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EXPORT-IMPORT BANK OF INDIA

NON-TARIFF MEASURES ON INDIAN EXPORTS

PART-1

Export-Import Bank of India

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Part I

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Overview

Introduction

Non-tariff measures (NTMs) have taken centrestage of any discussion on global trade flows. A large part of these trade flows happen along the global and regional value chains, so the onus of keeping these stumbling blocks out of the way falls on all participants. NTMs impose huge costs on exporters, particularly from developing countries. Interestingly both the developed and developing nations impose NTMs on imports, in order to address safety, health, environment and other similar concerns. The reality, however, is that NTMs are often imposed to protect domestic producers. There is a thin line between NTMs and Non-Tariff Barriers (NTBs) and the discourse around NTMs often has one side defending its action by offering a rationale while the other tries to prove that these measures cause unnecessary obstacles to the smooth flow of trade.

GATT (General Agreement on Trade and Tariffs) was created primarily to bring down import duties (tariffs) which nations had imposed to protect their producers and help the State generate revenue for funding its sovereign functions. Trading nations brought down their tariffs significantly to encourage liberal flows of goods across political borders. While tariffs have come down significantly, global trade flows have been severely impacted by the emerging NTMs that nations have adopted. These measures are created through various policy instruments such as laws, regulations and regulatory practices, presumably to serve national objectives but often used to create new barriers at the borders.

Primary Sources, Literature Survey and Information from Individual Countries

Many studies documenting the NTMs faced by Indian exporters are in the public domain. Most have drawn from the secondary information available on the subject and tried to consolidate specific information at one place. This study has been carried out using three sources of information. First, a survey of exporters in different product areas, exporting to all major destinations of India's export interest. This survey has helped understand industry perceptions related to the Tariff and Non-Tariff Measures they face. An extensive interaction with several Export Promotion Councils has helped in not merely accessing documentation of measures reported to them by their constituents and efforts made to deal with such measures, but also to develop an appreciation of their capacities to assist their constituents. Further, our interactions with some government representatives involved in addressing these issues and an examination of institutional mechanisms available to address these concerns, has provided a basis to consider potential ways of mitigating the effects of such NTMs. The study documents information received from all these sources.

The second source of information is a literature survey on the subject. This examines the emerging trends in the evolution of NTMs faced by exporters from a developing country perspective. The literature survey shows that NTMs are proliferating, increasing in complexity and are directly correlated with the decrease in tariffs. While NTMs engage most of our attention, it would be a mistake to ignore the impact

of various aspects of tariffs on India's exports. The study thus examines the spectrum of issues faced by Indian exports in this regard, including the link or overlap between tariffs and NTMs. It is difficult to comprehend a problem unless its impact is quantified, so the study also attempts an impact analysis of NTMs faced by Indian exports.

The third source includes existing reviews of NTMs adopted by specific countries, such as the annually updated reports by USTR and the EU, the Trade Policy Report prepared by the WTO Secretariat, and specific trade-related documents and announcements by Customs and other agencies of the specific countries covered.

This study provides detailed information on NTMs in various markets and for different products of export interest to India, and also shows the two types of links between tariffs and NTMs. In one case, lower tariffs have been accompanied by NTMs, often with a rise in its incidence. Another is the situation in which certain products face high levels of both tariffs and NTMs. The first part of the report examines the theoretical basis of NTMs and analyses experiences, effects and trends of NTMs and tariff measures while the second part actually documents such measures more specifically adopted by some of India's major trading partners.

Tariffs

While addressing NTBs has become critical to a nation's pursuit of promoting its exports, tariffs continue to engage their attention. It is a common perception that tariffs in the developed world have come down substantially whereas in the developing world they are still significantly higher. This perception is not far from reality, but the fact remains that even in the developed world many tariff peaks can be observed, which form major barriers to exports from the developing world. Tariffs serve many purposes. They protect infant industry in developing economies and allow them space to grow, they help some developing countries in revenue generation and they are instruments to help countries deal with external competition. Tariffs have often been used as tools to promote import substitution-based industrialisation. Lately, tariffs have been used to create barriers on grounds of national security, such as the recent imposition by the United States on several products imported from China. Some in turn have been imposed in retaliation of such measures, equally strongly. Similarly, import duties are quite often imposed through various trade remedial measures such as anti-dumping duties, safeguard duties and countervailing duties, to create a level playing field and address unfair trade practices. An analysis of tariffs in India's main export markets shows that Indian exports face stiff tariffs in major export markets. This is both due to tariff peaks in developed economies and the change in the significance of different markets in Indian exports. An examination of ten dynamic product areas of India's export interest to five top export destinations, which roughly account for 80% of India's total exports of those products, shows that the direction of trade has moved from developed countries to developing countries, where the tariff is higher than average, particularly in China, Nepal and Mexico.

While average tariffs for most products, apart from some food, textile and clothing items are low, tariff peaks in products of export interest to India tend to be high. For example, while the average tariffs on apparel is 12% in the US, on women's skirts and blouses it tends to be over 32%. The examination of average and peak tariff on products of export interest in India's major export destinations shows that they are higher than the simple average of the country. For example, USA's average tariff is 3% whereas for product categories where India has an export interest the simple average rises to 4%. Similarly, for EU, which has an average tariff of 5%, the products of interest to India carry a

tariff of 8%. In the case of Australia, a tariff peak of 163% on transport equipment clearly discourages any exports from India. Tariff peaks, mostly for textiles and clothing which are of interest to India in EU and Japan, are quite high. In the US, coffee, tea and spices have a tariff peak of 51%. Products such as gems and jewellery and pearls, which account for nearly 15% of India's exports, have a tariff peak of 32% whereas leather and footwear have a tariff peak of 56%.

An examination of countries within the medium tariff range imposing an average tariff of 6 to 15%, shows imposition of high tariffs on several products of interest to India. For example, labour-intensive products like coffee, leather and footwear, several food items and light manufacturing products, incur tariff rates of over 10% in the Chinese market. In Indonesia, high tariff peaks on products such as leather, footwear and transport equipment, which are products of export interest to India, have been noticed. Similarly, several other such products find a place in exclusion lists in important FTAs such as the India-ASEAN FTA. Indian exports also face high tariffs in developing countries which follow a high tariff regime, such as Sri Lanka and Thailand (despite India having FTAs with them). Some least developed countries enjoy duty preferences in certain product areas under General Systems of Preferences (GSP) in major markets such as the US and EU, where India, though equally competitive, is deprived of potentially full market access. Another opportunity where India is potentially excluded from a market, is when competitors have preferential arrangements with large markets either as RTAs or through specific programmes, such as arrangements between the EU and Pakistan for textile products.

A curious fact about India's FTAs is the low extent of the utilisation of tariff preferences. While the global utilisation of preferences is as high as 70% to 80%, India generally uses tariff preferences under FTAs only to the extent of 5-25%. This again is dependent on selection of trade partners and the depth of tariff concessions secured from them. Another factor relevant for lesser utilisation of the preferences, inter alia, is the relative ignorance of Indian exporters about the available trade preferences, a fact clearly borne out by the responses in the primary survey. In many cases the exporters are simply not aware of the existence of the FTA or believe that compliance with it will be expensive and time consuming, such as obtaining Rules of Origin certificates. Some of the trade agreements India has negotiated are with countries which have low average tariffs and therefore the likelihood of using the trade preferences is limited. Unless peak tariffs of interest are addressed in such agreements, their utility raises questions. Indian exports are also more responsive to income changes as compared to price changes. Therefore, in a scenario of economic slowdown, the uptake of India's exports is adversely impacted.

Taxonomy of NTMs

NTMs cover a wide variety of measures as shown below, based on a widely accepted classification for these measures.

International classification of NTMs

- A Sanitary and phytosanitary measures
- B Technical barriers to trade
- C Pre-shipment inspection and other formalities
- D Price control measures
- E Licences, quotas, prohibitions and other quantity control measures
- F Charges, taxes and other para-tariff measures
- G Finance measures
- H Anti-competitive measures
- I Trade-related investment measures
- J Distribution restrictions
- K Restrictions on post-sales services
- L Subsidies (excluding export subsidies)
- M Government procurement restrictions
- N Intellectual property

O Rules of origin

P Export-related measures

NTMs can be classified into various categories but the most significant ones for exporters are the Technical Barriers to Trade (TBT) and Sanitary and Phytosanitary Measures (SPS). The measures that are permitted under various agreements of the WTO include among others import licenses, trade remedial measures, Rules of Origin, investment measures and technical regulations that are covered under the SPS and TBT agreements of the WTO. Trade remedial measures include anti-dumping, countervailing and safeguards. Other similar measures include quantitative restrictions, export subsidies, tariff rate quotas, etc. Data from the WTO's integrated trade intelligence portal (I-TIP) shows a total of 64,858 NTMs notified at the WTO between 1995 and December 2018. Out of these, 89% were covered under SPS (37%) and TBT (52%) agreements. The review of TBT and SPS notifications shows a consistent rise in the number of notifications over the years. Between 2010 and 2018 and average of 3600 SPS and TBT notifications per year were issued. Interestingly, both these agreements have a positive mandate for promoting trade and are so worded that members do not use these measures as restrictions creating unnecessary obstacles to international trade. The increase in numbers has also been largely attributed to many least developed and developing countries becoming very active in the notification process at the WTO. Interestingly, some of these countries have been observed to be notifying standards, which even their own producers may not be in a position to follow, creating a suspicion that such regulatory activity is spurred by established foreign producers to ring fence their established markets.

SPS notifications primarily cover food and food products whereas the scope of TBT notifications is much wider. The top ten products, which are covered by the SPS/TBT notifications, are food, chemicals, autos and auto components, electronic products, machinery, iron and steel, construction equipment, cosmetics, fertilisers and pharmaceuticals. The list of top ten countries issuing SPS notifications in the last three years is headed by Brazil followed by Canada, the European Union, United States and Japan in that order. Brazil is a major agriculture exporter, which explains its top position. Developed countries have used the SPS agreement more often, presumably to protect their human, plant and animal health. To what extent these measures are necessary to serve the desired objective, has been examined in the relevant chapters.

Evolution of NTMs

A feature of the relationship between tariffs and NTMs is that as nations bring down their tariff walls, their non-tariff measures increase, many of them proving to be trade barriers for the developing world. Therefore, while on the one hand, through the mechanism of the WTO and a multiplicity of trade agreements, tariff liberalisation may have taken place, in reality non-tariff measures have increased. A study that estimated the ad-valorem equivalent (AVEs) of NTMs at the product level for several countries found that NTMs were higher than tariffs through the period 1997-2015. In fact, tariffs decreased from 10% in 1997 to 4% in 2015 whereas NTM protection grew from 22% in 1997 to 51% in 2009 and remained at that level till 2015. The most frequent NTMs used were technical measures, followed by quality control and to a lesser degree price control and monopolistic measures. NTMs were generally higher for agriculture than manufacturing with a sharp rise post-2008 in the manufacturing sector. It may be of interest to note that the global economy faced serious challenges since 2008 and it is not surprising that many national economies resorted to non-tariff measures to protect their industry while continuing to appear globalisation-friendly by not reviewing tariff structures. Further, within manufacturing, most NTMs were erected in labour-intensive sectors such as

textiles, footwear, machinery and electrical equipment and rubber and plastics. In 2015, textiles figured prominently as one of the most protected sectors.

The evolution of trade protection can also be studied across countries in a regional and income-type context. North America shows a consistent trend of rising protectionism over the period, while most regions and income groups exhibit a fluctuating trend. A regression analysis was done using data from tariffs on products of export interest to India, to test whether NTMs increased when tariffs decreased. The regression analysis verified the inverse co-relation, though the impact of other variables could impact the result. This study shows that there is an inverse co-relation between NTMs and tariffs for Indian exports, i.e. the lower the tariffs the higher the number of NTMs and vice-versa. However, two exceptions stand out-China and Brazil. In these two countries both levels of tariffs and NTMs are high. Moreover, for certain product categories, such as agricultural products, both tariffs and NTMs tend to be high.

After food products, chemicals have received the greatest attention and among all the regulations, European Union's REACH regulation is easily the leader of such non-tariff measures. REACH was introduced in 2007 through a legislative framework with the objective of shifting responsibility from public authorities to the industry with regard to assessing and managing the risks posed by chemicals and providing appropriate safety information for users. It has impacted a wide range of companies across many sectors beyond the chemical industry. The REACH regulation has led to a huge compliance cost for smaller and medium sector enterprises in India. Many smaller producers, in order to implement REACH, had to spend disproportionately even on data collection and management, while their exports were not large enough. A large number of chemical producers turned sub-contractors to the European industry due to the adoption of REACH by the EU because then the onus of registration shifted to their principals. Measures similar to REACH have been adopted thereafter by China, South Korea and Taiwan. These measures have proved to be major trade barriers for developing country exporters and have proved protectionist in the long run.

Among the new array of non-tariff measures, are some which impose conditionality regarding the entire environmental consequences of the product, the process of making the product or its energy-related impact. Now even the Voluntary Water Efficiency Labelling Scheme is being encouraged by some importers such as Hong Kong and Singapore. Newer regulations are being adopted by countries such as US, Mexico, Brazil, Ecuador, Israel and Argentina, on energy conservation and energy efficiency standards for electrical products and appliances. The main focus of these regulations is to promote energy efficiency and reduce wastage of resources. The critical point at which these objectives will transition into the realm of protectionism is difficult to measure now. The expanding array of labour-related standards as applicable to manufacturing and services are being proposed in several countries. Though labour and environment standards are not part of the core trade disciplines, they are introduced as barriers by several countries in their technical regulations or by large buyers as private standards.

The relevant WTO agreements mandate members to notify changes to existing regulations across product categories. Member countries are expected to allow adequate time for other members to offer comments and based on such comments or discussions, if requested, the notifying member is expected to issue notifications. Sixty days is a reasonable time for notifications, between the date of notification to the WTO and the coming into effect of the regulation. SPS

measures that are notified include all relevant laws, decrees, regulatory requirements and procedures, processes and production methods, testing, inspection, certification and approval procedures, quarantine treatment etc. TBT measures cover all technical regulations, standards or conformity assessment procedures except when these are SPS measures, regardless of their objectives. The major hurdles faced by member countries on account of notifications are insufficient notice periods or when the language of notification is other than English. The response to such notification and substantive compliance becomes difficult and expensive, particularly for small and medium industries. Sometimes, the regulations run into scores of pages adding to translation costs. Often web-links to relevant laws or regulations are not provided, making it difficult for other countries to locate them for response or compliance. Some countries even make their regulations priced publications, making access to them difficult and expensive. All these issues can be addressed in committees of the WTO and bilaterally.

The Ecosystem of NTMs

Countries which have imposed a large number of non-tariff measures can be divided into two. First, those who have the technical, human and financial capacities to build a large non-tariff architecture around their international trade. All developed countries have over time built such capacities and as a matter of fact, some of them continue to extend and strengthen them, creating compliance issues and enhancing costs for those who want to access their markets. To what extent all the technical regulations are justified or the practices acceptable, is a debatable point, to say the least.

There is another category of NTMs which, as mentioned above, is increasingly being adopted in developing nations on the basis of advice by some large multinational corporations or by some third country interests. The hidden intent is often to protect the market for such corporations or the third country exports. In the latter case at times it may be observed that even most of the producers of the notifying country themselves may not be able to comply with the standards, leaving the market exclusively to others.

In the area of SPS, NTMs relating to pesticide residue levels play the most critical role in impacting market access for products from developing countries. The fixing of Maximum Residue Limits (MRL) is a very controversial activity. As long as the MRL is fixed on the basis of a universally accepted scientific rationale and a sound risk analysis, there may be no controversy. However, some nations, particularly the European Union, have started adopting the precautionary principle in order to identify such chemicals and to determine their harmful levels. Arguably, this is a debatable issue and not supported by the SPS agreement, which lays critical emphasis on scientific rationale and the language of the agreement is more trade-friendly than to encourage barriers to trade. There is a major debate on two other issues in this area. First, the same country adopts different permissible levels of residues of the same chemical for different products. This discriminatory marker of the ill-effects of pesticide residues is driven most of the time by protectionist intent in favour of a domestic product or producer. Secondly, fixing MRLs at the level of detection unconnected with the levels which are actually harmful to human health is another major concern. It is common knowledge that advancement in the fields of electronics and engineering are improving the technical capacities of machines and equipment, particularly their detection capabilities. These machines can detect a relatively much lower presence of chemicals. But can that alone be a reason for bringing down the MRL further? It is a trade-discouraging practice and increases costs of

compliance. Sometimes the exporter is expected to establish the non-toxicity of a certain chemical used in production/processing of an agricultural product when the relevant chemical is not in use in the importing country. These examples provide a strong basis to establish a sort of nexus between the regulatory practices adopted by the importing country and the interests of sellers of the new equipment.

Sometimes NTMs are based on insufficient scientific information. A case in point is the EU decision to withdraw ten substances for sale and use within the EU on account of their alleged status of being endocrine disruptors. The SPS agreement mandates a scientific justification in cases where national standards differ from international standards. However, such justification is often absent, despite the fact that international standards are formulated after following evolved and inclusive practices by institutions such as Codex Alimentarius. Article 10 of the SPS agreement allows developing countries special and differential treatment, however, the time period given for compliance with such unscientifically fixed levels is often too short and beyond a developing country's capacity for response. The study brings out some interesting cases of lack of standardisation of national regulations with international regulations, for example, where different definitions are adopted for the same or similar product in different countries. An interesting example is that of milk. The illustration in Chapter 3 proves that many countries, which can avoid such distortion by simply adopting internationally acknowledged definitions such as those accepted by the Codex Alimentarius, prefer variation at times to protect their markets or promote their producers. Among the latest in the armoury of SPS measures, which often work as trade barriers, is the new discipline of bio-security regulations, to manage the risk of pests and diseases entering into a given territory. This has added more layers to the enforcement of environmental conditions and compliance much more expensive and difficult. A small exporter, often from a developing or least developed country, suffers the most.

Survey Results

The survey interviewed 587 firms of which over 25% did not report any NTM-related problems. Most of the firms surveyed were small-scale and hence their reactions are of material interest. While the firms themselves could not identify detailed SPS and TBT measures they did report that quality control measures were further aggravated by a complement of other non-tariff measures such as port restrictions, tighter use of conformity assessment procedures, specific tests within the importing countries or inspectors from importing country regulatory agencies to exporting countries and the exporters to bear the costs of these tests and inspections, etc.

The complexity of standards is increasing both in developed and developing countries. However, the problems faced by exporters to developing countries mostly relate to tariffs, port clearances or bureaucratic delays. Trade defence measures are used by both developed and developing countries. The more sophisticated measures are used by developed countries and their conformity assessment procedures have been expensive and difficult to meet. In some cases, this has led to a rejection of consignments, e.g. shrimp, and it has taken over a year to restore these firms to the accepted list.

The primary survey shows that India's exporting community is quite diversified in terms of their understanding of the international trade eco-system and their articulation also varies with the extent of the scale at which they operate. That is why the results of the primary survey have been cross-validated with the feedback provided by Export Promotion Councils,

other industry associations and large exporters, who have the capacity to understand this eco-system and articulate their concerns well. The perceptions recorded at the grass-root level offer two broad learnings. The average exporter is not concerned whether the hurdle to export is from within the exporting country's trade eco-system or at the destination or in between. Any measure which he perceives as a hurdle in the smooth flow of his exports, has a certain cost implication for him, which makes the process that much more expensive and quite often he might lose the market to a competitor. There are some exporters, who have adapted to non-tariff measures and do not consider them as obstacles, either out of ignorance or simply as a result of their entrepreneurial zeal. They have adapted to these measures in a business-as-usual way. However, a large number of exporters recognise the costly implications of non-tariff measures and would like to see them out of the way.

As far as domestic measures are concerned, exporters can understand issues relating to Customs, logistics, infrastructure or local taxation. Their knowledge about institutional issues such as the existence of trade agreements is inadequate. These issues need to be addressed at the domestic level. However, the much bigger hurdle for exports comes from tariff and non-tariff related consequences. They need to be addressed in a far more organised, studied, coordinated and persistent manner in cooperation with trading partners and the domestic industry.

The fact that many exporters are relatively less informed about the institutional framework available to them for trade, is a commentary on major inadequacies in the trade policy framework. Many exporters are still not aware of the multilateral, plurilateral or bilateral institutional mechanisms available for preferential trading. Even when they may be exporting under a preferential mechanism, it is likely that they may not be able to distinguish between a bilateral trade agreement and a unilateral General System of Preferences (GSP). Such businesses may experience the duty differential in an export destination with reference to similar products of another country, but they may not be familiar with the fact that there could be a preferential trading arrangement, available to exporters of the other country, which are in effect not available to them. These experiences point to a strong need for in-depth advocacy and extension programmes, which will include creating awareness not just on institutional frameworks but on more important details such as Rules of Origin, Non-Tariff Measures and ways of getting around those measures. Some years ago the Department of Commerce started such programmes in a limited way with the intention of popularising Preferential Trade Agreements. But that alone is not enough. The woefully low utilisation of RTAs by Indian exporters is an evidence of the fact that Indian exporters either do not find enough use of the FTAs for their products, feel that the process of availing such preferences is cumbersome or are simply not aware of such preferences. But even this is not enough. The government should establish an extensive and well-equipped architecture for building skills and awareness among economic operators to make efficient use of international trade opportunities.

Trade Effects of NTMs

Estimating the effects of NTMs is not an easy task. Studies which have done so use a simple partial equilibrium framework to develop a tariff equivalent to the NTM that reflects by how much supply, demand or trade are affected by the measure. Measurement typically focuses on the change in import price associated with the introduction of the NTM, the resulting import reduction, the price elasticity of import demand, and the welfare cost of the NTM. A relatively common approach is to calculate ad valorem equivalents of NTMs, i.e. the ad valorem tariff rate

that would induce the same level of imports as the NTM in question. This is relatively straightforward in the case of quotas as, under perfect competition, their price and quantity effects can be replicated by appropriately chosen taxes on trade. The most common approaches to the measurement of NTMs are the price-gap approach, which aims at deriving a tariff/tax equivalent to the NTM, the quantity approach and inventory-based frequency measures.

Due to the complexity of obtaining data on prices in India, this chapter has used the inventory-based frequency measure approach. However, trade defence measures offer direct equivalent tariffs, so initially all such measures have been used in a Computable General Equilibrium Framework (CGE) to project an overall effect. NTMs may also have positive effects by depressing cost of inputs in the domestic economy. Netting out the positive and the negative effects at the economy-wide level shows the following effects – Exports: -0.01%, Imports: -0.2%, Employment: -0.05%, GDP: -0.02%, Output of Export Sectors: -0.03%. While at the aggregate levels these figures may look small, the sectoral effects are considerable.

The methodology used for translating the effects of SPS and TBT measures is to first estimate their frequency by looking at the coverage ratio, and then using the GTAP model to find their tariff equivalent. Once these have been established the model is further 'shocked' or recalibrated with the tariff equivalent to obtain the export, employment and output declines in particular sectors. In some sectors such as rice, the decline in exports possibility is around 96% in the market introducing the NTM. This is validated by actual interviews when it was found that after EU imposed stringent MRL restrictions, India was unable to export rice to EU markets. Very high trade effects were also observed in sectors such as food products, seafood, and textiles (affected due to regulations such as those on pigments and dyes). This has also been validated by the survey with industry associations. Commensurate declines were observed in employment and output. Hence SPS measures may actually cut off exports altogether, whereas trade defence measures may only have slowing effects on trade. This is borne out by the fact that entire consignments of food-related products are rejected for not complying with SPS measures, whereas trade defence measures have mainly slowing effects on exports.

Country Studies

The chapter on country studies provides details on NTMs in the major export destinations of India. While the main discussion is on NTMs, this is juxtaposed with tariffs, including the coverage of free trade agreements in terms of products that are exempt from tariff reduction. The country studies validate the result that even for countries with low tariffs, there is a significant impact of NTMs on India's exports. Further, the discussion shows that certain product categories such as foodstuffs and other agricultural products face both high tariffs and high NTMs even in countries which have an overall low tariff average. It is noteworthy that the largest export markets of India are also those with the highest number of NTMs, resulting in the associated burden in terms of costs, procedural requirements and time taken to complete the requirements. The discussion also shows that in a number of cases, especially agricultural products, pharmaceuticals, chemicals and equipment, the approval process for export market access can be long-drawn out, requiring bilateral discussions over an extended period of time.

The country studies also aim to inform exporters about the present situation in different key markets and provides a number of sources for ongoing information that could be useful in the future. In this context, specific trade concerns raised by other countries are also mentioned, because they may be relevant for India's existing and potential export

aspirations. Country studies also show the various initiatives made by India to bilaterally address trade-related concerns. The information in this Chapter can provide a basis to monitor and keep improving the information relevant for Indian exporters so that they can be better aware of the NTMs in their major markets.

Conclusion

This discussion begs the question whether the tariffs adopted by most trading nations over the last seventy years has made international trade any less burdensome, as whatever positive impact tariff reductions have on promoting global trade flows is offset by the introduction of NTMs. It is not implied that NTMs as a class of trade discipline are undesirable. They have their legitimate existence, but the international architecture of rules clearly prescribes that they be trade-friendly and not impede the flow of trade to the best extent possible. A developing country is faced with a serious dilemma when it comes to compliance with these regulations. While on the one hand, trading nations have brought their tariffs down significantly, apparently making access to their markets easy, on the other hand the adoption of NTMs increases compliance costs and also introduces new trade restrictions.

For a developing country like India this experience can be mitigated by adopting a few measures. The chapter titled Conclusions discusses some recommendations in this regard. First of all, information on these measures, their changes and coping strategies should be collected on a bi-annual basis and disseminated to exporters through their Export Promotion Councils. Second, Red Alert systems should be instituted to identify stringent existing and emerging standards. Third, the WTO process should be fully used to challenge these standards as necessary. Fourth, compliance issues should be more intensively and strategically discussed bilaterally through trade forums already established by the government of India. Lastly, domestic capacity to meet and set standards should be improved through both the hardware such as laboratories, better science and software which includes improving standards incrementally, raising awareness and building a database of best practices. These are just a few examples of coping strategies. Discussions with producers in an organised manner could result in many more solutions.

This is a first attempt to document NTMs in a framework used by countries such as the US, EU and Japan. These reports should become a regular feature as NTMs are moving goalposts which are sensitive to technology changes and consumer concerns. They can also be used for protectionist purposes as shown in the report. This report should be brought out every two years. In the interim, as shown by the survey, a report on domestic impediments to meeting NTMS or expanding exports should also be brought out.

1

Chapter One

Literature Review of NTMs Imposed on India

Introduction

India is one of the fastest growing economies in the world with an expected growth rate of 7.3% in 2018 and 7.4% in 2019 (WEO, 2018). India's economic growth has been accompanied by a higher growth rate in trade. The ratio of exports of goods and services to GDP has increased from 13.1% in 2000 to 18.9% in 2017, while the corresponding ratio for imports has increased from 14.1% to 21.8%.[1] The increase in India's international trade has contributed to the nation's economic growth, together with a significant change in its structural and technological base. This momentum is likely to continue, with relatively high growth rates in the future, positioning India on the world map of international trade and investment.

Though India's high growth rate is improving its ranking in terms of its GDP, the relative performance in trade has been less impressive (Table 1.1). Further, the higher import growth, especially for merchandise trade, has made India focus on its trade deficit and emphasise on ways to address constraints on its export growth. While India is improving its trade-related domestic policy framework through initiatives such as trade facilitation and ease of doing business, it is also important to address obstacles to exports that arise due to policy obstacles faced by Indian exporters in markets abroad. A compendium of such policy constraints will provide a basis for a structured interaction with trading partners, based on an identification of the key concerns facing Indian exporters.

[1] World Bank Database

Table 1.1 : Global Rank of India for GDP, Trade and FDI, 2017

	Global Rank of India in 2017 (in 2010)
GDP	6th (9th)
Merchandise Exports	20th (20th)
Merchandise Imports	11th (13th)
Commercial Services Exports	8th (7th)
Commercial Services Imports	10th (7th)
FDI Inflows	10th (14th)

Source: WTO; UNCTAD; and Knoema.com

This report focuses on exports of merchandise products. It is useful to consider the top export markets for Indian merchandise exports, either in terms of ranking or share of countries. If the top 30 export destinations for Indian merchandise exports along with a cut off of 1% of exports going to different economies is used, the list contains 28 countries. However if the European Union is treated as a single economy, then using the criterion of 1% of Indian exports going to a country, there are 22 export markets (of which seven are members of the EU) – see Figure 1.1.

The EU and the USA are the largest export destinations for India with respective shares of 17.6 % and 15.7% in 2017. It is also significant that a large number of the major export destinations are in Asia. India has a free trade agreement (FTA) with a number of them, like ASEAN, Japan, Malaysia, Singapore, South Korea, and neighbouring economies.

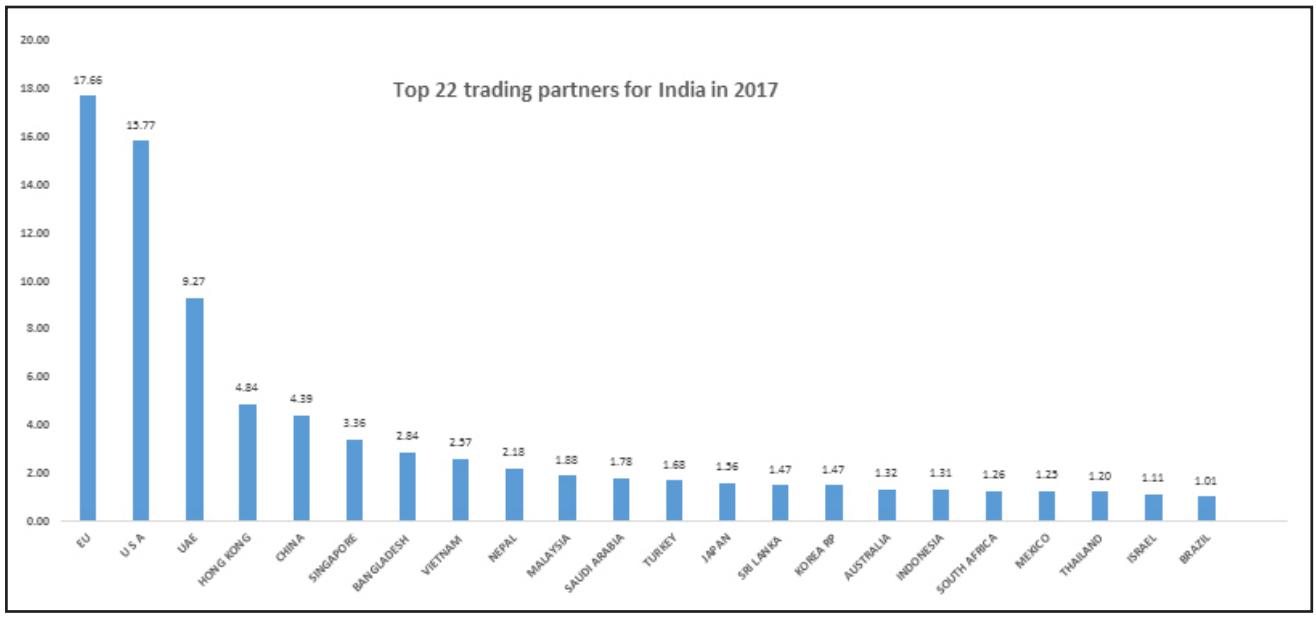
It is noteworthy that FTAs now focus not only on tariffs but dominantly on NTMs. This is because as tariffs have decreased due to WTO negotiations, autonomous liberalisation and FTAs, new forms of trade restrictions have emerged.

Table 1.2: India's Top 30 Export Destination Countries, 2017-18

Rank	Country	Rank	Country	Rank	Country
1	USA	11	Netherlands	21	Australia
2	UAE	12	Belgium	22	Spain
3	Hong Kong, China	13	Italy	23	Indonesia
4	China	14	Malaysia	24	South Africa
5	Singapore	15	Saudi Arabia	25	Mexico
6	UK	16	Turkey	26	Thailand
7	Germany	17	France	27	Israel
8	Bangladesh	18	Japan	28	Brazil
9	Vietnam	19	Sri Lanka	29	Iran
10	Nepal	20	South Korea	30	Canada

Source: Department of Commerce, Government of India

Figure 1.1: Top 22 Share of Top Export Destinations for Indian Exports in 2017 (EU shown as a single trading partner)



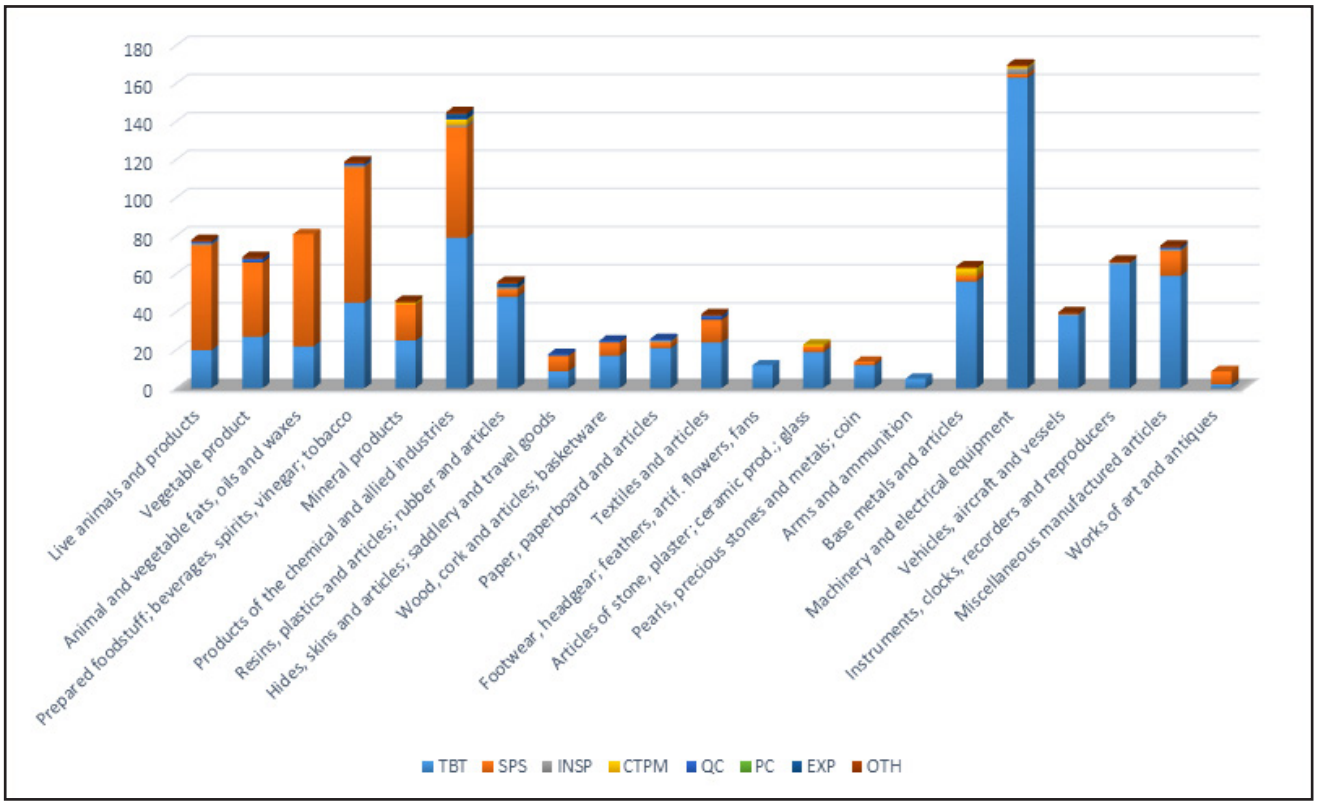
These are non-tariff barriers (NTBs), which are part of a larger set of NTMs. It must be noted that all NTMs are not NTBs. Transparency and trade disciplines relating to these measures are part of the WTO agreements and initiatives, for instance in the areas of Sanitary and Phytosanitary Measures, Technical Barriers to Trade and Trade Policy Review Mechanism. The NTMs now are much larger in impact compared to tariffs. A special focus on NTMs is therefore a primary area of effort to improve trade possibilities.

'NTMs are policy measures, other than ordinary Customs tariffs, that can potentially have an economic effect on international trade in goods, changing quantities traded, prices, or both'[2]. NTMs are any official policy measures that distort international trade, implicitly and explicitly and use any measures apart from traditional tariffs.[3] EU defines NTMs as all types of non-price restrictions and non-quantity restrictions, both at federal and State level, on goods, services and investments. NTMs are 'All measures other than the normal tariffs that have the effect of trade restriction among nations'[4]. While trade has grown over the years, the increasing concern in the developed country markets has been on protecting human, plant and animal life and health as also the desire to protect the environment. These as well as a number of others issues have led to an increase in the number of non-tariff measures (NTMs) – see for example, Chart 2 which shows the types of NTMs in the EU.

A number of the issues underlying an NTM are now part of accepted considerations in international trade. However, these measures have the possibility of becoming a barrier to trade if careful monitoring and resulting problems are not part of the bilateral or multilateral interaction. Often, the NTMs pose difficulties particularly for developing countries like India to access markets for goods.

[2]MAST, 2009
[3]Unctad, 2010
[4]OECD

Figure 1.2: EU imposition of NTMs for All members and Bilateral



Source: UNCTAD.

Notes: The abbreviations for the measures are as follows: Sanitary and Phytosanitary [SPS], Technical Barriers to Trade [TBT], Pre-shipment Inspection [INSP], Contingent Trade Protective Measures [CTPM], Quantity Control Measures [QC], Price Control Measures [PC]. Other measures [OTH], Export-related Measures [EXP]

An important part of the analysis of NTMs is to quantify their effects on international trade. It has been shown that the impact of trade restrictiveness of NTMS is almost twice as much as that of tariffs[5].

Reduction in NTMs have been proven to improve trade. For example, a study has shown that a reduction in NTMs by 5% will improve trade by 2 to 3%. [6]

The significance of NTMs for international trade is shown by a body of literature, which inter alia has questioned whether they are protectionist or precautionary measures. As economies have grown, NTM-related trade concerns have multiplied. Combined with this, technology has improved to measure and identify the specific product or process-related characteristics that are addressed by NTMs. This has increased the complexity of NTMs as well as the methods that would be required to meet the criteria specified as threshold under a specific NTM (such as extent of residue of a chemical in the product sold). Hence issues such as the precautionary principle versus the concept of proportionality (embodied in the WTO code of good practices as the 'least trade restrictive measure to gain the same objective') is of more relevance today. It appears that public concern and evolving science, particularly in advanced markets, is moving in favour of the precautionary principle. Hence while WTO jurisprudence has weighed in on proportionality, recent advances in NTMs suggest that countries like India would have to improve their standards

[5]WTO, 2012

[6]Hoekman and Nicita (2011)

and adhere to export market requirements. This requires a new approach to NTMs and introspection on India's own capabilities to deal with them.

Given this background of the increasing proliferation and complexity of NTMs, it is important to understand the range of NTMs faced by exports, to provide a basis for developing a clear prioritisation of the action points by India. This is based on a survey of the literature, a consideration of the existing reports identifying NTMs (such as the USTR Report), and a survey of Indian exporters.

This chapter is a review of the literature on NTMs faced by India, which highlight NTMs in the major trading markets. Annex 1 gives the measures mentioned in the literature with the author attributions. The literature review begins with a survey of the NTMs in EU, India's largest trading partner. Section 1 thus covers NTMs imposed by EU. Section 2 reviews NTMs by the US. Section 3 reviews NTMs imposed by other countries especially on food. Section 4 examines instances of discriminatory NTMs. Finally Section 5 concludes with some observations regarding NTMs.

1.1. NTMs in the EU

The trade volumes between the EU and India have increased as regards Indian exports to the EU as well as Indian imports from the EU. However, with India's GDP surpassing average global levels in the last few years, the EU and other developed markets have imposed NTMs that are targeted towards specific product categories of interest to India. Literature points to links that have been established in the past between the NTMs imposed by the home country and the income level of the exporting country. A study[7] of 2017 indicates that NTMs on Indian exports to EU is positively co-related to the growth of per capita GDP of India.

The data from WTO shows that the non-tariff measures imposed by EU on products of interest to India remains dynamic, thereby posing a challenge to exporters, especially in the small and medium sector, in building a sustainable export model for Europe for several products. Among the measures, TBT (1236) and SPS (695) are frequently used by the EU as shown in Table 1.3 below.

NTMs on food products in the EU

Food products face the maximum number of SPS measures. For instance, in 2014 imports of Indian mangoes were restricted in the EU on account of charges that could harm indigenous European crops. However, in 2015, the ban was removed after clearance from the EU Food and Veterinary office.[8]

Table 1.3: NTMs affecting exports from India to EU

NTMs by EU Impacting India	No. of Measures
Sanitary and Phytosanitary (SPS)	695
Technical Barriers to Trade (TBT)	1236
Anti-dumping (ADP)	5
Countervailing (CV)	5
Special Safeguards (SSG)	71
Quantitative Restrictions (QR)	10
Tariff-rate quotas (TRQ)	87
Export Subsidies (XS)	20

Source: World Trade Organization [9]

[7] *Rakhi, S., Seema S. & Deepak T. (2017). Non-Tariff Measures in Indian Context and the European Union. International Journal of Economics and Finance. Published by Canadian Centre of Science and Education*

[8] *Rohin Kaul, 2016*

[9] *WTO (World Trade Organization). Integrated Trade Intelligence Portal. Available at: https://i-tip.wto.org/ goods/default.aspx?language=en*

Similarly, imports of Indian meat into the EU, Gulf countries and Indonesia have been restricted on account of the prevalence of Foot and Mouth Disease in some parts of India. Indian exporters are of the view that EU maintains very stringent standards for meat as opposed to many other international standards.

Some of the challenges faced by India in the EU that have been recorded in studies surveyed for this chapter can be summarised as follows:

- Milk and milk products from India have faced restrictions in the EU as cows in India are not mechanically milked. Due to the small size of holdings of cattle, traceability of the milk procured for exports have faced problems.
- Shrimp exports from India face a higher level of inspection. Frozen octopus imports into the EU were restricted on grounds of different microbial content requirement in different countries of the EU.
- Indian spices faced restrictions in EU on grounds that have not been transparent. Spain, for instance, detained consignments based on allegations of chillies being contaminated by aflatoxin. Similarly, Germany and Italy restricted Indian spices on account of pesticide residue levels. Exporters, many studies state, find a lack of transparency in the EU on the levels of pesticides that can be used in exported food products.
- Imports of meat from India have faced restrictions in the EU because of the presence of rinderpest. However, India has been rinderpest-free since 1995. Import of buffalo meat was restricted due to lack of standardisation of health-related standards within EU and due to a prevalence of Foot and Mouth Disease (FMD) in Indian cattle.[10]
- Tea exports have been affected due to concerns about pesticide levels. Lack of standardisation across the developed world on pesticide residue levels also hurts exports. For instance, Indian exporters adhered to maximum pesticide levels recommended by the US, however, some members of EU impose stricter limits of only 0.01 mg of tetrafidon and 2 mg of ethion per kg.
- EU does not import shell-free eggs from India citing pesticide residue issues. The Codex Alimentarius specifications for DDT and lindane (gamma-BHC) are 0.5 ppm and 0.1 ppm on shell-free eggs while EU accepts up to 0.1 ppm of DDT and 0.02 ppm of lindane.
- Groundnuts grown anywhere in India have been restricted in the EU on account of aflatoxin which is found in groundnuts produced only in parts of Gujarat.
- EU banned imports where hormones, natural or synthetic, have been used in livestock production.
- Indian whiskeys are based on molasses rather than cereals and cannot be sold in the EU. Whiskey as the EU defines it is made from cereals.

Other NTMs in the EU

Literature available in India shows that the country also faces other measures that become barriers to export such as a sharp increase in anti-dumping investigations by the EU and US particularly for products such as steel and related products[11]. Even though India recorded the highest export growth of iron and steel (69%) from 2014-2017[12], new certification norms required in the construction industry in EU has made exports more difficult. The REACH regulation in EU has had a very sobering impact on India's leather export industry that has faced challenges to increase and sustain exports.

The default MRL (Maximum Residue Levels) set by the European Communities are very high and the risk assessment of this level does not have a scientific justification. Essentially they are set on

[10]Sheshank and Animesh, 2014
[11]H.A.C Prasad, 2017.
[12]https://www.wto.org/english/res_e/statis_e/wts2018_e/wts2018_e.pdf

the precautionary principle with little attention to proportionality. Member States like the UK, Netherlands and Germany have set up MRLs for some compounds which are not standardised even across the EU.

1. 2. NTMs in the US

India's exports to the US were $48.6 billion in 2017, up by 5.6% from 2016.[13] The USA goods exports to India were $25.7 billion, up by 18.7% ($4.0 billion) from 2016. The USA goods trade deficit with India was $22.9 billion in 2017, a 5.9% decrease ($1.4 billion) over 2016. India was the United States' 15th largest goods export market in 2017. The major NTMs faced in the US by India are shown in Table 1.4 below. As Table 1.4 shows, the number of SPS measures i.e. generally food related NTMs, are much higher in the US for Indian exports than TBT and other such measures.

Food related measures in the US

Literature survey of NTMs faced by Indian exporters in the US shows that the rate of rejection of food product exports to USA is very high compared to other products such as cosmetics, drugs and antibiotics.

Table 1.4: NTMs by the USA affecting India

NTMs by USA Impacting India	No. of Measures
Sanitary and Phytosanitary (SPS)	3001
Technical Barriers to Trade (TBT)	1626
Anti-dumping (ADP)	27
Countervailing (CV)	21
Special Safeguards (SSG)	496
Quantitative Restrictions (QR)	59
Tariff-rate quotas (TRQ)	52
Export Subsidies (XS)	13

Source: World Trade Organization [14]

This is based on an analysis of the Operational and Administrative System for Import Support (OASIS) data by U.S. Food and Drug Administration.[15] Non-scientific quarantine restrictions, eco-labelling requirements, Customs surcharges, compliance with SPS, unreasonable packaging and mislabelling are a few of the issues arising from the strict requirements for exports to the USA. Exports of food products are further affected due to difficulties faced by farmers in complying with issues related to pesticides in the production and trade of agricultural products.

Mango exports to the USA involve high certification cost, complex process to access the markets that include a large number of agreements and protocols including the costs associated with the irradiation process. Fresh fruits such as grapes were also banned from exports to USA for using sulphur pads in package boxes, which should ideally not be a concern as American producers of grapes also used similar procedures.[16]

India's horticultural export market has been adversely affected by SPS standards imposed by the USA.[17] The higher number of rejections of consignments and notifications are due to reasons such as filth, pesticide residues, microbial contamination and non-compliance of other mandatory technical parameters. The important non-tariff barriers as identified by Agricultural Products Export Development Authority (APEDA)[18] that adversely affected the export of Indian horticultural commodities are given in Table 1.5.

1.3. Food related concerns in other countries and Other NTMs imposed on India

There are several food safety barriers imposed by the top export markets for India such as the US, Vietnam, EU, Saudi Arabia, Japan and Bhutan.[19]

[13] (USTR, 2018)
[14] WTO (World Trade Organization). Integrated Trade Intelligence Portal. Available at: https://i-tip.wto.org/ goods/default.aspx?language=en
[15] Vijith Krishnan, 2016
[16] Indhushree, Kuruvila, Thomas and Bastine, 2017
[17] Idris, Singh & Praveen, 2015
[18] APEDA. Non-Tariff Barriers Faced by Indian Agricultural Products. Available at: http://www.apeda.gov.in
[19] Arpita M., Tanu M., and Avantika K. 2017.

These products include mangoes, table grapes, okra, peanuts, curry leaves, chilies, shrimps, prawns, and tamarind. Reasons for rejection are as follows:

- Pest infestation,
- Presence of higher than approved level of pesticide residue,
- Frequent lowering of MRLs without any scientific justification,
- Lack of harmonisation of standards across countries,
- Rigid import requirements by importing countries,
- Lack of mutual recognition of conformity assessment systems,
- Increased use of risk analysis technique,
- Awareness of consumer health and well-being among developing countries,
- Hygiene issues,
- High risk country for certain diseases such as Foot and Mouth Disease.

Fresh grapes from India to Japan were banned on account of a threat of infestation of oriental fruit fly in Pakistan. But on data collection, it was proved that there was no such infestation in Indian grapes. Therefore, regional infestation had banned grape exports from India until it was proved otherwise. The use of the precautionary principle in banning food product imports can have a detrimental/dampening effect on exports from India.

Indian mangoes and other fruits faced bans in Australia and New Zealand due to the presence of fruit flies and stone weevils. Indian fruit exports to China such as grapes, mango, guava, muskmelon, watermelon, papayas and vegetables such as aubergines, cucumber, beans, gherkins, leguminous vegetables and capsicum faced delays as the Chinese took a very long time in finalising the protocol on phytosanitary measures and certification procedures.

India's agricultural commodities like rice, fishery products, tea, peanuts, spices and organic food products face rejection from developed nations on account of aflatoxin standards, HACCP standards, sub-standard process and product certifications, pesticide residues etc. The major difficulty arises due to lack of information provided by these countries on quality standards. Often the reasons for rejection are not justified. Few examples of rejection on SPS grounds from other countries, based on the literature survey, are as follows:

- The international standard of a DDT residue level is 6 ppm while Japan demands a level of 0.4 ppm in unmanufactured tobacco. India's exports of unmanufactured tobacco to Japan faces restrictions on SPS grounds even though the residue level of Indian tobacco is 1-2 ppm which is within permitted international standards.

Table 1.5: Food related NTMs

Countries	Non Tariff Barriers
Japan	Ban on the import of fresh grapes from India on the basis of report of the incidence of oriental fruit fly on grapes in Pakistan and vapor heat treatment (VHT) for mango fruit flies
USA	Mangoes – High Cost of Certification and irradiation for stone weevil infection
	Grapes – Use of Sulphur Pads
Australia	Ban on import of Indian mangoes and other fruits due to presence of fruit flies and weevil
China	Delay in finalization of protocol on phyto sanitary measures and certification procedures
New Zealand	Ban on import of Indian mangoes and other fruits due to presence of fruit flies and weevil
European Communities	Different MRLs by the member countries for pesticides, drugs and other contaminants
Source: APEDA	

- Presence of pesticides/antibiotics hinders the exports of shrimps to USA and Japan.
- Even though India's beef exports meet the stipulations of the OIE, Indonesia restricts the entry of Indian beef and has campaigned against it on grounds of the prevalence of Foot and Mouth Disease in India. As a result, exports to countries such as Jordan, Lebanon, USA, EU and the Philippines have been affected.
- Korea insists on pasteurisation of albumen at 57 degrees C for 30 minutes. It does not accept the dry heat treatment of killing pathogens which is approved by USA and EU. Australia and New Zealand, on the other hand, insist on dry heat treatment.
- Metallic, pesticide and antibiotic content in marine products creates barriers of entry. For example, 0.2% of benzoic content in shrimps from India was banned while this limit was set at 0.6 % in the case of other countries.
- Hygiene conditions of egg processing plants in India are at par with international standards but countries such as Malaysia and Australia do not approve the Indian standards for SPS as they feel that it is below their expectations.
- Eggs and poultry meat require an initial approval from EU especially with regard to the Newcastle disease. Imports of poultry products from India have been banned in Russia. Similarly, countries such as Australia, New Zealand and Latin America prohibit entry of samples of poultry products from India.
- Pesticide residues, quarantine measures and other SPS restrictions imposed by the USA, Japan and China on fresh Indian fruits have nearly stopped the export of many fresh fruits into these countries.
- Although pests in floricultural products are found in Japan, it imposes very strict quarantine procedures including zero tolerance for insects and pests from India.
- Maximum Residue Limits of aflatoxin have been set on chillies, peanuts and other nuts by EU and Japan. In fact, Spain put Indian chillies on Rapid Red Alert.
- Rice from India is also scrutinised on the standards for pesticide residues.
- Organic food from India is subjected to standard setting, certification, exports and institutional support.

India's fishery sector enjoys a comparative advantage due to its natural factor endowment but the exports are often hampered by importing countries due to their safety requirements and standards. SPS, TBT and pre-shipment inspections are the NTMs that affect fish and fisheries exports.[20] More education, accessibility, affordability, improved quality and better infrastructure is needed to increase exports in this sector where India enjoys a comparative advantage.

Other NTMs imposed on India

Textiles and clothing is an important sector for Indian exports and several NTMs have reduced trade with other South Asian Association for Regional Cooperation (SAARC) countries. Customs clearance and administrative procedures such as presentation, collection, communication and data processing along with labelling, licensing, and testing are a few of the barriers faced in other SAARC countries. NTMs affect 97% of textile and clothing trade among SAARC countries.[21] The NTMs faced by India are as follows:

- Minimum imports price (28%)
- Imports restrictions (20%)
- Certification (15%)

[20] Veena Renjini K, 2016
[21] Ajay Kumar, 2017.

- Customs Clearance (7%)
- Anti -Dumping Measure (5%)

Countries such as Russia, Iraq, Pakistan, Vietnam, Zimbabwe, Nigeria and Nepal are producing negative lists of pharmaceutical imports to protect their domestic economies. There are increasing on-site inspections inspite of having WHO Good Manufacturing Practice and Pharmaceuticals Inspection Co-operation Scheme (PICs) approvals. Inspite of the fact that a pharmaceutical product may hold an active Drug Master File (DMF) from reputed regulators such as US Food and Drug Administration (USFDA), EU has started a system of written confirmations to be issued by Central Drugs Standard Control Organisation (CDSCO) for every exported active pharmaceutical ingredient (API).

Indian exports to Japan are affected by a number of issues, which include SPS and TBT measures, high transaction costs, government procurement, and barriers on the export of pharmaceuticals.[22] The registration procedure and product licensing issues in Brazil for Indian pharmaceutical companies to export their products is very time consuming and tedious. India also requested information about the various discriminatory NTMs which violate national treatment related to restrictions prevailing as per laws, regulations or government orders in Thailand.

1. 4 Discriminatory NTMs

In the last few years there have been many instances when India has realised that the proposed regulations by different WTO member countries have imposed restrictions on exports. These issues were raised with the appropriate authorities in those countries. While in some cases the issue remained unresolved, in some they were resolved to the mutual satisfaction of both trade partners. Some of those case studies are detailed as follows.

Marine Products

While there are a few cases of discriminatory NTMs, an important example relates to exports of shrimps to the US. Two antibiotics namely nitrofurantine and chlorophenicol have been banned in the EU. These antibiotics are also used by shrimp exporters from Bangladesh and Vietnam. However the treatment for Indian shrimp exports is more stringent on the grounds that antibiotics are freely sold over the counter in India and hence their usage is unrestricted.

While only 10% of the imports of shrimps into the EU from other countries are checked for the presence of these antibiotics, 50% of the imports from India into the EU are checked. Thus the sampling method itself is discriminatory. Second, 14 companies were delisted and were not permitted to export shrimps to the EU following a visit by a technical authority from the EU. While the export inspection council (EIC) is the competent authority to certify exporters, their certificate was not accepted and a Technical Inspector was sent from the EU to inspect the premises of exporting firms. Third, the delisted exporting firms cannot themselves apply for relisting, it is the importing firm that can apply for relisting. It took one and a half years to get the companies relisted.

Testing of Chemicals in Food Products

The technique used to collect samples and the procedures used for pesticide testing are undeniably the most critical step in the residue testing process. Proper sampling ensures that the sample submitted fully represents the crop, shipment or production lot for human consumption. For instance, pesticides should be tested on the final product which will be consumed, rather than on the intermediary products. Changing the product criteria for testing of residues would certainly create trade barriers. For instance, on 4th May 2012, the European Commission Health and Consumers Directorate-General issued a SPS

[22] Shashank &Animesh, 2014

notification G/SPS/N/EU/22 amending EC regulation No 396/2005. It proposed three issues – a) addition of certain new categories of fruits and vegetables that are available in the market b) change in taxonomical nomenclature of certain fruits and c) clarification or modification of the parts of products on which the residues should be analysed.

The draft stated that, while examining the residues in or on rice, paddy rice would be tested for residues instead of the earlier practice of testing the whole rice grain.

India responded to the proposed regulation by raising its concern that testing or examination of traceability of residue levels should be undertaken on final products. Paddy rice would always have higher levels of pesticide residues as pesticides are sprayed directly on it, but paddy rice is not directly consumed. In the case of rice, which can't be consumed raw, there is a need to test the whole grain rice instead of paddy rice. The European Union took the Indian response into consideration and decided that residues would be analysed on the whole grain product and not paddy rice and the issue was resolved.

Withdrawal of Chemicals

In the EU, a decision was taken to withdraw an authorisation/permit under the conditions specified in Regulation (EC) No 1107/2009, which included the following:

- When active substances are included or renewed on the list of approved active substances included in Regulation (EU) No 540/2011 but products containing active substances are not successfully re-registered
- The active substance(s) contained in the product are withdrawn from/not renewed on the list of approved active substances included in Regulation (EU) No 540/2011
- Significant safety or efficacy concerns with the product or a specific use
- A requirement for the submission of data to continue with the authorisation of the product or a specific use is not met
- Data submitted in support of an application does not support the continuing authorisation of the product or a specific use
- A product or a specific use is commercially withdrawn
- For products not authorised/permitted to uniform principles, at the final commission deadline for re-registration of all active substances in the product;
- False or misleading information was submitted to support an authorisation/permit.

In addition, if a product gets a new authorisation/permit(s), the previous authorisation(s) is withdrawn to ensure that a product does not have a number of extant authorisations at the same time. When EU withdraws an authorisation/permit, it will receive either a 'phased' or 'immediate' withdrawal grace period. A phased withdrawal will usually allow a certain amount of time for existing stocks authorised/permitted under that specific authorisation/permit number to be placed on the market, and a certain amount of time for existing stocks of the product to be used safely. An immediate withdrawal will not allow the authorisation/permit holder to place any stocks of their product authorised/permitted under that specific authorisation/permit onto the market, nor will anybody else be able to market or use existing stocks of that product.

India has witnessed large numbers of substances being withdrawn in recent years. This may be for reasons of safety or because companies took commercial decisions not to support substances through the review process. For instance, EU has issued several notifications[23] on withdrawal of oxyfluorfen, beta-cypermethrin, clothianidin, imidacloprid, thiamethoxam, bifenthrin,

isoproturon, tricyclazole, triasulfuron and propiconazole. Table 1.6 shown the list of pesticides and the products on which they are used. Analysis shows that these pesticides are widely used in other countries. There has been no report on adverse impact from the use of these pesticides.

In many cases, the EU Authority concluded that a final consumer risk assessment cannot be performed due to several data gaps identified for the food crop uses. It also concluded that the consumer risk assessment through dietary intake could not be finalised due to several data gaps, hence, EU uses the precautionary principle while proposing the withdrawal of these substances. Such wide use of the precautionary principle instead of the risk-based approach puts the majority of pesticides out of use. Further, the unavailability of immediate substitutes also has a greater impact on trade. In such cases countries like the EU should consider using the data available in other countries for fixing MRLs.

Malaysia: Mandating Application through Local Representative for Pharmaceutical Products

In February 2016, Malaysia issued two notifications[24] on pharmaceutical products. One referred to the registration and authorisation of generic products, and the second was on mandatory inspection of pharmaceutical products. According to the Malaysian authorities, these measures were taken to ensure quality, safety and efficacy of imported pharmaceutical products.

This notification stated that all Bioequivalence (BE) studies used in supporting the registration of generic products in Malaysia shall be conducted in BE Centres, which are inspected by the National Pharmaceutical Control Bureau (NPCB) and listed in the NPCB Centre Compliance Programme. NPCB Compliance Programme for BE Centres is intended to ascertain whether BE Centres have implemented the requirements as described in the guidelines. In Malaysia, local BE Centres are eligible to apply directly for the BE Centre inspection. However, for any Foreign BE Centre, a Malaysian registered company authorised by the Foreign BE Centre shall apply on their behalf.

Under the NPCB Compliance Programme, foreign BE centres need to approach local Malaysian companies to apply for an authorisation on their behalf.

Table 1.6: MRL on Products Exported by India

Sr. No.	Pesticide	MRL in Products
1	Oxyfluorfen	Rice, Groundnut Oil
2	Beta-cypermethrin	Wheat grains, Milled wheat grains, Brinjal, Cabbage, Lady finger, Oil seeds except groundnut, Meat and Poultry (carcass fat basis, Milk and Milk Products
3	Clothianidin	****
4	Imidacloprid	Cotton seed, Oil, Rice
5	Thiamethoxam	Rice
6	Bifenthrin	Cotton seed
7	Isoproturon	Wheat
8	propiconazole	Wheat
9	Tricyclazole	Rice

***** FSSAI has not prescribed any residue levels for this pesticide, but as per Central Insecticide Board (CIB) it is mainly used in Rice, Cotton, Sugarcane, Tea, etc.*

In India, drug registration is regulated as per the Drug and Cosmetic Rules and the Good Clinical Practice Guidelines issued by the (CDSCO-Central Drugs Standard Control Organisation) Directorate General of Health Services, Ministry of Health and Family Welfare, Government of India. In India, there are 75 clinical centres and bio-analytical centres

[24] G/TBT/N/MYS/66 dated 23rd February 2016 and G/TBT/N/MYS/67 dated 23rd February 2016

approved by CDSCO to conduct Bioavailability/ Bioequivalence studies. Hence, India requested the Malaysian authorities to allow Indian BE centres to apply directly to the NPCB for authorisation for conducting BE studies for generic products exported from India. For this purpose India also requested the NPCB to provide accreditation for Indian BE centres so that it would ease procedural delays and also result in reducing costs and lowering trade barriers. India has raised this issue bilaterally with Malaysia; however, there has been no progress on this issue as yet.

EU: Good Clinical Practices for Medicinal Products

In 2016, the European Union (EU) issued a draft[25] regulation on detailed arrangements for the Good Clinical Practices inspections procedures for medicinal products, including the qualification and training requirements for inspectors. According to the EU authorities, these measures were taken to protect human health.

Article 3.1 of the EU proposal says, "Each Member State shall set up a properly designed quality system ensuring that the inspection procedures are observed and consistently monitored". India stated that this clause empowers EU member countries to establish and design separate and individual quality system for inspection procedures to ensure good clinical practice. In this context, India requested the European Commission to clarify whether the member states of EU will follow a common harmonized quality system for conducting inspection procedures or would member states of EU be free to develop their own criteria for developing quality systems for inspection procedures.

India also stated that, if there is no harmonized quality system in place across the EU then it may impact market access for India as it may have to meet separate systems for exporting to different member states of the EU.

Article 4.1 of the EU proposal says, 'Inspectors shall have completed education at university level, or have equivalent experience, in medicine, pharmacy, pharmacology, toxicology or other fields relevant to the principles of good clinical practice'. This clause talks about the educational qualification of inspectors. However, the term 'other fields relevant to the principles of good clinical practice' may create ambiguities, as this may result in difference of opinion among member states of EU while recruiting inspectors to ensure good clinical practice. Since the same inspectors would be deployed to inspect foreign entities exporting to the EU, India requested the EU authorities to reconsider the term 'or other fields relevant to the principles of good clinical practice' as this does not provide the expected transparency to exporting nations on the exact qualification of the inspectors who may be authorised to inspect units in exporting countries like India.

Article 13 of the EU proposal says, 'Inspection reports and records: Without prejudice to the obligation to submit the inspection reports via the EU Portal in accordance with Article 78(6) of Regulation (EU) No 536/2014, Member States shall keep for at least 25 years relevant records of national inspections as well as of the inspections performed outside their territory, including information on the outcome of the inspection as regards good clinical practice compliance status as well as any action taken by the sponsor or Member State in the follow up of the inspection. These records shall not contain personal data of clinical trials subjects.'

As per the above clause, EU Member States shall keep for at least 25 years relevant records of national inspections as well as of the inspections performed outside their territory. India requested the EU authorities to clarify whether this clause is obligatory for third countries as well, like India. If the clause is mandatory for entities exporting to EU

[25] G/TBT/N/EU/462 dated 9th November 2016

as well then India stated that generally the patented drug duration is 20 years from the date on which the application for the patent was filed. Hence, the proposed criterion of 25 years is too long and will place an unnecessary burden on exporting entities. India has raised this issue at the Committee meeting with EU, however, the issue remains unresolved.

South Africa: Compulsory specifications for fish and fishery products

In July 2014, the South African National Regulator for Compulsory Specifications (NRCS) proposed[26] an amendment to the existing law and introduced compulsory specifications for frozen fish, frozen marine molluscs and frozen products.

The proposed amendment requires that the frozen fish, frozen marine molluscs, and products derived therefrom meant for human consumption (and offered for sale) should comply with the compulsory specifications and requirements laid down in the South African National Standard (SANS) 585: 2014.

In response, India stated that the South African compulsory specifications and requirements for frozen fish, marine molluscs and their derivatives were likely to delay clearances of Indian export consignments in South Africa. This could lead to significant financial loss for Indian exporters as the consignments carrying perishable goods could get damaged, if delayed. As per MPEDA, South Africa is accepting India's certification issued by Export Inspection Council (EIC).

Australia: Exports of Shrimp/Prawn from India

A major issue, which is seriously obstructing exports of raw frozen shrimp/prawn to Australia is the stringent bio-security requirements. Bio-security Australia undertook an import risk analysis (IRA), to assess pathogenic agents that could potentially be introduced to Australia through the importation of uncooked prawns and prawn products intended for human consumption, and examined a range of risk management options for pathogenic agents considered to pose an unacceptable bio-security risk. In 2009, Bio-security Australia completed the final import risk analysis (IRA) report and policy recommendations for the importation of prawns and prawn products from all countries. The final IRA report recommends risk management for white spot syndrome virus (WSSV), yellow head virus (YHV), taura syndrome virus (TSV) and NHPB (in the case of unfrozen product) to meet Australia's appropriate level of quarantine protection.

On 10th January 2017, Australia notified[27] that the importation of uncooked prawns (including prawn meat) had been suspended under the Bio-security (Suspended Goods - Uncooked Prawns) Determination 2017 for a period of six months. This was due to an unacceptable level of bio-security risk posed by white spot syndrome virus (WSSV). The import suspension lapsed on 6 July 2017 and on 7th July 2017, Australia issued enhanced import conditions to allow for safe trade in prawns and prawn products. From 7th July 2017, previous classes of prawn products, namely uncooked prawns, marinated prawns, and Australian prawns processed overseas in a non-Australian government audited supply chain, are consolidated into one product class. Prawns within this class must be uncooked, frozen and have had the head and shell removed (the last shell segment and tail fans permitted).

India understands the concerns highlighted by Australia of pathogenic agents that could potentially be introduced within their territory through the importation of uncooked prawns and prawn products intended for human consumption. However, the procedures laid down by the Australian authorities are stringent and trade restrictive.

[26] G/SPS/N/ZAF/36 dated 29th July 2014
[27] *G/SPS/N/AUS/412 dated 10th January 2017*

Point a) of the enhanced import condition states that, exports of prawns into Australia will have to be certified by the competent authority of the exporting country that the prawns are free of white spot syndrome virus (WSSV) and yellow head virus (YHV), as per the sampling and test methods recognized by the OIE. Further, point c) states that, prawns will have to undergo 100% inspection on arrival in Australia for WSSV and YHV at an Australian screening laboratory.

Prawns/shrimps from India have to undergo 100% inspection upon arrival, irrespective of having a valid certificate issued by an Indian competent authority. However, Australian authorities have, in 2017 and 2018, visited India and recognized EIC Quality Control labs for issuing certification for marine products. However, irrespective of this, Indian exports also have to undergo 100% inspection on arrival in Australia.

This shows that the Australian authorities are not accepting the certification issued by recognised labs in India. India has four Quality Control (QC) laboratories in Kochi (Kerala), Bhimavaram, Nellore (Andhra Pradesh) and in Bhubaneswar (Odisha). These QC Laboratories (Kochi, Nellore and Bhimavaram) are accredited as per the ISO/IEC 17025: 2005 and ISO 9001: 2008 standard, by the National Accreditation Board for Testing and Calibration Laboratories (NABL), a member of the International Laboratory Accreditation Co-operation (ILAC). The laboratories are also approved by the Export Inspection Council of India for testing of fish and fishery products intended for export (commercial samples).

Conclusion

Literature on NTMs imposed on Indian exporters is not extensive. The limited literature that is available has been examined here and it was found that food related NTMs have been most frequently used against India. While major trading partners such as EU and US have used NTMs more exhaustively, other partners such as Japan, and even developing countries are now using NTMS as trade barriers. The case of textiles exports to SAARC countries is an important example. Perhaps part of the reason is that several SAARC countries export textiles and each wants to protect its own domestic market. As tariffs within this region for intra SAARC trade are low, non-tariff barriers are used with impunity.

One issue, which has emerged from the literature review is the changing landscape with respect to food standards. Issues of health protection and protectionism need to be closely examined especially with the increasing use of the precautionary principle. In the absence of scientific evidence, countries may err on the side of precaution.

This chapter has also given several instances of NTMs which may in formation or implementation be discriminatory. These issues have been raised bilaterally or multilaterally with India's trading partners but have not been resolved in some cases. It nevertheless provides an understanding of the protectionist nature of NTMs and situations where NTMs can turn to NTBs. It also clarifies cases where India may need to build its capacity to meet some legitimate NTMs.

Apart from NTMs, tariffs are also instruments of protection used by countries to limit imports of particular products. While this report is primarily about NTMs, it also examines tariff issues as they impact Indian exports. The next chapter reviews tariffs on Indian exports.

2

Chapter Two

Tariffs on Indian Exports

Introduction

A tariff is a tax at the border. It adds to the cost of imported goods and is one of several trade policies that a country can enact. Tariffs are paid to the customs authority of the country imposing the tariff. They are often created to protect infant industries in developing economies, but are also used by more advanced economies. The act of levying tariffs is often highly politicised.

The role of tariffs in international trade has declined in modern times. One of the primary reasons for the decline is the introduction of international organisations designed to improve free trade, such as the World Trade Organisation (WTO). Such organisations make it more difficult for a country to levy tariffs and taxes on imported goods, and can reduce the likelihood of retaliatory taxes. Since the mid-90s, many countries have reduced tariffs and trade barriers, which has improved global integration and brought about globalisation. Multilateral agreements between governments increase the likelihood of tariff reduction, while enforcement of binding agreements reduces uncertainty. Because of this, countries have shifted to NTMs. Free trade benefits consumers through increased choice and reduced prices, but because the global economy brings uncertainty with it, many governments impose tariffs and other trade barriers to protect the industry. There is then a delicate balance between efficacy and every government's need to ensure low unemployment.

This chapter analyses tariffs imposed by countries that account for almost 95% of India's export market. The product groups studied also account for nearly 95% of India's export basket. This chapter shows that while tariffs in India's major markets are generally low, NTMs and tariff peaks are high. It also shows that India's major export categories continue to face high tariffs even in their major markets especially in comparison to its competitors. This issue is illustrated by the example of textiles and garments.

This chapter is organised as follows. Section 1 provides an overview of India's trade, its tariffs, and its main markets at a macro level. Section 2 explores the issue of tariff peaks by categorising India's markets into low, medium and high tariff countries. This section also identifies the different market conditions of India's developed and developing country trading partners. It briefly explores the issue of why India's Free Trade Agreements have not reduced tariffs. Section 3 examines the special case of textiles and garments where tariffs continue to play a major disruptive role in India's trade with its developed country partners. Section 4 explores the relationship between NTMs and tariffs. Section 5 concludes with some observations on the role of tariffs and the relationship between tariffs and NTMs.

2.1. Overview on tariffs

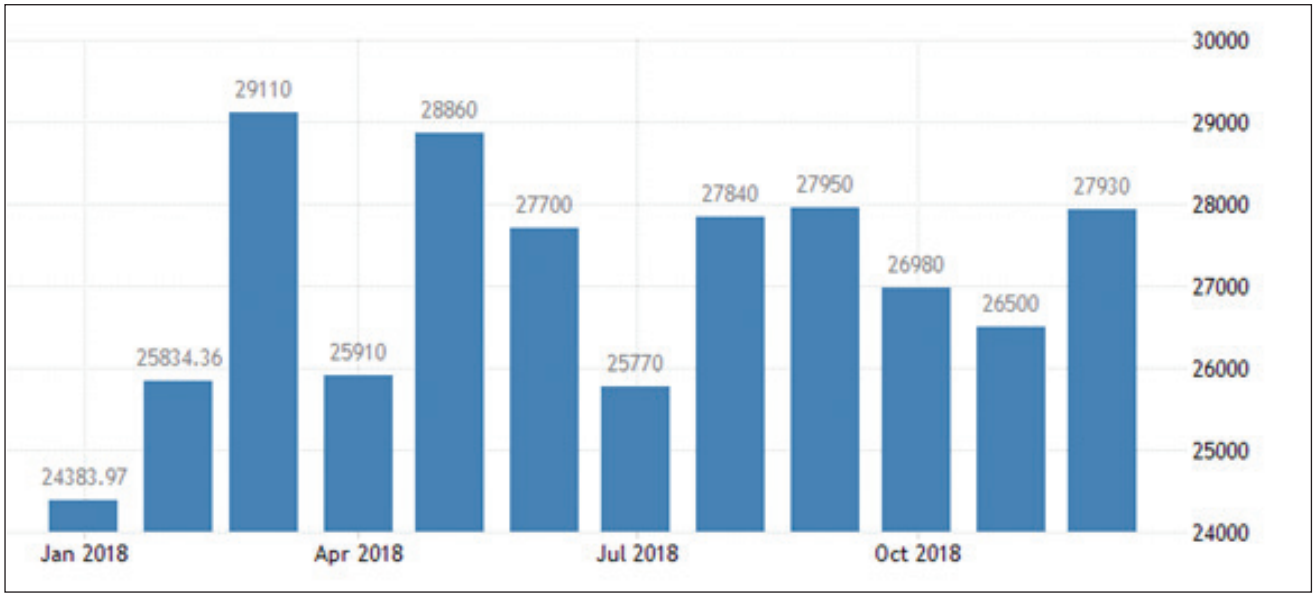
Recent exports and export markets

Exports from India increased by 0.8% year-on-year to USD 28 billion in December of 2018. Major export increases were observed for petroleum products (42.7%), chemicals (12.3%), drugs and pharmaceuticals (3.2%), textiles (9%), and electronic goods (37.1%). In recent years, India exported mostly pearls, precious and semi-precious stones and jewellery (16% of total shipments); mineral fuels, oils and waxes and bituminous substances (12%), vehicles, parts and accessories (5%), nuclear reactors, boilers, machinery and mechanical appliances (5%), pharmaceutical products (5%), and organic chemicals (4%). India's main export partners are the United States (15% of the total exports), United Arab Emirates (11%), Hong Kong (5%), China (4%), Singapore (4%) and United Kingdom (3%). In 2018, India reached its highest export level in value terms of over 324 billion USD.

Indian exporters face stiff tariffs in its major export markets. Hence, future negotiations should take account of these tariffs. What is important, however, is to identify low, medium and high tariff countries for Indian exports. Moreover, it's not just countries, but also specific tariff lines that could be a problem for Indian exports. This section analyses both the countries and the specific tariffs that need to feature in India's future negotiations.

Table 2.1 shows the tariff rates in countries which cover over 80% of the total exports from India. Two countries, Iran and Iraq have been excluded,

Figure 2.1: Monthly Exports from India in 2018 (USD million)



Source: Tradingeconomics.com | Ministry of Commerce and Industry, India

as their latest tariffs were not available from the same source. While these countries account for less than 2% of India's total trade, they are nevertheless part of India's top twenty export destinations. Hong Kong, which is another important export market for India has 0 tariffs, and hence has been excluded from this Table.

Table 2.1 shows that the highest tariffs are imposed by Brazil, China, Republic of Korea (Rok), and Nepal. It is interesting to note that India has FTAs with both Rok and Nepal. Two other high tariff countries are Sri Lanka and Thailand. Both have FTAs with India. This issue is further investigated below in section 2.2.

Table 2.2 shows the percentage share of exports to the top 22 trading partners of India. In terms of percentage share, the EU and WE are major markets accounting for over a third of India's exports. Exports to both these markets have grown in the past two years. Singapore increased its import purchases from India between 2016 and 2017 by 57.4%. In second place was China, with a 40.1% gain in value. Vietnam boosted its imports from India by 36.3%, trailed by a 32.2% improvement for Malaysia and a 27.2% boost from Bangladesh-based importers. United Arab Emirates, the third largest market for India was the only top trade partner to cut back on its imports from India, posting a modest 0.1% year-over-year decline in 2017.

Table 2.1: Tariffs in India's major markets (%)

Country	Simple average MFN applied	Trade weighted average
Australia	2	4
Bangladesh	14	11
Brazil	13	10
China	10	5
EU	5	3
Hong Kong	0	0
Indonesia	8	5
Japan	4	2
Korea Republic	14	9
Malayasia	6	5
Mexico	7	4
Nepal	12	14
Singapore	0	0
South Africa	8	7
Sir Lanka	9	7
Thailand	9	7
Turkey	11	5
UAE	5	4
USA	3	2
Vietnam	10	6

Source: WTO Statistical database

India's export profile changed after 2010. From largely exporting primary products, textiles and clothing, tea and spices, its exports now consist of

Table 2.2: India's Top 22 Trading Partners

Top 22 Trading partners of India with export share of each country more than 1%				
Rank	**Country**	**Export Value (US$)**	**% Share**	**Cumulative (%)**
1	EU	53597.93	17.66	
2	U S A	47878.48	15.77	33.43
3	U ARAB EMTS	28146.12	9.27	42.71
4	HONG KONG	14690.27	4.84	47.55
5	CHINA P RP	13333.53	4.39	51.94
6	SINGAPORE	10202.82	3.36	55.30
7	BANGLADESH PR	8614.35	2.84	58.14
8	VIETNAM SOC REP	7813.08	2.57	60.71
9	NEPAL	6612.96	2.18	62.89
10	MALAYSIA	5701.56	1.88	64.77
11	SAUDI ARAB	5410.70	1.78	66.55
12	TURKEY	5090.70	1.68	68.23
13	JAPAN	4734.22	1.56	69.79
14	SRI LANKA DSR	4476.46	1.47	71.26
15	KOREA RP	4460.98	1.47	72.73
16	AUSTRALIA	4012.32	1.32	74.06
17	INDONESIA	3963.77	1.31	75.36
18	SOUTH AFRICA	3825.21	1.26	76.62
19	MEXICO	3782.79	1.25	77.87
20	THAILAND	3653.83	1.20	79.07
21	ISRAEL	3364.05	1.11	80.18
22	BRAZIL	3063.49	1.01	81.19

Source: Ministry of Commerce, Annual Report 2018

Table 2.3: Tariffs on India's Dynamic Exports

HS CODE	Product	Top export destinations and their tariffs(Apr-July 2018)				
71	Pearls, precious stones, metals, coins	Hong Kong	USA	Belgium	Israel	Thailand
		0	2.1	0.6	2.1	2.5
72	Iron and steel	Nepal	Italy	UAE	USA	China
		11.1	0.3	5	0.3	5
29	Organic chemicals	China	USA	Malaysia	Indonesia	Brazil
		5.7	2.8	0.1	3.8	5.3
87	Vehicles other than railway, tramway	Mexico	USA	South Africa	Bangladseh	Nepal
		10.5	3.1	10	13.5	
85	Electrical, electronic equipment	USA	Germany	Singapore	Indonesia	China
		1.5	2.5	0	6.1	8.7
89	Ships, boats, and other floating structures	UAE	Singapore	South Africa	Malaysia	UAE
		1.1	0	2.2	1.2	1.1
2710	Petroleum Products	UAE	Singapore	Netherlands	China	KoreaRep
		5	0	2.5	6.3	4.8
71	Gold & Other Precious Metal Jewellery	UAE	USA	Hongkong	Belgium	Israel
		0.4	2.1	0	0.6	2.1
30	Drug Formulations, Biologicals	USA	SouthAfrica	UK	China	Singapore
		0.2	0.3		4.5	0

Source: Ministry of Commerce, Annual Report 2018

petroleum products, auto components, electronic goods, chemicals and pharmaceuticals. While the average tariffs on its current basket of dynamic exports are not very high, developing country tariffs are still high.

Table 2.3 shows the largest markets for the different product categories in order of magnitude. The five markets shown above in Table 2.3 constitute over 80% of the total exports in that particular product chapter for India in decreasing order of magnitude. The direction of trade for these dynamic product categories has also changed from largely developed countries to developing countries, where the tariff is higher than average in China, Nepal, and Mexico. It is to be noted that the US has increased its tariff on steel to 25%, although negotiations on tariff reduction are still ongoing.

Table 2.4: Tariffs on top 25 Products exported by India

S. no.	Product Category	Value USD billions	% share	Tariff (%)
1	Pearls, precious stones, metals, coins	$30.44	17	5
2	Mineral fuels, oils, distillation products	$25.17	14	5
3	Machinery, nuclear reactors, boilers	$12.69	7	4
4	Vehicles other than railway, tramway	$12.35	7	8
5	Organic chemicals	$10.10	6	4
6	Pharmaceutical products	$9.71	5	4
7	Iron and steel	$8.32	5	5
8	Electrical, electronic equipment	$6.63	4	5
9	Articles of apparel, not knit or crocheted	$6.19	3	14
10	Articles of apparel, knit or crocheted	$6.07	3	14
11	Cereals	$5.67	3	11
12	Fish, crustaceans, molluscs, aquatic invertebrates	$5.42	3	8
13	Articles of iron or steel	$4.98	3	5
14	Cotton	$4.71	3	3
15	Plastics	$4.49	2	4
16	Other made textile articles, sets, worn clothing	$3.70	2	8
17	Aluminium	$3.31	2	5
18	Meat and edible meat offal	$3.29	2	19
19	Miscellaneous chemical products	$2.77	2	4
20	Ships, boats, and other floating structures	$2.59	1	8
21	Copper	$2.51	1	5
22	Coffee, tea, mate and spices	$2.42	1	12
23	Optical, photo, technical, medical apparatus	$2.18	1	6
24	Rubbers	$2.14	1	8
25	Tanning, dyeing extracts, tannins, derivatives, pigments	$2.12	1	4

Source: Ministry of Commerce, Annual Report 2018

Table 2.4 gives the profile of Indian exports in the year 2017. These products account for roughly 90% of the goods exported by India in 2017.

While average tariffs for most products apart from some food and textiles and clothing are low, tariff peaks in products of export interest to India tend to be high. For example, while average tariffs on apparel is 12%, those on women's skirts and blouses tend to be over 32% in US markets.

2.2 Tariff peaks in different categories of countries

Low tariff countries for Indian exports (average tariff of 5 or below)

There is a group of countries that constitute India's major export partners where tariffs on Indian exports are very low. Table 2.5 below shows tariffs on the major product categories of export interest to India. Essentially, the tariffs on products exported by India to these countries have been aggregated for each product line at the HS 6 digit level. Together, these countries account for about 50% of the total exports from India.

Comparing tables 2.1 and 2.5, some interesting observations emerge. For some countries, the average tariff on products of export interest to India are higher than the simple average of the country as a whole. For example, the US's average tariff is 3% whereas for product categories where India has an export interest, the simple average rises to 10%. Even if we exclude outliers such as beverages and tobacco with a tariff of 108%, the average tariff for products of export interest to India is closer to 6%. Similarly for Japan, while the simple average is 4%, for products of export interest to India, it is 7%. This is despite the fact that India has a Comprehensive Economic Partnership Agreement (CECA) with Japan. Part of the reason for these figures could be that the CECA utilisation rates remain low (see below), hence the MFN tariff is of relevance for Indian exporters. Both Saudi Arabia and UAE also have average tariffs for products of export interest to India, which are marginally higher than their overall average tariffs.

The more important issue in India's exports to these countries is that of tariff peaks. For exports to the EU, tariff peaks on textiles and clothing are over 12%, whereas in Japan for the same categories, tariff peaks are 25% and 13% respectively. These are MFN tariffs. For most countries the tariffs on textiles and clothing continue to remain high with some tariff peaks. As this sector is very important and together constitutes the highest sector of Indian exports, its tariffs have been examined in a separate section. [29]

While average and modal tariffs of all these countries are low, there are substantial tariff peaks. This is especially important in the case of India's CECA with Japan. India is in a position now to export dairy products but Japan's tariffs on these products are very high. The other tariff peak in the case of Japan comes under cereals and preparations, but mostly concern rice. Tariffs under leather and footwear are also high. Hence, in subsequent negotiations, tariffs for these product categories can be considered for reduction. Other higher tariffs are imposed on clothing and some food products, and hence may also be reconsidered in the negotiations.

In the case of the US, peak tariffs are imposed on beverages and tobacco. While some beverages may be of importance, the strategy of the government of India is to discourage tobacco production and hence exports too. The other high tariff areas are dairy products and clothing. These areas could be considered for bilateral negotiations. In the case of the EU, peak tariffs are imposed on clothing, beverages, and tobacco. Hence, bilateral negotiations where clothing tariffs can be reduced would be of value. These tariff rates also indicate that FTAs with either the US or EU would only be meaningful if tariff peaks in sectors such as clothing and dairy can be addressed. Fish exports to the

[29] Ministry of Commerce, Annual Report, 2018, Annex on Exports

EU also face higher tariffs, which is significant, as shrimps are of particular export interest to India. In the case of Malaysia, India has a dynamic export interest in three categories, namely electrical machinery, transport equipment, especially auto components, and chemicals. As India has a FTA with ASEAN these are the products that should be considered for tariff negotiation. With Israel, tariff concessions are needed in the category of food products especially fruits and vegetables.

Table 2.5: Tariffs on products of Export interest to India

Product categories	Australia	EU	Israel	Japan	Malaysia	Saudi Arabia	US	UAE
Animal products	0	2	17	21	0	2	9	2
Dairy products	0	0	0	35	0	5	10	5
Fruit, vegetables, plants	2	9	13	8	11	3	7	3
Coffee, tea , spices	1	3	0	13	3	3	2	3
Cereals & preparations	2	9	3	12	0	3	6	2
Oilseeds, fats & oils	1	2	2	2	6	4	21	4
Sugars and confectionery	3	13	1	21	0	4	6	3
Beverages & tobacco	2	21	1	1	0	53	108	53
Cotton	0	0	0	0	5	5	0	5
Other agricultural products	0	3	6	2	0	4	1	4
Fish	0	12	4	5	3	4	1	4
Minerals, metals and other basic manufacturing	3	2	2	1	8	5	2	5
Petroleum and Petroleum products	0	3	3	1	3	6	7	5
Chemicals	2	4	2	2	9	4	3	4
Wood, paper, etc.	4	0	3	1	4	7	0	5
Yarn, fabrics and textiles	4	7	3	6	2	6	8	5
Clothing	5	12	6	9	0	5	12	5
Leather, footwear, etc.	5	6	6	10	0	6	5	5
Non-electrical machinery	4	2	4	0	7	4	1	4
Electrical machinery	3	2	3	0	14	4	2	3
Transport equipment	3	5		0	10	5	3	4
Manufactures, not elsewhere specified	2	1	4	1	9	5	1	5
Average tariff rate	2	5	4	7	4	7	10	6
Median tariff rate[30]	2	3	3	2	3	4.5	4	4
Modal tariff rate[31]	0	2	3	1	0	4	1	5
Peak tariff rate	5	21	17	35	14	53	108	53

Source: WTO statistical database

[30]Median tariff rate refers to the tariff rates which are in the middle range.
[31]Modal tariff rate refers to the most frequently occurring tariff rate.

It is also interesting to note the products with maximum tariffs in the low tariff category. For example, in the US, apart from some agricultural products, tariff peaks occur in products of export interest to India. For instance, textiles and clothing have a tariff peak of over 30%. This impacts India, as this category constitutes roughly 6-10% of India's exports. Similarly coffee, tea and spices have a tariff peak of 51%. Manufactures not included elsewhere (which includes gems and jewellery and pearls) account for nearly 15% of India's exports, and have a tariff peak of 32%, whereas leather footwear has a tariff peak of 56%. Hence, India's negotiations with the US should focus on tariff peaks in products of export interest rather than on average tariffs. This also holds for Israel, where its tariff peak is over 100% for both rice and fish, which India exports.

Medium tariff countries (average tariff of 6-15%)

Comparing Tables 2.1 and 2.6 shows that almost all countries have higher than average tariffs on products of export interest to India. These countries account for 16% of India's exports.

Table 2.6: Tariffs on products of export interest to India

Product categories	Brazil	China	Indonesia	Nepal	Mexico	South Africa
Animal products	9	13	5	10	17	0
Dairy products	16	10	5	20	10	0
Fruit, vegetables, plants	10	13	6	11	21	12
Coffee, tea , spices	16	16	16	25	21	10
Cereals & preparations	13	41	12	15	14	10
Oilseeds, fats & oils	7	10	5	10	4	8
Sugars and confectionery	17	30	12	17	15	19
Beverages & tobacco	15	28	47	23	36	40
Cotton	6	25	3	0	0	4
Other agricultural products	9	15	4	9	10	3
Fish	11	8	6	11	16	1
Minerals, metals and other basic manufacturing	10	8	7	12	3	6
Petroleum and Petroleum products	1	7	1	25	0	3
Chemicals	9	7	6	11	3	3
Wood, paper, etc.	13	5	6	15	4	8
Yarn, fabrics and textiles	25	9	12	13	11	18
Clothing	35	16	24	20	22	43
Leather, footwear, etc.	20	14	14	15	11	17
Non-electrical machinery	12	6	5	8	2	3
Electrical machinery	13	11	5	9	3	6
Transport equipment	19		13		10	8
Manufactures, not elsewhere specified.	14	9	7	16	5	5
Average tariff rate	14	14	10	14	11	10
Median tariff rate	13	11	6	13	10	7
Modal tariff rate	9	13	5	11	10	3
Peak tariff rate	35	41	47	25	36	43

Source: WTO Statistical database

All the countries in this tariff category are developing countries. Comparing Table 2.1 and Table 2.6 shows that for all these countries, the average tariff on products of export interest to India is higher than their national average tariff. This suggests that most tariff negotiations with developing countries should focus on overall tariff negotiations rather specific sectors. It also indicates that these products also constitute the major export basket of these countries, and hence their tariffs are high.

The most important trading partner in this category is China. China has imposed high tariffs on India's confectionery, which is not a high share of India's trade. However, labour-intensive products such as cotton, leather and footwear, a number of food items, and light manufacturing incur tariffs of over 10% in Chinese markets. Thus, India's trade strategy with China should consider negotiating downward tariffs on these products, as they account for a high share of India's exports to China.

Indonesia has very high tariff peaks on products such as leather and footwear and transport equipment, both of which are of export interest to India. Furthermore, the utilisation of ASEAN tariff concessions is very low and several products of export interest to India are on the exceptions list as these products are also produced by the ASEAN countries. Another country which is of interest here is South Africa which has a tariff peak of 655% on textiles which is of interest to India. Saudi Arabia also has high tariffs on some food items which India exports to the Middle East.

High Tariff countries (average tariffs of 16% and above)

There are a few other countries particularly developing countries which account for about 10% of India's trade. These countries continue to impose high tariffs on India's exports. Again, it can be observed that their modal tariff, i.e. the most frequently occurring tariff, is much lower than the average tariff applicable to Indian exports. Comparing Table 1 and Table 2.7 shows us that the average tariffs applicable on Indian exports are higher than the average tariffs for all countries in this category of high tariffs. This suggests that these countries export similar products and hence they impose high tariffs to protect their markets.

All food products have much higher than average tariffs in almost all countries included in Table 2.7. Cereals have a very high average tariff in the Republic of Korea. Hence, rice exports to RoK face prohibitively high tariffs. Tariffs on fish exports and clothing exports to RoK are also high. India has a CECA with RoK which has very low preference utilisation. Hence, such high tariffs, including an average tariff of 27% on products of export interest to India versus a country average of 14% (See Table 2.2.1) appears absurd.

As far as Bangladesh is concerned, India has a non-reciprocal tariff arrangement with Bangladesh. While tariffs applicable to Indian products are lower than the modal MFN tariff, there are nevertheless higher than the average tariff for Bangladesh (See Table 2.7). Moreover, there are tariff peaks on food. It is therefore necessary to gradually reduce tariffs for Indian goods in Bangladesh, although this may be politically difficult.

For Sri Lanka, Thailand and Vietnam the average tariffs for Indian exports is much higher than the modal tariff and certainly higher than the country average. Given that these countries are India's FTA and even bilateral trading partners these tariff rates must be negotiated downward. Turkey also has absurdly high tariffs on Indian exports.

Two things can be observed from Tables 7 and 8. One is that despite high tariffs, India has several overlapping agreements with countries. See Table 2.8 below. Second, tariff peaks as shown in Table 2.7 is high for products of export interest to India. Negotiations with these countries should take account of these two factors.

Table 2.7: Tariffs on Products of Export Interest to India

Product categories	Bangladesh	Korea Rep	Sri lanka	Thailand	Turkey	Vietnam
Animal products	21	26	20	35	175	9
Dairy products	25	89		18	25	58
Fruit, vegetables, plants	12	50	24	41	49	20
Coffee, tea , spices	10	34	25	44	4	3
Cereals & preparations	25	205	16	16	12	20
Oilseeds, fats & oils	25	34	18	11	64	29
Sugars and confectionery	1	15	0	20	0	5
Beverages & tobacco	25	45	100	56	140	8
Cotton	12	0	0	0	2	7
Other agricultural products	22	15	14	11	34	14
Fish	21	14	18	13	44	24
Minerals, metals and other basic manufacturing	17	4	7	5	6	18
Petroleum and Petroleum products	11	4	9	8	2	15
Chemicals	14	6	3	3	3	9
Wood, paper, etc.	5	2	9	7	2	4
Yarn, fabrics and textiles	5	9	13	11	13	7
Clothing	15	12	15	30	19	11
Leather, footwear, etc.	18	9	15	16	3	15
Non-electrical machinery	25	6	2	3	94	24
Electrical machinery	12	5	9	6	5	29
Transport equipment	22	6	6	26	0	16
Manufactures, not elsewhere specified	20	6	15	6	7	11
Average tariff rate	17	27	16	18	32	16
Median tariff rate	18	10.5	14	12	10	15
Modal tariff rate	25	6	9	11	2	9
Peak tariff rate	25	205	100	56	175	58

Source: WTO statistical database

2.3 FTAs and preference utilisation

Tariff rates for India would come down automatically if there was better utilisation of preferences under PTAs and FTAs. Most of India's exports incur MFN rates. While the global utilisation of preferences is as high as 70-80%, in India on an average it is as low as 3%.[32] The reasons for the non-utilisation of preferences are summarised below:

- Lack of awareness about FTAs and Rules of Origin (RoO) in the industry

[32]Deloitte, PTA Utilisation, An Opportunity Waiting for the Indian Industry,

- Poor participation of the industry in trade negotiations
- Lack of skill set, specialisation, and focus on setting up auditable FTA origin management system by the industry
- High cost of FTA compliance estimated in terms of a tariff equivalent of 3%
- Misaligned benefit and costs– the exporter bears the cost of obtaining the Country of Origin (COO) certificate while the benefits of duty reduction accrues to the importer
- Non-tariff barriers in the importing country.
- Revenue bias of the Customs administration in the country of import may discourage exports under PTAs due to onerous invoice requirements and Country of Origin certificates

India's exports to FTA countries have not outperformed overall export growth, or exports to the rest of the world. Both have grown at a commensurate rate of 13% y-o-y. FTAs have led to increased imports and exports, although this has widened the trade deficit. For example, India's trade deficit with ASEAN (Association of Southeast Asian Nations), South Korea and Japan has doubled to $24 billion in FY2017 from $15 billion in FY2011 (with the signing of the respective FTAs) and $5 billion in FY06.[33]

India does not maintain published statistics on PTA and FTA utilisation. Figures obtained through Korea International Trade Association (KITA) for 2012 and 2014 indicate that India's utilisation rates for its exports were 52.7% in 2012 and 67% in 2014.[34] According to the Asian Development Bank, the utilisation rate of India's FTAs varied between 5% and 25%, which is one of the lowest in Asia.[35] Utilisation rate, which shows the degree to which preference-eligible dutiable imports enter under preferential—rather than the MFN—tariffs use the following formula.

The formula for the utilisation rate is:

$$\sum_{i \in p} Mi\,u \,/ \sum_{i \in p} Mi$$

Where

i is a tariff line

Mi is the value of imports in the tariff line i from FTA members

MiU is the value of imports from FTA members that actually utilized the FTA's preferential

Rate in the tariff line *i*

P is the set of all dutiable tariff lines that are eligible for preferences under that FTA.

Using this formula, Deloitte estimated the tariff utilisation rate for Indian exports under FTAs to be as low as 3%.[36] Also, India's exports are much more responsive to income changes as compared to price changes. So, a tariff reduction or elimination does not significantly boost exports.

When it comes to the India-ASEAN FTA, there is a deterioration in the quality of trade. Apart from the surge in the total trade deficit due to tariff cuts, sector wise trade flows are also important. As per the UN's Harmonised System of Product Classification, products can be grouped into 99 chapters, and further into 21 sections like textiles, chemicals, vegetable products, etc. India has experienced a worsening of the trade balance (deficit increased or surplus reduced) for 13 out of 21 sectors.[37] This

[33]https://economictimes.indiatimes.com/news/economy/foreign-trade/view-india-must-tread-carefully-on-free-trade-agreements/articleshow/64055496.cms
[34]Sheshadri, V.S., 2015, India Korea CEPA, An Appraisal of Progress,
RIS, http://www.ris.org.in/sites/default/files/FINAL%20India%20and%20Korea%20Report.pdf
[35]Mashiro Kawai and Ganesan Wignaraja, 2010, Asian FTAs-Trends, Prospects and Challenges, ADB Economics Working Paper Series no: 226
[36]Deloitte, 2017, FTA-An Opportunity in waiting for Indian Industry,
[37]RIS, Indo-ASEAN trade agreement

Table 2.8: Major Bilateral and Regional Agreements of India

S. No.	Acronym	Groupings	Member Countries No	Member Countries Names	FTAs/PTAs
1	APTA	Asia Pacific Trade Agreement	5	Bangladesh, China, India, Republic of Korea, Sri Lanka.	PTA
2	India ASEAN TIG	India ASEAN Trade in Goods Agreement	11	Brunei, Cambodia, Indonesia, Laos, Malaysia, Myanmar, Philippines, Singapore, Thailand, Vietnam and India.	FTA
3	BIMSTEC	Bangladesh, India, Myanmar, Sri Lanka, Thailand Economic Cooperation	7	Bangladesh, India, Myanmar, Sri Lanka, Thailand, Bhutan and Nepal.	Under negotiations
4	GSTP	Global System of Trade Preferences	44	Algeria, Argentina, Bangladesh, Benin, Bolivia, Brazil, Cameroon, Chile, Colombia, Cuba, Democratic People's Republic of Korea, Ecuador, Egypt, Ghana, Guinea, Guyana, India, Indonesia, Iran, Iraq, Libya, Malaysia, Mexico, Morocco, Mozambique, Myanmar, Nicaragua, Nigeria, Pakistan, Peru, Philippines, Republic of Korea, Romania, Singapore, Sri Lanka, Sudan, Thailand, Trinidad and Tobago, Tunisia, Tanzania, Venezuela, Vietnam, Yugoslavia, Zimbabwe.	PTA
5	IBSA	India Brazil and South Africa	3	India, Brazil and South Africa.	Under negotiations
6	SAFTA	South Asia Free Trade Agreement	7	India, Pakistan, Nepal, Sri Lanka, Bangladesh, Bhutan and the Maldives	FTA
7	ISLFTA	Indo Sri Lanka FTA	2	Sri Lanka, India	FTA
8	IMCECA	Indo Malaysia CECA	2	Malaysia, India	FTA
9	ISCECA	India Singapore CECA	2	Singapore, India	FTA
10	JICEPA	Japan India CEPA	2	Japan, India	FTA
11	IKCEPA	India Korea CEPA	2	South Korea, India	FTA

Source: Compiled from Commerce Ministry web site "Trade Agreements" and Srivastava. Ajay, Chapter 27, Free Trade Agreements, Business Impact of WTO, FTAs and other International Trade Issues.

also includes value-added sectors like chemicals and alloys, plastics and rubber, minerals, leather, textiles, gems and jewellery. Sectors where trade balance has improved include animal products, cement and ceramic, arms and ammunitions. Sectors where trade deficit has worsened account for approximately 75% of India's exports to ASEAN[38].

2.4. The Special case of Textiles and Clothing

Major Indian export markets offer preferential tariffs to certain competitor countries but not to India. Tariffs on exports of textiles from India to China (world's largest importer of yarn)[39] range from 7.5% (yarn), 10% (fabric), and 12% (made-ups), while Vietnam, Cambodia and Indonesia enjoy duty-free access under their FTAs with China. In addition, Bangladesh and Pakistan get preferential tariff for their exports to China.[40]

Bangladesh is an LDC, which results in duty-free tariffs for its exports to most developed countries, including the EU.[41] Vietnam is part of ASEAN and thus

[38]Ibid

[39]China is the third largest importer of textiles products in the world, with a share of 5.5 per cent in global imports. See page 143 of https://www.wto.org/english/res_e/statis_e/wts2018_e/wts2018_e.pdf

[40]https://www.thehindu.com/business/Industry/fall-in-exports-to-china-worries-textile-industry/article24604352.ece.

[41] The EU is by far the largest importer of textiles, with its imports in 2017 being US$74 Billion (including intra-EU trade). Even excluding intra-EU trade, its imports of textiles were US$31 Billion. The second largest importer of textiles was the US, with US$28 Billion imports in 2017; China was third largest importer of textiles with US$17 Billion.

gets better market access conditions than India. In addition, Vietnam has concluded FTAs with the EU and ten other economies under the Comprehensive and Progressive Trans Pacific Partnership (CPTPP)[42], which will result in preferential tariff treatment for its exports to these economies. Similarly, as a member of ASEAN, Vietnam also benefits from the China-ASEAN Free Trade Agreement, under which it gets preferential access to the Chinese market compared to India. The tariff situation for different components for textiles, i.e. yarn, fabrics and made-ups are shown below.

Yarn

In the table below, the rows show the top ten exporters of yarn and the columns show the top ten importers of yarn at the global level. China and Hong Kong are the largest importers of cotton yarn from India. However, yarn exports from India have fallen continuously over the last three years as shown above in table 2.7. A close look at the tariffs applied to exports of yarn from different economies shows that Vietnam's exports have no tariffs in a number of the major importing markets whereas exports from India pay higher tariffs in several markets, such as 4.4% tariff in China, India's largest market for yarn. India also faces higher tariffs than its competitors such as Korea, Mexico, Pakistan and Turkey in the EU markets. In the Australian market, which was the largest importer of yarn last year China, Indonesia, Korea, the US and Vietnam get 0 tariffs while India has to pay 5%. To understand the bias in tariffs against India, a different methodology involving trade weighted averages has been used below [43].

Fabrics

As far as fabrics are concerned the largest export markets for India are US, South Korea, EU, and Vietnam, apart from the SAARC region where a uniform tariffs prevails.

Table 2.9: Trade Weighted Average of all HS 6 digit lines of Yarn Exports

	Importers									
Exporters	**Australia**	**China**	**Dominican Republic**	**Egypt**	**EU**	**Hong Kong**	**Japan**	**Korea**	**Russia**	**Turkey**
China	0.00		0.00	5.00	4.05	0.00	4.40	6.27	5.00	4.04
India	5.00	4.41	0.00	5.00	4.05	0.00	0.00	3.65	5.00	3.20
Indonesia	0.00	0.00	0.00	5.00	4.06	0.00	0.00	0.95	5.00	3.20
Korea	0.00	3.55	0.00	5.00	0.00	0.00	5.49		5.00	0.60
Mexico	5.00		0.00		0.00			8.00		
Pakistan	5.00	4.05		5.00	0.00	0.00	4.48	7.53	5.00	3.24
Turkey	5.00	5.20	0.00	0.00	0.00	0.00	4.29	3.43	5.00	
US	0.00	5.13	0.00	5.00	4.07	0.00	5.17	0.00	5.00	4.00
Uzbekistan				5.00	3.20	0.00	4.48	7.07	0.00	3.27
Vietnam	0.00			5.00	3.26	0.00	0.00	0.00	2.50	3.20

Source: Calculated from the COMTRADE database.

[42]Australia, Brunei, Canada, Chile, Japan, Malaysia, Mexico, New Zealand, Peru and Singapore.

[43]Trade weighted average tariffs are calculated by multiplying the tariff on a product line at the 6 digit level with exports in that particular tariff line and then averaging it with over all tariff lines. Thus for example for Yarn it would be $\sum Xij/\sum j$, where i=tariff on tariff line i, j=export of product X in tariff line i. Thus for yarn, fabric and made-ups all the tariff lines given in Annex 2 have been used as specified under yarn, fabrics and made-ups.

In Table 2.10, the top ten exporters of fabric are shown as columns, while the top ten importers of fabric are shown as rows. The weighted average tariffs faced by India's exports in several of its major markets are very different from its competitors. For example, while Pakistan exports at 0 tariffs to the EU and China, two of the largest importers of fabric in the world, India's tariffs are 8% and nearly 11% in the EU and Chinese market respectively. South Korea has 0 tariff in all major markets, and Turkey also gets preferential market access in the EU. The EU also has 0 tariffs in Morocco and Turkey and near 0 tariffs in Mexico. It also enjoys preferential access in the US through NAFTA. The same is true for Japan. On the other hand, India does not have preferential access to any of the ten major importing countries.

Made-ups

India's exports to the US and EU have fallen in the financial year 2017-2018. In Table 2.11, the top ten exporters of made-ups are shown as columns, while the rows show the top ten importers.

As can be seen from Table 2.10, the four major competitors - Turkey, Pakistan, Bangladesh and Egypt get 0 tariffs in the EU, while India has to pay a 7.5% tariff.

In general, Indian exporters are at a disadvantage, as exports of competitors like Bangladesh face 0 tariffs in several developed economies (including EU) because of its status as a Least Developed Country. Likewise, other significant textiles exporters like Turkey and Pakistan get preferential tariffs in the EU market. Moreover, the largest importer of textiles in the world, EU (with a share of 23.3% in global textile imports[44]) has negotiated an FTA with Vietnam. While the effects of the FTA are yet to be felt, the global textile export share of Vietnam has more than doubled since 2010.

Clothing

Tariffs are constantly evolving, especially where most of India's competitors are entering into FTAs with the major players. While Bangladesh will continue to get duty-free access to EU markets and a number of other developed country markets till 2023, it also has non-reciprocal duty-free access to SAFTA markets.

Table 2.10: Trade Weighted Average tariff of all HS 6 digit lines of export of Fabrics

Exporters	EU	Vietnam	Bangladesh	US	China	Hong Kong	Indonesia	Mexico	Turkey	Morocco
China	8.00	NA	NA	8.31		0.00	0.00	10.00	8.00	
Pakistan	0.00	NA	NA	8.17	0.00	0.00	10.63	10.00	6.40	8.89
EU		NA	NA	8.31	10.58	0.00	12.28	0.28	0.00	0.00
India	8.00	NA	NA	8.23	9.75	0.00	5.06	10.00	6.40	8.49
Turkey	0.00	NA	NA	8.24	10.51	0.00	12.08	10.00		0.00
Hong Kong	8.00	NA	NA	8.42	1.60		12.34	10.00	8.00	10.00
US	8.00	NA	NA		10.27	0.00	12.18	0.29	8.00	
Japan	8.00	NA	NA	8.31	10.58	0.00	0.00	0.91	8.00	10.21
South Korea	0.00	NA	NA	0.04	5.17	0.00	0.00	10.00	1.30	10.00
Egypt	0.00	NA	NA	8.33		0.00	14.17	10.00	0.00	

Source: Calculated from Comtrade data base.

[44] Page 143 of https://www.wto.org/english/res_e/statis_e/wts2018_e/wts2018_e.pdf

2.11: Trade Weighted Average tariff of all HS 6-digit lines of export of Made-ups

Importers										
Exporters	US	EU	Japan	Canada	Australia	Saudi Arabia	Switzerland	Russia	UAE	China
China	4.67	7.46	3.06	10.40	0.23		0.00	5.56		
India	4.70	7.50	0.00	10.30	2.59	5.00		5.89	5.00	11.50
Turkey	4.23	0.00	4.61	11.44	2.63	5.00	0.00	5.78	5.00	13.24
Pakistan	4.19	0.00	3.82	10.74	2.42	5.00		4.17	5.00	7.94
EU	4.67		5.73	0.00	2.58	5.00	0.00	6.11	5.00	11.79
Bangladesh	4.92	0.00	0.00	0.25	0.00		0.00	0.00		
Egypt	3.97	0.00	5.14	10.77	3.02		0.00	5.00		
Vietnam	6.18	6.25	0.00	11.71	1.44			1.74		
US		7.46	5.79	0.00	0.00	5.00		5.71	5.00	11.92
Iran	0.72	8.34	4.17	10.96	2.31			3.75		

Source: Calculated from COMTRADE database.

Table 2.12: Tariffs for India and Competitor countries

Country	HS 61	HS 62
European Union		
Bangladesh	0%	0%
China	11.79%	11.52%
India	9.43%	9.22%
Vietnam	9.43%	9.22%
World (excluding intra –EU trade)	3.4%	3.3%
United States Of America		
Bangladesh	13.98%	10.44%
China	13.98%	10.44%
India	13.96%	10.37%
Vietnam	13.98%	10.44%
World	11.1%	8.4%
United Arab Emirates		
Bangladesh	5%	5%
China	5%	5%
India	5%	5%
Vietnam	5%	5%
World	5%	5%

Source: Comtrade database

This situation is likely to change for Vietnam after the ratification of its two major Free Trade Agreements; the Vietnam EU FTA and the Comprehensive and Progressive Trans Pacific Partnership (CPTPP). The Vietnam EU FTA is expected to be ratified by the end of the year, which will phase in a reduced tariff scheme for Vietnam, ultimately leading to zero tariff (like Bangladesh). The Comprehensive and Progressive Trans Pacific Partnership (CPTPP) will be implemented likely by 2019.

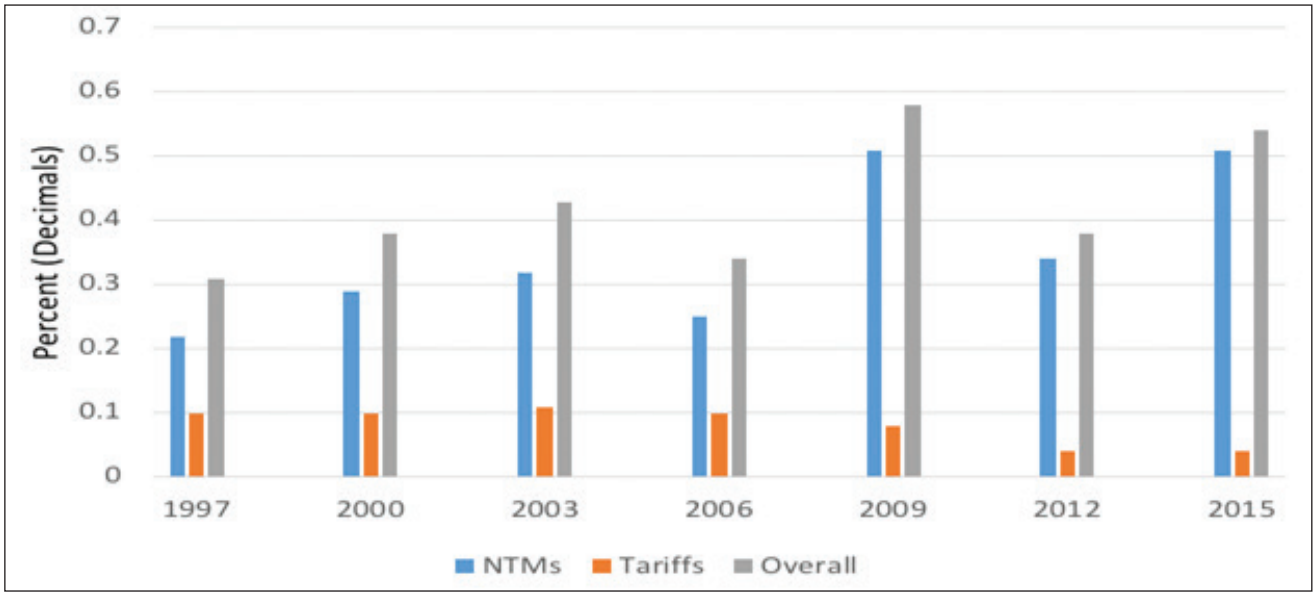
2.5 Tariff and NTMs

Trade liberalisation, through the WTO, but also through regional, bilateral and unilateral trade reforms, has resulted primarily in tariff liberalisation. However overall trade protection may have actually gone up as non-tariff measures (NTMs) have increased.[45] Indeed, the Trade Analysis and Information System (TRAINS) database reports that about 2,852 product lines were subject to one NTM type in 2015, compared to 1,456 product lines in 1997.[46]

A study that estimated the ad-valorem equivalents (AVEs) of NTMs at the product level for several countries,[47] found that NTMs were higher than tariffs through the period 1997-2015. In fact, tariffs decreased from 10% in 1997 to 4% in 2015, whereas NTM trade protection grew from 22% in 1997 to 51% in 2009 and remained at that level till 2015. The most frequent NTMs used were 'technical measures' followed by 'quantity control' and, to a lesser degree, 'price control' and 'monopolistic measures'.

NTMs were generally higher for agriculture than manufacturing, with a sharp rise post-2008 in the manufacturing sector. Within manufacturing, the most NTM-protected activities were labour intensive sectors such as textiles, footwear, machinery and electrical equipment, and rubber and plastics.[48] Interestingly, by 2015, textiles figured prominently as one of the most 'protected' sectors, and in this sector 'technical measures' were the predominant NTM.[49]

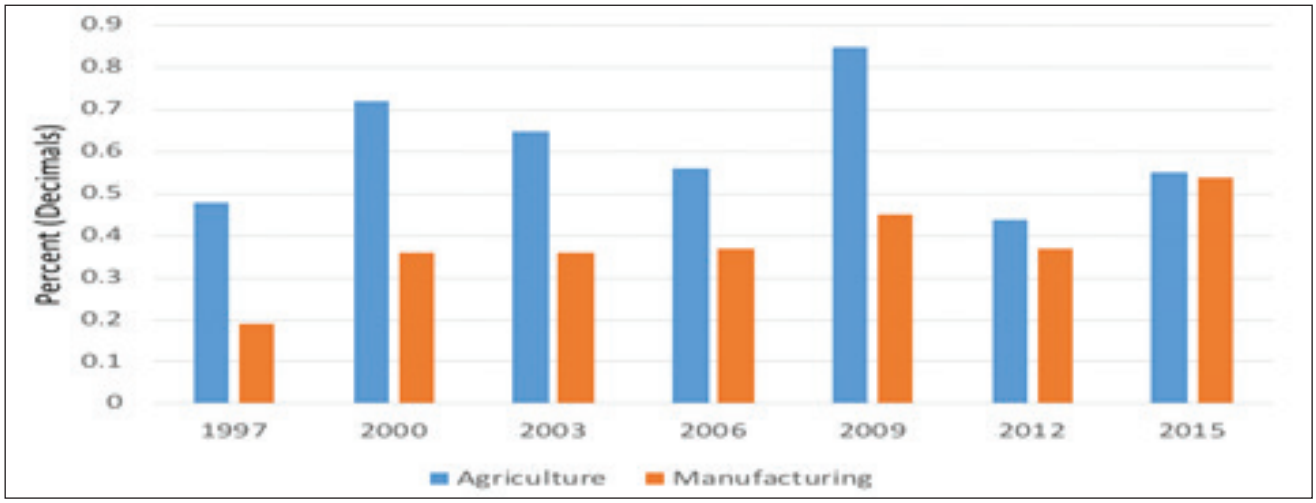
Figure 2.2 Average AVE of NTMs, tariffs and overall protection, 1997-2015



Data source: Niu et al. (2018

[45]Bacchetta, M and C Beverelli (2012), "Non-tariff measures and the WTO", VoxEU.org, 31 July.
[46]Sailesh singh Gunessee, Chris Milner, Zhaohui Niu 19 June 2018, Growing non-tariff and overall protection, https://voxeu.org/article/growing-non-tariff-and-overall-protection
[47]Niu, Z, C Liu, S Gunessee and C Milner (2018), "Non-tariff and overall protection: evidence across countries and over time", GEP Research Paper 2018/05, forthcoming in Review of World Economics.
[48, 49]Ibid

Figure 2.3 Average AVE of NTMs across sectors, 1997-2015



Data source: Niu et al. (2018

Trade protection across country groupings

The evolution of trade protection can also be studied across countries grouped by regions and income types. North America shows a consistent trend of rising protectionism over the period, while most regions and income groups exhibit a fluctuating trend. While tariffs have been falling in both developing and developed countries, NTMs have been increasing in the OECD countries with some significant outliers. These outliers include some of the BRICs.

The AVE estimates confirm the anecdotal evidence that has suggested increasing rather than declining overall trade protection, mainly due to the greater use of non-tariff measures. It also tallies with the reported incidence of trade-impeding policy interventions in the Global Dynamics database and reports of the Global Trade Alert[50]. Given the growing dominance of non-tariff protection over tariff protection, it is clear that policymakers need to pay careful attention to NTMs during trade negotiations, whether bilaterally or multilaterally involving the WTO.

India's Scenario – Do low tariffs accompany higher NTMs?

India has been underperforming in the export sector consistently since 2013. In 2018, while global exports were estimated to grow by over 1.8%, India's exports only grew by 0.8%. While tariffs have been analysed in detail, NTMs above affect India's exports significantly. In keeping with overall global trends in markets where tariffs are low, NTMs have been high. Table 2.13 shows India's trade trends, which have been ranked in descending order of magnitude of tariffs.

In keeping with the findings of the studies shown above there is an inverse correlation between NTMs and tariffs for Indian exports. The lower the tariff the higher the number of NTMs and vice versa. Two exceptions stand out. These are China and Brazil. In these two countries both the levels of tariffs and NTMs are high.

Correlation between tariffs and NTMs for Indian exports

Using data from Table 2.13, a regression analysis was carried out to test whether NTMs increase when tariffs decrease. The regression analysis verified the inverse correlation, though the r-square value was low suggesting that there could be several other variables that figure in the equation, which correlated tariffs and NTMs.

[50]www.globaltradealert.org/global_dynamics

Table 2.13: Profile of India's Tariffs and NTMS

Countries	NTMs	tariff rate	export_17	%share in exports
Indonesia	5	44	4	1
srilanka	0	36	4	1
southafrica	3	35	4	1
nepal	2	34	7	2
mexico	6	34	4	1
israel	0	34	3	1
brazil	29	33	3	1
Thailand	7	32	4	1
korearep	2	27	4	1
china	11	12	13	4
saudiarabia	3	11	5	2
australia	6	8	4	1
singapore	0	7	10	3
usa	52	5	48	16
japan	22	5	5	2
EU	64	4	54	18

Notes:
1. NTMs refers to the number of NTMs applied in 2017.
2. Tariffs are trade weighted average tariffs for 2017. They are also tariffs on the same products on which NTMs have been imposed.
3. Exports refer to India's export in USD billion to the relevant country in 2017.

Source: Comtrade data base

The results show that lowering of tariffs has been accompanied by an increase in NTMs. The correlation is strong in 95% of the sample. However, NTMs can proliferate because of other reasons as shown above, such as consumer preferences, regulatory issues, technological sophistication and producer concerns. This is reflected in the low r-square value. As stated earlier, BRICs could be outliers to this correlation between NTMs and tariffs. This is because in countries such as Brazil both tariffs and incidence of NTMs are high. Hence, a second regression, which excluded the outlier Brazil, was conducted.

Excluding Brazil, the results become even more robust. The r-square value increased and the confidence interval went up to 97.5%, thus indicating that the negative correlation between NTMs and tariffs is unlikely only in 2.5% of the cases examined here. Increase in the r-square value indicates that the negative correlation between tariffs and NTMs becomes more pronounced when Brazil is excluded from the analysis. Hence the role of omitted variables diminishes when Brazil is excluded.

Panel 1: Regression results including Brazil

```
. reg tariffrate ntms

      Source |       SS       df       MS      Number of obs   =        16
-------------+------------------------------   F(1, 14)        =      4.90
       Model |  795.435918     1  795.435918   Prob > F        =    0.0439
    Residual |  2270.50158    14  162.178684   R-squared       =    0.2594
-------------+------------------------------   Adj R-squared   =    0.2065
       Total |  3065.9375     15  204.395833   Root MSE        =    12.735

------------------------------------------------------------------------------
  tariffrate |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
        ntms |  -.3765823   .1700412    -2.21   0.044    -.7412844   -.0118802
       _cons |   27.55222   3.900306     7.06   0.000     19.18689    35.91754
------------------------------------------------------------------------------
```

Panel 2: Regression results excluding Brazil

```
. reg tariffrate ntms

      Source |       SS       df       MS              Number of obs =      15
-------------+------------------------------           F(1, 13)      =    6.46
       Model |  979.177038     1  979.177038           Prob > F      =  0.0246
    Residual |  1970.5563     13  151.581254           R-squared     =  0.3320
-------------+------------------------------           Adj R-squared =  0.2806
       Total |  2949.73333    14  210.695238           Root MSE      =  12.312

------------------------------------------------------------------------------
  tariffrate |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
        ntms |  -.4280368   .1684121    -2.54   0.025    -.791869   -.0642046
       _cons |   27.08872   3.785091     7.16   0.000    18.91152    35.26591
------------------------------------------------------------------------------
```

Conclusions

Indian exports face both tariff and non-tariff barriers. Tariff negotiations should focus on developing countries, especially India's free trade partners. NTMs should focus on some of India's major developed country trading partners. However, neither issue can be ignored, as substantial exports of India still face high tariffs.

India's utilisation of PTA and FTA tariffs are very low. Attention should be paid to improve the utilisation of preferences and measures should be instituted to improve. Easier procedures for obtaining Rules of Origin certificates should be put in place. Further discussions with Customs authorities of importing countries on the low utilisation of tariff preferences should also take place. It may also be important to investigate the issue of sectoral reciprocity given the tariff structure facing Indian exports, bilaterally and within FTAs.

3

Chapter Three

Trends and Evolution of NTMs

Introduction

This chapter will look at the systemic issues that arise for exporters due to the notification process at the WTO, which creates barriers to export. It will also identify specific issues that are used by countries to address domestic concerns. This chapter deals with the issues faced by exporters in India arising from these measures, specifically the increase in numbers of SPS and TBT measures compared to the other NTMs.

NTMs cover a range of actions that are permitted by the WTO, which sets global rules for free and fair trade among 164 member countries. The measures that are permitted under the WTO agreements include, among others, import licensing, trade remedial measures, rules of origin, investment measures and technical regulations. These measures are covered under the SPS and TBT agreements of the WTO. Trade remedial measures include anti-dumping, safeguards, countervailing, quantitative restrictions, export subsidies, tariff rate quotas, etc.

Among the various NTMs used by member countries of the WTO to safeguard domestic interests, SPS and TBT measures are the most popular. Data from the WTO-Integrated Trade Intelligence Portal (I-TIP) shows that a total of 64,621 NTMs have been issued at the WTO between 1995 to end December 2018. SPS and TBT measures accounted for 89% of these, suggesting that WTO member countries have been using SPS and TBT as an important tool while regulating international trade to meet domestic considerations. The dominance of SPS and TBT measures in the list of NTMs used by member countries of the WTO is shown in the Table below.

Table 3.1: NTMs Notified to WTO from 1995-31st December 2018

Non-tariff Measures (NTMs)	No.	% Share
Technical Barriers to Trade (TBT)	33563	52
Sanitary and Phytosanitary (SPS)	23979	37
Anti-dumping	2106	3.2
Quantitative Restrictions	1636	2.5
Special Safeguards	1347	2
Tariff-rate quotas	1274	1.9
Export Subsidies	429	0.6
Countervailing	218	0.3
Safeguards	69	0.1
Total	64858	100

Source: WTO-Integrated Trade Intelligence Portal (I-TIP)

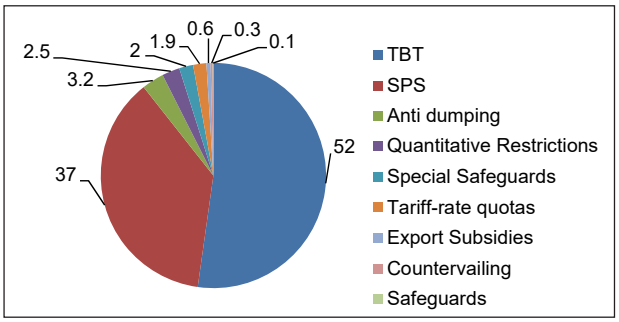
Figure 3.1 below shows the overwhelming dominance of TBT and SPS notifications over a period of nearly twenty-five years. TBT notifications account for over half the total notifications and SPS notifications for over a third of the total. The other dominant category is anti-dumping.

While the number of SPS and TBT measures may be more in number, trade displacements due to trade defence measures such as anti-dumping, safeguards and other quantitative restrictions may actually be more immediate.

A break up of the total number of SPS and TBT measures imposed by WTO member countries between 1995 and 2018 show that the US tops the list of countries that have issued notifications. The top twenty five countries issuing SPS or TBT notifications between 1995 and 2018 are listed below.

As can be observed from Table 3.2 below, US and Canada are major users of SPS measures, followed by Brazil, China and EU. However, most of the complaints of Indian exporters have centred on the EU. This points to the fact that the measures imposed by the EU may be more stringent or more

Figure 3.1: NTMs Notified at WTO over the last 23 Years



Source: Same as Table 3.1

difficult to meet. The survey conducted for this report, as well as the literature survey, showed that EU SPS measures have been a moving goalpost and are extremely sensitive to changes in technology. Hence, if a machine that can measure smaller maximum residue levels (MRL) comes in to the market, it is likely that the EU standards on these products will rise, i.e. the MRLs would fall.

The EU also tends to veer on the side of caution, i.e. they use the precautionary principle more frequently than the proportionality test, i.e. evaluate the risk that non-fulfillment of the standard would create. It has often proven to be difficult to bilaterally resolve these issues as was shown in Chapter 1.

Frequently, these standards are imposed on products that the EU does not even produce. SPS technical regulations take the following forms (i) prohibition and/or restriction of the final products to be imported (for example import bans on dairy products from countries with poor sanitary conditions) (ii) tolerance limits for residues and restricted use of substances such as food and food colouring additives, preservatives and sweeteners (iii) labelling, marking and packaging requirements like specifying the storage conditions, or alerts to potentially dangerous ingredients such as allergens (iv) hygienic requirements involving microbiological

Table 3.2 Notifications between 1st January 1995 to 31st December 2018

Sl. No.	Country	Nos.
1	USA	4293
2	Canada	2245
3	Brazil	1875
4	China	1299
5	EU	1245
6	Peru	964
7	Chinese Taipei	793
8	Chile	769
9	New Zealand	746
10	South Korea	741
11	Japan	656
12	Australia	617
13	Philippines	567
14	Mexico	538
15	Colombia	520
16	Saudi Arabia	447
17	Thailand	372
18	Costa Rica	279
19	Argentina	269
20	Ecuador	250
21	India	249
22	Russia	226
23	Albania	206
24	UAE	202
25	Bahrain	202

criteria of the final product (for e.g. that liquid eggs should be pasteurized or otherwise treated to destroy salmonella micro-organisms), or hygienic practices during production (such as milking equipment should be cleaned daily with a specified detergent), and other hygienic requirements (v) post-harvest treatment such as irradiation and fumigation and (vi) other requirements on production or post-production processes, for example, requirements on how plants should be grown or how animals should be raised or caught[51].

TBT technical regulations include the following (i) prohibition and/or restriction of imports for objectives set out in the TBT agreement such as those for importers of sensitive products like firearms and explosives who may be required to register in the importing country (ii) tolerance limits for residues and restricted use of substances (for example, the lead content permitted in consumer paints) (iii) labelling, marking and packaging requirements (e.g. appliances carrying labels indicating size, weight and electricity consumption level) (iv) production or post-production requirements such as the use of environment friendly equipment (v) product identity requirements (for example that a product must contain a minimum of 30% cocoa to be considered 'chocolate') and (vi) product-quality or performance requirements, for example that furniture or fixtures must resist a certain temperature.

Table 3.5 shows a comparative analysis of types of non-tariff measures issued by WTO member countries from 2015 to 2018. Except SPS and TBT measures, the numbers of other non-tariff measures such as anti-dumping, quantitative restrictions and safeguards have witnessed a decrease during last four years. The number of countervailing measures has not grown significantly. However, the numbers of SPS and TBT measures have witnessed a significant increase during the last four years. The observations from the two Tables show that countries are increasingly dependent on SPS and TBT measures when regulating import and export of products. Hence, it is pertinent to understand the rationale behind these notifications or measures and their possible impact on trade from developing countries like India.

[51] UNCTAD 2013

Table 3.4 TBT Notifications Issued at the WTO between 1st January 1995 to 31st December 2018

Sl. No.	Country	Nos.
1	United States of America	3468
2	Brazil	1747
3	European Union	1576
4	China	1479
5	Uganda	1345
6	Israel	1269
7	Mexico	1138
8	Saudi Arabia	1113
9	Canada	1066
10	Ecuador	1051
11	South Korea	990
12	Japan	898
13	Kenya	787
14	Thailand	775
15	Argentina	727
16	Chile	710
17	Colombia	662
18	Netherlands	630
19	Qatar	597
20	Bahrain	569
21	Chinese Taipei	532
22	Kuwait	461
23	United Arab Emirates	459
24	Czech Republic	420
25	Oman	402

Source: Tables 3.2- 3.4 WTO TBT IMS

The Table 3.4 above provide enough evidence to further our understanding of how SPS and TBT measures impact exports. It is also important to understand how countries issue these notifications and how the process of issuing notifications at the WTO may in itself pose barriers to trade for India.

It has been observed that the notification process leads to problems for exporters that need the attention of member countries, as many of these issues are systemic ones that should be addressed by member countries of the WTO.

Against this background, Section 3.1 critically examines the notification process at the WTO. Section 3.2 analyses the problems that Indian exporters face because of defective notifications. Section 3.3 analyses other problems, which arise due to the regulations of countries that impact Indian exports. Finally, the chapter concludes with some major observations arising from TBT and SPS measures.

3.1 The Notification Process at WTO

Focus on SPS/TBT Regulations

The WTO allows member governments to establish product requirements to achieve policy objectives, such as the protection of human health or the environment. However, SPS and TBT Agreements of WTO mandate countries to ensure that these requirements do not create unnecessary obstacles to international trade.

Following the core principle of transparency, WTO members are required to notify other members before adopting new measures if these are likely to affect international trade and provide an opportunity for comments. The total number of SPS and TBT notifications issued by member countries of the WTO in 2018 totalled 4696 and the average number of notifications issued from 2010 to 2018 stood at 3600.

Increase in Numbers and reasons why: The Table above shows that there is an increase in the number of SPS and TBT notifications issued at the WTO. This is because many least developed and developing countries have become very active in the notification process at the WTO.

In recent years, African countries such as Uganda, Kenya, Rwanda, Burundi and Tanzania were among the major notifying countries, along with other developing countries including Mexico, Taiwan and Egypt.

Table 3.5 Notifications in the last 3 Years

Non-tariff Measures (NTMs)	Notified to WTO in 2015	Notified to WTO in 2016	Notified to WTO in 2017	Notified to WTO in 2018
TBT	1983	2333	2580	3065
SPS	1340	1389	1480	1631
Countervailing	45	60	59	49
Quantitative Restrictions	24	445	1	0
Special Safeguards	18	0	0	0
Safeguards	35	22	19	12
Anti-dumping	425	481	451	257
	3870	4730	4590	5014

Source: WTO-Integrated Trade Intelligence Portal (I-TIP)

Table 3.6 WTO Notifications in Numbers

Year	SPS	TBT	Total	Average (2010-2018)
2018	1631	3065	4696	3600
2017	1480	2580	4060	
2016	1389	2333	3722	
2015	1340	1983	3323	
2014	1634	2242	3876	
2013	1297	2144	3441	
2012	1219	2201	3420	
2011	1385	1787	3172	
2010	1399	1904	3303	

Source: WTO database

In 2018, WTO also witnessed new entrants into the notification mechanism at the WTO such as Montenegro, Liberia and Namibia.

While this trend may be difficult to explain fully, it is important to place these developments in the context of PTAs negotiated with developing countries. According to Andres Staler of the World Bank, 'PTAs that include TBT and SPS provisions normally incorporate an active work program of cooperation on standards, certification and conformity assessment issues'. This has specially been the case in Africa where the ACP with the EU and the AGOA with the US have both forged a cooperation agreement on standards.[52] Both these agreements have also seen the introduction of a number of multinational companies that export products to the EU and have contributed to the development of national standards by bringing in methodologies and technologies from their home country.

Table 3.7: WTO SPS Notifications Relevant to India

Year	Total SPS Notifications Issued At WTO	Relevant For India	% Share
2018	1631	1248	77
2017	1480	1017	69
2016	1389	1051	76
2015	1340	1289	96
2014	1634	1182	72
2013	1297	1012	78
2012	1219	898	74
2011	1385	746	54
2010	1399	1029	74

Source: WTO SPS IMS

[52]Stoler, A., TBT and SPS standards, 2017,

Break-up of Products covered by TBT notifications at WTO:

While SPS notifications primarily cover food and food products, for TBT the range of products is more extensive. Hence, the results of a study of top ten products covered by countries while issuing notifications is provided in the Table below.

Table 3.8: Top Ten Products Subject to Notifications

Products	Year 2016	Year 2017	Year 2018
Food	681	883	907
Chemical	212	192	245
Auto and Auto Component	216	147	218
Electronic Products and Appliances	311	248	201
Machinery	201	167	198
Iron & Steel	67	60	103
Construction	54	55	85
Cosmetics	39	58	77
Fertiliser	16	53	74
Pharmaceutical	94	83	74

Source: WTO TBT IMS

The Table 3.8 shows that from a product perspective, regulations concerning food, fertiliser, and cosmetics witnessed high growth in notifications by countries. However, industrial products such as auto components and electrical products and appliances were also subject to a range of TBT notifications. All the products shown above feature in the top 25 exports of India.

Table 3.9 shows the top ten countries, which have issued SPS notifications at the WTO. While Brazil is an important exporter of fresh fruits and vegetables the other four countries among the top five are not. The top five countries after Brazil are major importers of fruits and vegetables and have the most stringent standards too.

For the developing countries apart from China in

Table 3.9: Top 10 Countries Issuing SPS Notifications at WTO

Country	Year 2016	Year 2017	Year 2018
Brazil	119	118	138
Canada	187	128	138
European Union	55	77	91
United States of America	117	60	70
Japan	66	56	67
Kenya	0	0	61
China	13	9	53
Uganda	1	2	51
Montenegro	0	0	49
Chinese Taipei	60	46	45

Source: WTO SPS IMS

Table 3.9, a simple explanation as given above can be offered. All the African countries export fruits and vegetables through multinationals, which have also lobbied the national governments to impose standards. The standards in most cases are exactly those used in the US or the EU and may or may not be suitable for tropical climates. Nevertheless, through technical assistance and a long association in the ACP and AGOA framework with the EU and US, these countries have been able to upgrade their standards. Table 3.10 has listed the objectives, which have provided a basis for SPS and TBT measures.

3.2. Issues for Exporters Arising From the Notification Process

As mentioned above, the WTO mandates members to notify changes to existing regulations and inform other members of new regulations that are proposed across product categories. Except in the case of emergency notifications, member countries are expected to '*allow reasonable time for other Members to make comments in writing, discuss these comments upon request, and take the comments and the results of the discussions into account.*'[53] A reasonable time period has normally meant 60 days

[53]Para 5 (d) of "Notification Procedures" in Annex B of WTO SPS Agreement titled "Transparency of Sanitary and Phytosanitary Regulations"

Table 3.10: NTMs Objectives

Objective Of NTMs	Number of SPS Measures	Number of TBT Measures
Health and safety	19073	10960
Food and feed	11353	7549
Tolerance limits and restricted use of substances	10573	3
Pests, diseases and related	9472	7
Specific product categories	1598	1
Labelling and packaging requirements	1565	3628
Conformity assessment - standards	170	793
Other specific requirements	123	1584

Source: WTO-Integrated Trade Intelligence Portal (I-TIP)

from the time the notification is issued at the WTO. This is to ensure that countries have enough time to analyse the proposed regulation and respond if market access is hampered due to the proposed regulation.

SPS measures that are notified by member countries include all relevant laws, decrees, regulations, requirements and procedures including, inter alia, end product criteria, processes and production methods, testing, inspection, certification and approval procedures, quarantine treatments including relevant requirements associated with the transport of animals or plants, or with the materials necessary for their survival during transport, provisions on relevant statistical methods, sampling procedures and methods of risk assessment and packaging and labelling requirements directly related to food safety.

TBT measures notified by member countries cover all technical regulations, standards or conformity assessment procedures, except when these are SPS measures, regardless of their objective. TBT measures could cover any subject, from car safety to energy-saving devices, to the shape of food cartons. To give some examples pertaining to human health, TBT measures could include requirements for pharmaceuticals or the labelling of cigarettes. In terms of food, most labelling requirements, nutrition claims and concerns, quality and packaging regulations are generally considered to be TBT measures.

Problems Faced in the Notification Process: Before identifying specific issues in regulatory changes which are emerging from the proposed and existing regulations of member countries at the WTO over the last few years that impact trade, it is important to first underline some of the issues in the notification process at the WTO that may impact exporters in India.

Reduced Time Limit for Response: Over the last few years, Brazil has issued notifications that do not provide the normally stipulated time period of 60 days to respond on the proposed changes in its regulations. In some cases the number of days given to respond is a week[54]. Annex 1 provides the details of notifications issued by Brazil, where there is very little time to respond for member countries. The very limited time period for adhering to the proposed changes in regulations does not give exporters enough time to understand the implications, and in the process exporters fear that these regulations may end up becoming a barrier to market access.

Language Barrier: The regulations provided by many countries with the notification are not available in all the three languages, English, Spanish and French, that the member countries are supposed to provide at the WTO. The unavailability of regulations in English in 21 countries has been an issue of concern for several companies in India, especially the small and medium sector entities. The problem is exacerbated as regulations run into several hundred pages and it

Table 3.11 Countries that Issue Regulations Only in Local Language

Sl. No	Country	Regulation Language
1.	Argentina	Spanish
2.	Brazil	Portuguese
3.	Bolivia	Spanish
4.	China	Chinese
5.	Colombia	Spanish
6.	Costa Rica	Spanish
7.	Dominican Republic	Spanish
8.	El Salvador	Spanish
9.	Honduras	Spanish
10.	Indonesia	Indonesian
11.	Israel	Hebrew
12.	Korea	Korean
13.	Mexico	Spanish
14.	Panama	Spanish
15.	Paraguay	Spanish
16.	Peru	Spanish
17.	Russia	Russian
18.	Tajikistan	Russian
19.	Ukraine	Ukrainian
20.	Uruguay	Spanish
21.	Vietnam	Vietnamese

is very time consuming and expensive to get these regulations translated for analysis. Further, after the regulations are adopted, the company has to have the proposed regulation translated again to ensure there are no changes and there is complete adherence to the adopted regulation.

Further in the case of some countries even the notification issued on the WTO website is not provided in English, completely going against the obligation to remain transparent in the notification process.

No Web-links: Another problem is that even the web-links for downloading these notifications are not always available, thereby defeating the very principle of transparency in the WTO agreements.[55] A total of 11 countries have been listed in Table 1 of Annexure 2, which have not provided links to the notifications.

Further, while many countries provide the two-page notification in English, others fail to do so[56]. For example, five countries in Latin America in Annexure 3 have not even provided the two-page notification in English as mandated.

The lack of availability of either the notification or the regulation that could run into hundreds of pages, makes adhering to technical regulations burdensome for industry, especially the small and medium sector companies.

All these measures adopted by countries while notifying the WTO of the proposed changes in old regulations or in introducing new ones, have a major impact for small and medium sector companies who may want to understand the regulation in detail before accessing the market.

Table 3.12: Notifications issues at WTO Unavailable in English

	Notification Number	Country	Date of Notification	Available Language
1.	G/TBT/N/ARG/251/Add.1	Argentina	18 December 2018	Spanish
2.	G/TBT/N/CHL/431/Add.1	Chile	12 December 2018	Spanish
3.	G/TBT/N/CRI/183	Costa Rica	11 December 2018	Spanish and French
4.	G/TBT/N/MEX/197/Add.3	Mexico	21 December 2018	Spanish
5.	G/TBT/N/SLV/203	El Salvador	19 December 2018	Spanish

[55]See Annex 2 for details of such notifications
[56]See Annex 3 for details of such notifications

Table 3.13: Notifications Where Links for Downloading Regulations were Unavailable

Sl. No.	Notification Number	Country	Date of Notification
1.	G/TBT/N/ARE/452, G/TBT/N/BHR/556 G/TBT/N/KWT/443, G/TBT/N/OMN/389 G/TBT/N/QAT/554, G/TBT/N/SAU/1096 G/TBT/N/YEM/157	Gulf Countries	10 December 2018
2.	G/TBT/N/GEO/106	Georgia	28 November 2018
3.	G/TBT/N/NGA/7	Nigeria	9 November 2018
4.	G/TBT/N/BDI/10	Burundi	26 November 2018
5.	G/TBT/N/KAZ/20	Kazakhstan	11 June 2018

In some cases countries do not put the regulation in the public domain, thereby creating a problem for exporters who need to meet the specifications mentioned in the regulations. It has also been noticed that in some cases the notifications do not provide the web-links to the regulations, thereby keeping the process non-transparent. Exporters may then have to get in touch with the relevant enquiry points of the countries to get the regulation.

Paying For Regulations: An important barrier that some countries face is that the standard proposed by the importing country is only available on payment, thereby impacting small and medium enterprises. It is important to point out that, while standards are voluntary by nature, they may be provided by the countries at a cost. However, the moment a standard is converted into a technical regulation and adherence to the standard becomes mandatory, governments must strive to provide a copy of the regulation to exporters as part of the transparency process enshrined in the WTO.

This becomes important for small and medium sector units. Egypt and Turkey are two countries that charge for some of the regulations, as they are only available through their standards setting organisation.

Further, in many cases the International Standard Organisation (ISO) standards referred to in many regulations may themselves be available only at a cost, thereby increasing the cost of compliance for small and medium sector companies.

3.3 Problems Arising From Regulations

This report has already identified issues of concern for exporters in India when countries issue notifications at the WTO. However, to understand how lack of harmonisation in regulations and standards can adversely impact trade flows, it is critical to further identify emerging problems in the regulations issued by different countries to benefit domestic industry and investors. These difficulties have been identified from the SPS and TBT notifications issued by WTO member countries over the last couple of years.

What is important to note is the fact that the regulations have impacted products across the value chain in both agricultural and industrial goods. The problems faced by exporters from the regulatory process include the following:

1. **Pesticide Residue Levels:** Trade barriers that hurt exports of agricultural commodities have been discussed for a long time, yet the major issue of Maximum Residue Limit (MRL) remains unresolved. MRLs refer to the highest concentration of a pesticide or chemical residue permitted in or on food crops and animal feeds. The problem is that irrespective of international standards for MRLs, importing countries set their own limits. Concerns have been raised by

India at the WTO and bilaterally about the use of extremely low default levels for MRLs in food and feed commodities that are exported to markets in Europe and US.

But countries have responded stating that MRLs differ between countries as weeds, insects and crop diseases vary from one country to another, resulting in different pesticide use patterns and varying critical Good Agricultural Practices (GAPs) used to achieve control.

Besides imposing different residue levels, countries have also been using Level of Detection (LoD) i.e. default value for pesticides. A general default MRL of 0.01 ppm applies where a pesticide is not specifically mentioned for use in a specific product. For instance, a pesticide is registered for use in wheat but not for other cereals. In this case, a default level i.e. 0.01 ppm will be applicable for all products other than wheat. India has raised the concern on the concept of default value of pesticides at the WTO committee meetings. However, the issue has remained unresolved.

Further, the EU uses the precautionary principle instead of risk analysis in setting the pesticide tolerance levels thereby creating barriers to trade for several products. Since 2017, the EU has issued a series of TBT notifications[57] withdrawing ten substances for sale and use within the EU citing the risk of endocrine disruptors. In many cases, the EU has cited its concerns based on 'insufficient' scientific information and precautionary risk of endocrine disruptors.

Another issue on residue levels is a distorted process of setting levels of detection for similar categories of products for the same pesticide, thereby creating barriers to trade. While Article 3.3 of the SPS Agreement allows countries to differ from international standards if they provide scientific justification, it has been noticed that in many cases countries fail to provide the scientific basis in a public forum. This makes the determination of pesticide residue levels non-transparent. Another issue faced by exporters while analysing the notifications issued by member countries on pesticides is the lack of clarity in countries declaring their adherence to international standards. When issuing notifications for many pesticides covering many products, countries claim they are in line with international standards. However, close examination shows that several pesticide residue levels in the proposed regulation are not in line with international standards. Only some of the pesticides used for some products are in line with international standards.

While the lack of non-conformity to international standards is more prevalent in pesticide issues the same has been noticed in the case of some industrial products like electrical equipment. For instance, in 2016, the Chilean Electricity and Fuels (SEC) issued a technical regulation[58] on electric products. The Chilean authorities have referred International Standard IEC 60364-4-41 2005 and IEC 60445. However, the technical requirements mentioned in the Chilean regulation differed from IEC 60445 and certain provisions contradicted the relevant international standards.

Lack of Harmonisation in Pesticide Levels: An examination of the proposed regulations issued by member countries of the WTO shows that in the agricultural sector, developing countries like India are disadvantaged by the fact that many countries now follow the precautionary principle instead of a risk analysis while registering pesticides and fungicides. There is also a lack of harmonisation across countries with international standards like Codex Alimentarius. The precautionary principle that has been

[57]G/TBT/N/EU/422, G/TBT/N/EU/469, G/TBT/N/EU/497, G/TBT/N/EU/498, G/TBT/N/EU/499, G/TBT/N/EU/508, G/TBT/N/EU/521, G/TBT/N/EU/319 and G/TBT/N/EU/319

[58]G/TBT/N/CHL/345 dated 22nd February 2016

primarily followed by the European Union ensures that many of the pesticides that are still in use in developing countries like India, are not acceptable in markets such as the EU based on scientific evidence. This creates barriers to trade. The problem faced by exporters is that many pesticides are not registered in some important markets, while they are still registered in India and are used against some prevalent pests and diseases. Given the high cost of registration in many developed country markets, the companies that manufacture these pesticides do not keep the pesticide registered for all products in all markets.

This means that the country where the pesticide is not registered for a particular product would keep the Limit of Determination (LoD) for some products of interest to India at the lowest level thereby hurting exports. However, for other products the importing country may keep the LoD level higher. The tables below show how countries maintain different levels of LoD for the same pesticide for different products.

Table 3.13 Comparison of Residue Levels EU Vs Other countries

	Products	Residue Levels EU (ppm)	Residue Levels Japan	Residue Levels Brazil	Residue Levels Canada	Residue Levels USA
Carbendazim	Rice	0.01	1 (Brown Rice)	0.05	-	-
	Maize	0.01	-	-	-	-
	Sorghum	0.01	-	-	-	-
	Oat	2	-	-	-	-
	Barley	2	0.6	-	-	-
	Pulses	0.1	-	-		-
	Citrus Fruits	0.2 to 0.7	3	5	10	-
	Grapes	0.3	3	-	5	-
	Berries	0.1	3	-	5 (Strawberry) 6 (Blackberries)	-
Chlorpropham	Potatoes	10		-	15	30
	Celery	0.05				
	Onion, Shallots	0.05	0.02			
	Lettuce, Spinach	0.05	0.05			
	Others	0.01	0.05 (Cabbage) 0.02 (Broad Beans) 0.1 (Soy) 0.02 (Barley, Rye)			0.06 (Sheep Meat, Cattle meat) 0.02 (Milk)

	Products	Residue Levels EU (ppm)	Residue Levels Japan	Residue Levels Brazil	Residue Levels Canada	Residue Levels USA
Tricyclazole	Tea, Coffee and Spices	0.05	-	-	-	-
	Others	0.01	3 (Rice) 0.06 (Sea Food)	3 (Rice)	-	3 (Rice)
Isoprothiolane	Rice	5	10	-	-	-
	Othes	0.01	0.02 (Milk) 3 (Seafood) 0.05 (Apple) 0.02 (Grape)			

Table 3.14 Comparison of Residue Levels US Vs Other Countries

	Products	Residue Levels USA (ppm)	Residue Levels Japan	Residue Levels Brazil	Residue Levels Canada	Residue Levels EU
Acetamiprid	Cereal grains	0.01	0.01	3 (Barley, Rice) 0.3 (Wheat)	1 (Rye, Barley)	
	Cotton seed	0.6	0.6	0.7	1	0.6 (Undelinted Cotton Seeds)
	Grapefruit	1	1	2		0.5
	Kumquat	1	1	2 (Other Citrus Fruits)	0.5 (Citrus)	0.5
	Lemon, Lime, Orange	1	1	2 (Lime, Orange)	0.5 (Citrus)	0.5
	Sugarcane	45	-	-	-	0.01
Acetamiprid	Cereal grains	0.01	0.01	3 (Barley, Rice) 0.3 (Wheat)	1 (Rye, Barley)	
	Cotton seed	0.6	0.6	0.7	1	0.6 (Undelinted Cotton Seeds)
	Grapefruit	1	1	2		0.5

	Products	Residue Levels USA (ppm)	Residue Levels Japan	Residue Levels Brazil	Residue Levels Canada	Residue Levels EU
	Kumquat	1	1	2 (Other Citrus Fruits)	0.5 (Citrus)	0.5
	Lemon, Lime, Orange	1	1	2 (Lime, Orange)	0.5 (Citrus)	0.5
	Sugarcane	45	-	-	-	0.01
Bifenthrin	Rice	0.01	-	0.7	0.15 (Dry Rice Beans)	0.01
	Sorghum	0.01	-	0.02	-	0.01
	Corn	0.05	0.05	0.02	-	0.05
	Soybean	0.2	0.3 (Soy)	0.02 (Soy)	0.8 (Edible Podded Soybeans)	0.3
	Pomegranate	0.5	-	-	-	0.01
	Peach	0.5	0.03	-	-	0.01
	Nectarine	0.5	1	-	-	0.01 (Apricots)
Diuron	Rice	0.01	0.05 (Brown Rice)	-	-	0.01
	Sorghum	0.5				0.01
	Sugarcane	0.2	0.05	0.1		0.01
	Wheat	0.5	0.7	0.05	1	0.01

Source: Global MRL Database

1. Basmati rice exports from India that comprise a very significant percentage of the export basket face this problem in both the US and EU. The same problem was also faced by shrimp exports to Japan in 2014, when a very extensively used food additive in shrimp feed, ethoxyquin, was put on the lowest level of determination of 0.01 ppm, while for fish the LoD was kept higher at 1 ppm.

Despite Article 10 of the WTO Agreement on SPS Measures allowing developing countries like India special and differential treatment, the period given for compliance with LoD levels in pesticide is limited thereby hurting exporters. Further, exporters feel that there is very little understanding of some inherent problems in the export of products like rice.

For example rice that is exported from India is harvested the previous year. However, when a country imposes the LoD on a pesticide that is still in use in India, it is then difficult for the consignment harvested the previous year to meet those criteria. Thus, companies may need to travel several times to the export markets

trying to convince policy makers to understand the nature of their problems, and seek a higher compliance time to meet the requirements of new regulations.

It has also been observed that there is a growing use of the precautionary principle over risk analysis in fixing maximum residue limits (MRLs) for pesticides and food additives to be used across a whole range of food products – cereals, fruits, vegetables and also marine and meat products.

2. **Registration and Traceability:** There is an increasing trend among countries to register units that export to their markets. Some umbrella regulations like the Food Safety and Modernisation Act (FSMA) of the US and the Chinese Registration and Supervision of Foreign Enterprises for Manufacturers exporting food to China, have cost implications and can be used as a means for creating barriers to trade.

   US FSMA: The USFDA Food Safety Modernization Act[59] (hereafter referred to as the Food Safety Act) is a statute passed by the United States Congress on January 4 2011, amending the Federal Food, Drug and Cosmetic Act (hereafter referred to as the FFDC Act) with respect to the safety of food supplies. It introduced an elaborate multi-layered scheme of checks within the food supply chain to minimise the possibility of food contamination as far as possible.

   A final rule had been notified[60] to amend FDA's regulation on the record availability requirements. As per this rule, if the FDA believes that the use of or exposure to an article of food is likely to be affected and will cause serious adverse health consequences or death to humans or animals, the FDA will check the records of those particular products. The Act further provides that, at the request of an officer or employee duly designated by FDA, the importer (excluding farms and restaurants) who manufactures, processes, packs, distributes, receives, holds such articles shall permit such officer or employee to have access to and copy all records relating to such articles and any other article of food that the FDA reasonably believes is likely to be affected in a similar manner.

   Registration of Foreign Facilities in China: In August 2011, the People's Republic of China issued a notification[61] proposing registration and supervision of foreign enterprises manufacturing food for export to China. The regulation inter alia mandated that foreign facilities should be registered with the Department of Public Health Management System, China.

   Such registration requirements are in addition to the registration requirements which the country of export already places on all food facilities within its territory, thus resulting in duplication of procedures, which in turn results in increased transaction costs for exporters, rendering them less competitive in the export market.

3. **Difference in the Definition of Products among Countries:** An important issue for exporters is the definition of a product when trading across countries. One important product of interest to India that faces this issue is milk.

   Exporters find that different countries use different definitions, thereby creating problems. Many countries define milk to only mean cow's milk, while for India the export of buffalo milk is important too. These differences in the definition of a product are creating a trade barrier, as a product described as milk in one a country may not be treated as milk in another country. For

[59] G/SPS/N/USA/2156
[60] G/SPS/N/USA/703/Add.3 dated 8 March 2012
[61] G/SPS/N/CHN/472 dated 19 August 2011

instance, In India, as per Food Safety Standard Regulation, 2011, milk is defined as:

"Milk is the normal mammary secretion derived from complete milking of healthy milch animal without either addition thereto or extraction therefrom unless otherwise provided..."

In US[62], as per the PART 131 -- Milk and cream: Subpart B--Requirements for Specific Standardized Milk and Cream, milk is defined as:
"Milk is the lacteal secretion, practically free from colostrum, obtained by the complete milking of one or more healthy cows....."

In the EU,[63] milk is defined as:
"Milk" means exclusively the normal mammary secretion obtained from one or more milking without either addition thereto or extraction therefrom"

In Australia[64], as per the "Australia New Zealand Food Standards Code – Standard 2.5.1 – Milk", milk is defined as:
"Milk means a) the mammary secretion of milking animals, obtained from one or more milking for consumption as liquid milk or for further processing, but excluding colostrum; or b) such a product with phytosterols, phytostanols and their esters added"

In Sri Lanka, as per Food Act No.26 of 1980, milk is defined as:
"Milk means the liquid milk which is the normal, clean, fresh mammary secretion obtained by milking of one or more healthy cows or buffaloes or goats or camel or other mulching animals, without the addition of any substance or extraction of fat or any other constituents."

In Codex[65], the CODEX STAN 206-1999: Codex general standard for the use of dairy terms, states that:
"Milk is the normal mammary secretion of milking animals obtained from one or more milking without either addition to it or extraction from it, intended for consumption as liquid milk or for further processing".
"Milk product is a product obtained by any processing of milk, which may contain food additives, and other ingredients functionally necessary for the processing."

In April 2018, Japan[66] issued a proposal amending the Ministerial Ordinance on milk by establishing specifications and standards for liquid infant formula. As per the definition, 'liquid infant formula' means *'the products which are obtained from product made by processing food made from raw milk, cow's milk or special-type cow's milk or made from them as principal raw materials, by adding the necessary nutrients for infants, and by reducing to liquid.'*

In May 2018, Chile[67] proposed establishing rules on the elaboration, denomination and labelling of dairy products or milk products. As per the draft, a new definition of the product 'milk' is generated. As per which, *'milk is a liquid product obtained from complete and uninterrupted milking of healthy cows, well fed and at rest, free of colostrum. However, milk other than cow's milk will be treated "reconstituted milk" and their products will not be treated as milk products.'*

Similarly, in May 2018, Tanzania[68] has issued a series of draft specifications for milk products

[62]https://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfcfr/CFRSearch.cfm?fr=131.110
[63]https://ec.europa.eu/agriculture/sites/agriculture/files/milk/policy-instruments/definitions-designations-reserved-milk-terms_en.pdf
[64]https://www.legislation.gov.au/Details/F2015L00462
[65]http://www.fao.org/docrep/015/i2085e/i2085e00.pdf
[66]G/SPS/N/JPN/572 dated 19th April 2018
[67]G/TBT/N/CHL/442 dated 24th May 2018
[68]G/TBT/N/TZA/163, G/TBT/N/TZA/165, G/TBT/N/TZA/167, G/TBT/N/TZA/168, G/TBT/N/TZA/169, G/TBT/N/TZA/170 dated 23rd May 2018

such as pasteurised milk, butter, milk powders, cream powder, sweetened condensed milk and ghee etc. In these drafts, the Tanzanian authorities have referred to the milk obtained from cows.

Though Codex-defined milk can be obtained from any milking animals, countries are still using their own definitions. Some countries like the US, Japan and Chile only refer to milk obtained from cows. On the other hand, the EU, Australia and India have a common understanding of milk, where milk can be obtained from any milking animal. In Sri Lanka, only milk obtained from cows, buffalo, sheep, goat and camel is treated as milk.

Hence, countries have their own discretion in defining the product 'milk', which can go beyond the internationally recognised guidelines i.e. Codex. Limiting the definition of milk to only milk obtained from cows is restrictive and will certainly hamper market access.

4. **Mandating A Local Presence:** For products like cosmetics, pharmaceuticals and chemicals, many countries are mandating the presence of a local legal entity to ensure that they have control over the imported product. In 2018, Colombia issued technical regulation[69] for raw materials, bulk and finished products of pharmaceuticals, cosmetics, disinfectants, ectoparasiticides, and various products for veterinary use. As per the draft, every natural or legal entity that is dedicated to the storage of raw materials, bulk and finished products of pharmaceuticals, cosmetics, disinfectants, ectoparasiticides and various products for veterinary use, must register with the ICA, in accordance with the requirements and procedures established in the present resolution. Second, the registration must be requested by the person, natural or legal, or its agent located in Colombia. Third, the documents issued by the official entities of the country of origin shall be apostilled or consularised as appropriate, and be accompanied by an official translation into Spanish.

   Similarly, to ensure quality, safety and efficacy of imported pharmaceutical products, the Malaysian National Pharmaceutical Control Bureau issued a notification in 2016, which described that all Bioequivalence (BE) studies used in supporting the registration of generic products in Malaysia should be conducted in BE Centres, which are inspected by the National Pharmaceutical Control Bureau (NPCB) and listed in the NPCB Centre Compliance Programme. NPCB Compliance Programme for BE Centres is intended to ascertain whether they have implemented requirements as described in the guidelines. In Malaysia, local BE Centres are eligible to apply directly for the BE Centre inspection. However, for any Foreign BE Centre, a Malaysian registered company authorised by the Foreign BE Centre should apply on their behalf.

5. **Bio-security Regulations:** In June 2016, the Australian government introduced biosecurity legislative framework—comprising the Biosecurity Act 2015 (the Act), four related Acts and delegated legislation (including regulations, declarations and determinations)—to manage the risk of pests and diseases entering Australian territory and causing harm to animal, plant and human health, the environment and the economy. The Biosecurity Import Conditions system (BICON) determines whether a commodity intended for import into Australia

   - is permitted
   - is subject to import conditions
   - requires supporting documentation
   - requires treatment
   - needs an import permit

[69] G/SPS/N/COL/277 dated 10th January 2018

6. **Designation of Specific Ports for Imports:** Indonesia mandated that some products like fruits or vegetables should only be brought through specific ports so that they can be easily monitored and tested. In 2012, Indonesia issued technical requirements[70] and plant quarantine action for the importation of fresh fruits and/or fruit vegetables into the territory of the Republic of Indonesia. This regulation stipulated designated points of entry for fresh fruits and/or fruit vegetables and that imports of fresh fruits and/or fruit vegetables shall only be imported through Tanjung Perak Seaport, Surabaya, Belawan Seaport, Medan, Soekarno-Hatta Seaport, Makassar and Soekarno-Hatta International Airport, Jakarta. The US has raised concerns against Indonesia at the WTO Committee meeting on these stipulations.

7. **Stricter Use of Conformity Assessment Procedures:** Countries are mandating that testing and inspection be done by specific laboratories located inside the country. This is adding to the cost of compliance for exporters and it overlooks the clause of MRAs in the WTO Agreements.

8. **Need to Send Advance Information on Cargo Movement:** This has been introduced as a trade facilitation measure, but does add to compliance costs for carriers, freight forwarders and warehouse operators. In March 2014, Canada Border Services Agency (CBSA) issued a notification[71] on trade facilitation measurers in Customs with regard to the trade facilitation measures proposed by Canadian Border Security Agency on carriers, freight forwarders and Customs sufferance warehouse operators.

   a) **Highway cargo and conveyance information:** This requires highway carriers to provide cargo and conveyance information (e.g. cargo description, licence plate information) electronically to the CBSA at least one hour before the conveyance arrives at the border. This requirement would give the CBSA time to assess risks and make informed decisions without creating significant delays to the travel time of the carrier.

   b) **Rail cargo, conveyance and arrival message information:** The regulation requires rail carriers to provide cargo and conveyance information electronically to the CBSA at least two hours before the train is expected to cross the border into Canada. In addition, rail carriers would be required to provide an electronic arrival message to the CBSA without delay after the train crosses the border into Canada.

   c) **Electronic arrival messages in the air and marine modes:** The regulation would require air and marine carriers to provide an electronic arrival message to the CBSA without delay upon arrival in Canada. Specifically, air carriers would be required to provide this message without delay after the aircraft is cleared by NAV CANADA to land at an airport following arrival in Canada. Marine carriers would be required to provide this message without delay after the vessel lands at a marine port of entry.

   d) **Carrier code requirements:** The proposed regulation requires commercial carriers and freight forwarders to hold a valid carrier code.

   e) **Freight forwarder cargo information:** The regulation would require freight forwarders in all modes of transportation to provide secondary or supplementary information to the CBSA electronically and within prescribed time frames, prior to the goods arriving in Canada, as follows:

[70] G/SPS/N/IDN/48, G/SPS/N/IDN/49, G/SPS/N/IDN/53, G/SPS/N/IDN/54, G/SPS/N/IDN/54/Corr.1, G/SPS/N/IDN/58
[71] G/TBT/N/CAN/409

Table 3.14: Notification Timings

Marine	Air	Rail	Highway
At least 24 hours before loading the goods or at least 24 hours before the estimated time of arrival at a port of arrival in Canada, depending on type and origin of goods	At least four hours before the estimated time of arrival or at the time of departure, depending on the duration of the flight	Two hours before the conveyance arrives in Canada	One hour before the conveyance arrives in Canada

9. **Regulating New Use of Chemicals:** The US, for instance, follows stricter norms for use of existing chemicals for new uses. Anyone who plans to manufacture (including import) a new chemical substance for a non-exempt commercial purpose is required by Section 5 of the Toxic Substances Control Act (TSCA) to provide the EPA with notice before initiating the activity. A pre-manufacture notice, or PMN, must be submitted at least 90 days prior to the manufacture of the chemical. PMN submissions require all available data on chemical identity, production volume, by-products, use, environmental release, disposal practices, human exposure and existing available test data.

   Regulation on Endocrine Disruptors: In 2009, the EU adopted a regulation EC No. 1107/2009 which brought changes in the regulatory framework of pesticides. It adopted the 'Hazard Criteria' replacing a 'risk-based assessment approach' in evaluating the effect of pesticides on human health, animals and environment.

   As per 'Hazard Criteria', even a minimal presence of side effects would be treated as unsafe to human health, plant and wildlife. This approach disregards 'acceptable daily dosage' of substances.

   In other words, any inherent presence of risks in the chemical substances would be considered as hazardous. It does not consider the conditions of coming into contact, dosage level, duration of exposure, time of occurrence as would be the case in risk management.

   In case of any chemical substances (that are used as pesticides) falling under the category of hazardous, they would be removed from the 'active substances list' to inactive or the maximum residue level (MRL) would be set at default value of 0.01 ppm. The EU regulation categorically stated that 'hazard criteria' would be applied in regulating pesticides that could potentially carcinogenic, immune toxic, mutagenic, or endocrine disruptors.

   Substances like linuron and mancozeb, which are high volume production chemicals (HPVC) that are also used in India, have been identified as endocrine disruptors.

   Impact for India: Pesticides are crucial in plant disease protection management and proven to be more efficient. Minor producers depend on such pesticides to protect their crops. When EC declares many of them as 'inactive' due to the endocrine disruptors regulation, then it affects everyone ranging from farmers, manufacturers, distributors, food processing industries and others involved in the agricultural business.

   Manufacturers have made huge investments in these substances and the EU's move adversely impacts those companies. Besides, farmers are helpless in their fight against the pests found

in common fruits and vegetables, in case a substitute is not available immediately.

Possible Reasons for EU Taking This Step: The chemical industry has slowly moved out of EU in the post-2000 era and it is largely concentrated in countries like the US, India and China. In addition, the EU's agricultural policy discourse is dominated by 'ORGANIC'. For instance, in the case of animal products, the EU has already banned use of any hormonal drugs. Besides, EU consumers' preferences for food have been changing towards being environment friendly. Endocrine Disruptors is an important way to ensure a strict regime in terms of agricultural commodities trade.

As a sector, chemicals have seen a huge number of regulations across countries. The European Union was the first country/region to come up with the REACH regulation. REACH is the European Regulation on Registration, Evaluation, Authorization of Chemicals. It came into force in 2007, replacing the former legislative framework for chemicals in the EU. REACH shifted the responsibility from public authorities to industry with regard to assessing and managing the risks posed by chemicals and providing appropriate safety information for users. It impacted a wide range of companies across many sectors beyond the chemical industry. It required new forms of cooperation among companies, enhancing communication along the supply chain, as well as developing tools to guide and assist companies and public authorities in its implementation[72]. As a result, the REACH regulation led to a huge compliance cost for small and medium sector enterprises in India.

Several countries are now adopting the REACH model. The countries that have in the last few years adopted REACH type regulations include China, South Korea and Taiwan.

Further the use of regulations on packaging material used for food products is also increasing the cost of compliance for exporters. Many countries are coming up with new regulations on the presence of chemicals in the packaging material.

Bio-security law is becoming a very important part of the regulations in many countries. The Australian use of this law in the marine sector had led to a potential barrier for India. Following bilateral negotiations, Australia has eased the process by setting up an inspection office in India, but marine exporters to Australia still find the process challenging, as a lot of their consignments are still inspected when going from India thereby increasing the cost of demurrage.

10. **Greater use of Environment & Energy Saving Norms That Creates Technological Barriers:** Many countries have proposed the use of water efficiency standards for kitchens and bathrooms. For instance, Hong Kong, China has proposed a voluntary water efficiency labelling scheme on water closets. Manufacturers, importers or other related parties in the water closet business can apply for registration of their water closets under this scheme. Water closets complying with the performance requirements will be registered under the scheme and will be rated on different water efficiency grades according to their water consumption level. Registered water closets will be allowed to affix water efficiency labels of a specified format showing their water efficiency grades and water consumption level. Similarly, in Singapore, from 1 April 2020 onwards, suppliers registering new models of thermostatic mixers under the mandatory Water Efficiency Labelling Scheme (WELS) are required to submit test results in accordance with European harmonised standard BS EN 1287 (1999).

[72]https://ec.europa.eu/growth/sectors/chemicals/reach_en

Countries like US, Mexico, Brazil, Ecuador, Israel, Argentina etc., have proposed regulations on energy conservation and energy efficiency standards for electrical products and appliances like computer servers, ice cream parlours, commercial refrigerators, billboards etc. The main focus of these regulations is to promote energy efficiency and reduce wastage of resources.

11. **Labour Norms:** In 2017, the Philippines Department of Agriculture, Bureau of Agriculture and Fisheries Standards issued a code of hygienic practices for fresh fruits and vegetables. The draft mandated standards on personal cleanliness, wherein agricultural workers should maintain a high degree of personal cleanliness and, where appropriate, wear suitable protective clothing and footwear. Cuts and wounds should be covered by suitable waterproof dressings when personnel are permitted to continue working.

    Labour Standards: An emerging trend in some countries like the Philippines is the introduction of labour standards in agricultural farms. In a notification at the WTO, Philippines stated that the farm owner should observe the International Labor Organization (ILO) Conventions and Recommendations on Child Labour.

    The farm worker should be insured against accidents in the conduct of his/her farm work and should encourage the promotion of gender equality in the work place. While these are major issues that need attention they should not be brought into the discussion with the WTO as trade and labour standards have been kept out of the discussions at the multilateral trade body.

    Environment in Regulation: Protection of the environment has become the new norm in regulations that are brought out by many developed countries. This requires either an adoption of new technologies as some of the existing chemicals are banned for use in products thereby possibly leading to increased costs for exporters.

    For instance under the Stockholm Convention on Persistent Organic Pollutants, Japan prohibited the manufacture, import and use of textile products including carpets made of 'short-chained chlorinated paraffins' and 'ether' in 2017. While India is a signatory to the Convention, it is yet to ban the chemical. This chemical is used to make carpets fire resistant. Until a replacement for this is found, it may hurt the industry, as they will not be able to use this in their exports to Japan. This is significant, especially since India's exports of carpets to Japan are over US$ 20 million out of the total Japanese import of over US$ 600 million.

    Energy conservation in products exported to several countries is also becoming mandatory thereby forcing companies to look at investing in new technologies.

Specific Trade Concerns (STCs) Raised at the WTO:

India has raised several trade concerns at the WTO, the details of which are provided in the Annexure to this Report. The main concerns related to conformity assessment procedures such as testing methodology, non-recognition of Indian testing agencies, non-adherence to principles set by international standard setting bodies like OIE, default residue levels of pesticides, registration of foreign facilities, prohibition of food additives, high certification costs, ban on imports of mangoes, withdrawal of equivalence, classification and labelling of chemicals as hazardous substances, endocrine disruptor substances, etc. While India has managed to get some relief due to many of these concerns being raised at the WTO committees,

there is a need for greater appreciation of issues faced by developing countries like India.

Conclusion

Some of the proposed regulations at the WTO that would have an adverse impact for exports include the call for registration of export units before getting a clearance to export and seeking mandatory testing at laboratories that are located outside the country from where the product is exported. Further mutual recognition of accreditation will help bring down costs for exporters.

There is no doubt that the small and medium-sized exporters in the country are facing the uphill task of keeping pace with the changing regulations across markets. The use of very stringent norms that are not in line with international standards are also hurting exports. There is a need to ensure that countries work towards easing trade rather than create new barriers by imposing NTMs that discriminate against some countries vis-à-vis others. While exporters will have to keep their ears to the ground on proposed changes, it will also be important for countries to provide details of changes in regulations in the three official languages of the WTO so that the principle of transparency is protected. Further introduction of new norms like labour standards should be resisted as no negotiations have been held in this regard under the umbrella of the WTO.

Further, there is a lot of difference in the conditions under which fruits and vegetables are produced in tropical and temperate countries. While tropical countries may be more susceptible to the infestation of pests and bacteria and need stronger antibiotics and pesticides, temperate countries may not require them. Research should work towards achieving a compatibility between both these conditions while at the same time reducing health risks in both climates. It is not the validity of scientific information that is being questioned here, rather its applicability and adaptability to tropical conditions. Further effort is required on the part of India's major export markets to reconcile the principle of precaution with that of proportionality, i.e. the risk that non-fulfillment of the standard would create.

4

Chapter Four

Results of the Survey-Industry Perception

Introduction

More than half of India's exports come from small and medium businesses, which operate in an extremely competitive environment. Quite often, their margins are very thin. Therefore, any additional cost impacts their bottom lines significantly, discouraging them from exporting or expanding their businesses. In order to understand exporters' knowledge of the international trade environment, a survey was carried out on NTMs faced by firms in different segments of the manufacturing sector. Results from the survey showed that small firms, in particular, lack awareness about the NTMs.

In most studies, much of the data on NTMs is acquired through secondary sources. This ignores the perception of the exporting community and their relative understanding of various issues that they come across. The export basket from India is variegated in terms of products and at the same time the class of exporters is quite diverse. Besides the basic elements of the trade environment, exporters' understanding of the hurdles in international trade varies from person to person, and sector to sector. Even within sectors, knowledge is dependent on the size, extent of global exposure and expanse of exporters' product baskets. The extent to which they are integrated with global markets also determines their understanding and knowledge about the eco-system for exports and their capacity to navigate such hurdles. For a new exporter or for those who operate on a smaller scale, NTMs are a huge discouragement, because the hurdles created by foreign market practices and their regulatory environment are further aggravated by their relative lack of exposure and capacities. Therefore, the survey has focused on the perceptions of the interviewees.

The survey sample was small, but it was spread across several cities, including Delhi, Mumbai, Chennai, Kochi, Pune, Kanpur and Kolkata. Further industrial sectors were selected relying on the literature, the

experience of the authors, India's export interests, and the potential and the propensity of a sector to face non-tariff hurdles. The authors had extensive interactions with Export Promotion Councils, a few product associations, and a cross-section of their knowledgeable members.

The cut-throat competitive environment of international trade creates a few unique situations – one of them is the tendency of exporters to avoid sharing critical factual details, such as their turnover, export destinations, consignee details, and value of consignment or total exports. In the survey, these shortfalls/gaps are glaring. For example, many interviewees were not open to disclosing their export values lest their price was disclosed. However, the primary purpose of the survey was to get a fair understanding of the information base of the exporters interviewed by the survey firm, their appreciation of global, bilateral and regional institutional mechanisms and their understanding of the non-tariff and tariff issues that arise during international trade. Special attention was paid to the capacities of small and medium enterprises as they contribute a large bulk of exports from India. The survey covered agricultural products, including grains, fruits and vegetables, spices, meat products, processed food products, pharmaceutical products, chemicals, marine products, textiles and garments, handicrafts, machinery and engineering products, electronic equipment, leather products and footwear. These products constitute a dominant share of India's exports.

4.1 Composition of Sampled Enterprises and their distribution across sectors

The relative proportion of each sector in the sample is influenced by their export performance and the extent of interest of Indian exporters, besides the extent of hurdles which each sector comes across in the international markets. More than 70% of the respondents were from the small and medium industry segment. The sectoral break-up of the exporters interviewed by the survey firm can be seen in Table 4.1 below.

Table 4.1 Sectors Sampled

Sectors covered	No. of Companies (No.)	No. of Companies (%)
Textile	25	6.0%
Sea Food	42	10.0%
Pharma	19	4.5%
Paper	2	0.5%
Oil & Gas	1	0.2%
Gems & Jewellery	16	3.8%
Garment/Apparel	43	10.2%
Leather & Footwear	19	4.5%
Engineering products	26	6.2%
Electronic Equipment	21	5.0%
Chemical	20	4.8%
Food products	172	41.0%
Agriculture products	14	3.3%
Number of firms which expressed problems	420	71.5%
No. of firms which expressed 'NO PROBLEMS'	167	28.5%

4.2 Perceptions Analysed

No Problem- The incomplete Perception

It can be seen that a significant number of respondents expressed that they had no problems while accessing markets of their interest. They belonged to almost all sectors covered. It is quite difficult to assume that these 167 respondents would not have faced any problem while exporting when more than double this number had several such hurdles. In a deeper interaction with such respondents and in discussions with the Councils, special emphasis was placed on exploring the reasons for such responses.

The reasons could be:

- These exporters have adapted themselves to the realities of business and, therefore, stopped seeing these measures as hurdles. Most of them are small players and may not have the capacity to even raise these issues but simply take them as fait accompli. Even the Councils may not be responsive enough to their concerns.
- Many of them are ignorant about the institutional framework and therefore may not be aware that many of the hurdles they face are not merely unwarranted but may also not be legally justifiable. Dealing with NTMs is 'business as usual' for them.

4.3 Specific Sector Coverage

Seafood Industry

The total number of companies surveyed in this sector was 42. The main products exported by these companies are fish, crab, shell, frozen seafood, cuttlefish, prawns, threadfin fish, mud crab, octopus, seafood pickle, squid crimples, seer fish, croaker, fish, eel fish, sole fish, fish maw, butterfly prawn, lobster, phosphate maw, yellow croakers, tuna, shrimp, dry Bombay Duck fish, dry anchovy, dry jawals and swordfish. However, shrimps and prawns were the major exports. The markets to which these products were exported were Qatar, Singapore, Chicago, Dubai, Thailand, China, Indonesia, Turkey, North America, Middle East, Africa, Vietnam, Tunisia, Europe, Taiwan, Bangladesh, Austria, USA, Hong Kong, Bolivia, Japan, Saudi, Iraq, Mongolia, Kazakhstan, Malaysia, Sri Lanka, Sweden, Greece, France, Netherlands, Sweden, Chile, UK, Turkey. Of these, the main markets were US and EU but besides them the higher barriers were reported inter alia from China, Indonesia, Japan and Malaysia.

Table 4.2 shows that high tariffs and para tariffs are one of the major barriers for firms that export seafood. Our examination shows that most countries have NTMs and often high tariffs on shrimps. Of all these countries the EU and US account for roughly two thirds of the shrimps exported from India. In chapter 2, Table 2.4 shows that the tariffs on crustaceans is on an average about 8%. Companies may perceive tariffs to be a major problem because para tariffs are high. In addition, anti-dumping and safeguard duties are very high in this sector. Import-related restrictions and procedural complexities

Table 4.2: Tariff and Non-Tariff Barriers

Tariff / Non-Tariff Related Barriers	No. of exporters	% of exporters
Customs Tariffs faced	15	36%
Charges and Para Tariffs in addition to statutory Customs tariffs	9	21%
Anti-Dumping Duty	12	29%
Countervailing Duty (Anti-Subsidy Duty)	1	2%
Safeguard Duty	5	12%
Import License by Importer	8	19%
Tariff Rate Quota	6	14%
Import quota	4	10%
Import Prohibition	9	21%
Pre -Shipment Requirement	1	2%
Custom Procedures/ Validation	9	21%
Difficulty with Rules of Origin	1	2%
Regulatory Standard/ Requirement SPS	4	10%
Regulatory Standard/ Requirement TBT	9	21%
Restriction on after sales services and distribution	11	26%
Government Procurement	13	31%
Local content Requirement	7	17%

such as documentation constitute a major concern for such exporters followed by technical regulations classified as SPS and TBT measures. Though not many firms have reported SPS and TBT issues, MPEDA has ranked them as the main barrier. This may be because there is little awareness of what constitutes a TBT or an SPS barrier, and problems of this nature may be clubbed under Customs procedures or import licensing issues. Our interaction also shows that technical issues such as SPS and TBT measures could be placed at a higher position in the hierarchy of barriers in this product segment. The perceptions of the firms tally with the perceptions of the industry association MPEDA, which has also raised questions on the discriminatory sampling methodology used by EU. Interestingly, some respondents reported local content requirements, government procurement and restrictions on after-sales service and distribution as obstacles. These latter categories of responses are difficult to explain but further examination shows that they may have to do with specific practices or regulations requiring local employment in storage or restrictions in distribution due to issues around validity of import licences.

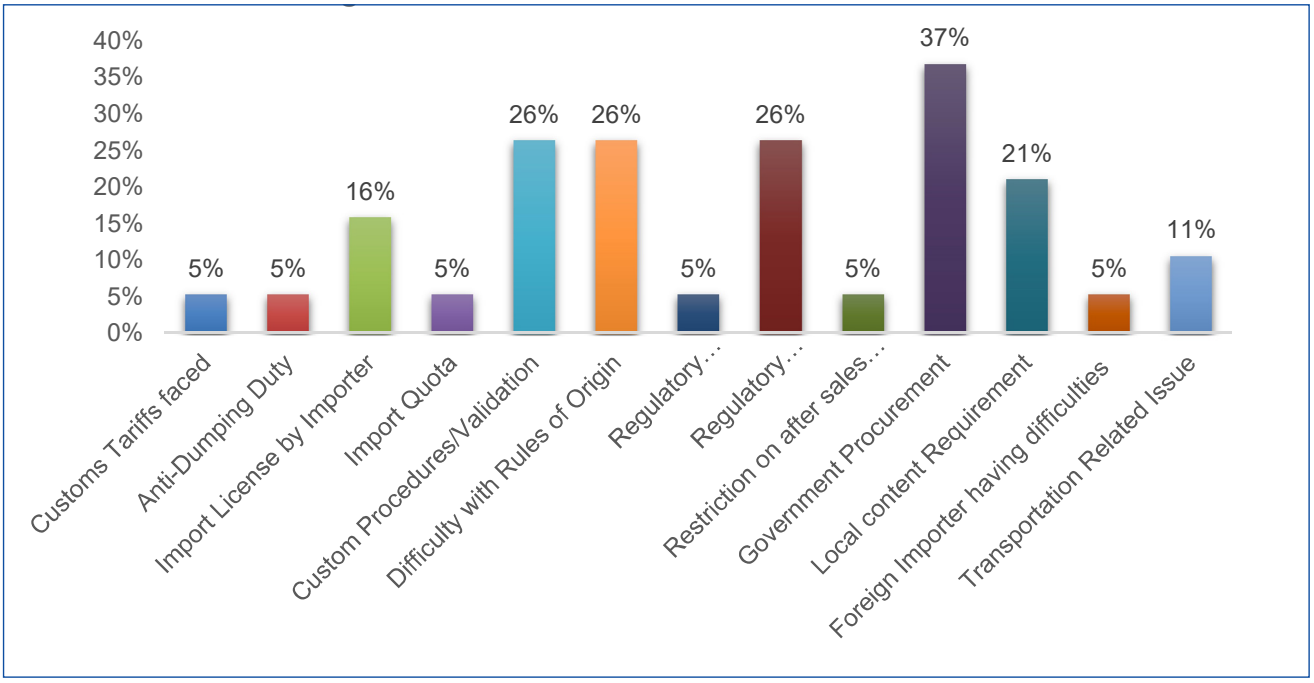
Pharmaceutical Industry

Nineteen firms were covered by the survey. The products exported by these firms, by their own description, included tablets/capsules, medicine, mixture of odoriferous substances, ortho wedge footwear, syrup, cream, oncology tablets and capsules, face care, body care, baby care, weight gain nutrition supplements. Major markets included African countries, Vietnam, Thailand, Indonesia, Malaysia, Syria, Sri Lanka, Nepal, Germany, China, Poland, Russia, Tajikistan, Philippines, Vietnam, Kenya, Zambia, Malawi, Ghana, Nigeria, USA, Europe, UAE, Mauritius, Nepal, Canada, Australia, Singapore and Italy.

Major complaints came from those respondents, who were exporting to Brazil, China, EU, Ukraine, Korea and Indonesia. The concerns were largely regulatory in nature relating to issuing of licences, registration processes, insistence on bio-equivalence, and differentiated rules framework in different parts of a country or various countries within the European Union.

The highest NTMs were recorded on government procurement procedures. It is to be noted that

Figure 4.2 Tariff / Non Tarrif Related Barriers



pharmaceutical products are often imported, especially in developing countries, by the government and then distributed under the national health care systems. These procedures often have a bias towards national companies and may discriminate against Indian exporters. Since India is not a member of the Government Procurement Agreement, its exporters cannot claim preference in government procurement in cases where the importing country is a member of the Agreement. This is also tied to the difficulties of penetrating markets with local content requirements. Regulatory issues, especially those related to patents and registration requirements which vary from country to country, are a major impediment to trade. Customs procedures, as well as rules of origin checking at both the border and the country of origin, have also proved to be a challenge. This was validated by the Pharmaexil.

In regulated markets, registration is the main requirement for market access and understandably SPS and TBT measures are less of an issue in comparison to the regulatory issues. This industry is strongly regulated, and returns are very high on patented drugs. However, such drugs are also expensive, and a balance must be maintained between public health concerns and the profits of pharmaceutical companies. Hence, barriers veer towards regulations rather than quality standards, though the latter may also be important in specific cases. Two kinds of experiences are recounted by the exporters in case of registration-related measures. In many developing countries registration takes a very long time and follows a cumbersome process which may require the exporter to commit to tests and trials which are unwarranted and expensive. Simpler processes are consciously avoided, and very high fees are charged. In some developed countries the registration process is not just very expensive but is extremely rigorous and demanding. But some of the regulatory institutions in prominent developed countries are regarded as technically and procedurally very sound, effective and rigorous and imported medicines which are successful on their benchmarks, can actually be accepted in any other market. Despite such universal appreciation, some countries would still require importers to go through the rigour of their regulatory tests, which are highly avoidable, as they take longer time and the costs are heavy. Some developing countries would simply adopt these practices knowing well that their regulators are neither equipped to carry out such tests/procedures, nor do their domestic producers have the capacity to pass these tests. Such measures could be adopted under the influence of large multi-national manufacturers from the developed countries or because of commitments made by some developing countries in their agreements with other countries in order to secure the market for the producers of such other countries.

Most of the problems in this industry can be traced to the fact that competitors in developing country markets are big pharma from the EU and the US that have sophisticated registration procedures. India has the highest number of registrations with leading regulators such as the USFDA or the European EDQM. Therefore, when Indian exporters face hurdles in registration in several other markets, their frustration can be appreciated. Since most of the exports from India fall in the generic category, from time to time Indian exporters suffer discriminatory treatment at the hands of Customs agencies of the transit country on allegations of patent piracy even while the medicine is in transit to other markets and is not even remotely likely to be released in the country of transit.

Paper Industry

Only two companies were interviewed. The main products exported are stationery, notebooks, and wallpaper and interior decoration products. The main export markets are Japan, UAE, US, UK, EU, Africa and Australia. The main barriers are tariffs, import prohibition and getting payments on

time. NTMs in the EU are particularly strenuous, as rules and regulations are mandatory and it takes a long time for checking and inspection. The documentation required for processing payments is also difficult to understand. Cargo handling is slow in the US and port charges are high in Japan.

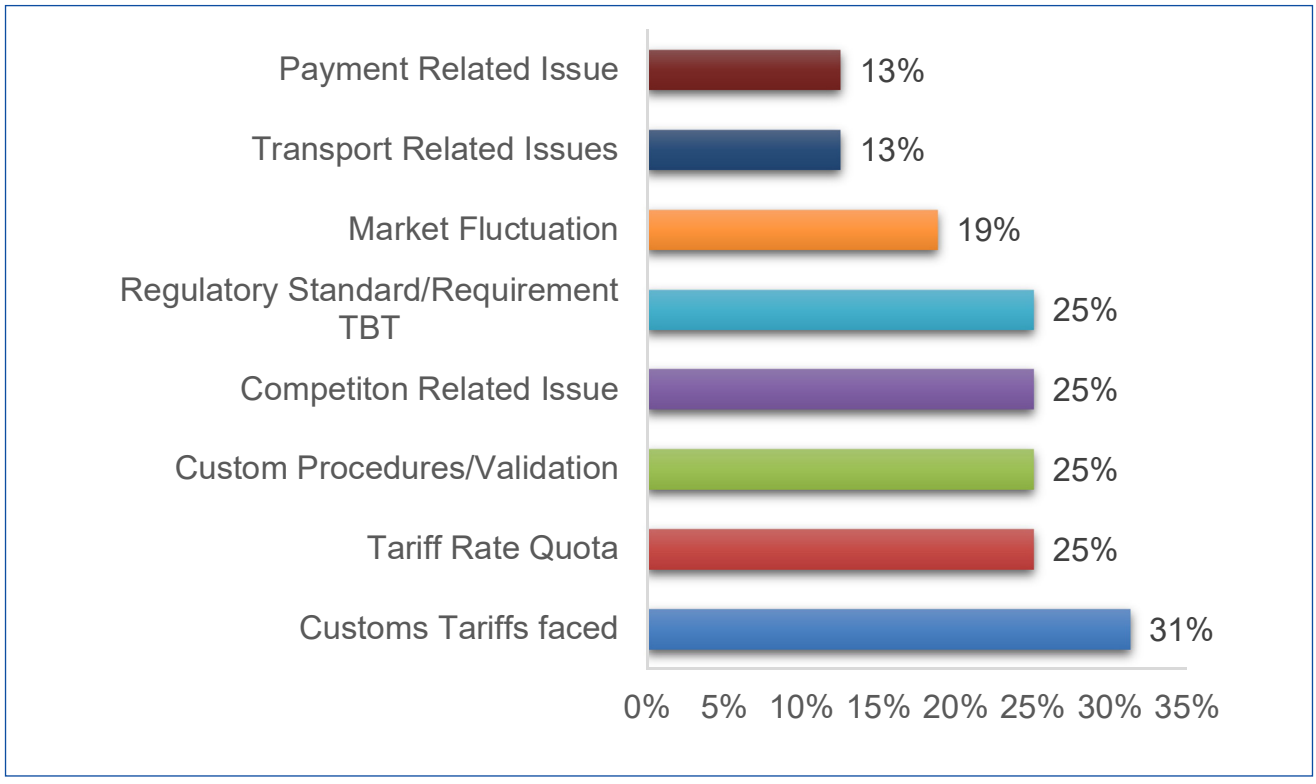
Gems and Jewellery

About 16 companies were interviewed. The main products exported are emerald, ruby, semi-precious faceted gemstone, amethyst, citrine, Kashmiri sapphire, aquamarine, gold plated jewellery, 92.5 sterling silver, artificial jewellery, semi-precious jewellery, pendants, blue sapphire, gemstone beads, rudraksha beads, vastu sets, gemstone earrings, gemstone rings, solar quartz semi-precious gem stone beads, and window druzy. None of the companies surveyed are exporters of diamonds. The main markets were Chile, Europe, UK, USA, Italy, Australia, Bangkok, Thailand, China, East Asia, Middle East, Africa, Switzerland, Korea, France, Belgium, Sweden, Hong Kong, Malaysia, Singapore, Germany, Oman, Dubai and Nigeria.

Figure 4.3 shows the major tariff and non-tariff barriers faced by this industry. As this is the highest export item from India in value terms, the barriers faced by this industry are of great importance. Most firms complained of tariff escalation and reported that the tariff on jewellery, especially semi-precious jewellery, tends to be high. This is especially the case in Africa and EU. TBT-related standards were of major concern to the industry. This is especially the case in Germany and the Middle East. Inspection of products is a major cause for concern in the US markets, as it is time consuming, and payments are often delayed. Since this is a very competitive industry, margins tend to be low. Moreover, raw material is much cheaper in ASEAN countries, putting the Indian industry at a disadvantage.

An examination of responses in relation to country-wise barriers showed that Customs charges, additional duties and luxury taxes constituted the major concerns for our respondents. Some complaints about payment systems, delays in payments by importers and regulatory uncertainties

Figure 4.3: Tariff / Non Tarrif Related Barriers



were also reported. Since these products are of high value, frequent currency fluctuation and market fluctuation also affect the exporters' bottom lines. As in some other cases, frequent regulatory and policy changes in the Middle Eastern countries were also reported. Among the major destinations, EU, African countries and the US posed major challenges of tariff and non-tariff nature.

Leather Industry

Nineteen firms were surveyed. The main products exported were industrial shoes and safety shoes, riding boots, leather harness goods, saddlery harness, footwear finish leather, saddles, equestrian products, leather bags, leather wallets, purses, belts, furnished goods, ladies casual slippers, ladies footwear, ladies casual flat slipper, red bridal designer traditional footwear, pagarkhi bell pink designer handmade leather juti, leather briefcases, office bags and card holders. The main markets covered were Chile, Europe, UK, USA, Italy, Australia, Bangkok, Thailand, China, East Asia, Middle East, Africa, Switzerland, Korea, France, Belgium, Sweden, Hong Kong, Malaysia, Singapore, Germany, Oman, Dubai and Nigeria.

Figure 4.4 shows that the main barrier to exports for these firms was tariffs. The industry complained that several countries in the EU charged higher tariffs than the EU average, as taxes and the Customs procedures in some countries are extremely complicated. Indian leather products exporters face stiff competition both in the developed and developing countries on account of biases that favour the local industry in developing countries and other competitors in developed countries. Tariff barriers are the main protectionist measures. Both in the US and EU tariff peaks in some products are high. In some African and Asian countries payment delays are common, adding to the cost of exports. There are frequent changes in regulations in the Middle Eastern countries, which also add to the cost of exports.

Garment Industry

A total of 43 companies were covered by the survey. The main products exported were skirts, blouses, and trousers. The main markets were Africa, Argentina, Australia, Bangladesh, Brazil, Canada, China, Colombia, Europe, Germany, Japan, Korea, Peru, Saudi Arabia, Scandinavia, Turkmenistan, UAE, Ukraine, UK, Uzbekistan and the US.

Figure 4.4 Tariff / Non Tarrif Related Barriers

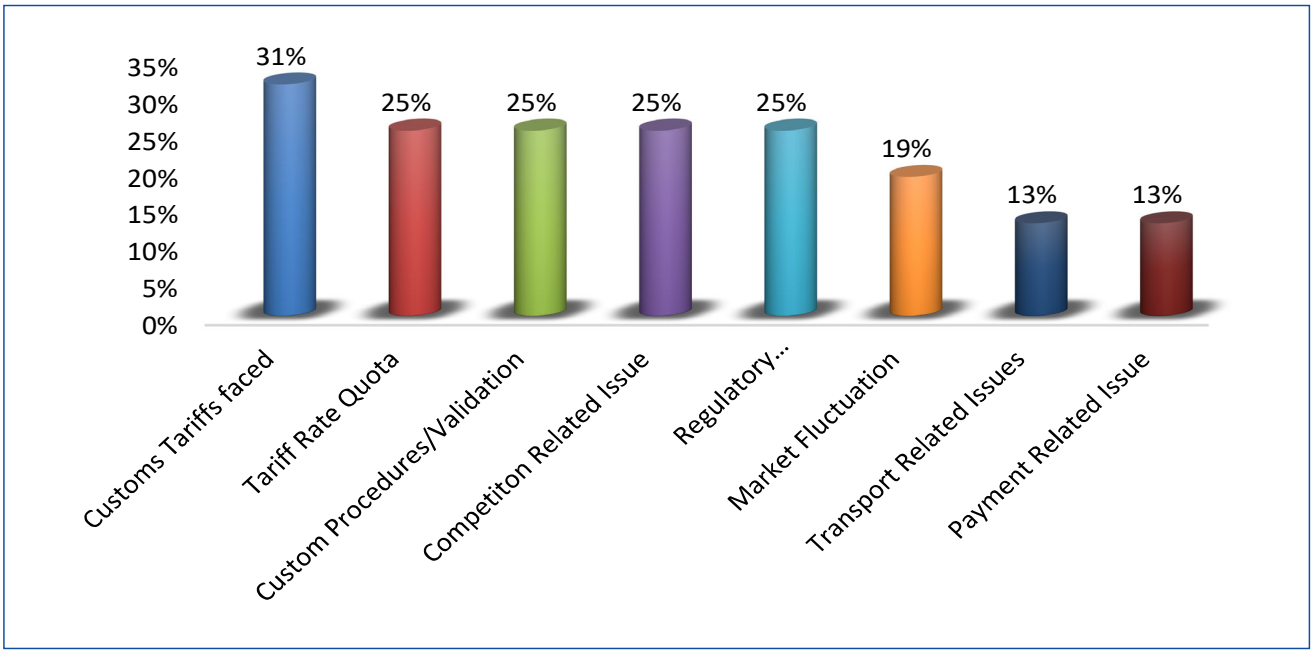
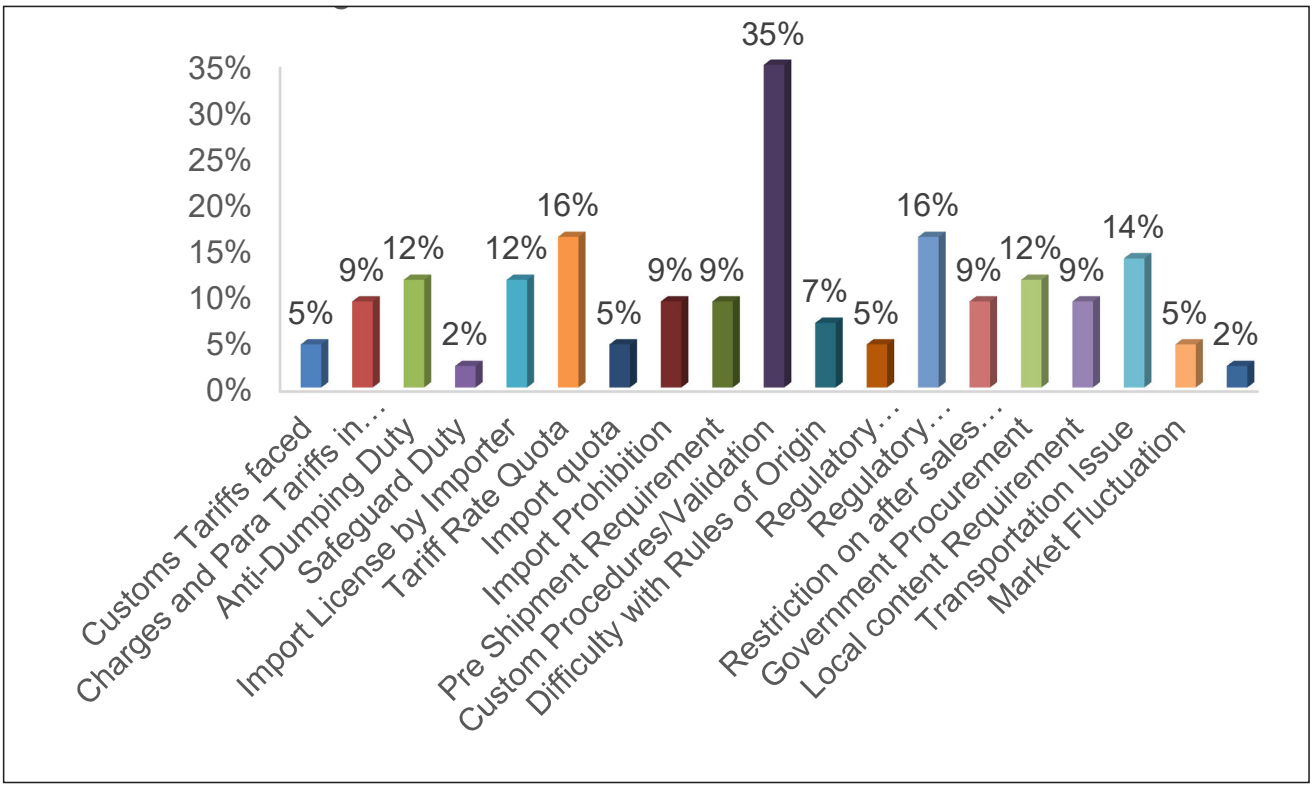


Figure 4.5 : Tariff / Non Tarrif Related Barriers



The major NTMs in this market were related to Customs procedures. Tariff rate quotas and other regulatory issues were also barriers to exports. Trade defence measures such as anti-dumping were prevalent in these markets.

In several Gulf countries tariffs, para tariffs and anti-dumping duties tend to be high. According to exporters, quality standards on content and colour of the readymade garments in Gulf countries are complex, unpredictable and unreasonable. An interesting observation came from exporters of garments to the Gulf countries where certain fashions and unique designs of garments were not accepted.

Compliance documentation and long inspection procedures formed another set of challenges. Measures such as labelling requirements and product standards also posed significant challenges. Out-of-quota tariffs are high and obtaining tariff rate quota documents can be expensive and complicated in many places. Some exporters complained that getting information was difficult because of language barriers. The EU regulation on chemicals called REACH has also had a dampening effect. Firms found the numerous checks performed during Customs clearance in the EU unclear. Also, the whole consignment got cancelled if one product was found breaching REACH and environmental standards in the EU.

In Latin American countries, Brazil and Argentina require certificates of origin. Obtaining them and getting them verified in the importing country can require complex documentation and translation. Apart from documentation, changing goalposts in environmental regulation affect the textiles and garments industry exports. The application of Japanese industrial standards as well as labelling according to Japanese specifications also pose difficulties.

Agricultural products

14 firms were surveyed. The products exported included dry flowers, agricultural raw products, live

animals, food beverages, drip irrigation systems, fresh red onion, rice, white corn, fresh potato, spices and herbs. The main countries of export were Australia, Bangladesh, China, Indonesia, Italy, Germany, Japan, Kuwait, Korea, Malaysia, Nepal, Sri Lanka, South Africa and Sri Lanka.

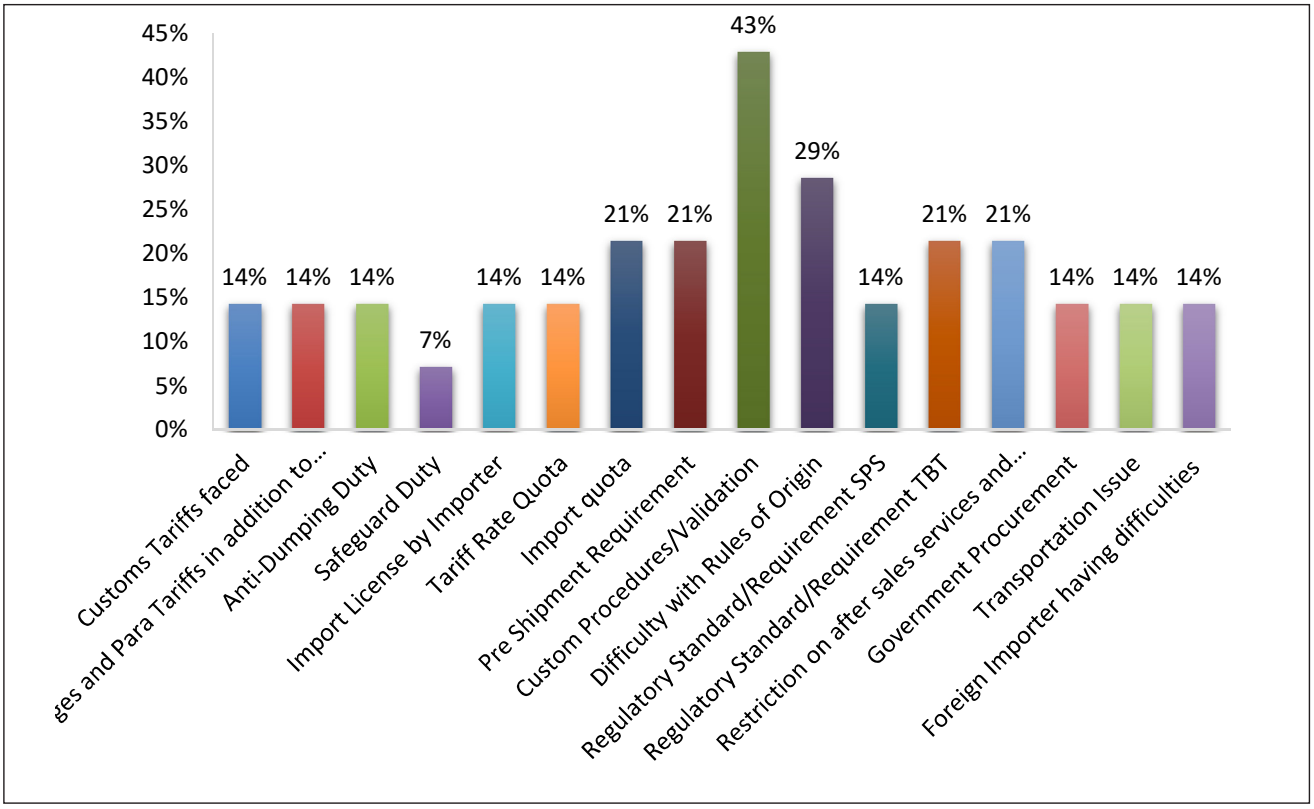
As expected most of the concerns were raised around quality, testing and certification procedures, further handling of the cargo at ports and by the Customs also caused significant concerns to the exporters. Inadequate quarantine and risk assessment procedures were also reported. Some responses reported contractual/commercial practices, which were a cause of concern to them, as such practices led to high transactions costs or even rejection or abandonment of consignments. In some developed markets high cost of services at the ports was reported. High import duties were not reported generally, except in some markets such as Europe and the US.

The most important NTB as shown in Table 4.6 is Customs procedure and its validation. These problems arise primarily because of SPS procedures, which require certificates that need to be validated at the port of entry in the importing country. The larger and more stringent the requirement, the greater the difficulty in obtaining the requisite documents and validating them. The next major difficulty arises because of rules of origin. African importers' testing programmes are slow. In China quarantine and certification requirements are stringent. In Europe on the whole, but especially in Italy, clearing consignments takes time. Duties on agricultural products are higher than anticipated. Japan has a number of restrictions on providing after sales services and hence demand for Indian products may decrease over time.

Food industry

This was the largest segment of the survey sample. 172 firms were surveyed. The main products

Table 4.6:Tariff / Non Tarrif Related Barriers

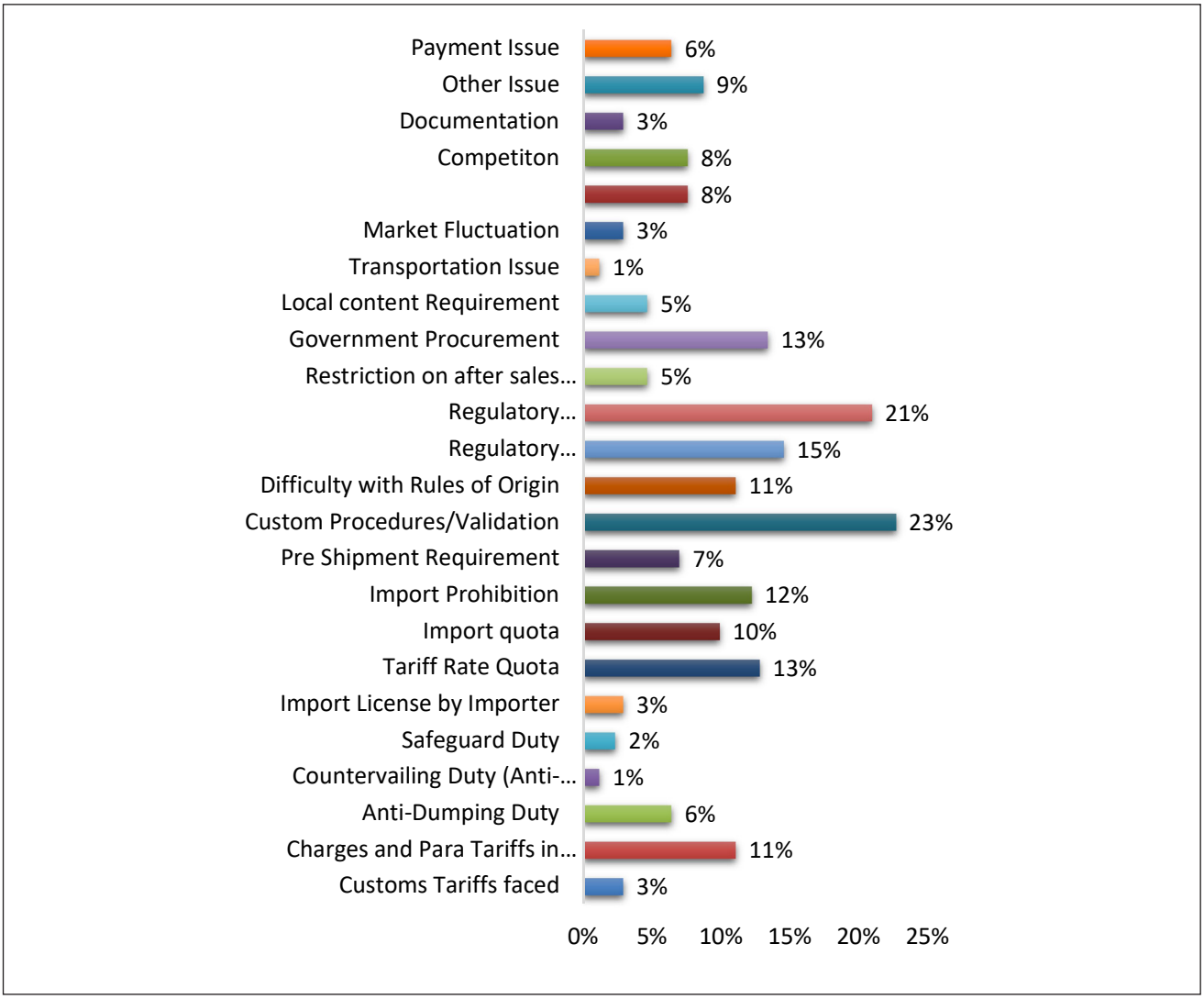


exported included fruits, vegetables, rice, processed food and other food products. It also included dairy products and confectioneries. The main markets to which these food products were exported included both developed and developing countries. While US, EU and Canada were some of the main markets, the Gulf and other Asian countries are also prominent importers.

The major NTBs in this sector are TBT and SPS regulations. As stated earlier, Customs procedures and validation difficulties are just a surrogate or a reflection of stringent quality standards, which requires verification at various levels. Failure to meet these standards also results in import prohibition, and in some cases, it takes time for imports to be restored to the permitted lists of EU importers. A case in point was the detection of the fruit fly in mango exports from India. Mango imports into Europe were banned altogether, and it took the government and the exporters over two years to restore the export of mangoes.

Figure 4.7 lays out various broad categories within which respondents could be classified, on account of their responses. SPS measures have grown fast and are the cause of most hurdles for exporters in general. Since food products often respond to local preferences, absence of international standards and restrictive measures on a wide spectrum

Figure 4.7 Tariff / Non Tarrif Related Barriers



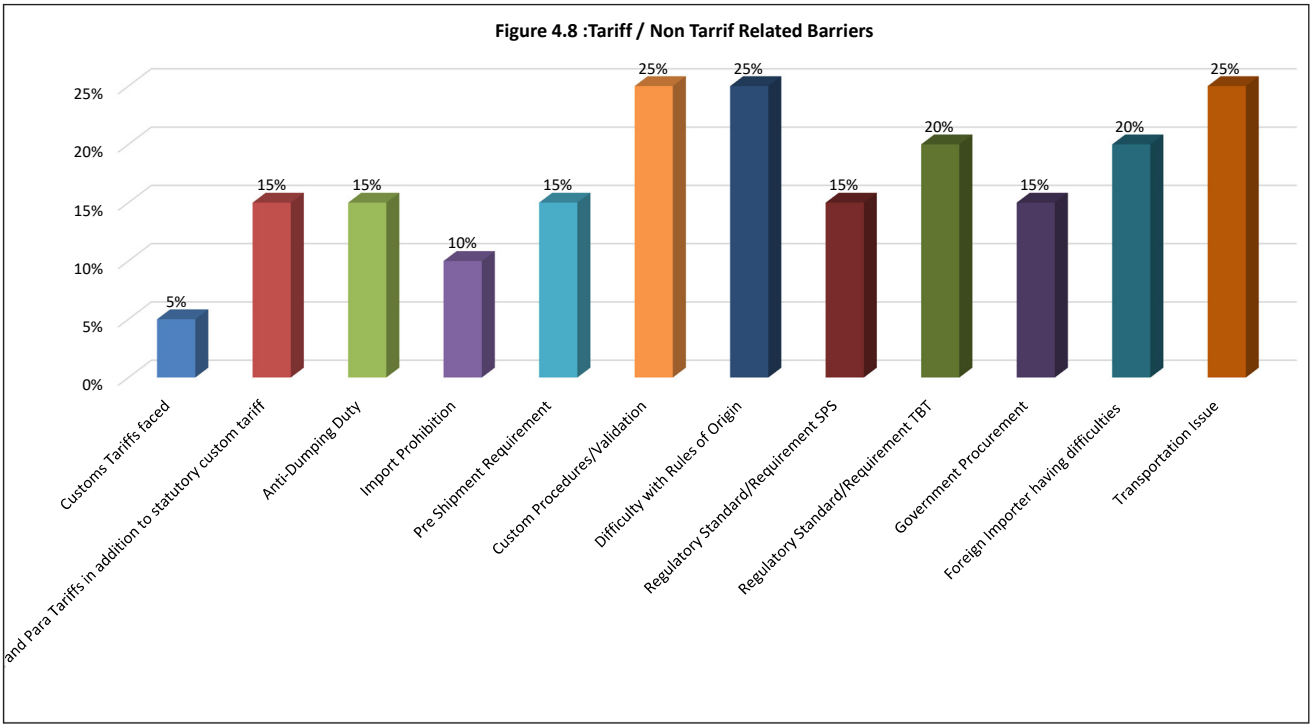
are reported from destination markets. These measures range from unreasonableness of technical regulations, inspection, testing and certification systems and procedures on the one side, to the routine Customs valuation, duties, para-tariffs and documentation related issues, on the other. Emerging and more complex SPS measures such as bio-security measures and standards adopted following precautionary principles and absence of the application of proportionality principle are other major concerns. Labelling requirements comprising disclosure of various kinds are significant hurdles. Respondents also reported high cost of transport, storage and warehousing and high cost of disposal in case of rejection. The ever-evolving nature of regulations around Maximum Residue Limits (MRL) relating to chemicals and pesticides and consequent detection processes, largely driven by the precautionary principle and availability of machines capable of detection in very low concentration are the most critical hurdles. In the European Union, regulations often differ from country to country and this non-harmonisation leads to high costs. This non-harmonisation involved Customs and trade administration in terms of classification, valuation, origin, Customs procedures, tribunals, administrative review, referrals of ECJ decisions, standards, technical regulations etc.

Some of the hurdles come about when competing countries follow polices that assist their exporters in an irrational manner. Sometimes some non-tariff barriers were faced because of regulatory inadequacies in the exporting country, for example, in the case of meat and meat products, India's characterisation as an FMD infested country covers the entire geographical area of the country because regionalisation has not been adopted by India. Another interesting experience was reported in the case of the ban on grape imports from India by Japan on the grounds that grape production in Pakistan, a neighbouring country with similar geo-agricultural conditions, was infested by oriental fruit flies. Since India is in the same region, the effect of the measure was extended to India as well. In several cases, domestic support was reported as a major obstacle. This included import quotas, minimum import prices, non-preferential rules of origin etc. In some cases, the importing country deputes inspectors to carry out inspections in India at different production and processing sites thereby adding significant costs to the export transactions, for example, in the case of mango exports to the USA. Price preferences to domestic companies and insistence on local content were also reported. Some respondents reported inappropriate valuation by foreign Customs. At least one respondent reported that exports to Turkmenistan were hindered due to an unfair tender process which mandated that only those companies, which have minimum operating experience in Turkmenistan, could offer tenders. Extensive labelling requirements including adoption of language other than English were reported by many. The long time taken at ports in clearing products for distribution and difficult documentation requirements were reported by many, particularly those exporting to Dubai. Respondents exporting to Korea reported some very restrictive and trade distorting policies such as export subsidies, special emergency tariffs on apprehended import surges, import quotas, non-preferential rules of origin, imposition of environmental waste charges for processing waste in Korea, standards and conformity assessment procedures which are more restrictive than international practices etc.

Chemicals Industry

The survey covered 20 firms. Important products exported by these firms were cosmetics, laboratory chemicals, textile chemicals, epoxy primers, pigments, water treatment chemicals, industrial chemical, azo dyes, pigments and agricultural chemicals. The main export markets were US, EU, Japan and a number of African and Asian countries. Some Latin American markets such as Brazil are also important importers of chemicals.

Figure 4.8 :Tariff / Non Tarrif Related Barriers



By all accounts, registration of chemicals and permission for importation were the biggest stumbling blocks for the respondents. The REACH regulation of the EU has turned out to be the most difficult and expensive measure for compliance by the exporters of chemicals. Several exporters also complained of anti-dumping duties and high transport and shipping costs.

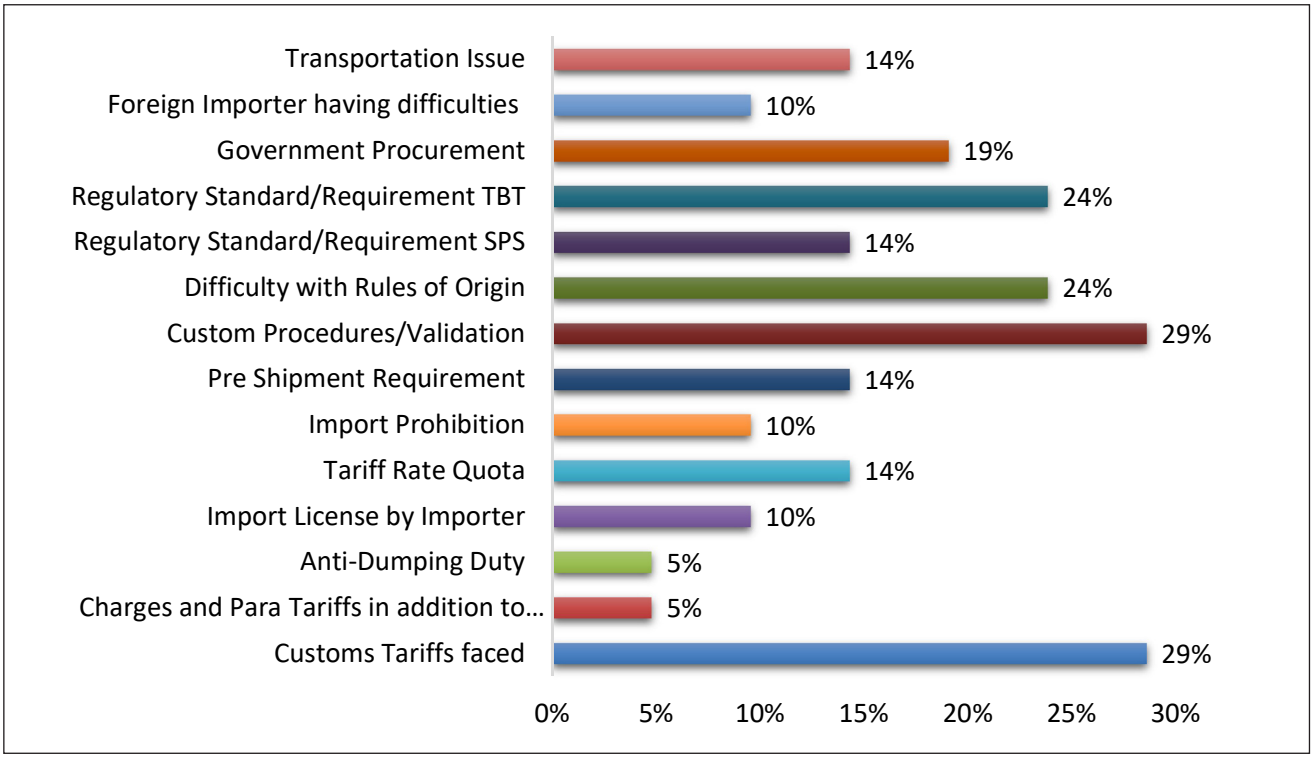
Electronic Equipment industry

21 firms were surveyed. The main products exported were chargers, USB connectors, S.S. wires, motor fans, battery caps, speakers, switchgears, decorative lighting, table lamps and designer lamps. The main markets for these products were Africa, Japan, USA, Italy, Germany, Saudi Arabia, UAE, China, Vietnam and Korea.

The main problems faced by exporters were tariffs and regulatory barriers, particularly TBT barriers. Rules and regulations in this industry are changed in countries like Canada and the EU. This information is not readily available to exporters and increases the cost of compliance for them. It also reduces the predictability for the exporters.

Among several measures reported, labelling requirements, high tariffs, compliance with technical regulations, particularly in Europe, and lack of harmonisation in trade administration in Europe were reported as major hurdles. Highly restrictive testing and certification regimes were, in particular, reported with reference to electronics and electrical and engineering products. High Customs duties in some markets, long procedures and frequently changing regulations in Europe were also reported. Those exporting to the Middle East also indicated payment risks and delays. The need for stamping and high Embassy charges were reported by respondents exporting to Qatar. Several respondents referred to the absence of testing labs in India. This could reflect the absence of a third party certification system in the destination countries. The procedures for clearance and detection of bugs in the equipment are cumbersome in the US and could cost up to 5-7% of the CIF value of exports. Damage during transport is the liability of the

Figure 4.9 Tariff / Non Tarrif Related Barriers



exporter and transport facilities are slow in Germany and Japan, which could also increase costs. Further in the EU, there is a problem of tariff classification of some of these products. Consequently, tariff categorisation may become difficult leading to delay at the Customs Authorities. Moreover, lack of harmonisation of Customs procedures in the EU can lead to further delays in transporting products from one country to another.

Engineering Products

26 companies were surveyed. The main products exported were solar lighting, steel pipes, cleaning machines, gear transmission systems, car parts, automobiles and food processing machines. The main export destinations were over 30 developed and developing countries.

As shown in Figure 4.10, the major NTMs relate to pre-shipment and Customs procedures validation testifying the predominance of TBT measures. Government procurement of these products may also imply that signatories of the GPA have an advantage over Indian exporters, as India is not a signatory of the WTO agreement on Government Procurement. Hence, it cannot avail of the benefits of GPA contracts.

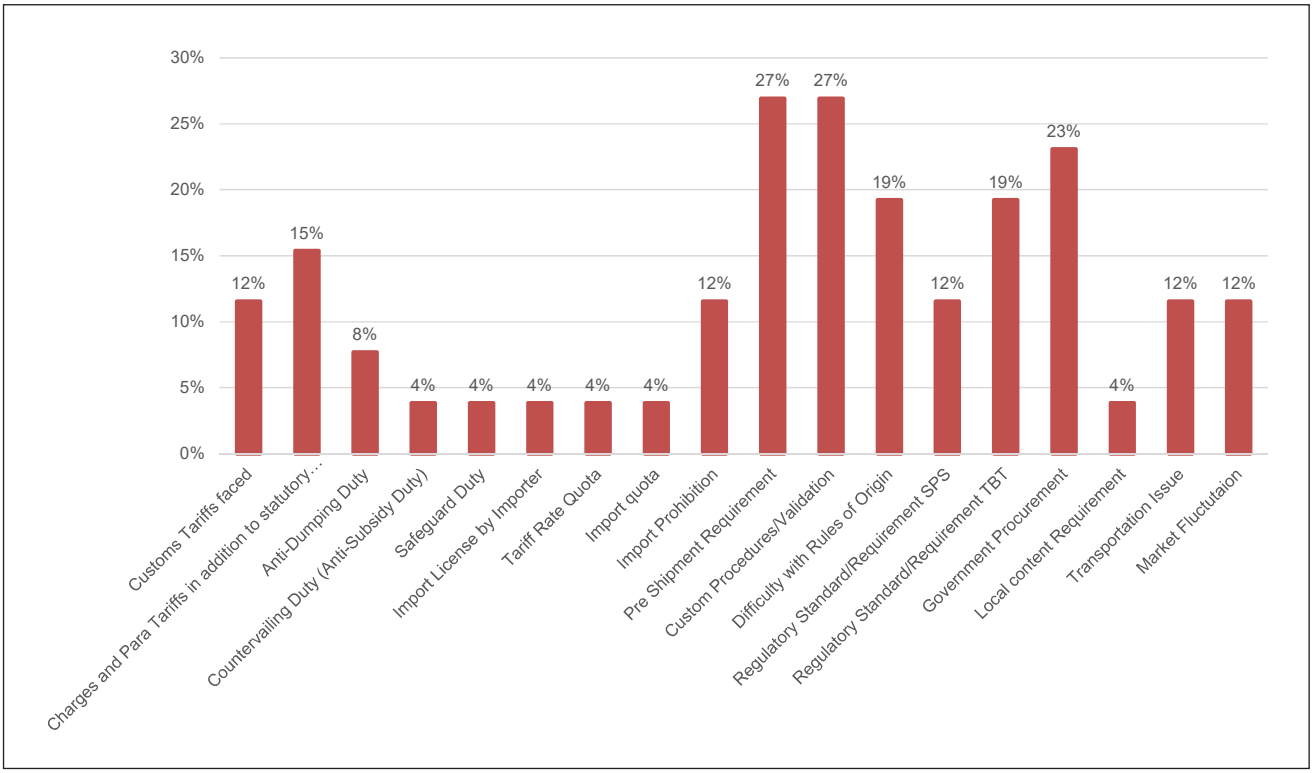
High Tariffs, trade defence measures and conformity assessment procedures appear to be the main problem of the industry. High costs of shipping, faulty containers, slow transportation, adoption of standards over and above international standards were some of the other measures reported.

Annex 2 provides information on country-wise barriers for products covered by the Survey.

Textile Industry

The total number of companies interviewed was about 25. The main products exported were handlooms, handicrafts, furnishing fabrics, raw cotton, chikan apparels and textiles. The main markets were US, Canada, UAE, UK, France, Italy, Germany, Japan, China, Singapore, Spain, Qatar, Pakistan, Doha, Jordan, Bangladesh, Belgium, Oman, Israel, Saudi Arabia, Hong Kong, Peru, Sri Lanka, Europe and Nepal.

Figure 4.10 : Tariff / Non Tarrif Related Barriers



Summary

The above list the category of NTMs and then go on to give a country-wise listing of NTMs for each sector as perceived by the exporters. It can be seen from the Table that two kinds of barriers are perceived by the industry. First, those which are domestic in nature and action to mitigate the problems lies within the country, such as infrastructure issues or policy inadequacies. In a technical sense these are not NTMs. Nevertheless, these are burdensome for the exporters and need resolution. The second kind is what we call the NTMs, which are barriers to trade. Since the Export Promotion Councils are more knowledgeable about the technical dimension of barriers, specific details of such barriers have been taken from them and put forward in other chapters in the Study. However, this chapter essentially looks at the perceptions of the exporters.

It can therefore be concluded while the barriers belong to several categories, they can be broadly grouped as follows:

a) Measures or institutional issues which are faced by exporters within their own country and the solution lies with their respective governments or other relevant institutions.

b) Facts and events which are entirely commercial in nature and most often need to be settled between the parties to a trade transaction. There is little that the receiving country can do to resolve these issues though the extant commercial legislation or practices in the receiving country may at times be against a global practice or an international law. In such cases the exporter can find a solution under the relevant international or receiving country law on his own or through the good offices of the exporting country.

c) Measures which can be broadly classified as those concerning rates of import duties, other para tariffs, additional duties, charges and fees etc. Such measures may have legitimacy under extant trade agreements or relevant domestic laws when they are in line with various multi-

lateral, regional or bilateral trade agreements. In the chapter on Tariffs some of these issues have been discussed at length. Some of the exporters have specifically spoken about discriminatory tariffs but such discrimination may have legitimacy due to some preferential agreements. The solution therefore lies in the institutional handling of the problem

d) There are a plethora of NTMs which affect exports the most and can be addressed in different ways. Broadly such NTMs can classified in the following groups:

i. Customs procedures and documentation
ii. Inadequate infrastructure at the ports and issues of transportation
iii. Inadequacy in payment procedures at ports and with the Customs department
iv. Issues arising from currency fluctuation or currency manipulation
v. Frequent change in rules and regulations
vi. High-tariffs, para-tariffs and other charges and frequent changes in tariffs
vii. Imposition of trade remedial measures
viii. Import licensing, tariff rate quotas and restrictions and their poor or flawed administration
ix. Local content requirements, discriminatory and restrictive government procurement policies and delays in procurement
x. A wide range of issues including governance of the standards regime, testing, inspection and certification system under TBT and SPS Agreements
xi. Discriminatory laws and policies in importing countries
xii. Inadequate technical regulatory infrastructure and regulatory practices
xiii. Issues around implementation of commitments under trade agreements
xiv. Political issues such as sanctions against exports to some countries
xv. Cumbersome, costly, irrational, time-consuming and discriminatory registration process delaying market access
xvi. Restriction on export of used goods or environmental regulations which impact market access or make compliance unnecessarily cumbersome and costly

Conclusion

The survey shows that India's exporting community is quite diversified in terms of their understanding of the international trade eco-system and their articulation also varies with the extent of the scale on which they operate. That is why the results of the primary survey have been cross-validated with the feedback provided by Export Promotion Councils, other industry associations and large exporters, who have the capacity to understand this eco-system and articulate their concerns. The perceptions recorded at the grassroots level impart two broad learnings. As far as the average exporter is concerned, he is not concerned whether the hurdle to export emanates from within the country's own trade eco-system, is manifested at the destination or in between. Any measure, which he perceives as a hurdle to the smooth flow of his exports, has a certain cost implication for him, which makes exports that much more expensive, and quite often he might lose the market to a competitor. There are some exporters, who have adapted to non-tariff measures either out of their ignorance or simply in their entrepreneurial zeal have adapted to these measures in a business-as-usual mindset. However, a large number of exporters recognise the costly implications of such non-tariff measures and would like to see them out of the way.

As far as domestic measures are concerned, they can comprehend issues relating to Customs, logistics, infrastructure or local taxation. Their comprehension about institutional issues such as

existence of trade agreements is inadequate. These issues need to be addressed at the domestic level. However, the much bigger hurdle for exports comes from the tariff and non-tariff related consequences. They need to be addressed in a far more organised, studied, coordinated and persistent manner in cooperation with trading partners and domestic industry.

The fact that many of the exporters are relatively less informed about the institutional framework available to them for trade, is a commentary on major inadequacies in the domestic trade policy framework. Many exporters are still not aware of the multilateral, plurilateral or bilateral institutional mechanisms available for preferential trading. Even when they may be exporting under a preferential mechanism, there is a likelihood that they may not be able to distinguish between a bilateral trade agreement and a unilateral General System of Preferences (GSP). Such businesses may experience the duty differential in an export destination with reference to similar products of another country, but they may not be familiar with the fact that there could be a preferential trading arrangement, available to exporters of the other country, which may not be available to exporters from India. These experiences reiterate a strong need for in-depth advocacy and extension programmes, which will include not merely awareness raising on institutional frameworks but impart more important details such as Rules of Origin, Non-Tariff Measures and ways of getting around those measures. Some years ago, the Department of Commerce started such programmes in a limited way with respect to popularising Preferential Trade Agreements. But that alone is not enough. The woefully low utilisation of RTAs by Indian exporters is evidence of the fact that they either do not find enough use of the FTAs for their products, feel the process of availing such preferences cumbersome or are simply not aware of such preferences. But even this is not enough. It is the responsibility of the government to establish an extensive architecture for building skills and awareness among economic operators to make efficient use of international trade opportunities.

5

Chapter Five

Trade Effects of NTMs

Introduction

To analyse the trade effects of NTMs, it is very important to first examine the channels through which NTMs affect trade. NTMs can change trade volumes or the cost of producing traded goods. As shown in earlier chapters, NTMs are closely correlated to the reduction of tariffs. In general though not always, NTMs are imposed on imports by countries with low tariffs. Also, as NTMs help in reduction of imports it increases the demand for domestic goods which leads to an increase in employment and further to wage increases. On the other hand NTMs can also affect the domestic economy adversely by increasing domestic prices and overall cost of production in the economy.

NTMs include a wide range of instruments such as quotas, licences, technical barriers to trade (TBTs), sanitary and phytosanitary (SPS) measures, export restrictions, Customs surcharges, financial measures and anti-dumping measures. The more neutral term NTMs have been preferred to the term non-tariff barriers (NTBs) because it leaves open the judgment of whether a given measure constitutes a trade barrier. NTMs may be intrinsically protectionist but they may address market failures as well, such as externalities and information asymmetries between consumers and producers. NTMs which address market failures may restrict trade while at the same time improving welfare. Other NTMs such as certain standards or export subsidies may expand trade. Identifying a measure as an NTM does not imply a prior judgment as to its actual economic effect, its appropriateness in achieving various policy goals or its legal status under the WTO legal framework or other trade agreements. The qualification of NTMs as NTBs can only be done as a result of analysis based on comprehensive data.

Various taxonomies of NTMs/NTBs have been proposed, none of which can be complete since

NTMs are defined in terms of what they are not.[73] The recently revised international classification of NTMs includes the categories listed in Table 5.1.[74]

Table 5.1 International classification of NTMs

K	Sanitary and phytosanitary measures
L	Technical barriers to trade
M	Pre-shipment inspection and other formalities
N	Price control measures
O	Licences, quotas, prohibitions and other quantity control measures
P	Charges, taxes and other para-tariff measures
Q	Finance measures
R	Anti-competitive measures
S	Trade-related investment measures
T	Distribution restrictions*
Q	Restrictions on post-sales services*
R	Subsidies (excluding export subsidies)*
S	Government procurement restrictions*
T	Intellectual property*
U	Rules of origin*
V	Export-related measures*

Source: UNCTAD (2010)

Some NTMs such as quotas or voluntary export restraints, for example, are being progressively phased out, while other forms are moving to the forefront. For example, because manufactured products are of increasing complexity, carrying potential health risks and other hazards, the number of product standards can be expected to rise. Similarly, rising traceability demands for foodstuffs mean increasingly complex regulations for foodstuff imports. With the advent of environmental concerns linked to climate change, NTMs will likely assume even greater importance.

Quantifying NTMs is a challenge because of their heterogeneous nature and lack of data (see below).[75] Most measurement methods use a simple partial equilibrium framework to develop a tariff equivalent to the NTM that reflects how much supply, demand or trade are affected by the measure. Measurement typically focuses on the change in import price associated with the introduction of the NTM, the resulting import reduction, the change in the price elasticity of import demand or the welfare cost of the NTM. A relatively common approach is to calculate ad valorem equivalents of NTMs, i.e. the ad valorem tariff rate that would induce the same level of imports as the NTM in question. This is relatively straightforward in the case of quotas as, under perfect competition, their price and quantity effects can be replicated by appropriately chosen taxes on trade. In this chapter, the most common approaches to the measurement of NTMs are presented – the price-gap approach, which aims at deriving a tariff/tax equivalent to the NTM, the quantity approach and inventory-based frequency measures.

Essentially the theory behind the methods is the same. Section 1 details the theory behind the methods used to calculate the effect of NTMs on trade. The methodologies used to measure the impact frequently vary depending on the availability of data. Section 2 provides a summary of some of these methodologies. Section 3 summarises the empirical literature on the effects of NTMs. Section 4 measures the trade effects of Indian NTMs. In doing so it distinguishes between measurable NTMs, such as trade defence measures where additional duties or taxes are specified or quantified and standards

[73] Authoritative paper by Deardorff and Stern (1998) who discuss the definition and propose a taxonomy with five categories.

[74] This new classification was elaborated as part of a joint project by international institutions led by a Group of Eminent Persons to improve the collection and dissemination of information on non-tariff barriers (NTBs) (see UNCTAD, 2010). Categories marked with "*" are included in the classification to collect information from private sector through survey and web-portals. Note that a classification of procedural obstacles has also been elaborated for the same purpose.

[75] Ferrantino (2006) provides a comprehensive survey of recent progress in the quantification of NTMs.

related NTMs, where SPS and TBT requirements are a basis for restricting trade. In the latter case trade effects are more difficult to quantify. For measuring the trade effects, this report uses a Computable General Equilibrium analysis with a GTAP dataset based on an input-output model.[76] Finally Section 5 concludes with the main results of this analysis.

5.1 Theory behind measuring the impact

As stated earlier the quantity gap is the difference between the volumes of the goods exported before and after the NTM was imposed. Traditionally it was used to measure the effects of an import quota on exports. This method was used more often than the price gap approach as data on volume of trade was more easily available than price data.

Quantity approach

World trade report 2012 shows the regression equation (Gravity equation) used for measuring the trade effects of NTMs using the quantity approach.

$$\text{Ln (value of imports)} = \alpha + b_1 \ln (1+ \text{tariff}) + b_2 \text{NTM} + b_3 cX$$

Variable X includes all those other variables which affect trade, for example distance, travel cost, and GDP.

NTMs enter the equation as a dummy variable, i.e. if there is an NTM for a particular product it is given the value of 1, but remains 0 otherwise. This equation is used to estimate the value of b_2 which can then be used to estimate the impact of NTMs for future years.

The concept of elasticity has been used to further refine this method. Elasticity estimation method uses a time series of import elasticities of a particular commodity or a particular sector across countries. This can help predict whether NTMs would affect some countries and some sectors more than others.

Price Approach

The price effect of an NTM is the difference between the market price of the restricted product and the price that would have prevailed without the NTM. However price data is not easily available. Hence this is often substituted with a tax equivalent method. As stated earlier, it was mostly used to measure the effects of import quotas. Import quota means restrictions on imports of a particular commodity. The effect of the quota was measured by the premium received. When imports decrease without any change in domestic demand, prices of that commodity in the domestic market rises more than the import price. The difference between both prices is known as the premium. Who receives the premium depends on how a quota is administered.

The practical way of applying this method is to compare the domestic price of goods in comparison to a reference price. The idea behind this method is that NTMs raise the domestic price above what it would be in their absence. The price gap is the difference between the price prevailing in the NTM-constrained market (the 'internal price') and the price prevailing outside (the 'external price') corrected for the influence of other factors which may influence prices. A simple expression of the tariff equivalent of a given NTM would be:[77]

$$TE_{NTM} = (pd/pw) - (1 \tau c) \quad)$$

where p_d is the internal price, net of wholesale and retail margins, p_w is the world price, net of wholesale and retail margins, τ is the tariff expressed in ad valorem terms and c is the international transport margin (c.i.f. /f.o.b. margin) expressed in ad valorem terms. This expression is simple because the prices used have already been adjusted for other factors that influence prices, such as wholesale and retail distribution, rents or profits, taxes other than tariffs and subsidies. These factors must be subtracted from the price difference before the mark-up can be attributed to NTMs.

[76]For a complete description of the model see Annex 1 of chapter 5.

[77]This is a basic formula (from Moroz and Brown, 1987 and Linkins and Arce, 2002) as presented in Ferrantino (2006) who also presents three other, more sophisticated price-gap formulae.

A price gap is a very simple concept, however, can be difficult to implement. Difficulties in its implementation come from the variety of ways of calculating internal and external prices, which give rise to widely divergent estimates.[78] The external price is often taken as the one prevailing in a comparable but unconstrained market. However, rarely does one have a fully comparable market. In the case of EU bananas for instance, Norway would be a good comparator because shipping distances are comparable and it had no quota when the EU did. But Norway being a very small market, the conditions of competition were not quite comparable. The United States would be a better comparator from the point of view of size but it has lower freight rates. The variety of possible comparators generates very different external price estimates. As for the internal price, in principle it should be easier to estimate but in practice this is not necessarily so. For instance, list prices on the domestic wholesale market may have little to do with prices in actual transactions, or when importers and distributors are owned by the same firm, transfer prices may be unobservable or uninformative. Table 5.2 shows a few examples of how scattered price-gap estimates can be in practice.

Table 5. 2 Price-gap calculations compared: EU bananas

	Raboy			Borrel-	
	(a)	(b)	(c)	Bauer	NERA
Internal price	631	631	631	624	521
External price	563	627	579	560	262
Price gap	68	4	52	64	259

Sources: Borrel and Bauer (2004), NERA Economic Consulting and Oxford Policy Management (2004) and Raboy (2004) Note: All prices are in current euros.

The price-wedge method suffers from other drawbacks. First, in the presence of several different NTMs it only provides an aggregate measure of their effects but does not allow assessment of the respective contributions of each of the NTMs. Second, quality differences would need to be taken into account but they are hard to quantify. Various extensions of the price-gap approach to calculating tariff-equivalent estimates of NTMs have been proposed in the literature. Some account explicitly for commodity heterogeneity and perceived quality of substitutes and/or trading costs.[79] These extensions sometimes require the use of econometric techniques.

Inventory-based frequency measures

Frequency or coverage ratios provide a simple but crude way of assessing the importance of NTMs in a country's trade, based on inventories of NTMs. Frequency ratios are calculated as the share of tariff lines in a certain product category subject to selected NTMs. Similarly, coverage ratios are calculated as the share of imports of a certain category of products subject to NTMs.

Table 5.3 shows an illustrative calculation. Suppose that in HS 87 (transportation equipment), the home country has NTMs in place in HS four-digit categories 8703 (passenger cars) and 8711 (motorcycles) in order to protect a domestic car and motorbike assembly industry. The first step in calculating the automobile sector's coverage ratio consists in 'marking HS four-digit categories with a binary variable equal to one for those categories (8703 and 8711) that have NTMs and zero otherwise. The second step consists of multiplying this binary variable by the import share of each category and taking the sum. This gives a

[78]Under Annex V of the WTO's Agricultural Agreement, external and internal prices are to be calculated as follows: "External prices shall be, in general, actual average CIF unit values for the importing country. Where average CIF unit values are not available or appropriate, external prices shall be either appropriate average CIF unit values of a near country; or estimated from average FOB unit values of (an) appropriate major exporter(s) adjusted by adding an estimate of insurance, freight and other relevant costs to the importing country. [...] The internal price shall generally be a representative wholesale price ruling in the domestic market or an estimate of that price where adequate data are not available." (Guidelines for the Calculation of Tariff Equivalents for the Specific Purpose Specified in Paragraphs 6 and 10 of this Annex, Annex 5, WTO Agriculture Agreement, p. 71.)

[79]See Ferrantino (2006) and Yue et al. (2006).

coverage ratio of 32.35% in this example (31.28% + 1.07%).[80] The same calculation can be carried out for a country's entire trade, producing a summary measure of the incidence of NTMs.

However, assessing the effect of NTMs this way is crude because it does not take into account the measures' stiffness. That is, an NTM that barely reduces trade volumes is treated in the same way as one that reduces them drastically (by the nature of the binary coding). Worse, the end-result is subject to the same bias as that shown for average tariffs. That is, a prohibitive quota reducing imports of a certain category of goods to a very low level mechanically reduces the category's share in total imports, resulting in a low coverage ratio. As for frequency indexes, they would give the same weight to products that are not imported and to products that are imported in large amounts. A third

Table 5.3 Coverage ratio: illustrative calculation

HS code	Import value (US$ 1,000)	Import share (%)	NTM	Description
87	58,827,533			Vehicles other than railway or tramway rolling stock
8701	1,975,665	3.36	0	Tractors (other than tractors of heading 87.09)
8702	264,003	0.45	0	Motor vehicles for the transport of ten or more persons, including the driver . . .
8703	18,400,000	31.28	1	Motor cars and other motor vehicles principally designed for the transport . . .
8704	5,658,077	9.62	0	Motor vehicles for the transport of goods
8705	418,058	0.71	0	Special purpose motor vehicles, other than those principally designed for t . . .
8706	435,047	0.74	0	Chassis fitted with engines, for the motor vehicles of headings 87.01 to 87 . . .
8707	172,346	0.29	0	Bodies (including cabs), for the motor vehicles of headings 87.01 to 87.05
8708	28,600,000	48.62	0	Parts and accessories of the motor vehicles of headings 87.01 to 87.05
8709	211,767	0.36	0	Works trucks, self-propelled, not fitted with lifting or handling equipment . . .
8710	622,752	1.06	0	Tanks and other armoured fighting vehicles, motorised
8711	628,913	1.07	1	Motorcycles (including mopeds) and cycles fitted with an auxiliary motor
8712	62,290	0.11	0	Bicycles and other cycles (including delivery tricycles), not motorised
8713	54,315	0.09	0	Carriages for disabled persons
8714	363,429	0.62	0	Parts and accessories of vehicles of headings 87.11 to 87.13
8715	28,653	0.05	0	Baby carriages and parts thereof
8716	932,218	1.58	0	Trailers and semi-trailers
HS 87 Cov. ratio (%)		32.35		

drawback is that NTM inventories may be incomplete and their coverage of measures may differ across measures and countries. In spite of these well-known drawbacks, coverage ratios have been widely used as summary measures of the incidence of NTMs. Frequency measures have also been used in gravity equations to identify the effects of NTMs on trade flows.

Tariff equivalent for Agricultural Products

There is another price comparison method used by Moroz and Brown broadly for agriculture products. According to them tariff equivalent to quantity restrictions is equal to

TE = Pc/Pw - (t+d+1)

Where

TE = the tariff equivalent of the quantitative restriction

Pw, Pc = world and domestic prices net of wholesale and retail trade margins

t = the tariff rate

d = the rate for international transportation including insurance

Another equation used for calculating tariff equivalent used by Moro and Brown was:

TE = APMP - APMG x (1 + t)

where

APMP = the average propensity to import by the private sector

APMG = the average propensity to import by the government

t = the tariff rate

5.2 Summary of methodologies

The Gravity Model

This method was proposed by **Veena Renjini KK** for calculating tariff equivalent of NTMs. This method estimated the trade pattern of fishery sector exports from India after NTMs, using panel data with pooled and random effects model. This method used India as an exporting country and all of EU as the importing country.

Variables used in Gravity model

Xij = f (Xi, Xj, Rij)

Xij is the column vector of the export value of commodity C from exporting country I (India) to importing country j (J = 1...32).

Xi, variables used for exporting country and Xj represents variables used for importing countries

Rij is Resistance Variable which includes two variables. First is distance between exporting and importing country and second is MRL standards in commodity C that are imposed by importing country J.

Models used

Pooled regression model

$$\ln Xij = \beta 0 + \beta 1 \ln GDPit + \beta 2 \ln GDPjt + \beta 3 \ln MRL1ijt + \beta 4jMRL2jit + \beta 4jMRL3ijt + \beta 5 \ln Dijt + Uij$$

GDPit represent GDP value of exporting country (India) at time period t

GDPjt – value of GDP of importing country j in time period t

Di reflects the presence of NTM in the tariff line item (takes value 1 or 0)

Random Effect Model

$$\ln Xij = \beta 0 + \beta 1 \ln GDPit + \beta 2 \ln GDPjt + \beta 3 \ln MRL1ijt + \beta 4jMRL2ijt + \beta 4jMRL3ijt + \beta 5 \ln Dijt + \alpha i + Vit$$

where αi and Vit are random effects.

These models show how exports of India to a particular country change when there is a change in independent factors and a given NTM is used. They also discussed that before using any method it is important to check which method is suitable using Hausman or Breusch-Pagan test.[81]

Gravity-based estimation methods have mostly followed Kee, Nicita and Olleraga (2009). These

[81] http://support.sas.com/documentation/cdl/en/etsug/60372/HTML/default/viewer.htm#etsug_panel_sect041.htm

methods estimate ad valorem equivalent of trade restrictiveness as a whole based on the gravity equation. These values are then used as the base NTM data in the CGE model and data, and shocked for their changes as if they were tariffs. However, there is a limitation to treating them as tariffs, as they would be assigned revenue changes that are not practical. Therefore, to avoid this issue, several CGE papers have employed a non-tariff barrier variable; for example, in GTAP, the variable named 'ams' captures the effect of an unknown policy on prices, without any revenue implication. This is technically labelled as import-augmented technological change. Shocking it results in reduced or increased sourcing of imports from a particular exporter vis-à-vis the others.

Recent econometric approaches to estimating NTM effects are either price-based or quantity based. Price-based methods examine international price differences and assess the extent to which NTMs cause certain domestic prices to be higher than they would be in their absence.[82] They extend the intuition behind the price-gap method to many countries and products simultaneously (Ferrantino, 2006). By contrast, Quantity-based methods are gravity-based most of the time, i.e. they use some form of the gravity model. The decision to use a price or quantity-based method is often based on the availability of data. As data on trade flows is abundant even at a highly disaggregated level, while price data is more problematic, quantity analysis is often preferred to price analysis. This study has also used a variant of quantity analysis.

5.3 Literature survey of trade effects of NTMs

The earlier literature on measuring impacts of NTMs measures the effect of quotas on trade flows. A panel-based framework was used to estimate the export tax equivalent (ETE) of quotas.[83] This research examined how the textile and clothing sectors evolved in terms of market access conditions as ETEs vary over time. A panel of bilateral data on clothing and textile trade, country-pair coverage of quotas and the underlying bilateral tariffs were used in this framework. The results revealed that exports were shifted between binding and non-binding quotas. Hence trade effects of quotas were found to be at best ambiguous.

The price impact of quotas and their discrete changes were influenced by many other factors such as exchange rates. Hence isolating the effects of quotas on prices from those of a volatile exchange rate was a challenge. However the methodology does allow the estimation of elasticities that take account of quota-constrained trade in the sample.

Ideally, through the methodology above, reliable information should be obtained through quotas to quantify the impact on imports. However, getting access to data at the sector or industry level was complicated. Due to missing values, estimates of the trade impact of NTMs could have a strong downward bias.

Further, the effect of NTBs on trade can be derived from quantity-impact measures, but difficulties could arise in obtaining the appropriate data as in the case of price comparison measures. Thus, in obtaining the correct information on data, identification of the traded quantity before introducing NTMs is important and time-series analysis can be put to use with the adoption of a range of hypotheses that are relevant to producers' and consumers' behaviour. This will result in measures that are NTM-specific.

Another study by UNCTAD used the inventory approach to NTMs which is based on the UNCTAD Database on Trade Control Measures.[84] This approach carefully registered the estimate of the depth of trade that is covered by the NTMs or their frequency of applications against individual or

[82] See for example Dean et al. (2005).
[83] Francois & Woerz, 2009
[84] UNCTAD, 2005

groups of countries or specific sectors. Information is mainly derived from the government publications or the WTO notifications. Although this database is useful, it has its own limitations but trade coverage and frequency coverage ratios can be used in a gravity model for quantifying NTMs. This report has used coverage ratios in a CGE framework to derive trade effects.

Cross-country or cross-commodity regression analysis can be used for modelling the quantity effects of trade measures or for deriving a price effect[85]. However, care must be taken while modelling as the endogeneity of NTMs could restrict imports and they could be imposed due to political pressures.

Several studies have used the CGE approach for studying agreements such as TPP[86], TTIP[87], other EU FTAs[88], etc. Literature on time as a barrier to trade has focused specifically on the time sensitivity of trade flows that may be part of trade barriers particularly related to procedures, rules, infrastructure etc.; however, these may not be explicitly related to policy-based NTMs. There have been some further improvements in this method, such as the gravity redux method[89], which can determine the trade costs based on the information on Armington elasticities of substitution between domestic products and imports, trade and domestic consumption, by understanding the behaviour of countries to source from different countries relative to domestic demand.[90] The results from these studies also show ambiguous effects of NTMs on trade.

The second strand of literature concerns structural methods of handling NTMs. For example, a study conducted an analysis of Intellectual Property regulations and environmental/labour standards in TPP showed a structural increase in capital and labour costs due to compliance with these standards. However this increase in costs was accompanied by increased access to markets in the developed countries due to improved standards.[91] Another study employed a rigorous micro-level sector-focused analysis of costs of effluent treatment in the textile industry to come up with the trade costs of environmental standards in that sector for India.[92] A similar method focusing on child labour bans that may act as labour standard was conducted using a comprehensive dataset on child labour split from unskilled labour, and then using their productivity-wage differentials from adults from several ILO studies and reports. This paper also leveraged the Willingness to Pay method[93], incorporating changes in consumers' willingness to pay or preference parameters, to capture the changed preference for one exporter over the other. The results in this case also showed increased costs of compliance but also increased exports. The choice of method used for calculating NTMs has a bearing on the results, while the Willingness to Pay method behaves similar to the tariff shock method and the exporters' production costs method is similar to the 'ams' method, in the short run. However, the dynamic long run effects are very different across methods. A new methodology was developed for adjusting the exporters' production costs directly.[94]

[85]Leamer and Stern, 1970
[86]Petri and Plummer, 2012
[87]Egger et al, 2015
[88]Francois et al 2012
[89]Novy, 2013
[90]This has been used in studies such as Narayanan et al (2017) and APTIR 2017.
[91]Narayanan et al (2016)
[92]Narayanan (2018)
[93]Developed by Walmsley and Minor (2015)
[94]Walmsley and Strutt (2018)

Rules of Origin (ROO) effects, including the costs of utilising preferences, are now routinely incorporated in CGE modelling studies, but the translation of specific formulations of these rules into quantifiable impacts on trade is still largely a matter of 'guesstimation'. The effect on tradability of inputs due to ROO regionalisation escapes workable treatment. However, some studies employ a rich data set on re-exports from Dubai to understand the[95] substitution between domestic use and re-exports, from the imports coming into the economy. Others have employed rich datasets on utilisation of preferences to capture the tariff equivalent of compliance measures needed for utilising preferences. In other words, these methods require novel and rich datasets for rigorous analysis.[96]

In general, literature on the trade impacts of NTMs using the Gravity Model analysis is ambiguous. The methodology, direction of trade flows, type of industries and the nature of standards affect the magnitude of effects.[97] Some studies find that standards significantly restrict trade for middle-income and low-income nations.[98] Others suggest that international standards or their harmonisation may have either a positive or an insignificant trade impact on developing countries.[99] For example one set of literature shows that harmonisation of international standards may expand trade for developing countries, while others show that harmonisation of regional standards impedes trade for some countries.[100] Another set of studies show that heterogeneity in various regulations and food safety standards may not have any impact on trade.[101]

To reflect modern trade theory and to capture the effect of competition aspects of trade agreements, a rapidly growing number of models introduce firm-level heterogeneity and ways to capture the pro-competitive effect of firm entry into trade. However, capturing the role of quality in affecting substitutability of imports across alternative sources is at an early stage of development.[102]

In short, the first strand of literature provides a generic way to model the NTMs in a CGE framework, while the second strand provides specific ways to model different types of NTMs, as well as more rigorous methodologies to represent them. While it appears that the second strand is a clear winner in terms of the chosen methodology to model NTMs, it also requires a lot of information. The first strand is easier in terms of computation, since the datasets on NTMs are either readily available[103] or easy to compute.[104] Since none of the methods have been validated to be more accurate than others, this paper has used the second strand to measure the impact of NTMs.

5.4 Impact of NTMs on trade from India

Economy wide effects of Trade defence measures (TDMs)

Getting economy-wide effects of the impact of all NTMs is a very difficult exercise. However using the coverage ratio approach as outlined above (See Annex 2 for details of coverage ratio) an attempt was made to estimate the overall effects of NTMs. This approach has several limitations, but it does indicate that some effects of NTMs may be netted out through the input-output structures of an

[95]Narayanan and Mahate (2014)
[96]Mimouni et al (2015) as well as Norberg et al (2018)
[97]Li and Beghin, 2012
[98]Anders and Caswell, 2009; Hoekman and Nicita, 2011; Tran et al., 2012; Wilson et al., 2003b
[99]Fontagne et al. 2005; Czubala et al., 2009; Xiong and Beghin; 2012, Chevassus-Lozza et al., 2008 and Henry de Frahan and Vancauteren, 2006
[100]Disdier et al.(2014)
[101]Winchester et al. 2012
[102]Akgul et al 2016.
[103]Akgul et al 2016.
[104]Novy 2013

economy. Thus for example, an anti-dumping duty on steel in the US markets may depress the price of steel in domestic Indian markets affecting the price of tractors as well as transport, thus causing food prices to fall. This may in turn increase exports of food thus netting out some of the reduction in export earnings through decreased exports of steel. This is the approach taken in a CGE analysis for this chapter. (See Annex 2 for details of the CGE approach).

While there are some methodological limitations for converting SPS and TBT-related NTMs to tariff equivalents to determine their trade effects, it is relatively easier to estimate the trade effects of trade defence measures. These include anti-dumping, countervailing measures, safeguards and other such measures. Only some of India's exports have been subject to these measures in 2017. The effects of these measures were estimated with an input-output model through a CGE analysis. Using a CGE analysis with the GTAP database showed the following results:

Table 5.4

Exports: -0.01%
Imports: -0.2%
Employment: -0.05%
GDP: -0.02%
Output:-0.03%

While these percentages appear small it works out to astronomical numbers when it is translated to dollars and cents. For example this small loss in GDP would result in a loss of 36 billion USD and exports would fall by nearly 3 billion USD. What is even more interesting is that imports fall by a larger percentage than exports because of the trade defence measure. The reason for it could be because the import content of exported products subject to trade defence measures are high. Indeed the major products subject to trade defence measures are paper, steel, chemicals and textiles. For all these products the import content of exports is upwards of 20%.[105] Hence before imposing anti-dumping duties or other measures any country should take into account the import content of the product as its exports may also be hurt.

The positive effects of removing trade defence measures would be stronger than the negative effects of imposing them. The following results were obtained through the same CGE analysis. Thus there is a two-pronged approach to estimating the effects of trade defence measures. One that it depresses present trade and second, that through input output linkages it has a chilling effect on future trade. Table 5.5 shows the effects on the Indian economy when trade defence measures are revoked.

Table 5.5

Exports: 0.041%
Imports: 0.035%
Employment: 0.12%
GDP: 0.04%
Output: 0.05%

Sectoral Effects of Trade Defence Measures

The list of quantifiable NTMs include trade defence measures and have been obtained from the literature survey, the MoC reports and the survey reports. These have been summarized in Annex 3.

While all measures were not included in the CGE modelling exercise, only anti-dumping and tariff-related measures were simulated. The measures that were investigated had been imposed in 2017 and hence trade figures for 2017 also were relevant. As the incidence of these measures have been decreasing, their trade effects were also not found to be very high, as shown above. The sectoral effects were, however, marked and significant.

[105] Icrier study

While effects of SPS and TBT measures are largely localised to the sectors on which they are imposed, the impact of trade defence measures (TDMs) are felt in several allied sectors. Using the TDMs as tariff shocks it was found that anti-dumping duties on steel for example, has an export depressing effect on other products such as textiles, petroleum, coal, leather products, chemicals and many other allied sectors through backward and forward linkages.

There were multiple sectors included in the AD and CVD documents. However in 2017 there were only four TDMs on India's exports of steel, chemicals and textiles. The effects were modelled by shocking the corresponding GTAP sectors for the different countries which imposed these measures, combined with their coverage ratios. The sectors in the documents are defined at HS-6 digit level, for which the data was procured from UN COMTRADE. Then, their shares in the corresponding GTAP sectors are computed, using the attached mapping (See Annex 3), which was downloaded from the GTAP website. The initial tariffs for these sectors were also downloaded from UN COMTRADE, and then the shocks to reach these final levels were computed, finally the shocks were multiplied by the shares of these sectors in their corresponding GTAP sectors.

Table 5.6 shows the decrease in exports which are likely from TDMs in key sectors such as steel, chemicals and textiles. It is important to note that the most affected sectors would be chemicals, other manufactures and even business services when an anti-dumping duty is imposed on steel. Similar linkages can be seen in the steel and textiles sector.

Table 5.6: Export effects of Anti-dumping duties on steel, chemicals and textiles (mn USD)

Category	Steel	Chemicals	Textile
Textiles	87	40	-108
Wearing apparel	81	37	10
Leather products	0	14	0
Petroleum, coal products	35	15	5
Chemical, rubber, plastic products	157	-567	13
Iron and steel	-1296	16	4
Metals nec	54	21	5
Motor vehicles and parts	47	20	0
Transport equipment nec	50	22	4
Machinery and equipment nec	92	39	9
Manufactures nec	131	59	11
Business services nec	222	97	21

Source: Modelling results

While there is a substantial decline in exports of steel, chemicals and textiles to the tune of 11%, 9% and 5%, the other sectors experience a slight increase in exports. This is explained by the fact than anti-dumping duties often depress prices in the exporting economy so that all allied products become cheaper to export. Hence backward-forward linkages with these base sectors may increase exports of other sectors though overall export earnings may decline. However, output, investment and employment in the sectors affected by NTMs is shown in Table 5.7 below.

Table 5.7: Output, Employment and Investment effects of TDM

Category		Steel	Chemical	Textiles
Output	Mn USD change	-1390	-650	-125
Investment	Mn USD change	-459.08	-227.934	-44.2141
Employment	Million of Jobs	11.8	-6.27	-1.6772

Source: Modelling results

While trade effects are important, even more striking are the output, investment and employment effects in these core sectors. Output decreases are greater than trade and investment declines are roughly 25% to a third of output decline. This shows that the investment multipliers of these sectors are very high. Employment decline is higher in sectors which have the maximum number of TDMs, steel in this case. Textiles which is mostly informal would experience a decline of nearly 16 lakh workers which is a lot for an industry where a number of workers live just on the brink of poverty. Hence the direct and indirect effects of TDMs can be severe.

Measuring the impact of SPS and TBT through coverage ratio approach

Given the paucity of data the method used in this report is a rough and ready measure using the coverage ratio approach (See Section 1). Table 5.8 below shows that almost 70% of India's major exports are affected by NTMs. In fact the products analysed below are all those with a coverage ratio of NTMs above 15%. In addition they constitute roughly 80% of Indian exports. Table 5.8 covers the top 32 exports from India at the HS4 digit level in descending order of magnitude of export value. The knowledge on NTMs imposed as stated earlier has been derived through 3 sources (1) Those that are reported in the literature (2) those that are reported by the Export Promotion Councils (3) those that have been obtained through the survey conducted for this study.

Gems and jewellery, accounting for 17% of India's total exports, has a relatively low coverage ratio. This implies that 31% of the exports in this category are subject to NTMs. While the coverage ratio of products in the second category too, i.e. nuclear reactors etc., accounting for nearly 16% of Indian exports is not high, these products are in the high value added category and hence NTMs could have a significant impact. In fact, some products such as turbo jets which face NTMs are one of the dynamic sectors of Indian exports. Hence it is important to address these NTMs as they affect a growing and dynamic export sector.

Table 5.8 shows the high coverage ratio of NTMs in this important sector of Indian exports. Chemicals in Table 5.8 cover Chapters 29, 32 and 38. Together they account for roughly 12% of the total value of exports from India. Organic chemicals exports showed the most dynamic growth at the turn of this decade with declining exports after 2013. India is the 11th largest exporter of organic chemicals and occupies 2.8% of global markets. Most of its competitors are developed countries, though China and Singapore have emerged as major exporters in the past decade. India's organic chemicals had seen a large inflow of Foreign Direct Investment at the turn of this decade and a fair volume of its trade is intra-firm. Hence the high coverage ratio shown by Table 5.7 appears counter-intuitive. However, trade in organic chemicals has been declining and India's primary trading partners are now developing countries. As far as miscellaneous chemicals and tanning and dyeing extracts are concerned, the coverage ratio is also very high at over 70%. It is important to address these NTMs which are mostly standards-related as they not only affect this sector but also allied exports of agricultural goods, textiles and clothing and leather and footwear.

Table 5.8 shows that textiles and clothing have a very high coverage ratio for NTMS averaging at over 85%. This includes chapters 52, 53, 62 and 63 at the HS4 level. This sector accounts for nearly 12% of India's total value of exports. It is a large employment generator and after agriculture employs the largest number of people in the Indian economy. Given the employment sensitivity of this industry it is urgent to form forums for discussion on NTMs with India's major markets. While the textiles and garment sector is largely informal, it operates with a system of merchant exporters who are extremely sensitive to market changes as well as NTMs. Hence merchant

exporters especially in garments form the backbone of this industry and should be sensitised to the existing and emerging NTMs in this industry.

As can be observed from Table 5.8, pharmaceuticals from Chapter 30 have a very high coverage ratio of over 92%. This sector accounts for over 5% of the value of India's total value of exports. In this Chapter one single product namely generics, accounts for nearly 92% of the total exports and is subject to the highest number of NTMs. These NTMs as stated in earlier chapters relate to patents, transit conditions of products through Europe to Africa and REACH regulations which in its implementation is discriminatory against India. The China-US trade war offers an opportunity to export both to the US and to China.

India is also hoping to be among the top three pharma exporters in the world which makes it even more urgent to address NTMs. Most of the NTMs in the iron and steel sector (accounting for 5% of India's total exported value) have taken the form of trade defence measures such as anti-dumping and safeguards. Hence there is an immediate chilling effect on trade. The NTMs in this sector are related to global over-capacity and hence falling prices. The domestic steel industry has been supported by the government and India is emerging as one of leading players in this sector. However a move to reduce trade defence measures in this sector is required.

Exports of electrical machinery, accounting for 5% of total exports has been increasing in recent years. It is the most traded product globally, testifying to the potential for increase in India's exports. With improving stability of power supply in India, the prospects for trade increase are very high. The government of India has delicensed this industry and allowed 100% FDI units thus improving the investment climate. This industry is thus poised for growth and tackling NTMs has become a priority. This is also one of the dynamic sectors of the Indian economy.

The high NTM coverage ratio in the cereals sector is almost entirely accounted for by rice which forms a large portion of exports in this category. The major NTMs imposed on rice come in the SPS category and relate to MRLs. Exporters claim that the science behind these standards may be rigorous but there is no application of risk assessment or the concept of proportionality. NTM discussions with India's major trading partners should focus on the balance between the precautionary principle and proportionality.

Table 5.8 shows a high coverage ratio of fish and crustaceans. In this category the major export products are shrimps and prawns. For the past twenty years this category of exports has been subject to some form of SPS measures. In fact the most stringent standards are in the European Union and these measures have proven to be a moving goal post for Indian exporters. This sector became a dynamic sector of export only by 2010 when aquaculture was introduced in Indian shrimp production. It is now the largest exporter to the US and among the top exporters to the EU. It is urgent to hold regular discussions on NTMs in this sector as exports get rejected and companies get delisted from exporting. It takes over two years to get companies relisted and the dampening effect on exports is fairly severe. In this sector too discussions should focus on the concept of balance between precaution and the principle of proportionality with a strong accent on risk assessment techniques.

The plastics sector is also one of the dynamic sectors of Indian exports. Its NTMs have primarily been the use of trade defence measures especially countervailing duties and safeguard measures. Exports in recent years has been boosted by higher shipment of plastic raw materials and value-added plastic products including woven sacks, plastic sheets, films, plates, optical items, laminates, packaging items and medical disposables to the European Union, North America, Latin America and

Table 5.8: Coverage ratio of NTMs in different Export Categories

Product Code	Description	Export	Coverage ratio
71	Natural or cultured pearls, precious or semi-	41165029	31
84	Nuclear reactors, boilers, machinery ...	16633523	13
87	Vehicles other than railway or tramway rolling....	16206133	79
29	Organic chemicals	13556922	63
30	Pharmaceutical products	12884848	92
72	Iron and steel	11708857	78
62	Articles of apparel and clothing accessories, ...	8997092	91
85	Electrical machinery and equipment and parts....	8793821	42
61	Articles of apparel and clothing accessories,....	8347737	67
10	Cereals	7334876	96
52	Cotton	6917321	93
3	Fish and crustaceans, molluscs	6646894	86
39	Plastics and articles thereof	5921437	76
63	Other made up textile articles; sets;	4960897	92
2	Meat and edible meat offal	4308317	96
38	Miscellaneous chemical products	3710045	72
9	Coffee, tea, mate and spices	3321743	94
40	Rubber and articles thereof	2845315	74
32	Tanning or dyeing extracts; tannins and their....	2783207	85

Source: Based on data from the MOC

Caribbean and North-East Asia, according to the Council. The US, China and UAE were the top three destinations for India's plastic products during FY18. These three countries accounted for 25.7% of India's plastic product exports by value. It is therefore important to address the NTMs in this sector as future exports will depend on them.

Table 5.8 shows that the NTM coverage ratio of meat exports is very high from India. Most standards relate to SPS measures. As in the case of fish and crustaceans, antibiotic residues are a cause for major concern in export markets. The rearing conditions of meat in India are very different from its major markets and hence process related standards would be a major problem for Indian exports. Some form of equivalence of rearing conditions should be negotiated so that meat exports are not hindered.

Table 5.8 shows a very high coverage ratio for the category of products covering tea, coffee and spices. Exports of coffee, tea, mate and spices in India averaged 1391.93 million USD from 1996 until 2016, reaching an all-time high of 3063.00 million USD in 2011 and a record low of 541.81 million USD in 2016. While exports in 2017-2018 have been higher, it has not reached the level of 2011 yet. Recent studies have found that in the case of India and China, differences in MRLs arising from the stricter standards in importing countries, lead to a significant decrease in tea trade value. This negative impact of differences in MRLs is found to be slightly less than that of

tariffs, implying that in this case, the NTM acts as a policy substitute for import tariffs in the global tea trade.[106]

Table 5.8 shows a high NTM coverage ratio for rubber articles of which the major product exported is rubber tyres. Globally this industry is upgrading with concepts like green tyres, labelling of energy efficiency standards, fuel efficiency etc. This implies that exports have to be re-engineered to meet changing global demands and the number of NTMs in this industry are therefore on the rise.

Using CGE to Estimate Trade Effects of NTMs

Using the coverage ratios, an ad valorem tariff equivalent was obtained from the GTAP CGE model. The coverage ratio shows the extent of exports under each product category that were affected by NTMs. Using the assumption that in the limit the standard would result in exports of that product going down to 0 as has been shown by the rejection rate of several products above, the model endogenously arrived at the tariff equivalents. Thus exported quantity was an exogenous variable and tariff is treated as an endogenous variable. A complete description of the GTAP model and its assumptions are provided in the Annex 2 of this report. Using these assumptions the tariff equivalents of the sectors that are subject to the maximum number of SPS and TBT measures in international markets are summarised below in Table 5.9.

As can be observed from Table 5.9, the tariff equivalent of SPS and TBT standards are highest in marine products, food products and meat. This is completely consistent with survey findings and those from industry associations as the maximum number of SPS standards are imposed on these categories of products. The second highest AVEs are to be found in the textiles sector again in keeping with the perceptions of the industry as shown in Chapter 4. Chemicals, metal products and pigments also show very high tariff equivalents. The lowest tariff equivalents are for gems and jewellery and

Table 5.9: Tariff Equivalent of Selected Products in India's Major Markets

AVE	USA	Canada	Mexico	East Asia	S E Asia
Rice	40	40	40	40	40
Fisheries	82	81	82	82	82
Cattle Meat	47	47	47	47	54
Food Products	68	68	67	67	68
Textiles	47	47	47	47	47
Apparel	27	27	27	27	27
Pigments	40	40	40	41	40
Chemicals, Rubber and Plastics	30	30	30	29	30
Iron and steel	35	35	35	35	35
Metal products	51	51	51	51	51
Autos	37	37	37	37	37
Electronic Equipment	16	16	16	16	16
Machinery	12	12	12	12	12
Jewels	12	12	12	12	12

[106]Chae Won Hwang, (Samsung Economic Research Institute, Seoul, South Korea), 2017, Effect of non-tariff measures on international tea trades, www.emeraldinsight.com/doi/abs/10.1108/JKT-05-2017-0054?fullSc=1&journalCode=jkt

AVE	South Asia	Latin America	EU_28	Oman	MENA	SSA	R.O.W
Rice	43	40	40	40	40	40	40
Fisheries	90	82	82	82	82	82	81
Cattle Meat	49	47	47	49	49	48	47
Food Products	68	67	67	68	67	67	67
Textiles	48	47	47	48	47	47	47
Apparel	27	27	27	31	27	27	27
Pigments	41	40	40	40	40	40	40
Chemicals, Rubber and Plastics	31	30	30	29	30	30	30
Iron and steel	37	35	35	35	35	35	35
Metal products	51	51	51	51	51	51	51
Autos	39	37	37	37	37	38	37
Electronic Equipment	16	16	16	15	16	16	16
Machinery	12	12	12	12	12	12	12
Jewels	12	12	12	12	12	12	12

engineering products which mostly consists of machinery. As these are two high ticket exports from India it is heartening to note that at least a third of India's exports have a lower incidence of NTMs. By contrast over two thirds of India's exports are subject to NTMs with high AVEs.

Using these AVEs the impact on India's major exports using the CGE model was found to be as follows:

Table 5.10: Export Effects of SPS and TBT Measures

Category	Pre tbtspsv1	Post tbtspsv1	Ch tbtspsv1	%Ch tbtspsv1
Rice	82	3	-79	-96
Fisheries	441	62	-379	-86
Cattle Meat	4957	198	-4759	-96
Food Products	10136	608	-9528	-94
Textiles	19271	771	-18500	-96
Apparel	16284	5374	-10910	-67
Pigments	1445	217	-1228	-85
Chemicals, Rubber and Plastics	44792	11198	-33594	-75
Iron and steel	12031	2647	-9384	-78
Metal products	6188	124	-6064	-98
Autos	13161	2764	-10397	-79
Electronic Equipment	4943	2867	-2076	-42
Machinery	18485	16082	-2403	-13
Jewels	27941	26544	-1397	-5

While the first five categories of exports with the highest AVEs show naturally the highest declines in exports, the surprising categories are metal products and pigments. This can be partly reasoned by the fact that these are highly competitive products with a very high elasticity of demand. Hence relatively small changes in tariffs have significant trade effects. The same reasoning applies to chemicals, iron and steel and autos. As expected the highest fall in exports due to SPS/TBT standards are in food products, especially marine products.

Conclusion

While theoretically it is easy to justify the different methodologies used for estimating the trade effects of NTMs, the volume of data required to estimate them is enormous. Generally studies have used the Gravity Model where dummies are used to signal the presence or absence of an NTM. While the literature survey shows ambiguous trade effects of NTMs, this study shows definite negative effects of NTMs. This is partly because the existing methodologies have been refined and a combination of techniques has been used for the estimation of trade and other macroeconomic effects.

While overall effects of NTMs on the Indian economy are relatively low and negative, removing them results in a larger gain. Hence the effects of imposing NTMs are to be measured against the counterfactual, i.e. the gains that would result from removing NTMs rather than just the costs of imposing them.

The negative effects of NTMs are from two different categories of NTMs. The magnitude of trade and other macroeconomic effects depends on the kind of NTM imposed. This study has disaggregated the effects of the two different kinds of NTMs, i.e. TDMs and SPS/TBT measures. It has then used a combination of coverage ratio and CGE modelling to estimate trade effects. It was found that TDMs have a less severe localised effect, but its effects are widespread in the sense they cover allied sectors and not just the sector covered by the TDM. In the case of SPS/TBT measures, their effects are severe for the sectors covered but do not necessarily spill to other sectors.

This chapter shows that nearly 70% of India's exports have a coverage ratio of NTMs well above 70%. This reflects the fact that Indian exports are very vulnerable to NTMs of various kinds. Earlier it was thought that about 50% of Indian exports were subject to NTMs. However by disaggregating the data to product categories and determining the coverage ratio, it can now be established that 80% of Indian exports have to encounter some NTM.

In TDMs as duties are imposed, converting them to tariffs was a straightforward arithmetic exercise. These tariffs were then used as shocks in a CGE model which used the GTAP database and input output linkages. The results showed a decline in exports, output and employment to the tune of 5-11% depending on the value of duty imposed. The exports of other allied products may increase due to price changes in the domestic market of the exporter. However output, investment and employment effects on the affected sectors are negative and by far outweigh the positive trade effects on allied industries.

The effects of TBT/SPS, especially SPS related NTMs are very different. They may be localised in the sense that the NTMs may not affect prices of other allied products, but their depressing effects on exports are very severe. For example in food and seafood products, NTMs related to SPS can practically bring exports down to 0 or in any case very low levels. This shows that SPS measures can lead and has in the past led to complete rejection of consignments. In addition the price margins are so low for many of the products affected by SPS measures that any slight increase in compliance costs can put a product out of the market. Hence it is important to make a concerted effort to address these measures through domestic, bilateral and multilateral discussions and solutions.

Conclusions

Information on NTMs faced by Indian exporters is not easily available in any single place, nor is it systematically organised for analysts and policy makers. The limited available literature shows that both SPS and TBT measures have been extensively imposed on Indian exports, and that the most serious impact has taken place through food-related NTMs. While major trading partners such as the EU and US have used NTMs more exhaustively, other partners such as Japan, and even developing countries are now using NTMS which in effect turn out to be trade barriers.

One issue which emerges from the literature review and primary evidence is the changing landscape with respect to food standards. The overlap between health protection and trade protectionism needs to be closely examined, especially with an increasing use of the precautionary principle. In the absence of scientific evidence countries may err on the side of caution and thus create barriers to market access. As in the past with tariffs where the system created vested interest groups that pressed for maintaining their privileged position in the market, the technology-based NTM creates its own momentum for a new set of vested interest groups, companies and laboratories.

Further, once market access is blocked due to NTMs, remedying the situation and attaining the possibility of getting market access is a very time-consuming, costly and effort-intensive process. It takes much longer to resume a market for a firm once it is blocked from that market, having faced NTMs. The many pending requests from India to several countries to perform Pest Risk Analyses (PRAs) for enabling market access to several agricultural products, is an example of these types of problems.

This report also shows several instances of NTMs, which in their formation or implementation, may be discriminatory. Such evidence provides an understanding of the protectionist nature of NTMs and situations where NTMs can turn into NTBs.

Another feature of the growth in global trade is the emergence of new trade partners, many from the developing world. Moreover, these new significant markets include those which have their own languages other than English. This expansion of markets benefits the exporters but also adds to complication by posing new NTMs. To achieve market access in these markets, policy makers and businesses require skills relating to knowledge of additional languages, social and ethical norms, consumer behaviour, business practices, besides the new regulatory environment. While these may be acquired with time, keeping up to date with regulations in multiple languages creates additional difficulties. This has happened, for example, as existing regulations with large and burdensome impact (such as REACH) may be replicated in these new markets. These developments clarify that the need to build capacity to meet NTMs and deal with them at the policy level is not only essential, but that its nature and content will keep evolving over time.

The Indian Government and industry have raised these concerns and other trade-related issues, bilaterally and multilaterally with India's trading partners, but many remain unresolved. In several cases however, progress has been made and solutions have emerged.

Tariffs

Both tariffs and NTMs are instruments of protection used by countries to limit imports of particular products. Indian exports face both these kinds of trade restrictions. Tariffs need to be reduced both in terms of tariff peaks and average tariff levels. In general, high tariffs are imposed by developing countries while high NTMs are evident in the trade policies of developed economies. Neither kind of trade barrier can be ignored, especially because a substantial number of India's exports still face high tariffs or tariff peaks.

India's utilisation of PTA and FTA tariffs is very low. Some of this could be due to relatively lower tariffs in partner markets not motivating the exporters enough to take the burden of using the FTA route for export or reasons of lack of awareness discussed elsewhere in this study. Steps should be taken to improve this utilisation. Easier procedures for obtaining Rules of Origin should be put in place. Further discussions with Customs authorities of importing countries on the low utilisation of tariff preferences should take place in a focused way. This also requires enhanced co-ordination between domestic policy makers and trade diplomats posted in these markets. It may be possible to investigate the possibility of sectoral reciprocity to ease the tariff problems faced by Indian exports. This would need to be coupled with the establishment of co-ordinated and frequently used bilateral mechanisms to address NTM-related concerns with the trade partners.

Trends in NTMs

The trend in SPS and TBT regulations is to move towards increasingly stringent requirements. These include the call for registration of export units before getting a clearance to export, seeking mandatory testing at laboratories that are located outside the country of export, using personnel from the importing country for certification, etc. While mutual recognition and accreditation agreements are few and far between, the Indian government needs to consistently work in that direction as it will help bring down costs for exporters.

There is no doubt that the small and medium-sized exporters in the country are faced with the uphill task of keeping pace with the changing regulations across markets. The use of very stringent norms that are not in line with international standards are also hurting exports. There is a need to ensure that countries work towards easing trade rather than create new barriers by imposing NTMs that discriminate against some countries vis-à-vis others. In this context it is important to bear in mind that even NTMs formulated in a non-discriminatory manner may have requirements which in effect have a differential impact on countries or exporters with lower resource, skill or information base. Those with a higher burden in effect would be the small and medium enterprises and low-income economies.

While exporters will have to keep their ears to the ground on the proposed changes it will also be important for countries to provide key details of the changes in regulations in the three official languages of the WTO so that the principle of transparency is protected.

Further, while there is a lot of difference in the conditions of production (especially for agricultural products such as fruits and vegetables) in tropical and temperate countries, the important point is to reconcile the principle of precaution with that of proportionality, i.e. assessment of the risk that non-fulfillment of the standard would create. Mechanisms should be created, or the existing mechanisms used more intensively and systematically to inform others about the NTM-related concerns, and options and solutions to these concerns. These solutions may include examples of similar practices elsewhere that are accepted in general without causing the problems faced by Indian exporters.

Results of the Primary Survey

The primary survey showed that India's exporting community is quite diversified in terms of their understanding of the international trade eco-system and their articulation also varies with the extent of the scale at which they operate. The results of the primary survey have been cross-validated with the feedback provided by Export Promotion Councils, other industry associations and large exporters, who have the capacity to understand this eco-system and better articulate their concerns. The perceptions recorded at the grassroot level impart two broad learnings. First, the average exporter is not concerned whether the hurdle to export is

coming from within the country's trade eco-system or manifested at the destination or in between. Any measure, which the exporter perceives as a hurdle in the smooth flow of his exports, has a certain cost implication which makes exports that much more expensive, and quite often the exporter might lose the market to a competitor. Second, there are some exporters, who have adapted to non-tariff measures either out of ignorance or in their entrepreneurial zeal have adapted to these measures in a business-as-usual mindset. However, a large number of exporters recognise the costly implications of such non-tariff measures and would like to see them out of the way.

As far as domestic measures are concerned, they can comprehend issues relating to Customs, logistics, infrastructure or local taxation. Their comprehension about institutional matters such as existence of trade agreements is inadequate. These issues need to be addressed at the domestic level. However, the much bigger hurdle for exports comes from the tariff and non-tariff related consequences. They need to be addressed in a far more coherent, studied, strategic and persistent manner in cooperation with trading partners and domestic industry. This study provides the information to develop such strategies, taking into account the factual information on NTMs imposed by India's main markets, and the views and perceptions of Indian exporters.

The fact that many of the exporters are relatively less informed about the institutional framework available to them for trade, is a commentary on major inadequacies in the trade policy framework. Many exporters are still not aware of the multilateral, plurilateral or bilateral institutional mechanisms available for preferential trading. Even when they may be exporting under a preferential mechanism, there is a likelihood that they may not be able to distinguish between a bilateral trade agreement and a unilateral General System of Preferences (GSP). Such businesses may experience the duty differential in an export destination with reference to similar products of another country, but they may not be familiar with the fact that there could be a preferential trading arrangement, available to exporters of the other country, which may not be available to exporters from India. These experiences establish a strong need of in-depth advocacy and extension programmes, which will include not merely awareness raising on institutional frameworks but impart more important details such as rules of origin, non-tariff measures and ways of geting around those measures. Some years ago the Department of Commerce started such programmes in a limited way with respect to popularising Preferential Trade Agreements. But that alone is not enough. The woefully low utilisation of RTAs by Indian exporters is evidence of the fact that they either do not find enough use of the FTAs for their products or feel the process of availing such preferences cumbersome or are simply not aware of such preferences. The Government has to step in to address this situation, to initiate and establish an extensive architecture for building skills and awareness among economic operators to make efficient use of international trade opportunities. To the extent that some such initiatives already exist, they must be brought together in an inter-linked way and their impact enhanced through developing synergies and by addressing the gaps.

Trade effects of NTMs

It is important to observe from the conclusions of this Report that nearly 90% of India's exports have a coverage ratio of NTMs well above 70%. This shows that Indian exports are very vulnerable to NTMs of various kinds. Earlier, it was thought that about 50% of Indian exports were subject to NTMs. However, by disaggregating the data to product categories and determining the coverage ratio, it can now be established that 90% of Indian exports have to encounter some NTM.

While theoretically it is easy to justify the different

methodologies used for estimating the trade effects of NTMs, the volume of data required to estimate trade effects is enormous. Generally, studies have used the Gravity Model where dummies are used to signal the presence or absence of an NTM. This study has gone a step further and first disaggregated the different NTMs, i.e. trade defence measures and SPS/TBT measures.

In the case of trade defence measures, as duties are imposed, converting them to tariffs was a straightforward arithmetic exercise. These tariffs were then used as shocks in a CGE model which used the GTAP database and input output linkages. The results showed a decline in exports, output and employment to the tune of 5-11% depending on the value of duty imposed. The exports of other allied products may increase due to price changes in the domestic market of the exporter. However, output, investment and employment effects on the affected sectors are negative and by far outweigh the positive trade effects on allied industries.

The effects of TBT/SPS, especially SPS-related NTMs, are very different. They may be localised in the sense that the NTMs may not affect prices of other allied products, but their depressing effects on exports are very severe. For example, in food and seafood products, NTMs related to SPS can practically bring exports down to zero or in any case very low levels. This shows that SPS measures can lead and have in the past led to complete rejection of consignments. In addition, the price margins are so low for many of the products affected by SPS measures that even a slight increase in compliance costs can put a product out of the market. Hence, it is important to make a concerted effort to address these measures through domestic, bilateral and multilateral discussions and solutions.

Recommendations

Our interaction with the stakeholder community over the past several years has shown that the recognition that NTMs cause the biggest hurdle to Indian exports is universal though a deeper understanding may vary between exporters. The government also recognises the loss of markets and export value which the country faces every year due to NTMs. But a concerted and cohesive action involving all stakeholders, informed with proper scientific understanding of the measures in question, utilising the existing institutional arrangements or creating new such arrangements is required on a long-term basis to deal with this growing crisis. India also needs to play a more active and extensive role in the international standard setting institutions with a view to influencing the process and evolving better domestic capacities. Mention must be made of the 'Standards Conclave' which the Department of Commerce institutionalised half a decade ago. This effort was mobilised primarily to set up a platform for annual discourse on standards and technical regulations with the objective of elevating these concerns to the mainstream of international trade in India. Later a regional version of the conclave was also initiated and it has been found useful in achieving the desired objectives including those of advocacy and awareness.

We propose further action as follows;

1. **Regular reports on NTMs:** During this study we have been quite convinced that this exercise needs to be conducted regularly, with a certain periodicity. Our experience of similar efforts followed by some important trade partners on a regular basis and the pace at which such measures are being adopted by trade partners on a wider basis establishes the need for regularising this study. We recommend that the report be produced every two years and we expect that as this exercise progresses, more value will be added.

2. **Build Database:** While efforts have been made in the country to create some database on NTMs our assessment is that such initiatives though laudable at their launch have not progressed

very satisfactorily. Therefore, there is need to create a strong database on NTMs. In order to do so we suggest incremental augmentation of existing efforts.

3. **Awareness and Capacity Development:** In several chapters of this study we have reported on the inadequacy of awareness of our export community about tariff and non-tariff measures. It is our assessment that the small and medium sized exporters are least informed about their trade ecosystem, as it evolves consistently. Though some efforts have been made by the government and the Export Promotion Councils, we believe that these efforts have neither been consistent nor have had enough depth. In our assessment these Councils need to do much more than what they are doing at present. We believe that without a monitored programme on capacity development, this awareness cannot be created. Hence, we strongly recommend that the Department of Commerce should build a well-thought out programme in collaboration with the DGFT and the Exim Bank to raise awareness and technical capacities of small and medium-sized exporters.

4. **Institutional Arrangements:** No country has institutionalized arrangements with all trade partners to take up issues of common interest. But it is essential to have institutionalized arrangements with at least top 20 trade partners where standing mechanisms are created and operated on a regular basis to sort out on-going issues arising from bilateral trade experiences. It is our understanding that even where such mechanisms have been created, they are not operated on a regular basis and have little effect on bilateral trade. We also believe that pursuing bilateral trade interests needs consistent efforts at the level of government agencies and the Export Promotion Councils. As far as government efforts are concerned, we feel the role of officers at the middle level in the government is akin to that of a medical representative of a pharmaceutical firm. They are expected to constantly meet the medical practitioners to market their products, similarly the officials should be regularly meeting their counterparts not merely to canvass Indian exports but also to take up non-tariff issues with them to facilitate exports by pursuing their removal, simplification and in a more institutional sense take up negotiation for Mutual Recognition Agreements, Equivalence on product standards and similar other trade facilitation initiatives. A periodicity should be built around this programme. The Export Promotion Councils take up exhibitions quite often, but they rarely pursue such issues in a Track 2 sort of format. It is advisable that in major product areas of our interest, EPCs should build platforms for exchange of information involving their counterpart importers and their organisations and seek engagements with regulators to put forward their side of the story to the regulators. In such engagements even our regulators could be asked to participate to bring in seriousness and greater technical focus. This approach brought significant gains in the pharmaceutical sector. Pharma is a regulated sector so this arrangement has been effective, but a similar approach can help in other areas such as food, agriculture, marine products, etc.

5. **Regional Trade Arrangements:** India has several Regional Trade Agreements in operation. Though we have not specifically looked at their institutional components, it is our understanding on the basis of past experience that almost all have some institutional arrangements for SPS/TBT and Customs procedure-related issues. We should critically review the availability of such arrangements and their regular operationalisation and effectiveness. Based on the critical review, the Department of

Commerce could pursue their creation, effective operationalisation and follow up. Regular meetings and effective engagements are vital for the success of these agreements. The regular utilisation of the Committee System is at the heart of any such regional trade arrangement.

6. **International Standards Setting:** India needs to increase its presence in the international standard setting processes. International standards institutions such as ISO, Codex, OIE often pose challenges which are aggravated either because of our absence in these processes or relative lack of participation in them. There may not be a direct linkage between standard setting and rise of Non-Tariff Measures, but such engagement gives greater insights, visibility and experience to our experts who can impart better understanding to stakeholders from the export eco-system so that they can face these challenges with greater familiarity. A focus on NTMs during the Standards Conclave is also required.

7. **Technical and Scientific Infrastructure:** Scientific research on standards and technical capacity for testing should be augmented. Many exporters in our survey commented on the inadequacy of our technical infrastructure. A comprehensive programme for building technical infrastructure by investing in setting up and equipping labs should be promoted. Side by side negotiations for inspection, testing and certification by third party labs should be pursued with trade partners.

8. **Focus in the WTO:** Our presence in the WTO committees on TBT and SPS has increased in the past few years. It is necessary to intensify this engagement further and engage with major trade partners by pointing out measures which have become barriers, keep scientifically examining various measures on a regular basis through domestic discussions involving scientific and sectoral experts and placing these issues on the table in the WTO. Building coalitions to broad-base the concerns with partners similarly positioned can elevate the discourse for a resolution. Where science is unclear and precaution is the basis for an NTM, India should multilaterally bring the issue of proportionality along with other trading partners.

9. **Focus on Trade effects of NTMs:** Regular data on trade effects should be collected through industry Associations and simulations should be used in discussions with trading partners.

10. **Regular Surveys:** Since we were constrained for time our survey sample was smaller than what we would have liked. But the survey did bring in some important lessons in trade governance. We therefore believe that such periodic surveys should become a regular feature of the study. This will raise awareness and capacity and also bring in elements of realism in future studies.

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Annex 1

References	Countries	Products	Types of NTMs
Prasad Dr, H.A.C; 2017	Indonesia Malaysia	Raw materials like palm oil making Indian oleo chemicals	Export tax
	EU and US	Steel and related products	Anti-dumping(AD)investigation
	Russia, Vietnam, Iraq, Pakistan, Zimbabwe, Nepal, Nigeria	Pharmaceuticals	Pharmaceuticals Inspection Co-operation Scheme (PICs) approvals
Idris, Singh and Praveen; 2015	US and EU	Horticultural exports	SPS standards(dirt, pesticide residues, microbial contamination and non-compliance of other mandatory technical parameters)
Kaul, Rohin; 2016	EU	Indian mangoes	SPS measures (infested with pests which could harm indigenous European crops)
		Eggplant, bitter gourd and snake gourd	SPS measures (infested with non-European fruit flies)
		Marine products	SPS measures(level of antibiotic residues more as compared to prescribed level)
	EU, Gulf countries, Indonesia	Meat	SPS measures (incidence of Foot and Mouth Disease in cattle)
Krishnan, Vijith K; 2016	US	Food products	Non-scientific quarantine restrictions, custom surcharges, eco labelling requirements and compliance with Sanitary and Phytosanitary (SPS) standards, stringent packing and labelling requirements.
Ajay kumar;2017	SAARC countries	Textiles and Clothing	Minimum import price, import restrictions, certification, Customs clearance and anti-dumping measures
Nedumpara, James J; 2016		Agricultural products (poultry and related products)	SPS standards: difficulties in choosing the appropriate adjudicative approach in resolving ambiguities or differing interpretations of international standards

References	Countries	Products	Types of NTMs
Kumar, Animesh and Priya, Shashank	US	Agricultural products such as pomegranates	US requires that Pest Risk Analysis (PRA) be carried out for new agricultural products before the import conditions are fulfilled
	US	Children's products i.e. shoes	Standard related issues: US requires compliance with multiple technical regulations regarding consumer protection in respect of health, safety and environment
		Handmade carpets	Third party testing requirements as per the notice of the Federal US Government, mandated by the Consumer Product Safety Commission
	US		Multiple regulators for technical regulations: Most of the States in the US have their own agencies to carry out administrative procedures regarding technical regulations and conformity assessment procedures
	US	Tea	Registration of tea consignments under FDA Rules: Registration is required under Bio Terrorism Act of US. India does not seek any relaxation of FDA rules for its tea consignments
	US		Labelling and description of product requirements: rules of origin for different purposes creates a complex trading environment for India
	US	Mangoes and eggs	Sampling and inspection procedures: Indian exports to US have encountered problems due to delays in the US customs sampling and inspection procedures, resulting in damage to the goods and subsequent commercial losses for the exporters, especially in the case of mangoes and eggs
			Cumbersome customs formalities involving administrative delays and paperwork
	US	Beverages (including wines and spirits), processed foods, dairy products , fruits and vegetables	Security risk surrounding the supply of foodstuffs which necessitates the registration of all foreign facilities that supply food to the US.

References	Countries	Products	Types of NTMs
Kumar, Animesh and Priya, Shashank	US	Automobiles	Security risk consists of introducing alien pathogens into the environment which can multiply and put the population at health risk. Requirement of Local Content: Indian trade sources have reported that the American Automobile Labelling Act promotes the use of US and Canadian parts, which makes entry of small cars made in India into the US market difficult
	US	Steel	Under US Steel Act passed in April 2008 by the Congress, steel has to be domestically produced. Market access for Indian steel exports could be impacted as a result of this Act
	US		Foreign Manufacturers Legal Accountability Act of 2013: India sought justification behind subjecting foreign nationals to domestic regulatory and product liability laws, which normally have a territorial application to the nationals of that country
	US	Iron, steel and manufactured goods	Buy American Act (Make in America: India has raised concerns with US over the fact that domestic preferences were incorporated into the US$787 billion fiscal stimulus package of early 2009, ensuring that locally made iron, steel and manufactured goods be used as construction materials in public projects funded with stimulus dollars
	US		Non-implementation of the decisions of WTO Dispute Settlement Body (DSB): India questioned US intentions to review its practice of 'zeroing in' on anti-dumping investigations in the near future
	US		Issues related to notifications in several important areas, including modifications of schedules, preferential rules of origin, quantitative restrictions and preference programmes

References	Countries	Products	Types of NTMs
Kumar, Animesh and Priya, Shashank	US	Agriculture products	State Aid and Subsidy: Dairy Export Incentive Programme (DEIP), Export Credit Guarantee Programme (GSM-102) act as barriers to exports and are not consistent with WTO provisions for India
	US	Gems & Jewellery	Denial of GSP (generalised system of preferences) benefits: Indian Gems & Jewellery do not get the benefits of GSP
		Textile and leather	SPS-TBT issues: Indian export bodies report that more stringent standards and conformity assessment procedures are acting as barriers to exports in EU. This is affecting the exports of developing countries for products like textiles, leather etc.
	EU	Leather sector products	REACH regulations: Mandatory for all chemical imports above one ton to be subject to registration, testing and certification, which leads to additional cost for the exporters
	EU	Heavy metal	Commission directive(sampling of consignments): India requested the European Commission to issue instructions to Member States that they should follow the Commission Directive 2001/22/EC of 8th March 2001 for sampling of heavy metal consignments
	EU	Frozen octopus	Market access problems for fishery products: Indian exporters have reported difficulties in export of frozen octopus because of restrictions on arsenic levels
	EU	Buffalo meat	Codex standards for food products: OIE guidelines are taken as international standards (health code, freshness of meat) for trade in animals and animal products
	EU	Egg, egg powder and other such products	Conformity assessment procedures: German Federal Ministry of Food, Agriculture and Consumer Protection may inspect Indian facilities to see if they conform to prescribed guidelines and standards

References	Countries	Products	Types of NTMs
Kumar, Animesh and Priya, Shashank	EU	Marine products	Differing standards for microbial levels: EC has initiated steps for standardise microbiological requirements within the EU
	EU	Rice, grapes, gherkins etc	Different norms for pesticide residue: Indian exporters of rice, grapes, gherkins etc., complain that different member states of the EU follow differing cut-off limits
	EU	Spices, processed food, groundnuts, cereals, etc.	Impractical approaches to product testing: The sampling procedure for testing purposes is extremely complex and expensive, which makes it technically and economically unfeasible for developing countries like India
	EU	Whiskey	Non recognition of Indian whiskey: As per the Commodity Nomenclature Code, a whisky has to be produced exclusively from cereals by distillation and matured for a period of three years
	EU	Herbal products	Scientific basis and criteria for herbal products: India had expressed concerns about the scientific basis on which such criteria had been developed and mandated by the EU
	EU	Tea	Rapid Alert System: The RAS for food and animal feed in the EU can be issued by any one country of the EU and is then automatically applicable to all other countries of EU
	EU	Chemicals	REACH regulations: Substances registered through Only Representative (OR) involves extra cost for port to EU. Indian manufacturers/ exporters are paying fees to OR
	EU		Intellectual property rights (seizure of goods): Some Indian pharmaceutical exports in transit to other countries have been seized in EU on the grounds of alleged violation of patent rights
		Cotton	Subsidy: India expressed its concern at the adverse effects of the large quantum of subsidy given by EU to the cotton sector on world cotton prices
	EU	Oxalic Acid	Other remedy actions: anti-dumping and anti-subsidy

References	Countries	Products	Types of NTMs
Kumar, Animesh and Priya, Shashank		Polyethylene terephthalate (PET)	Other remedy actions: anti-dumping and anti-subsidy
		Polyethylene terephthalate (PET)	Other remedy actions: anti-dumping and anti-subsidy
		Fatty Alcohols	Other remedy actions: anti-dumping and anti-subsidy
		Graphite Electrodes	Other remedy actions: antidumping and ant subsidy
		Graphite Electrode Systems	Other remedy actions: anti-dumping and anti-subsidy
		Synthetic Fibre Rope	Other remedy actions: anti-dumping and ant-subsidy
		Sulphanilic Acid	Other remedy actions: anti-dumping and anti-subsidy
		Stainless Steel Wires	Other remedy actions: antidumping and ant subsidy
		Glass fibres Wire Mesh	Other remedy actions: anti-dumping and anti-subsidy
		Stainless Steel Bars	Other remedy actions: anti-dumping and anti-subsidy
	EU	Tobacco	Farm subsidies on unmanufactured tobacco: It is claimed that tobacco production in EU is sustained on subsidies alone and if these are withdrawn, it might create opportunities for more exports from India
	EU	Chemicals	Mandatory standards, labelling, testing requirements: Indian exports were rejected due to improper labelling and/or presence of chemicals beyond permissible limits in Greece
	EU	Tea	Non-recognition of Indian tea testing laboratories: EU countries do not accept test reports for pesticide residue from Indian labs because such certificates have to be issued by European laboratories
		Aluminium tubes and pipes	VAT Refund in Germany: No VAT refunds are given to Indian Companies producing items such as aluminium tubes and pipes, while participating in a German fair

References	Countries	Products	Types of NTMs
Kumar, Animesh and Priya, Shashank		Pharmaceuticals	Indian pharmaceutical exporters reported that they faced barriers on account of lack of agreement on Mutual Recognition of Good Manufacturing Practices (GMP) in Germany
	EU	Live animals	Absence of Time limit for Approval: India has noted that absence of statutory time limits in giving approvals to first time imports of live animals can result in long delays, which will constitute a barrier to trade
	EU	Egg, egg powder, albumen etc.	Obstacles in accessing service markets
	EU		Different tax regimes for foreign and domestic service providers: Swedish social security taxes act as an important trade barrier, especially for Indian companies in the IT sector
	EU	Chemicals	Stockholm Convention: Indian export bodies report that Stockholm Convention is being used to impose non-tariff barriers such as product bands, phase out of import/ export restrictions
	Japan	Fruits, vegetables, Fish, meat, etc	SPS-TBT: Indian exports to Japan are affected by a number of issues, which include SPS-TBT measures and high transaction costs. The inspections conducted by the Japanese authorities with regard to the place of origin, labelling of fruits, vegetables, fish, meat, etc. is a very strong non-tariff barrier.
	Japan	Pharmaceuticals	Product registration: Indian manufacturers report difficulties in product registration in Japan largely because the guidelines are said to be available only in Japanese
	Japan	Tea, rice, wheat and agricultural and meat products	Pesticides and chemicals issues: Indian tea, rice and wheat producers say that Japan imposes very strict regulations with regard to pesticide and chemical residue on these items. Similarly, meat and meat product exports to Japan face difficulties on account of stipulations that ban use of natural and synthetic hormones in livestock production

References	Countries	Products	Types of NTMs
Kumar, Animesh and Priya, Shashank	Japan	Shrimp	Testing for pesticide residue: Japan has introduced mandatory testing for residue of the pesticide ethoxyquin in shrimp import consignments
	Japan	Land, mining, oil industry, elecommunications, and transport	Foreign Direct Investment and other regulatory restrictions: Under the Foreign Exchange and Foreign Trade Act, various laws stipulate specific restrictions on inward FDI in certain sectors, including land acquisition, mining, oil industry, telecommunications and transport
	Japan		India pointed out that obtaining visas for employees to do on-site work in Japan is a problem faced especially by companies in the IT sector
	Japan	Pharmaceuticals	Requirement of local content: Indian companies face barriers in sectors like pharmaceuticals as there is a requirement to partner with Japanese enterprises/trading houses for local marketing. This escalates costs for the Indian manufacturers as it takes time to build a product profile
	Japan	Dairy products, some footwear, leather products, textiles and clothing	GSP (generalised system of preferences) Scheme: Items such as dairy products, some footwear, leather products, textiles and clothing are not included in the GSP scheme for developing countries and are therefore subject to applied MFN duty rates
	Japan	Electrical heating and tracing cables	Third-Party Certification requirement: India has noted that the third party testing requirement in Japan is very cumbersome. To have a library of standards for specific countries is almost impossible for any Indian manufacturer owing to the high costs involved
	Japan	Agriculture products	State aid and subsidy in agriculture: Labour productivity in agriculture remains much lower than in the rest of the economy, and the Government of Japan has continued to move from price support to income support

References	Countries	Products	Types of NTMs
Kumar, Animesh and Priya, Shashank	China	Dairy and meat products	Lack of clarity in terms of technical standards
	China	Automotive sector	State aid and subsidy: India asked for the details of assistance provided to the automotive sector. India finds it difficult to assess China's subsidy programme as details are mostly provided in Chinese.
	Canada	Spices	Labelling requirements for spices are not standardised and this complicates matters at the time of import clearances and sale in the domestic market. Indian spice exporters find it difficult to comply with Canadian labelling requirements as it involves very long lists of ingredients. They have requested Canada to look into the possibility of allowing a leaflet inside the packaging as an alternative
	Canada	Food products	Provincial Government's requirements: India has observed that the SPS-related import requirements are not uniform in Canada and so the standards laid down are different
	Canada	Electricity generators	Local Content Requirements: Legislation requires participating electricity generators to source from 50 to 60% of their equipment in Ontario if they want to be eligible for generous subsidies
	Brazil	Pharmaceutical and agro-chemical products	Procedures regarding registration and issue of product licenses by Brazilian agencies to Indian pharmaceutical companies for export of their products to Brazil is cumbersome and time consuming.
	Brazil		Brazilian government has introduced INMETRO (National Institute of Metrology, Standardization and Industrial Quality) certification for almost all the engineering goods being imported to Brazil. Exporting companies have to be certified by INMETRO and it is reported that INMETRO certification is expensive

References	Countries	Products	Types of NTMs
	Brazil	Glass	Due to modifications in Brazilian import regulations with effect from July 29th 2008, prior licensing has been made mandatory for exports of glass containers to Brazil. This has led to additional transaction costs for exporters
	Brazil	Agriculture	India raised its concern in the TPR of 2009190 about the value of assistance to agriculture in the form of interventions in both the credit and agricultural domestic markets which are considered to be distorting forms of support. India observed that as Brazil was one of the world's largest exporters of agricultural products, its support to agriculture could affect global markets.
	Brazil		The registration procedure for setting up a new company is very slow and time consuming. It is also reported that the requirement that the cheque signatory, i.e. the Administrator of a company, must be a resident of Brazil creates practical difficulties. Added to this is the difficulty of long waiting periods at government and administrative offices, banks and other services
	Brazil	Pharmaceuticals	Pre-authorisation is required in the form of import licenses for specific molecules. Customs clearance by Brazilian agencies like the National Health Surveillance Agency (ANVISA) and Receita Federal takes as long as 15-20 days. About 50% of the market for hospital products is reserved for locally manufactured goods and therefore products manufactured in India cannot be supplied through some government and other public tenders

References	Countries	Products	Types of NTMs
Kumar, Animesh and Priya, Shashank	Brazil	Handlooms (textiles and garments)	Minimum Import Price: In the case of some products, the Brazilian Foreign Trade Ministry has fixed a minimum price to prevent under-invoicing by importers. But the Ministry does not publish these figures. They simply refuse import clearances when the prices are lower than the minimum prices. Import License: It is understood that for some of the textile items, an import license is required. Good Manufacturing Practices (GMP) Certification: Local value addition norms require at least 60% value localisation of goods by value and weight, in order to be eligible for preferential financing from financial institutions
	Brazil	Jute bags, jute fibres, polyester films and viscose yarn	Anti-dumping duties
	Brazil	Polyester	Countervailing duties
	Thailand	Marble, travertine, alabaster, granite and other stones used in building	Importers are required to apply for a non-automatic import licence from the Department of Foreign Trade in order to administer the import and use of marble and other stones used in building
	Thailand		During the investigation, foreign producers/ exporters are required to fill in pre-questionnaires or full-questionnaires and submit them by a certain deadline. However, not all documents provided by the Department are in English, such as petitioner's complaints, which hinder producers/exporters from responding in time
	Thailand	Air Coolers	Indian exporters require TISI approval (ISI standard in India).TISI is reluctant to issue the approval for import of air coolers to Thailand which is proving to be a market access barrier

References	Countries	Products	Types of NTMs
	Thailand		Other barriers: a) Import guidelines are not provided. A lot depends on interpretation of the rules by the local Customs officer. c) Bank guarantee required for temporary import procedure is required in local Thai language and English is not acceptable. This results in additional cost and delays d) Certificate of Origin is not issued promptly.
	Republic of Korea	Automobile sector	Republic of Korea intends to help local car makers produce 1.2 million 'green cars' and export 0.9 million units by 2015. India requested RoK to provide details of the 'support' offered to Korean automobile firms.
	Malaysia	Automobile sector	Significant barriers, including highway bans, also exist to the import, sale, and usage of large motorcycles
	Malaysia	Meat and poultry products	Malaysia requires all domestic and imported meat (except pork) to be certified as halal (produced in accordance with Islamic practices) by Malaysian authorities
	Russia	Meat products	Russian standards for bovine meat are more stringent than the OIE Terrestrial Animal Health Code. Conformity Certificates issued by EIC are not recognized. All this adds to transaction costs
	Russia		Phytosanitary norms are particularly restrictive
	Russia	Electrical heating and tracing cables for domestic, commercial and industrial heating applications	There is a third-party testing requirement in Russia which is reported to be very cumbersome
	Russia	Pharmaceutical products	There are comprehensive and stringent testing and certification procedures for pharmaceutical products (technical varieties)

References	Countries	Products	Types of NTMs
	Uzbekistan		Local Customs Charges: In addition to the tariff fixed by the Government on imports, the local Customs Department charges 0.7% of the total value of the consignment as processing fee which is not part of the tariff
			Procedure for registration and certification of imported items is cumbersome and takes considerable time which indirectly discourages imports
			There is a lengthy procedure for conversion of local currency into hard currency for repatriation as profits or service fees. This takes at least 4 to 6 months and is restricted to once or twice a year.
	Ukraine	Pharmaceutical products, cosmetics and toiletries, etc.	There is a compulsory certification requirement for several goods imported into Ukraine
	Azerbaijan		a) Imports into Azerbaijan are controlled through an unwritten monopoly system, whereby a particular item can be imported only in partnership with a particular business group of the country. b) Visa regime, including for business persons, investors and employment has been tightened and it is increasingly difficult and expensive to obtain such visas. c) Quality assessment and registration of medicines and pharmaceutical products has also been made fairly restrictive and there is an attempt to control the market share of each country/region through such measures
	Azerbaijan		Azerbaijan insists on certain types of testing in laboratories outside India. Independent test laboratories exist in India with world-class facilities where such tests can be conducted but these are not accepted by Azerbaijan

References	Countries	Products	Types of NTMs
	Kazakhstan	Visas	It is reported that Kazakhstan follows a restrictive policy while issuing visas to Indian businessmen which acts as a non-tariff barrier
	Tajikistan	Pharmaceutical exports	The drug regulatory authority of Tajikistan (GENSEL) seeks documents on par with European standards. Indian firms while complying with CIS standards for drug approvals for exporting to CIS countries, face the problem of meeting another standard for exporting to Tajikistan
	Tajikistan		Difficulties in registration of companies
	Moldova		Licensing of certain types of activities: The types of activity that have been licensed include those whose illegal practice can violate the rights, legal interests and health of citizens, can pose problems to the environment and State security and whose legalization can be accomplished only through licensing
	Iran	Tea	Exporters of tea are required to register themselves with Iranian health authorities after filling in designated forms and paying a one- time registration fee of US$6000. This and other costs of legislation prior to shipment is acting as a barrier to tea exports to Iran
	Ecuador		It is reported that the Ecuadorian Government requires licenses for certain products with the aim of protecting the environment, as well as the health of consumers
	Australia	Fruits, vegetables and dairy products	Stringent Sanitary and Phyto-Sanitary (SPS) measures result in long delays for clearance of agricultural items like fruits, vegetables and dairy products from India
	Australia	Pharmaceutical products	They require prior approval from the Therapeutic Goods Administration (TGA) which is reported to be a long drawn out and expensive process

References	Countries	Products	Types of NTMs
	Australia	Law, engineering, accounting and health	It is reported that in the education sector, mutual recognition of qualifications and professional licensing is an area of major concern, particularly in professional fields such as law, engineering, accounting and health
	Armenia	Pharmaceutical products	Some of the pharmaceutical products and medicines are subject to import and export permissions, issued by the Ministry of Health of the Republic of Armenia
	Colombia		Customs Issues: The absence of clear procedures to solve the problem of incorrect import documentation also becomes a barrier of sorts. Shipments are reported to have been detained for long periods by Colombian Customs because of improper tariff schedule classifications, use of an improper address, or typing mistakes
	Turkey	Footwear	Quantitative Restrictions on footwear imports from certain specific countries including India
	Iraq	Tea	Customs Issues: a) The payment pattern is very slow and in effect, money remains blocked b) Though it is mentioned in the terms and conditions that the testing information should reach the exporter within seven days, the port authorities take a long time to process the documents and it takes several months to confirm whether the goods have been accepted or not c) Sometimes, after several months, a rejection letter comes without giving any reason
	Ethiopia	Large power stations	Insistence on overseas experience/reference in specific countries/ continents. Biased qualification clause against some companies

References	Countries	Products	Types of NTMs
	Mozambique		a) Delay in registration of drugs from India causes increase in transaction costs b) Compulsory pre-shipment inspection regime acts as a barrier to imports c) Container scanning fee adds to the transaction costs
	United Arab Emirates (UAE)	Electricity and Water Authority	Biased qualification clause
	United Arab Emirates (UAE)	Agrochemicals	Ministry of Environment and Water, UAE, does not register agrochemicals manufactured by Indian companies
	Georgia	Hydro power	Insistence on overseas experience/reference in specific countries/continents
	Saudi Arabia		Local participation requirements
	Qatar	Egg and Egg products	Import of egg and egg products are banned in Qatar
K, Veena Renjini; 2016		Fish and fishery products	SPS, TBT and Pre-Shipment Inspections
Sharma, Sangeeta V; 2014	ASEAN	Energy sector	
Singh, Rakhi; Sharma, Seema and Tandon, Deepak; 2018	European Union		Sanitary and phytosanitary measures, technical barriers to trade, price control measures, quantity control measures, para-tariff measures, finance measures, trade-related investment measures and all other measures included in the TRAINS database.
Bakshi, Kajli		Coffee, pulses, spices	Sanitary and phytosanitary measures
	EU	Peanuts	(SPS)Product Related Standards: These are the restrictions imposed on the quality of a product. It includes the specific limits up to which the presence of microbes or other pathogens is allowed
	EU	Mango pulp, milk products	(SPS)Production Process Standards: These requirements have an adverse impact on the export of goods
		Food products	(SPS)Testing Procedure Standards

References	Countries	Products	Types of NTMs
			(SPS)Certification: Developed countries often demand that certain international standards are complied with (Harmony and Transparency)
Goyal, Tanu M; Mukharjee, Arpita and Kapoor, Avantika; 2017		Mangoes, table grapes, okra, peanuts, curry leaves, chillies, shrimps, prawns and tamarind	Bans and rejections of export consignments
		Mangoes, eggplant, fruits and vegetables	Pest infestation : This is a common issue faced by Indian food products – particularly fresh food products
	US and EU	Basmati rice, plain rice, capsicum, okra, shrimps, green chillies etc.	Presence of higher than approved level of pesticide residue
	EU	Processed food products like peanuts, chips, aloo- bhujia	
		Grapes	Tracenet
		Basmati rice	Frequent lowering of MRLs: In the case of certain chemicals, developed countries often lower MRLs frequently
		Grapes	Lowering of MRLs without any scientific justification: Sometimes, MRLs may be lowered without scientific justification under the precautionary principle of the WTO SPS Agreement
		PUS basmati rice, peanuts	Lack of uniform standards across countries: Different countries permit different MRLs
	EU, Australia and Canada	Dairy products	Rigid import requirements imposed by importing countries: Often, the importing countries have specific requirements regarding the technology used, laboratory testing procedures, etc.
			Lack of mutual recognition of Conformity Assessment System

References	Countries	Products	Types of NTMs
		Chemicals, peanuts and fresh vegetables	Increased use of Risk Analysis Technique and awareness of consumer health and well-being in developing countries
		Animal feed, tea, cottage cheese, ethnic sweets such as gulab jamun and rasmalai, ready-to-eat meals such as palak paneer etc	Hygiene issues and high-risk country for certain diseases such as Foot and Mouth Disease
			Pest infestation and use of chemicals and pesticides
		Animal feed and dairy products	Animal hygiene conditions
		Peanuts	Outdated processing technology and unscrupulous practices: In certain cases, the post-harvest processing technology may be outdated or traders may engage in unscrupulous practices
			Issues with traceability: Many exporters in the survey said that they do not source agricultural products directly from farmers; rather, they source from mandis local vendor hubs and other agricultural markets
	EU	Mangoes	Slow reactions to concerns raised: In a number of cases when instances of non-compliance are raised by the key markets, the Indian government has not taken corrective measures as has been taken by other countries, resulting in a ban on Indian products
			Infrastructure bottlenecks: Exporters pointed out that they found it difficult to set up the required infrastructure for treating products before they are exported
			Market linkages and marketing issues: The "Agricultural Marketing and Farmer Friendly Reforms Index" ranked Indian States and Union Territories based on reforms adopted by them

References	Countries	Products	Types of NTMs
			Piecemeal regulation: As developed countries become stricter with their food safety regulations, several agencies in India are getting involved in administering standards for exports
			Issues with Data Collection for TraceNet: In order for TraceNet to work efficiently, data from the fields and data about farmers fed into it by State department officials must be accurate and helpful to the concerned parties
Main Features of the Agreement on Sanitary and Phyto-Sanitary Measures and Analysis of the SPS Restrictions Faced and Imposed by India	Japan	Tobacco	Japan insists on a DDT residue level of 0.4 ppm in unmanufactured tobacco while the international standard is set at 6 ppm
	EU	Milk and milk products	Indian cows are not mechanically milked and often the cows have not been kept in farms(SPS)
	EU, US and Japan	Shrimps	Presence of pesticides/antibiotics
	Italy and Germany	Spices	Pesticide residue
	US and EU	Tea	Concerns about pesticide content
		Marine products	Metal, pesticide and antibiotic content
	EU	Groundnut	Aflatoxin residue
	EU	Shell-free eggs	Pesticide residue
	Indonesia	Beef	Foot and Mouth Disease
	US, Japan and China	Fruits	Pesticide residue
	Japan	Floricultural products	Zero tolerance for insects and pests

Annex 2: Country wise NTM barriers, Findings from the Survey

Table 1: Country wise barriers for food, seafood and agricultural industry

Country	(TDMs) AD, CVD, Charges, paratariffs, tariff rate quota and Customs tariffs	(Documentation) Import licence by importer, Preshipment requirement, Customs procedure and documentation	STCs and LCR	Import quota and reference price
Africa	Additional duties imposed by Customs	GATT - WTO Agreement On Import Licensing	Export inspections / SPS Contain Sealing	
		Pre- shipment procedures inspection and other formalities are quite slow	Testing of product is very time consuming	
Australia		Documentation procedure is time consuming	Import ban due to presence of fruit flies and stone weevil	Valuation of goods rejected on the basis of a minimum or reference price
		Customs clearance takes a very long time	High food safety standards and bio-security issues	
Bolivia	Finance Ministry has imposed definitive anti-dumping duty on fishing nets			
Chile		Some mandated testing procedures take 3 months to complete.		
China	Tariff on seafood higher then tariffs on manufacturing goods		Delay in finalisation of protocol on SPS measures and certification procedures	

Country	(TDMs)AD, CVD, Charges, para tariffs, tariff rate quota and Customs tariffs	(Documentation) Import licence by importer, Preshipment requirement, Customs procedure and documentation	STCs and LCR	Import quota and reference price
Colombia	High tariff rates at 150%, which is discriminatory			
Dubai	If the goods are not exported within the specified timeline, cold storage charges have to be paid	Cumbersome clearance procedures, high fees, delays going up to 10-12 days	Rejection of the whole carton of vegetables if a single vegetable is found rotten	
	Tariff rate quota for spices is strictly fixed	Customs clearances are very complicated and lengthy which increases the delivery time		
Europe	Custom rates are quite high	Documentation problems in the case of new orders	Non-harmonised MRLs in EC (Germany has more stringent standards)	
	Duties are high		Pesticide residue levels varies from country to country and new regulations are imposed at short notice. There is no validated analytical method for determination of contaminations in spices. The process is cost prohibitive and creates undue delays	

Country	(TDMs) AD, CVD, Charges, para tariffs,tariff rate quota and Customs tariffs	(Documentation) Import licence by importer, Preshipment requirement, Customs procedure and documentation	STCs and LCR	Import quota and reference price
France				Valuation of goods rejected on the basis of minimum or reference price
Indonesia		Problems relating to documentation		
Iran		Strict verification rules on product export documents and certification		
Italy			If there is any problem regarding the packaging of the product, charges have to be borne by the exporter	
Japan	High Customs duties		Impractical plant quarantine procedures including zero tolerance for insects/ pests. Consignments refumigated despite SPS certificates.	
Korea	Faulty Customs valuations			
Malaysia	Para tariffs are quite high in addition to statutory Customs tariffs		Proper information is not given at the right time regarding packaging and problems are raised later	

Country	(TDMs) AD, CVD, Charges, para tariffs,tariff rate quota and Customs tariffs	(Documentation) Import licence by importer, Preshipment requirement, Customs procedure and documentation	STCs and LCR	Import quota and reference price
Mongolia			Delay in shipment because of local content requirements	
Oman	Anti-subsidy duty related rules and regulations are often not explained by the authorities			
Russia		Documentation procedures are very lengthy as Russia needs more certification and documentation		
South Korea	Duties are very high in comparison to North Korea and Dubai. The product price therefore becomes double the actual MRP and importers are reluctant to place orders			
Sudan	High tariff duties			
UAE		Pre-shipment paper work and formalities cumbersome		Import quota is always less for mango exports

Country	(TDMs) AD, CVD, Charges, para tariffs,tariff rate quota and Customs tariffs	(Documentation) Import licence by importer, Preshipment requirement, Customs procedure and documentation	STCs and LCR	Import quota and reference price
UK	Anti-dumping Duty hike on Indian shrimp	Documentation problems-Honolulu, US has less documentation in comparison with European countries like UK and Germany		
	Tariff Rate Quota is higher in European countries			
USA	Anti- Dumping duties have been raised by 30-40%	Clearance procedures take time as inspecting policies are changed without prior information.		
	Custom charges are very high	Problems with granting authority and validity of import licences		

Table 2 : Country-wise barriers for Gems and jewellery

Country	(TDMs) AD, CVD,Charges, para tariffs, tariff rate quota and custom tariffs	(Documentation)Import licence by importer, preshipment requirements, Customs procedure and documentation
Africa	Customs charges additional ad-valorem Tax of 15%	
	Luxury Tax is high	
Chile	Customs charges are additional	
Europe	Tariff rate on Jewellery items are quite high	Documentation process is quite lengthy and complicated in European countries

Table 3 : Country-wise barriers for Pharma and Chemicals

Country	(TDMs) AD, CVD, Charges, para tariffs, tariff rate quota and custom tariffs	(Documentation)Import licence by importer, Preshipment requirement, Customs procedure and documentation	STCs, LCR, Certificate of origin
Australia		Proper documentation is required	
Brazil		Clearances from Brazilian Health Surveillance Agency (ANVISA), inspection by ANVISA, registration of products, issuance of licences for sale, reports of bio equivalence and procedural delays	
China			Documentary evidence, invoice, packaging list, and certificate of origin
Colombia		Registration takes 11-12 months. Colombian Drugs Control & Certification Authority (INVIMA) undertakes physical inspection, certifies Spanish translated documents.	
Dubai			Whole consignment cancelled if proper information is not provided on the product itself

Country	(TDMs) AD, CVD, Charges, para tariffs, tariff rate quota and custom tariffs	(Documentation)Import licence by importer, Preshipment requirement, Customs procedure and documentation	STCs, LCR, Certificate of origin
Europe	Anti-dumping tariffs are quite high and different in other countries	Customs clearance is slow and complicated	
Indonesia		Cumbersome process to register a new product	
Korea		Prior approval required for importer	
Qatar		Customs inspection procedure is quite complicated and time-consuming	
Middle East	High duties charged		
Panama		Delayed registration even up to 18 months	
Turkey	Anti dumping duty is 6.8% -20.3% which is very high.		
UAE	Anti-Dumping Duty is higher	Documentation procedures are lenghty and expensive	
USA			Procedures for obtaining Certificates of origin is difficult
			Zero tolerance on radioactive contamination caused by Cobalt 60 which is unreasonable

Table 4 : Country-wise barriers for Leather & Textiles

Country	(TDMs)AD, CVD, Charges, para tariffs, tariff rate quota and Customs tariffs	(Documentation) Import licence by importer, Pre-shipment requirements, Customs procedures and documentation	STCs and LCR	Import quota and reference price
Australia		Validation of consignments cargo details and inspection checks at docks are time-consuming		
Africa	Customs charges additional duties			
	Luxury tax is high			
Canada		Documentation process in some countries are different in comparison of other country. Testing procedures are lengthy, sometimes taking upto 3 Months		High import quota is allowed due to which demand is low
Chile	Customs charges extra with additional tax of 15%			

Country	(TDMs)AD, CVD, Charges, para tariffs, tariff rate quota and Customs tariffs	(Documentation) Import licence by importer, Preshipment requirements, customs procedures and documentation	STCs and LCR	Import quota and reference price
Europe		Documentation process is quite lengthy and complicated in European countries	Registration/ testing & certification under REACH (w.e.f. June, 2007) costs around Euro 85000 - 325000 per chemical, about 30000 chemicals covered. REACH mandates gathering of information by manufacturers and importers on properties of chemical	
	Different countries charge different rates			
France	Some ports apply high anti-dumping duties which are borne by the exporter, which decreases the profit by percentage	Often exporters face delays in getting import licences and other official documents through different channels		
Germany	Statutory Customs tariffs are very high on chikan apparels and garments	Customes clearance rules in Europe are rigid		

Country	(TDMs)AD, CVD, Charges, para tariffs, tariff rate quota and Customs tariffs	(Documentation) Import licence by importer, Preshipment requirements, customs procedures and documentation	STCs and LCR	Import quota and reference price
Italy		Customs rules are sometime problematic as various aspects of the consignments have to be clarified		
Middle East	Often FTA benefits are not given	Rules and regulations changed frequently and without notice. This impedes exports		
Oman		Delays in Customs clearances leads to delays		
South Africa	As Charges are high profit margins are reduced	Documentation process is very slow		
UAE	Para tariffs and anti-dumping duty in Gulf countries is very high	Import licence documentation takes a long time	Local content requirement at docks or through cargo in Customs clearance is very complicated	
		Pre-shipment documentation details of importer side of custom tariff take delay few times		
UK	Countervailing duties palce a heavy burden on export trade			

Country	(TDMs)AD, CVD, Charges, para tariffs, tariff rate quota and Customs tariffs	(Documentation) Import licence by importer, Preshipment requirements, customs procedures and documentation	STCs and LCR	Import quota and reference price
USA		Inspection of products is quite lengthy and complicated		

Table 5 : Country-wise barriers for Electrical and Engg. Products

Country	(TDMs) AD, CVD, Charges, para tariffs, tariff rate quota and Customs tariffs	(Documentation) Import licence by importer, Pre-shipment requirement, Customs procedures and documentation	STCs and LCR
Africa	Customs tariff rates are higher due to which demand is less and profit margins are also reduced	Importer and Exporter require pre-shipment Inspection	Proper labelling on goods at the time of export
Bangladesh	Anti-subsidy charges, surcharges at port are sometimes high		
Canada	Tariff rates are very high so the profit margin is less and demand is also less	Licence procedures are lengthy and complicated	
China		Problems in submitting document a different document are required in different countries	
Europe	Due to high import duties, product cost are 11% higher than other countries. Exporters face low demand in Europe	Procedures are lengthy and time-consuming leading to delays and buyer dissatisfaction	
	Customs charges are higher		
France		For new importers' it takes time to get the importing licence	Proper labelling required on goods at the time of export
Germany	Customs tariffs are higher due to which profit margin is less		

Country	(TDMs) AD, CVD, Charges, para tariffs, tariff rate quota and customs tariffs	(Documentation) Import licence by importer, Preshipment requirement, Customs procedure and documentation	STCs and LCR
Korea	Clearance procedures and taxes		Testing and certification regimes are highly restrictive in terms of procedures, time frames and cost of compliance
Qatar	Embassy charges approxoximately-30000 per shipping bill		
Nepal	Extra VAT and charges for export of automobiles		
Sri Lanka	Recently port charges have been increased	Export import license difficult to obtain	
Turkey	Anti-dumping duty is charged at 20%		
UAE		Pre-shipment is license is required	
UK		Clearance difficulties	
USA	Tariff rates are quite high	Proper document are required for pre-shipment but different documents are required for different countries	Labelling issues involving Certificates of Origin, weight, ingredients, etc.
			Testing and certification are highly restrictive in term of procedure time frames and cost of compliance
Vietnam	7.5% Duty Compulsory		

Annex 3: Coverage Ratio of NTMs for Indian Exports

Coverage ratios provide a simple but crude way of assessing the importance of NTMs in a country's trade based on inventories of NTMs. Coverage ratios are calculated as the share of imports of a certain category of products subject to NTMs.

Table 1: NTMs Coverage ratio for Gems and Jewellery (17% of total Exports)

Product Code	Description	Export	exp_share	NTM	CR
71	Natural or cultured pearls, precious or semi- ….	41165029			
7101	Pearls, natural or cultured, whether or not …	3617	0		0
7102	Diamonds, whether or not worked, but not…	24656932	60		0
7103	Precious stones (other than diamonds) and….	464344	1		0
7104	Synthetic or reconstructed precious or semi-…	219819	1		0
7105	Dust and powder of natural or synthetic precious …	4661	0		0
7106	Silver (including silver plated with gold or platinum)….	8960	0		0
7107	Base metals clad with silver, not further worked than…	124	0		0
7108	Gold (including gold plated with platinum) unwrought …	2272508	6		0
7109	Base metals or silver, clad with gold, not further worked ….	2	0		0
7110	Platinum, unwrought or in semi-manufactured forms,…	20552	0		0
7111	Base metals, silver or gold, clad with platinum, not …	6	0		0
7112	Waste and scrap of precious metal or of metal clad with …	443236	1		0
7113	Articles of jewellery and parts thereof, of precious metal …	12763440	31	1	31
7114	Articles of goldsmiths' or silversmiths' wares and parts …	82670	0		0
7115	Other articles of precious metal or of metal clad with …	4531	0		0
7116	Articles of natural or cultured pearls, precious or semi-…	16936	0		0
7117	Imitation jewellery	201366	0	1	0
7118	Coin	1326	0		0
					31

Table 2: NTMs Coverage Ratio in Textiles and clothing (12-14% of total Trade)

Product Code	Description	Export	exp_share	NTM	CR
61	Articles of apparel and clothing accessories, knitted or crocheted	8347737			
6101	Men's or boys' overcoats, car-coats, capes, cloaks, anoraks...	10755	0		0
6102	Women's or girls' overcoats, car-coats, capes, cloaks, anoraks ...	6099	0		0
6103	Men's or boys' suits, ensembles, jackets, blazers, trousers, bib...	665726	8	1	8
6104	Women's or girls' suits, ensembles, jackets, blazers, dresses, ...	741390	9	1	9
6105	Men's or boys' shirts, knitted or crocheted.	745593	9	1	9
6106	Women's or girls' blouses, shirts and shirt-blouses, knitted ...	172392	2		0
6107	Men's or boys' underpants, briefs, nightshirts, pyjamas, ...	714163	9	1	9
6108	Women's or girls' slips, petticoats, briefs, panties, ...	553709	7		0
6109	T-shirts, singlets and other vests, knitted or crocheted.	2711966	32	1	32
6110	Jerseys, pullovers, cardigans, waistcoats and similar articles,...	314763	4		0
6111	Babies' garments and clothing accessories, knitted or crocheted.	899334	11		0
6112	Track suits, ski suits and swimwear, knitted or crocheted.	8113	0		0
6113	Garments, made up of knitted or crocheted fabrics of heading...	1222	0		0
6114	Other garments, knitted or crocheted.	585916	7		0
6115	Panty hose, tights, stockings, socks and other hosiery, including...	130741	2		0
6116	Gloves, mittens and mitts, knitted or crocheted.	31180	0		0
6117	Other made up clothing accessories, knitted or crocheted; ...	54675	1		0
					67

Product Code	Description	Export	exp_share	NTM	CR
52	Cotton	6917321			
5201	Cotton, not carded or combed	1673471	24	1	24
5202	Cotton waste (including yarn waste...	127962	2		0
5203	Cotton, carded or combed	2500	0		0
5204	Cotton sewing thread, whether or...	17182	0		0
5205	Cotton yarn (other than sewing thread), ...	3390423	49	1	49
5206	Cotton yarn (other than sewing thread),...	48734	1		0
5207	Cotton yarn (other than sewing thread) ...	1300	0		0
5208	Woven fabrics of cotton, containing 85 % ...	990113	14	1	14
5209	Woven fabrics of cotton, containing 85 %...	434896	6	1	6
5210	Woven fabrics of cotton, containing less...	37931	1		0
5211	Woven fabrics of cotton, containing less ...	144083	2		0
5212	Other woven fabrics of cotton	48727	1		0
					93

Product Code	Description	Export	exp_share	NTM	CR
63	Other made up textile articles, sets, ...	4960897			
6301	Blankets and travelling rugs	180150	4		0
6302	Bed linen, table linen, toilet linen ...	1545537	31	1	31
6303	Curtains (including drapes) and interior ...	131445	3		0
6304	Other furnishing articles, excluding...	1599531	32	1	32
6305	Sacks and bags, of a kind used for the	738724	15	1	15
6306	Tarpaulins, awnings and sunblinds; tents;...	8992	0		0
6307	Other made up articles, including dress ...	659421	13	1	13
6308	Sets consisting of woven fabric and yarn...	340	0	1	0
6309	Worn clothing and other worn articles.	72555	1	1	1
6310	Used or new rags, scrap twine, cordage,...	24201	0	1	0
					92

Product Code	Description	Export	exp_share	NTM	CR
62	Articles of apparel and clothing accessories, not knitted or crocheted	8997092			0
6201	Men's or boys' overcoats, car-coats, capes, cloaks, anoraks (including ...	12363	0		0
6202	Women's or girls' overcoats, car-coats, capes, cloaks, anoraks ...	19706	0		0
6203	Men's or boys' suits, ensembles, jackets, blazers, trousers, bib ...	1170303	13	1	13
6204	Women's or girls' suits, ensembles, jackets, blazers, dresses, skirts, ...	2422123	27	1	27
6205	Men's or boys' shirts	1329746	15	1	15
6206	Women's or girls' blouses, shirts and shirt-blouses	1372376	15	1	15
6207	Men's or boys' singlets and other vests, underpants, briefs, nightshirts...	117792	1		0
6208	Women's or girls' singlets and other vests, slips, petticoats, briefs,...	203901	2		0
6209	Babies' garments and clothing accessories	282107	3		0
6210	Garments, made up of fabrics of heading 56.02, 56.03, 59.03, 59.06 ...	17122	0		0
6211	Track suits, ski suits and swimwear; other garments	1286311	14	1	14
6212	Brassieres, girdles, corsets, braces, suspenders, garters and similar...	94775	1		0
6213	Handkerchiefs	9372	0		0
6214	Shawls, scarves, mufflers, mantillas, veils and the like	606894	7	1	7
6215	Ties, bow ties and cravats	2315	0		0
6216	Gloves, mittens and mitts	23634	0		0
6217	Other made up clothing accessories; parts of garments or of clothing ...	26254	0		0
					91

Table 3 : Coverage ratio of Chemicals (9% of India's exports)

Product Code	Description	Export	exp_share	NTM	CR
29	Organic chemicals	13556922			0
2901	Acyclic hydrocarbons	253660	2		0
2902	Cyclic hydrocarbons	2295007	17	1	17
2903	Halogenated derivatives of hydrocarbons	237516	2		0
2904	Sulphonated, nitrated or nitrosated	129871	1		0
2905	Acyclic alcohols and their halogenated,....	281296	2		0
2906	Cyclic alcohols and their halogenated,...	340245	3	1	3
2907	Phenols, phenol-alcohols	190275	1		0
2908	Halogenated, sulphonated, nitrated	32520	0		0
2909	Ethers, ether-alcohols, ether-phenols,...	323699	2		0
2910	Epoxides, epoxyalcohols, epoxyphenols and...	17026	0		0
2911	Acetals and hemiacetals, whether or not with ...	12415	0		0
2912	Aldehydes, whether or not with other oxygen ...	106613	1		0
2913	Halogenated, sulphonated, nitrated or nitrosated ...	8353	0		0
2914	Ketones and quinones, whether or not with other ...	320774	2		0
2915	Saturated acyclic monocarboxylic acids and their	528384	4	1	4
2916	Unsaturated acyclic monocarboxylic acids, cyclic ...	183690	1		0
2917	Polycarboxylic acids, their anhydrides, halides, ...	381667	3		0
2918	Carboxylic acids with additional oxygen function ...	282632	2		0
2919	Phosphoric esters and their salts, including ...	9556	0		0
2920	Esters of other inorganic acids of non-metals ...	68546	1		0
2921	Amine-function compounds	443603	3	1	3
2922	Oxygen-function amino-compounds	494984	4		0
2923	Quaternary ammonium salts and hydroxides, ...	134673	1		0
2924	Carboxyamide-function compounds, amide-...	315981	2	1	2
2925	Carboxyimide-function compounds ...	114362	1		0
2926	Nitrile-function compounds	64091	0		0
2927	Diazo-, azo- or azoxy-compounds	38568	0		0
2928	Organic derivatives of hydrazine or of hydroxylamine	53097	0		0

Product Code	Description	Export	exp_share	NTM	CR
2929	Compounds with other nitrogen function	89416	1		0
2930	Organo-sulphur compounds	85369	1		0
2931	Other organo-inorganic compounds	125362	1		0
2932	Heterocyclic compounds with oxygen hetero-atom(s) only	228767	2		0
2933	Heterocyclic compounds with nitrogen hetero-atom(s) only	2207793	16	1	16
2934	Nucleic acids and their salts, whether or not chemically ...	476724	4	1	4
2935	Sulphonamides	164288	1		0
2936	Provitamins and vitamins, natural or reproduced by synthesis ...	220152	2		0
2937	Hormones, prostaglandins, thromboxanes and leukotrienes,...	185462	1		0
2938	Glycosides, natural or reproduced by synthesis, and their salts,...	24477	0		0
2939	Alkaloids, natural or reproduced by synthesis, and their salts, ...	190599	1		0
2940	Sugars, chemically pure, other than sucrose, lactose, maltose,...	6218	0		0
2941	Antibiotics	833899	6	1	6
2942	Other organic compounds	1055296	8	1	8
					63

Product Code	Description	Export	exp_share	NTM	CR
38	Miscellaneous chemical products	3710045			
3801	Artificial graphite; colloidal or semi-...	30264	1		0
3802	Activated carbon; activated natural...	163244	4		0
3803	Tall oil, whether or not refined	13	0		0
3804	Residual lyes from the manufacture ...	424	0		0
3805	Gum, wood or sulphate turpentine and ...	5837	0		0
3806	Rosin and resin acids, and derivatives ...	5050	0		0
3807	Wood tar; wood tar oils; wood creosote; ...	43	0		0
3808	Insecticides, rodenticides, fungicides, ...	2436399	66	1	66
3809	Finishing agents, dye carriers to accelerate ...	49752	1		0
3810	Pickling preparations for metal surfaces;...	14534	0		0
3811	Anti-knock preparations, oxidation inhibitors, ...	121521	3		0
3812	Prepared rubber accelerators; compound ...	88256	2		0
3813	Preparations and charges for fire-extinguishers;...	9097	0		0
3814	Organic composite solvents and thinners, ...	7090	0		0
3815	Reaction initiators, reaction accelerators and...	153377	4		0
3816	Refractory cements, mortars, concretes and ...	40581	1		0
3817	Mixed alkylbenzenes and mixed alkylnaphthalenes,...	2178	0		0
3818	Chemical elements doped for use in electronics, ...	221	0		0
3819	Hydraulic brake fluids and other prepared...	10843	0		0
3820	Anti-freezing preparations and prepared de-icing fluids	1673	0		0
3821	Prepared culture media for the development or...	12499	0		0
3822	Diagnostic or laboratory reagents on a backing, ...	52178	1		0
3823	Industrial monocarboxylic fatty acids; acid oils from ...	226095	6	1	6
3824	Prepared binders for foundry moulds or cores; ...	274474	7		0
3825	Residual products of the chemical or allied industries, ...	262	0		0
3826	Biodiesel and mixtures thereof, not containing or...	4141	0		0
					72

Product Code	Description	Export	exp_share	NTM	CR
32	Tanning or dyeing extracts; tannins and their derivatives;...	2783207			
3201	Tanning extracts of vegetable origin; tannins and their ...	4858	0		0
3202	Synthetic organic tanning substances; inorganic tanning ...	62117	2		0
3203	Colouring matter of vegetable or animal origin (including ...	15134	1		0
3204	Synthetic organic colouring matter, whether or not	2072410	74	1	74
3205	Colour lakes; preparations as specified in Note 3 to this...	46630	2		0
3206	Other colouring matter; preparations as specified in ...	184632	7	1	7
3207	Prepared pigments, prepared opacifiers and prepared ...	12969	0		0
3208	Paints and varnishes (including enamels and lacquers)	45074	2		0
3209	Paints and varnishes (including enamels and lacquers) ...	9070	0		0
3210	Other paints and varnishes (including enamels, lacquers...	15341	1		0
3211	Prepared driers	14892	1		0
3212	Pigments (including metallic powders and flakes) ...	102574	4	1	4
3213	Artists', students' or signboard painters' colours,...	16296	1		0
3214	Glaziers' putty, grafting putty, resin cements, ...	17546	1		0
3215	Printing ink, writing or drawing ink and other inks, ...	163664	6		0
					85

Table 4: Coverage ratio for Vehicles ... (covers 7% of India's Exports)

Product Code	Description	Export	exp_share	NTM	CR
87	Vehicles other than railway or tramway rolling- stock	16206133.32			0
8701	Tractors (other than tractors of heading 87.09)	908613	6		0
8702	Motor vehicles for the transport of ten or more...	276446	2	1	2
8703	Motor cars and other motor vehicles principally	6589788	41	1	41
8704	Motor vehicles for the transport of goods	929948	6	1	6
8705	Special purpose motor vehicles, other than those...	46314	0		0
8706	Chassis fitted with engines, for the motor vehicles ...	465028	3		0
8707	Bodies (including cabs), for the motor vehicles of ...	14722	0		0
8708	Parts and accessories of the motor vehicles of ...	4436638	27	1	27
8709	Works trucks, self-propelled, not fitted with lifting...	2428	0		0
8710	Tanks and other armoured fighting vehicles, motorised,...	51662	0		0
8711	Motorcycles (including mopeds) and cycles fitted with ...	1902434	12		0
8712	Bicycles and other cycles (including delivery tricycles), ...	50879	0		0
8713	Carriages for disabled persons, whether or not motorised...	20128	0		0
8714	Parts and accessories of vehicles of headings 87.11 to 87.13	434057	3	1	3
8715	Baby carriages and parts thereof	201	0		0
8716	Trailers and semi-trailers; other vehicles, not mechanically ...	76847	0		0
					79

Table 5: Coverage ratio of Nuclear Reactors and Machinery (7% of total exports)

Product Code	Description	Export	exp_share	NTM	CR
84	Nuclear reactors, boilers, machinery ...	16633523			
8401	Nuclear reactors; fuel elements (cartridges)...	10083	0		0
8402	Steam or other vapour generating boilers...	227369	1		0
8403	Central heating boilers other than those of ...	6624	0		0
8404	Auxiliary plant for use with boilers of heading ...	51288	0		0
8405	Producer gas or water gas generators, with or ...	27634	0		0
8406	Steam turbines and other vapour turbines	118301	1		0
8407	Spark-ignition reciprocating or rotary internal ...	822072	5		0
8408	Compression-ignition internal combustion ...	537617	3		0
8409	Parts suitable for use solely or principally with ...	976204	6		0
8410	Hydraulic turbines, water wheels, and regulators ...	68056	0		0
8411	Turbo-jets, turbo-propellers and other gas turbines	1761317	11	1	11
8412	Other engines and motors	192688	1		0
8413	Pumps for liquids, whether or not fitted with a ...	902948	5		0
8414	Air or vacuum pumps, air or other gas compressors...	734997	4		0
8415	Air conditioning machines, comprising a motor-...	138265	1		0
8416	Furnace burners for liquid fuel, for pulverised ...	14696	0		0
8417	Industrial or laboratory furnaces and ovens	54256	0		0
8418	Refrigerators, freezers and other refrigerating	259948	2	1	2
8419	Machinery, plant or laboratory equipment,	589416	4		0
8420	Calendaring or other rolling machines, other ...	14884	0		0
8421	Centrifuges, including centrifugal dryers; ...	544601	3		0
8422	Dish washing machines; machinery for cleaning...	182649	1		0
8423	Weighing machinery (excluding balances of a...	23757	0		0
8424	Mechanical appliances (whether or not hand-...	88346	1		0
8425	Pulley tackle and hoists other than skip hoists; ...	39056	0		0
8426	Ships' derricks; cranes, including cable cranes;	94433	1		0
8427	Fork-lift trucks; other works trucks fitted with ...	9657	0		0

Product Code	Description	Export	exp_share	NTM	CR
8428	Other lifting, handling, loading or unloading ...	97417	1		0
8429	Self-propelled bulldozers, angle dozers, graders	515205	3		0
8430	Other moving, grading, levelling, scraping	174227	1		0
8431	Parts suitable for use solely or principally with....	542297	3		0
8432	Agricultural, horticultural or forestry machinery ...	90360	1		0
8433	Harvesting or threshing machinery, including straw...	50682	0		0
8434	Milking machines and dairy machinery	10507	0	1	0
8435	Presses, crushers and similar machinery used in...	3508	0		0
8436	Other agricultural, horticultural, forestry, poultry-...	18700	0	1	0
8437	Machines for cleaning, sorting or grading seed, grain...	73120	0		0
8438	Machinery, not specified or included elsewhere in ...	144823	1		0
8439	Machinery for making pulp of fibrous cellulosic material...	39066	0		0
8440	Book-binding machinery, including book-sewing...	13437	0		0
8441	Other machinery for making up paper pulp, paper or ...	59273	0		0
8442	Machinery, apparatus and equipment (other than the ...	17094	0		0
8443	Printing machinery used for printing by means of plates, ...	99746	1		0
8444	Machines for extruding, drawing, texturing or cutting man...	5533	0		0
8445	Machines for preparing textile fibers; spinning, doubling ...	242306	1		0
8446	Weaving machines (looms)	30032	0		0
8447	Knitting machines, stitch-bonding machines and machines ...	4416	0		0
8448	Auxiliary machinery for use with machines of heading ...	151647	1		0
8449	Machinery for the manufacture or finishing of felt or	379	0		0

Product Code	Description	Export	exp_share	NTM	CR
8450	Household or laundry-type washing machines, including...	49654	0		0
8451	Machinery (other than machines of heading 84.50) for...	67042	0		0
8452	Sewing machines, other than book-sewing machines ...	54464	0		0
8453	Machinery for preparing, tanning or working hides, skins ...	2658	0		0
8454	Converters, ladles, ingot moulds and casting machines, ...	28800	0		0
8455	Metal-rolling mills and rolls therefor	148349	1		0
8456	Machine-tools for working any material by removal of ...	7336	0		0
8457	Machining centres, unit construction machines (single...	17649	0		0
8458	Lathes (including turning centres) for removing metal	36668	0		0
8459	Machine-tools (including way-type unit head machines) ...	10748	0		0
8460	Machine-tools for deburring, sharpening, grinding, honing,	27306	0		0
8461	Machine-tools for planing, shaping, slotting, broaching, ...	12692	0		0
8462	Machine-tools (including presses) for working metal by...	50910	0		0
8463	Other machine-tools for working metal or cermets,	16540	0		0
8464	Machine-tools for working stone, ceramics, concrete, ...	5154	0		0
8465	Machine-tools (including machines for nailing, stapling, ...	38348	0		0
8466	Parts and accessories suitable for use solely or principally...	158903	1		0
8467	Tools for working in the hand, pneumatic, hydraulic or...	74728	0		0

Product Code	Description	Export	exp_share	NTM	CR
8468	Machinery and apparatus for soldering, brazing or welding...	23393	0		0
8470	Calculating machines and pocket-size data recording, ...	12189	0		0
8471	Automatic data processing machines and units thereof; ...	150221	1		0
8472	Other office machines (for example, hectograph or stencil ...	93504	1		0
8473	Parts and accessories (other than covers, carrying cases ...	240146	1		0
8474	Machinery for sorting, screening, separating, washing,	388553	2		0
8475	Machines for assembling electric or electronic lamps, ...	28601	0		0
8476	Automatic goods-vending machines (for example, ...	9204	0		0
8477	Machinery for working rubber or plastics or for the ...	280513	2		0
8478	Machinery for preparing or making up tobacco, not ...	10157	0	1	0
8479	Machines and mechanical appliances having individual ...	656475	4		0
8480	Moulding boxes for metal foundry; mould bases; moulding ...	128108	1		0
8481	Taps, cocks, valves and similar appliances for pipes, boiler...	1249865	8		0
8482	Ball or roller bearings	517422	3		0
8483	Transmission shafts (including cam shafts and crank shafts) ...	840813	5		0
8484	Gaskets and similar joints of metal sheeting combined with...	90042	1		0
8486	Machines and apparatus of a kind used solely or principally ...	6542	0		0
8487	Machinery parts, not containing electrical connectors, ...	224887	1		0
					79

Table 6: Coverage Ratio of Pharmaceutical products (5% of total Exports)

Product Code	Description	Export	exp_share	NTM	CR
30	Pharmaceutical products	12884848			
3001	Glands and other organs for organo-therapeutic ...	29715	0		
3002	Human blood; animal blood prepared for therapeutic...	748967	6		
3003	Medicaments (excluding goods of heading 30.02, ...	328277	3	1	3
3004	Medicaments (excluding goods of heading 30.02, ...	11530335	89	1	89
3005	Wadding, gauze, bandages and similar articles...	47383	0		
3006	Pharmaceutical goods specified in Note 4 to this Chapter	200172	2		
					92

Table 7: Coverage ratio of NTMs in Iron and Steel (5% of total Exports)

Product Code	Description	Export	exp_share	NTM	CR
72	Iron and steel	11708857			
7201	Pig iron and spiegeleisen in pigs, blocks...	209222	2		0
7202	Ferro-alloys	2216269	19		0
7203	Ferrous products obtained by direct reduction ...	148763	1		0
7204	Ferrous waste and scrap; remelting scrap	7333	0	1	0
7205	Granules and powders, of pig iron, spiegeleisen,....	18563	0	1	0
7206	Iron and non-alloy steel in ingots or other ...	21791	0	1	0
7207	Semi-finished products of iron or non-alloy steel	1115124	10	1	10
7208	Flat-rolled products of iron or non-alloy steel, of a ...	2715596	23	1	23
7209	Flat-rolled products of iron or non-alloy steel, ...	885684	8	1	8
7210	Flat-rolled products of iron or non-alloy steel, ...	1621345	14	1	14
7211	Flat-rolled products of iron or non-alloy steel, ...	40565	0	1	0
7212	Flat-rolled products of iron or non-alloy steel,...	43328	0	1	0
7213	Bars and rods, hot-rolled, in irregularly wound coils,...	156311	1	1	1
7214	Other bars and rods of iron or non-alloy steel, not ...	319936	3	1	3

Product Code	Description	Export	exp_share	NTM	CR
7215	Other bars and rods of iron or non-alloy steel	40248	0	1	0
7216	Angles, shapes and sections of iron or non-alloy steel	68701	1	1	1
7217	Wire of iron or non-alloy steel	48961	0	1	0
7218	Stainless steel in ingots or other primary forms; semi-...	42176	0	1	0
7219	Flat-rolled products of stainless steel, of a width of 600..	565757	5	1	5
7220	Flat-rolled products of stainless steel, of a width of less...	120748	1	1	1
7221	Bars and rods, hot-rolled, in irregularly wound coils, of ...	89035	1	1	1
7222	Other bars and rods of stainless steel; angles, shapes ...	610991	5	1	5
7223	Wire of stainless steel	261830	2	1	2
7224	Other alloy steel in ingots or other primary forms; semi...	29541	0	1	0
7225	Flat-rolled products of other alloy steel, of a width of 600 ...	188846	2	1	2
7226	Flat-rolled products of other alloy steel, of a width of less ...	15941	0	1	0
7227	Bars and rods, hot-rolled, in irregularly wound coils, ...	29434	0	1	0
7228	Other bars and rods of other alloy steel; angles, shapes and ...	64200	1	1	1
7229	Wire of other alloy steel	12616	0	1	0
					78

Table 8 : NTMs Coverage ratio for the Electrical Machinery sector (4% of total Exports)

Product Code	Description	Export	exp_share	NTM	CR
85	Electrical machinery and equipment and parts thereof; sound..	8793821			
8501	Electric motors and generators (excluding generating sets)...	454134	5		0
8502	Electric generating sets and rotary converters...	302046	3		0
8503	Parts suitable for use solely or principally with the...	258737	3		0
8504	Electrical transformers, static converters (for example, ...	1208310	14	1	14
8505	Electro-magnets; permanent magnets and articles ...	36614	0		0
8506	Primary cells and primary batteries	7895	0		0
8507	Electric accumulators, including separators therefor, ...	264463	3		0
8508	Vacuum cleaners	2439	0		0
8509	Electro-mechanical domestic appliances, with self-...	45031	1		0
8510	Shavers, hair clippers and hair-removing appliances, ...	1562	0		0
8511	Electrical ignition or starting equipment of a kind used ...	294592	3		0
8512	Electrical lighting or signalling equipment (excluding ...	135039	2		0
8513	Portable electric lamps designed to function by their ...	2609	0		0
8514	Industrial or laboratory electric furnaces and ovens...	82219	1		0
8515	Electric (including electrically heated gas), laser or other...	43428	0		0
8516	Electric instantaneous or storage water heaters and ...	55439	1		0
8517	Telephone sets, including telephones for cellular ...	1037879	12	1	12
8518	Microphones and stands therefor; loudspeakers,...	123350	1		0
8519	Sound recording or reproducing apparatus	1208	0		0
8521	Video recording or reproducing apparatus, whether...	1658	0		0

Product Code	Description	Export	exp_share	NTM	CR
8522	Parts and accessories suitable for use solely...	699	0		0
8523	Discs, tapes, solid-state non-volatile storage ...	236370	3		0
8525	Transmission apparatus for radio-broadcasting ...	66926	1		0
8526	Radar apparatus, radio navigational aid apparatus ...	26737	0		0
8527	Reception apparatus for radio-broadcasting, whether...	25997	0		0
8528	Monitors and projectors, not incorporating television...	59560	1		0
8529	Parts suitable for use solely or principally with the	106438	1		0
8530	Electrical signalling, safety or traffic control ...	12966	0		0
8531	Electric sound or visual signalling apparatus (for....	50871	1		0
8532	Electrical capacitors, fixed, variable or adjustable ...	123266	1		0
8533	Electrical resistors (including rheostats and potentiometers)...	38042	0		0
8534	Printed circuits	129697	1		0
8535	Electrical apparatus for switching or protecting electrical ...	185028	2	1	2
8536	Electrical apparatus for switching or protecting electrical...	624954	7		0
8537	Boards, panels, consoles, desks, cabinets and other bases, ...	462523	5	1	5
8538	Parts suitable for use solely or principally with the apparatus...	584782	7		0
8539	Electric filament or discharge lamps, including sealed beam ...	86636	1		0
8540	Thermionic, cold cathode or photo-cathode valves and tubes....	3324	0		0
8541	Diodes, transistors and similar semiconductor devices;...	175715	2		0
8542	Electronic integrated circuits.	77065	1		0
8543	Electrical machines and apparatus, having individual functions, ...	117008	1		0

Product Code	Description	Export	exp_share	NTM	CR
8544	Insulated (including enamelled or anodised) wire, cable ...	817282	9	1	9
8545	Carbon electrodes, carbon brushes, lamp carbons, battery	287292	3		0
8546	Electrical insulators of any material.	84172	1		0
8547	Insulating fittings for electrical machines, appliances or....	48761	1		0
8548	Waste and scrap of primary cells, primary batteries and ...	3056	0		0
					42

Table 9: NTMs Coverage Ratio of Cereal exports (3% of total exports)

Product Code	Description	Export	exp_share	NTM	CR
10	Cereals	7334876			
1001	Wheat and meslin	55218	1		0
1002	Rye	8	0		0
1003	Barley	380	0		0
1004	Oats	158	0		0
1005	Maize (corn)	157508	2		0
1006	Rice	7075759	96	1	96
1007	Grain sorghum	10817	0		0
1008	Buckwheat, millet and canary seeds;...	35026	0	1	0
8519	Sound recording or reproducing apparatus	1208	0		0
					96

Table 10 : NTM coverage ratio of Fish and Crustaceans (3% of total exports)

Product Code	Description	Export	exp_share	NTM	CR
3	Fish and crustaceans, molluscs	6646894			
301	Live fish	2000	0		0
302	Fish, fresh or chilled, excluding	51930	1	1	1
303	Fish, frozen, excluding fish fillets	734955	11	1	11
304	Fish fillets and other fish meat	225636	3	1	3
305	Fish, dried, salted or in brine;.....	69816	1		0
306	Crustaceans, whether in shell or....	4750276	71	1	71
307	Molluscs, whether in shell or not,....	811135	12		0
308	Aquatic invertebrates other than c.....	1146	0		0
8519	Sound recording or reproducing apparatus	1208	0		0
					86

Table 11: NTMs Coverage Ratio for Plastics (2% of total exports)

Product Code	Description	Export	exp_share	NTM	CR
39	Plastics and articles thereof	5921437			
3901	Polymers of ethylene, in primary forms	485399	8	1	8
3902	Polymers of propylene or of other olefins, ...	510374	9	1	9
3903	Polymers of styrene, in primary forms	114263	2		0
3904	Polymers of vinyl chloride or of other ...	110137	2		0
3905	Polymers of vinyl acetate or of other	22485	0		0
3906	Acrylic polymers in primary forms	86258	1		0
3907	Polyacetals, other polyethers and epoxide ...	1198133	20	1	20
3908	Polyamides in primary forms	49876	1		0
3909	Amino-resins, phenolic resins and polyurethanes.....	117879	2		0
3910	Silicones in primary forms	60427	1		0
3911	Petroleum resins, coumarone-indene resins, ...	64270	1		0
3912	Cellulose and its chemical derivatives, ...	68382	1		0
3913	Natural polymers (for example, alginic acid) ...	6854	0		0

Product Code	Description	Export	exp_share	NTM	CR
3914	Ion-exchangers based on polymers of heading....	49670	1		0
3915	Waste, parings and scrap, of plastics	2815	0		0
3916	Monofilament of which any cross-sectional....	44908	1		0
3917	Tubes, pipes and hoses, and fittings therefor ...	149627	3		0
3918	Floor coverings of plastics, whether or not....	84218	1		0
3919	Self-adhesive plates, sheets, film, foil, tape....	70417	1		0
3920	Other plates, sheets, film, foil and strip, of plastics...	821568	14	1	14
3921	Other plates, sheets, film, foil and strip, of plastics	279764	5		0
3922	Baths, shower-baths, sinks, wash-basins,....	6771	0		0
3923	Articles for the conveyance or packing of goods....	715663	12	1	12
3924	Tableware, kitchenware, other household articles....	169181	3	1	3
3925	Builders' ware of plastics, not elsewhere specified...	16863	0		0
3926	Other articles of plastics and articles of other ...	615235	10	1	10
					76

Table 12: NTM Coverage Ratio of Meat exports (2% of total Exports)

Product Code	Description	Export	exp_share	NTM	CR
2	Meat and edible meat offal	4308317			
201	Meat of bovine animals, fresh or chilled	55438	1	1	1
202	Meat of bovine animals, frozen	3935837	91	1	91
203	Meat of swine, fresh, chilled or frozen	1285	0	1	0
204	Meat of sheep or goats, fresh, chilled ...	134927	3	1	3
205	Meat of horses, asses, mules or hinnies...	0	0	1	0
206	Edible offal of bovine animals, swine.....	176652	4		0
207	Meat and edible offal, of the poultry of	4124	0	1	0
210	Meat and edible meat offal, salted....	55	0	1	0
					96

Table 13: NTMs Coverage ratio of tea, coffee and spices (1% of total trade)

Product Code	Description	Export	exp_share	NTM	CR
9	Coffee, tea, mate and spices	3321743			
901	Coffee, whether or not roasted or	638406	19	1	19
902	Tea, whether or not flavoured	768194	23	1	23
903	Maté	1	0		0
904	Pepper of the genus Piper; dried or ...	898256	27	1	27
905	Vanilla	32837	1		0
906	Cinnamon and cinnamon-tree flowers	5429	0		0
907	Cloves (whole fruit, cloves and stems)	4819	0		0
908	Nutmeg, mace and cardamoms	134395	4		0
909	Seeds of anise, badian, fennel, ...	448094	13	1	13
910	Ginger, saffron, turmeric (curcuma),...	391313	12	1	12
					94

Table 14: NTMs Coverage Ratio of Rubber (1% of total trade)

Product Code	Description	Export	exp_share	NTM	CR
40	Rubber and articles thereof	2845315			
4001	Natural rubber, balata, gutta-percha, guayule, chicle and similar natural gums, in primary forms or in plates, sheets or strip	42043	1		0
4002	Synthetic rubber and factice derived from oils, in primary forms or in plates, sheets or strip; mixtures of any product of heading 40.01 with any product of this heading, in primary forms or in plates, sheets or strip	86244	3		0
4003	Reclaimed rubber in primary forms or in plates, sheets or strip	77504	3		0
4004	Waste, parings and scrap of rubber (other than hard rubber) and powders and granules obtained therefrom	586	0		0
4005	Compounded rubber, unvulcanised, in primary forms or in plates, sheets or strip	32176	1		0

Product Code	Description	Export	exp_share	NTM	CR
4006	Other forms (for example, rods, tubes and profile shapes) and articles (for example, discs and rings), of unvulcanised rubber	2869	0		0
4007	Vulcanised rubber thread and cord	7436	0		0
4008	Plates, sheets, strip, rods and profile shapes, of vulcanised rubber other than hard rubber	82857	3		0
4009	Tubes, pipes and hoses, of vulcanised rubber other than hard rubber, with or without their fittings (for example, joints, elbows, flanges)	123518	4		0
4010	Conveyor or transmission belts or belting, of vulcanised rubber	119044	4		0
4011	New pneumatic tyres, of rubber	1648547	58	1	58
4012	Retreaded or used pneumatic tyres of rubber; solid or cushion tyres, tyre treads and tyre flaps, of rubber	50277	2		0
4013	Inner tubes, of rubber	68621	2		0
4014	Hygienic or pharmaceutical articles (including teats), of vulcanised rubber other than hard rubber, with or without fittings of hard rubber	54754	2	1	2
4015	Articles of apparel and clothing accessories (including gloves, mittens and mitts), for all purposes, of vulcanised rubber other than hard rubber	40059	1		0
4016	Other articles of vulcanised rubber other than hard rubber	407518	14	1	14
4017	Hard rubber (for example, ebonite) in all forms, including waste and scrap; articles of hard rubber	1263	0		0
					74

Annex 4: Computable General Equilibrium Modelling

General equilibrium, which dates back to Leon Walras (1834-1910), is one of the crowning intellectual achievements of economics. It recognises that there are many markets and that they interact in complex ways so that loosely speaking, everything depends on everything else. Demand for any one good depends on the prices of all other goods and on income. Income, in turn, depends on wages, profits, and rents, which depend on technology, factor supplies and production, the last of which, in its turn, depends on sales (i.e., demand). Prices depend on wages and profits and vice versa.

To make such an insight useful, economists have to be able to simplify it sufficiently to derive predictions and conclusions. Theorists typically do this by slashing the dimensionality, say to just two goods, two factors and two countries, and often focusing on just a few parts of the system. An alternative approach is to keep the complex structure but to simplify the characterization of economic behaviour and solve the whole system numerically rather than algebraically. This is the approach of Computable General Equilibrium (CGE) modelling. CGE models specify all their economic relationships in mathematical terms and put them together in a form that allows the model to predict the change in variables such as prices, output and economic welfare resulting from a change in economic policies, given information about technology (the inputs required to produce a unit of output), policies and consumer preferences. They do this by seeking prices at which supply equals demand in every market goods, factors, foreign exchange. One of the great strengths of CGE models is that they impose consistency of one's view of the world, e.g., that all exports are imported by another country, that the sum of sectors' employment does not exceed the labour force, or that all consumption be covered by production or imports. This consistency can often generate empirical insights that might otherwise be overlooked in complex policy analysis - such as the fact that import protection gives rise to an implicit tax on exports. A key component of GTAP is a CGE model known as the GTAP Model, which is briefly documented in the GTAP book (Hertel, 1997). Another component of this project is the GTAP Data Base which underlies the GTAP Model.

The mathematical relationships assumed in the GTAP Model are generally rather simple, and although many markets are recognised, they still have to be very aggregated—particularly for global economic analysis. The GTAP Data Base underlying the GTAP Model has 57 sectors (in version 6), so, for example, transport and communications services appear as a single industry. In principle all the relationships in a model could be estimated from detailed data on the economy over many years. In practice, however, their number and parameterisation generally outweigh the data available. In the GTAP Model, only the most important relationships have been econometrically estimated. These include the international trade elasticities (Hertel et al., 2005), and the agricultural factor supply and demand elasticities (OECD, 2001). The remaining economic relationships are based on literature reviews, with a healthy dose of theory and intuition. An important limitation of CGE models is that very few of them are tested as a whole against historical experience—although GTAP is one such model.

The standard GTAP Model is amenable to modifications. Many of these modifications are documented in the GTAP Applications.

CGE modelling is a very powerful tool, allowing economists to explore numerically a huge range of issues on which econometric estimation would be impossible; in particular to forecast the effects of future policy changes. The models have their limitations, however. First, CGE simulations are not unconditional predictions but rather thought experiments about what the world would be like if the policy change had been operative in the assumed

circumstances and year. The real world will doubtless have changed by the time we get there. Second, while CGE models are quantitative, they are not empirical in the sense of econometric modelling; they are basically theoretical, with limited possibilities for rigorous testing against experience. Third, conclusions about trade policy are very sensitive to the levels assumed for trade restrictions in the base data. One can readily do sensitivity analysis on the parameter values assumed for economic behaviour, although less so on the data, because altering one element of the base data requires compensating changes elsewhere in order to keep the national accounts and social accounting matrix in balance. Of course, many of these criticisms apply to other types of economic modelling, and therefore, while imperfect, CGE models remain the preferred tool for analysis of global trade policy issues.

Using GTAP for estimating effects of Trade defence measures

The GTAP model has been adapted for estimating the trade effects of NTMs. First of all NTMs in the last year, 2017-2018, have been disaggregated into trade defence measures and SPS/TBT effects. In the case of trade defence measures the methodology is fairly straightforward. The CVD or anti-dumping duties are added to the tariff and the model is shocked for trade effects. The data on CVD for example is given below.

Table 1: CVD cases and duties against India in 2017

Sr. No	Country	Name of the Product	Date of Initiation	Final Findings	Remarks
1	China	Ortho Chloro Para Nitro aniline	13-02-2017	Aarti Industries: 21.20%, All others: 166.80%	Aarti is the sole exporter of the product to China
2	US-DOC	Cold Drawn Mechanical Tubing	16-05-2017	Tubes India: 42.60%, Good Luck: 8.02%, All others: 22.41%	Applied AFA on Tubes India Ltd. as they had provided the wrong Information
3	US-DOC	Fine Denier Polyester Staple Fibre	27-06-2017	RIL: 27.36 Bombay Dyeing: 13.38% Others: 24.80%	RIL had hidden some information so USDOC had imposed AFA
4	Mexico	Dicloxacillin Sodium	08-08-2017	No exporter participated 64.90	Mexico has continued the duty determined during 2012
5	Canada	Polyethylene Terephthalate Resin	18-08-2017	RIL: 04.00%, All others: 35.20%	Only RIL had participated in this investigation
6	US-DOC	Stainless Steel flanges	11-09-2017	Echjay: 4.92%, Bebitz: 256.16%. All others: 4.92%	AFA imposed on Bebitz as they had not filed the complete response. GOI had raised the issue in all its submissions, but USDOC not agreed to accept the response of Bebitz

Sr. No	Country	Name of the Product	Date of Initiation	Final Findings	Remarks
7	US-DOC	Polytetrafluoro Ethylene (PTFE)	26-10-2017	Gujarat Flourochemicals: 3.60%, All others: 3.60	No duty imposed as there is no injury to DI from the import from India
8	CBSA	Carbon Welded Steel Pipes	11-12-2017	Manu International and Surya Roshni Ltd. CVD of 7,844 rupees per MT 20% of the export price	

Source: Ministry of Commerce, Government of India

The methodology consists of first converting the Product at HS6 level to the HS4 sector. So for instance if 2 of the HS 6 lines in the HS4 category is subject to TDM, the percentage trade in the HS4 line is converted to the HS 4 category and mapped on to the GTAP sector. The correspondence and mapping is shown in Table 4 below. Subsequently, tariff shocks equivalent to CVD, safeguards, and antidumping duties were introduced in the GTAP framework. These shocks changed all prices and established a new equilibrium which showed trade, output and employment changes because of the trade defence measures.

Table 2: Safeguards

Member imposing country	In force	Product description	Avg. MFN Applied duties
Chile	22-Apr-16	Steel wire rod	
China	22-May-17	Sugar	9.7
Costa Rica	19-Feb-15	Pounded rice	19.1
Egypt	15-Apr-15	Steel rebars	0
India	29-Mar-16	Hot-rolled flat products of non-alloy and other alloy steel in coils of a width of 600 mm or more	
India	23-Nov-16	Hot rolled flat sheets and plates of alloy or non-alloy steel	
Indonesia	17-Aug-15	Bars and rods, hot-rolled, in irregularly wound coils	
Indonesia	21-Jan-15	I and H sections of other alloy steel	
Indonesia	7-Sep-15	Coated paper and paper board	
Indonesia	10-Jul-18	Ceramic flags and paving	7.3
Jordan	16-Apr-15	Writing and printing papers size A4)	
Jordan	16-Jun-15	Bars and rods of iron and steel	
Jordan	15-May-17	Aluminium bars, rods and profiles	10.9
Kyrgyz Republic	12-Aug-15		
Kyrgyz Republic	12-Aug-15	Combine harvesters and modules	
Kyrgyz Republic	12-Aug-15	Tableware and kitchenware	
Kyrgyz Republic	12-Aug-15		

Member imposing country	In force	Product description	Avg. MFN Applied duties
Kyrgyz Republic	12-Aug-15	Wheat flour	0
Malaysia	11-Sep-15	Hot-rolled coils	
Malaysia	2-Jul-15	Hot-rolled steel plate	
Malaysia	14-Apr-17	Steel concrete reinforcing bar	6.0
Malaysia	15-Apr-17	Steel wire rod and deformed bar-in-coil	6.0
Morocco	1-May-15	Cold-rolled sheets and plated or coated sheets	
Morocco	1-Jan-17	Paper in rolls and paper in reams	
Philippines	1-May-15	Newsprint	
South Africa	11-Aug-17	Certain flat-rolled products of iron, non-alloy steel or other alloy steel	
Thailand	15-Sep-16	Hot rolled steel flat products with certain amounts of alloying elements	2.8
Thailand	28-Jan-17	Structural hot rolled H-Beam with alloy	
Turkey	1-Jun-15	Wallpaper and similar wallcoverings	
Turkey	17-Oct-17	Toothbrushes	13.2
Ukraine	1-Jun-16	Flexible porous plates, blocks and sheets of polyurethane foam	
Vietnam	25-Mar-16	Monosodium glutamate	
Vietnam	1-Aug-16	Semi-finished and certain finished products of alloy and non-alloy steel	
Vietnam	19-Aug-17	Mineral or chemical fertilisers	10.5
Vietnam	15-Jun-17	Pre-painted galvanised steel sheet and strip	10.5
Zambia	10-Jul-15	Flat-rolled products of iron or non-alloy steel, trailers and semi-trailers	

Table 3: Anti-dumping

Member imposing country	In force	Product description	Avg. MFN Applied duties
Argentina	10-Dec-15	Non-adjustable spanners and wrenches	35
Argentina	16-Feb-18	Flags and paving or tiles	
Australia	16-Aug-17	Zinc coated (galvanised) steel	
Brazil	22-May-15	PET films	12.5
Brazil	28-Nov-16	PET Resin	
Brazil	19-Jun-18	Grinding balls	
Canada	2-Apr-15	Certain oil country tubular goods	0
China	13-Feb-18	Ortho chloro para nitroaniline	

Member imposing country	In force	Product description	Avg. MFN Applied duties
China	31-May-18	Meta phenoxy benzaldehyde	
Colombia	9-Dec-15	High-pressure decorative laminates	
Egypt	3-Nov-15	Polyethylene tere-phthalate (PET)	0
European Union	18-Mar-16	Tubes and pipes of ductile cast iron	
Indonesia	7-Dec-15	Biaxially oriented polyethelene	10
Korea, Republic of	19-Nov-15	Ethyl acetate	5.5
Korea, Republic of	29-Nov-17	Ferro silico manganese	
Mexico	21-Apr-16	Carbon steel tubing with straight longitudinal or helical seams	
Mexico	19-Oct-16	Ferro silico manganese	
Pakistan	23-Dec-15	Sorbitol 70% solution	
Pakistan	18-Oct-17	Cotton yarn 55.5 and above	
Pakistan	27-Jan-18	Sulphonic acid	
Chinese Taipei	22-Aug-16	Carbon steel plate	
Turkey	21-Jun-18	Polyester partially oriented yarn	13.2
United States of America	6-May-16	Certain polyethylene terephthalate resin	
United States of America	25-Jul-16	Corrosion-resistant steel products	
United States of America	20-Sep-16	Cold-rolled steel flat products	
United States of America	17-Nov-16	Welded stainless pressure pipe	
United States of America	6-Mar-17	Certain new pneumatic off-the-road tyres	
United States of America	24-Aug-17	Finished carbon steel flanges	
United States of America	11-Jun-18	Cold-drawn mechanical tubing of carbon and alloy steel	

Estimating the effects of SPS/TBT Measures on Trade

Following steps were followed in the GTAP model to estimate the effects of trade:

1. Each HS 4 chapter with a coverage ratio data was first mapped on to the general GTAP database.
2. The coverage ratio data was used to understand the proportion of GTAP sectors subject to TBTs and SPS.
3. One assumption was introduced here. It was assumed that in the limit SPS and TBT measures reduce exports to 0. This is validated by empirical evidence which shows that when MRLs are reduced, export consignments are rejected, thus reducing, the value to 0.
4. Multiplying coverage ratio by -100% the shock at the bilateral commodity level on GTAP aggregation was obtained. Thus exports were made exogenous and tariffs endogenous in this section of the analysis.
5. For example the shock was the bilateral exports from India to US adjusted for the coverage ratio in the particular product on which SPS or TBT measure was applicable.
6. From this shock the AVE was generated by the model itself. Hence at this step of the exercise tariffs were made endogenous and exports exogenous.
7. In the second step this AVE was made exogenous and the model effects on export, employment and output were generated.

Table 4: Mapping of HS 4 chapters to GTAP sectors

No.	Modified HS4 code	GTAP no.	GTAP code	Description	GTAP Description
1	PDR1006p	1	PDR	1006(part):	Paddy rice
2	WHT1001	2	WHT	1001:00:00	Wheat
3	GRO1002	3	GRO	1002:00:00	Cereal grains nec
4	GRO1003	3	GRO	1003:00:00	Cereal grains nec
5	GRO1004	3	GRO	1004:00:00	Cereal grains nec
6	GRO1005	3	GRO	1005:00:00	Cereal grains nec
7	GRO1007	3	GRO	1007:00:00	Cereal grains nec
8	GRO1008	3	GRO	1008:00:00	Cereal grains nec
9	V_F0701	4	V_F	701:00:00	Vegetables, fruit, nuts
10	V_F0702	4	V_F	702:00:00	Vegetables, fruit, nuts
11	V_F0703	4	V_F	703:00:00	Vegetables, fruit, nuts
12	V_F0704	4	V_F	704:00:00	Vegetables, fruit, nuts
13	V_F0705	4	V_F	705:00:00	Vegetables, fruit, nuts
14	V_F0706	4	V_F	706:00:00	Vegetables, fruit, nuts
15	V_F0707	4	V_F	707:00:00	Vegetables, fruit, nuts
16	V_F0708	4	V_F	708:00:00	Vegetables, fruit, nuts
17	V_F0709	4	V_F	709:00:00	Vegetables, fruit, nuts
18	V_F0713	4	V_F	713:00:00	Vegetables, fruit, nuts

No.	Modified HS4 code	GTAP no.	GTAP code	Description	GTAP Description
19	V_F0714	4	V_F	714:00:00	Vegetables, fruit, nuts
20	V_F0801	4	V_F	801:00:00	Vegetables, fruit, nuts
21	V_F0802	4	V_F	802:00:00	Vegetables, fruit, nuts
22	V_F0803	4	V_F	803:00:00	Vegetables, fruit, nuts
23	V_F0804	4	V_F	804:00:00	Vegetables, fruit, nuts
24	V_F0805	4	V_F	805:00:00	Vegetables, fruit, nuts
25	V_F0806	4	V_F	806:00:00	Vegetables, fruit, nuts
26	V_F0807	4	V_F	807:00:00	Vegetables, fruit, nuts
27	V_F0808	4	V_F	808:00:00	Vegetables, fruit, nuts
28	V_F0809	4	V_F	809:00:00	Vegetables, fruit, nuts
29	V_F0810	4	V_F	810:00:00	Vegetables, fruit, nuts
30	V_F0813	4	V_F	813:00:00	Vegetables, fruit, nuts
31	OSD1201	5	OSD	1201:00:00	Oil seeds
32	OSD1202	5	OSD	1202:00:00	Oil seeds
33	OSD1203	5	OSD	1203:00:00	Oil seeds
34	OSD1204	5	OSD	1204:00:00	Oil seeds
35	OSD1205	5	OSD	1205:00:00	Oil seeds
36	OSD1206	5	OSD	1206:00:00	Oil seeds
37	OSD1207	5	OSD	1207:00:00	Oil seeds
38	C_B1212p	6	C_B	1212(part):	Sugar cane, sugar beet
39	PFB5201	7	PFB	5201:00:00	Plant-based fibres
40	PFB5301p	7	PFB	5301(part):	Plant-based fibres
41	PFB5302p	7	PFB	5302(part):	Plant-based fibres
42	PFB5303p	7	PFB	5303(part):	Plant-based fibres
43	PFB5305	7	PFB	5305:00:00	Plant-based fibres
44	OCR0601	8	OCR	601:00:00	Crops nec
45	OCR0602	8	OCR	602:00:00	Crops nec
46	OCR0603	8	OCR	603:00:00	Crops nec
47	OCR0901p	8	OCR	0901(part):	Crops nec
48	OCR0902p	8	OCR	0902(part):	Crops nec
49	OCR0903	8	OCR	903:00:00	Crops nec
50	OCR0904	8	OCR	904:00:00	Crops nec
51	OCR0905	8	OCR	905:00:00	Crops nec
52	OCR0906	8	OCR	906:00:00	Crops nec
53	OCR0907	8	OCR	907:00:00	Crops nec
54	OCR0908	8	OCR	908:00:00	Crops nec
55	OCR0909	8	OCR	909:00:00	Crops nec

No.	Modified HS4 code	GTAP no.	GTAP code	Description	GTAP Description
56	OCR0910	8	OCR	910:00:00	Crops nec
57	OCR1209	8	OCR	1209:00:00	Crops nec
58	OCR1210	8	OCR	1210:00:00	Crops nec
59	OCR1211	8	OCR	1211:00:00	Crops nec
60	OCR1212p	8	OCR	1212(part):	Crops nec
61	OCR1213	8	OCR	1213:00:00	Crops nec
62	OCR1214	8	OCR	1214:00:00	Crops nec
63	OCR1404p	8	OCR	1404(part):	Crops nec
64	OCR1801	8	OCR	1801:00:00	Crops nec
65	OCR2308	8	OCR	2308:00:00	Crops nec
66	OCR2401	8	OCR	2401:00:00	Crops nec
67	CTL0101	9	CTL	101:00:00	Cattle,sheep,goats,horses
68	CTL0102	9	CTL	102:00:00	Cattle,sheep,goats,horses
69	CTL0104	9	CTL	104:00:00	Cattle,sheep,goats,horses
70	CTL0511p	9	CTL	0511(part):	Cattle,sheep,goats,horses
71	OAP0103	10	OAP	103:00:00	Animal products nec
72	OAP0105	10	OAP	105:00:00	Animal products nec
73	OAP0106	10	OAP	106:00:00	Animal products nec
74	OAP0208p	10	OAP	0208(part):	Animal products nec
75	OAP0307p	10	OAP	0307(part):	Animal products nec
76	OAP0407	10	OAP	407:00:00	Animal products nec
77	OAP0409	10	OAP	409:00:00	Animal products nec
78	OAP0410	10	OAP	410:00:00	Animal products nec
79	OAP0502	10	OAP	502:00:00	Animal products nec
80	OAP0504	10	OAP	504:00:00	Animal products nec
81	OAP0505	10	OAP	505:00:00	Animal products nec
82	OAP0506	10	OAP	506:00:00	Animal products nec
83	OAP0507	10	OAP	507:00:00	Animal products nec
84	OAP0510	10	OAP	510:00:00	Animal products nec
85	OAP0511p	10	OAP	0511(part):	Animal products nec
86	OAP1521p	10	OAP	1521(part):	Animal products nec
87	OAP4101	10	OAP	4101:00:00	Animal products nec
88	OAP4102	10	OAP	4102:00:00	Animal products nec
89	OAP4103	10	OAP	4103:00:00	Animal products nec
90	OAP4301	10	OAP	4301:00:00	Animal products nec

No.	Modified HS4 code	GTAP no.	GTAP code	Description	GTAP Description
91	WOL5001	12	WOL	5001:00:00	Wool, silk-worm cocoons
92	WOL5101p	12	WOL	5101(part):	Wool, silk-worm cocoons
93	WOL5102	12	WOL	5102:00:00	Wool, silk-worm cocoons
94	FRS0604	13	FRS	604:00:00	Forestry
95	FRS1301	13	FRS	1301:00:00	Forestry
96	FRS1401	13	FRS	1401:00:00	Forestry
97	FRS4001p	13	FRS	4001(part):	Forestry
98	FRS4401p	13	FRS	4401(part):	Forestry
99	FRS4403p	13	FRS	4403(part):	Forestry
100	FRS4404	13	FRS	4404:00:00	Forestry
101	FRS4501p	13	FRS	4501(part):	Forestry
102	FSH0301	14	FSH	301:00:00	Fishing
103	FSH0302p	14	FSH	0302(part):	Fishing
104	FSH0306p	14	FSH	0306(part):	Fishing
105	FSH0307p	14	FSH	0307(part):	Fishing
106	FSH0508	14	FSH	508:00:00	Fishing
107	FSH1212p	14	FSH	1212(part):	Fishing
108	FSH7101p	14	FSH	7101(part):	Fishing
109	COA2701	15	COA	2701:00:00	Coal
110	COA2702	15	COA	2702:00:00	Coal
111	OIL2709	16	OIL	2709:00:00	Oil
112	OIL2714p	16	OIL	2714(part):	Oil
113	GAS2711p	17	GAS	2711(part):	Gas
114	OMN2501	18	OMN	2501:00:00	Minerals nec
115	OMN2502	18	OMN	2502:00:00	Minerals nec
116	OMN2503	18	OMN	2503:00:00	Minerals nec
117	OMN2504	18	OMN	2504:00:00	Minerals nec
118	OMN2505	18	OMN	2505:00:00	Minerals nec
119	OMN2506	18	OMN	2506:00:00	Minerals nec
120	OMN2507	18	OMN	2507:00:00	Minerals nec
121	OMN2508	18	OMN	2508:00:00	Minerals nec
122	OMN2509	18	OMN	2509:00:00	Minerals nec
123	OMN2510	18	OMN	2510:00:00	Minerals nec
124	OMN2511	18	OMN	2511:00:00	Minerals nec
125	OMN2512	18	OMN	2512:00:00	Minerals nec

No.	Modified HS4 code	GTAP no.	GTAP code	Description	GTAP Description
126	OMN2513	18	OMN	2513:00:00	Minerals nec
127	OMN2514	18	OMN	2514:00:00	Minerals nec
128	OMN2515	18	OMN	2515:00:00	Minerals nec
129	OMN2516	18	OMN	2516:00:00	Minerals nec
130	OMN2517	18	OMN	2517:00:00	Minerals nec
131	OMN2518p	18	OMN	2518(part):	Minerals nec
132	OMN2519	18	OMN	2519:00:00	Minerals nec
133	OMN2520p	18	OMN	2520(part):	Minerals nec
134	OMN2521	18	OMN	2521:00:00	Minerals nec
135	OMN2524	18	OMN	2524:00:00	Minerals nec
136	OMN2525	18	OMN	2525:00:00	Minerals nec
137	OMN2526	18	OMN	2526:00:00	Minerals nec
138	OMN2528	18	OMN	2528:00:00	Minerals nec
139	OMN2529	18	OMN	2529:00:00	Minerals nec
140	OMN2530	18	OMN	2530:00:00	Minerals nec
141	OMN2601p	18	OMN	2601(part):	Minerals nec
142	OMN2602	18	OMN	2602:00:00	Minerals nec
143	OMN2603	18	OMN	2603:00:00	Minerals nec
144	OMN2604	18	OMN	2604:00:00	Minerals nec
145	OMN2605	18	OMN	2605:00:00	Minerals nec
146	OMN2606	18	OMN	2606:00:00	Minerals nec
147	OMN2607	18	OMN	2607:00:00	Minerals nec
148	OMN2608	18	OMN	2608:00:00	Minerals nec
149	OMN2609	18	OMN	2609:00:00	Minerals nec
150	OMN2610	18	OMN	2610:00:00	Minerals nec
151	OMN2611	18	OMN	2611:00:00	Minerals nec
152	OMN2612	18	OMN	2612:00:00	Minerals nec
153	OMN2613	18	OMN	2613:00:00	Minerals nec
154	OMN2614	18	OMN	2614:00:00	Minerals nec
155	OMN2615	18	OMN	2615:00:00	Minerals nec
156	OMN2616	18	OMN	2616:00:00	Minerals nec
157	OMN2617	18	OMN	2617:00:00	Minerals nec
158	OMN2621	18	OMN	2621:00:00	Minerals nec
159	OMN2703	18	OMN	2703:00:00	Minerals nec
160	OMN2714p	18	OMN	2714(part):	Minerals nec

No.	Modified HS4 code	GTAP no.	GTAP code	Description	GTAP Description
161	OMN7102p	18	OMN	7102(part):	Minerals nec
162	OMN7103p	18	OMN	7103(part):	Minerals nec
163	CMT0201	19	CMT	201:00:00	Meat: cattle,sheep,goats,horse
164	CMT0202	19	CMT	202:00:00	Meat: cattle,sheep,goats,horse
165	CMT0204	19	CMT	204:00:00	Meat: cattle,sheep,goats,horse
166	CMT0205	19	CMT	205:00:00	Meat: cattle,sheep,goats,horse
167	CMT0206	19	CMT	206:00:00	Meat: cattle,sheep,goats,horse
168	CMT0209	19	CMT	209:00:00	Meat: cattle,sheep,goats,horse
169	CMT1501	19	CMT	1501:00:00	Meat: cattle,sheep,goats,horse
170	CMT1502	19	CMT	1502:00:00	Meat: cattle,sheep,goats,horse
171	CMT1505	19	CMT	1505:00:00	Meat: cattle,sheep,goats,horse
172	OMT0203	20	OMT	203:00:00	Meat products nec
173	OMT0207	20	OMT	207:00:00	Meat products nec
174	OMT0208p	20	OMT	0208(part):	Meat products nec
175	OMT0210	20	OMT	210:00:00	Meat products nec
176	OMT1503	20	OMT	1503:00:00	Meat products nec
177	OMT1504	20	OMT	1504:00:00	Meat products nec
178	OMT1506	20	OMT	1506:00:00	Meat products nec
179	OMT1601	20	OMT	1601:00:00	Meat products nec
180	OMT1602p	20	OMT	1602(part):	Meat products nec
181	OMT1603	20	OMT	1603:00:00	Meat products nec
182	OMT2301p	20	OMT	2301(part):	Meat products nec
183	VOL1208	21	VOL	1208:00:00	Vegetable oils and fats
184	VOL1404p	21	VOL	1404(part):	Vegetable oils and fats
185	VOL1507	21	VOL	1507:00:00	Vegetable oils and fats
186	VOL1508	21	VOL	1508:00:00	Vegetable oils and fats
187	VOL1509	21	VOL	1509:00:00	Vegetable oils and fats
188	VOL1510	21	VOL	1510:00:00	Vegetable oils and fats
189	VOL1511	21	VOL	1511:00:00	Vegetable oils and fats
190	VOL1512	21	VOL	1512:00:00	Vegetable oils and fats
191	VOL1513	21	VOL	1513:00:00	Vegetable oils and fats
192	VOL1514	21	VOL	1514:00:00	Vegetable oils and fats
193	VOL1515	21	VOL	1515:00:00	Vegetable oils and fats
194	VOL1516	21	VOL	1516:00:00	Vegetable oils and fats
195	VOL1517	21	VOL	1517:00:00	Vegetable oils and fats

No.	Modified HS4 code	GTAP no.	GTAP code	Description	GTAP Description
196	VOL1521p	21	VOL	1521(part):	Vegetable oils and fats
197	VOL1522	21	VOL	1522:00:00	Vegetable oils and fats
198	VOL2304	21	VOL	2304:00:00	Vegetable oils and fats
199	VOL2305	21	VOL	2305:00:00	Vegetable oils and fats
200	VOL2306	21	VOL	2306:00:00	Vegetable oils and fats
201	MIL0401	22	MIL	401:00:00	Dairy products
202	MIL0402	22	MIL	402:00:00	Dairy products
203	MIL0403	22	MIL	403:00:00	Dairy products
204	MIL0404	22	MIL	404:00:00	Dairy products
205	MIL0405	22	MIL	405:00:00	Dairy products
206	MIL0406	22	MIL	406:00:00	Dairy products
207	MIL1702p	22	MIL	1702(part):	Dairy products
208	MIL2105	22	MIL	2105:00:00	Dairy products
209	MIL3501p	22	MIL	3501(part):	Dairy products
210	PCR1006p	23	PCR	1006(part):	Processed rice
211	SGR1701	24	SGR	1701:00:00	Sugar
212	SGR1702p	24	SGR	1702(part):	Sugar
213	SGR1703	24	SGR	1703:00:00	Sugar
214	OFD0302p	25	OFD	0302(part):	Food products nec
215	OFD0303	25	OFD	303:00:00	Food products nec
216	OFD0304	25	OFD	304:00:00	Food products nec
217	OFD0305	25	OFD	305:00:00	Food products nec
218	OFD0306p	25	OFD	0306(part):	Food products nec
219	OFD0307p	25	OFD	0307(part):	Food products nec
220	OFD0408	25	OFD	408:00:00	Food products nec
221	OFD0511p	25	OFD	0511(part):	Food products nec
222	OFD0710	25	OFD	710:00:00	Food products nec
223	OFD0711	25	OFD	711:00:00	Food products nec
224	OFD0712	25	OFD	712:00:00	Food products nec
225	OFD0811	25	OFD	811:00:00	Food products nec
226	OFD0812	25	OFD	812:00:00	Food products nec
227	OFD0814	25	OFD	814:00:00	Food products nec
228	OFD0901p	25	OFD	0901(part):	Food products nec
229	OFD0902p	25	OFD	0902(part):	Food products nec
230	OFD1101	25	OFD	1101:00:00	Food products nec

No.	Modified HS4 code	GTAP no.	GTAP code	Description	GTAP Description
231	OFD1102	25	OFD	1102:00:00	Food products nec
232	OFD1103	25	OFD	1103:00:00	Food products nec
233	OFD1104	25	OFD	1104:00:00	Food products nec
234	OFD1105	25	OFD	1105:00:00	Food products nec
235	OFD1106	25	OFD	1106:00:00	Food products nec
236	OFD1108	25	OFD	1108:00:00	Food products nec
237	OFD1109	25	OFD	1109:00:00	Food products nec
238	OFD1302	25	OFD	1302:00:00	Food products nec
239	OFD1602p	25	OFD	1602(part):	Food products nec
240	OFD1604	25	OFD	1604:00:00	Food products nec
241	OFD1605	25	OFD	1605:00:00	Food products nec
242	OFD1702p	25	OFD	1702(part):	Food products nec
243	OFD1704	25	OFD	1704:00:00	Food products nec
244	OFD1802	25	OFD	1802:00:00	Food products nec
245	OFD1803	25	OFD	1803:00:00	Food products nec
246	OFD1804	25	OFD	1804:00:00	Food products nec
247	OFD1805	25	OFD	1805:00:00	Food products nec
248	OFD1806	25	OFD	1806:00:00	Food products nec
249	OFD1901	25	OFD	1901:00:00	Food products nec
250	OFD1902	25	OFD	1902:00:00	Food products nec
251	OFD1903	25	OFD	1903:00:00	Food products nec
252	OFD1904	25	OFD	1904:00:00	Food products nec
253	OFD1905	25	OFD	1905:00:00	Food products nec
254	OFD2001	25	OFD	2001:00:00	Food products nec
255	OFD2002	25	OFD	2002:00:00	Food products nec
256	OFD2003	25	OFD	2003:00:00	Food products nec
257	OFD2004	25	OFD	2004:00:00	Food products nec
258	OFD2005	25	OFD	2005:00:00	Food products nec
259	OFD2006	25	OFD	2006:00:00	Food products nec
260	OFD2007	25	OFD	2007:00:00	Food products nec
261	OFD2008	25	OFD	2008:00:00	Food products nec
262	OFD2009	25	OFD	2009:00:00	Food products nec
263	OFD2101	25	OFD	2101:00:00	Food products nec
264	OFD2102	25	OFD	2102:00:00	Food products nec
265	OFD2103	25	OFD	2103:00:00	Food products nec

No.	Modified HS4 code	GTAP no.	GTAP code	Description	GTAP Description
266	OFD2104	25	OFD	2104:00:00	Food products nec
267	OFD2106	25	OFD	2106:00:00	Food products nec
268	OFD2209	25	OFD	2209:00:00	Food products nec
269	OFD2301p	25	OFD	2301(part):	Food products nec
270	OFD2302	25	OFD	2302:00:00	Food products nec
271	OFD2303p	25	OFD	2303(part):	Food products nec
272	OFD2309	25	OFD	2309:00:00	Food products nec
273	OFD3502p	25	OFD	3502(part):	Food products nec
274	OFD3505p	25	OFD	3505(part):	Food products nec
275	B_T1107	26	B_T	1107:00:00	Beverages and tobacco products
276	B_T2201	26	B_T	2201:00:00	Beverages and tobacco products
277	B_T2202	26	B_T	2202:00:00	Beverages and tobacco products
278	B_T2203	26	B_T	2203:00:00	Beverages and tobacco products
279	B_T2204	26	B_T	2204:00:00	Beverages and tobacco products
280	B_T2205	26	B_T	2205:00:00	Beverages and tobacco products
281	B_T2206	26	B_T	2206:00:00	Beverages and tobacco products
282	B_T2207	26	B_T	2207:00:00	Beverages and tobacco products
283	B_T2208	26	B_T	2208:00:00	Beverages and tobacco products
284	B_T2303p	26	B_T	2303(part):	Beverages and tobacco products
285	B_T2307	26	B_T	2307:00:00	Beverages and tobacco products
286	B_T2402	26	B_T	2402:00:00	Beverages and tobacco products
287	B_T2403	26	B_T	2403:00:00	Beverages and tobacco products
288	TEX5002	27	TEX	5002:00:00	Textiles
289	TEX5003	27	TEX	5003:00:00	Textiles
290	TEX5004	27	TEX	5004:00:00	Textiles
291	TEX5005	27	TEX	5005:00:00	Textiles
292	TEX5006	27	TEX	5006:00:00	Textiles
293	TEX5007	27	TEX	5007:00:00	Textiles
294	TEX5101p	27	TEX	5101(part):	Textiles
295	TEX5103	27	TEX	5103:00:00	Textiles
296	TEX5104	27	TEX	5104:00:00	Textiles
297	TEX5105	27	TEX	5105:00:00	Textiles
298	TEX5106	27	TEX	5106:00:00	Textiles
299	TEX5107	27	TEX	5107:00:00	Textiles
300	TEX5108	27	TEX	5108:00:00	Textiles

No.	Modified HS4 code	GTAP no.	GTAP code	Description	GTAP Description
301	TEX5109	27	TEX	5109:00:00	Textiles
302	TEX5110	27	TEX	5110:00:00	Textiles
303	TEX5111	27	TEX	5111:00:00	Textiles
304	TEX5112	27	TEX	5112:00:00	Textiles
305	TEX5113	27	TEX	5113:00:00	Textiles
306	TEX5202	27	TEX	5202:00:00	Textiles
307	TEX5203	27	TEX	5203:00:00	Textiles
308	TEX5204	27	TEX	5204:00:00	Textiles
309	TEX5205	27	TEX	5205:00:00	Textiles
310	TEX5206	27	TEX	5206:00:00	Textiles
311	TEX5207	27	TEX	5207:00:00	Textiles
312	TEX5208	27	TEX	5208:00:00	Textiles
313	TEX5209	27	TEX	5209:00:00	Textiles
314	TEX5210	27	TEX	5210:00:00	Textiles
315	TEX5211	27	TEX	5211:00:00	Textiles
316	TEX5212	27	TEX	5212:00:00	Textiles
317	TEX5301p	27	TEX	5301(part):	Textiles
318	TEX5302p	27	TEX	5302(part):	Textiles
319	TEX5303p	27	TEX	5303(part):	Textiles
320	TEX5306	27	TEX	5306:00:00	Textiles
321	TEX5307	27	TEX	5307:00:00	Textiles
322	TEX5308	27	TEX	5308:00:00	Textiles
323	TEX5309	27	TEX	5309:00:00	Textiles
324	TEX5310	27	TEX	5310:00:00	Textiles
325	TEX5311	27	TEX	5311:00:00	Textiles
326	TEX5401	27	TEX	5401:00:00	Textiles
327	TEX5402	27	TEX	5402:00:00	Textiles
328	TEX5403	27	TEX	5403:00:00	Textiles
329	TEX5404	27	TEX	5404:00:00	Textiles
330	TEX5405	27	TEX	5405:00:00	Textiles
331	TEX5406	27	TEX	5406:00:00	Textiles
332	TEX5407	27	TEX	5407:00:00	Textiles
333	TEX5408	27	TEX	5408:00:00	Textiles
334	TEX5501	27	TEX	5501:00:00	Textiles
335	TEX5502	27	TEX	5502:00:00	Textiles

No.	Modified HS4 code	GTAP no.	GTAP code	Description	GTAP Description
336	TEX5503	27	TEX	5503:00:00	Textiles
337	TEX5504	27	TEX	5504:00:00	Textiles
338	TEX5505	27	TEX	5505:00:00	Textiles
339	TEX5506	27	TEX	5506:00:00	Textiles
340	TEX5507	27	TEX	5507:00:00	Textiles
341	TEX5508	27	TEX	5508:00:00	Textiles
342	TEX5509	27	TEX	5509:00:00	Textiles
343	TEX5510	27	TEX	5510:00:00	Textiles
344	TEX5511	27	TEX	5511:00:00	Textiles
345	TEX5512	27	TEX	5512:00:00	Textiles
346	TEX5513	27	TEX	5513:00:00	Textiles
347	TEX5514	27	TEX	5514:00:00	Textiles
348	TEX5515	27	TEX	5515:00:00	Textiles
349	TEX5516	27	TEX	5516:00:00	Textiles
350	TEX5601	27	TEX	5601:00:00	Textiles
351	TEX5602	27	TEX	5602:00:00	Textiles
352	TEX5603	27	TEX	5603:00:00	Textiles
353	TEX5604	27	TEX	5604:00:00	Textiles
354	TEX5605	27	TEX	5605:00:00	Textiles
355	TEX5606	27	TEX	5606:00:00	Textiles
356	TEX5607	27	TEX	5607:00:00	Textiles
357	TEX5608	27	TEX	5608:00:00	Textiles
358	TEX5609	27	TEX	5609:00:00	Textiles
359	TEX5701	27	TEX	5701:00:00	Textiles
360	TEX5702	27	TEX	5702:00:00	Textiles
361	TEX5703	27	TEX	5703:00:00	Textiles
362	TEX5704	27	TEX	5704:00:00	Textiles
363	TEX5705	27	TEX	5705:00:00	Textiles
364	TEX5801	27	TEX	5801:00:00	Textiles
365	TEX5802	27	TEX	5802:00:00	Textiles
366	TEX5803	27	TEX	5803:00:00	Textiles
367	TEX5804	27	TEX	5804:00:00	Textiles
368	TEX5805	27	TEX	5805:00:00	Textiles
369	TEX5806	27	TEX	5806:00:00	Textiles
370	TEX5807	27	TEX	5807:00:00	Textiles

No.	Modified HS4 code	GTAP no.	GTAP code	Description	GTAP Description
371	TEX5808	27	TEX	5808:00:00	Textiles
372	TEX5809	27	TEX	5809:00:00	Textiles
373	TEX5810	27	TEX	5810:00:00	Textiles
374	TEX5811	27	TEX	5811:00:00	Textiles
375	TEX5901	27	TEX	5901:00:00	Textiles
376	TEX5902	27	TEX	5902:00:00	Textiles
377	TEX5903	27	TEX	5903:00:00	Textiles
378	TEX5906p	27	TEX	5906(part):	Textiles
379	TEX5907	27	TEX	5907:00:00	Textiles
380	TEX5908	27	TEX	5908:00:00	Textiles
381	TEX5909	27	TEX	5909:00:00	Textiles
382	TEX5910	27	TEX	5910:00:00	Textiles
383	TEX5911	27	TEX	5911:00:00	Textiles
384	TEX6001	27	TEX	6001:00:00	Textiles
385	TEX6002	27	TEX	6002:00:00	Textiles
386	TEX6003	27	TEX	6003:00:00	Textiles
387	TEX6004	27	TEX	6004:00:00	Textiles
388	TEX6005	27	TEX	6005:00:00	Textiles
389	TEX6006	27	TEX	6006:00:00	Textiles
390	TEX6109	27	TEX	6109:00:00	Textiles
391	TEX6110	27	TEX	6110:00:00	Textiles
392	TEX6115	27	TEX	6115:00:00	Textiles
393	TEX6301p	27	TEX	6301(part):	Textiles
394	TEX6302	27	TEX	6302:00:00	Textiles
395	TEX6303	27	TEX	6303:00:00	Textiles
396	TEX6304	27	TEX	6304:00:00	Textiles
397	TEX6305	27	TEX	6305:00:00	Textiles
398	TEX6306	27	TEX	6306:00:00	Textiles
399	TEX6307	27	TEX	6307:00:00	Textiles
400	TEX6308	27	TEX	6308:00:00	Textiles
401	TEX8804	27	TEX	8804:00:00	Textiles
402	TEX9404p	27	TEX	9404(part):	Textiles
403	WAP4203p	28	WAP	4203(part):	Wearing apparel
404	WAP4302	28	WAP	4302:00:00	Wearing apparel
405	WAP4303	28	WAP	4303:00:00	Wearing apparel

No.	Modified HS4 code	GTAP no.	GTAP code	Description	GTAP Description
406	WAP4304	28	WAP	4304:00:00	Wearing apparel
407	WAP6101	28	WAP	6101:00:00	Wearing apparel
408	WAP6102	28	WAP	6102:00:00	Wearing apparel
409	WAP6103	28	WAP	6103:00:00	Wearing apparel
410	WAP6104	28	WAP	6104:00:00	Wearing apparel
411	WAP6105	28	WAP	6105:00:00	Wearing apparel
412	WAP6106	28	WAP	6106:00:00	Wearing apparel
413	WAP6107	28	WAP	6107:00:00	Wearing apparel
414	WAP6108	28	WAP	6108:00:00	Wearing apparel
415	WAP6111	28	WAP	6111:00:00	Wearing apparel
416	WAP6112	28	WAP	6112:00:00	Wearing apparel
417	WAP6113	28	WAP	6113:00:00	Wearing apparel
418	WAP6114	28	WAP	6114:00:00	Wearing apparel
419	WAP6116	28	WAP	6116:00:00	Wearing apparel
420	WAP6117	28	WAP	6117:00:00	Wearing apparel
421	WAP6201	28	WAP	6201:00:00	Wearing apparel
422	WAP6202	28	WAP	6202:00:00	Wearing apparel
423	WAP6203	28	WAP	6203:00:00	Wearing apparel
424	WAP6204	28	WAP	6204:00:00	Wearing apparel
425	WAP6205	28	WAP	6205:00:00	Wearing apparel
426	WAP6206	28	WAP	6206:00:00	Wearing apparel
427	WAP6207	28	WAP	6207:00:00	Wearing apparel
428	WAP6208	28	WAP	6208:00:00	Wearing apparel
429	WAP6209	28	WAP	6209:00:00	Wearing apparel
430	WAP6210	28	WAP	6210:00:00	Wearing apparel
431	WAP6211	28	WAP	6211:00:00	Wearing apparel
432	WAP6212	28	WAP	6212:00:00	Wearing apparel
433	WAP6213	28	WAP	6213:00:00	Wearing apparel
434	WAP6214	28	WAP	6214:00:00	Wearing apparel
435	WAP6215	28	WAP	6215:00:00	Wearing apparel
436	WAP6216	28	WAP	6216:00:00	Wearing apparel
437	WAP6217	28	WAP	6217:00:00	Wearing apparel
438	WAP6501	28	WAP	6501:00:00	Wearing apparel
439	WAP6502	28	WAP	6502:00:00	Wearing apparel
440	WAP6504	28	WAP	6504:00:00	Wearing apparel

No.	Modified HS4 code	GTAP no.	GTAP code	Description	GTAP Description
441	WAP6505	28	WAP	6505:00:00	Wearing apparel
442	WAP6506p	28	WAP	6506(part):	Wearing apparel
443	WAP6507	28	WAP	6507:00:00	Wearing apparel
444	LEA4104	29	LEA	4104:00:00	Leather products
445	LEA4105	29	LEA	4105:00:00	Leather products
446	LEA4106	29	LEA	4106:00:00	Leather products
447	LEA4107	29	LEA	4107:00:00	Leather products
448	LEA4112	29	LEA	4112:00:00	Leather products
449	LEA4113	29	LEA	4113:00:00	Leather products
450	LEA4114	29	LEA	4114:00:00	Leather products
451	LEA4115	29	LEA	4115:00:00	Leather products
452	LEA4201	29	LEA	4201:00:00	Leather products
453	LEA4202	29	LEA	4202:00:00	Leather products
454	LEA4205	29	LEA	4205:00:00	Leather products
455	LEA6401	29	LEA	6401:00:00	Leather products
456	LEA6402	29	LEA	6402:00:00	Leather products
457	LEA6403	29	LEA	6403:00:00	Leather products
458	LEA6404	29	LEA	6404:00:00	Leather products
459	LEA6405	29	LEA	6405:00:00	Leather products
460	LEA6406	29	LEA	6406:00:00	Leather products
461	LEA9113p	29	LEA	9113(part):	Leather products
462	LEA9605	29	LEA	9605:00:00	Leather products
463	LUM4401p	30	LUM	4401(part):	Wood products
464	LUM4403p	30	LUM	4403(part):	Wood products
465	LUM4405	30	LUM	4405:00:00	Wood products
466	LUM4406	30	LUM	4406:00:00	Wood products
467	LUM4407	30	LUM	4407:00:00	Wood products
468	LUM4408	30	LUM	4408:00:00	Wood products
469	LUM4409	30	LUM	4409:00:00	Wood products
470	LUM4410	30	LUM	4410:00:00	Wood products
471	LUM4411	30	LUM	4411:00:00	Wood products
472	LUM4412	30	LUM	4412:00:00	Wood products
473	LUM4413	30	LUM	4413:00:00	Wood products
474	LUM4414	30	LUM	4414:00:00	Wood products
475	LUM4415	30	LUM	4415:00:00	Wood products
476	LUM4416	30	LUM	4416:00:00	Wood products
477	LUM4417	30	LUM	4417:00:00	Wood products

No.	Modified HS4 code	GTAP no.	GTAP code	Description	GTAP Description
478	LUM4418	30	LUM	4418:00:00	Wood products
479	LUM4419	30	LUM	4419:00:00	Wood products
480	LUM4420	30	LUM	4420:00:00	Wood products
481	LUM4421	30	LUM	4421:00:00	Wood products
482	LUM4501p	30	LUM	4501(part):	Wood products
483	LUM4502	30	LUM	4502:00:00	Wood products
484	LUM4503	30	LUM	4503:00:00	Wood products
485	LUM4504	30	LUM	4504:00:00	Wood products
486	LUM4601	30	LUM	4601:00:00	Wood products
487	LUM4602	30	LUM	4602:00:00	Wood products
488	LUM9401	30	LUM	9401:00:00	Wood products
489	LUM9403	30	LUM	9403:00:00	Wood products
490	LUM9404p	30	LUM	9404(part):	Wood products
491	LUM9610	30	LUM	9610:00:00	Wood products
492	PPP3804	31	PPP	3804:00:00	Paper products, publishing
493	PPP4701	31	PPP	4701:00:00	Paper products, publishing
494	PPP4702	31	PPP	4702:00:00	Paper products, publishing
495	PPP4703	31	PPP	4703:00:00	Paper products, publishing
496	PPP4704	31	PPP	4704:00:00	Paper products, publishing
497	PPP4705	31	PPP	4705:00:00	Paper products, publishing
498	PPP4706	31	PPP	4706:00:00	Paper products, publishing
499	PPP4707	31	PPP	4707:00:00	Paper products, publishing
500	PPP4801	31	PPP	4801:00:00	Paper products, publishing
501	PPP4802	31	PPP	4802:00:00	Paper products, publishing
502	PPP4803	31	PPP	4803:00:00	Paper products, publishing
503	PPP4804	31	PPP	4804:00:00	Paper products, publishing
504	PPP4805	31	PPP	4805:00:00	Paper products, publishing
505	PPP4806	31	PPP	4806:00:00	Paper products, publishing
506	PPP4807	31	PPP	4807:00:00	Paper products, publishing
507	PPP4808	31	PPP	4808:00:00	Paper products, publishing
508	PPP4809	31	PPP	4809:00:00	Paper products, publishing
509	PPP4810	31	PPP	4810:00:00	Paper products, publishing
510	PPP4811	31	PPP	4811:00:00	Paper products, publishing
511	PPP4812	31	PPP	4812:00:00	Paper products, publishing
512	PPP4813	31	PPP	4813:00:00	Paper products, publishing

No.	Modified HS4 code	GTAP no.	GTAP code	Description	GTAP Description
513	PPP4814	31	PPP	4814:00:00	Paper products, publishing
514	PPP4816	31	PPP	4816:00:00	Paper products, publishing
515	PPP4817	31	PPP	4817:00:00	Paper products, publishing
516	PPP4818	31	PPP	4818:00:00	Paper products, publishing
517	PPP4819	31	PPP	4819:00:00	Paper products, publishing
518	PPP4820	31	PPP	4820:00:00	Paper products, publishing
519	PPP4821	31	PPP	4821:00:00	Paper products, publishing
520	PPP4822	31	PPP	4822:00:00	Paper products, publishing
521	PPP4823	31	PPP	4823:00:00	Paper products, publishing
522	PPP4901	31	PPP	4901:00:00	Paper products, publishing
523	PPP4902	31	PPP	4902:00:00	Paper products, publishing
524	PPP4903	31	PPP	4903:00:00	Paper products, publishing
525	PPP4904	31	PPP	4904:00:00	Paper products, publishing
526	PPP4905	31	PPP	4905:00:00	Paper products, publishing
527	PPP4906	31	PPP	4906:00:00	Paper products, publishing
528	PPP4907	31	PPP	4907:00:00	Paper products, publishing
529	PPP4908	31	PPP	4908:00:00	Paper products, publishing
530	PPP4909	31	PPP	4909:00:00	Paper products, publishing
531	PPP4910	31	PPP	4910:00:00	Paper products, publishing
532	PPP4911	31	PPP	4911:00:00	Paper products, publishing
533	PPP5905	31	PPP	5905:00:00	Paper products, publishing
534	PPP8442p	31	PPP	8442(part):	Paper products, publishing
535	P_C2704	32	P_C	2704:00:00	Petroleum, coal products
536	P_C2706	32	P_C	2706:00:00	Petroleum, coal products
537	P_C2710	32	P_C	2710:00:00	Petroleum, coal products
538	P_C2711p	32	P_C	2711(part):	Petroleum, coal products
539	P_C2712	32	P_C	2712:00:00	Petroleum, coal products
540	P_C2713	32	P_C	2713:00:00	Petroleum, coal products
541	CRP1518	33	CRP	1518:00:00	Chemical,rubber,plastic prods
542	CRP1520	33	CRP	1520:00:00	Chemical,rubber,plastic prods
543	CRP2601p	33	CRP	2601(part):	Chemical,rubber,plastic prods
544	CRP2707	33	CRP	2707:00:00	Chemical,rubber,plastic prods
545	CRP2708	33	CRP	2708:00:00	Chemical,rubber,plastic prods
546	CRP2801	33	CRP	2801:00:00	Chemical,rubber,plastic prods
547	CRP2802	33	CRP	2802:00:00	Chemical,rubber,plastic prods

No.	Modified HS4 code	GTAP no.	GTAP code	Description	GTAP Description
548	CRP2803	33	CRP	2803:00:00	Chemical,rubber,plastic prods
549	CRP2804	33	CRP	2804:00:00	Chemical,rubber,plastic prods
550	CRP2805	33	CRP	2805:00:00	Chemical,rubber,plastic prods
551	CRP2806	33	CRP	2806:00:00	Chemical,rubber,plastic prods
552	CRP2807	33	CRP	2807:00:00	Chemical,rubber,plastic prods
553	CRP2808	33	CRP	2808:00:00	Chemical,rubber,plastic prods
554	CRP2809	33	CRP	2809:00:00	Chemical,rubber,plastic prods
555	CRP2810	33	CRP	2810:00:00	Chemical,rubber,plastic prods
556	CRP2811	33	CRP	2811:00:00	Chemical,rubber,plastic prods
557	CRP2812	33	CRP	2812:00:00	Chemical,rubber,plastic prods
558	CRP2813	33	CRP	2813:00:00	Chemical,rubber,plastic prods
559	CRP2814	33	CRP	2814:00:00	Chemical,rubber,plastic prods
560	CRP2815	33	CRP	2815:00:00	Chemical,rubber,plastic prods
561	CRP2816	33	CRP	2816:00:00	Chemical,rubber,plastic prods
562	CRP2817	33	CRP	2817:00:00	Chemical,rubber,plastic prods
563	CRP2818p	33	CRP	2818(part):	Chemical,rubber,plastic prods
564	CRP2819	33	CRP	2819:00:00	Chemical,rubber,plastic prods
565	CRP2820	33	CRP	2820:00:00	Chemical,rubber,plastic prods
566	CRP2821	33	CRP	2821:00:00	Chemical,rubber,plastic prods
567	CRP2822	33	CRP	2822:00:00	Chemical,rubber,plastic prods
568	CRP2823	33	CRP	2823:00:00	Chemical,rubber,plastic prods
569	CRP2824	33	CRP	2824:00:00	Chemical,rubber,plastic prods
570	CRP2825	33	CRP	2825:00:00	Chemical,rubber,plastic prods
571	CRP2826	33	CRP	2826:00:00	Chemical,rubber,plastic prods
572	CRP2827	33	CRP	2827:00:00	Chemical,rubber,plastic prods
573	CRP2828	33	CRP	2828:00:00	Chemical,rubber,plastic prods
574	CRP2829	33	CRP	2829:00:00	Chemical,rubber,plastic prods
575	CRP2830	33	CRP	2830:00:00	Chemical,rubber,plastic prods
576	CRP2831	33	CRP	2831:00:00	Chemical,rubber,plastic prods
577	CRP2832	33	CRP	2832:00:00	Chemical,rubber,plastic prods
578	CRP2833	33	CRP	2833:00:00	Chemical,rubber,plastic prods
579	CRP2834	33	CRP	2834:00:00	Chemical,rubber,plastic prods
580	CRP2835	33	CRP	2835:00:00	Chemical,rubber,plastic prods
581	CRP2836	33	CRP	2836:00:00	Chemical,rubber,plastic prods
582	CRP2837	33	CRP	2837:00:00	Chemical,rubber,plastic prods

No.	Modified HS4 code	GTAP no.	GTAP code	Description	GTAP Description
583	CRP2839	33	CRP	2839:00:00	Chemical,rubber,plastic prods
584	CRP2840	33	CRP	2840:00:00	Chemical,rubber,plastic prods
585	CRP2841	33	CRP	2841:00:00	Chemical,rubber,plastic prods
586	CRP2842	33	CRP	2842:00:00	Chemical,rubber,plastic prods
587	CRP2843	33	CRP	2843:00:00	Chemical,rubber,plastic prods
588	CRP2844	33	CRP	2844:00:00	Chemical,rubber,plastic prods
589	CRP2845	33	CRP	2845:00:00	Chemical,rubber,plastic prods
590	CRP2846	33	CRP	2846:00:00	Chemical,rubber,plastic prods
591	CRP2847	33	CRP	2847:00:00	Chemical,rubber,plastic prods
592	CRP2848	33	CRP	2848:00:00	Chemical,rubber,plastic prods
593	CRP2849	33	CRP	2849:00:00	Chemical,rubber,plastic prods
594	CRP2850	33	CRP	2850:00:00	Chemical,rubber,plastic prods
595	CRP2852	33	CRP	2852:00:00	Chemical,rubber,plastic prods
596	CRP2853	33	CRP	2853:00:00	Chemical,rubber,plastic prods
597	CRP2901	33	CRP	2901:00:00	Chemical,rubber,plastic prods
598	CRP2902	33	CRP	2902:00:00	Chemical,rubber,plastic prods
599	CRP2903	33	CRP	2903:00:00	Chemical,rubber,plastic prods
600	CRP2904	33	CRP	2904:00:00	Chemical,rubber,plastic prods
601	CRP2905	33	CRP	2905:00:00	Chemical,rubber,plastic prods
602	CRP2906	33	CRP	2906:00:00	Chemical,rubber,plastic prods
603	CRP2907	33	CRP	2907:00:00	Chemical,rubber,plastic prods
604	CRP2908	33	CRP	2908:00:00	Chemical,rubber,plastic prods
605	CRP2909	33	CRP	2909:00:00	Chemical,rubber,plastic prods
606	CRP2910	33	CRP	2910:00:00	Chemical,rubber,plastic prods
607	CRP2911	33	CRP	2911:00:00	Chemical,rubber,plastic prods
608	CRP2912	33	CRP	2912:00:00	Chemical,rubber,plastic prods
609	CRP2913	33	CRP	2913:00:00	Chemical,rubber,plastic prods
610	CRP2914	33	CRP	2914:00:00	Chemical,rubber,plastic prods
611	CRP2915	33	CRP	2915:00:00	Chemical,rubber,plastic prods
612	CRP2916	33	CRP	2916:00:00	Chemical,rubber,plastic prods
613	CRP2917	33	CRP	2917:00:00	Chemical,rubber,plastic prods
614	CRP2918	33	CRP	2918:00:00	Chemical,rubber,plastic prods
615	CRP2919	33	CRP	2919:00:00	Chemical,rubber,plastic prods
616	CRP2920	33	CRP	2920:00:00	Chemical,rubber,plastic prods
617	CRP2921	33	CRP	2921:00:00	Chemical,rubber,plastic prods

No.	Modified HS4 code	GTAP no.	GTAP code	Description	GTAP Description
618	CRP2922	33	CRP	2922:00:00	Chemical,rubber,plastic prods
619	CRP2923	33	CRP	2923:00:00	Chemical,rubber,plastic prods
620	CRP2924	33	CRP	2924:00:00	Chemical,rubber,plastic prods
621	CRP2925	33	CRP	2925:00:00	Chemical,rubber,plastic prods
622	CRP2926	33	CRP	2926:00:00	Chemical,rubber,plastic prods
623	CRP2927	33	CRP	2927:00:00	Chemical,rubber,plastic prods
624	CRP2928	33	CRP	2928:00:00	Chemical,rubber,plastic prods
625	CRP2929	33	CRP	2929:00:00	Chemical,rubber,plastic prods
626	CRP2930	33	CRP	2930:00:00	Chemical,rubber,plastic prods
627	CRP2931	33	CRP	2931:00:00	Chemical,rubber,plastic prods
628	CRP2932	33	CRP	2932:00:00	Chemical,rubber,plastic prods
629	CRP2933	33	CRP	2933:00:00	Chemical,rubber,plastic prods
630	CRP2934	33	CRP	2934:00:00	Chemical,rubber,plastic prods
631	CRP2935	33	CRP	2935:00:00	Chemical,rubber,plastic prods
632	CRP2936	33	CRP	2936:00:00	Chemical,rubber,plastic prods
633	CRP2937	33	CRP	2937:00:00	Chemical,rubber,plastic prods
634	CRP2938	33	CRP	2938:00:00	Chemical,rubber,plastic prods
635	CRP2939	33	CRP	2939:00:00	Chemical,rubber,plastic prods
636	CRP2940	33	CRP	2940:00:00	Chemical,rubber,plastic prods
637	CRP2941	33	CRP	2941:00:00	Chemical,rubber,plastic prods
638	CRP2942	33	CRP	2942:00:00	Chemical,rubber,plastic prods
639	CRP3001	33	CRP	3001:00:00	Chemical,rubber,plastic prods
640	CRP3002	33	CRP	3002:00:00	Chemical,rubber,plastic prods
641	CRP3003	33	CRP	3003:00:00	Chemical,rubber,plastic prods
642	CRP3004	33	CRP	3004:00:00	Chemical,rubber,plastic prods
643	CRP3005	33	CRP	3005:00:00	Chemical,rubber,plastic prods
644	CRP3006	33	CRP	3006:00:00	Chemical,rubber,plastic prods
645	CRP3101	33	CRP	3101:00:00	Chemical,rubber,plastic prods
646	CRP3102	33	CRP	3102:00:00	Chemical,rubber,plastic prods
647	CRP3103	33	CRP	3103:00:00	Chemical,rubber,plastic prods
648	CRP3104	33	CRP	3104:00:00	Chemical,rubber,plastic prods
649	CRP3105	33	CRP	3105:00:00	Chemical,rubber,plastic prods
650	CRP3201	33	CRP	3201:00:00	Chemical,rubber,plastic prods
651	CRP3202	33	CRP	3202:00:00	Chemical,rubber,plastic prods
652	CRP3203	33	CRP	3203:00:00	Chemical,rubber,plastic prods

No.	Modified HS4 code	GTAP no.	GTAP code	Description	GTAP Description
653	CRP3204	33	CRP	3204:00:00	Chemical,rubber,plastic prods
654	CRP3205	33	CRP	3205:00:00	Chemical,rubber,plastic prods
655	CRP3206	33	CRP	3206:00:00	Chemical,rubber,plastic prods
656	CRP3207	33	CRP	3207:00:00	Chemical,rubber,plastic prods
657	CRP3208	33	CRP	3208:00:00	Chemical,rubber,plastic prods
658	CRP3209	33	CRP	3209:00:00	Chemical,rubber,plastic prods
659	CRP3210	33	CRP	3210:00:00	Chemical,rubber,plastic prods
660	CRP3211	33	CRP	3211:00:00	Chemical,rubber,plastic prods
661	CRP3212	33	CRP	3212:00:00	Chemical,rubber,plastic prods
662	CRP3213	33	CRP	3213:00:00	Chemical,rubber,plastic prods
663	CRP3214	33	CRP	3214:00:00	Chemical,rubber,plastic prods
664	CRP3215	33	CRP	3215:00:00	Chemical,rubber,plastic prods
665	CRP3301	33	CRP	3301:00:00	Chemical,rubber,plastic prods
666	CRP3302	33	CRP	3302:00:00	Chemical,rubber,plastic prods
667	CRP3303	33	CRP	3303:00:00	Chemical,rubber,plastic prods
668	CRP3304	33	CRP	3304:00:00	Chemical,rubber,plastic prods
669	CRP3305	33	CRP	3305:00:00	Chemical,rubber,plastic prods
670	CRP3306	33	CRP	3306:00:00	Chemical,rubber,plastic prods
671	CRP3307	33	CRP	3307:00:00	Chemical,rubber,plastic prods
672	CRP3401	33	CRP	3401:00:00	Chemical,rubber,plastic prods
673	CRP3402	33	CRP	3402:00:00	Chemical,rubber,plastic prods
674	CRP3403	33	CRP	3403:00:00	Chemical,rubber,plastic prods
675	CRP3404	33	CRP	3404:00:00	Chemical,rubber,plastic prods
676	CRP3405	33	CRP	3405:00:00	Chemical,rubber,plastic prods
677	CRP3407	33	CRP	3407:00:00	Chemical,rubber,plastic prods
678	CRP3501p	33	CRP	3501(part):	Chemical,rubber,plastic prods
679	CRP3502p	33	CRP	3502(part):	Chemical,rubber,plastic prods
680	CRP3503	33	CRP	3503:00:00	Chemical,rubber,plastic prods
681	CRP3504	33	CRP	3504:00:00	Chemical,rubber,plastic prods
682	CRP3505p	33	CRP	3505(part):	Chemical,rubber,plastic prods
683	CRP3506	33	CRP	3506:00:00	Chemical,rubber,plastic prods
684	CRP3507	33	CRP	3507:00:00	Chemical,rubber,plastic prods
685	CRP3601	33	CRP	3601:00:00	Chemical,rubber,plastic prods
686	CRP3602	33	CRP	3602:00:00	Chemical,rubber,plastic prods
687	CRP3603	33	CRP	3603:00:00	Chemical,rubber,plastic prods

No.	Modified HS4 code	GTAP no.	GTAP code	Description	GTAP Description
688	CRP3604	33	CRP	3604:00:00	Chemical,rubber,plastic prods
689	CRP3701	33	CRP	3701:00:00	Chemical,rubber,plastic prods
690	CRP3702	33	CRP	3702:00:00	Chemical,rubber,plastic prods
691	CRP3703	33	CRP	3703:00:00	Chemical,rubber,plastic prods
692	CRP3707	33	CRP	3707:00:00	Chemical,rubber,plastic prods
693	CRP3802	33	CRP	3802:00:00	Chemical,rubber,plastic prods
694	CRP3803	33	CRP	3803:00:00	Chemical,rubber,plastic prods
695	CRP3805	33	CRP	3805:00:00	Chemical,rubber,plastic prods
696	CRP3806	33	CRP	3806:00:00	Chemical,rubber,plastic prods
697	CRP3807	33	CRP	3807:00:00	Chemical,rubber,plastic prods
698	CRP3808	33	CRP	3808:00:00	Chemical,rubber,plastic prods
699	CRP3809	33	CRP	3809:00:00	Chemical,rubber,plastic prods
700	CRP3810	33	CRP	3810:00:00	Chemical,rubber,plastic prods
701	CRP3811	33	CRP	3811:00:00	Chemical,rubber,plastic prods
702	CRP3812	33	CRP	3812:00:00	Chemical,rubber,plastic prods
703	CRP3813	33	CRP	3813:00:00	Chemical,rubber,plastic prods
704	CRP3814	33	CRP	3814:00:00	Chemical,rubber,plastic prods
705	CRP3815	33	CRP	3815:00:00	Chemical,rubber,plastic prods
706	CRP3817	33	CRP	3817:00:00	Chemical,rubber,plastic prods
707	CRP3818	33	CRP	3818:00:00	Chemical,rubber,plastic prods
708	CRP3819	33	CRP	3819:00:00	Chemical,rubber,plastic prods
709	CRP3820	33	CRP	3820:00:00	Chemical,rubber,plastic prods
710	CRP3821	33	CRP	3821:00:00	Chemical,rubber,plastic prods
711	CRP3822	33	CRP	3822:00:00	Chemical,rubber,plastic prods
712	CRP3823	33	CRP	3823:00:00	Chemical,rubber,plastic prods
713	CRP3824p	33	CRP	3824(part):	Chemical,rubber,plastic prods
714	CRP3825	33	CRP	3825:00:00	Chemical,rubber,plastic prods
715	CRP3901	33	CRP	3901:00:00	Chemical,rubber,plastic prods
716	CRP3902	33	CRP	3902:00:00	Chemical,rubber,plastic prods
717	CRP3903	33	CRP	3903:00:00	Chemical,rubber,plastic prods
718	CRP3904	33	CRP	3904:00:00	Chemical,rubber,plastic prods
719	CRP3905	33	CRP	3905:00:00	Chemical,rubber,plastic prods
720	CRP3906	33	CRP	3906:00:00	Chemical,rubber,plastic prods
721	CRP3907	33	CRP	3907:00:00	Chemical,rubber,plastic prods
722	CRP3908	33	CRP	3908:00:00	Chemical,rubber,plastic prods

No.	Modified HS4 code	GTAP no.	GTAP code	Description	GTAP Description
723	CRP3909	33	CRP	3909:00:00	Chemical,rubber,plastic prods
724	CRP3910	33	CRP	3910:00:00	Chemical,rubber,plastic prods
725	CRP3911	33	CRP	3911:00:00	Chemical,rubber,plastic prods
726	CRP3912	33	CRP	3912:00:00	Chemical,rubber,plastic prods
727	CRP3913	33	CRP	3913:00:00	Chemical,rubber,plastic prods
728	CRP3914	33	CRP	3914:00:00	Chemical,rubber,plastic prods
729	CRP3915	33	CRP	3915:00:00	Chemical,rubber,plastic prods
730	CRP3916	33	CRP	3916:00:00	Chemical,rubber,plastic prods
731	CRP3917	33	CRP	3917:00:00	Chemical,rubber,plastic prods
732	CRP3918	33	CRP	3918:00:00	Chemical,rubber,plastic prods
733	CRP3919	33	CRP	3919:00:00	Chemical,rubber,plastic prods
734	CRP3920	33	CRP	3920:00:00	Chemical,rubber,plastic prods
735	CRP3921	33	CRP	3921:00:00	Chemical,rubber,plastic prods
736	CRP3922	33	CRP	3922:00:00	Chemical,rubber,plastic prods
737	CRP3923	33	CRP	3923:00:00	Chemical,rubber,plastic prods
738	CRP3924	33	CRP	3924:00:00	Chemical,rubber,plastic prods
739	CRP3925	33	CRP	3925:00:00	Chemical,rubber,plastic prods
740	CRP3926	33	CRP	3926:00:00	Chemical,rubber,plastic prods
741	CRP4001p	33	CRP	4001(part):	Chemical,rubber,plastic prods
742	CRP4002	33	CRP	4002:00:00	Chemical,rubber,plastic prods
743	CRP4003	33	CRP	4003:00:00	Chemical,rubber,plastic prods
744	CRP4004	33	CRP	4004:00:00	Chemical,rubber,plastic prods
745	CRP4005	33	CRP	4005:00:00	Chemical,rubber,plastic prods
746	CRP4006	33	CRP	4006:00:00	Chemical,rubber,plastic prods
747	CRP4007	33	CRP	4007:00:00	Chemical,rubber,plastic prods
748	CRP4008	33	CRP	4008:00:00	Chemical,rubber,plastic prods
749	CRP4009	33	CRP	4009:00:00	Chemical,rubber,plastic prods
750	CRP4010	33	CRP	4010:00:00	Chemical,rubber,plastic prods
751	CRP4011	33	CRP	4011:00:00	Chemical,rubber,plastic prods
752	CRP4012	33	CRP	4012:00:00	Chemical,rubber,plastic prods
753	CRP4013	33	CRP	4013:00:00	Chemical,rubber,plastic prods
754	CRP4014	33	CRP	4014:00:00	Chemical,rubber,plastic prods
755	CRP4015	33	CRP	4015:00:00	Chemical,rubber,plastic prods
756	CRP4016	33	CRP	4016:00:00	Chemical,rubber,plastic prods
757	CRP4017	33	CRP	4017:00:00	Chemical,rubber,plastic prods

No.	Modified HS4 code	GTAP no.	GTAP code	Description	GTAP Description
758	CRP4402	33	CRP	4402:00:00	Chemical,rubber,plastic prods
759	CRP5906p	33	CRP	5906(part):	Chemical,rubber,plastic prods
760	CRP6506p	33	CRP	6506(part):	Chemical,rubber,plastic prods
761	CRP7104p	33	CRP	7104(part):	Chemical,rubber,plastic prods
762	CRP8401p	33	CRP	8401(part):	Chemical,rubber,plastic prods
763	CRP8523p	33	CRP	8523(part):	Chemical,rubber,plastic prods
764	CRP8536p	33	CRP	8536(part):	Chemical,rubber,plastic prods
765	CRP8547p	33	CRP	8547(part):	Chemical,rubber,plastic prods
766	CRP9405p	33	CRP	9405(part):	Chemical,rubber,plastic prods
767	NMM2518p	34	NMM	2518(part):	Mineral products nec
768	NMM2520p	34	NMM	2520(part):	Mineral products nec
769	NMM2522	34	NMM	2522:00:00	Mineral products nec
770	NMM2523	34	NMM	2523:00:00	Mineral products nec
771	NMM2715	34	NMM	2715:00:00	Mineral products nec
772	NMM2818p	34	NMM	2818(part):	Mineral products nec
773	NMM3801	34	NMM	3801:00:00	Mineral products nec
774	NMM3816	34	NMM	3816:00:00	Mineral products nec
775	NMM3824p	34	NMM	3824(part):	Mineral products nec
776	NMM6801	34	NMM	6801:00:00	Mineral products nec
777	NMM6802	34	NMM	6802:00:00	Mineral products nec
778	NMM6803	34	NMM	6803:00:00	Mineral products nec
779	NMM6804	34	NMM	6804:00:00	Mineral products nec
780	NMM6805	34	NMM	6805:00:00	Mineral products nec
781	NMM6806	34	NMM	6806:00:00	Mineral products nec
782	NMM6807	34	NMM	6807:00:00	Mineral products nec
783	NMM6808	34	NMM	6808:00:00	Mineral products nec
784	NMM6809	34	NMM	6809:00:00	Mineral products nec
785	NMM6810	34	NMM	6810:00:00	Mineral products nec
786	NMM6811	34	NMM	6811:00:00	Mineral products nec
787	NMM6812	34	NMM	6812:00:00	Mineral products nec
788	NMM6813	34	NMM	6813:00:00	Mineral products nec
789	NMM6814	34	NMM	6814:00:00	Mineral products nec
790	NMM6815	34	NMM	6815:00:00	Mineral products nec
791	NMM6901	34	NMM	6901:00:00	Mineral products nec
792	NMM6902	34	NMM	6902:00:00	Mineral products nec

No.	Modified HS4 code	GTAP no.	GTAP code	Description	GTAP Description
793	NMM6903	34	NMM	6903:00:00	Mineral products nec
794	NMM6904	34	NMM	6904:00:00	Mineral products nec
795	NMM6905	34	NMM	6905:00:00	Mineral products nec
796	NMM6906	34	NMM	6906:00:00	Mineral products nec
797	NMM6907	34	NMM	6907:00:00	Mineral products nec
798	NMM6908	34	NMM	6908:00:00	Mineral products nec
799	NMM6909	34	NMM	6909:00:00	Mineral products nec
800	NMM6910	34	NMM	6910:00:00	Mineral products nec
801	NMM6911	34	NMM	6911:00:00	Mineral products nec
802	NMM6912	34	NMM	6912:00:00	Mineral products nec
803	NMM6913	34	NMM	6913:00:00	Mineral products nec
804	NMM6914	34	NMM	6914:00:00	Mineral products nec
805	NMM7001	34	NMM	7001:00:00	Mineral products nec
806	NMM7002	34	NMM	7002:00:00	Mineral products nec
807	NMM7003	34	NMM	7003:00:00	Mineral products nec
808	NMM7004	34	NMM	7004:00:00	Mineral products nec
809	NMM7005	34	NMM	7005:00:00	Mineral products nec
810	NMM7006	34	NMM	7006:00:00	Mineral products nec
811	NMM7007	34	NMM	7007:00:00	Mineral products nec
812	NMM7008	34	NMM	7008:00:00	Mineral products nec
813	NMM7009	34	NMM	7009:00:00	Mineral products nec
814	NMM7010	34	NMM	7010:00:00	Mineral products nec
815	NMM7011	34	NMM	7011:00:00	Mineral products nec
816	NMM7013	34	NMM	7013:00:00	Mineral products nec
817	NMM7014	34	NMM	7014:00:00	Mineral products nec
818	NMM7015	34	NMM	7015:00:00	Mineral products nec
819	NMM7016	34	NMM	7016:00:00	Mineral products nec
820	NMM7017	34	NMM	7017:00:00	Mineral products nec
821	NMM7018	34	NMM	7018:00:00	Mineral products nec
822	NMM7019	34	NMM	7019:00:00	Mineral products nec
823	NMM7020	34	NMM	7020:00:00	Mineral products nec
824	NMM8546p	34	NMM	8546(part):	Mineral products nec
825	NMM8547p	34	NMM	8547(part):	Mineral products nec
826	NMM9405p	34	NMM	9405(part):	Mineral products nec
827	I_S2618	35	I_S	2618:00:00	Ferrous metals

No.	Modified HS4 code	GTAP no.	GTAP code	Description	GTAP Description
828	I_S2619	35	I_S	2619:00:00	Ferrous metals
829	I_S7201	35	I_S	7201:00:00	Ferrous metals
830	I_S7202	35	I_S	7202:00:00	Ferrous metals
831	I_S7203	35	I_S	7203:00:00	Ferrous metals
832	I_S7204	35	I_S	7204:00:00	Ferrous metals
833	I_S7205	35	I_S	7205:00:00	Ferrous metals
834	I_S7206	35	I_S	7206:00:00	Ferrous metals
835	I_S7207	35	I_S	7207:00:00	Ferrous metals
836	I_S7208	35	I_S	7208:00:00	Ferrous metals
837	I_S7209	35	I_S	7209:00:00	Ferrous metals
838	I_S7210	35	I_S	7210:00:00	Ferrous metals
839	I_S7211	35	I_S	7211:00:00	Ferrous metals
840	I_S7212	35	I_S	7212:00:00	Ferrous metals
841	I_S7213	35	I_S	7213:00:00	Ferrous metals
842	I_S7214	35	I_S	7214:00:00	Ferrous metals
843	I_S7215	35	I_S	7215:00:00	Ferrous metals
844	I_S7216	35	I_S	7216:00:00	Ferrous metals
845	I_S7217	35	I_S	7217:00:00	Ferrous metals
846	I_S7218	35	I_S	7218:00:00	Ferrous metals
847	I_S7219	35	I_S	7219:00:00	Ferrous metals
848	I_S7220	35	I_S	7220:00:00	Ferrous metals
849	I_S7221	35	I_S	7221:00:00	Ferrous metals
850	I_S7222	35	I_S	7222:00:00	Ferrous metals
851	I_S7223	35	I_S	7223:00:00	Ferrous metals
852	I_S7224	35	I_S	7224:00:00	Ferrous metals
853	I_S7225	35	I_S	7225:00:00	Ferrous metals
854	I_S7226	35	I_S	7226:00:00	Ferrous metals
855	I_S7227	35	I_S	7227:00:00	Ferrous metals
856	I_S7228	35	I_S	7228:00:00	Ferrous metals
857	I_S7229	35	I_S	7229:00:00	Ferrous metals
858	I_S7301	35	I_S	7301:00:00	Ferrous metals
859	I_S7302	35	I_S	7302:00:00	Ferrous metals
860	I_S7303	35	I_S	7303:00:00	Ferrous metals
861	I_S7304	35	I_S	7304:00:00	Ferrous metals
862	I_S7305	35	I_S	7305:00:00	Ferrous metals

No.	Modified HS4 code	GTAP no.	GTAP code	Description	GTAP Description
863	I_S7306	35	I_S	7306:00:00	Ferrous metals
864	I_S7307	35	I_S	7307:00:00	Ferrous metals
865	NFM2620	36	NFM	2620:00:00	Metals nec
866	NFM2818p	36	NFM	2818(part):	Metals nec
867	NFM7106	36	NFM	7106:00:00	Metals nec
868	NFM7107	36	NFM	7107:00:00	Metals nec
869	NFM7108	36	NFM	7108:00:00	Metals nec
870	NFM7109	36	NFM	7109:00:00	Metals nec
871	NFM7110	36	NFM	7110:00:00	Metals nec
872	NFM7111	36	NFM	7111:00:00	Metals nec
873	NFM7112p	36	NFM	7112(part):	Metals nec
874	NFM7115p	36	NFM	7115(part):	Metals nec
875	NFM7401	36	NFM	7401:00:00	Metals nec
876	NFM7402	36	NFM	7402:00:00	Metals nec
877	NFM7403	36	NFM	7403:00:00	Metals nec
878	NFM7404	36	NFM	7404:00:00	Metals nec
879	NFM7405	36	NFM	7405:00:00	Metals nec
880	NFM7406	36	NFM	7406:00:00	Metals nec
881	NFM7407	36	NFM	7407:00:00	Metals nec
882	NFM7408	36	NFM	7408:00:00	Metals nec
883	NFM7409	36	NFM	7409:00:00	Metals nec
884	NFM7410	36	NFM	7410:00:00	Metals nec
885	NFM7411	36	NFM	7411:00:00	Metals nec
886	NFM7412	36	NFM	7412:00:00	Metals nec
887	NFM7501	36	NFM	7501:00:00	Metals nec
888	NFM7502	36	NFM	7502:00:00	Metals nec
889	NFM7503	36	NFM	7503:00:00	Metals nec
890	NFM7504	36	NFM	7504:00:00	Metals nec
891	NFM7505	36	NFM	7505:00:00	Metals nec
892	NFM7506	36	NFM	7506:00:00	Metals nec
893	NFM7507	36	NFM	7507:00:00	Metals nec
894	NFM7601	36	NFM	7601:00:00	Metals nec
895	NFM7602	36	NFM	7602:00:00	Metals nec
896	NFM7603	36	NFM	7603:00:00	Metals nec
897	NFM7604	36	NFM	7604:00:00	Metals nec

No.	Modified HS4 code	GTAP no.	GTAP code	Description	GTAP Description
898	NFM7605	36	NFM	7605:00:00	Metals nec
899	NFM7606	36	NFM	7606:00:00	Metals nec
900	NFM7607	36	NFM	7607:00:00	Metals nec
901	NFM7608	36	NFM	7608:00:00	Metals nec
902	NFM7609	36	NFM	7609:00:00	Metals nec
903	NFM7801	36	NFM	7801:00:00	Metals nec
904	NFM7802	36	NFM	7802:00:00	Metals nec
905	NFM7804	36	NFM	7804:00:00	Metals nec
906	NFM7901	36	NFM	7901:00:00	Metals nec
907	NFM7902	36	NFM	7902:00:00	Metals nec
908	NFM7903	36	NFM	7903:00:00	Metals nec
909	NFM7904	36	NFM	7904:00:00	Metals nec
910	NFM7905	36	NFM	7905:00:00	Metals nec
911	NFM8001	36	NFM	8001:00:00	Metals nec
912	NFM8002	36	NFM	8002:00:00	Metals nec
913	NFM8003	36	NFM	8003:00:00	Metals nec
914	NFM8101	36	NFM	8101:00:00	Metals nec
915	NFM8102	36	NFM	8102:00:00	Metals nec
916	NFM8103	36	NFM	8103:00:00	Metals nec
917	NFM8104	36	NFM	8104:00:00	Metals nec
918	NFM8105	36	NFM	8105:00:00	Metals nec
919	NFM8106	36	NFM	8106:00:00	Metals nec
920	NFM8107	36	NFM	8107:00:00	Metals nec
921	NFM8108	36	NFM	8108:00:00	Metals nec
922	NFM8109	36	NFM	8109:00:00	Metals nec
923	NFM8110	36	NFM	8110:00:00	Metals nec
924	NFM8111	36	NFM	8111:00:00	Metals nec
925	NFM8112	36	NFM	8112:00:00	Metals nec
926	NFM8113	36	NFM	8113:00:00	Metals nec
927	FMP7112p	37	FMP	7112(part):	Metal products
928	FMP7308	37	FMP	7308:00:00	Metal products
929	FMP7309	37	FMP	7309:00:00	Metal products
930	FMP7310	37	FMP	7310:00:00	Metal products
931	FMP7311	37	FMP	7311:00:00	Metal products
932	FMP7312	37	FMP	7312:00:00	Metal products

No.	Modified HS4 code	GTAP no.	GTAP code	Description	GTAP Description
933	FMP7313	37	FMP	7313:00:00	Metal products
934	FMP7314	37	FMP	7314:00:00	Metal products
935	FMP7315p	37	FMP	7315(part):	Metal products
936	FMP7316	37	FMP	7316:00:00	Metal products
937	FMP7317	37	FMP	7317:00:00	Metal products
938	FMP7318	37	FMP	7318:00:00	Metal products
939	FMP7319	37	FMP	7319:00:00	Metal products
940	FMP7320	37	FMP	7320:00:00	Metal products
941	FMP7322p	37	FMP	7322(part):	Metal products
942	FMP7323	37	FMP	7323:00:00	Metal products
943	FMP7324	37	FMP	7324:00:00	Metal products
944	FMP7325	37	FMP	7325:00:00	Metal products
945	FMP7326	37	FMP	7326:00:00	Metal products
946	FMP7413	37	FMP	7413:00:00	Metal products
947	FMP7415	37	FMP	7415:00:00	Metal products
948	FMP7418p	37	FMP	7418(part):	Metal products
949	FMP7419p	37	FMP	7419(part):	Metal products
950	FMP7508	37	FMP	7508:00:00	Metal products
951	FMP7610	37	FMP	7610:00:00	Metal products
952	FMP7611	37	FMP	7611:00:00	Metal products
953	FMP7612	37	FMP	7612:00:00	Metal products
954	FMP7613	37	FMP	7613:00:00	Metal products
955	FMP7614	37	FMP	7614:00:00	Metal products
956	FMP7615	37	FMP	7615:00:00	Metal products
957	FMP7616	37	FMP	7616:00:00	Metal products
958	FMP7806	37	FMP	7806:00:00	Metal products
959	FMP7907	37	FMP	7907:00:00	Metal products
960	FMP8007	37	FMP	8007:00:00	Metal products
961	FMP8201	37	FMP	8201:00:00	Metal products
962	FMP8202	37	FMP	8202:00:00	Metal products
963	FMP8203	37	FMP	8203:00:00	Metal products
964	FMP8204	37	FMP	8204:00:00	Metal products
965	FMP8205	37	FMP	8205:00:00	Metal products
966	FMP8206	37	FMP	8206:00:00	Metal products
967	FMP8207	37	FMP	8207:00:00	Metal products

No.	Modified HS4 code	GTAP no.	GTAP code	Description	GTAP Description
968	FMP8208	37	FMP	8208:00:00	Metal products
969	FMP8209	37	FMP	8209:00:00	Metal products
970	FMP8210	37	FMP	8210:00:00	Metal products
971	FMP8211	37	FMP	8211:00:00	Metal products
972	FMP8212	37	FMP	8212:00:00	Metal products
973	FMP8213	37	FMP	8213:00:00	Metal products
974	FMP8214	37	FMP	8214:00:00	Metal products
975	FMP8215	37	FMP	8215:00:00	Metal products
976	FMP8301	37	FMP	8301:00:00	Metal products
977	FMP8302	37	FMP	8302:00:00	Metal products
978	FMP8303	37	FMP	8303:00:00	Metal products
979	FMP8304	37	FMP	8304:00:00	Metal products
980	FMP8305	37	FMP	8305:00:00	Metal products
981	FMP8306	37	FMP	8306:00:00	Metal products
982	FMP8307	37	FMP	8307:00:00	Metal products
983	FMP8308	37	FMP	8308:00:00	Metal products
984	FMP8309	37	FMP	8309:00:00	Metal products
985	FMP8310	37	FMP	8310:00:00	Metal products
986	FMP8311	37	FMP	8311:00:00	Metal products
987	FMP8401p	37	FMP	8401(part):	Metal products
988	FMP8402	37	FMP	8402:00:00	Metal products
989	FMP8403	37	FMP	8403:00:00	Metal products
990	FMP8404	37	FMP	8404:00:00	Metal products
991	FMP8487p	37	FMP	8487(part):	Metal products
992	FMP9307	37	FMP	9307:00:00	Metal products
993	FMP9406	37	FMP	9406:00:00	Metal products
994	MVH8407p	38	MVH	8407(part):	Motor vehicles and parts
995	MVH8408p	38	MVH	8408(part):	Motor vehicles and parts
996	MVH8409p	38	MVH	8409(part):	Motor vehicles and parts
997	MVH8609	38	MVH	8609:00:00	Motor vehicles and parts
998	MVH8701p	38	MVH	8701(part):	Motor vehicles and parts
999	MVH8702	38	MVH	8702:00:00	Motor vehicles and parts
1000	MVH8703	38	MVH	8703:00:00	Motor vehicles and parts
1001	MVH8704p	38	MVH	8704(part):	Motor vehicles and parts
1002	MVH8705	38	MVH	8705:00:00	Motor vehicles and parts

No.	Modified HS4 code	GTAP no.	GTAP code	Description	GTAP Description
1003	MVH8706	38	MVH	8706:00:00	Motor vehicles and parts
1004	MVH8707	38	MVH	8707:00:00	Motor vehicles and parts
1005	MVH8708	38	MVH	8708:00:00	Motor vehicles and parts
1006	MVH8716p	38	MVH	8716(part):	Motor vehicles and parts
1007	OTN8407p	39	OTN	8407(part):	Transport equipment nec
1008	OTN8409p	39	OTN	8409(part):	Transport equipment nec
1009	OTN8411p	39	OTN	8411(part):	Transport equipment nec
1010	OTN8412p	39	OTN	8412(part):	Transport equipment nec
1011	OTN8601	39	OTN	8601:00:00	Transport equipment nec
1012	OTN8602	39	OTN	8602:00:00	Transport equipment nec
1013	OTN8603	39	OTN	8603:00:00	Transport equipment nec
1014	OTN8604	39	OTN	8604:00:00	Transport equipment nec
1015	OTN8605	39	OTN	8605:00:00	Transport equipment nec
1016	OTN8606	39	OTN	8606:00:00	Transport equipment nec
1017	OTN8607	39	OTN	8607:00:00	Transport equipment nec
1018	OTN8608	39	OTN	8608:00:00	Transport equipment nec
1019	OTN8711	39	OTN	8711:00:00	Transport equipment nec
1020	OTN8712	39	OTN	8712:00:00	Transport equipment nec
1021	OTN8713	39	OTN	8713:00:00	Transport equipment nec
1022	OTN8714	39	OTN	8714:00:00	Transport equipment nec
1023	OTN8716p	39	OTN	8716(part):	Transport equipment nec
1024	OTN8801	39	OTN	8801:00:00	Transport equipment nec
1025	OTN8802	39	OTN	8802:00:00	Transport equipment nec
1026	OTN8803	39	OTN	8803:00:00	Transport equipment nec
1027	OTN8805	39	OTN	8805:00:00	Transport equipment nec
1028	OTN8901	39	OTN	8901:00:00	Transport equipment nec
1029	OTN8902	39	OTN	8902:00:00	Transport equipment nec
1030	OTN8903	39	OTN	8903:00:00	Transport equipment nec
1031	OTN8904	39	OTN	8904:00:00	Transport equipment nec
1032	OTN8905	39	OTN	8905:00:00	Transport equipment nec
1033	OTN8906	39	OTN	8906:00:00	Transport equipment nec
1034	OTN8907	39	OTN	8907:00:00	Transport equipment nec
1035	OTN8908	39	OTN	8908:00:00	Transport equipment nec
1036	ELE8443p	40	ELE	8443(part):	Electronic equipment
1037	ELE8469	40	ELE	8469:00:00	Electronic equipment

No.	Modified HS4 code	GTAP no.	GTAP code	Description	GTAP Description
1038	ELE8470	40	ELE	8470:00:00	Electronic equipment
1039	ELE8471	40	ELE	8471:00:00	Electronic equipment
1040	ELE8472	40	ELE	8472:00:00	Electronic equipment
1041	ELE8473	40	ELE	8473:00:00	Electronic equipment
1042	ELE8517	40	ELE	8517:00:00	Electronic equipment
1043	ELE8518	40	ELE	8518:00:00	Electronic equipment
1044	ELE8519	40	ELE	8519:00:00	Electronic equipment
1045	ELE8521	40	ELE	8521:00:00	Electronic equipment
1046	ELE8522	40	ELE	8522:00:00	Electronic equipment
1047	ELE8523p	40	ELE	8523(part):	Electronic equipment
1048	ELE8525	40	ELE	8525:00:00	Electronic equipment
1049	ELE8527	40	ELE	8527:00:00	Electronic equipment
1050	ELE8528	40	ELE	8528:00:00	Electronic equipment
1051	ELE8529	40	ELE	8529:00:00	Electronic equipment
1052	ELE8532	40	ELE	8532:00:00	Electronic equipment
1053	ELE8533	40	ELE	8533:00:00	Electronic equipment
1054	ELE8534	40	ELE	8534:00:00	Electronic equipment
1055	ELE8540	40	ELE	8540:00:00	Electronic equipment
1056	ELE8541	40	ELE	8541:00:00	Electronic equipment
1057	ELE8542	40	ELE	8542:00:00	Electronic equipment
1058	ELE8543p	40	ELE	8543(part):	Electronic equipment
1059	ELE8548p	40	ELE	8548(part):	Electronic equipment
1060	OME6301p	41	OME	6301(part):	Machinery and equipment nec
1061	OME7315p	41	OME	7315(part):	Machinery and equipment nec
1062	OME7321	41	OME	7321:00:00	Machinery and equipment nec
1063	OME7322p	41	OME	7322(part):	Machinery and equipment nec
1064	OME7418p	41	OME	7418(part):	Machinery and equipment nec
1065	OME7419p	41	OME	7419(part):	Machinery and equipment nec
1066	OME8401p	41	OME	8401(part):	Machinery and equipment nec
1067	OME8405	41	OME	8405:00:00	Machinery and equipment nec
1068	OME8406	41	OME	8406:00:00	Machinery and equipment nec
1069	OME8407p	41	OME	8407(part):	Machinery and equipment nec
1070	OME8408p	41	OME	8408(part):	Machinery and equipment nec
1071	OME8410	41	OME	8410:00:00	Machinery and equipment nec
1072	OME8411p	41	OME	8411(part):	Machinery and equipment nec

No.	Modified HS4 code	GTAP no.	GTAP code	Description	GTAP Description
1073	OME8412p	41	OME	8412(part):	Machinery and equipment nec
1074	OME8413	41	OME	8413:00:00	Machinery and equipment nec
1075	OME8414	41	OME	8414:00:00	Machinery and equipment nec
1076	OME8415	41	OME	8415:00:00	Machinery and equipment nec
1077	OME8416	41	OME	8416:00:00	Machinery and equipment nec
1078	OME8417	41	OME	8417:00:00	Machinery and equipment nec
1079	OME8418	41	OME	8418:00:00	Machinery and equipment nec
1080	OME8419	41	OME	8419:00:00	Machinery and equipment nec
1081	OME8420	41	OME	8420:00:00	Machinery and equipment nec
1082	OME8421	41	OME	8421:00:00	Machinery and equipment nec
1083	OME8422	41	OME	8422:00:00	Machinery and equipment nec
1084	OME8423	41	OME	8423:00:00	Machinery and equipment nec
1085	OME8424	41	OME	8424:00:00	Machinery and equipment nec
1086	OME8425	41	OME	8425:00:00	Machinery and equipment nec
1087	OME8426	41	OME	8426:00:00	Machinery and equipment nec
1088	OME8427	41	OME	8427:00:00	Machinery and equipment nec
1089	OME8428	41	OME	8428:00:00	Machinery and equipment nec
1090	OME8429	41	OME	8429:00:00	Machinery and equipment nec
1091	OME8430	41	OME	8430:00:00	Machinery and equipment nec
1092	OME8431	41	OME	8431:00:00	Machinery and equipment nec
1093	OME8432	41	OME	8432:00:00	Machinery and equipment nec
1094	OME8433	41	OME	8433:00:00	Machinery and equipment nec
1095	OME8434	41	OME	8434:00:00	Machinery and equipment nec
1096	OME8435	41	OME	8435:00:00	Machinery and equipment nec
1097	OME8436	41	OME	8436:00:00	Machinery and equipment nec
1098	OME8437	41	OME	8437:00:00	Machinery and equipment nec
1099	OME8438	41	OME	8438:00:00	Machinery and equipment nec
1100	OME8439	41	OME	8439:00:00	Machinery and equipment nec
1101	OME8440	41	OME	8440:00:00	Machinery and equipment nec
1102	OME8441	41	OME	8441:00:00	Machinery and equipment nec
1103	OME8442p	41	OME	8442(part):	Machinery and equipment nec
1104	OME8443p	41	OME	8443(part):	Machinery and equipment nec
1105	OME8444	41	OME	8444:00:00	Machinery and equipment nec
1106	OME8445	41	OME	8445:00:00	Machinery and equipment nec
1107	OME8446	41	OME	8446:00:00	Machinery and equipment nec

No.	Modified HS4 code	GTAP no.	GTAP code	Description	GTAP Description
1108	OME8447	41	OME	8447:00:00	Machinery and equipment nec
1109	OME8448	41	OME	8448:00:00	Machinery and equipment nec
1110	OME8449	41	OME	8449:00:00	Machinery and equipment nec
1111	OME8450	41	OME	8450:00:00	Machinery and equipment nec
1112	OME8451	41	OME	8451:00:00	Machinery and equipment nec
1113	OME8452	41	OME	8452:00:00	Machinery and equipment nec
1114	OME8453	41	OME	8453:00:00	Machinery and equipment nec
1115	OME8454	41	OME	8454:00:00	Machinery and equipment nec
1116	OME8455	41	OME	8455:00:00	Machinery and equipment nec
1117	OME8456	41	OME	8456:00:00	Machinery and equipment nec
1118	OME8457	41	OME	8457:00:00	Machinery and equipment nec
1119	OME8458	41	OME	8458:00:00	Machinery and equipment nec
1120	OME8459	41	OME	8459:00:00	Machinery and equipment nec
1121	OME8460	41	OME	8460:00:00	Machinery and equipment nec
1122	OME8461	41	OME	8461:00:00	Machinery and equipment nec
1123	OME8462	41	OME	8462:00:00	Machinery and equipment nec
1124	OME8463	41	OME	8463:00:00	Machinery and equipment nec
1125	OME8464	41	OME	8464:00:00	Machinery and equipment nec
1126	OME8465	41	OME	8465:00:00	Machinery and equipment nec
1127	OME8466	41	OME	8466:00:00	Machinery and equipment nec
1128	OME8467	41	OME	8467:00:00	Machinery and equipment nec
1129	OME8468	41	OME	8468:00:00	Machinery and equipment nec
1130	OME8474	41	OME	8474:00:00	Machinery and equipment nec
1131	OME8475	41	OME	8475:00:00	Machinery and equipment nec
1132	OME8476	41	OME	8476:00:00	Machinery and equipment nec
1133	OME8477	41	OME	8477:00:00	Machinery and equipment nec
1134	OME8478	41	OME	8478:00:00	Machinery and equipment nec
1135	OME8479	41	OME	8479:00:00	Machinery and equipment nec
1136	OME8480	41	OME	8480:00:00	Machinery and equipment nec
1137	OME8481	41	OME	8481:00:00	Machinery and equipment nec
1138	OME8482	41	OME	8482:00:00	Machinery and equipment nec
1139	OME8483	41	OME	8483:00:00	Machinery and equipment nec
1140	OME8484	41	OME	8484:00:00	Machinery and equipment nec
1141	OME8486	41	OME	8486:00:00	Machinery and equipment nec
1142	OME8487p	41	OME	8487(part):	Machinery and equipment nec

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