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Abstract

This paper provides some important indicators of non-tariff measures in Indian textiles and clothing exports. The paper identifies major trading partners and HS codes to study the impact of Non Taiff Measures (NTMs) on Indian exports. First, using count measures i.e. frequency and coverage ratios, suggests that more than 60% of export value is affected by the NTMs in USA, EU-25 and Canada at various points in time. Second, it calculates Ad-Valorem Equivalents using price differential methods which are imposed in the SMART model under the partial equilibrium framework to know the trade impact of NTMs. A total trade loss of about billion 2.34 US$ (16.8% of base trade value) is estimated, while the zero tariff gains are roughly billion 1.36 US$ that's 9.8% of base trade. Also this paper develops the framework for the primary research in the field of Non-Tariff Measures.

Key words: Non-Tariff Barriers, Ad-Valorem Equivalents of Non-Tariff Measures
JEL Code (s): F10, F13, F14

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Introduction

During past two decades, with the eight GATT rounds of multilateral trade liberalization, applied tariffs have been halved on average globally and policy makers have started grasping the importance of Non-Tariff Measures (NTMs). In 2004, UNCTAD's TRAINS database censed on average 5620 tariff lines for each country as being subject to one type of NTMs and technical measures account for 58.5% of total tariff lines subject to NTMs (Fugazza, *et al.* 2006). During 1994 to 2004 the use of NTMs and Technical Measures to Trade (TBTs) other than quantity and price controls and finance measures have increased from 55% to 85% and 32% to 59% respectively[2]. These trends suggest that the trade impediments through NTMs and TBTs are increasing worldwide in the tariff reduction era and it's anticipated that the non-tariff and technical measures to trade rather than tariff measures will be increasingly used by the developed countries to protect their industries in the years to come.

In spite of tariff liberalization, the large number of NTMs negates the liberalization of tariff measures and hence, there is fear among countries about the application of alternative trade barriers i.e. non tariff measures, which have emerged as another form of *disguised protectionism*. Some of the following reasons have also contributed to the recent discussion and analysis of NTMs.

- *First* tariff reduction, as part of trade labializations, will not be enough incentive for the countries.
- *Second* NTMs are likely to reduce the gains achieved through tariff liberalization.
- *Third* with gradual shifting of unofficial trade to official trade, the issue of NTMs will become more important and visible and;
- *Fourth* the cost of compliance for the firms will also become higher.

The broadest definition of a non-tariff barrier is any measure other than a tariff that distorts trade (Linkins, 2002). Some of the widely accepted definitions of NTMs are:

[2] For more details see UNCTAD (2005).

- "Any measure (public or private) that causes internationally traded goods and services, or resources devoted to the production of these goods and services, to be allocated in such a way as to reduce potential real world income"…...Baldwin (1970).
- "Any governmental device or practice other than a tariff which directly impedes the entry of imports into a country and which discriminates against imports, but does not apply with equal force on domestic production or distribution"… Hillman (1991).

Broadly it can be said that NTMs are measures, other than tariffs, that are connected with state (administrative) activity and influence prices, quantity, structure and/or direction of international flows of goods and services as well as resources used to produce these goods and services. These NTMs are of different nature such as restrictive standards, burdensome regulations and procedures, inspection requirement, quantitative restrictions including ban, labelling requirement.

The term "non-tariff measures" is defined to include export restraints and production and export subsidies, or measures with similar effect, not just import restraints. This is the term most widely used in GATT and UNCTAD, although textbooks generally prefer the terms "barriers" or "distortions" (Bora at el, 2002) [3]. However, still there is no consensus on using the term Non-Tariff Measures (NTMs) and Non-Tariff Barriers (NTBs) and what we should mean by NTMs or NTBs is not entirely self-evident. Through out this paper, we use the term "non-tariff measures" which includes all kind of policy measures which are beyond the scope of tariff measures.

NTMs and Indian Exports

Impact of NTM is worldwide and India is also not intact, and to gauge this impact there are studies on NTMs with either country or sector focus or both however, studies which concentrate on the impact of NTMs on Indian exports are rare; and the notable among those are reviewed here. Saqib and Taneja (2005), using inventory approach, found that the incidence of NTMs imposed on India by ASEAN and Sri Lanka has increased during 1997-

[3] The reason why the Geneva agencies have adopted the term "measures" is to avoid some of the measurement and judgmental problems associated with the terms "distortions" and "barriers". As UNCTAD has explained it, "measures" encompasses all trade policy instruments, even though their restrictiveness or effects, if any, may vary between countries applying the measures or at different points of time in a specific country; for example, if the world price of a product rises above the domestic support price, a variable levy would not be applied, although the mechanism remains in force. A quota may be greater than import demand, implying no restrictiveness.

98 to 2002-03. By 2002-03, there was a substantial increase in the proportion of exports subject to NTMs, from some countries such as Philippines, Malaysia, Indonesia and Thailand up to 37%, 32%, 29% and 25% respectively. Metha (2005) calculated frequency and coverage ratios and found that India is facing various kinds of NTMs in some of its major export partners such as USA, EU, Japan which is significantly higher than other countries. He has identified that about 44 per cent of India's exports to US face several of the listed hard-core NTMs – the most important being technical requirements (safety) and labelling requirements and the main commodities affected are textiles, including ready-made garments, iron and steel, fish and seafood. Further, nearly 25% of exports to EU and 46% exports to Japan face the NTMs while the respective figures for the world are 12% and 39.5% only. Taneja (2007) identified NTMs with special focus on Indo-Pak trade and found that Pakistan's positive list approach (only 1075 items currently) towards Indian imports is also a kind of NTM. Further, only two items appeared in the top 50 items that were of export interest to India and of import interest to Pakistan in a recent expansion of the positive list by 302 items. Also, Pakistan does not allow cotton to be imported by the rail route and allows only five items to be imported by the road route.

NTMs and Textiles and Clothing Exports

There have been incidences that Textile and Clothing (T&C) exports are facing various NTMs in the major markets. The restrictions are mainly in the form of shipments being subjected to rigorous labelling and marking requirements, security parameters and document verification at ports (in USA) and issues relating to compliance with labour and environmental norms[4].

The main forms of restrictions that have been raised, with respect to some Indian shipments in the US, are in the form of norms violating US child labour policies, sanitary measures in the Indian suppliers' workplace, suspected use of azo-dyes and security checks of consignments. Indian exporters are facing 'spot audits' from bigger US buyers such as Wal-Mart and JC Penney. The audits being conducted by the US buyers on their Indian suppliers, aims at checking instances of child labour and ensure that labour standards being used conform to stipulated norms. These checks are over and above the mandatory social audits conducted annually by the bigger retailers on their supplier base in India. Added to this,

[4] http://www.thehindubusinessline.com/2006/01/05/stories/2006010502780900.htm

second highest (19%) anti-dumping cases have been filed against Indian textile exports (Metha, 2005) and around 95% of apparel tariff lines in the US have either product characteristic requirements or labeling requirements (Kee at el, 2008).

EU countries are also creating non-tariff measures for Indian exports by bringing social and environmental issues into sourcing decisions. Trade unions and global NGOs are attacking India's apparel export industry using labor rights and other considerations. Among the Indian garment manufacturers who were accused of labour abuse in 2007 are Gokaldas Exports and Texport Overseas (accused by Brussels-based labour union federations) and Fibres and Fabrics International (under attack from the Clean Clothes Campaign)[5]. Global brands like Tommy Hilfiger, Levi's, Ann Taylor and Mexx have snapped sourcing ties with Bangalore-based Fibres & Fabrics International (FFI) after international watchdog Clean Clothes Campaign (CCC) accused the company of labor rights violations in 2008.

There is the low level of understanding of such measures within the industry. In this industry about 66% is in the power-loom sector, 22% is handlooms and 6% is knitting and they are unaware about such NTM issues so not well prepared. The mill sector is a little more aware of this, but here too, it is only around 30-35 per cent of the integrated mills that really understand such issues, and can take the necessary actions within their companies to counter the effects of trade protectionism.

To date all tariff and non-tariff measures initiated by the US, EU etc have succeeded in hampering trade in the short and long term. According to TEXPROCIL officials, "Even as India won the bed-linen case against the EU at the WTO level, during the period of investigation etc, trade was hampered to a very large extent. So even if we do win the case finally, during the period that the case is on, which is a long period, there is apprehension in the minds of the buyers and the exporters and trade is diverted to competing countries"[6]. Also fighting a case through dispute settlement body costs about million 7-10 US$, as per the estimates, which is not a cost-effective business for every firm.

All these NTMs like TBTs, audits for social, labor and environmental compliance have made the industry jittery. There has been resurgence in the use of these measures which invariably

[5] just-style.com, 11 March, 2008.
[6] Express Textile, 16 - 31 March, 2005.

affect both domestic and export markets of developing countries. Hence the identification of NTMs and conducting of studies on NTMs affecting developing countries' exports should be taken as a matter of priority.

Importance of Textile & Clothing Sector

This study specifically focuses on the impact of NTMs in the Indian textiles and clothing sector. Some of the important reasons behind choosing the textile and clothing sector for the study are as follows.

First, there have been recent increasing incidences of the NTMs in this sector as discussed in the previous section. *Second,* this sector is one of the major contributors to the gross domestic product, total exports, manufacturing output, industrial employment (see table 1). *Third,* the textile and clothing has been one of the highly sensitive sectors observing high import and export changes due to tariff reduction. There is 26% and 49% change in imports and exports respectively when South Asian countries liberalize with North American Free Trade Agreement (NAFTA) and about 50% import and 64% export change is observed, if EU countries are involved with SAFTA (Kumar & Saini, 2007). *Fourth,* There are few NTM studies on India covering specific trade partners however till date, none of the India focused study has specifically examined the NTMs faced by Indian textile and clothing exports in the major markets.

Table 1 Significance of Textile and Clothing Sector in India- 2006-07

Exports	**Million USD**	**% share in exports**	**Imports**	**Million USD**	**% share in imports**
Textile & Clothing	19439.47	15.37	Textile & Clothing	2756.96	1.48
Total Exports	126262.67		Total Imports	185604.1	
Contribution to GDP, Manufacturing Output and Industrial Employment					
GDP	Manufacturing Output	Industrial Employment		Direct Employment	Indirect Employment
4%	26%	18%		38mill.	53mill.
Source: Exim databank, DGFT and Ministry of Textile, GOI					

Table 1 provides the data on textiles and clothing sector contribution in imports and exports as well as overall economy. This sector accounts for more than 15% of total Indian exports, 4% of gross domestic product, 26% of manufacturing output, 18% of industrial employment, 38 million direct employment and 53 million indirect employment.

Table 2 clearly reveals the major export destination and share in Indian textiles export basket. More than 56% of market is comprised of EU-25 and USA. 8 EU countries' individual share can also be observed in the table. Other significant contributors are UAE, China, Turkey and Canada with almost 2% or more shares of Indian exports. At lower end, there are some Asian countries such as Bangladesh, Sri Lanka, Pakistan and Japan.

Table 2 India' Top Export Destination of Clothing and Textiles Sectors - 2007

S No	Partner Name	Export Value ($ '000)	% Share
	World	20969201	100
1	EU25 members	7118106	33.95
2	United States	4660667	22.23
3	**United Kingdom**	1622892	7.74
4	**Germany**	1298553	6.19
5	United Arab Emirates	1262704	6.02
6	China	988277	4.71
7	**Italy**	889822	4.24
8	**France**	888414	4.24
9	Turkey	669228	3.19
10	**Spain**	559481	2.67
11	**Netherlands**	470124	2.24
12	Canada	387108	1.85
13	**Belgium**	384404	1.83
14	Saudi Arabia	360042	1.72
15	Bangladesh	355697	1.70
16	Pakistan	343139	1.64
17	Egypt, Arab Rep.	265408	1.27
18	Japan	254077	1.21
19	Sri Lanka	248218	1.18
20	**Denmark**	238344	1.14
21	Korea, Rep.	218781	1.04
	Total excl 8 EU countries	**17131450**	**81.70**

Source: Wits UN Comtrade HS 2002 classification, EU countries are in bold.

Given aforementioned importance of textile and clothing sector in Indian economy and increasing incidences of NTMs in the sector, this paper attempts to quantify the impact of NTMs on Indian exports. The paper specifically tries to answer questions - such as what level of "*disguised protectionism"* Indian textile and clothing exports are facing? What is the pattern of that and has that changed (increased) over a period of time? How much trade and employment is lost due to NTM restrictions? What would be the likely gains of removing tariffs in the key export markets? What is the magnitude of tariff and non-tariff restrictions

and its impact? What will be likely impact on domestic producers of removing all NTMs in key segment of textile and clothing exports?

The reminder of this paper is structured as follows. Next section reviews important studies on NTM methodology, *third* section discusses approach and methodology of the study, *fourth* section reports the result obtained from the study. *Lastly*, paper concludes with some of the directions for further research while discussing general insights from the results.

Literature Review on Methodology

Unlike tariffs, NTMs can neither be straightforwardly categorized and quantified nor easy to model. There are various general approaches available for measuring NTMs however; some of the most widely used approaches[7] are categorized in table 3 with the examples of important studies under each approach.

Table 3 Various Approaches Available to Study the NTMs

Approaches	Approach Orientation	Important Studies
Survey based approaches	**Trade-oriented -** quantification is subject to respondent bias.	Saqib and Taneja (2005)
Econometric Inventory and Gravity approaches	**Trade-oriented -** may provide insight to broad relationships between technical measures and trade; and provides the incidences of NTMs but data may be problematic.	Mehta (2005), Saqib and Taneja (2005), Disdier et. al (2007)
Partial Equilibrium Price-wedge, Cost-benefit measures, Sectoral model method	**Welfare oriented -** depending on use; draws together various effects of TBTs and; assesses trade and welfare implication in detail, but data availability pose practical difficulties.	Deardorff and Stern (1997), Thilmany and Barret (1997), Paarlberg and Lee (1998), Bradford (2003)
Computable General Equilibrium Price-wedge and Micro-based methods	**Welfare oriented -** depending on use; provides insight to aggregate level economy-wide effects but data also pose practical difficulties.	Andriamanajara et al. (2004), Fugazza et. al (2008), Kee et al. (2008)

Among above, the important studies on the India are reviewed in the earlier section while other recent and important works (from methodological view point) on NTMs are discussed here.

[7]See Deardoff and Stern (1997) and Ferrantino (2006) for a comprehensive review and discussion on the various approaches. Useful discussions are also found in Maskus et al. (2000) on quantification of technical measures to trade while Beghin and Bureau (2001) discusses sanitary and phytosanitary standards.

Thilmany and Barrett (1997) studied the implications of technical regulations for dairy exports from the United States within the NAFTA. They compared domestic and international prices to estimate the producer subsidy equivalent and import tariff-rate equivalent of these trade barriers. Paarlberg and Lee (1998) included a risk-based approach to a partial equilibrium framework. They studied the case of U.S. tariff protection against beef imports from countries that may transmit foot-and-mouth disease (FMD).

Bradford (2003) computed AVEs using price differentials between retail prices and import prices after correcting for transport, taxes and other distribution costs. The results show extensive protection. Japan's average tariff equivalent is 57%, those of the European countries range from 48% to 55%, and that of the United States is lowest, at 12%. An applied general-equilibrium analysis of this protection shows that Japan's barriers impose large costs on itself; Japanese and U.S. barriers greatly burden poorer countries; the United States would benefit significantly from multilateral, but not unilateral, opening.

Disdier et al. (2007) used gravity model and analyzed the impact of measures notified by OECD importing countries under the SPS and TBT agreements on bilateral trade flow and have found, using *inter alia* ad-valorem equivalents of SPS and TBT regulations, that these measures have, on the whole, a negative impact on trade in agricultural products.

Andriamanajara et al. (2004) used CGE model with 14 product groups and 18 regions and estimated the global *Ad Valorem Equivalents* (AVEs) for NTMs to derive the welfare effects in the GTAP model. The price effects obtained are generally very large i.e. up to 190% in the wearing apparel and bovine meat sector in Japan and China respectively and in the EU the price effect is about 60% in wearing apparel. Global gains are to the tune of about billion 90 US$ arising mostly from liberalization in Japan and Europe and in the textile and machinery sectors. Fugazza et al. (2006) focused on methodological questions related to the treatment of NTMs in CGE models with an application of the GTAP model and concludes that the serious estimation and modelling efforts remain to be undertaken in order to make CGE modelling a useful policy tool to analyze NTMs. Kee et al. (2008) provides indicator of trade restrictiveness for 78 developing and developed countries which suggests that poor countries tend to have more restrictive trade policies but they also face higher trade barriers on their exports.

Approach & Methodology

There are various general approaches available for measuring NTMs however the desirability of a particular approach is contingent upon data available and its appropriateness to the questions at hand, and none of them is a standard tool for quantifying NTM in all cases. NTM quantification techniques can be broadly grouped into two categories. First, *ex-post* approaches such as gravity-based econometric models tend to estimate the observed impact of NTMs. Second, *ex ante* methods such as simulations involving the calculation of tariff equivalents are usually employed to predict the impact of NTM regimes whose effects are, as yet, unobserved (Korinek, et al. 2008). Consistent with second approach, the following approaches and methods have been considered for the study after considering their appropriate-ness with study objectives and data availability. Methodologically this study can be divided into three stages. *First*, using inventory approach, frequency and coverage ratios have been calculated. *Second*, ad-valorem equivalent (AVE) have been calculated using price wedge method and *Third*, these calculated AVEs have been implement in the SMART model under the partial equilibrium framework in order to assess the trade diversion effect.

Table 4 Methods for the Study

Approach	Question /Area to be addressed	Method[8]	Data type/source
Inventory Approach	How many lines or products of imports are subject to NTMs?	Index of Frequency Ratio	Commodity Export & Import and NTMs data India Trade, UNCTAD Trains, WITS - Comtrade
	How much of imports of a country are subject to NTMs?	Index of Coverage Ratio	
Price Wedge Method	Calculating the price wedge between the imported good and the comparable product in the domestic market.	Calculating Price relatives or percentage difference between the prices i.e. *tariff equivalents*	Tariff data and Price data Domestic price=Import Price and World Price = World Price of competing countries WITS –Trains, Unit value approach for price data
SMART Model	Measuring the trade diversion impact.	Using *ad valorem equivalents* (AVEs) in SMART model under the partial equilibrium framework	WITS SMART data base

[8]For index definition and more details about price relative measures please refer to Mehta (2005), Bijit Bora (2002) and Deardoff and Stern (1997) respectively.

Frequency and coverage ratios have been calculated for the years in data are available in the WITS UNCTAD Trains.

HS 2002 classification has been used in calculating the AVEs; and the reference year is 2007 except Bangladesh (2004), Sri Lanka and UAE (2005). HS 2002 data for Egypt are not available in the WITS UN Comtrade therefore Egypt is dropped from AVE calculation and SMART simulations.

Additionally, the impact of zero tariffs is also assessed to see the contrast between the impact of NTM and tariffs. In other words, how much India will gain, if all major countries eliminate all tariffs and NTMs on the imports coming from India? We report the NTM and tariff results simultaneously.

A brief description of each of above methods is given below.

Inventory Approach

In the literature two most widely used indices are frequency and coverage ratio which measures the extent of protection by NTMs. These indices estimate the how many lines or products[9] of imports are subject to NTMs i.e. frequency ratio and how much of imports of a country are subject to NTMs i.e. "coverage ratio of NTMs. In the first step of research we calculate these two indices, as described here.

Frequency Ratio

The frequency index shows the percentage of import transactions covered by a selected group of NTMs for an exporting country. It is calculated as:

$$Fjt = \left[\frac{\sum D_{it} . M_{iT}}{\sum M_{iT}} \right] \times 100$$

- Di reflects the presence of an NTM on the tariff line item;
- Mi indicates whether there are imports from the exporting country *j* of good *i;*
- *t* is the year of measurement of the NTM; and

[9] It has been found all tariff lines of a HS code (6 digits) have been affected due to NTM therefore analysis has been done at HS code (6 digits) level rather than tariff line level.

- T is the year of the import.

Coverage Ratio

The percentage of trade subject to NTMs for an exporting country *j* at a desired level of product aggregation is given by the trade coverage ratio:

$$Cjt = \left[\frac{\sum D_{it} . V_{iT}}{\sum V_{iT}} \right] \times 100$$

- if an NTM is applied to the tariff line item *i*, the dummy variable Di, takes the value of one and zero if there is no NTM;
- Vi is the value of imports in item *i*;
- *t* is the year of measurement of the NTM; and
- T is the year of the import weights.

There are studies which have used inventory approach in studying NTMs such as Mehta (2005) used frequency ratio to study NTMs imposed on different Indian export sectors, Mehta and Mohanty (1999) have used frequency ratio based on hard-core NTMs of non-agriculture goods for 1995 and 1998 and Moenius (1999) used the inventory-based method as an input in econometric approaches.

The most widely available source of information on NTMs is the UNCTAD TRAINS database. It has been used in this research paper to generate frequency and coverage ratios.

Price Wedge Method

Price-wedge methods rely on the idea that NTMs can be gauged in terms of their impact on the domestic price in comparison to a reference price. This method has been used to provide a tariff equivalent or Ad-Valorem Equivalent (AVE) measure. The tariff equivalent measure can be estimated by calculating the price wedge between the imported good and the comparable product in the domestic market. The correct measure would be to compare the price that would prevail without the NTM to the price that would prevail domestically in the presence of the NTM if the price paid to suppliers were to remain unchanged (Deardorff and

Stern 1998). However, these prices usually are unobservable, and actual measures focus instead on a comparison of the domestic and foreign price in the presence of the NTM.

The price impact is a general property of NTMs, such a price comparison can pick up the net effects of all NTMs that are present in a market. This technique is used frequently by World Bank economists and; Roningen and Yeats (1976), Baldwin (1975), and Bhagwati and Srinivasan (1975). The research indicates that price comparison method, perhaps, is the best for measuring the presence or size of non-tariff barriers in international textile trade as it allow us to compare tariff and non-tariff trade barriers effects and relies on direct primary data (Zigmantavičienė et al., 2006). Empirically, in the short term one percentage point reduction in the tariff rate results in a proportional one percent lower rise in clothing prices (Hoegh-Omdal and Wilhelmsen, 2002).

In this method, comparison with free world price is also suggested (Bora, 2002). However, reference price (price of group of countries which are producing similar quality goods) instead of world price could be a better measure of comparison when accounted for product quality differences. Therefore, in this study, we compare the import prices from India with the import price from South Asia (Bangladesh, Pakistan, and Sri Lanka) and China to the major trading partners. Main reason behind doing this is to adjust for quality differences. We assume that textile and clothing products exported from India can be better compared with South Asian and Chinese products rather than world, at least at most disaggregate level i.e. HS 6 digit level. China contributes about 20-30% of total EU-25 and USA imports therefore inclusion of China makes reference price more representative.

Please note that reference price is also not completely free from NTMs however at country level Bangladesh (being one of the least developed countries in Asia) and Sri Lanka (due to the special treatment agreed with the West) are largely free from NTMs. Therefore price difference measure also includes some of the competitive factors besides NTMs impact which is one the limitations of this method.

Price data at HS 6 digit level are unavailable therefore we have taken the unit values as proxies for prices. Hence we compare cif import prices from India with cif import price from South Asia+China. In case of unavailability of price data at most disaggregate level the unit value method could be an alternative approach (Zigmantavičienė et al., 2006). Recently

Schott (2006) and Harrigan (2005) have use unit values as proxies for export prices. Sazanami, Urata, and Kawai (1995), in their study of the cost of protection for Japan, have used 'unit values' of imported and domestic goods as proxies for prices. Some other studies have also used unit values derived from detailed trade data to infer the price gaps [Knetter (1994) and Swagel (1995)]. Unit values can provide reasonable estimates of price gap at very detailed classification levels (for example, the Harmonized System 10-digit). At higher levels of aggregation, though, unit values are notoriously inexact measures of prices because of large quality differences in products[10].

However, the proxies selected for the prices i.e. unit values based on the cif import price are expected to perform well. *First,* we perform the analysis at HS code 6 digit level which leads to less aggregation and quality problems and *Second,* that about 88% NTMs are related to technical, labeling and other related requirements in USA and in Japan about 75% are related to product characteristics and labelling (Mehta, 2005) and around 95% of apparel tariff lines in the US have either product characteristic requirements or labeling requirements (Kee at el, 2008). The nature of these restrictions is such that home country (in this case India) has to incur cost inside the border (either at plant level or any of stages before the shipment of goods) for complying with NTM regulations and this cost is automatically reflected in the cif value of goods. Above studies support our proposition that the most of the NTM restrictions are imposed inside the border and these costs are inbuilt in the cif price.

SMART Model

In the third step of the research we have imposed *ad valorem equivalents* (estimated through price differential method) in the SMART Model to know the trade effect. *In addition to NTMs, we also examine impact of zero tariffs on India, using this model, in order to do a comparative analysis of the gains due to tariff and non tariff barriers elimination.* SMART is partial equilibrium modeling tool included in WITS that is used for market analysis. It focuses on one importing market and its exporting partners and assesses the impact of a tariff change scenario by estimating new values for a set of variables.

[10] For instance, Sazanami et al. derive tariff equivalents by comparing the unit values of domestically produced goods and imported goods in the same product category. It turns out that the unit values of radios and TVs produced in Japan are six times higher than the unit values of such products imported into Japan. The actual level of protection, though, is probably much less than this, because Japanese radios and TVs are generally of much higher quality than those that the Japanese import.

Theoretical Framework and Assumptions

Infinite Export Supply Elasticity

The setup of SMART is that, for a given good, different countries compete to supply (export to) a given home market. The focus of the simulation exercise is on the composition and volume of imports into that market. Export supply of a given good (say banana) by a given country supplier (say Ecuador) is assumed to be related to the price that it fetches in the export market. The degree of responsiveness of the supply of export to changes in the export price is given by the export supply elasticity. ***SMART assumes infinite export supply elasticity (99 in the SMART model***) - that is, the export supply curves are flat and the world prices of each variety (e.g., bananas from Ecuador) are exogenously given.

Armington Assumption

SMART relies on the Armington assumption to model the behavior of the consumer. In particular, the adopted modeling approach is based on the assumption of imperfect substitutions between different import sources (different varieties). That is, goods (defined at the HS 6 digit level) imported from different countries, although similar, are imperfect substitutes. Within the Armington assumption, the representative agent maximizes its welfare through a two-stage optimization process: *First*, given a general price index, she chooses the level of total spending/consumption on a 'composite good'. The relationship between changes in the price index and the impact on total spending is determined by a given ***import demand elasticity***[11]. *Second*, within this composite good, she allocates the chosen level of spending among the different 'varieties' of the good, depending on the relative price of each variety. The extent of the between-variety allocative response to change in the relative price is determined by the ***Armington substitution elasticity (1.5 in the SMART model).***

Trade Creation and Trade Diversion

SMART reports the result of any trade policy shock on a number of variables. In particular, it reports the effects on trade flows (i.e. imports from the different sources). It also decomposes those trade effects in trade creation and trade diversion. ***Trade creation*** is defined as the direct increase in imports following a reduction on the tariff imposed on good g from country C. If the tariff reduction on good g from country C is a preferential tariff reduction (i.e. it

[11] we use country specific import demand elasticities calculated by world bank team (Kee, Hiau Looi, Alessandro Nicita and Marcelo Olarreaga, "Import Demand Elasticities and Trade Distortions", 2004) instead of SMART elasticities which are neither new nor country specific.

does not apply to other countries), then imports of good g from country C are further going to increase due to the substitution away from imports of good g from other countries that becomes relatively more expensive known as ***trade diversion*** in the SMART model.

Advantages and Limitations

The main advantage of the partial equilibrium approach to market access analysis is its minimal data requirement. In fact, the only required data for the trade flows, the trade policy (tariff) and a couple of behavioral parameters (elasticities). Another advantage (which follows directly from the minimal data requirement) is that it permits an analysis at a fairly disaggregated (HS code 6 digit) level which is neither convenient nor possible in the framework of a general equilibrium model. This also resolves a number of 'aggregation biases.' Among limitations, the analysis is only done on a pre-determined number of economic variables. This makes it very sensitive to a few (badly estimated) behavioral elasticities. It misses important interactions and feedbacks between various markets. In particular, the partial equilibrium approach tends to neglect the important inter-sectoral input/output (or upstream/downstream) linkages that are the basis of general equilibrium analyses. It also misses the existing constraints that apply to the various factors of production (e.g. labor, capital, land) and their movement across sectors (WITS SMART Model).

Unit of Analysis: Commodity and Country Selection

There are more than 800 commodities (chapter 50-63) in the textile and clothing sector at the HS code 6 digit level however the study focuses on the top 100 commodities (refer annexure table 3 for the list of selected 100 HS code) which represents about 83% of the total trade. On the country side, the study consider top 20 export partners which accounts for about 84% of Indian textile exports (refer table 2) instead of all trade partners i.e. more than 200 countries.

Table 5 Commodity and Country Selection

Total Textile & Clothing Exports – 2006-07 19439.47 Million USD				
Commodity Selection		Country Selection		
Total HS code at 6 digit level	% share of top 100 HS code	% share of Total Trade	Total partner countries	% share of top 20 countries
834	83%	13%	>200	84%
Source: EXIM databank DGFT and India Trades				

The export partners selected for the study are: USA, EU-25 (India's major trading partner in EU 25 are- UK, Germany, Italy, France, Spain, Netherlands, Denmark, and Belgium), Japan,

Canada, China, Saudi Arabia, United Arab Emeritus, Turkey, Korea South, Egypt, Bangladesh, and Sri Lanka. We consider EU-25 as a single market consisting of major trading partners, as latest data for EU countries are grouped under EU-25.

The study is commodity centric i.e. textile and clothing sector not the NTM centric as the whole idea is to assess the non-tariff-barrier's impact on the export of select sector. The timeframe for the analysis is 19990-91 to 2006-07. In case of unavailability of data for 2006-07, the data for the latest available year is considered for the study. Data points selected for a particular method depends on the data availability under the WITS and other resources.

Results and Discussion

Frequency and Coverage Ratio

Table 6 shows the frequency and coverage ratios for various countries and for different years. As per the results, the United States imposed NTMs on about 74% of the total (or sampled) textile and clothing products (frequency ratio) in the year 2000 and these tariff lines or HS codes accounts for about 85% of the total export value i.e. coverage ratio. European Union is relatively less protectionist and imposed NTMs on about 30% of the total products which accounts for almost double trade value i.e. 60% in the year 1999. In that year, both these restrictions have increased from a very low level i.e. 4% in 1991.

Table 6 Frequency and Coverage Ratio of Major Export Partners

	Country/Region	**Year**	**2006**	**2000**	**2001**	**1999**	**1996**	**1991**
1	United States	FR		74.00				
		CR		85.32				
2	EU-25	FR				30.00		4.00
		CR				60.00		4.36
3	Canada	FR		75.00				
		CR		92.12				
4	Japan	FR			2.56		7.34	
		CR			1.40		5.87	
5	Turkey	FR	1.00			0.33		
		CR	3.98			10.01		
6	Egypt, Arab Rep.	FR			1.85	57.41		
		CR			0.04	25.68		
7	Bangladesh	FR		21.17				
		CR		20.30				

FR - Frequency Ratio, CR – Coverage Ratio, Source: WITS Comtrade data

In the year 2000, the restriction level of the Canada is also similar to the USA with the frequency and coverage ratios of 75% and 92% respectively. India faced less restriction in Japan where about 3% tariff lines and only 1.4% export values of the Indian textile have faced NTMs. Restriction on Indian export to Japan have declined in 2001 as compared to 1996 by more than two times as evident from the table.

Latest NTM data are available for the turkey in the WITS comtrade for year 2006. In this year, frequency ratio is one while coverage ratio is four times more i.e. 4%. In the year 1999, frequency ratio is low (0.33%) but coverage ratio is high (10%) implying that India traded more under very few tariff lines which faced NTM restrictions. Egypt shows pattern different than Turkey where India faced restriction in about 57% of total tariff lines which accounts about 26% of total export value in the same year. However, these restrictions significantly declined in 2001 when about 2% of the total tariff lines were subject to NTM in which India's trade was almost negligible (0.04%). Among the neighbor countries, in Bangladesh Indian textile exporters faced NTMs in one-fifth of the total tariff lines as well as in the total export value in year 2000.

Overall, based on inventory approach, US, EU-25 and Canada are most restrictive and more than 60% of India's textiles exports are facing NTMs at different point in time. Egypt and Bangladesh are at the second tier in terms of relative comparison of NTM restriction while Japan and Turkey are the least restrictive.

Ad-Valorem Equivalents of Non-Tariff Measures

Table 7 provides the average Ad-Valorem Equivalents (AVE) of the NTMs calculated at HS 6 digit level based on the price differential method. AVE have been calculated based on the year 2007 data expect except Bangladesh (2004), Sri Lanka and UAE (2005). The second column of table provides the average AVE values in the absolute term while third column shows the imported weighted AVE. All import weighted AVEs are lower than the absolute AVEs with one exception i.e. Pakistan.

Table 7 Ad-Valorem Equivalents (in %) of Non-Tariff Measures

S. No.	Countries	Average AVE[12]	Average MWAVE
1	USA	61	31
2	EU25	52	31
3	Japan	66	21
4	Canada	43	26
5	Korea	262	16
6	S. Arabia	126	68
7	Turkey	67	13
8	UAE	154	55
9	China	139	4
10	Bangladesh	136	45
11	Pakistan	17	96
12	Sri Lanka	340	40
	Average	**122**	**37**

AVE- Average Ad-Valorem Equivalents
AMWAVE –Average Import Weighted Ad-Valorem Equivalents

The SMART simulations have been done with HS 6 digit level AVE rather than average AVE and we use simple AVEs rather than import weighted AVE due to the fact that import weighted AVEs are low due to lower import share of particular HS code and import share might be low due to the NTM restrictions therefore at most disaggregate level simple AVE is the better measure than import weighted.

The simple average ad-valorem equivalent of all studied countries is 122% and it is 37% when import-weighted. Major trading partner USA and EU-25 has 61% and 52% AVE respectively and 31% for both when it's import-weighted. Highest AVE is for Sri Lanka and Korea 340% and 262% respectively but it significantly goes down when weighted by imports. However, India traded low in the NTMs affected HS code (or due to NTM restrictions India traded low) therefore import weighted AVE significantly declines to 40% and 16% respectively. Canada has lowest average AVE i.e. 43% (expect Pakistan with 17%) implying lower NTM restriction imposed on Indian exports as compared to other countries.

Average AVE for Japan is 66% and the import-weighted AVE is 21%. China and Bangladesh have almost similar average AVE i.e. 139 and 136 respectively while import-weighted AVEs are 4% and 45% respectively implying India is trading low with China as compared to Bangladesh in the NTM affected products. For Pakistan average AVE of studied HS code (in 2007, India traded only in about 19 HS code of the sample HS code) is 17 when its import

[12] For HS level AVE please refer to Annexure.

weighted it becomes 96% due to the one heavily traded commodity - Cotton, not carded or combed (HS code 520100) (almost 99% share in total imports from India), where the price difference is about 8%. Saudi Arabia and UAE also represents similar trend with the simple AVE of 126% and 154% and with the reduced import weighted AVE of 68% and 55%.

Overall, due to NTMs and some other competitive factors (which are hard to determine with available data) Indian textiles exports are becoming more costly in the range of 17% (Pakistan) to 340% (Sri Lanka) with huge variation across destinations. However, at the aggregate level India is trading low in the NTM affected product categories therefore reducing the AVE estimates in range of 4% (China) to 96% (Pakistan). And for all countries average tariff equivalent estimate is about 122% absolute and 37% import weighted. Similar figures, tough at world level and for all sectors, in Kee, et al (2008) are 45% and 32% respectively.

Comparing AVE Estimates with Other Studies

We compare our AVE estimates with those of others as an external test to our results. Our AVE estimates are either similar or somewhat higher at aggregate level when compared with AVEs calculated by other studies through different methods.

There are three notable studies which provide AVEs for important markets, as shown in the table 8. Except Bradford (2003), table reports the average AVE for the lines (HS Codes), for which NTMs exists in a particular country. In the Bradford (2003) it's not clear whether he reports AVE for all lines or AVE only for binding NTMs. Average AVEs for all lines with or without NTMs, if reported, are specifically mentioned in the table. The main difference in the other studies and this study must be noted before comparing the results that all these studies have included most of the sectors or HS codes of each country while this study concentrates only on the textiles and clothing sector (chapter 50-63 of the HS classification).

Bradford (2003) provided AVEs for Australia, Canada, Japan, United States and 5 European countries (Belgium, Germany, Italy, Netherlands and the United Kingdom). These AVEs are computed using price differentials between retail prices and import prices, after correcting for transport, taxes and other distributions costs.

Andriamananjara et al. (2004) also provides estimate of AVEs of NTMs for 12 groups of products (that correspond to GTAP product classification). They use price data from the Economist Intelligence Unit for 18 regions/countries and estimate the impact of NTMs on retail prices controlling for several variables capturing distribution costs (GDP per capita, distance, wages in the non-traded sector etc.). The most complete exercise is undertaken for apparel sector. Andriamananjara et al. (2004) estimates a simple average AVE of NTMs in apparel across countries of 73% (it varies between 16 and 190%).

Kee et al. (2008) first estimates the quantity-impact of NTBs on imports and then transformation of quantity-impacts into price effcts, using the import demand elasticities in Kee, Nicita and Olarreaga (2004). Kee et al. (2008) estimates 39% simple average for apparel that varies between 0 and 249% across countries. Our simple average AVEs for apparel sector (product chapter 61-62), across countries is 44% and it varies between 2 and 243%.

Table 8 Comparison of Various AVE Estimates of NTMs (in %)

Country/Region	Bradford (2003)	Andriamanjara[13] (2004)	Kee, et al (2008)	**Present Study**
USA	12	16	37(10)	**61(31)**
EU-25/European Union	48-55	41	45(13)	**52(31)**
Canada	8	25	33(5)	**43(26)**
Japan	57	114	35(11)	**66(21)**
China			35(6)	**139(4)**
S. Arabia			34(5)	**126(68)**
Turkey			35(6)	**67(13)**
Sri Lanka			44(0.3)	**340(40)**
Bangladesh			34(4)	**136(45)**
Apparel Sector	-	73 (16-190)	39(0-249)	**44(2-243)**

Except Bradford (2003) table reports the average AVE for the lines (HS Codes) for which NTMs exists in a particular country. Parenthesis in forth column (Kee, et al, 2008) reports AVE for all lines in that country. Parenthesis in last columns reports the import weighted AVEs and in last row table reports the across country variation.

[13] This study reports the sector specific AVE, the country's average AVE, reported here, are the average of the given sectors.

The result in various studies differs such as Bradford's AVE for Japan and European countries; Andriamanjara' estimates for Japan; and present studies' estimates (mostly un-weighted) are higher. In the apparel sector, our result are consistent with Kee et al (2008) estimates while Andriamanjara's average AVE estimates are higher.

There could be various reasons why these numbers differs. Some of the explanations are; *first*, that the AVE given by other studies capture NTM impact in all sector rather than textile and clothing sector and therefore results are not expected to be match. Also the higher AVE estimates of this study can be explained by the higher frequency and coverage ratios shown in table 6. *Second,* that the studies using price comparisons method assumes that domestically produced goods and import goods are perfect substitutes ignoring product differentiation, which could be quite significant if analysis is performed at a more aggregate level. However, it should be noted here that its reasonable to assume that Indian textile and clothing products are largely similar at HS 6 digit level, if not exactly, to South Asian+Chinese product. *Third*, reporting AVE when it's binding and excluding products for which it's negative, results in the relatively higher AVE estimates. This could be one of the reasons behind the higher AVE estimates of studies other than Bradford (2003).

Analysis of Negative Ad-Valorem Equivalents

We do a small test on the some of the common HS codes (represented by EU-25) for which negative AVE is obtained. Based on the Balassa's (1967) Revealed Competitive Advantage Index it has been found that India is much more competitive than compared group of countries (i.e. SAC =South Asia+China) in about 88% HS code of the test (refer table 4 in annexure). This implies that even if India is facing NTMs in the major trading partner but still it's more competitive than other counterparts (Bangladesh, Sri Lanka, Pakistan and China) making its AVE negative. However, in the further analysis such as SMART simulation, we drop the HS codes for which AVEs are found negative.

SMART Simulation Results

Overall Trade Impact of NTMs

Table 9 reports the result obtained from the SMART simulations for different aggregated segments (for product aggregation please refer annexure table 3). As noted earlier that, along

with NTMs, we also examine the impact the tariff elimination to do a comparative analysis of gains (due to zero tariff) and losses (due to NTMs).

Table 9 Impact of Non-Tariff Measures and Tariff Elimination
(Base trade & gross output/person in 000 USD and Change in %)

	Sectors	Base	NTB	Change	Tariff	Change	Gross Output/ worker	Employment Loss due to NTM (in no.)
1	Cotton, cotton yarn & fabrics & other fabrics	2711234	-169445	-6.2	182813	6.7	19.35	8759
2	Man made filaments, stable fibres & veg. fibers	816333	-226519	-27.7	64333	7.9	67.17	3372
3	Carpets and other textile floor coverings	784086	-58620	-7.5	18632	2.4	24.53	2390
4	Apparel and clothing accessories	8050360	-1506286	-18.7	945841	11.7	11.35	132697
5	Other made up textile articles	1610209	-386474	-24.0	153543	9.5	24.53	15758
	Total	13972221	-2347345	-16.8	1365162	9.8		162975

Beside tariff and non-tariff impact, table also reveals the employment loss based on the gross output per worker measure. Data on the gross output and no of workers employed in textiles and clothing industry have been obtained from the Annual Survey of Industries (ASI), then the gross output per worker is calculated and lastly ASI industries are matched with our product aggregation to know the impact on employment.

Table 9 shows that man made filaments and stable fibers and other made up textile articles are among the most hit sectors due to NTM restrictions with about 27.7% and 24% of the base trade values respectively while the trade gains due to the tariff elimination will be 7.9% and 9.5% respectively of base trade value for these segments. The NTM impact for apparel and clothing accessories and carpets and other textile floor coverings is about 18.7% and 7.5% respectively. Among sectors, cotton, cotton yarn, cotton fabrics and other fabrics is least (6.2%) affected due to non tariff barriers. Tariff elimination by the partner countries will result about 11.7% trade gain in the apparel and clothing accessories which is the highest among the sectors. Similar gains for carpets and other textiles floor coverings is very small 2.4%. In most of the sectors, gains due to zero tariffs partially cover the losses caused by the NTM and only gains in cotton, cotton yarn, cotton fabrics and other fabrics sectors (6.7%) is able to outweigh the losses (6.2%) due to non tariff restrictions. Overall, approximate 16.8%

of the total trade is lost due to NTMs while similar gains by tariff zero are only 9.8% which is quite easy to understand that the post NTM simple average tariff is about 15 times more than pre NTM. In contrast, that there is only about 11.31% (see annexure table 1 for country specific tariff change) average tariff fall so trade gains are unable to compensate for NTM losses. More restrictiveness of the NTMs is quite in line with the results of Kee at el, (2008) where they found that contribution of NTMs to the overall level of trade restrictiveness is higher than the contribution of tariffs.

These results can be interpreted in the other words also that by elimination of both tariff and non-tariff measures total gains to overall sectors will be about 26.6%(16.8%+9.8%) of the base trade. Similarly, at the sectoral level, highest beneficiary sectors will be man made filaments, stable fibers & other veg. fibers (35.6%), other made up textiles articles (33.5%) and apparel and clothing accessories (30.4%).

Based on the average output/worker measure employment loss due to NTM is roughly 163 thousands. Apparel and clothing sector witnesses' largest job cut of about 132.6 thousands as its output/worker ratio is low and it has significant share in the base trade value. Other made up textile articles sector reports the second largest loss i.e. more than 15.7 thousands while rest is shared by other three sectors.

Country wise Trade Impact of Tariff and Non-Tariff Measures

Table 10 reports the country specific effect of NTMs and tariff elimination. Discussion concentrates on key export partners.

Result varies both across countries and sectors. Made filaments and stable fibres and other veg textile fibres is one of the highly affected product category due to NTM in the all countries except South Asia, China and Turkey. NTMs imposed by these countries represents roughly from 50% to one-third of the base trade. China and South Asian countries except Sri Lanka impose highest restrictions in the carpets and other floor coverings sector though sector's contribution is very low for these countries. In other countries also except USA (14%), this sector is one of the least/unaffected sectors by NTM.

Apparel and clothing accessories sector is affected to a large extent in USA (15.8%), EU-25 (22.1%), China (55.5%), Sri Lanka (38.1%) and Canada (14.5%). This impact is also driving the impact on employment given large trade value with most of the member countries

specially -USA, EU-25, Japan, Canada and UAE. The cotton sector is badly affected in S. Arabia (93.3%) and UAE (72.2%) in percentage term, though it has low contribution to India's export basket. The loss in the other made up textile articles sector is high (USA-27% and Japan- 42%) due to several NTMs imposed by these countries. This sector is badly affected in the Korea (87%), S. Arabia (73%), Turkey (40%), UAE (58.5%) and Sri Lanka (59%) also.

Overall the NTMs by major trading partners i.e. USA and EU-25 restrict approximately 18.7% and 20.3% respectively of the total trade which is quite easy to understand that the post NTM average tariff increases by about 7 and 5 times respectively i.e. 69% and 63% (annexure table 1). Canada (13%) and Japan (9%) also restricts the textile export flow from India though with low magnitude. At aggregate level, the least restrictive countries are – Korea (5.3%), Turkey (4.1%), China (1.3%), Pakistan (3%) and Bangladesh (5.1%).

Trade gains due tariff elimination are also quite easy to understand. In general, gains are high where the base tariff rates are high and low where base rates are low. Average tariff of sample HS code for EU-25, USA and Japan are 11.5%, 9.38% and 7.43% respectively and elimination of these brings benefit to EU-25 (10.7%) and about 9% for both Japan and USA. Similarly in other countries such as Canada, S. Arabia, UAE export losses are proportionate to the pre and post average tariff change. China and Bangladesh also gains about 11% and 9% respectively by bringing their average tariff rates (13% and 22% respectively) to zero level (refer annexure table 1). Overall, the losses due to NTM are highest in EU-25 (20.3%) and gains due to tariff reduction are highest in Canada (14.4%) of the base trade values. Here it's important to note that we run the simulation based on the absolute AVE rather than import-weighted AVE therefore the reported post NTM tariffs are high. The main reason behind doing this is that AVE might contribute to the significantly low trade value so the import weighted AVE may not be a true measure of NTM restriction.

In other words, at aggregate level India will gain highest in UAE (40%), EU-25 (31%), USA (28%), and Canada (28%) if both tariff and non-tariff measures are eliminated simultaneously. Similarly results can be interpreted for other countries. Extending the zero tariff benefit to Japan, Canada, Korea, Turkey, China and Bangladesh compensates for the NTM loss either fully or partially.

Table 10 Impact of Non-Tariff Measures and Tariff Elimination (Base Trade in 000 USD and Change in %)

		Base	NTM	Tariff	Base	NTM	Tariff	Base	NTM	Tariff	Base	NTM	Tariff
Sectors		**USA**			**EU-25**			**Japan**			**Canada**		
1	Cotton, cotton yarn & other fabrics	124721	-18.2	4.5	502693	-13.8	5.0	47980	-14.0	3.5	19087	-5.6	2.3
2	Man made filaments & stable fibres	64874	-46.8	20.1	313359	-28.9	7.0	6549	-33.3	40.4	13762	-40.8	5.3
3	Carpets and other floor coverings	384900	-14.0	2.0	331145	-1.0	1.6	3222	3.7	8.8	27075	-1.7	8.7
4	Apparel and clothing accessories	2688551	-15.8	10.8	4601076	-22.1	12.2	125506	-2.1	9.8	273842	-14.4	16.2
5	Other made up textile articles	919258	-27.4	8.4	583157	-18.0	10.7	17702	-41.9	7.8	60451	-9.5	15.0
Total		**4182305**	**-18.7**	**9.4**	**6331430**	**-20.3**	**10.7**	**200959**	**-9.4**	**9.1**	**394217**	**-13.3**	**14.4**
Sectors		**Korea**			**S Arabia**			**Turkey**			**UAE**		
1	Cotton, cotton yarn & other fabrics	167106	-3.7	7.3	3442	-93.3	28.2	331554	-3.3	2.6	22785	-72.2	7.7
2	Man made filaments & stable fibres	2281	-57.7	17.2	18259	-53.8	9.3	217337	-2.3	4.4	135846	-58.6	8.3
3	Carpets and other floor coverings	1827	0.0	11.9	3523	0.0	5.3	27534	-0.2	7.9	3431	0.0	7.1
4	Apparel and clothing accessories	12875	-5.7	15.2	92304	-0.3	5.8	74546	-12.3	19.0	163405	-3.2	7.4
5	Other made up textile articles	1800	-87.4	16.1	7161	-73.2	5.8	5307	-40.0	13.3	12457	-58.5	7.9
Total		**185890**	**-5.3**	**8.1**	**124690**	**-14.8**	**6.9**	**656278**	**-4.1**	**5.4**	**337923**	**-32.1**	**7.8**
Sectors		**China**			**Sri Lanka**			**Bangladesh**			**Pakistan**		
1	Cotton, cotton yarn & other fabrics	987633	-0.7	10.7	43751	-19.9	0.0	181554	-5.3	8.3	278929	-3.0	1.9
2	Man made filaments & stable fibres	24892	-4.1	7.5	11013	-9.0	1.2	6646	-1.6	14.6	1515	-2.9	7.7
3	Carpets and other floor coverings	1085	-89.4	20.9	287	-1.4	14.0	45	-99.2	26.0	10	-62.9	26.0
4	Apparel and clothing accessories	8590	-55.5	25.5	4190	-38.1	23.4	5413	-2.1	33.5	63	-0.1	30.6
5	Other made up textile articles	1964	-11.7	28.3	732	-59.1	17.3	219	-1.8	36.2	0	0.0	20.9
Total		**1024164**	**-1.3**	**10.8**	**59972**	**-19.6**	**2.1**	**193877**	**-5.1**	**9.3**	**280517**	**-3.0**	**2.0**

Country and Sector wise Employment Impact of NTMs

Based on the average output per worker measure table 11 reports the largest job lose (98984) in EU-25 followed by USA (51501) and Canada (3865). Apparel and clothing contributes highest job loss in EU-25, USA and Canada which is understandable by the low output/worker ratio (11.35) and good amount of trade diversion from the high base trade value. In the carpets and other textile floor coverings sector, employment loss is almost negligible in all countries; expect USA & EU-25, given its low base trade value and subsequently low trade loss due to NTM. The NTMs by UAE and Turkey also contributes to the employment loss of about 2791 and 1525 respectively. NTMs in manmade filaments, stable fibres etc sector contributed most in UAE employment loss given its more than half (58.6%) decline in its base trade value.

Table 11 Impact of NTMs on Employment (no. of workers)

	Sector	**USA**	**EU-25**	**Japan**	**Canada**	**Korea**	**S Arabia**
1	Cotton, cotton yarn & fabrics & other fabrics	1175	3575	347	55	324	166
2	Man made filaments, stable fibres & veg. fibers	452	1347	32	84	20	146
3	Carpets and other textile floor coverings	2193	139	5	18	0	0
4	Apparel and clothing accessories	37424	89647	234	3473	64	21
5	Other made up textile articles	10257	4275	303	235	64	214
	Total	51501	98984	911	3865	472	547
	Sector	**Turkey**	**UAE**	**China**	**Sri Lanka**	**Bangla desh**	**Pakistan**
1	Cotton, cotton yarn & fabrics & other fabrics	558	850	335	451	495	427
2	Man made filaments, stable fibres & veg. fibers	73	1186	15	15	2	1
3	Carpets and other textile floor coverings	2	0	40	0	2	0
4	Apparel and clothing accessories	805	457	420	141	10	0
5	Other made up textile articles	87	297	9	18	0	0
	Total	1525	2791	819	624	509	428

Overall, sectoral analysis reveals that apparel and clothing contributes highest to the employment loss (132697) followed by other made up textile articles (15758) and cotton, cotton yarn, cotton fabrics and other fabrics (8759). Total job loss due to all countries restrictive NTM policies is about 163 thousands (refer table 9).

Conclusion and Direction for Further Research

This paper provides some important indicators of non-tariff measures in Indian textiles and clothing exports. The paper identifies major trading partners and HS codes to study the impact of NTMs on Indian exports. The count measures i.e frequency and coverage ratio suggests that more than 60% of export value is affected by the NTMs in USA, EU-25 and Canada at various data points. One general observation is that coverage ratio is, by and large, higher than the frequency ratio. Ad-valorem equivalent is varying across countries in the range of 17% (Pakistan) to 340% (Sri Lanka) while the AVE for major export markets such USA (61%), EU-25 (52%), Japan (66%) and Canada (43%) is not too scattered. Further the imported weighted AVE shows more similarity across countries with reduced AVE levels.

Due to NTMs, at aggregate level, textiles and clothing sector have observed a total trade loss of about billion 2.34 US$ which is 16.8% of base trade value while on the other hand, the zero tariff gains are roughly billion 1.36 US$ that's 9.8% of base values. Among sectors, man-made filaments, stable fibres & other fibres and other made up textile articles are highly affected (in % terms) due to NTMs while the zero tariff scenario will bring largest (11.7%) benefits to the apparel and clothing accessories sector. Employment losses are also high in this sector which contributes about 81% to total job loss of about 163 thousands.

Due to decreasing tariff levels and some other reasons, non-tariff measures is one of the emerging fields of study for the researcher as well as trade policy makers. The methodology is still evolving and in literature, there is no standard technique for zooming into NTMs. The above results should be interpreted with due carefulness as there are assumptions, drawbacks (discussed in the methodology section) and proxies used to arrive at reasonable estimates. It's also understood that AVE captures some of the unwanted results which are almost impossible to separate out with the available data. This study therefore, builds further scope for validating results by the actual data drawn from the field (and the survey of exporters could be one the means for this); and comparing and testing the results obtained from various methods. However, this paper is an attempt to provide the most disaggregate analysis (HS-6 digit level) of tariff and non-tariff impact and it gives some reasonable NTM estimates for the debate to policy makers; and for further refinement to the researcher community.

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Annexure

Table 1 Simple Average Tariff Rates

S. No.	Country	Average Simple Tariff	Pre-NTM Tariff	Post-NTM Tariff
1	USA	9.38	8.34	69.18
2	EU-25	11.56	11.37	63.04
3	Japan	7.43	6.55	98.54
4	Canada	12.79	10.99	48.85
5	Korea	10.90	10.90	430.98
6	S Arabia	5.00	5.00	191.71
7	Turkey	9.19	8.50	75.18
8	UAE	5.00	5.00	233.40
9	China	12.70	12.01	181.84
10	Sri Lanka	15.00	10.00	253.50
11	Bangladesh	21.82	20.15	136.31
12	Pakistan	15.00	12.50	35.19
Average		11.31	10.11	151.48

Note - average simple tariff includes average of all selected 100 HS codes while Pre-NTM includes the average of only NTM affected HS codes therefore the pre-NTM tariff is slightly lower than the average simple tariff.

Table 2 Ad-Valorem Equivalent at HS Code Level

Country	USA		EU25		Canada		Japan		Korea		S. Arabia	
Product	**AVE**	**MAVE**	**AVE**	**MAVE**	**AVE**	**MAVE**	**AVE**	**MAVE**	**AVE**	**MAVE**	**AVE**	**MAVE**
500720	10.3	19.4	21.4	33.4	-15.1	-22.9	78.9	56.6	37.2	29.2	39.2	16.6
500790	77.7	18.4	51.7	14.6	29.0	14.1	133.6	8.5	220.8	13.8	326.7	139.1
520100	94.0	0.4	-9.5	-1.6	3.5	0.1	-15.0	-63.0	-46.4	-235.0	199.2	2.8
520511	38.9	0.2	3.9	0.1	38.4	0.0	-25.3	-0.3	-25.9	-11.0		
520512	6.9	0.3	-5.9	-1.1	-11.3	-2.4	-0.5	0.0	-1.5	-2.2		0.0
520521	38.8	0.0	-6.9	-0.4			26.4	0.1	99.0	0.1		
520522	-18.7	-1.2	-15.7	-12.5	-7.7	-4.2	21.3	5.1	-18.9	-136.0	-28.0	-0.6
520523	-17.5	-4.1	-13.4	-16.0	-12.4	-3.5	-20.5	-54.0	-26.9	-1465.9		
520524	-1.8	-0.2	-10.8	-7.9	-39.5	-44.8	-3.8	-15.2	-16.3	-218.1		
520548		0.0	19.8	16.5			7.3	80.8	41.4	225.3		
520710	-83.6	-0.9	-45.4	-0.9	20.7	1.0			267.2	16.8	345.6	102.8
520790	-51.9	0.0	276.6	0.6	385.2	0.0			309.7	7.0	23.9	0.0
520811	-3.7	-0.1	-33.9	-16.9	1.5	0.0	166.2	214.0	-39.0	-22.6	586.5	69.6
520812	3.2	0.2	6.6	3.4	-35.4	-1.0	214.8	7.0	-15.3	-1.6	287.2	452.8
520831	137.1	1.2	0.3	0.0	-25.4	-4.3	22.8	1.9	40.8	5.9	626.4	54.5
520851	98.5	0.8	44.5	0.7	-75.5	-0.1	213.6	15.4	97.6	0.2	450.5	146.2
520852	38.2	3.9	11.8	0.6	68.7	5.1	48.6	2.5	181.6	2.2	231.7	16.6
520911	-4.6	-0.8	-8.7	-0.9	-25.8	-4.5	40.3	1.3	4.2	0.2	402.8	33.9
520942	-20.6	-0.1	6.8	2.5	5.0	0.6			19.1	6.8		
531010	21.3	8.5	9.7	4.0	13.5	7.3	7.0	11.5	12.3	3.8		0.0
540233	-24.5	-6.0	6.6	1.3	-1.1	-1.4	-26.2	-0.7	-4.9	-0.8	457.7	16.5
540242	-13.5	-0.3	-12.2	-2.7	-12.0	-0.2	-6.5	0.0	-20.2	-12.5	-29.3	-2.2
540331	-3.7	0.0	-7.2	-0.7	137.5	17.3	-17.1	-7.5	-16.7	-0.9		
540710	221.7	1.8	86.1	3.6	-1.2	0.0			1685.6	86.9	229.4	1157.9
540752	76.6	3.0	352.7	79.6	-41.8	-8.4	320.3	6.4	-12.7	0.0	98.9	45.5
540754	-36.0	-1.0	95.5	3.8	63.5	6.8					20.6	49.5
550320	26.9	13.5	-6.1	-4.0	53.7	10.1	227.1	7.6	306.8	96.1	20.5	78.1
550410	-12.8	0.0	-7.4	-3.4	-27.3	-0.1	25.0	1.2	-4.6	-0.5		
550922	6.3	0.5	-12.8	-2.0			39.5	1.3				
550951	10.1	0.3	-3.3	-0.9	129.8	0.0	17.9	1.4	-1.0	-0.1	31.4	14.0
550953	-9.1	-0.1	11.4	4.5	13.7	0.9	0.3	0.0			23.9	1.1
551011	2.5	0.1	-6.8	-4.2	14.0	0.0	-18.6	-10.6	-14.0	-0.4		
551219	38.0	0.3	107.6	3.7	62.9	23.3	467.3	34.5	829.0	1.0	51.4	2.3
551229	69.0	0.0	21.8	0.0	177.0	0.0			6139.5	22.7	137.2	52.3
551511	89.2	0.5	50.2	5.1	39.4	2.4	216.4	44.6	336.8	18.9	6.1	21.5
551512	62.9	0.3	8.7	0.1	82.8	0.3			58.4	0.1	21.4	5.9
570110	-31.8	-142.9	-23.2	-39.7	-78.1	-215.5	0.0	0.0	-0.1	0.0	0.0	0.0
570190	52.6	19.2	16.0	5.1	29.6	12.7						
570220	74.7	46.4	0.6	0.3	-76.3	-93.8	0.0	0.0	0.0	0.0	0.0	0.0
570231	43.3	6.3	-23.5	-4.6	14.7	1.2	0.0	0.0	0.1	0.0	0.0	0.0
570259	55.6	1.7	4.7	0.5	-5.4	-0.3	0.0	0.0	0.1	0.0		
570310	-7.5	-21.2	-40.8	-33.6	-43.7	-101.1	0.0	0.0	0.0	0.0	0.0	0.0
570500	185.5	130.6	-0.3	-0.3	13.8	1.3	0.0	0.0	0.0	0.0	0.0	0.0
581092	107.1	14.5	285.9	147.5	107.6	63.9	471.5	55.1	270.4	19.8	124.1	148.5
590310	3.3	0.1	27.2	1.5	-0.4	0.0	41.4	0.1			-20.5	-2.7
610342	11.7	3.1	-32.0	-15.3	-33.0	-11.5	0.0	0.0	0.0	0.0	0.0	0.0
610442	36.4	11.6	-12.9	-10.7	-9.5	-3.2	0.0	0.0	0.0	0.0	0.0	0.0
610462	-12.7	-8.8	10.9	15.1	-4.8	-5.9	0.0	0.0	-0.2	0.0	0.0	0.0
610510	12.3	87.3	28.1	74.6	23.3	131.5	0.0	0.0	0.0	0.0	0.0	0.0

610610	-7.6	-9.4	-3.7	-6.5	6.3	5.5	0.0	0.0	0.0	0.0	0.0	0.0
610711	-7.4	-15.7	10.6	11.9	24.6	47.4	0.0	0.0	0.0	0.0	0.0	0.0
610721	-10.6	-0.7	107.1	150.0	-27.8	-33.5	0.0	0.0			0.0	0.0
610821	-3.4	-2.1	3.9	2.5	-3.4	-2.2	0.0	0.0	0.0	0.0	0.0	0.0
610831	-39.0	-18.2	10.8	29.6	-19.1	-69.9	0.0	0.0	0.0	0.0	0.0	0.0
610910	22.6	99.7	27.9	437.7	42.5	506.8	0.0	0.0	0.0	0.0	0.0	0.0
610990	-1.8	-0.3	19.4	14.2	27.9	10.0	0.0	0.0	0.0	0.0	0.0	0.0
611011	-8.3	-0.1	-23.4	-2.8	14.6	0.9	0.0	0.0	0.0	0.0	0.0	0.0
611020	-17.0	-141.6	-6.2	-26.0	-16.2	-76.7	0.0	0.0	0.0	0.0	0.0	0.0
611120	-2.5	-3.6	-26.7	-74.9	0.0	0.0	154.9	41.3	199.4	16.6	48.7	73.8
611420	15.5	9.9	-30.5	-17.8	0.0	0.0	72.8	12.4	244.8	23.1	-89.2	-3.0
620319	196.7	1.0	-32.9	-0.4	7.7	0.1						
620332	50.7	3.6	-14.7	-2.2	43.0	4.6	0.0	0.0	0.0	0.0	0.0	0.0
620342	33.5	182.2	19.9	69.6	24.0	92.4	0.0	0.0	0.0	0.0	0.0	0.0
620343	13.5	8.9	9.3	3.8	47.7	58.4	0.0	0.0	0.0	0.0	0.0	0.0
620412	15.2	0.0	-6.9	-0.2	-9.4	-0.2					0.0	0.0
620413	46.8	0.3	-10.8	-0.4	-21.4	-2.1					0.0	0.0
620419	216.2	2.0	31.8	1.7	-16.0	-0.5						
620422	-37.3	0.0	-0.4	0.0	9.8	0.9	0.0	0.0	-1.0	0.0	0.0	0.0
620432	-0.3	-0.1	25.8	7.7	37.8	7.9	0.0	0.0	0.0	0.0	0.0	0.0
620442	13.9	46.8	-24.9	-113.6	-12.6	-30.2	0.0	0.0	0.0	0.0	0.0	0.0
620443	-35.2	-13.9	-40.2	-43.5	-43.2	-19.6	0.0	0.0	0.0	0.0	0.0	0.0
620449	39.1	19.0	15.5	10.3	6.2	2.1	0.0	0.0	0.0	0.0	0.0	0.0
620452	25.3	70.5	22.7	74.1	12.9	27.0	0.0	0.0	0.0	0.0	0.0	0.0
620453	23.8	7.9	30.8	13.1	23.7	3.2	0.0	0.0	0.0	0.0	0.0	0.0
620462	10.8	58.7	-10.1	-23.5	13.8	36.1	0.0	0.0	0.0	0.0	0.0	0.0
620520	26.8	141.1	29.7	178.8	18.1	94.1	0.0	0.0	0.0	0.0	0.0	0.0
620530	32.4	8.0	99.9	26.6	68.9	26.7	0.0	0.0	0.0	0.0	0.0	0.0
620590	15.2	2.9	61.9	18.0	12.1	1.5	0.0	0.0	0.0	0.0	0.0	0.0
620610	55.1	11.9	22.6	6.8	16.7	2.2	0.0	0.0	0.0	0.0	0.0	0.0
620630	0.9	6.1	-10.8	-86.5	-8.9	-45.4	0.0	0.0	0.0	0.0	0.0	0.0
620640	19.9	20.4	15.5	27.5	18.7	14.3	0.0	0.0	0.0	0.0	0.0	0.0
620821	67.9	19.5	72.1	25.5	-4.9	-3.5	0.0	0.0	0.0	0.0	0.0	0.0
620920	108.9	61.2	-51.1	-53.6	0.0	0.0	121.0	114.1	451.6	96.7	-17.1	-65.9
621142	144.4	217.0	40.8	22.6	0.0	0.0	-7.3	-22.4	-9.9	-1.3	44.0	6.8
621410	119.8	17.9	82.7	25.6	134.4	27.2		0.0				
621420	87.8	16.4	124.7	45.0	70.3	12.3	0.0	0.0	0.0	0.0	0.0	0.0
621430	168.5	23.1	80.1	42.6	77.5	26.5	0.0	0.0	0.0	0.0	0.0	0.0
621490	305.0	22.1	222.4	99.5	-1.4	-0.2						
630210	68.2	5.0	18.4	2.4	0.0	0.0	51.9	0.6	65.1	2.7	239.5	35.3
630221	34.6	48.1	-25.7	-31.0	0.0	0.0	-2.9	-0.9	366.2	7.3	521.9	107.8
630231	35.9	249.3	0.8	0.6	0.0	0.0	53.1	59.1	144.6	8.3	137.5	49.1
630260	22.7	216.4	23.2	39.4	24.6	116.3	7.1	3.2	56.8	2.3	146.2	0.9
630311												
630391	26.2	24.4	23.8	0.3	4.8	6.8	100.8	249.2	137.7	31.9	106.6	43.2
630419	91.7	21.7	-10.6	-0.1	0.0	0.0	3.8	1.8	68.4	5.1	130.8	17.1
630492	58.3	44.6	11.2	0.1	27.6	10.7	13.5	34.3	93.5	26.9	100.4	26.3
630499	160.4	51.9	128.1	0.6	93.8	18.9	86.9	16.0	245.4	34.5	292.0	235.3
630510	9.2	1.5	36.2	0.1	21.4	2.0	2.3	0.3			38.7	138.2
630710	12.1	7.0	-25.9	0.0	-39.6	-7.3	19.8	3.8	65.8	0.0	32.2	9.5
630790	-33.5	-33.9	-19.8	-0.1	-69.8	-54.6	14.6	16.6	3.0	0.2	363.4	361.1

AVE-Ad-Valorem Equivalent, MAVE-Import Weighted Ad-Valorem Equivalent. Blank cell means either no trade or unavailability of data.

Table 2 Ad-Valorem Equivalent at HS Code Level…*continue*

Country	Turkey		UAE		China		Pakistan		Bangladesh		Pakistan	
Product	**AVE**	**MAVE**	**AVE**	**MAVE**	**AVE**	**MAVE**	**AVE**	**MAVE**	**AVE**	**MAVE**	**AVE**	**MAVE**
500720	6.9	3.8	36.0	65.4	0.0	0.0	-25.7	-6.1				
500790	30.4	0.6	44.4	6.7	0.0	0.0	-14.5	-3.2	59.3	0.0		
520100		0.0	65.8	0.2	-7.4	-628.4	194.1	19.3	26.0	926.5	7.8	769.6
520511			-27.3	-5.8	-12.0	-2.0	8.6	283.5	11.7	117.4	41.7	1.0
520512	16.2	4.9	3455.1	12.3	0.6	1.3	24.3	60.5	11.4	4.9		
520521			113.5	4.3	1357.0	0.1	19.9	200.1	-6.7	-158.6		
520522	6.8	18.7	237.1	0.7	4.4	15.0	5.8	15.7	-6.3	-7.3		
520523	2.2	14.0		0.0	8.0	16.4	796.1	35.1	-21.7	-11.7	5.5	0.4
520524	-1.5	-19.9	21.3	0.0	4.3	13.1		0.0	-34.0	-27.6		
520548	-13.7	-14.0	69.1	90.7	34.0	12.9	-62.8	-12.8	-35.8	0.0		
520710			337.1	30.7		0.0	21.7	3.6	-21.1	-7.6		
520790			212.4	6.7		0.0	61.8	40.9	19.3	7.7		
520811	26.5	1.3	126.0	27.6	0.0	0.0	-11.4	-10.7	-28.8	-11.5		
520812	45.4	22.2	110.6	8.8	0.0	0.0	89.7	4.2	2.5	0.4		
520831			33.5	21.7	0.0	0.0	-7.6	-7.4	44.1	6.2		
520851			119.9	161.1		0.0	-1.8	-5.5				
520852			29.7	3.8	0.0	0.0	-9.4	0.0	37.1	0.2		
520911			428.7	34.2	0.0	0.0	29.7	75.0	-48.3	-3.8		
520942	13.5	86.0	8.0	4.7	0.0	0.0	27.9	427.1	-22.5	-443.2	0.0	0.0
531010	6.1	1.9	-44.4	-36.8		0.0	25.8	1.8				
540233	8.3	25.3	122.1	37.9	280.2	2.8	-26.7	-59.7	-31.4	-1.5		
540242	-0.8	-2.6	442.6	0.0		0.0		0.0	15.4	0.1		
540331	0.5	0.1	65.1	3.2	138.7	0.8			-7.9	-3.8		
540710			107.0	66.9			-35.2	-39.6	-8.8	-0.1		
540752			17.8	118.8	0.0	0.0	-56.4	-0.4	-60.1	0.0	0.0	0.0
540754	-29.9	-2.5	39.6	492.7		0.0			34.0	0.9		
550320	-0.4	-0.1	-16.4	-4.7	-3.6	-4.6	-25.0	-0.4	-49.7	-7.9		
550410	0.8	1.2		0.0	75.2	4.2	236.7	0.8	-49.3	-50.5	-14.8	-7.2
550922	-0.6	-1.9		0.0	-29.1	-0.1	-3.2	-6.8	-36.5	-0.8		
550951	0.8	13.6	122.5	4.4		0.0		0.0	77.5	1.0		
550953	-11.2	-8.6		0.0	3.1	1.3	11.4	1.5	-59.7	-7.6		
551011	-1.3	-7.3		0.0	117.3	2.6			-65.3	-27.4	13.4	0.5
551219			-19.8	-38.1	0.0	0.0	-4.0	-17.1	6.0	0.1	-1.0	
551229			30.5	0.2		0.0	-0.9	-0.1	282.7	6.9		
551511	6.0	0.6	109.8	1414.0	0.0	0.0	-31.6	-197.2	-19.7	-20.3		
551512			19.4	8.0	0.0	0.0	103.5	5.4	-20.5	-0.2		
570110	-18.5	-69.2	0.0	0.0	132.1	7.3			234.7	5.5	63.5	0.2
570190	-29.5	-4.8	0.0	0.0	-29.8	0.0	-54.4	-1.5	-67.4	0.0		
570220		0.0	0.0	0.0	86.2	1.4	-45.1	-11.3				
570231				0.0		0.0		0.0				
570259				0.0		0.0						
570310			0.0	0.0	48.3	1.1		0.0				
570500	728.1	5.6	0.0	0.0	-37.9	-0.4	50.7	0.6	202.3	0.0		
581092	403.5	98.5	64.2	170.6	-62.4	-0.1	51.3	0.1		0.0		
590310			-71.0	-63.0	178.0	0.1	104.7	174.2	-35.5	0.0		
610342	-40.4	-3.0	0.0	0.0	579.9	1.6	72.2	2.2	154.0	0.6		
610442	-11.7	-0.9	0.0	0.0	270.6	0.6	265.9	0.4				
610462	-36.6	-4.6	0.0	0.0	131.3	0.8	57.4	0.1				
610510	-3.0	-0.3	0.0	0.0	54.1	3.3	85.1	3.1	-16.3	0.0		

610610	-60.3	-19.7	0.0	0.0	-2.6	0.0	-97.5	-2.6	-80.2	0.0		
610711	13.4	0.2	0.0	0.0	-65.2	0.0	32.8	1.1	110.9	0.0		
610721	-8.0	-0.2	0.0	0.0	333.9	0.0						
610821	-22.6	-0.2	0.0	0.0	-74.5	0.0	579.5	9.1	-53.5	0.0		
610831	-12.3	-1.4	0.0	0.0	79.0	0.1		0.0				
610910	-14.1	-12.5	0.0	0.0	194.4	28.7	54.1	46.5	62.0	1.0		
610990	9.9	0.9	0.0	0.0	111.5	2.9	-7.9	-7.2	-24.7	-0.6		
611011	-10.2	-0.1	0.0	0.0	164.9	0.5			-81.9	-0.4		
611020	3.6	1.3	0.0	0.0	885.9	32.7			-36.2	0.0		
611120	-13.5	-11.7	39.0	41.3	23.9	0.1						
611420			219.7	37.4	0.0	0.0						
620319			0.0	0.0		0.0	-82.8	-10.5	-91.6	0.0	-20.6	-0.4
620332	38.3	0.5	0.0	0.0	-70.6	-0.9	5196.5	3.7				
620342	106.1	53.7	0.0	0.0	154.8	15.9	103.9	113.2	105.4	0.3		
620343	-21.2	-0.2	0.0	0.0	94.8	0.4	141.0	1.2			4.2	0.0
620412			0.0	0.0		0.0	153.5	10.9	568.5	0.1		
620413			0.0	0.0		0.0						
620419			0.0	0.0		0.0	49.1	6.9	-47.6	-38.0		
620422	-33.1	-0.9	0.0	0.0	-17.4	0.0	117.8	0.6				
620432	-30.9	-2.5	0.0	0.0	-57.8	-1.8	96.0	0.5				
620442	-8.1	-5.8	0.0	0.0	-39.0	-1.1	53.1	17.8				
620443	-85.5	-20.3	0.0	0.0	-49.7	-0.2	-92.1	-0.5	-81.2	-116.1		
620449	87.1	7.2	0.0	0.0	140.4	0.7	7.4	4.3	-80.4	-0.8	-13.2	0.0
620452	-6.8	-4.5	0.0	0.0	-2.3	-0.1	178.0	9.7				
620453	-72.9	-5.9	0.0	0.0	-78.7	-0.2						
620462	25.5	8.0	0.0	0.0	154.4	8.6	307.2	24.2	-84.1	0.0		
620520	11.4	10.6	0.0	0.0	17.6	2.0	60.6	22.5	61.0	0.8		
620530	170.5	2.1	0.0	0.0	97.0	0.6	0.0	0.0		0.0		
620590	31.5	1.0	0.0	0.0	155.4	0.5	16.3	7.6	-67.8	-2.0		
620610	3.4	0.2	0.0	0.0	161.8	0.3			-21.7	0.0		0.0
620630	-56.4	-126.0	0.0	0.0	-30.8	-1.5	65.4	2.3	915.3	0.3		
620640	-61.1	-64.1	0.0	0.0	-27.7	-0.1	15.4	0.0	-12.6	0.0		
620821	-19.1	-0.7	0.0	0.0	-43.9	0.0	-18.4	-1.8				
620920	26.9	3.8	161.0	70.9	-12.9	-0.1	-22.6	-0.9				
621142	75.2	7.1	200.7	27.0	0.0	0.0	-44.8	-56.0				
621410	115.0	10.8	0.0	0.0	-41.4	-0.3						
621420	80.7	11.4	0.0	0.0	-8.7	-0.2						
621430	-44.0	-10.9	0.0	0.0	85.9	0.3		0.0	-47.1	-0.4		
621490	-38.2	-3.9	0.0	0.0	234.5	1.3	188.7	17.4	26.1	1.8		
630210			153.2	9.7	-0.6	0.0	2897.7	29.9	-71.8	-4.4		
630221			402.1	62.3	0.0	0.0	448.8	157.1	-60.1	-2.6		
630231	96.3	6.5	-18.9	-2.1	0.0	0.0	103.4	22.4	-15.1	-0.1		
630260	-32.2	-1.3	33.6	26.7	0.0	0.0	18.0	4.8	-70.4	0.0		
630311			593.7	8.4		0.0	99.9	0.0				
630391			855.3	282.6	0.0	0.0	2865.4	67.6				
630419	75.3	14.6	336.7	94.9	0.0	0.0	193.8	9.4				
630492	-33.0	-1.9	228.0	66.8	22.2	0.3	583.1	39.0	-59.1	-0.1		
630499	-50.5	-4.2	281.6	92.0	153.5	2.0	15.5	0.2				
630510	8.0	2.5	-24.4	-24.5		0.0	-66.6	-12.0				
630710		0.0	62.7	2.3	0.0	0.0	-42.6	-0.3	-86.9	0.0		
630790	57.3	1.2	143.3	43.1	31.5	0.5	-93.2	-3.1	200.8	0.4	0.8	0.0

AVE-Ad-Valorem Equivalent, MAVE-Import Weighted Ad-Valorem Equivalent. Blank cell means either no trade or unavailability of data.

Table 3 Selected HS Codes and Product Aggregation

Product Aggregation	HS Code	S. No.	Product Name
Cotton, cotton yarn, cotton fabrics and other fabrics	500720	1	Other fabrics, containing 85 % or m
	500790	2	Other fabrics
	520100	3	Cotton, not carded or combed.
	520511	4	Measuring 714.29 decitex or more (n
	520512	5	Measuring less than 714.29 decitex
	520521	6	Measuring 714.29 decitex or more (n
	520522	7	Measuring less than 714.29 decitex
	520523	8	Measuring less than 232.56 decitex
	520524	9	Measuring less than 192.31 decitex
	520548	10	Measuring per single yarn less than
	520710	11	Containing 85 % or more by weight o
	520790	12	Other
	520811	13	Plain weave, weighing not more than
	520812	14	Plain weave, weighing more than 100
	520831	15	Plain weave, weighing not more than
	520851	16	Plain weave, weighing not more than
	520852	17	Plain weave, weighing more than 100
	520911	18	Plain weave
	520942	19	Denim
Man made filaments and stable fibres and other veg. textile fibers	531010	20	Unbleached
	540233	21	Of polyesters
	540242	22	Of polyesters, partially oriented
	540331	23	Of viscose rayon, untwisted or with
	540710	24	Woven fabrics obtained from high te
	540752	25	Dyed
	540754	26	Printed
	550320	27	Of polyesters
	550410	28	Of viscose rayon
	550922	29	Multiple (folded) or cabled yarn
	550951	30	Mixed mainly or solely with artific
	550953	31	Mixed mainly or solely with cotton
	551011	32	Single yarn
	551219	33	Other
	551229	34	Other
	551511	35	Mixed mainly or solely with viscose
	551512	36	Mixed mainly or solely with manmade
	581092	44	Of manmade fibres
	590310	45	With poly(vinyl chloride)
Carpets and other textile floor coverings	570110	37	Of wool or fine animal hair
	570190	38	Of other textile materials
	570220	39	Floor coverings of coconut fibres
	570231	40	Of wool or fine animal hair
	570259	41	Of other textile materials
	570310	42	Of wool or fine animal hair
	570500	43	Other carpets and other textile flo
Apparel and clothing accessories	610342	46	Of cotton
	610442	47	Of cotton
	610462	48	Of cotton
	610510	49	Of cotton
	610610	50	Of cotton
	610711	51	Of cotton
	610721	52	Of cotton
	610821	53	Of cotton
	610831	54	Of cotton
	610910	55	Of cotton
	610990	56	Of other textile materials
	611011	57	Of wool
	611020	58	Of cotton
	611120	59	Of cotton
	611420	60	Of cotton
	620319	61	Of other textile materials
	620332	62	Of cotton
	620342	63	Of cotton
	620343	64	Of synthetic fibres
	620412	65	Of cotton
	620413	66	Of synthetic fibres
	620419	67	Of other textile materials

	620422	68	Of cotton
	620432	69	Of cotton
	620442	70	Of cotton
	620443	71	Of synthetic fibres
	620449	72	Of other textile materials
	620452	73	Of cotton
	620453	74	Of synthetic fibres
	620462	75	Of cotton
	620520	76	Of cotton
	620530	77	Of manmade fibres
	620590	78	Of other textile materials
	620610	79	Of silk or silk waste
	620630	80	Of cotton
	620640	81	Of manmade fibres
	620821	82	Of cotton
	620920	83	Of cotton
	621142	84	Of cotton
	621410	85	Of silk or silk waste
	621420	86	Of wool or fine animal hair
	621430	87	Of synthetic fibres
	621490	88	Of other textile materials
Other made up textile articles	630210	89	Bed linen, knitted or crocheted
	630221	90	Of cotton
	630231	91	Of cotton
	630260	92	Toilet linen and kitchen linen, of
	630311	93	Of cotton
	630391	94	Of cotton
	630419	95	Other
	630492	96	Not knitted or crocheted, of cotton
	630499	97	Not knitted or crocheted, of other
	630510	98	Of jute or of other textile bast fi
	630710	99	Floorcloths, dishcloths, dusters an
	630790	100	Other

Table 4 Analysis of Negative AVE

s. no.	HS Codes	Index of Revealed Competitive Advantage				Testing -AVE of EU25	
		India	China	SAC	India-SAC	Criteria	AVE-EU25
1	520100	16.15	0.04	0.09	16.06	1	-9.52
2	520512	2.01	0.35	2.76	**-0.76**	0	-5.88
3	520521	72.66	0.06	0.22	72.44	1	-6.93
4	520522	13.62	1.26	3.18	10.45	1	-15.70
5	520523	20.32	1.32	1.87	18.45	1	-13.36
6	520524	16.43	2.90	3.27	13.16	1	-10.79
7	520710	33.05	0.32	0.35	32.70	1	-45.38
8	520811	29.08	1.90	3.16	25.92	1	-33.89
9	520911	16.10	0.45	3.78	12.32	1	-8.66
10	540242	18.63	0.97	0.96	17.67	1	-12.20
11	540331	11.36	6.52	6.43	4.93	1	-7.19
12	550320	4.87	1.46	1.45	3.42	1	-6.12
13	550410	5.44	3.11	3.07	2.37	1	-7.43
14	550922	15.09	2.29	2.25	12.83	1	-12.80
15	550951	45.69	1.22	1.21	44.48	1	-3.34
16	551011	13.88	1.58	1.57	12.31	1	-6.79
17	570110	27.44	1.19	3.73	23.71	1	-23.20
18	570231	26.95	0.02	0.02	26.94	1	-23.46
19	570310	15.69	1.14	1.12	14.57	1	-40.81
20	570500	20.16	3.27	3.23	16.94	1	-0.32
21	610342	1.53	8.96	8.93	-7.40	0	-32.01
22	610442	3.49	3.12	3.11	0.37	1	-12.95
23	610610	6.24	1.67	1.82	4.42	1	-3.66
24	611011	2.01	1.70	1.68	0.33	1	-23.43
25	611020	0.72	4.35	4.31	-3.59	0	-6.25
26	611120	5.16	4.28	4.26	0.90	1	-26.73
27	611420	5.54	2.18	2.30	3.23	1	-30.48
28	620319	8.42	2.64	2.75	5.67	1	-32.91
29	620332	2.50	3.75	3.86	-1.36	0	-14.66
30	620412	27.98	1.20	1.64	26.34	1	-6.86
31	620413	11.75	3.70	3.72	8.03	1	-10.82
32	620422	15.06	2.10	2.09	12.97	1	-0.42
33	620442	16.37	2.29	2.28	14.09	1	-24.88
34	620443	4.12	2.51	2.48	1.63	1	-40.18
35	620462	1.48	3.15	3.24	-1.75	0	-10.09
36	620630	14.46	2.27	2.25	12.21	1	-10.80
37	620920	5.65	4.37	4.35	1.31	1	-51.15
38	630221	3.32	2.26	2.75	0.57	1	-25.67
39	630419	36.83	2.67	2.84	33.99	1	-10.61
40	630710	6.18	2.62	4.58	1.61	1	-25.86
41	630790	4.59	3.08	3.12	1.47	1	-19.79
	Average	14.83	2.35	2.73	12.10		
	RCA>1	**40**	**34**	**36**	**Total 0's**	36	
	RCA<1	**1**	**7**	**5**	**Total 1's**	5	
					36/41*100	88%	