysis to the unique economic and strategic considerations of each trade partnership. In the pre-FTA stage, this categorization of vulnerability serves as a foundational step for stakeholder consultations. By engaging with ministries, industrial bodies, and exports promotion councils, policymakers can validate the data-driven findings against real-world experiences and concerns. This collaborative process ensures a comprehensive understanding of the vulnerabilities, including potential trade barriers not captured by the data alone.

The trend analysis's simplicity and ease of use, contrast with the more complex models like CGE models, making it accessible to a wider audience, including industry professionals and policymakers. The proposed establishment of an FTA monitoring committee, as advocated by Finance Minister Nirmala Sitharaman, can further bolster this approach by providing annual reports on FTA performance, thus bridging the gap between sophisticated economic models and practical applications. To enhance the effectiveness of this methodology, improvements in data collection, particularly in merchandise trade documentation, are necessary. These enhancements will provide more accurate evaluations of FTA utilisation and support evidence-based policy formation. Ultimately, these analytical methods empowers stakeholders to make

informed decision, ensuring that the economic benefits of trade agreements are fully realized and that industries can maximize the advantages available to them.

Final Observations

The authors would like to reiterate a few points about this suggested approach for Pre and Post FTA analysis. We have three main objectives behind our attempt at developing a simple to understand, apply and use approach. These are:

1. Developing shared understanding and approach facilitating debate and efficient trade-offs:

A transparent and easy to understand methodology based on intuitive economic logic allows participants to challenge the different assumptions (weights or scores). Such challenges would have to be based on evidence and objective data, leading to more informed evidence-based debate. This is increasingly crucial as Indian policymakers would have to make very focused and objective decisions as to which sectors to protect, which to provide transition time to adjust and which to open to competition specific to the FTA partner in question. In a world increasingly defined by geopolitics and realities of friend-shoring, strategic bilateral relationships, including FTA (or FTA like agreements with limited coverage of a few sectors) will assume greater importance. Negotiating and increasingly re-negotiating for these agreements requires such a tool that provides flexibility and a realistic understanding of multiple interests involved in trade-offs that would be inevitable in such negotiating, but without completely sacrificing objectivity and evidence-based decision making that allows for informed trade-offs that are essential to national economic interests.

2. Synchronization between trade and industrial policy:

India's ability to emerge as a major player in the sectors that will drive the global economy in the future will also require a more nuanced selection and prioritization during negotiations. Any trade-off that loses sight of this longer-term goal and does not take into account the emerging landscape of industrial policy in other countries, and industrial policy in India (or any other country that is negotiating) will lead to sub-optimal decisions. Such an approach could lead to over-prioritization of short-term gains over longer-term strategic interests. Hard decisions might need to be made removing protection from certain sectors where such

protection hampers India's competitiveness, while extending it new areas in order to support industrial policy objectives or respond to impact of industrial policy or market distorting policies of other countries. In other words, this would always be a much more dynamic environment with prioritizations changing depending on the partner country or recent developments in that sector globally.

3. Effective monitoring is essential to optimal use of FTAs:

Having easy to use post FTA analysis methods allow for continuous monitoring of trade flows with FTA partner countries, picking up on specific sectoral trends. Initial findings, i.e., deviations from trend can then be further substantiated based on industry inputs on causes for variation from expected trends, or further gleaned simply looking at production and output data in India or globally for specific sectors. Additional information related to policy interventions by other countries, including initiation of new industrial or trade policy measures by major producer or consumer economies for that sector, or major new investments by lead players in that sector can also be considered to nuance the interpretation of deviation from trends. All of this would ensure that a) there is no misutilization FTA preferences by rogue or fraudulent entities and b) a dynamic mapping of how individual sectors are being impacted by an FTA is overtime is institutionalized and maintained. Such continued monitoring therefore would be a critical resource for any discussion or re-negotiation informing issues related to enforcement of rules of origin in the exporting country or at the border in the importing country. It would also serve as critical input to FTA renegotiation, helping nuance analysis of sectoral vulnerabilities-including helping recalibrate the pre FTA analysis discussed earlier.

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ANNEXURE 1

Data Description

For the following analysis, data points have been used at two levels of product disaggregation namely the HS 6-Digit as well as the HS 8-Digit national tariff lines of India. The data sourced is based on the HS Nomenclature 2022 from the United Nations Statistical Division (UNSD). India's national tariff lines at HS 2022 Nomenclature have been used as the base of the analysis.

Bilateral trade of India and its specific partner country considered for the analysis below as well as the global trade patterns of the countries has been extracted from World Integrated Trade Solutions (WITS) by World Bank at HS 6-Digit level of disaggregation. Data points regarding India's bilateral trade with its respective partner country at HS 8-Digit level of disaggregation has been extracted from Directorate General of Commercial Intelligence and Statistics (DGCIS), Ministry of Commerce and Industry, GoI.

India's latest tariff data²⁷ has been extracted at its national tariff lines while the partner countries' tariffs²⁸ have been extracted from Tariff Download Facility at HS 6-Digit level of disaggregation.

²⁷ India's tariff data has been extracted at its national tariff lines applicable as of 1st January 2024, as provided for by Central Board of Customs and Indirect Taxes (CBIC), India.

²⁸ The latest available have been mapped to the HS 2022 base.

ANNEXURE 2

Table 16: Weights assigned to the 17 VIs used for the Vulnerability Analysis of India with respect to South Africa under scenario - 1

Vulnerability Indicators (VIs)	Weights Assigned
India's Customs Duty/Tariff Rates	12.5%
Compound Annual Growth Rate (CAGR) of the Global Import Basket	12.5%
Product Lines under India's Production Linked Incentive (PLI) Scheme	12.5%
India's Import Dependence	12.5%
India's reliance on China as one of its Top 3 Suppliers India's reliance on its FTA Partners¹ as one of the Top 3 Suppliers South Africa as one of India's Top 5 Suppliers South Africa's Global Export Share Product Category South Africa's Tariff Rates High Technology Products Global Import Basket (World Imports from World at HS 6-Digit level of disaggregation averaged from 2020-2022) Elasticity Business Cycle Export Intensity India's transaction Velocity India's transaction Width	Cumulative weight of 50%

Source: Author's Assessment

ANNEXURE 3

Table 17: Weights assigned to the 17 VIs used for the Base Vulnerability Analysis for India with respect to South Africa under scenario - 2

Key Performance Indicators (VIs)	Weights Assigned
<p>India’s Customs Duty/Tariff Rates</p> <p>Product Lines under India’s Production Linked Incentive (PLI) Scheme</p> <p>India’s Import Dependence</p>	<p>Cumulative weight of 40%</p>
<p>South Africa’s Global Export Share</p> <p>Business Cycle</p> <p>Export Intensity</p>	<p>Cumulative weight of 20%</p>
<p>India’s reliance on China as one of its Top 3 Suppliers</p> <p>India’s reliance on its FTA Partners¹ as one of the Top 3 Suppliers</p> <p>South Africa as one of India’s Top 5 Suppliers</p> <p>Product Category</p> <p>South Africa’s Tariff Rates</p> <p>High Technology Products</p> <p>Compound Annual Growth Rate (CAGR) of the Global Import Basket</p> <p>Global Import Basket (World Imports from World at HS 6-Digit level of disaggregation averaged from 2020-2022)</p> <p>Elasticity</p> <p>India’s transaction Velocity</p> <p>India’s transaction Width</p>	<p>Combined weight of 40%</p>

Source: Author’s Assessment

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