

ANALYZING THE EFFECTS OF NTMs FOR  
PAKISTAN'S TRADE, ECONOMY, AND  
WELFARE: A CGE BASED APPROACH



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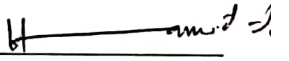
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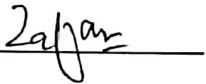
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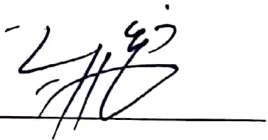
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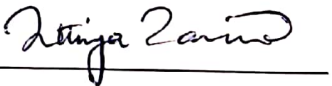
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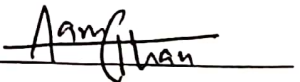
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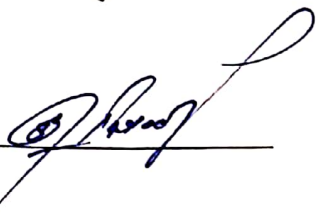
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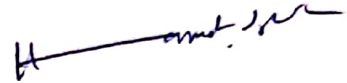
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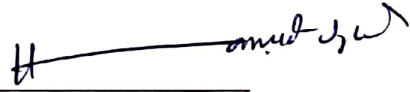
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*Dedicated to .....*

My Father, *Haji Manzoor Elahi (Late)*

*and*

My Mother, *Ghulam Fatima*

Their prayers are the most important part of my success

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A beautiful journey of my life completes with this note, it was hard and hectic but interesting. When I look back, it seems like a dream. This is only Allah (SWT), Who helped me at every step, made my family helping and my wife cooperative, provided with the requirable from His bounties, Alhamdulillah.

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## ABSTRACT

In the wake of trade liberalization, countries have decreased traditional tariffs dramatically, while non-tariff measures have substantially increased, and are proving “sand in the wheel of trade”. NTMs are important for public health and environment but if such standards are mutually recognized through bilateral or multilateral agreements then the hectic and lengthy procedures can be avoided. This is the basic hypothesis investigated and checked in this research. For this purpose, a novel approach is used by combining the econometric model with CGE model. First, econometric model is derived, and baseline effects of non-tariff measures are estimated numerically in the form of their ad-valorem equivalent (AVE) values, then assumption of mutual recognition is imposed and AVEs are estimated again for non-tariff measures imposed by Pakistan and by its trading partners. For this purpose, Price Gap approach is utilized with latest data on NTMs available through ITC. Then MyGTAP model is extended by integrating SAM (2015) for Pakistan into CGE model to gauge the economy wide effects of these NTMs in both, with and without mutual recognition.

Results show that Overall textile & wearing apparel sector is facing much of the NTMs manifested in the higher AVE values for this sector. Developed countries, especially EU-27 impose strict SPS measures on Agri- related sectors, meat & livestock, and processed food. While TBT measures are mostly imposed on textile & wearing apparel, extractions, heavy and light manufacturing sectors. Results show a substantial decrease in AVE values in case of mutual recognition of standards, which means Pakistan can get its traders facilitated if such arrangements are negotiated. CGE results for bilateral partners show that in case of China, Pakistan’s welfare gain is equal to \$ 399 million, it is \$ 900 million in case of EU-27, and \$ 530 million in case of UK. Pakistan’s welfare is losing by \$ 389 million due to proposed mutual recognition of standards in RCEP, however if Pakistan makes recognition arrangements with RCEP, its welfare increases by \$ 1.14 billion. Based on the results and after consultation with the stakeholders, study suggests that Pakistan should improve the local NTM infrastructure, should upgrade domestic laboratories and then should negotiate with trading partners, especially EU-27, UK, China, and RCEP, for the mutual recognition of standards.

**Keywords:** trade liberalization, economic integration, non-tariff measures, computable general equilibrium model

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## LIST OF ABBREVIATIONS

\$	US dollar
AVE	Ad-Valorem Equivalent
CGE	Computable General Equilibrium
DOTS	Direction of Trade Statistics
GTAP	Global Trade Analysis Project
ITC	International Trade Center
MOC	Ministry of Commerce
MOF	Ministry of Finance
MR	Mutual Recognition of standards
NTMS	Non-Tariff Measures
RCEP	Regional Comprehensive Economic Partnership
UN	United Nations
UNCTAD	United Nations Conference on Trade and Development
UNESCAP	United Nations Economic and Social Commission for Asia and the Pacific
WB	World Bank
WITS	World Integrated Trade Solution
WTO	World Trade Organization



# CHAPTER 1

## INTRODUCTION

### 1.1 Background

Internationally, trade policies have turned in a new direction with more focus on the imposition of non-tariff measures (NTMs). The basic purpose of these measures is to protect the public health and environment. But International trade bodies like WTO and UNCTAD are greatly concerned about the increasing number of NTMs, due to their cost raising effects and restricting market entry (Fontagné *et al.*, 2015). Ghodsi & Stehrer (2016) argue that the increase in the number of NTMs notified to WTO, from 1995 to 2012 was 400%. The reason behind this trend is to ascertain that NTMs can replace tariffs as policy tool and can provide the same level of protection. However, the effect of these NTMs on trade is more than that of tariffs (UNCTAD, 2019). World Bank, WTO, and IMF have also warned against this trend in their joint report of 2017. NTMs have now become a hot topic in the mainstream academic and policy research [Murina & Nicita (2017), Baccini *et al.* (2018), Baldwin (2011), Blanchard *et al.* (2016)]. The study of trade costs and their effect on international trade has been attracting the attention of policy makers and researchers since long. But the effect of NTMs is much difficult to capture. Usually, these are imposed with legal support, these are in the form of documentations requirements and causing lengthy procedures (Timini & Conesa, 2019). This is the reason that there is limited literature on the quantification and effects of NTMs.

Non -Tariff Measures are hurting developing countries the most (De Melo & Nicita, 2018). The situation is even worse for those developing nations which have agrarian based economies. Developed nations extensively use SPS and TBT measures on

agriculture and livestock related sectors, hence the trade of these countries is badly affected. A developing country like Pakistan needs trade to become its engine of growth. Pakistan can increase its exports by 12 billion dollars till 2024 if integration with international market is improved, and strong linkages are developed among value chains (ITC, 2020), and World Bank suggests that Pakistan can become an upper middle-income country by 2047. But this potential development is facing impediments due to imposition of non-tariff measures, ambiguous regulations at home and lack of information among traders. This is the real motivation behind this study and in this context NTMs application by Pakistan and its trading partners is analyzed in depth.

Pakistan started trade liberalization process in 1980s, followed by tariff reduction steps in 1990s, while focusing on free trade agreements with key trade partners and trading blocs. The rationale for free trade agreements is based on the notion that regional trade agreements create trade (Delgado, 2007). Another purpose of RTAs is to choose liberalized trade through specific incentives for member countries of a particular RTA providing them with a shield against international market competition. Further, countries can introduce economic and legal reforms more accurately in case of regional blocs (Whalley, 2007). Once these reforms are successful, countries can move on for a global free trade regime. But the exercise of trade liberalization and regional integration in case of Pakistan has not been successful if above mentioned rationale and objectives are considered. Recent business surveys and studies [ITC (2020), Raihan (2016)] suggest that major obstacle faced by the business community relates to the regulatory requirements in the name of Non-Tariff Measures (NTMs).

## **1.2 Prevalence of Tariff & non-tariff measures**

Basic purpose of tariffs is the protection of local industries against international competition, using the resources optimally, making balance of trade better, and

discouraging the import of such goods which are considered harmful to the society's health and environment. However, in Pakistan tariffs are considered a major source of revenue for the government because these are much easier to collect than the direct taxes. Revenue from tariffs is roughly about 40% of total indirect revenue. Though globally tariffs are substantially reduced due to increase globalization and due to the rise of regionalism. However, Pakistan still operates a regime where tariff rates are much higher. With weighted mean tariff of about 13%, Pakistan's tariff rates are highest among the top seventy exporters. Business community and especially traders are facing various issues due to current tariff regime like increasing cost of raw material and others.

UNCTAD defines NTMs as “policy measures other than ordinary customs tariffs, that can potentially have an economic effect on international trade in goods, change in quantities traded, or prices or both (UNCTAD, 2019)”. The ultimate purpose of NTMs is to protect the citizens for health and better environment. However, these are widely being used for trade protection motives. Niu (2018) found that especially after Global Financial Crises of 2008, use of NTMs has gradually increased. In Pakistan imposition of non-tariff measures is relatively moderate with only 33.12% coverage ratio and 15.24% frequency ratio for imports. However, our imports to USA face big numbers in terms of coverage ratio and frequency ratio which are respectively 77.36% and 61.52%. Overall, \$ 1740 billion of exports destined to USA are affected by the imposition of non-tariff measures in USA. European Union is one of those regions which have the highest coverage and frequency ratios for their imports. Overall coverage ratio is 94.31% while frequency ratio is 93.88%. Textile & Wearing apparel is the most protected sector with 100% coverage and frequency ratios.

### **1.3 Concerns of the stakeholders<sup>1</sup>**

Doing business easily is such a process that starts at local levels, governments can streamline their mechanism, make the system digitally operated, documentation can be decreased to the level where it is only necessary, and can start hearing the voice of business community with maturity. For this purpose, this study includes extensive consultation with officials, business community and experts, which resulted in valuable feedback from stakeholders. It is found that businessmen are not satisfied with the policies frequently formulated by the federal government. Traders complain that government does not consult with them regarding the bans or restriction on imported or exported goods. In the same way there is no consultation process for FTAs negotiations and concession grants for specific goods and countries. Further, it costs them extra investment when they need to, ultimately, adjust themselves with the new policy environment and new realities.

Conformity assessments due to technical measures (SPS, TBT) are the biggest hurdle faced by the exporters in Pakistan. They feel that lengthy procedures, high costs and administrative inefficiencies are even bigger challenge than the conformity itself. Laboratories in Pakistan lack the required infrastructure and staff is not well trained, as a result, exporters are compelled to get certifications and sampling testing process in foreign laboratories which again causes extra time wastage. Both exporters and importers found complaining about the domestic procedures, while for a larger number, local procedures are even creating more hurdles. Biggest challenges facing sector, in terms of NTMs is the agriculture sector of Pakistan. Exporters of fruits, vegetables, dry fruits, cereals, processed food, whether small or larger enterprises, equally face the

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<sup>1</sup> Chapter 2 of the thesis dedicated to the concerns of stakeholders on trade policies. This is survey based and contains the expert opinion and official stance also. Current section provides a summary.

burdensome problems due to conformity requirements. They complained<sup>2</sup> about the accreditation of their local standards as par with European standards, the biggest market for such exported items. According to the exporters along with foreign standards, local requirements make the problem even severe.

#### **1.4 Research objectives**

Objective of this study is to assess the effects of non-tariff measures on trade, economy, and welfare of Pakistan. Based on survey of the literature and after consultations with the stakeholders, it is found that one possible way of decreasing problems attached with non-tariff measures may be the mutual recognition of standards between Pakistan and its trading partners. So, by estimating the effects of NTMs numerically, the objective is to find whether mutual recognition can work to enhance trade and welfare. Mutual recognition means if two countries mutually agree to accept the certifications and standardizations of each other, then traders from each country are allowed to import and export if they have got certifications of their products from anyone of these countries. For this objective, current study, first assesses the effective rate of trade protection caused by NTMs by estimating Ad-valorem equivalents (AVEs)<sup>3</sup> of NTMs in terms of tariff. For this purpose, Price Gap approach is utilized with latest data on NTMs available through ITC. Then MyGTAP model of CGE family is developed to gauge the economy wide effects of these NTMs. Using price gap approach AVE values, under the assumption of mutual recognition are also estimated. Then both sets of AVEs are incorporated in MyGTAP model and simulation results are taken for the situation

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<sup>2</sup> Around 70% of traders

<sup>3</sup> AVEs presented in percentages translate the real effect of NTMs in tariff terms. For example, if for a specific measure we get AVE value of 15, it means this measure's imposition costs extra 15% tariff.

where Pakistan and its trade partners are mutually recognizing each other's standards pertaining to NTMs. Formally research objectives are designed as follows:

- To assess the effective rate of trade protection caused by the NTMs, which Pakistan and its trading partners have imposed on each other.
- To examine the impacts of mutual recognition of NTMs in Pakistan's current and potential FTAs, on trade, GDP, and household welfare of Pakistan.
- To assess the implications for Pakistan's trade and economy if Pakistan joins RCEP and mutual recognition of standards is agreed upon.

To fulfill these objectives a sample of countries is selected which consists of current and potential FTA & RTA partners and important countries like USA, UK, and members of GCC. Further, Regional Comprehensive Economic Partnership (RCEP) is emerging as the largest trade bloc, so it is very important to study the implications for Pakistan if these countries reach some agreement on NTMs. Keeping this in view two scenarios are investigated, firstly, mutual recognition of NTMs among current members of RCEP is assumed and through MyGTAP model implications are drawn for Pakistan, then, Pakistan's possible inclusion in RCEP is assumed and again mutual recognition of standards is implemented and results for Pakistan are estimated.

### **1.5 Significance of the study**

In Pakistan's context, only few studies can be cited containing the calculation of NTMs and their impacts for Pakistan [Aleem & Faizi (2021), Ali (2019), Mahmood *et al.* (2017), (Kemal *et al.*, 1994)]. These studies are limited in scope and provide only partial analysis. As to the author's knowledge, detailed study of NTMs imposed on Pakistani exports is not yet done. This study will contribute to the literature in many ways. This is the first study in which Non-Tariff Measures will be estimated at sector level using highly disaggregated data (HS6 digit) for major countries with which Pakistan has

signed Free Trade Agreements and for largest partners of Pakistan. For this estimation latest price-gap approach (estimation of Ad-valorem equivalents of NTMs) will be used which has not yet been applied in any study on Pakistan.

It is also important to mention that there is no study on Pakistan that provides CGE based analysis of NTMs. This research will fill this gap in the literature by studying the impacts of NTMs on economy, trade and household welfare using GTAP (global trade analysis project) model. Akram *et al.* (2020) and Khan (2020) have studied the impact of RCEP (ASEAN + 5) on Pakistan. These studies cover the impact of tariff reductions within bloc over Pakistan's trade. After implementation of RCEP these countries are considering negotiations over the standardization and mutual recognition. If Pakistan remains out of the bloc the new scenario will adversely affect its economy. So, it is very important to study the possible impact on Pakistan if RCEP countries reach some conclusion over the elimination of NTMs, current study will also fill this gap.

## **1.6 Summary of the outcomes**

Results of the study show that overall textile & wearing apparel sector is facing much of the NTMs manifested in the higher AVE values for this sector. Developed countries, especially EU-27 impose strict SPS measures on Agri- related sectors, meat & livestock, and processed food. Results of AVEs for RCEP countries show that on average AVE value of textile sector is highest among all sectors while other sectors are moderately protected. Overall, developed countries use SPS measures against agriculture, livestock, and processed food excessively, which is a reason of genuine concern for developing countries like Pakistan. However, one good thing coming out of results is the substantial decrease in AVE values in case of mutual recognition of standards, which means Pakistan can get its traders facilitated if such arrangements are negotiated.

## **1.7 Organization of the study**

This study is arranged as follows: Introduction is followed by chapter 2, which provides an extensive consultation with officials, business community, and experts. Chapter 3 elaborates Pakistan's overall trade, its trade with FTA members and major trading partners, while NTMs applied by these countries are also summarized. Chapter 4 is dedicated to the literature. Chapter 5 explains the theoretical framework covering this study. Chapter 6 explains the modelling and methodology used for this study. Chapter 7 provides the results and their interpretation, while chapter 8 concludes this study. Studies consulted for this thesis are cited in Reference section, while some important details are given in the Appendix.



## CHAPTER 2

### NON-TARIFF MEASURES, PAKISTAN'S TRADE POLICIES AND CONCERNS OF STAKEHOLDERS

Pakistan can increase its exports by 12 billion dollars till 2024 if integration with international market is improved, and strong linkages are developed among value chains (ITC, 2020), and World Bank suggests that Pakistan can become an upper middle-income country by 2047 (World-Bank, 2006). But this potential development is facing impediments due to transparency issues, imposition of non-tariff measures, ambiguous regulations at home and lack of information among both importers and exporters. Doing business easily is such a process that starts at local levels, governments can streamline their mechanism, make the system digitally operated, documentation can be decreased to the level where it is only necessary, and can start hearing the voice of business community with maturity.

This chapter is dedicated to the discussion about Pakistan's trade policies, tariff structure, rules governing non-tariff measures, and then a detailed section discusses the concerns of business community and other stakeholders on NTMs, their application in Pakistan, its shortcomings and then based on these discussions some recommendations are forwarded. Concerns and views of business community and other stakeholders are collected through a survey<sup>4</sup>, while experts and concerned officials are also interviewed.

#### 2.1 Theory of Tariffs

Basic purpose of tariffs is the protection of local industries against international competition, using the resources optimally, making balance of trade better, and

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<sup>4</sup> Methodology of survey is given in Appendix B

discouraging the import of such goods which are considered harmful to the society's health and environment. However, in Pakistan tariffs are considered as a major source of revenue for the government because these are much easier to collect than the direct taxes. Revenue from tariffs is roughly about 40% of total indirect revenue (FBR 2019). Though globally tariffs are substantially reduced due to increased globalization and due to the rise of regionalism. However, Pakistan still operates a regime where tariff rates are much higher. With weighted mean tariff of about 13%, Pakistan's tariff rates are highest among the top seventy exporters.

### **2.1.1 Tariff policy trends in Pakistan**

Pakistan has been using higher tariff rates in the past and still these are highest among exporting countries. In 2000, average mean tariff was around 23% which was reduced to 9% in 2014. Effect of this reduction was not only witnessed on imports, but exports were also substantially increased. The export growth recorded during the period stood at 173%. After this period, tariffs are rapidly increased again and the average tariff stood at around 12% (2017), this effect was witnessed through decline in exports which stood at only \$ 23 billion during 2019. Share of exports in GDP was 14% in 2010, which decreased to 7% by 2019. Negative effects of higher tariffs were also seen on the industrialization process also. The share of industry in national income was 26% in 2010 which decreased to only 20% in 2019 (MOF-Pakistan, 2019).

### **2.1.2 Tariff regimes in Pakistan**

Pakistan operates its tariff regimes in the form of tariff slabs. With increase in slabs, it becomes easy to adjust maximum classes according to their capacity. In general, lowest level of slabs are applied on necessary raw materials while semi-finished goods used as inputs in local industries are also prioritized. However, in Pakistan with every new tariff

policy number of slabs has been changing. This fluctuation creates uncertainty among the traders. For example, tariff policy was operating with ten slabs in 1993, which were reduced to 6 in 2015. Tariff rate was set at 25% as its maximum limit, however extra 1% duty was levied on about half of the tariff lines. Many raw material groups were also encompassed. In 2016, slabs were reduced to 5, 20% was the maximum tariff rate, while tariff rate for lowest slab was increased to 2%, previously it was 1%. This policy changed the real burden of tariff for different groups. For example, all the raw material and basic goods importers that were previously paying only 1% tariff, were now paying 2% tariff. In the same way omitting one slab, increased the tariff burden for those who were falling in the middle level slabs (MOC-Pakistan, 2016).

This was again done in 2017 with decreasing the number of slabs from 5 to 4, though limit on maximum tariff was decreased, however slabs of 2% and 5% were merged and the new tariff rate for this slab was 3%. It means tariff was raised for those who were paying only 2% previously, though they were paying nothing before 2014. Apparently maximum tariff is reduced but now the government is generating higher revenue than before.

An encouraging change was seen in 2018 when in finance act of 2018, 236 tariff lines pertaining to raw materials were given concession. In the same year further 186 tariff lines of raw materials were exempted from tariff. In 2019, more than 1600 tariff lines were exempted from tariff while extra tariff was charged on upper slabs. Currently there are four slabs of 3, 11, 16 and 20 percent (MOC-Pakistan, 2019).

### **2.1.3 Issues faced by the traders due to current tariff regime**

Business community and especially traders are facing various issues due to current tariff regime. The basic motive of tariffs, the revenue collection, has caused many market distortions, and has eroded competitiveness. The higher tariff on raw materials

is increasing the cost of production beyond the capacity of industrialists. This is also the reason of declining share of manufacturing sector in the national income of Pakistan. Intuitively, higher tariffs on trade means that local market is being protected, therefore, traders take it easy to involve in such activities which are locally oriented, hence, naturally an export bias has been created. Businessmen find themselves confused due to slab structure and overlapping of duties and regulations. This is also a cause for increased cross border smuggling, misquoting, and mis-invoicing. Another aspect of tariff regime is the differentials in the rates being charged to commercial and industrial importers. Rates are higher for commercial importers, small businesses cannot afford to import by themselves, they need to get raw materials from such commercial suppliers. Hence the cost of production for these small businesses is increasing due to this bias in the tariff regime.

## **2.2 Non-Tariff Measures**

The ultimate purpose of NTMs is to protect the citizens for health and better environment. However, these are widely being used for trade protection motives. Further, these are also used to protect the production monopolies of large firms and multinational corporations. Niu (2018) found that especially after Global Financial Crises of 2008, use of NTMs has gradually increased.

### **2.2.1 MAST Classification**

To avoid the disputes and complexities over the definition and classification of non-tariff measures, UNCTAD in 2009 issued a detailed classification of non-tariff measures. It was reviewed and validated by the consultants of world trade organization in 2012 that is why it is called Multi Agency Support Team Classification. It is now

compulsory for every member of WTO to follow this classification while issuing notifications on non-tariff measures.

This classification consists of alphabetically named 16 chapters. Chapter A to C or called technical measures which include Sanitary and Phytosanitary measures, Technical Barriers to Trade and Pre-shipment inspections. For this study keeping in view the prevalence of different categories of NTMs, these are divided in three categories, SPS, TBT and Others. Impact of these different types of NTMs is different across sectors, countries, and products. For example, SPS measures are mostly applied on agriculture related sectors while TBT measures encompass almost all the sectors, however the prevalence of SPS is greater than TBT. Agriculture and its related sectors are most prone to NTMs. According to the estimates almost 60% of Agri and food items face at least one type of NTM (Cadot & Gourdon, 2016). The leading trading sectors of Pakistan including agriculture and livestock related sectors, and textile are heavily protected through the usage of NTMs around the globe.

<b>Imports</b>	<b>Technical measures</b>	<b>A</b> SANITARY AND PHYTOSANITARY MEASURES <b>B</b> TECHNICAL BARRIERS TO TRADE <b>C</b> PRE-SHIPMENT INSPECTION AND OTHER FORMALITIES
	<b>Non technical measures</b>	<b>D</b> CONTINGENT TRADE-PROTECTIVE MEASURES <b>E</b> NON-AUTOMATIC LICENSING, QUOTAS, PROHIBITIONS AND QUANTITY-CONTROL MEASURES OTHER THAN FOR SPS OR TBT REASONS <b>F</b> PRICE-CONTROL MEASURES, INCLUDING ADDITIONAL TAXES AND CHARGES <b>G</b> FINANCE MEASURES <b>H</b> MEASURES AFFECTING COMPETITION <b>I</b> TRADE-RELATED INVESTMENT MEASURES <b>J</b> DISTRIBUTION RESTRICTIONS <b>K</b> RESTRICTIONS ON POST-SALES SERVICES <b>L</b> SUBSIDIES (EXCLUDING EXPORT SUBSIDIES UNDER P7) <b>M</b> GOVERNMENT PROCUREMENT RESTRICTIONS <b>N</b> INTELLECTUAL PROPERTY <b>O</b> RULES OF ORIGIN
	<b>Exports</b>	<b>P</b> EXPORT-RELATED MEASURES

Source: UNTAD

**Figure 2-1: Mast Classification**

### 2.2.2 Summary of NTMs applied by Pakistan

For Pakistan Coverage ratio is 33.12% and frequency ratio is 15.24% for imports (WITS 2021). As far as trade restrictions are concerned, Pakistan uses bans instead, against the global practice, of delaying tactics. Pakistan has a unique negative list covering around one thousand items which is applied to India only. Twenty categories are banned for exports which include fertilizers, animals etc. Another twenty groups are allowed to export with pre-permission. These include mostly food and raw textile items. 13 groups pertaining to animals, birds, literature are banned and cannot be imported due to religious and safety reasons. 44 other manufactured products are banned due to economic and protectionist motives. 56 groups of items including animal and plant products are almost restricted from import and a special permission from respective authorities is required.

In Pakistan, large number of products require certification from “Pakistan Standard and Quality Control Authority”. Restrictions related to ports also apply to specific countries e.g., India and Afghanistan. Other than SPS regulations, customs inspection, procedures, political reasons, security related concerns also play an important role. Under MAST classification E329 (without any economic reason) 585 groups of commodities under different HS chapters cannot be imported from India. About 80 product groups pertaining to human, plant and animal health and safety face at least one SPS measure while 186 groups of commodities face at least one type of TBT measure.

### **2.3 Trade Laws, Consultation with stakeholders and experts**

This section is based on the discussions regarding policies relating to non-tariff measures and other regulations, discussions with concerned stakeholders which include both importers, exporters, and representatives of business associations. Stakeholders are asked to pinpoint the problems they face while importing or exporting. Then experts from academia and research are involved to comment on the policies and concerns of the business community. First, policies governing non-tariff measures and other regulations are discussed, then business community’s point of view is explained, expert opinion is elaborated, and by the end of this chapter some recommendations are forwarded.

#### **2.3.1 Some Important Laws related to trade**

In Pakistan most of the legislation regarding international trade is done at federal level, however provinces are also mandated with the powers to establish standards for the public health and environmental safety. Many times, traders are confused between national and sub national level requirements, lack of proper awareness is the main cause of unfamiliarity with these regulations. Here, some important laws pertaining to

international trade in Pakistan are presented. only those laws are covered which are promulgated at federal level and apply to all regions of Pakistan.

#### **“Import and Export Act, 1950”**

The act promulgated by the ministry of commerce gives mandate to the Pakistani federal government to ban, restrict or control the affairs related to the imports and exports of any goods to and from Pakistan. This was the first legislation pertaining to international trade in Pakistan. Many amendments have been made through finance acts to make it more practicable and in accordance with the emerging requirements.

#### **“Customs Act, 1969”**

This act gives mandate to Federal Board of Revenue (formerly central board of revenue) to impose and collect custom duties and tariffs on the goods imported to Pakistan. Through this act bans are introduced on many imported items based on intellectual property rights, fake trademark, fake descriptions etc.

#### **“Pakistan Animal Quarantine Act, 1979”**

This act relates to the imports and exports of livestock and animal products. It empowers federal government to regulate, ban or restrict the imports of animals and meat products on public health, environment, or other grounds. It also mandates government to impose sanctions on the imports from specific countries. On the trade of animals and meat products, along with quarantine officials appointed under this act, customs officers also exercise their jurisdictions under Customs Act. This act is mainly used to introduce regulations and other measures for not only local producers and suppliers but also the exporters of other countries.



### **“Plant Quarantine Act, 1976”**

The act empowers federal government to formulate regulations and standards to ban or discourage the import of such plants and other products that are likely to damage the flora and fauna. Department established under this act is fully authorized to destroy, deport, or decide otherwise about any import shipment which comes from specific countries. The suspected items include sugarcane, potatoes, tobacco, maize, rubber, bananas etc. Industries using these restricted goods as raw materials sometimes complain that many clauses of this act are misused and most of the time it is discretion of concerned department to give their interpretation.

### **“Pakistan Standards and Quality Control Authority Act, 1996”**

With the name of the act an authority is established which is mandated to set the standards for imports and exports. However, stakeholders are of the view that information provided by the body is sometimes not updated and hence it adds further problems for both importers and exporters.

### **“Import Policy Order, 2013”**

Import policy orders are basically the tool for levying import taxes and imposing non-tariff measures. Policy order empowers federal government to ban anything from importation, which it thinks as against the public interest, further, government can ban from one source or from any number of sources.

### **“Export Policy Order, 2016”**

This policy order establishes rules and conditions for exports from Pakistan. Its schedules provide detail on the goods which are banned for exports and those goods which can be exported under restrictions.

## **“Import Policy Order 2020”**

Issued on 25 September 2020 by the ministry of commerce bans many items to be imported into Pakistan by the private sector and allows only state enterprises to engage in the importation. Further it levies extra 50 dollars for every document to be attested, in case of imports from Kenya. The policy bans imports from Israel and levies certain extra requirements for importation from India.

### **2.4 Business concerns on policies**

Normally businessmen are not happy with the policies frequently formulated by the federal government. Traders complain that government does not consult with them regarding the bans or restriction on imported or exported goods. In the same way there is no consultation process for FTAs negotiations and concession grants for specific goods and countries. Further, it costs them extra investment when they need to, ultimately, adjust themselves with the new policy environment and new realities. They raised the issues of advance payments, problems in rebates and other issues while discussing the shortcomings of these trade policy orders. Traders think that public organizations established under these rules are also not working efficiently because they lack required modern infrastructure and operational staff. From customs service and other agencies involved in clearance at borders and ports, traders expect the process of checking and inspection to be completed in timely manner.

### **2.5 What business community says?**

Discussions with business community reveals that more than half of them feel uneasy due to cumbersome procedures, lengthy documentation, wait time, certifications, and testing requirements. Much of these problems are due to ineffectiveness of Pakistani regulatory systems. Non-tariff measures affect importers and exporters in different

ways, intensity of these effects is sector specific also. Most affected sector is agriculture and its sub sectors. Agriculture sector exporters face difficulties while exporting fruits, vegetables, and food due to strict SPS measures imposed by partners specially in Europe and Middle East. They deem European standards as more restrict and cumbersome to fulfil. Traders feel easier while trading with UAE, Oman, Germany, and UK.

### **2.5.1 Technical measures biggest hurdle**

Conformity assessments due to technical measures (SPS, TBT) are the biggest hurdle faced by the exporters in Pakistan. They are of the view that lengthy procedures, high costs and administrative inefficiencies are even bigger challenge than the conformity itself. Laboratories in Pakistan lack the required infrastructure and staff is not well trained, as a result, exporters get certifications and sampling testing process in foreign laboratories which again creates extra time wastage. In this study we have identified three major categories of NTMs, namely, SPS, TBT and Others. Business community is supporting this categorization by saying that SPS and TBT measures are proving the biggest challenge due to related conformity requirements, while other measures like price controls, border related procedures, rules of origins are relatively less challenging in nature.

### **2.5.2 Domestic regulatory problems**

Both exporters and importers found complaining about the domestic procedures, while for a larger number, local procedures are even creating more hurdles. The major problems concerning domestic challenges relate to inspections before exporting, certifications required for exports. Traders related to manufacturing sector and

agriculture sector face most of these hurdles, this issue is less important for small business entities.

### **2.5.3 Procedural hurdles**

Procedural hurdles appeared the biggest issue during discussions with importers and exporters. Complexity of documentation, lack of information, overlapping jurisdictions of state and sub state level organizations, and wastage of time during this process are highly challenging. Due to such delays many a times they are unable to export perishable goods. Procedures for perishable goods like fruits and vegetables are much easier in countries like Viet Nam and Bangladesh, and this the reason for their considerable access to European markets. While in Pakistan due to lengthy procedures exporters can only do such business with nearby countries.

### **2.5.4 Problems faced by Agriculture and livestock related exporters**

Biggest challenges facing sector, in terms of NTMs is the agriculture sector of Pakistan. Exporters of fruits, vegetables, dry fruits, cereals, processed food, whether small or larger enterprises, equally face the burdensome problems due to conformity requirements. About 52% complained about the accreditation of their local standards as par with European standards, the biggest market for such exported items. According to the exporters along with foreign standards, local requirements make the problem more severe.

In Europe, Germany and UK are those countries which impose more severe requirements for the Pakistani Agri-products. Share of European Union in Pakistani Agri-exports is only about 10% while the associated obstacles are more problematic than any other partner. Therefore, Viet Nam, Bangladesh and Philippine like countries have more share in EU markets than Pakistan, though their relative distance to EU

markets is greater than that of Pakistan (around 45% of exporters support this claim). In the same way, Gulf countries especially Saudi Arabia and UAE are more tough destinations if their share in Pakistani Agri-exports is considered. Pakistani traders face less difficulties in SAARC and China regions.

Pakistan is a large producer of fruits like kinos, mangos, and others. Their exports are mostly destined to Russia, Afghanistan India, and UAE, but most of the fruit exporters claim that they feel difficulties while fulfilling the requirements imposed by the importing destinations. For exporters, time and cost involved in testing for SPS measures are their major concerns. The one issue raised with great concern was the field visit protocol of the plant protection department, which issues certificates once such visits are completed. Growers cum exporters complain that the department lacks the required facilities and so the staff, hence, it takes a long time to complete the visit and issuance of the required certificate. An important SPS measure relates to the checking of non-useful particles in fruits and food items. In Pakistan PCSIR is the concerned body which issues such certificates, first, it takes too much time to get the required certificate from the body which hampers the quality of exported goods, second, many a times these are not accepted in several destination markets.

Meat products, under SPS measures, require the tests for antibiotic particles. Exporters complain that Pakistani laboratories results are not recognized in the world market due to their unreliability. Pakistan has not signed mutual recognition agreements with partners that is another reason for the unacceptability of their certificates. Exporters need to send samples to the importing country's labs, due to delay period meat products are perished. Customers of those countries which accept Pakistani standards are skeptical about the certifications which causes the loss of reputation.

“Animal Quarantine Department” is responsible for visiting the slaughterhouses and issue the clearance certificates. Department lacks staff and facilities, further the certificates are not recognized in important destinations. As a result, producers cum exporters are compelled to invite experts from developed countries to visit the slaughter process and issue the certificates which causes additional cost to the exporters.

Rice is one of the major exports of Pakistan. Exporters of rice argue that Pakistani agencies responsible for testing and issuing certificates do not incorporate many of the parameters required by the destination markets. As a result, these certificates are not recognized in many global markets. Europe requires pesticide free rice products, while in Pakistan there is no public agency for testing and issuing such certificates.

Agri-food exporters (60%) complain about the extra regulatory requirements imposed by the importing countries like Qatar, UAE, Bahrain, and others. These countries require additional documentation for each shipment. Embassies of these countries are mandated with the verification of these documents. Such bureaucratic hurdles are viewed as one of the biggest challenges for Agri-exporters.

### **2.5.5 Textile Sector**

Textile & wearing apparel is the largest exporting sector of Pakistan. Exporters related to this sector mostly faces challenges in complying with the standards of foreign markets. In Pakistan, for the most part of this sector is operating in traditional ways with older technologies, while importing countries require the fabric, towels, gloves and carpets to be prepared with new technologies so these are iodized free. They can produce with in use technologies but for exporting they need testing certificates which are issued in foreign countries. Further such certificates are issued for a specific shipment. Exporters demand the establishment of such accredited laboratories locally.

## **2.6 Recommendations from business community**

The challenges described by the business community mostly pertain to testing and certification requirements under SPS and TBT measures. They are much concerned about the lengthy procedures and paperwork involved in acquiring these certificates. Conformity requirements from partner countries require testing of shipments which is not facilitated locally, laboratories are less facilitated and where these are providing the required services, their certificates are not accepted by the partner countries due to absence of mutual recognition. Business community wants laboratories to be upgraded according to the international standards, staff need to be adequately trained, and Pakistan should make such arrangements with partners that can facilitate the acceptance of these certifications globally.

Business community is greatly concerned about the lengthy procedures at borders due to unavailability of warehouses and cold storages. Testing is necessary but it should be made easy through establishment of facilities required for perishable commodities. Another major problem faced by business community is the unavailability of information regarding regulations and standards. Government bodies should maintain an online portal that should guide on local requirements and country specific partner's requirements. Businessmen are also worried about the advance cash requirements for their imports of raw materials. They need a streamlined channel so that raw materials can be imported without any impediment.

In Pakistan manufacturing sector faces both local and foreign regulations while it is even big hurdle for fruits, vegetables, and food exporters. Countries are more cautious about the health of their citizens and the environment. That is why Agri-related sectors are highly regulated with SPS and TBT measures.

Further it is revealed from discussion with business community that businesses of every size are affected by these regulations. Though it is generally presumed that as the scale of production rises it becomes easier to abide by these regulations. But this is not the complete truth in case of Pakistan. Generally big players have more options, and they can diversify their export destinations based on the regulatory requirements in those markets. While in case of Pakistan exporters have a few options, and when it comes to Agri-related sectors then the options are even fewer. Hence business community is of the view that both smaller and larger businesses feel equally burdensome to comply with these requirements.

Meat and livestock exporters complained about the extra procedures faced by them in US and European markets. These markets require full information about the product, from live animal to packaged meat. In Pakistani conditions it is not easy for such exporters to give this information in detail.

Another issue raised from the trade associations is the presence of non-accredited laboratories and testing organizations worldwide. These are considered as third party between importer and exporter and their certificates are recognized in the importer countries. However due to lack of awareness, exporters send their samples to such non-accredited organizations, pay fee, but in return what they get in form of certificates are not recognized by the importers. So, the government need to setup information regarding the accredited labs operating worldwide. At least a database must be established of only those laboratories which are closely concerned to largest exporting sectors of Pakistan.

The biggest problem faced by exporters and importers domestically relates to the port inspections. They are of the view that average time for such inspections is more than one week. Customs officials behave arbitrarily, they handle the goods without any care



and demand bribes for early clearance. Traders not only pay extra fees at ports, but they need to incur extra cost due to late delivery at the destinations. Ports lack scanners, cold storages, and other facilities as a result many times shipments are damaged, if these consist of perishable goods. Exporters pointed out towards another problem due to delay process, they are of the view that due to such delays, often they miss their vessels and are compelled to arrange alternative shipments. Another problem is the repacking of the shipments after necessary checking, exporters argue that once their bundles are opened then these are not adequately repacked. As a result, they become aware of rough packing only when it reaches the buyer. Exporters demand that they should be allowed to repack their shipments by themselves once the inspection process gets completed.

## **2.7 Information disseminating bodies in Pakistan**

Government of Pakistan has appointed Pakistan Standards and Quality Control Authority to provide information and procedures relating to TBT measures. But this information is limited in nature and often it is not updated. In the same way SMEDA is also assigned with to disseminate information regarding all measures to the small businesses. However, information provided is not up to the mark and sometimes it lacks the basic knowledge also. Other ministerial websites and authorities also face the same issues.

## **2.8 Import problems related to finance**

Both importers and exporters are unhappy with the financing procedure in Pakistan. Specially after the strict steps in the wakes of FATF pressure, banks are much reluctant and demand several documents for advance payments in case of imports. Exporters need raw materials to be imported from abroad, exporter in foreign country demands advance payment, so the lengthy procedure hampers the import requirements of these exporters. In the same way in case of exports, payments are sent to the Pakistani banks

which again require cumbersome documents related to the transaction for the release of this payment.

## **2.9 Rebates scheme**

Occasionally Pakistani government announces duty rebate schemes for exporters with the purpose of boosting exports. More recently FBR issues to notifications<sup>5</sup> relating to this duty drawback. However, exporters do not find it helping as there are many issues in the channelization of these payments. They think that process is complicated and opportunity cost of wasted time is much more than the rebate itself. At the time of rebate claim, a long list of information is demanded which is usually impossible to furnish. Further, many departments at national level are involved in the process that is why, the process becomes lengthier, and traders are unable to get the updates regarding their claims. It has been a practice that trade associations were involved for the validation of the claims made by the traders. Now the role of associations is vanished, claims are sent to State Banks through scheduled banks and hence validation of documents becomes more difficult. Normal period for such rebates ranges from 3 years to 5 years, which effects the cashflow of companies.

## **2.10 Transportation facilities**

According to the estimates<sup>6</sup> in Pakistan more than 90% cargo is transmitted through road channels. National Logistic Cell is the sole company operating in Pakistan. This is such a monopoly which lacks the required infrastructure and trucks to fulfil the needs of the economy. Delays due to transportation cause damage to the quality and quantity of goods. Some traders use private cargo facilities which costs them very high.

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<sup>5</sup> Notification No 1(42-B)TID/18-TR II Duty drawback Order 2018-21 for garments, home textiles and processed fabrics.

S.R.O., 711(1)/2018. Local taxes and Levies Drawback (Non-Textile) order, 2018-21.

<sup>6</sup> ITC (2015). Road freight transport sector and emerging competitive dynamics.

## **2.11 Official stance**

In contradiction with the stance of traders, customs officials and officials at ministry of commerce argue that government wants to focus on exports to check the chances of money laundering. One reason for this ascertain is the fact, according to the officials, that traders misquote the invoices. When they export from Pakistan the invoices are undervalued, these shipments are sent to a transit country, then from there these are sent to actual destination with original invoices. Due to this discrepancy exchange remittances to Pakistan decrease while there is a strong reason to believe that this channel can be utilized by money launderers. Consequently, customs officials should work vigilantly, delay in verification is part of this extra care, and traders are asked to provide and prove the original market value of their shipments.

About the damages to the packaging during the inspection process is defended with the reason that many exporters use low standard packaging, wooden boxes, and such packaging which is in contradiction with SPS measures. Further there is redressal mechanism available to listen and redress the complains of the traders. On the delay, customs officials are of the view that they can only clear any consignment once it has got clearance from the antinarcotic force officials. Due to unavailability of sophisticated scanners, which can detect the narcotics hidden in the packaging, it takes time to check and clear the shipments.

## **2.12 Recommendations**

These recommendations are based on the discussions with officials, businessmen and experts from academia and research.

### **2.12.1 Transparency of information**

One major problem revealed during discussions with traders was the unavailability of information and unawareness about NTMs among exporters and importers. It is proposed to establish an easily accessible portal, which should gather all possible information and guidance for the traders, this portal should guide them on the process and procedure involved, documents required, bans or restrictions imposed on certain goods, concessions to and from the partner countries, details about getting certificates and testing of the shipments, internationally recognized laboratories working in Pakistan, and accredited laboratories of the nearest countries.

Further this mechanism should develop an alert system, where trader can get latest information through SMS on subscription, this is especially important for small businesses. Further this mechanism should get feedback from the traders on new standards and on the currently in work standards. Further, consultation with business, both small and large, should be institutionalized.

### **2.12.2 Expenditure on testing should be considered as investment**

Experts are of the view that Pakistani manufacturers cum exporters consider conformity expenditure as extra cost, though internationally in big playing markets it is considered as an investment. So, Pakistani exporters need to think that this cost can make them internationally more competitive. To address this issue seminars and workshops should be arranged under the public sector, exporters should get aware of the real issue and attached benefits.

### **2.12.3 Upgradation of standardization bodies locally**

A major concern of the business is related to the low quality of Pakistani certifications and testing. That is why, Pakistani certificates are not generally accepted in the

importing markets. It is recommended that the quality and services structure should be improved. These bodies complain about the unavailability of proper budget as the basic reason of low service quality. Government and relevant ministries should show their commitment in this regard. It is also necessary to hire right person for the right job, staff must be adequately trained, number of workforces must commensurate the workload so that unnecessary delays can be avoided. Further, an overseeing body must be established to keep an eye over the work of laboratories. Government should foster to transform the paper-based system of certification into digital system, accompanied with a tracking mechanism so that traders can get information about their sample testing without any hustle and bustle. Further, federal, and provincial level departments should work in coordination.

It is highly needed to establish a mechanism for testing of pesticides and fertilizers whether locally produced or imported. Pakistan's most NTMs affected sector is the agriculture sector, and the major obstacle to its exports stem from the issue of maximum residue limit. Pakistani labs test pesticides and fertilizers with only traditional technologies, which are unable to capture the new variants. Scientific research is needed and upgraded technologies must be adopted so that instead of consignment certification in the final round of export process, pesticides can be detected for maximum residue limits in the early stage of checking. This will help farmers in choosing only those pesticides and fertilizers which do not damage the quality of vegetables and fruits.

#### **2.12.4 Mutual Recognition**

Pakistani exporters face another big challenge due to unacceptability of Pakistani standards and certificates in markets of Europe, America, and many other Asian countries. Government should take steps to negotiate with trading partners on the mutual recognition of standards. Mutual recognition means that two countries accept

the standards applied in each of them, and if trader gets certificate from any of these two countries, then it will be acceptable to both. For example, Bangladesh needs every food consignment imported to be tested by country's atomic energy agency for the presence of radioactive particles. Pakistan can make agreement on mutual recognition with Bangladesh on testing for radioactive particles at home. In the same, India needs to test every imported food from SAARC countries to be tested at central food laboratories, again we can negotiate with India over the recognition of standards mutually.

But mutual recognition is only possible when Pakistan enhances its local capacity for standardization and sample testing, and, quality of certifications is improved, accredited from international bodies and transparency is assured.

## **CHAPTER 3**

### **TRADE TRENDS, FTAs AND NTM PREVALENCE IN PARTNER COUNTRIES**

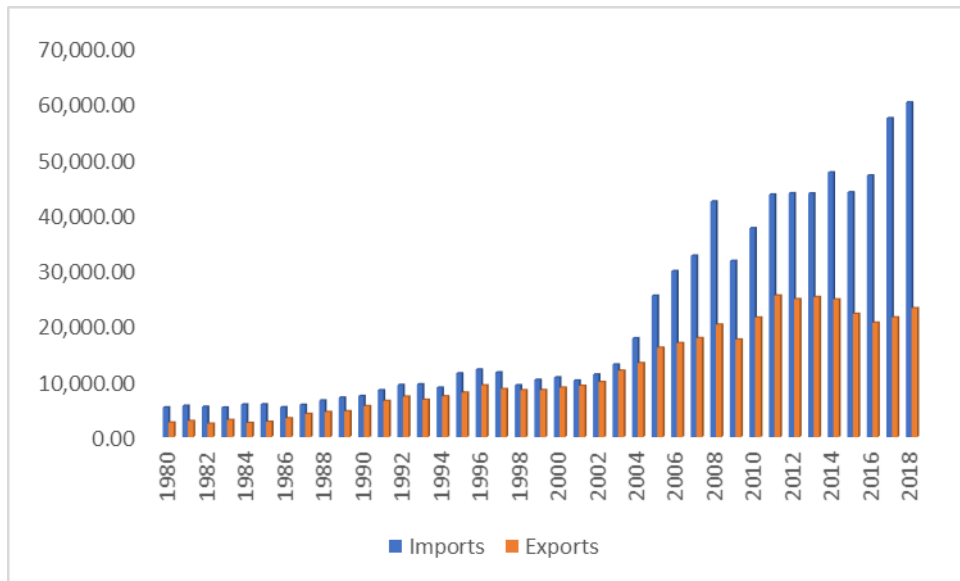
In this chapter Pakistan's overall trade and, trends over time and trade with partner countries especially those included in this study are discussed. Chapter is divided in multiple sections where each section corresponds to a specific FTA or potential FTA, while summary of NTMs imposed by specific country or members of FTA is also discussed. First section is dedicated to overall trade performance of Pakistan while in the subsequent sections Pakistan's trade with some important partners and trade blocs is discussed.

#### **3.1 Pakistan's overall trade performance**

A developing country like Pakistan needs trade to become its engine of growth. Empirical research shows that trade has strong positive relationship with productivity, employment creation and household level income. However, trade trends in Pakistan are not encouraging to fulfil all these above-mentioned objectives. After a successful decade of performance, Pakistan's external sector has remained stagnant during the previous years. Primarily it can be attributed to the slowdown of international market after global financial crises and more recently due to Covid-19 situation.

Trade profile of Pakistan shows that imports of goods and services are 20.32% of GDP while this number is 10.12% in case of exports. Pakistan mainly exports and imports consumer goods which have 61.07% share in exports while 31.84% share in imports. In the same way raw materials have 10.94% and 19.62%, intermediate goods 24% and 27.47% and capital goods have 3.98% and 20.77% export and import shares respectively. Top five exported items include rice, textile and wearing apparel sectors

while top 5 imported items comprise petroleum and transmission sectors. Pakistan exported 2824 products while these were destined to 194 countries, on the other hand number of imported commodities is 4039 while these were supplied by 208 countries. In the Figure (3-1) volumes of exports and imports are presented for period from 1980 to 2018.



Source: Direction of trade statistics, IMF

**Figure 3-1:** Pakistan’s aggregate exports and imports (US \$ million)

Trend shows that Pakistan exhibits a persistent trade deficit throughout the period. This deficit remained moderate till 2002, while we see a sharp escalation in trade deficit since 2004, and there are even larger differentials during recent years. Pakistan has been a relatively less opened and even lesser liberalized economy till 2000s, this is the one possible reason of low trade volumes and hence low level of trade deficits, while after 2000s liberalizing the economy through numerous free trade agreements with countries like Sri Lanka, China, and others and incorporation in blocs like SAFTA and D-8 have increased the volume of external sector. However, so far Pakistan has not been able to establish a solid trade base and hence exports have not boosted. In the following tables Pakistan’s largest trading partners for exports and imports are shown.



### 3.1.1 Trading partners of Pakistan

Table (3-1) below shows that Pakistan's overall exports are almost stagnant in the discussed period. USA appears to be the largest export partner of Pakistan. In 2020, more than \$ 4 billion of exports were destined to the US markets. It is one of the largest importers of textile and wearing apparel products. In top 14 importers of Pakistan 7 belong to Europe, main items exported to these markets include rice, textile, clothing, and other manufactured products. While the share of Agri-related products and processed food is very low. The main reason for the low presence of Agri-related sectors is the imposition of NTMs by the EU countries. China is the second largest importer of Pakistani products; however, imports of Pakistan are much more than its exports. From the neighboring countries Afghanistan is another big importer of Pakistani products, while in other SAARC countries only Bangladesh is included in the top importers of Pakistan.

**Table 3-1:** Pakistan's export partners (\$ thousand)

<b>Importers</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>	<b>2019</b>	<b>2020</b>
<b>World</b>	20533793	21911598	23778621	23818817	22237163
<b>USA</b>	3429743	3565800	3826257	4042271	4141847
<b>China</b>	1590858	1510410	1829435	2042893	1867039
<b>United Kingdom</b>	1557630	1637489	1739452	1682328	1726185
<b>Germany</b>	1186247	1288479	1318636	1344826	1395015
<b>UAE</b>	784747	870393	989724	1179059	1096883
<b>Netherlands</b>	650798	759387	948696	1058341	1094784
<b>Afghanistan</b>	1369768	1392230	1356360	1183592	870861
<b>Spain</b>	837343	905969	928667	949000	794274
<b>Italy</b>	667285	704430	776416	810401	718631
<b>Bangladesh</b>	656160	647403	788725	793034	583437
<b>Belgium</b>	650637	701773	670594	597727	571056
<b>Saudi Arabia</b>	380435	335027	318300	406120	432299
<b>France</b>	372958	400557	449626	443784	396875
<b>Turkey</b>	236873	327852	304649	296607	357439
<b>Canada</b>	220071	245266	273117	290553	284820

Source: ITC Trade data

Table (3-2) shows import partners of Pakistan. China is the largest supplier, and its share in total imports is approximately 27%. Pakistan's imports have been rising till 2018, we see a downward trend afterwards. Petroleum products have the largest share in Pakistani imports, UAE, Saudi Arabia, Qatar, and Kuwait the largest supplying markets. Pakistan imports capital goods from China, USA, and Japan, while China is the largest supplying market for consumer and intermediate goods also. In top suppliers of Pakistan four countries belong to East Asia, which shows Pakistan's trade potential with these countries.

**Table 3-2: Pakistan's Import Partners (US \$ thousand)**

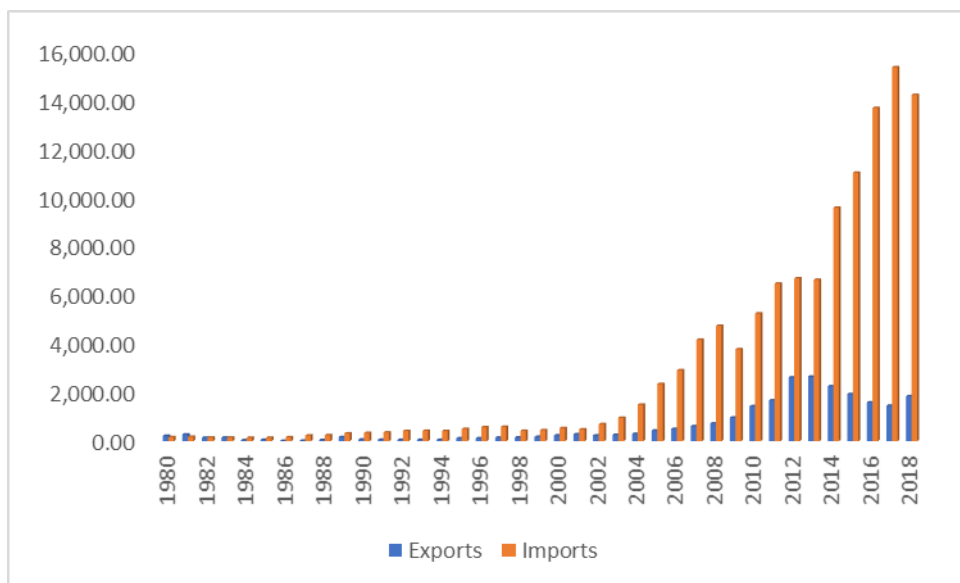
<b>Exporters</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>	<b>2019</b>	<b>2020</b>
<b>World</b>	46998269	57518651	60391133	50134812	45775135
<b>China</b>	13680153	15404325	14599749	12423997	12486525
<b>UAE</b>	6202090	7534899	8702013	6340201	4474234
<b>USA</b>	2006823	2846399	2957855	2614705	2583822
<b>Indonesia</b>	2088831	2586768	2511831	2222140	2405305
<b>Saudi Arabia</b>	1843133	2734072	3254606	2439770	1893130
<b>Qatar</b>	774256	1610484	2395203	2190934	1482868
<b>Japan</b>	1961395	2297060	2281617	1362462	1137477
<b>Kuwait</b>	1271958	1470115	1413042	1255313	1121889
<b>Malaysia</b>	944632	1102497	1164333	956870	1085583
<b>South Korea</b>	739451	873732	965758	775421	1061863
<b>Brazil</b>	451681	613512	509434	506696	942118
<b>South Africa</b>	505154	1045272	1242536	1174655	921568
<b>Thailand</b>	920023	1281056	1436136	1060720	896054
<b>Germany</b>	996462	1112994	1303849	930018	855943

Source: ITC Trade data

### **3.2 Pakistan China Free Trade Agreement**

Pakistan and China moved first to bilateral free trade in 2006 when they signed Early Harvest program, which paved the path for free trade agreement between two countries in the same year. The agreement came into force in november 2006 for only goods trade, while both countries agreed on the provisions related to services in 2009. Under the agreement, Pakistan opened 11 sectors and 107 sub-sectors for Chinese imports

while China maintained number of sectors the same however subsectors were increased to 133. Pakistan was granted access to fabric, bedding and cotton, linen, tiles, marble, leather, sports and steel sectors without any duty. This concession was extended to intermediate engineering goods later. Agreement is considered a significant achievement for Pakistan’s external sector. However the results of this agreement are not encouraging for Pakistan’s Trade and economy. Pakistan’s production cycle is disturbed due to cheap Chinese supplies in Pakistani market. Pakistan has incurred overall negative impact due to this agreement (Hussain & Shah, 2017), while business associations say that they are unable to get the benefits from this agreement. It can also be seen from the following graph.



Source: Direction of trade statistics, IMF

**Figure 3-2:** Pakistan China Imports and Exports (US \$ million)

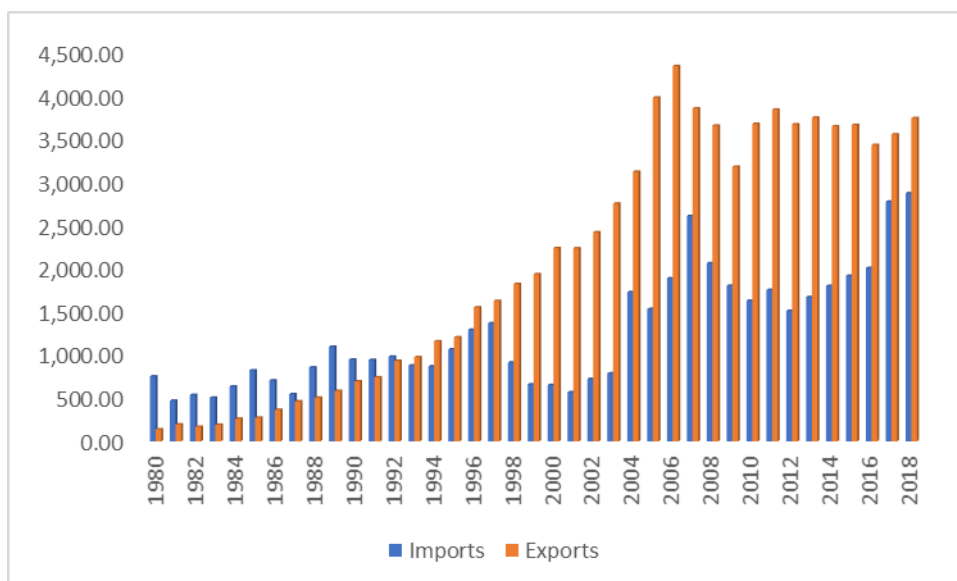
Trend depicted in Figure (3-2) shows that in post agreement period trade between the two countries have increased manifold, however share of China is much more than Pakistan. Till 2002 the difference between Pakistan’s exports and imports is not considerable, however it increases sharply after the bilateral FTA.

### **3.2.1 NTMs in China**

China transformed its economy from closed into comparatively opened in phases. Since its accession to WTO, tariff rates are substantially decreased. However, China is one of those countries which notify NTMs the most every year. In China there are 29 agencies responsible for issuance and implementation of non-tariff measures. Data shows that, 2517 regulations exist in China, out of which 1448 are categorized as mandatory standards, while almost 100% tariff lines face at least one type of NTM. TBT type measures are mostly used, which account for around 60% of total NTMs, and more than 99% products are affected by TBT. SPS measures come at number second with 23% share. Out of these measures 82% are mandatory. While from non-technical category, non-automatic licensing, prohibition and quotas are mostly cited.

### **3.3 Pakistan USA Trade**

United States of America is the largest trading partner of Pakistan in terms of exports. One encouraging fact of USA-Pak trade is the balance of trade surplus for Pakistan. Pakistan and USA signed Investment Framework Program in 2003, which boosted trade and investment in Pakistan. Though there is no formal trade agreement between two countries however Pakistan is granted certain concessions for its main exporting sector by United States of America.



Source: Direction of trade statistics, IMF

**Figure 3-3: Pakistan's Trade with USA (US \$ million)**

Trade trends of Pakistan with USA show home country trade deficit till early nineties; however, we see turn in Pakistan's favor since then. There is a continuous increase in Pakistan's exports to US from start of the series till 2006, then we see a decline which continues till 2010. The explanation for this trend lies behind the events of global financial crises as the purchasing power of American consumers was hit the most in that depression, but Pakistan maintained trade surplus over USA. In the previous decade we see up and down situation with Pakistan's exports, which can be attributed to overall situation of business in Pakistan.

### 3.3.1 NTMs in USA

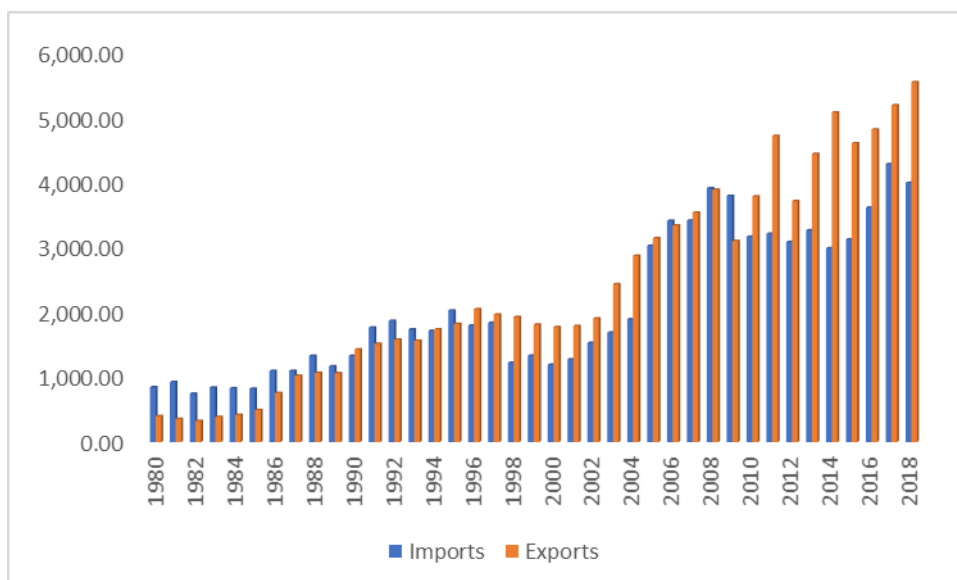
Exports to USA face big numbers in terms of coverage ratio and frequency ratio which are respectively 77.36% and 61.52% (WITS 2021). Overall, \$ 1740 billion of imports are affected by the imposition of non-tariff measures in America. While exports of USA face relatively less restrictions and face 31.92% coverage ratio while 29.83% frequency ratio. In USA top ten NTMs belongs to TBT and SPS measures, labeling requirement is the most cited NTM with 42.83% coverage ratio and 44% frequency ratio, 2286

products are affected by this type of measure. Overall, 8800 products are affected by top ten measures while the volume of affected trade is huge.

If we look at the sectoral effects, Animals, foods, and vegetables are most protected sectors with 100% coverage and frequency ratio. All products in these groups face at least one type of SPS measure, while TBT measures are also heavily imposed. Textile, transportation, and fuel sectors have coverage ratio of above 90%. Chemicals, stones, mechanical and electrical products are also heavily protected by imposition of NTMs.

### 3.4 Pakistan’s Trade with European Union

Pakistan’s trade with European Union manifests trade surplus for Pakistan attributed mainly due to GSP status awarded by EU. This system was first developed in 1997, extended to 90 developing countries over time, while Pakistan was granted the same in 2013. This system offers multiple market concession to the grantees. The reason for Pakistan’s inclusion into the system is its narrow export base. Pakistan takes the advantage through this system in textile and wearing apparel sector.



Source: Direction of trade statistics, IMF

**Figure 3-4:** Pakistan’s trade with EU(US \$ million)

Historically Pakistan maintains a trade balance deficit with EU in 90s, while since 2000s Pakistan has trade surplus over EU. After granting GSP plus status Pakistan's exports are considerably increased, which is also witnessed from the Figure (3-4). However still Pakistani traders complain about the non-tariff measures applied by the European nations. Pakistani traders face restrictions in grain crops, fruits and vegetables and processed food sectors. According to the business community, if testing and certification standards in Pakistan are uplifted and mutual recognition is gained from the European countries then exports in Agri-related sectors can increase considerably.

### **3.4.1 NTMs in European Union**

European Union is one of those regions which have the highest coverage and frequency ratios for their imports. Overall coverage ratio is 94.31% while frequency ratio is 93.88%. Exports of EU face lesser restrictions with frequency ratio of 10% while coverage ratio of only 5.79%. In case of European Union top ten NTMs are TBT and SPS type measures, while labelling requirement has the highest coverage ratio of 73%, frequency ratio is 70%. Almost every product exported to EU faces at least one type of NTM.

Textile & Wearing apparel is the most protected sector with 100% coverage and frequency ratios. Animals, vegetables & fruits, other livestock products like hides and skins, chemicals and processed foods also face above 98% coverage and frequency ratios. Fuels, footwear, plastic, rubber are also highly protected with frequency and coverage ratios of above 90%. Overall import protection through NTMs encompasses more than 90% products, while total volume of protected imports crosses \$ 1.7 trillion.

### **3.5 South Asian Free Trade Agreement (SAFTA)**

Pakistan is the second largest economy in the region, however its trade within SAARC is relatively small as compared with its international trade volume. Pakistan exports less than 10% of its total exports to SAARC countries, and for imports this ratio is only less than 5%. With only 5 % intra-regional trade SAFTA (South Asian Free Trade Agreement) is one of those regional blocs which are least integrated and could not perform well since adoption. The rationale for regionalism is based on the notion that regional trade agreements create trade (Delgado, 2007). Another purpose of RTAs is to choose liberalized trade through specific incentives for member countries of a particular RTA providing them with a shield against international market competition. Further, countries can introduce economic and legal reforms more accurately in case of regional blocs (Whalley, 2007). Once these reforms are successful, countries can move on for a global free trade regime.

SAARC was established in 1985 as a regional bloc of Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, and Sri Lanka, with a rationale of regional cooperation resulting in rapid industrialization. Members agreed on SAPTA (South Asian Preferential Trade Agreement) in 1993, and it was implemented in 1995. In 2004 countries signed the framework of SAFTA, with inclusion of Afghanistan as its 8<sup>th</sup> member, the agreement came into force in 2006. But the exercise of trade liberalization and regional integration in south Asia has not been successful if above mentioned rationale and objectives are considered. If we look at trade directions in South Asian region, we get a very disappointing picture. During 90s share of regional trade remained around 4%, with a bit increase during 2000s. It was at its peak in 2003 at 6%. This regional trend is very low as compared with other successful regional blocs like EU, NAFTA, ASEAN etc.



**Table 3-3:** Share of member countries trade within SAARC (% of total trade)

	1995	2000	2005	2010	2015	2019
<b>Afghanistan</b>	11	18	27	18	23	28
<b>Bangladesh</b>	12	8	10	11	10	10
<b>Bhutan</b>		31	82	80	81	85
<b>India</b>	2	3	3	4	3	3
<b>Maldives</b>	14	22	18	18	19	16
<b>Nepal</b>	15	39	61	65	61	66
<b>Pakistan</b>	2	3	6	8	8	5
<b>Sri Lanka</b>	7	7	10	17	22	17
<b>SAARC Average</b>	4.2	4.4	5.6	4.5	5.2	5.1

Source: Author's calculations using Direction of Trade Statistics, IMF

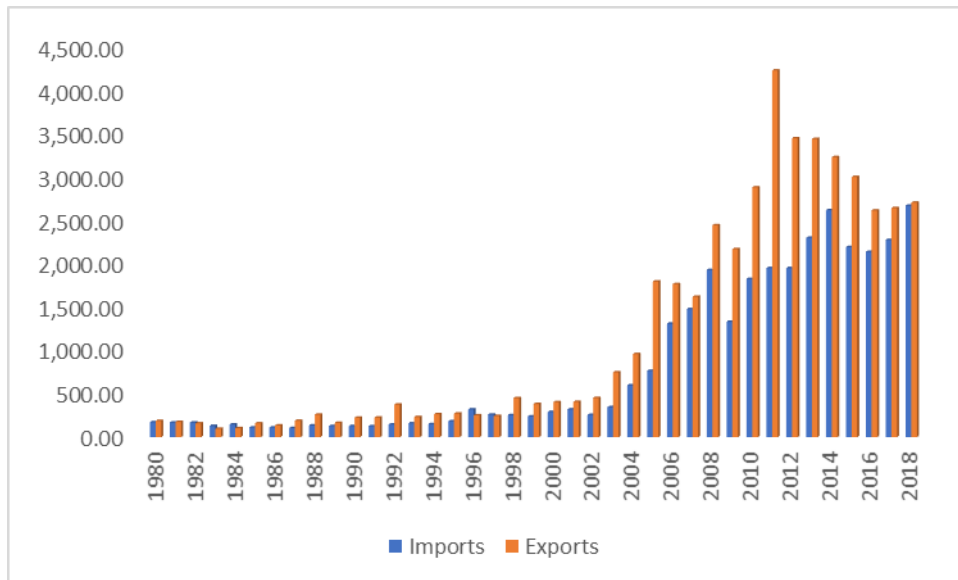
So, why did SAFTA cannot perform better? Many answers and possible reasons are there, ranging from economic to political. Some common reasons include the issue of sensitive lists implemented by member countries. SAFTA framework allows members to maintain such lists, but these are very long and even expanding to such countries in the region which are less competitive. While in the bilateral FTAs like Pakistan-Sri Lanka and India-Sri Lanka free trade agreements, number of such commodities is relatively very low (Weerakoon & Thennakoon, 2006). The most cited reason for SAFTA's ineffectiveness is the assertion that Military and political tensions between Pakistan and India are big obstacles in the realization of SAFTA in letter and spirit and that is why regional economies are resorting to bilateralism (India- Sri Lanka FTA, Pakistan- Sri Lanka FTA etc.).

However recent business surveys and studies [ITC business survey 2019<sup>7</sup>, Raihan (2016)] suggest that major obstacle faced by the business community relates to the regulatory requirements in the name of Non-Tariff Measures (NTMs). SAARC members were obliged to abolish all NTMs for each other within 7 years of signing the SAFTA as was stipulated in the feasibility studies for SAFTA. Instead, these regulatory restrictions are increasing over time and the members are only asked to provide details

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<sup>7</sup> International Trade Center, Geneva. <https://ntmsurvey.intracen.org/home>

of all non-tariff measures applied by them to the SAARC Secretariat where experts will review these measures and give their recommendation. Submission of such information is also not binding for member countries (Hussain, 2008). Another big problem is the fact that a lack of good understanding of NTMs is found in almost all the members.



Source: Direction of trade statistics, IMF

**Figure 3-5:** Pakistan's trade with SAARC (US \$ million)

### 3.5.1 Prevalence of NTMs in SAFTA

If look at NTM prevalence in SAFTA region then we see that mainly domestic industries are protected through bans and delaying tactics. Imports of Afghanistan face 22.74% and 13.30% coverage ratio and frequency ratio respectively. Afghanistan largely depends on Pakistan and its ports for international trade. Both importers and exporters face multiple challenges and should fulfil double procedural requirements. Further, considerable restrictions are imposed in terms of NTMs. 150 types of TBT and SPS measures are imposed on broad categories of cement, food, petroleum, and technology related products. These types include labeling, licensing, packaging, certification related requirements. Registration and licensing conformities pose a big challenge as the regulatory system is run through multiple and overlapping

departments. Good news from Afghanistan is the absence of any ban for any specific product from SAARC countries.

Bangladesh's regulatory regime is focused on protection of local industries in kind of NTMs specific to health, and environment. Generally, regulations are shaped by the presumed interests of local business. 21 HS-4-digit categories including firearms, re-manufactured equipment, certain chemicals, plastic bags etc., are facing bans on social, security and environmental grounds. Many products are facing quality standard, further, every food item being imported should get a clearance certificate regarding radioactive particles from country's atomic energy agency. 13 categories of products including live animals, leather, pulses, different types of shrimp, jute, seeds, petroleum products also face restrictions. Registration requirements are also imposed on large number of products. Another big concern of business and consumer groups is about para-tariffs, which are imposed in the form of discriminatory duties. Sometimes revenue from such duties is greater than that of usual custom duties (Bangladeshi NBR 2019). Such duties (MAST Classification F69) are imposed on more than 270 groups of commodities.

Bhutan, LDC member of SAARC with relatively small economy and landlocked geography, mostly depends on India for its international trade. For imports and exports through Indian ports a lengthy licensing and registration procedure need to be followed. Every importer needs a registration with finance ministry. Import policy is tilted towards India, for example a single individual or entity can import a maximum of four containers per year from other than India. A strict ban is imposed on the import of used clothes and textile. Vehicles, wood products and alcohol containing items are often subject to restrictions. 14 categories of products require strict licensing for import from any country.

India, the largest economy in SAARC, mainly focuses on development of strategic industries through different regulatory regimes. For Indian imports coverage ratio is 45.52% while frequency ratio is 43.71%. India is world's 18<sup>th</sup> largest exporter and 10<sup>th</sup> largest importer (ITC<sup>8</sup> statistics, 2019). However, its trade within SAARC does not reflect this ranking, it exports only 5% of its total exports to SAARC countries while in case of imports this ratio is only around 1%. Protectionist policies based on policymakers' perceptions regarding local business, health, environment, security, and religious concerns. India started liberalization in 90s, but still restrictive practices are prevalent in the form of quantitative measures, para-tariffs, and complex bureaucratic procedures that cause great concern in Indian and specifically South Asian business community. Since 2011, India has granted several concessions to the least developed countries of SAARC, yet fluctuating procedures, discretionary powers to interpret regulations make them skeptical to trade with India.

Analysis of NTMs imposed by India shows that instead of banning particular groups of commodities specific procedural and delaying tactics are largely used. 428 HS-6-digit products cannot be imported without license which entails a lengthy procedure. 52 tariff lines cannot be imported while 33 commodities are those which can only be imported by state organizations. Import of beef and beef containing products is strictly prohibited on religious grounds, while genetically modified food and related items face strict TBT measures and other certification requirements. Para-tariffs are bit more problematic in case of India, such measures are levied by different states and are not discussed in any bilateral or multilateral negotiations. Access restrictions are also very important, only 140 Indian imports are allowed to enter through Wagah border, in the same way yarn

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<sup>8</sup> International trade center, Geneva, [www.intracen.org](http://www.intracen.org)

and other textile related products are required to enter Bangladesh through Chittagong port only.

Indian regulations pose 250 categories of products under strict SPS measures, which include, quarantine, certification, and inspection regulations. Every food consignment must be tested at central food laboratory before entering the country which is against the practice of sample testing. Technical barriers to trade are also widely used and about 228 categories of products are required to fulfil testing, certification, labeling and other regulations. Affected sectors extend from machinery, chemical, processed food, to household items.

Maldives is the smallest economy in SAARC with India, Sri Lanka, and Pakistan as its largest trading partners. 48% of Maldives total exports destined to SAARC countries and for imports this ratio is 18% (ITC Statistics 2018). Under the trade law of 1979, license is the pre-requisite for all imports which is issued to only registered companies. Five categories are banned based on religious and social reasons, these include pigs, such material which is against the Islam, Idols, and other products. 22 product groups belonging to whales, turtle, dolphin are prohibited from export due to ecological reasons. Largely, Maldives has state run trade of items like rice, flour, fish, and sugar. Up till now, Maldives has not imposed any SPS, or TBT measure and it accepts the standards adopted by exporting countries.

Nepal is another small economy in SAARC with a relatively smaller trade capacity. Major part of its cross-border trade occurs with India, with fewer trade activities with China, Pakistan, and Bangladesh. Anyhow, Nepal operates a regulatory regime which is supportive of local business growth. 6 categories of products including light bulbs, specific dyes, beef, some specific plastic items are banned for imports. 4 categories including specific narcotics, arms, foods containing opium are allowed only after

license and fulfilling quantitative restrictions. For excisable items separate licenses are required. Para-tariffs are levied on different petroleum products.

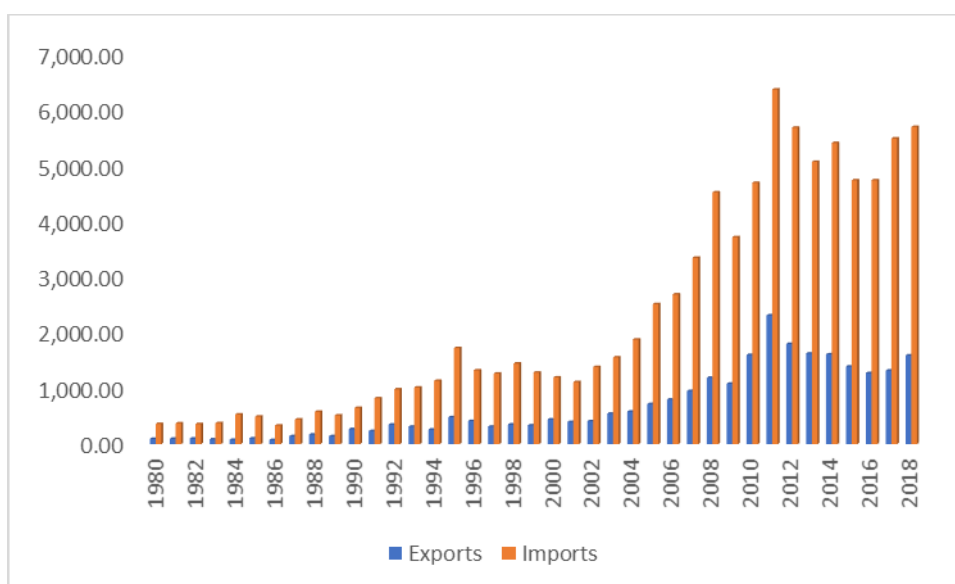
As far as trade restrictions are concerned, Pakistan uses bans instead, against the global practice, of delaying tactics. Pakistan has a unique negative list covering around one thousand items which is applied to India only. Twenty categories are banned for exports which include fertilizers, animals etc. Another twenty groups are allowed to export with pre-permission. These include mostly food and raw textile items. 13 groups pertaining to animals, birds, literature are banned and cannot be imported due to religious and safety reasons. 44 other manufactured products are banned due to economic and protectionist motives. 56 groups of items including animal and plant products are almost restricted from import and a special permission from respective authorities is required.

In Pakistan, large number of products require certification from Pakistan Standard and Quality Control Authority. Restrictions related to ports also apply to specific countries e.g., India and Afghanistan. Other than SPS regulations, customs inspection, procedures, political reasons, security related concerns also play an important role. Under MAST classification E329 (without any economic reason) 585 groups of commodities under different HS chapters cannot be imported from India. About 80 product groups pertaining to human, plant and animal health and safety face at least one SPS measure while 186 groups of commodities face at least one type of TBT measure. Like other regional economies, Sri Lanka's regulatory regime largely focuses on domestic business protection, health, and safety concerns. Imports face 63.30% and 46.71% coverage and frequency ratio respectively. Regulations win a considerable amount of revenue for the government. Sri Lanka maintains ban on 38 groups of products including plants and animals. Animals and their products from 22 countries

are fully banned. Food categories require testing for radioactive particles before entry. 15 groups of food containing artificial colors are banned from imports. Genetically modified foods are restricted and for their import a log procedure must be followed.

### 3.6 Group of Developing-8 countries

D-8 is a group of 8 developing countries, namely, Bangladesh, Egypt, Indonesia, Iran, Malaysia, Nigeria, Pakistan, and Turkey. Established in 1997 with the objective of economic cooperation and enhanced trade. Member countries also commit to grant concessions on tariffs and other trade related measures, yet we don't see any considerable advancement in this regard. A reason of ineffectiveness of this organization lies in the economic structures of the respective economies, as all of these are developing countries with heavy dependence on trade in semi-finished goods. However, an encouraging phenomenon is the geographic location of these countries, as these are all located on important international sea routes.



Source: Direction of trade statistics, IMF

**Figure 3-6:** Pakistan's trade with D-8 countries (US \$ million)

Pakistan has considerable trade with other members of D-8. In this bloc Pakistan trades the most with Malaysia and Turkey. Though informal trade with Iran has increased over

time yet recorded trade is around \$ 1 billion. Pakistan imports palm oil and rubber products from Indonesia and Malaysia, while Pakistan's rice and textile sector has a reasonable share in these countries markets. Strong imposition of NTMs is also witnessed in these countries which can be negotiated for enhanced trade and public welfare.

### **3.6.1 NTMs in D-8**

In this study we have included 6 out of 8 developing countries. NTMs of Pakistan and Bangladesh have been discussed earlier, while NTMs imposed by Indonesia and Malaysia will be discussed under NTMs in RCEP, while the case of Turkey is discussed here.

Imports to Turkey face relatively higher coverage and frequency ratios which are 60.74% and 67.62% respectively. While exports of Turkey face only 24.16% coverage ratio and 19.25% frequency ratio. In Turkey top ten imposed NTMs are SPS and TBT type measures while pre-shipment requirement of passing through specified ports is also a major concern. Certification requirements and authorization requirements (B140) affect around 1400 products, while these have coverage ratio of 32% and 24% respectively. Requirement of specific port hurts 1470 products which is highest among all the NTMs imposed. Export restrictive measures are also substantially used and these affect around 200 products.

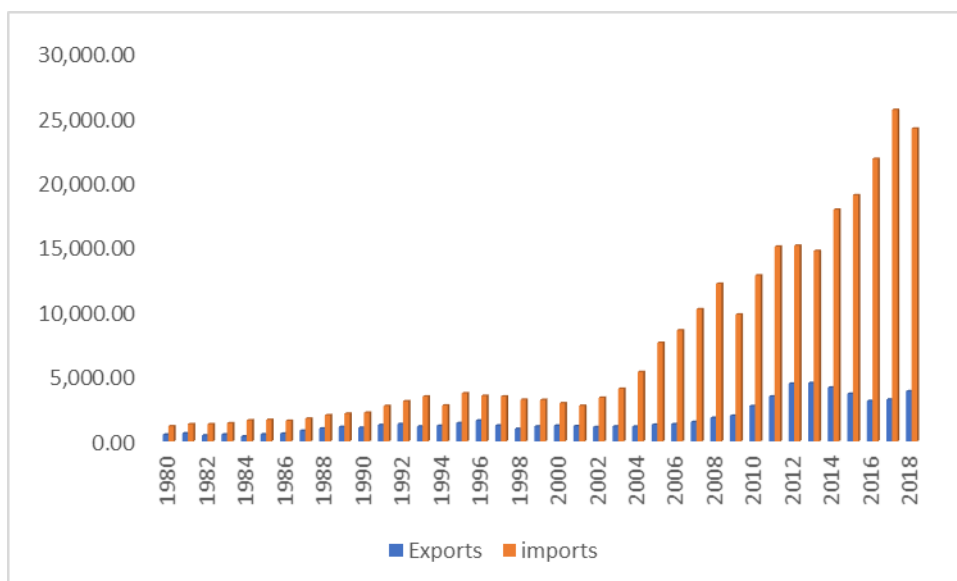
Sectoral analysis is not much different than European countries. Vegetables, animals, and food products are highly protected with the usage of NTMs. These groups have coverage ratio and frequency ratio of above 90%. It means these groups face at least one type of SPS measure while much of the products face multiple SPS and TBT measures. Textile sector has a frequency ratio of 100%, while its coverage ratio is 83%, in other words every textile product entering Turkey should fulfill some specific



standardization and certification requirements. Footwears, stones, fuels, and livestock products are also substantially protected their frequency and coverage ratios range from 70% to 80%. Wood, metals, and minerals are the least protected sectors. Overall, more than 3300 imported products face at least one type of NTM. The volume of affected trade is about \$ 118 billion. As far as Pakistan's trade with Turkey is concerned, Pakistani traders complain about the imposition of NTMs on Agri-related and textile sectors.

### **3.7 Pakistan's Trade with RCEP Countries**

Regional Comprehensive Trade Agreement was signed in November 2020. It consists of ASEAN plus 5 members, namely, Australia, China, Japan, South Korea, and New Zealand. When negotiations started in 2011, India was also a potential member of the agreement, but later withdrew its membership on the argument of domestic industry loss. RCEP is the largest trading bloc so far, as it comprises more than 2 billion population of the world and more than 30% of international trade emanates from these countries. Intra-RCEP trade is considerable due to previous regional integration due to ASEAN, while cordial trade relations with new entrants are also considerable. RCEP countries agree to abolish tariffs within the bloc to a negligible level and substantial gains have been realized in this regard. Countries also included the clauses of deep integration and mutual recognition of standards in the trade agreement.



Source: Direction of trade statistics, IMF

**Figure 3-7:** Pakistan's trade with RCEP countries (US \$ million)

Pakistan, on many occasions, have been considering negotiations and possible inclusion in the RCEP bloc, some feasibility studies were also conducted (for example Ghani 2014). However, more recently no such effort is seen. Pakistan has considerable trade ties with members of RCEP, bilateral FTAs are also signed with some countries (for example Pak-China FTA, Pak-Malaysia FTA) while some agreements are at negotiation stage (Pak- South Korea FTA). Among RCEP members four to five countries have been Pakistan's major trading partners, while many of them are the trade competitors of Pakistan. If we talk about trade between Pakistan and RCEP, we see a situation which is not favorable for Pakistan. We have a persistent balance of trade deficit with these countries. But much of the imports from these countries are used as raw material for Pakistan's exports to other countries. Malaysia is Pakistan's largest supplier of palm oil, in the same we have strong trade ties with China.

### 3.7.1 NTMs in RCEP

In this section prevalence of NTMs in RCEP region is discussed. We have analyzed the facts and data of member countries separately and alphabetically.

Australia has relatively high coverage ratio and frequency ratio which are 77% and 61% respectively, which means imposition of NTMs is hurting the trade as the coverage ratio is higher than that of frequency. Australian exports face relatively lesser restrictions as coverage ratio is 25% and frequency ratio is 32%. In case of Australia top ten mostly imposed NTMs belong to SPS and TBT measures while export restrictions are also considerably applied. Inspection requirement has the highest coverage and frequency ratio which are 60% and 46% respectively. Total number of affected products with this requirement is 2291. Testing requirement has very low frequency ratio as compared with its coverage ratio, these are 19% and 50%, it means though it is imposed on only 955 products, but the volume of affected trade is very large. Labelling requirement is affecting around 1900 products but the volume of affected trade is relatively lesser due to its lower coverage ratio.

NTMs data on sectoral NTMs for Australia follows the trend of other developed countries. Animals, textile, and vegetables are the most protected sectors with around 100% frequency and coverage ratios. Animals, vegetables, food, and livestock sectors face heavy imposition of SPS type measures, while TBT measures are also used. Textile sector's 766 products face at least one type of NTM, individually this is the most protected sector in terms of frequency ratio. Overall, 77% imported products face the imposition of NTMs while the number of affected products is 3076. In aggregate \$ 160 billion of imports are affected by at least one type of NTM.

Brunei's imposition of NTMs effect 25% of imports in number while 44% in quantity. Coverage and frequency ratios for exports are relatively less, 38% and 15% respectively. Brunei is the relatively small economy in RCEP which imposes several standard measures under SPS, TBT and other chapters of MAST Classification. However, in contrast to other economies included in the sample, Brunei has highest

number of coverage ratio for exports, 37.4% of exports are administered under state run enterprises, frequency ratio is only less than 1% and number of affected products is 3. It means these products constitute 37% of Brunei's exports and \$ 3 billion of trade is affected with only one type of NTMs. Rest of the top ten NTMs pertain to SPS and TBT measures, while additional charges clause (F690) is applied to 768 products.

In case of food products, vegetables and fruits, fuels, and animal groups, high number of NTMs are imposed and the coverage ratio of these groups is above 98%, while every food product being exported to Brunei face at least one type of NTM. Overall, 44% of import volume and 1089 products are affected while the volume of affected imports is around \$ 2 billion.

In case of Indonesia registration requirements for imports is the largely applied NTM which covers 33.98% of product number while 50% of their volume, \$ 78 billion of imports come under the effect of this measure. Traceability requirements which mostly pertain to livestock products is the second largest measure applied by Indonesia which affects 1366 products and more than \$ 78 billion of imports. Indonesia also operates a strict policy for its exports to other countries, such measures encompass around 1000 products.

Livestock exports to Indonesia face 100% frequency and coverage ratios, while vegetables and other Agri-related product groups are also largely protected with coverage ratio of over 95%. Sector of interest for Pakistani traders, textile and wearing apparel, is also heavily protected with frequency ratio of 78% and coverage ratio of 80%, affected trade pertaining to this sector crosses \$ 6 billion. Overall, 67% of imports face at least one type of NTM, total number of affected products is 2797, while more than \$ 108 billion of imports are facing NTMs.

In Japan NTMs are moderately applied with a maximum coverage ratio of 51% while the maximum frequency ratio for a single measure is 28%. TBT regulations pertaining to storage and transportation have the most impact on imports, its coverage ratio is 50% while frequency ratio is 25%, number of affected products is 1263 while the volume of affected trade is \$ 348 billion. Traceability requirements for certain sectors like livestock, processed food are also heavily imposed, coverage ratio is 47% while frequency ratio is 24%. In top ten mostly imposed NTMs, TBT and SPS measures are greater in number while export related technical measures (P690) are also applied on 39% of exports and the volume of affected exports is more than 245 billion dollars.

Japan has applied strict regulations for fuels, vegetables, animals, food products. Coverage ratio and frequency ratio of NTMs for these sectors is greater than 97%. Vegetables face 99% coverage ratio while the number of affected products from this sector is 326. To protect local industries against international competition mechanical, electrical, chemicals, and transportation sectors are also highly protected, and their coverage ratio is above 80%. Overall, Japanese imports face 76% coverage ratio, 3066 products are affected while the volume of encompassed imports is more than 522 billion dollars.

Malaysia regulates comparatively less strict regime with import coverage ratio of 57% while frequency ratio of 36%. In Malaysia Authorization requirements (B140) are the mostly used regulations with coverage ratio of 49% and frequency ratio of 28%, 1434 products are affected with these types of NTMs, volume of affected trade is above 93 billion dollars. Other NTMs included in the top ten list include SPS and TBT measures, however licensing requirements for exports from Malaysia are also strictly imposed with coverage ratio of 17% and it encompasses above 30 billion dollars of exports.

If we talk about sectoral imposition of NTMs, animals is the most protected group with 100 coverage and frequency ratios, while the volume of affected trade is about 3 billion dollars. Vegetable and food groups also face 99% protection measured in terms of frequency and coverage ratios. Overall, 54% of imports face at least one type of NTM while the volume of total affected imports is around \$ 103 billion.

New Zealand mostly imposes SPS and TBT related measures if we look at top ten measures used to regulate the trade. However, exporting from New Zealand requires to comply with export related technical measures (P690), which cover 46% of exports and 279 products, affected trade volume is more than 17 billion dollars. For imports, authorization requirements (B140) have a coverage ratio of 32% and frequency ratio of 22% while number of affected products is 1046, and the volume of affected imports is 12.6 billion dollars. Labelling is required for 31% of imports which cover 1607 products.

sectoral imposition is also following the trend of other developed countries. Vegetables, food products and animals are highly protected with SPS and TBT measures, coverage ratios of these groups is above 99%. Other livestock product groups like hides and skins also face considerable number of NTMs, coverage ratio for this group is 97%. however, stones, metals, plastic, and rubber face lesser NTMs which show the coverage ratio of less than 10%. Overall, 76% imports are covered through NTMs with affected product count of 2595 and total volume of affected imports is above \$ 30 billion.

In Singapore top ten measures belong to SPS and TBT types. Authorization requirement has the highest coverage ratio of 32% while 475 products are covered under this single measure. Labeling requirement is also a big issue for exports to Singapore.

In Singapore fuels, animals, vegetables, and food products are the highly protected sectors with coverage ratio of over 95%. Overall imports to Singapore face moderate

level of NTMs. 39% of imports are covered under these NTMs while the number of affected products is 1343, and the volume of affected imports is 123 billion dollars.

Vietnam has a coverage ratio of 38% and frequency ratio of 47% for its imports while for exports these measures are 46% and 22% respectively.

Vietnam regulates a sophisticated system of NTMs. In top ten most cited measures SPS, TBT and export related measures are included. Testing requirement (B820) and conformity assessment (A890) are largely used with coverage ratio above 20%. Number of affected products is above 1000. Testing requirement and quarantine requirement under SPS are also widely used with coverage ratio of above 10%.

If we look at sectoral regulations, food group is 100% protected with imposition of NTMs, several SPS and TBT measures apply to this group. Vegetables, textile, and animal groups also face heavy regulations with coverage ratio of around 90%. Overall, 38% of imports face NTMs while product count affected from non-tariff measures is 2340, and the volume of affected imports is more than 63 billion dollars.

## CHAPTER 4

### REVIEW OF THE LITERATURE

To study the trade costs and their effect on international trade has been attracting the attention of policy makers and researchers since long. But the effect of NTMs is much difficult to capture. Usually, they are imposed with legal support, these are in the form of documentation requirements and causing lengthy procedures (Timini & Conesa, 2019). International trade bodies like WTO and UNCTAD are also greatly concerned about the increasing numbers of NTMs, due to their cost raising effects and restricting market entry (Fontagné *et al.*, 2015). Ghodsi *et al.* (2017) argue that the increase in the number of NTM notified to WTO, from 1995 to 2012 was 400%. And the effect of these NTMs on trade is more than that of tariffs (UNCTAD, 2019). With increasing number of NTMs, research on this topic has also escalated. In 2000, globally a total of around one million NTMs were imposed while the number of studies found that year was just 14, while in 2017 number of global NTMs raised to around 4 million and the number of studies raised to 140 (Santeramo & Lamonaca, 2019). Research also support the positive effects of NTMs on public health and quality of environment (Beghin *et al.*, 2015).

In this chapter we have discussed theoretical literature on economic theories, specifically gravity model and the concept of monopolistic competition which provide the building bloc of our theoretical framework, some important studies on the theoretical evolution of NTMs estimation, and empirical work on non-tariff measures is included, then a survey is included on literature pertaining to free trade agreements and Pakistan's trade.



#### 4.1 Theoretical literature

Isard (1954) developed an analytical framework for international trade which was different from Heckscher-Ohlin model (Pal & Kar, 2021). While Tinbergen (1962) independently used the same idea to explain the patterns of trade between any two countries. Presently a mixed gravity-based framework is in use with some additional characteristics. Then Anderson (1979), Bergstrand (1989), Helpman (1987), Feenstra *et al.* (1998), Chaney (2008), Deardorff (2011), and Chaney (2018) have further improved the gravity model and these variations are widely used in the empirical work.

Gravity model in trade was initially considered merely as an empirical observation with little theoretical basis. The relationship between the size of trading economies, their distance and the amount of trade was stable, but these did not seem to subscribe to the fundamental theorems of international trade relying heavily on the Ricardian structure, and the Heckscher–Ohlin model. It was believed that gravity equations introduced factors that were either subsumed under the explanations available in the classical models; or that the factors were too esoteric to have wider applicability. Regardless, the extraordinary stability of the gravity equation and its power to explain bilateral trade flows prompted the search for a theoretical explanation for it. In this connection, later modification to the trade theory in (Krugman, 1980) is more amenable to the empirical observations from the gravity model. In fact, (Bergstrand, 1989) also shows that a gravity model reflects trade due to monopolistic competition in the product market and that a preference for variety between identical countries is very important. Notwithstanding, Deardorff (2011) showed that a gravity model can arise from differences in factor-proportions as part of traditional explanations. Further, (Eaton & Kortum, 1997) derived a gravity-type equation from a Ricardian model, while Helpman

*et al.* (2008) and Chaney (2008) related the structure of gravity equations to models with differentiated goods and heterogeneous firms.

First good effort in the course of measuring the effects of NTMs is seen in Anderson & Neary (2003). In this paper a trade restrictiveness index is developed comprehensively. Using index approach such values of tariffs are traced which can have equal effect of NTMs. Later, (Kee *et al.*, 2009) improved the theoretical work of Anderson and Neary and tried to find out the ad-valorem equivalents of NTMs which can translate the estimated effect of NTMs in tariff terms. This paper is considered the first mature effect for estimating the effects of NTMs. Kee *et al.* (2009) used quantity gap approach and gave estimates of missed trade due to imposition of NTMs. They used import demand elasticities to convert the coefficients into AVEs. However, a major limitation of Kee *et al.* (2009) pertains to unavailability of reliable data on non-tariff measures. With increased efforts on data collections have attracted many researchers in this direction. Kee & Nicita (2016) again investigated the effects of NTMs for over 90 economies by using the latest data available through UNCTAD. Study concludes that NTMs are substitutes of tariffs and their cost effect can be estimated through their AVE values. Other major efforts include the work of Dean *et al.* (2009), which measures the restrictiveness effect of NTMs using the product price data of 60 countries. This paper was the first effort to estimate the price raising effects directly without using import elasticities. Though it provided deep insights into the effects of NTMs, however the usage of price data is questionable as it is not comparable among countries usually. A fine effort to directly estimate the price effects of NTMs is seen in Cadot & Gourdon (2016), Cadot *et al.* (2018). In these studies, AVEs are estimated using monopolistic competition models, new data from TRAINS and UNCTAD is applied, and price gap approach is used to estimate the AVEs for over 50 countries. They argued against the

quantity gap approach by saying that results produced are inconsistent, further import elasticities are used to transform the coefficients into AVEs, so if elasticity for a specific product group is equal to zero then whatever the value of AVE, no effect on trade volume will be recorded. It is also a fact that international comparison of NTMs results is difficult (Timini & Conesa, 2019). The reasons include different methodologies are applied and data sets also have different sources. For instance, Ferro *et al.* (2015) used the data on residue levels to find out the effects of NTMs on Agri trade. NTMs are mostly imposed on final goods, as the focus on primary or intermediate goods can disturb the entire production cycle (Baccini *et al.*, 2018). Another trend of NTMs literature indicates that regulatory distance between two trading partners is also used to capture the effects on trade flows. Bao & Chen (2013) made the first attempt while more recently Cadot *et al.* (2018) has also used the same concept to measure the restrictiveness of trade for a large number of countries. Further the effect of NTMs on final goods is also heterogeneous due to different compatibility requirements (Amiti & Konings, 2007). Niu (2018) improved the work of Kee *et al.* (2009) and used the data for three reference years to estimate the AVEs for 97 countries. Study concludes that NTMs have evolved into the real source of protectionism. Nguyen *et al.* (2022) highlighted the issue of Jensen's inequality in the estimation of AVEs through quantity approach within gravity framework. Research claims that if this inequality is not considered then the results of AVEs will be biased.

Primary conclusion drawn from theoretical literature is the argument that non-tariff measures are widely being used for protectionist motives and hence these have negative effects on trade flows across the countries (Sheldon, 2012). Literature also shows that though empirical work on NTMs is done through estimation of AVEs, however, these alone cannot tell the complete effects on trade, and economy. Hence current study fills

the gap by first estimating the AVEs of NTMs applied by Pakistan and its trading partners then these values are incorporated by updating MyGTAP model and economy wide effects are drawn. Using the logic of Sheldon (2012) we have used the concept of mutual recognition of standards to check if it can help decrease the trade cost associated with the application of non-tariff measures.

#### **4.2 Empirical literature**

It is ambiguous to trace out the exact effects of specific NTMs on certain exporters and importers (Fugazza, 2013). Survey of literature suggests that research is more focusing on SPS and TBT like measures [ Cadot & Gourdon (2016), Kee & Nicita (2016), Niu (2018)]. However, we find rigorous research on the other measures also (Fontagné *et al.*, 2015). Empirical research shows that the effects of NTMs on trade volumes are mixed (Ghodsi *et al.*, 2017). As described by Taylor & Chen (2019), effects on NTMs depend on the scope and type of NTM being used, results can be positive if these are increasing product quality and maintain the health and environmental standards, while if these are imposed to restrict the trade then definitely results will be negative. Further these effects may be sector or product specific (Anders & Caswell, 2009), and these can be more negatively affecting the agriculture and livestock sectors (Wilson & Otsuki, 2004). Effects of NTMs also depend on classes of countries. For example, most of the NTMs applied by the developed countries on developing countries exert negative effects on trade flows and hence welfare (Anders & Caswell, 2009), while there effect is ambiguous when a developed country imposes NTMs on other developed country. Empirical Research also shows that there is potential for enhanced trade if unnecessary NTMs are abolished while others are mutual recognized across the countries, however, such removal and recognition depend on the political will in the countries [ Cadot & Gourdon (2016), Murina & Nicita (2017), Vanzetti *et al.* (2018)]. Research also

supports the argument that rise in NTMs can undermine the process of liberalization achieved so far [ Jensen *et al.* (2012), Evenett & Fritz (2015)].Recent research also supports the idea of mutual recognition, Chen & Mattoo (2008) describe it as necessary for deep integration. Korwatanasakul & Baek (2021), using an indicator of additional compliance as an alternative to non-tariff measures assessed the effects of NTMs on global value chains. With analysis of 19 industries from 30 countries, the study found that effect NTMs is much more than that of traditional tariffs and this negative is even worse for backward GVC participation. Cali & Montfaucon (2021) checked the competition effect of NTMs on the Indonesian exporting firms and found that by restricting import competition, these measures reduce the survival of firms in export markets as well as the intensive and extensive margins of their exports. Non-tariff measures have a more negative effect than import tariffs in most cases.

However, we also find the evidence of positive effects of NTMs in research [Murina & Nicita (2017), Henson & Humphrey (2010), Henson *et al.* (2011)]. We find some encouraging effects on trade also (Rindayati *et al.*, 2018), these effects are especially considerable when take into account the intensive margins of trade (Bao & Qiu, 2012).

#### **4.3 Studies on trade blocs and Pakistan**

We find a lot of literature in the favor of FTAs and regional trade blocs. Bagwell *et al.* (2003), Ossa (2011) argue that regional agreements are important for the economies to apply regulations with incentivizing the trading sectors, it helps coordinated efforts on application of standards across the respective region. WTO also defends RTAs with the argument that many countries which are unable to perform better in a multilateral setting can do much if they are tied with some regional economies in the form of trade agreements (WTO, 2011). In the same report it is also argued that countries can achieve

the goals of deep integration better in a regional setting. Here in this section, we have included some selected studies on FTAs, especially those which are related to Pakistan. Gravity model analysis is widely used to predict trade creation and trade diversion in Pakistan and overall in South Asia. Khan & Mahmood (2017) analyzed the trade diversion and creation effects of Pakistan's FTAs. The study found that within SAFTA, Pakistan's exports rose by 6.4% during the period 2007 to 2015. While for the same period trade grew by 13.8% in case of Malaysia, 18.04% in case of China, and around 3.6% in case of Sri Lanka. Delgado (2007), Rahman *et al.* (2006), Tumbarello (2006), Hirantha (2004), Rahman (2003), Hassan (2001) and others have found mixed results of creation-diversion effects due to SAFTA. Using partial equilibrium analysis Raihan (2011), World-Bank (2006), Pursell (2004), DeRosa & Govindan (1996) have shown that welfare gains can be realized through enhanced regional trade in food sectors. Hirantha (2004) shows, on the basis of gravity model estimations, that trade enhances under SAPTA with no trade diversion effects. Nufile *et al.* (2013) argues that in SAPTA and under SAFTA, a very small number of tariff lines are covered. While Gul & Yasin (2011) conclude that most of the countries in region are in the same stage of development with similar production methods and product mix, so the possibilities of increased trade are very little. In the same way studies based on CGE models have analyzed economy wide welfare effects for regional economies. Raihan & Razzaque (2007), Bandara & Yu (2003), Pigato (1997) used GTAP database and model with different versions of ever evolving dataset. Studies show that if SAFTA is fully implemented, India and Sri Lanka will gain the higher while Bangladesh will gain the least but without any loss.

Mahmood *et al.* (2017) investigated the trade cost of Pakistan with its major trading partners, study also reach the conclusion that improvements in port infrastructure and

discouraging the red tape at international borders can considerably decrease the trade cost, further trade facilitation agreements with partner countries can also help make the trade easier. (Akram *et al.*, 2020) explored the possible inclusion of Pakistan in RCEP agreement. Using trade complementarity and revealed comparative advantage indicators, study found that future demand of current RCEP members matches with future supply of Pakistani industries. Based on these indices, trade between Pakistan and RCEP is expected to grow by a factor of 1.8.

Taneja (2007) studied the bilateral trade between India and Pakistan and found an excellent potential. Study recorded great concerns about NTMs from business representatives of both countries. Indians find a restrictive regime in terms of NTMs faced by their produces crossing the border with a cumbersome sensitive list. While Pakistani imports face discriminatory imposition of barriers from the India side. Broad categories of NTMs include SPS, TBT, Financial restraints, and custom procedural measures. ADB-FCCI (2010) focused on the rise in NTMs and highlighted that pace of integration through SAFTA has made some progress in terms of tariff reduction, however members are increasingly using NTMs with real negative effects thus overweighing the positive effects of tariff reduction.

Rahman (2011) is of the view that presence of high level of NTMs is the major challenge in South Asian integration. Study points out that regional cooperation, in these days, heavily depends on supply chains and vertical integration that is again facing a challenge in the form of NTMs. Study found that issue of NTMs is one of those issues which are given the least importance. Mukherjee (2012) builds argument on the slow process of multilateralism under Doha Round and stresses that South Asian countries need to focus on those commodities which entail comparative advantage while giving equal importance to trade cost reductions. Akhter & Ghani (2010)

concludes that SAARC bloc have trade creating effects for both member and nonmember countries, study recommends that major economies of the region must negotiate trade restrictions seriously.

Khan *et al.* (2018) investigated the free trade agreement between Pakistan and Malaysia, the study employed GTAP model to check the impact the tariff reductions on both sides. Study concludes that if Pakistan and Malaysia grant the equal concessions to each other what they are granting to other trading partners then both can achieve in terms of trade, GDP, welfare, and household level income.

Hussain & Shah (2017) employed GTAP model to analyze the effect of FTA for respective economies of Pakistan and China. Analyzing both aggregate and sector level results, study argues that Pakistan's benefits are much little than China. However, there is an export potential in leading exporting sectors of Pakistan.

Akram (2008) investigated the trade potential of Pakistan with more than 150 countries. Study shows that Pakistan has great potential for trade with SAARC and ASEAN countries. Similarly, Qamar (2005) is of the view that Pakistan can improve its balance of trade and can reduce its production cost by importing cheaper raw materials from the regional economies instead of importing costly material from distant partners.

TBT measures have greatly affected the textile and other sectors in Pakistan. Shah *et al.* (2014) tested the impacts of TBT measures on the production and exports of different industries. Study argue that such measures have proven instrumental for improving the competitiveness and technology in the textile sector of Pakistan. Nakhoda (2017) analyzed the effects of NTMs for various exporting sectors of Pakistan. Study concludes that cost raising effects are much higher for smaller firms.

Vanzetti *et al.* (2018) is of the view that ASEAN countries have substantially reduced the levels of tariff, and these economies have gained a lot, but little effort is seen on the



front of NTMs. Study projects that if RCEP countries agree on mutual recognition of standards, then their net welfare can increase by more than 5 billion dollars.

Fukase & Martin (1999) argued that ASEAN bloc can increase trade, size of the economy and welfare in the regional economies by fostering free trade, boosting the small business through incentivized trade and can attract the foreign investment in the region. It is also argued that regionalism can result into multilateralism as it gets matured. Brenton *et al.* (1999) is of the view that regional blocs have trade enhancing effects. Lee & Shin (2006) found that trade blocs in East Asia and Pacific have trade increasing effects while little diversion of trade is recorded. This argument is also supported by Clarete *et al.* (2003), which argues that FTAs in ASEAN region can not only increase trade in the region but internationally also.

Acharya (2011) analyzed potential trade trends in seventeen FTAs, results for ASEAN indicate that due to consolidated agreement on trade restrictions, within bloc trade can increase up to 136%.

Bao & Qiu (2012) analyzed the effects of SPS and TBT measures applied by China, study shows that SPS measures have trade diversion effects for agriculture sector while TBT measures have increased trade in manufacturing sector.

## CHAPTER 5

### THEORETICAL FRAMEWORK

#### 5.1 Introduction

This chapter provides the theoretical framework used in this study. The relationship of non-tariff measures with trade volume and prices is well explained by traditional theories. Ricardian model predicts that countries will specialize in the goods in which they have comparative advantage due to technology or productivity (Ricardo 1817). Krugman (1980) identifies countries trade differentials because of consumer preferences for variety. In the spirit of this model only those firms will remain and of course export which are cost efficient and can bear extra production expenses whether through regulation are other means. In this setting with increase in costs due to NTM application number of exporters and hence the volume of exports will decrease, however if we add consumer preferences then this effect may be positive, negative, or neutral. In the following Figure (5-1) transmission channel of NTMs is defined, then gravity equation is elaborated which is building block of model and methodology used in this study. Only two relevant extensions of gravity equations are given in detail. In fact Anderson (1979) was the first study to lay down the theoretical foundations of gravity model, this is explained first and then monopolistic competition model augmenting the gravity equation is elaborated.

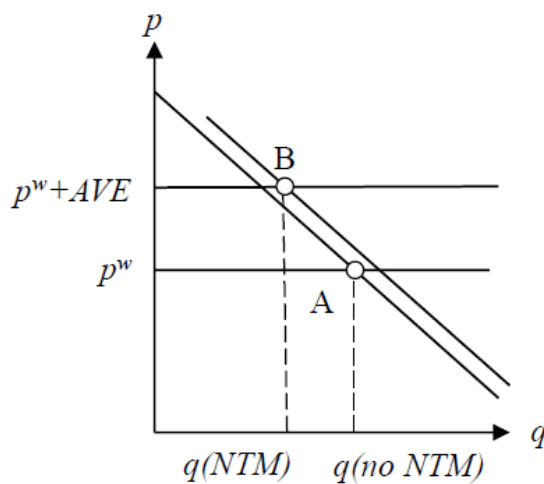
#### 5.2 Transmission Channel of Non-Tariff Measures

Using traditional import demand framework, in the following figure transmission of NTM effects over import prices and volumes is illustrated, price gap is also defined which is used to estimate NTMs. In both panel world prices are given on vertical axis while imports are measured on horizontal axis. pw stands for world prices and AVE is

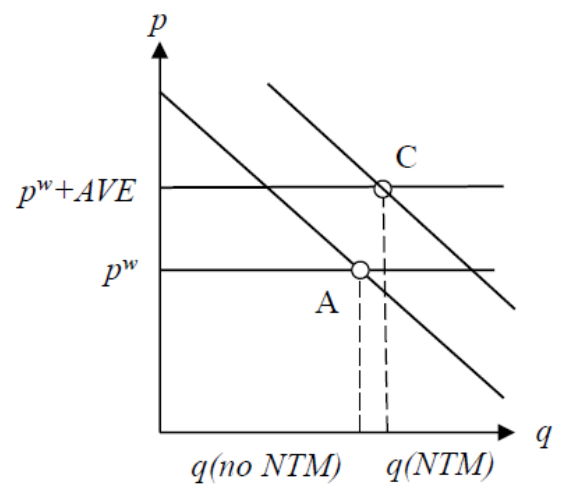
NTM, represented in ad-valorem equivalent of tariff terms. Two panels show different effects for the markets with different demand preferences. For both panels price increasing effect of NTM is same, but quantity effect is different. In weak effect case consumer is just looking at the prices, so the quality effect is lesser and hence outward shift in demand curve is of less magnitude. So, the price raising effect of NTM with decreased imports is witnessed, while in panel b, consumer preferences are such that they are preferring quality over price, that is why shift in demand curve is much more than that of panel a. Despite increased price, quantity imported has increased, we can call it strong effect of NTM.

The objective of this chapter is to calculate these AVEs, which is basically the gap between ex-ante price and ex-post price i.e., the difference of  $p^w$  and  $p^w + AVE$ . Variation of quantity imported is also important but is of no use as far as the estimation of AVEs is concerned, however it can be used to analyze the trade diversion and trade creation effects of NTMs.

Case a: Weak market-creating effect



Case b: Strong market-creating effect



Source: (Cadot *et al.*, 2018)

**Figure 5-1:** Weak and strong market creating effects of NTMs

### 5.3 Gravity model

With solid theoretical and empirical base gravity model is one of those models which are used the most in studying the international trade. It is appealing and takes its base from Newton's law of gravity which elaborates the attraction between two universal objects directly related to their masses while inversely related to their distance. Using the same analogy economists defined trade flows between two countries as positively related to their economic size while inversely related to the geographic distance between them. Later, researchers also added variables in the equation that were theoretically facilitating the trade flows or creating the frictions in bilateral trade.

Tinbergen (1962) first time used gravity relationship to examine the effects of trade policy. Empirical appeal of this and further studies encouraged academia to pursue the course with development of theoretical basis of this framework. Tinbergen defined the trade flow between two countries as directly related to their economy sizes while inversely related to the geographic distance between them. It assumes no trade frictions and trade cost is only depicted in the form of distance. This version of gravity model is depicted like this:

$$X_{ij} = \frac{Y_i Y_j}{D_{ij}} \quad (5.1)$$

Here  $X_{ij}$  shows bilateral exports or imports between country  $i$  and  $j$ ,  $Y_i Y_j$  are the respective national incomes of these countries while  $D_{ij}$  is the distance between them.

Trade flow is measured in US dollars while distance is measured in 1000 nautical miles.

Anderson (1979) is acknowledged as first study to apply a gravity model with theoretical underpinnings. Paper shows that with homothetic utility, market clearing situation and where preferences of representative consumer are defined by Cobb-Douglas function, flow of bilateral trade can be defined as:

$$X_{ij} = \frac{Y_i Y_j}{Y_w} \quad (5.2)$$

Here  $X_{ij}$  shows bilateral exports or imports between country  $i$  and  $j$ ,  $Y_i Y_j$  is the respective national income of these countries while  $Y_w$  is the global income. Above equation does not include trade costs, and it is assumed that there are no frictions. Anderson (1979) introduced frictions into the gravity model. Paper used demand framework with Armington model of constant elasticity of substitution. Armington measures the degree of substitution between local and imported varieties. Anderson introduced trade costs encompassing over multi countries and added them in the form of CES aggregation. Equation becomes like this:

$$X_{ij} = \frac{Y_i Y_j}{Y_w} (r_{ij})^{1-\alpha} \left[ \sum_k (r_{ik})^{1-\alpha} \frac{Y_k}{Y_w} \right]^{-1} \quad (5.3)$$

Above equation is different from Anderson's first equation by the second term on right hand side. In fact, this term defines the gap between frictionless trade and actual trade. So, this is the cost which determines the trade flow between two countries. This and other specifications of gravity equation are used in estimating AVEs of NTMs in several studies [Kee *et al.* (2009), Cadot & Gourdon (2016), Cadot *et al.* (2018)]

Now we turn to gravity equation defined in monopolistic competition framework, which is basically used as guiding tool to derive the methodology followed in this study.

#### 5.4 Monopolistic Competition

Armington based gravity framework provides theoretical underpinnings using demand side. Krugman (1980), and Bergstrand (1989) defines gravity equation in monopolistic competition framework and define the supply side. Under this approach it is assumed that each firm is identical but provides its own variety and works under heterogenous productivity levels. Consumers love the variety (Dixit-Stiglitz preferences) and it is the building block of this model. Krugman has also employed CES aggregation over

different varieties of goods. For entry, cost is fixed and hence increasing returns to scale exist. With these specifications gravity equation is explained like this:

$$X_{ij} = B_0 p_i^{-\sigma} \left(\frac{t_{ij}}{P_j}\right)^{1-\sigma} Y_i Y_j \quad (5.4)$$

Here again left-hand side represents the trade flow between country (i) and country (j), while the last term of right-hand side is their respective national income. However, there are two terms representing price,  $p_i^{-\sigma}$  shows exporter's extra cost, while  $P_j^{1-\sigma}$  shows importers extra cost. These prices also include costs due to trade barriers, hence equation suggests that trade flows are inversely related to these barriers (Chaney, 2008). By now we can link the dots and go ahead with the model and methodology constructed upon this theoretical framework and used in this study. Gravity model is the corner stone in measuring the cost associated with bilateral trade. However, it is the monopolistic competition version of the model which guides us to augment NTMs in the gravity equation and build the idea of mutual recognition of standards. The argument behind this idea is to ascertain that if two countries are willing to accept the standards of each other then they can reduce the trade cost, and hence through gravity framework, friction will be reduced and trade will be increased. The model and methodology based upon this argument is elaborated in next chapter.

## CHAPTER 6

### MODELLING AND METHODOLOGY

This chapter consists of model and methodology. For this study, we have used two models. First one is econometric, based on monopolistic competition model following cadet et.al 2018. Using this model, we have estimated AVEs of NTMs for all the countries included in the study. Pakistan is taken as home country while 20 other countries are included in the sample. Selection of countries is based on FTAs and RTAs signed by Pakistan, while major trading partners are also included. Being largest trade bloc, RCEP is also included.

We are using two step methodologies, firstly, mathematical, and econometric is developed to estimate the Ad-Valorem Equivalents of NTMs, and it is based on the monopolistic competition model extended by Cadot & Gourdon (2016). We are checking the hypothesis of mutual recognition of standards, and accordingly methodology is developed to estimate AVEs with and without mutual recognition. In second stage MyGTAP model of CGE family is developed to gauge the economy wide and welfare effects if standards are mutually recognized across the countries. AVEs estimated at first stage through econometric estimations are incorporated into MyGTAP model. By using the methodology of Minor & Walmsley (2013), social accounting matrix of Pakistan is incorporated into the model to estimate the household level effects. In rest of the chapter, first monopolistic competition model is discussed, followed by econometric model, then MyGTAP model is explained, by the end of the chapter aggregation scheme is elaborated.

## 6.1 Model

Quantitative assessment of NTMs has been limited due to data and measurement of NTMs. Some studies have used incidence measures to show the effect of NTMs on trade. However, these provide no theoretical background and provide very limited information (Niu, 2018). For the first time, Kee *et al.* (2009) attempted to provide a quantitative measurement of NTMs, by using robust trade theories. The study uses quantity-based approach to estimate the coefficients of NTMs and then with import demand elasticities these coefficients are transformed into AVEs. One problem with quantity-based approach is the usage of import demand elasticities to retrieve AVEs. For the estimation of elasticities, we need a bulk of data and rigorous econometric estimation, so the results can vary from research to research and hence the AVEs will also vary. Second problem is the nature of elasticity values, for example if elasticity is equal to one then a change in NTM will not affect the trade volume (Cadot *et al.*, 2018). Following Cadot & Gourdon (2016) we have used Price Gap approach, which estimates the difference of prices when NTMs are applied.

As adopted by Cadot & Gourdon (2016), assuming a monopolistic competition model where firms have productivity level  $\varphi$ . Subscripts  $o, d, k$  represent origin (exporting country), destination (importing country) and product respectively. Let  $Q_{dk}$  be demand for exports by country  $d$  for  $k$ . Let  $P_{dk}$  is price index of market for  $d$ ,  $\sigma$  is the elasticity of substitution between varieties,  $w_o$  is the marginal cost which exhibits supply in the exporting country prior to productivity adjustment. With this adjustment the marginal cost will be  $\frac{w_o}{\varphi}$ .  $\tau_{odk}$  is fixed trade cost combining traditional trade costs like distance etc, and compliance cost of NTMs imposed by importing country  $d$  on  $k$ .  $e_{od}$  is the exchange rate between importer and exporter countries.



Let  $q_d(\varphi)$  and  $p_d(\varphi)$  be quantity and FOB price charged by a firm in destination country. According to Melitz (2003), profits obtained by exports to  $d$  are:

$$\begin{aligned}\pi_d(\varphi) &= \left[ e_{od} p_d(\varphi) - \frac{w_o}{\varphi} \right] q_d(\varphi) \\ &= \left[ e_{od} p_d(\varphi) - \frac{w_o}{\varphi} \right] Q_{dk} P_{dk}^{1-\sigma} [\tau_{od} p_d(\varphi)]^{-\sigma}\end{aligned}\quad (6.1)$$

Which gives a FOB pricing rule known as Mill Pricing, which means that there are no price differentials among importers:

$$p_{ok}^{FOB}(\varphi) = \left( \frac{\sigma}{\sigma-1} \right) \frac{w_o}{\varphi} \quad (6.2)$$

The matching CIF price will be:

$$p_{odk}^{CIF}(\varphi) = \tau_{od} \left( \frac{\sigma}{\sigma-1} \right) \frac{w_o}{\varphi} \quad (6.3)$$

Let  $M_o$  be the firms with productivity level above  $\varphi^*$  in  $o$ , and let  $\mu_o(\varphi)$  be the distribution of firms' productivity. Using CES aggregator we have:

$$P_{odk}^{CIF} = \left\{ \int_0^\infty [p_{odk}^{CIF}(\varphi)]^{1-\sigma} M_o \mu_o(\varphi) d\varphi \right\}^{\frac{1}{1-\sigma}} \quad (6.4)$$

This equation yields unit value of import which is given in CEPII data being used in this study, it can be rewritten in terms of a aggregator  $\tilde{\varphi}_o$ :

$$P_{odk}^{CIF} = M_o^{\frac{1}{1-\sigma}} p(\tilde{\varphi}_o) = M_o^{\frac{1}{1-\sigma}} \tau_{odk} \left( \frac{\sigma}{\sigma-1} \right) \frac{w_o}{\tilde{\varphi}_o} \quad (6.5)$$

$$\text{Where } \tilde{\varphi}_o = \left[ \int_0^\infty \varphi^{1-\sigma} \mu_o(\varphi) d\varphi \right]^{\frac{1}{\sigma-1}}$$

Finally, let  $n_{dk}$  be an indicator of the presence of an NTM on product  $k$  in destination market  $d$ ,  $t_{odk}$  be the ad-valorem tariff faced by product  $k$  from origin  $o$  on destination market  $d$ , and

$$\tau_{odk} = \exp[\beta_1 n_{dk} + \beta_2 \ln(1 + t_{odk}) + x_{od} \gamma] \quad (6.6)$$

Under mill pricing rule firms pass through the entire compliance cost to the importer using CIF unit values.

### 6.1.1 Econometric Model

In the previous section Equation (6) gives the ad-valorem tariff faced by product  $k$  when it is exported from  $o$  to  $d$ . This expression after linearization can be used to estimate AVEs of NTMs using fixed effects. We will use the approach in which prices of some goods in some countries face the application of NTMs. Let  $v_{odk}$  be the unit value of product  $p$  imported from country  $o$  to country  $d$ , this is the empirical part of  $P_{odk}^{CIF}$ . Let subscripts A, B and other represent SPS, TBT and Other NTMs respectively, and  $n_{dk}$  is the number of specific NTM type applied on a specific product.

Finally adding bilateral and gravity variables like distance between partners, common language and common border and exporter characteristics<sup>9</sup> like GDP per capita, the basic estimation equation with regards to (6.5) and (6.6) will be:

$$\begin{aligned} \ln v_{odk} = & \delta_o + \beta_1^A n_{dk}^A + \beta_2^B n_{dk}^B + \beta_3^{other} n_{dk}^{other} + \beta_4 \ln(1 + \tau_{odk}) + \beta_5 Contig_{od} \\ & + \beta_6 LO + \beta_7 LE + \beta_8 \ln(Dist) + \beta_9 \ln(GDP.capita) + u_{odk} \end{aligned} \quad (6.7)$$

NTMs affect each country differently. Even if the same set of NTMs is applied by an importer upon all suppliers, the results can be heterogenous. Countries have distinct characteristics and different structure to implement the regulatory requirements imposed through NTM notifications. For a larger importer compliance cost will be less, in the same way a large country with better infrastructure and larger export base will have to bear less compliance cost. That means, in the presence of an NTM a country with larger export share in the world market for that specific product will be better off compared with a country which has a smaller export share. In a nutshell, effect of NTM in terms of compliance cost for a specific country will depend on its relative import and

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<sup>9</sup> In standard gravity equation economy wide variables of both importer and exporter are used, but here we are estimating sector specific AVEs so importer will remain the same throughout the data set pertaining to a given sector, so only exporter characteristics are included.

export share in the world market. We will use this idea to calculate bilateral AVEs between any pair of countries. So, we introduce interaction of import share and export share with each type of NTMs into our model and it will become:

$$\begin{aligned}
lnv_{odk} = & \delta_o + \beta_1^A n_{dk}^A + \beta_2^B n_{dk}^B + \beta_3^{other} n_{dk}^{other} + \beta_4 \ln(1 + \tau_{odk}) + \beta_5 Contig_{od} + \\
& \beta_6 LO + \beta_7 LE + \beta_8 \ln(Dist) + \beta_9 \ln(GDP. capita) + \beta_{10} ims_{dk} \cdot n_{dk}^A + \\
& \beta_{11} ims_{dk} \cdot n_{dk}^B + \beta_{12} ims_{dk} \cdot n_{dk}^{other} + \beta_{13} eks_{ok} \cdot n_{dk}^A + \beta_{14} eks_{ok} \cdot n_{dk}^B + \\
& \beta_{15} eks_{ok} \cdot n_{dk}^{other} + u_{odk} \quad (6.8)
\end{aligned}$$

Equation (6.8) will be estimated for each country and each sector<sup>10</sup> separately and hence our results will show the average AVEs applied to a specific sector by specific importing country. Coefficients of direct and interactive terms will be used through following formulae to retrieve bilateral AVEs.

$$AVE_j^A = \exp(\beta_1^A + \overline{ims}_{dk} \beta_{10} + \overline{eks}_{ok} \beta_{13}) - 1 \quad (6.9)$$

$$AVE_j^B = \exp(\beta_2^B + \overline{ims}_{dk} \beta_{11} + \overline{eks}_{ok} \beta_{14}) - 1 \quad (6.10)$$

$$AVE_j^{other} = \exp(\beta_3^{other} + \overline{ims}_{dk} \beta_{12} + \overline{eks}_{ok} \beta_{15}) - 1 \quad (6.11)$$

Here by j we mean a specific sector,  $\overline{ims}_{dk}$  and  $\overline{eks}_{ok}$  show import share and export share averaged over a specific sector. Interactive terms of import share, export share and specific NTMs are expected to have negative signs so in above expressions the countries with higher export shares will face smaller values of AVEs as compared with countries that have lower export shares. In the same way for an importing country with higher import share respective suppliers will have to face lesser degree of AVEs and vice versa.

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<sup>10</sup> GTAP10a sectors are used, detail is given in the coming sections.

### 6.1.2 Mutual Recognition of standards

By mutual recognition of standards, we mean that any two countries recognize the standards prevailing in each country, and if importers or exporters meet the standards of any country then they are allowed to trade across the borders within these two countries. By this concession cost can be reduced and trade can enhance. Following Cadot & Gourdon (2016) we have incorporated it through interactive dummies into our model and equation (6.8) will become:

$$\begin{aligned}
 \ln v_{odk} = & \delta_o + \beta_1^A n_{dk}^A + \beta_2^B n_{dk}^B + \beta_3^{other} n_{dk}^{other} + \beta_4 \ln(1 + \tau_{odk}) + \beta_5 Contig_{od} \\
 & + \beta_6 LO + \beta_7 LE + \beta_8 \ln(Dist) + \beta_9 \ln(GDP.capita) \\
 & + \beta_{10} ims_{dk} \cdot n_{dk}^A + \beta_{11} ims_{dk} \cdot n_{dk}^B + \beta_{12} ims_{dk} \cdot n_{dk}^{other} \\
 & + \beta_{13} eks_{ok} \cdot n_{dk}^A + \beta_{14} eks_{ok} \cdot n_{dk}^B + \beta_{15} eks_{ok} \cdot n_{dk}^{other} + \beta_{16}^A \cdot RTA \cdot n_{dk}^A \\
 & + \beta_{17}^B \cdot RTA \cdot n_{dk}^B + \beta_{18}^{other} \cdot RTA \cdot n_{dk}^{other} + u_{odk}
 \end{aligned} \tag{6.12}$$

Here RTA is a dummy variable, when importer and exporter are part of any RTA then its value is equal to 1, and 0 otherwise. We have estimated equation (9) and (13) separately for each sector and each country and calculated AVEs without MR and AVEs with MR. The methodology adopted to capture the effects of Mutual Recognition on AVEs of NTMs is provides the results in case of any specific trading partnership. The results obtained through this equation provide the average effect for all trading partners of a specific RTA, however these values may vary due to respective import and export shares of each country. Accordingly in situations where bilateral FTA exists, the results are depicting the direct effects on both countries while in case of multilateral agreements, effects are estimated for each country.

## **6.2 Interpretation of AVEs**

Interpretation of AVEs is similar to that of tariff: AVEs represent the additional costs that the presence of NTMs has on international trade. Kee, et al. (2009), in their pioneer paper on AVEs investigated and showed that AVEs of NTMs and tariffs are substitutes of each other and countries resort to NTMs when they lower tariff rates. Similarly, Kee and Nicita (2016) also drew the same conclusion that tariffs and AVEs of NTMs are same in their nature. The effect of NTMs is expected to be heterogeneous. Primarily, the impact of NTMs differs across countries because countries make use of NTMs differently. However, distinct from tariffs, the impact of NTMs on the costs of trade generally varies even in the case of identical NTMs. In practice, the effect of specific NTMs on trade may be different across importers because of a host of factors which include implementation methods, stringency, and enforcement mechanisms. The impact of a specific NTM can also be different across exporters because compliance costs are generally different.

## **6.3 Computable general equilibrium (CGE) model**

CGE is a static economic model, based on input-output tables, which assumes equilibria in all sectors of the economy. Models of CGE family are mainly used for analyzing the effects due to changes in government policies. This analysis gives information about economy wide indicators, sectoral and household effects and most importantly welfare effects. Using standard economic theory these models take households as utility maximizers and firms as profit maximizers. A lot number of equations determine economy wide equilibrium resulting in elasticities as its output which can be further used to check the effects of shocks due to policy change. CGE models are consistent across sectors, provide inter-linkages of sectors and economies. In a nutshell CGE models are constructed like a net, where every sting is connected to each other, and if

one of these is pulled the effect can be gauged on rest of the stings contained. In the same way a shock given to any sector or factor, or tariffs can proliferate a change throughout the framework. This quality is unique to CGE models which makes it useful for studying the economy wide effects of such shock. (Gohin 1996, Adam et al 1998). Global CGE model can be constructed using IO tables of multiple regions and may be used for analyzing the effects of policy change in one region over the indicators of other regions. Global trade analysis project (GTAP) is one such model that provides model and data supporting standard CGE model.

### **6.3.1 GTAP**

Global Trade Analysis Project is a global networking of researchers and GTAP model is the basic tool of analysis. The main contribution of this network is the GTAP dataset, comprising real economic data. Data is developed based on Input Output tables arranged for all regions included in the dataset. GTAP model operates with one regional household and its utility maximizing function. Regional expenditures are allocated to private expenditure, government expenditure and savings. Regional households sell commodities to the firms and earn in turn. Firms use these commodities with other intermediate goods to produce final goods. Every version of GTAP data refers to a specific base year and is built upon IO tables of all regions included in the dataset, these IO tables provide economy related specific information. Bilateral data, protection and taxation data is gained from different international sources.

### **6.3.2 MyGTAP Model**

For better economic analysis and household income analysis MyGTAP model is used which is a more sophisticated form of standard GTAP model. In MyGTAP regional household is fragmented into government consumer and multiple private households.

Using Minor & Walmsley (2013) we have developed our model used in this study. When separating regional household, separate income and expenditure are allocated to the government, after consuming on goods and services, leftover is called government savings. Taxes and foreign aid are the main sources of government income. Private household earns income from multiple sources which include factor earnings, remittances, transfer payments. It is assumed that expenditures are done in Linear Expenditure System (LES) setting.

### 6.3.3 Basic relationships in MyGTAP model

In this section some important and basic relationships of MyGTAP are explained.

#### Household income and consumption

GTAP model only explains the transfer flows from single source to the regional household however in MyGTAP number of these channel is many, including remittances, rent on capital, transfers between households, and from and to the government. All of these channels collectively determine the disposable income of household. Household income is depicted in the following equation.

$$\begin{aligned}
 hinc(h,r) = & [sum(i, endw, c omm, evoh(i, h, r)) - vdeph(h, r)] + \\
 & [remih(h, r) - remoh(h, r)] + [fyih(h, r) - fyoh(h, r) + \\
 & [sum(k, hhld, trnh(k, j, r) - trnh(h, k, r) + trng(h, r)] \quad (6.13)
 \end{aligned}$$

Term on left hand side shows household income of (h) in (r), here r is a specific region. The first term on right hand side shows income from endowments net of depreciation. Second term is difference of inflows and outflows of remittances. The next terms is the net income acquired in the form of rent on capital. In the same way next term defines net gain after receiving and paying to other households in the same region. The last term depicts transfers from government to the household. This equation is used to check the impacts of policy shocks relating to the household income.

Household gets income from the sources mentioned above. Now this income is divided among household consumption and savings. A Cobb-Douglas function is employed to maximize the utility of concerned household. Following relationship defines household consumption:

$$income(r) * u(r) = privexp(r) * up(r) + save(r) * [qsave(r) - pop(r)]$$

(6.14)

In above equation left hand side shows income in region (r),  $u(r)$  is the utility function, while  $up(r)$  is the expenditure function with constant share of income and consumption. Right hand side shows that in private expenditure also contains the savings in region r net of population growth.

### **Government Income and Consumption**

As discussed earlier in MyGTAP model regional household is segregated among single government and multiple private households. Government gets sources from various sources including taxes and foreign inflows of aid. Government income accounting equation is given below.

$$ginc(r) = [aidi(r) - aido(r)] + [ttax(r) - sum(h, hhld, rng(h, r))]$$

(6.15)

Left hand side of the equation depicts government income in region r, while on right hand side different components of government income are defined. The first term of right-hand side elaborates foreign aid inflows net of aid outflows. Second term shows government tax collection less of government payments to households in region r. Like circular flow government is making payments to the households, as we saw in previous subsection while at the same time it is collecting taxes from private households.



### Savings in region (r)

Savings in region r is combination of household savings and government savings.

This is explained in the following relationship:

$$save(r) * qsave(r) = Sav\_gov(r) * qgsave(r) + sum(h, hhld, sav - hhld(h, r) * qhsave(h, r)) \quad (6.16)$$

On left hand side first term indicates regional savings in region (r), while second term 'qsave(r) is its proportional change. While on the right-hand side government savings are given as multiple of savings and its percentage change. The second term depicts private savings, again it is a multiple of savings and its percentage change. This equation is also used to examine the policy effects on savings in region (r).

### Remittances

In MyGTAP model, remittances are introduced as inflows and outflows. These are part of private income. Following equation further defines the remittances:

$$remoh(h, r) = sum(i, endw - comm, shrlab(i, h, r) * psh(i, h, r) + qoh(i, h, r)) + sremoh(h, r) + remavo \quad (6.17)$$

Above equation depicts remittances outflow which is given on left hand side. On right hand side first term is the sum of labor endowments and change in labor wages, psh(I, h, r) is the change rate in wage. Second terms shows change in endowments occupied by the labor, third term is a shift factor used to capture outflow rate, while last term is the overall average rate of outflows.

In the next equation remittances inflows are explained.

$$remih(h, r) = remavi + (sremih(h, r)) \quad (6.18)$$

Left hand side of the equation shows remittances inflows for household (h) in region r, first term on right hand side is the average rate of inflows, while the last term is the overall average rate of inflow of remittances.

The model can only be solved if remittances balance equation is incorporated into the model closure. Hence for equilibrium remittances inflows should equal to the remittances outflows. From the above two equations the following equilibrium condition is derived:

$$\begin{aligned} & \text{sum}(h, \text{hhld}, \text{sum}(r, \text{reg}, \text{regi}^{(h,r)} * \text{remih}(h, r))) = \\ & \text{sum}(h, \text{hhld}, \text{sum}(r, \text{reg}, \text{remo}^{(h,r)} * \text{remoh}(h, r))) \quad (6.19) \end{aligned}$$

On the left-hand side aggregate change in remittances inflows of all private households in region r is given. While aggregate change in remittances outflows by all private households is given on the right-hand side. This equation is also part of the model closure.

### **Factor Income transfers**

In MyGTAP transfer of factor wages among regions is allowed and it is an extra source of income for private households. First, we elaborate the income outflows in following equation:

$$\begin{aligned} \text{fyoh}(h, r) = & \left[ \text{sum}(i, \text{endw\_c omm}, \text{shrcap}(i, h, r)) \right] + \text{qoh}(i, h, r) + \text{sfyoh}(h, r) + \\ & \text{fyavo} \quad (6.20) \end{aligned}$$

On the left-hand side change in income outflows is given, the income outflow of household h in region r. on the right-hand side first term is the sum of changes in endowments and the share of capital (i) in total capital owned by household (r), while multiplying term is the rate of change of supply price for endowments. Second term is the change rate of endowment supplied by household. Third term is a shift factor, while the last term depicts the overall change in income outflows. Equation for income inflows is given below:

$$\text{fyih} = \text{fyavi} + \text{sfyih}(h, r) \quad (6.21)$$

Income inflows are mapped on left hand side while right hand side explains the channels of this inflow. First term on right hand side is the rate of change in inflows to household (h), while last term is again a shift factor for change in inflows. Like remittances income inflows and income outflows should equate to satisfy the general equilibrium nature of the model. Both should equate for the final solution of the model. So we allow adjustments so that both can equate. Equilibrium condition is depicted through following equation:

$$\begin{aligned} \text{sum}(h, \text{hhld}, \text{sum}(r, \text{reg}, \text{fyi}))) &= \text{sum}(h, \text{hhld}, \text{sum}(r, \text{reg}, \text{fyo}(h, r) * \\ &\text{fyoh}(h, r))) \end{aligned} \quad (6.22)$$

Above equation is derived with the help of inflow and outflow equations and it is part of the model closure also.

### **Foreign Aid**

As implied by the government income and consumption section, foreign aid is a part of government income. Following equation depicts foreign aid outflow for the government in region (r):

$$\text{aidout}(r) = \text{gincome}(r) + \text{saidout}(r) + \text{aidavo} \quad (6.23)$$

On the left-hand side shows the outflow of aid. While first term on right hand side is the change in government income, second term is the shift factor which corresponds to the exogenous shocks while last term is the overall change in foreign aid outflow. Likewise we have the expression for foreign aid inflow, which is given in the following:

$$\text{aidin}(r) = \text{saidin}(r) + \text{aidavi} \quad (6.24)$$

Foreign aid inflow is given on the left-hand side while first term on right hand side depicts the shift factor which is prone to external shock and it determines the rate of change in inflows, while last term is the overall average change in the foreign aid inflows. For general equilibrium purposes and solution of the model, foreign aid

inflows and outflows must equate to each other. Equilibrium condition is given in the following where inflows and outflows are equated:

$$sum(r, reg, aidi(r) * aidin(r)) = sum(r, reg, aido(r) * aidouy(r))$$

(6.25)

This equation is part of the model closure also.

### 6.3.4 Multiple households

In standard GTAP model there is only one regional household which includes the government also, all income goes to this single household while it is the source of all expenditures in the region. However, in MyGTAP model we can disaggregate this single household into government and multiple private households. For this we need some additional information on factors, endowments, types of households, their endowments, transfer of income among households and between government and households, remittances etc.

In MyGTAP it is assumed that household of each types supplies endowments to the firms which is used to produce final goods. So total supply of factors in a region is the aggregation of all individual supplies of endowments to the firms by all households. It is depicted in the following equation.

$$qo(i, r) = sum(h, hhld, shrevomh(i, h, r) * qoh(i, h, r))$$

(6.26)

Left hand side shows the aggregate supply in a specific region, while on right hand side share of single household in this aggregate supply, along with the rate of change is given.

$$semplh(i, h, r) = emplh(i, h, r) + empl(i, r) \quad (6.27)$$

Above equation depicts the condition where endowment of household can be affected in terms of unemployment due to some exogenous shock.

### **6.3.5 Model closure**

MyGTAP model closure assumes perfect competition in all markets and sectors with full mobility of capital and labor across sectors while natural resources are immobile. Government expenditure is a share of its income, tax is not replaced, and as tariff falls government income decreases. Income from foreign resources depends upon local prices like interest rate. As in standard economic theory investment is a function of rate of return. Total savings in a region are aggregate of household savings and government savings. Trade balance is assumed to be endogenous as is the case in standard GTAP.

## **6.4 Variables and Data**

In this study we are using two step approach, where in first step AVEs will be estimated through econometric techniques while in second step these AVEs will be incorporated in MyGTAP model to check the economy wide effects. Detail of data utilized for both steps is given below.

### **6.4.1 Data used for estimation of AVEs**

In this study to estimate AVEs one year i.e 2018 data of all variables is used. A very challenging task for price gap approach is the unavailability of import prices. Of course, each country collects data on a basket of goods which is primarily used for estimating inflation, it contains imported goods also but is not comparable across countries. Instead of relying on this heterogenous country data we have used CEPII data on Trade Unit Value and it will serve as empirical counterpart of CIF prices. One possible issue with this data may be presence of misquoted quantities, but as long as we are using econometric technique for estimation instead of simple calculation so these quantities will not bias our results.

For NTMs, 2018 data is taken from International Trade Centre (ITC) which is an upgraded version of data collected through a joint project of World Bank, UNCTAD and African Development Bank. This HS6 digit data reports every NTM notification of any type reported by around 150 countries to WTO. In our estimation equation variable  $n_{ak}$  is used for NTMs which is basically the number of NTMs faced by a specific HS6 digit product. Data on tariff, import shares and export shares is also taken from ITC, while data on country characteristics and gravity variables is taken from CEPII.

#### **6.4.2 Data used for CGE based simulations**

For this study two datasets are used i.e. GTAP 10a and Social Accounting Matrix for Pakistan 2013-14(IFPRI 2015). SAM for Pakistan 2013-14 gives detailed information on 16 types of household income. These households are categorized in respect of urban and rural, landowner and landless farmers, and then size of owned land is also considered. Further a mapping is developed for factors of production between SAM and GTAP10a.

#### **6.5 Aggregation scheme**

For current study we are using GTAP10a which contains data on 141 regions and 65 sectors. For keeping our analysis simplified and specific to our objectives we have developed a higher level of aggregation in which 65 sectors are condensed to 11. We have 21 countries, so we maintained these regions of interest separately, while all other regions are included in rest of world category. Aggregation scheme of sectors is given in the coming tables.

##### **6.5.1 Data Harmonization and GTAP sectors**

Another big problem was the fact that every dataset contains its own version of HS coding. These different versions were harmonized to 2017 version of World Customs

Organization, and then its concordance with GTAP classification was developed. Finally, we had more than 5300 products at HS6 digit level arranged into GTAP sectors as follows:

**Table 6-1:** Sectoral aggregation scheme<sup>11</sup>

<b>Aggregation</b>	<b>Number of products</b>	<b>GTAP Sectors</b>
Extractions	179	FRS, FSH, COA, OIL, GAS, OMN
Grain Crops	126	PDR, WHT, GRO, OSD, C B, PFB, OCR, PCR
Heavy Manufacturing	1531	P_C, CRP, NMM, I_S, NFM, ELE, OME, CHM, EEQ
Light Manufacturing	1987	LEA, LUM, PPP, FMP, MVH, OTN, OMF, BPH, RPP
Meat & Livestock	104	CTL, OAP, RMK, WOL, CMT, OMT
Processed Food	521	VOL, MIL, SGR, OFD, B T
Textile & Wearing Apparel	763	TEX, WAP
Vegetables & Fruits	108	V F
Utilities & Construction		ELY, GDT, WTR, CNS, AFS, RSA
Transport & Communication		TRD, OTP, WTP, ATP, CMN
Education & Health		EDU, HHT
Other Services		OFI, INS, OBS, ROS, OSG, DWE, WHS

Source: Aggregation scheme developed by authors

<sup>11</sup> Detail of GTAP sectors is given in the Appendix

### 6.5.2 Factors used in this study

In this study 12 types of factors of production are used as given in the following table.

**Table 6-2:** Description of factors of production

<b>Factor type</b>	<b>Code</b>
Labor small farmer	flab-s
Labor medium farmer	flab-m
Labor farm worker	flab-w
Labor non-farm low skilled	flab-l
Labor non-farm high skilled	flab-h
Land small	fnd-s
Land medium	fnd-m
Land large	fnd-l
Livestock	Fliv
Capital agriculture	fcap-a
Capital formal	fcap-f
Capital informal	fcap-i

Source: Social Accounting Matrix for Pakistan (2011)

### 6.5.3 Household scheme

As discussed earlier we have incorporated SAM-2011 in our MyGTAP model to check the effects on household income. These households are divided according to land, its ownership and province of residence. Urban households are divided into quartiles.



**Table 6-3:** Description of household types

<b>Household type</b>	<b>Description</b>
<b>Rural small farmer (1)</b>	Farmer with less than 12.5-acre land (Punjab)
<b>Rural small farmer (234)</b>	Farmer with less than 12.5-acre land (other provinces)
<b>Rural medium farmer (1)</b>	Farmer with greater than 12.5-acre land (Punjab)
<b>Rural medium farmer (234)</b>	Farmer with greater than 12.5-acre land (other provinces)
<b>Rural landless farmer (1)</b>	Farmer working on other's land (Punjab)
<b>Rural landless farmer (234)</b>	Farmer working on other's land (other provinces)
<b>Rural farm worker (1)</b>	Farmer working on wage
<b>Rural farm worker (234)</b>	Farmer working on wage
<b>Rural non-farmer (1)</b>	Non-Agriculture worker
<b>Rural non-farmer (2)</b>	Non-Agriculture worker
<b>Rural non-farmer (3)</b>	Non-Agriculture worker
<b>Rural non-farmer (4)</b>	Non-Agriculture worker
<b>Urban (1)</b>	Quartile 1
<b>Urban (2)</b>	Quartile 2
<b>Urban (3)</b>	Quartile 3
<b>Urban (4)</b>	Quartile 4

Source: Social Accounting Matrix for Pakistan (2011)

#### **6.5.4 Regional Aggregation**

We have taken our regions of interest separately while others regions are included in rest of Asia and rest of World categories. Detail of aggregation scheme is given in Table(6.4)<sup>12</sup>.

<sup>12</sup> Detail of all regions included in GTAP10a is given in the appendix

**Table 6-4:** Description of regions used in the study

<b>Regions</b>	<b>Description</b>
<b>Australia</b>	Australia
<b>Bangladesh</b>	Bangladesh
<b>Brunei</b>	Brunei
<b>China</b>	China
<b>Egypt</b>	Egypt
<b>EU-27</b>	EU-27
<b>GCC</b>	GCC
<b>India</b>	India
<b>Indonesia</b>	Indonesia
<b>Japan</b>	Japan
<b>Korea</b>	Korea
<b>Malaysia</b>	Malaysia
<b>New Zealand</b>	New Zealand
<b>Pakistan</b>	Pakistan
<b>Singapore</b>	Singapore
<b>Sri Lanka</b>	Sri Lanka
<b>Thailand</b>	Thailand
<b>Turkey</b>	Turkey
<b>USA</b>	USA
<b>Viet Nam</b>	Viet Nam
<b>UK</b>	UK
<b>D-8</b>	Bangladesh, Egypt, Indonesia, Malaysia, Pakistan, Turkey
<b>RCEP</b>	Australia, Brunei, China, Indonesia, Japan, Korea, Malaysia, New Zealand, Singapore, Thailand, Viet Nam
<b>SAFTA</b>	Bangladesh, India, Pakistan, Sri Lanka
<b>Rest of World</b>	remaining 120 regions

Source: Author's aggregation using GTAP10a

## **6.6 Estimations**

As discussed earlier, equation (6.8) is estimated for each sector and each country separately. In this way we had separate regression for each region and each sector, in total 168 regressions are run. Left hand side of the equation contains trade unit values for HS6 digit products imported from all sources where corresponding import value is greater than or equal to \$ 1000. So, in a certain sector level data set, importer remains

the same while exporters are heterogenous. Due to the nature of the data, estimations of this research could potentially encounter problems like heteroscedasticity and heterogeneity. To control the potential heteroskedasticity and ascertain that our econometric models do not violate the underlying assumptions of homoscedasticity, we have used robust standard errors. After the inclusion of robust standard errors, we saw significant changes in our estimates.

To control the heterogeneous differences among the selected sample of exporters for a specific importer estimation, we used the country fixed effects. Including these fixed effects ensure that the estimates obtained are unbiased due to the omission of country and time-specific invariant characteristics, such as geography, contiguity, distance, etc. Furthermore, the inclusion of country fixed effects can help substantiate the effects of changes within a country by controlling for the country-specific invariant characteristics. By using the above-mentioned techniques, we observe that the parameters obtained are more consistent as compared with non-inclusion of fixed effects. Cameron & Trivedi (2005) also suggest the inclusion of country and time specific fixed effects along with robust standard errors as an efficient strategy to control for such biases. This estimation gives us baseline results to retrieve AVEs of NTMs in a situation where mutual recognition does not exist. Then equation (6.12) is estimated in the same way and AVEs are again calculated using equations (6.9) to (6.11).

### **6.7 Incorporation of AVEs into MyGTAP and simulation design**

Estimates of equation (6.8) give us the baseline values of AVEs, that is the values of AVEs where no mutual recognition exists. These values are incorporated into the “Altertax” file of GTAP by adding the values of AVEs with the existing rates of tariffs, then model is updated for further simulations. For example, if on a specific sector 5% tariff is applied and the AVE value of applied NTMs is 45 then the overall protection

will be 50%. Once the model is updated with AVEs then AVE values at mutual recognition level are used to run the following simulations. In the above example where overall protection is 50%, if say mutual recognition level value of AVE is 30 then the new value of overall protection in presumed mutual recognition will be 35%, which is used to run the following simulations. This process is completed at bilateral and multi-lateral levels, as required. Table (6-5) elaborates the simulations design.

**Table 6-5:** Simulation Design

<b>Simulation</b>	<b>Description</b>
<b>Sim-1</b>	Economy wide and welfare effects on Pakistan if both China and Pakistan agree to recognize the standards mutually.
<b>Sim-2</b>	Economy wide and welfare effects on Pakistan if both EU-27 and Pakistan agree to recognize the standards mutually.
<b>Sim-3</b>	Economy wide and welfare effects on Pakistan if both GCC and Pakistan agree to recognize the standards mutually.
<b>Sim-4</b>	Economy wide and welfare effects on Pakistan if both Malaysia and Pakistan agree to recognize the standards mutually.
<b>Sim-5</b>	Economy wide and welfare effects on Pakistan if both Pakistan and Sri Lanka agree to recognize the standards mutually.
<b>Sim-6</b>	Economy wide and welfare effects on Pakistan if both Pakistan and Turkey agree to recognize the standards mutually.
<b>Sim-7</b>	Economy wide and welfare effects on Pakistan if both Pakistan and UK agree to recognize the standards mutually.
<b>Sim-8</b>	Economy wide and welfare effects on Pakistan if both Pakistan and USA agree to recognize the standards mutually.
<b>Sim-9</b>	Economy wide and welfare effects on Pakistan if D-8 countries agree to recognize the standards mutually.
<b>Sim-10</b>	Economy wide and welfare effects on Pakistan if SAFTA members agree to recognize the standards mutually.
<b>Sim-11</b>	Economy wide and welfare effects on Pakistan if RCEP countries agree to recognize the standards mutually.
<b>Sim-12</b>	Economy wide and welfare effects on Pakistan if RCEP members + Pakistan agree to recognize the standards mutually.

## CHAPTER 7

### RESULTS AND DISCUSSION

This study utilizes two different models and methodologies to estimate the effects of non-tariff measures on trade, economy, and welfare. As discussed in the previous chapter price gap approach based on the econometric model is used to estimate the AVEs of NTMs (Cadot et al 2018), then these AVEs are incorporated into MyGTAP model and then simulations are run according to the simulation design described in the previous chapter. This chapter contains both econometric and simulation results. Each section pertains to specific FTA (s), or RTA, and starts with the discussion of AVEs results then simulation results are discussed in detail.

#### 7.1 AVEs: an overall scenario

Table (7-1) shows the average AVEs applied by all countries included in this study. Both with and without MR results are quoted. It is evident that NTMs translated into AVEs are much higher than average tariff rates, which proves the presumption that non-tariff measures are now proving bigger challenge for trade than traditional tariffs. Even if countries agree to mutually recognize the standards, still AVEs are making big difference with average tariffs. Results show that, in terms of AVEs, SPS measures are mostly applied to Grain crops, meat & livestock, processed food, and vegetables & fruits groups. Excessive use of TBT measures is seen for textile and wearing apparel sector. Overall protection faced by the textile sector is 72.6%, which is much higher than any other sector. However, with mutual recognition of standards this protection rate comes closer to that of other sectors. Results also suggest that Pakistan can get higher export benefits from export sector if standards are mutually recognized. Heavy manufacturing and light manufacturing are also facing higher levels of protection. The

major share of protection comes through TBT measures, while from “Others” category also these sectors are facing the highest protection. We can also see that with mutual recognition, AVEs are considerably decreased. For example, in case of textile & wearing apparel sector, there is a decrease of 11 percentage points, while in case of Agri-related sectors values are also decreasing considerably. This scenario makes sense for Pakistan to negotiate with partner countries for mutual recognition of non-tariff measures, but with the pre-requisite of enhancing local capacity and enabling its certification and testing agencies enhance their quality and transparency to meet the international standards.

**Table 7-1: Average AVEs applied by sample counties (%)**

Sector	Average AVEs without MR <sup>13</sup>				Average AVEs with MR				Average Tariff
	SPS	TBT	Other	Total	SPS	TBT	Other	Total	
<b>Extractions</b>	15.0	20.1	14.7	47.2	13.2	16.1	13.4	39.4	1.9
<b>Grain Crops</b>	24.0	13.5	11.9	46.4	17.3	12.6	10.7	33.5	9.3
<b>Heavy Manufacturing</b>	15.0	31.6	15.9	61.2	12.8	24.4	15.0	49.3	2.7
<b>Light Manufacturing</b>	13.2	31.6	13.7	57.4	12.5	25.5	12.5	48.1	4.4
<b>Meat &amp; Livestock</b>	25.0	15.6	12.2	50.5	19.3	13.5	11.5	40.5	4.4
<b>Processed Food</b>	21.6	15.4	11.5	45.7	18.7	14.8	10.8	37.8	7.9
<b>Textile &amp; Wearing Apparel</b>	20.3	40.3	13.4	68.3	15.9	27.5	11.6	49.1	4.3
<b>Vegetables &amp; Fruits</b>	25.0	15.6	12.2	50.5	19.3	13.5	11.5	40.5	8.4

Source: Author’s estimations, using price gap approach

## 7.2 AVEs of NTMs applied by Pakistan

Table (7.2) explains the AVEs results for non-tariff measures applied by Pakistan. A comparison with the sample average suggests that Pakistan’s average tariff rates are much higher as compared with sample average. However, except for textile & wearing apparel sector, Pakistan has relatively lower values of NTMs applied on partner countries. AVE value for textile sector is much higher than other countries while it is

<sup>13</sup> MR = Mutual Recognition of Standards

also highest among the sectors. This was also discussed in stakeholders' feedback and was found that textile exporters face not only foreign restrictions but at home they encounter lengthy procedures and excessive documentation. Lowest AVE value is found for extractions, followed by processed food. Overall, sectoral AVE values are in good range as compared with AVE values estimated by Cadot & Gourdon (2016), and Cadot et al (2018). More promising results are found with mutual recognition, overall protection is much lower as compared with sample average. Textile sector is posting the biggest decrease of 28 percentage points. It means, with enhancing the local certification quality and mutually recognizing the standards with partners, Pakistan can gain in terms of exports and can get easy supplies of raw materials. In complete sample scenario maximum decline due to mutual recognition was recorded at 11 percentage points, while in case of Pakistan this is around 28 percentage points.

**Table 7-2: AVEs of NTMs applied by Pakistan on partners (%)**

Sector	Average AVEs without MR				Average AVEs with MR				Average Tariff
	SPS	TBT	Other	Total	SPS	TBT	Other	Total	
<b>Extractions</b>	10.4	14.1	17.0	25.3	9.1	11.8	12.4	21.1	7.8
<b>Grain Crops</b>	18.1	15.3	12.6	46.0	14.4	13.2	11.3	38.9	2.9
<b>Heavy Manufacturing</b>	13.1	20.7	14.1	47.8	11.1	14.9	13.1	39.2	9.6
<b>Light Manufacturing</b>	10.7	23.3	15.6	49.6	11.5	16.8	13.3	30.7	13.3
<b>Meat &amp; Livestock</b>	26.4	11.9	11.7	50.0	18.0	10.6	11.2	39.8	5.6
<b>Processed Food</b>	16.3	11.0	10.7	38.0	14.0	11.6	10.0	24.6	14.4
<b>Textile &amp; Wearing Apparel</b>	26.2	40.8	13.9	80.9	19.4	22.9	11.4	53.8	9.1
<b>Vegetables &amp; Fruits</b>	26.4	11.9	11.7	50.0	18.0	10.6	11.2	39.8	3.5

Source: Author's estimations, using price gap approach

### 7.3 AVEs of NTMs applied by Pakistan's partners

In this section Pakistan's bilateral trade analysis with important partners and FTA partners is discussed. Firstly, AVE results of partners, that means AVEs of NTMs

applied by partners on Pakistani exports, are given then simulation results in case of mutual recognition are presented.

### **7.3.1 AVEs of NTMs applied by European Union**

European Union operates a very strict regulatory system which is also evident from our results of AVEs given in Table (7.3). EU imposes traditional tariffs on only grain crops and processed food while these are accompanied with bigger AVE values. Grain crops and textile & wearing apparel are the most protected sectors, AVE value for grain crops is 88% while it is 73% for textile & wearing apparel. According to our aggregation scheme (Table 6-1), extractions contain fish and other raw sea food also, due to such inclusion extractions sector also faces strict regulations, that is why its AVE value is quite high. Overall results support the concerns of business community about strict SPS standards for food and Agri-related sectors. We see grain crops face 65% SPS measures while these are 29%, 20% and 20% for extractions, meat & livestock, and vegetables & fruits. TBT measures which often comprise of labelling and other regulatory requirements are mostly imposed on extractions and textile & wearing apparel sectors. Results also prove the hypothesis that developed countries, after substantial decrease in traditional tariffs due to global trade liberalization trends, are now excessively using NTMs to restrict the trade in sectors where developing countries have comparative advantage.



**Table 7-3: Average AVEs of NTMs applied by EU-27 (%)**

Sector	Average AVEs without MR				Average AVEs with MR				Average Tariff
	SPS	TBT	Other	Total	SPS	TBT	Other	Total	
<b>Extractions</b>	29.3	28.5	12.8	70.6	22.0	20.7	12.5	55.2	0.0
<b>Grain Crops</b>	65.0	12.5	11.0	88.5	39.9	12.1	0.0	52.0	10.0
<b>Heavy Manufacturing</b>	10.9	14.5	11.0	36.4	10.4	13.9	10.2	34.4	0.0
<b>Light Manufacturing</b>	10.8	13.2	10.3	34.3	10.8	12.4	10.3	33.5	0.0
<b>Meat &amp; Livestock</b>	20.2	17.9	11.6	49.7	18.0	16.2	11.3	45.4	0.0
<b>Processed Food</b>	13.5	13.7	10.9	38.1	11.6	12.4	10.4	34.4	3.0
<b>Textile &amp; Wearing Apparel</b>	13.9	44.5	14.7	73.1	13.3	35.3	13.6	62.2	0.0
<b>Vegetables &amp; Fruits</b>	20.2	17.9	11.6	49.7	18.0	16.2	11.3	45.4	0.0

Source: Author's estimations, using price gap approach

### 7.3.2 AVEs of NTMs applied by GCC countries

Gulf Cooperation Council countries are taken collectively as block in this research, due to the homogeneity of applied non-tariff measures and their economy mix. Results show that GCC countries have applied relatively lower rates of tariffs on their imports, while AVE values shows that cost associated with the implementation of non-tariff measures is comparatively low. Extractions face highest imposition of non-tariff measures, which can be explained by looking at the economic structure of these countries. Economies of these countries base on extractions and minerals with a strong comparative advantage which is why these countries impose heavy restrictions on the imports of products belonging to these groups. Further, in our aggregation scheme (Table 6.1) many oil products are included in the light manufacturing sector, which is also protected with restrictions, resulting in heavy import cost. One encouraging scenario for Pakistan is the low values of Agri- related sectors. Grain crops, meat & livestock, processed food, and vegetables & fruits face 46.5%, 33.3%, 36.3%, and 33.3% AVEs. Traditionally these markets are an ideal destination for Pakistani exports, and it is also supported by relatively low values of AVEs for these sectors. Gulf countries are also a major destination for Pakistani textile products, low level of protection through non-tariff

measures suggests further opportunities for Pakistani exporters. If we look at mutual recognition scenario, results are again encouraging, biggest fall is witnessed in the AVE value of light manufacturing sector, while extractions are also proving to be a viable exporting sector with decrease in AVE value by 11 percentage points. AVE values of grain crops, meat & livestock, processed food and vegetables & fruits are decreasing by around 4 percentage points each.

**Table 7-4: Average AVEs of NTMs applied by GCC countries (%)**

Sector	Average AVEs without MR				Average AVEs with MR				Average Tariff
	SPS	TBT	Other	Total	SPS	TBT	Other	Total	
<b>Extractions</b>	19.6	21.4	17.9	59.0	16.8	14.2	17.1	48.0	2
<b>Grain Crops</b>	21.5	13.9	11.1	46.5	19.0	12.2	10.9	42.1	0
<b>Heavy Manufacturing</b>	12.6	16.9	11.0	40.5	12.2	13.2	10.2	35.6	2
<b>Light Manufacturing</b>	11.5	49.8	11.7	73.0	10.8	21.4	11.0	43.1	5
<b>Meat &amp; Livestock</b>	11.6	10.4	11.4	33.3	10.3	9.7	9.9	29.9	0
<b>Processed Food</b>	24.8	11.6	0.0	36.3	20.3	10.6	0.0	30.9	7
<b>Textile &amp; Wearing Apparel</b>	11.0	19.6	10.5	41.1	10.3	17.4	9.9	37.5	5
<b>Vegetables &amp; Fruits</b>	11.6	10.4	11.4	33.3	10.3	9.7	9.9	29.9	0

Source: Author's estimations, using price gap approach

### 7.3.3 AVEs of NTMs applied by UK

Due to exit of UK from European Union, its analysis of trade is done separately. If we look at the results presented in (Table 7.5), we see the trend mostly followed by other developed countries included in this study, where Agri related sectors and textile are facing the higher levels of protection. AVE values for grain crops, meat & livestock, processed food, and vegetables & fruits are 76.6%, 49.6%, 49.5%, and 49.6% which look quite high. Meat & livestock multiple restrictions and standards while exporting to UK, which include certification and traceability requirements, which substantially increase the cost of exporting. Vegetables & fruits again face quarantine and labelling requirements, which are much difficult to manage for exporters from developing countries. One interesting result for Pakistan is the AVE value of textile sector which

faces the biggest challenge for exporting according to our result of AVEs. However lower or zero tariff rates coupled by mutual recognition of standards can benefit Pakistani exporters. In the presence of mutual recognition of standards, AVE values are considerably less than that of with mutual recognition, biggest drop is seen in case of textile & wearing apparel and grain crops by 20 percentage points, while values of other groups are dropped by around 10 percentage points each.

**Table 7-5: Average AVEs of NTMs applied by UK(%)**

Sector	Average AVEs without MR				Average AVEs with MR				Average Tariff
	SPS	TBT	Other	Total	SPS	TBT	Other	Total	
<b>Extractions</b>	16.4	36.8	17.0	70.3	16.4	26.5	12.4	55.3	1.0
<b>Grain Crops</b>	42.3	21.6	12.8	76.6	20.5	15.2	10.4	46.2	6.0
<b>Heavy Manufacturing</b>	12.7	18.0	10.7	41.4	11.1	14.2	10.2	35.5	0.0
<b>Light Manufacturing</b>	12.2	19.5	12.4	44.2	11.5	15.1	11.4	38.0	0.0
<b>Meat &amp; Livestock</b>	19.7	16.1	13.8	49.6	16.2	13.7	12.1	42.0	0.0
<b>Processed Food</b>	22.1	15.5	11.8	49.5	16.1	11.6	10.9	38.6	3.0
<b>Textile &amp; Wearing Apparel</b>	18.5	30.7	15.6	64.8	14.2	16.0	14.2	44.4	0.0
<b>Vegetables &amp; Fruits</b>	19.7	16.1	13.8	49.6	16.2	13.7	12.1	42.0	0.0

Source: Author's estimations, using price gap approach

### 7.3.4 AVEs of NTMs applied by USA

Table (7.6) shows average AVEs of non-tariff measures applied by USA. Once again, we find heavy imposition of non-tariff measures translated into AVEs, on Agri-related sectors. Though tariff rates are quite reasonable however these are accompanied by big values of AVEs. Grain crops face AVE value of 50.3%, while these values are even higher for meat & livestock and vegetables & fruits sectors. Main source of protection for these sectors is coming from SPS type measures while TBT measures are also considerable. Traceability requirements for meat & livestock is the biggest hurdle faced by the exporters of meat and its products, and which is also shown as a price effect in the form of AVE value. Textile & wearing apparel is facing quite reasonable level of restrictions and the AVE value is only 36.5%.

**Table 7-6: Average AVEs of NTMs applied by USA (%)**

Sector	Average AVEs without MR				Average AVEs with MR				Average Tariff
	SPS	TBT	Other	Total	SPS	TBT	Other	Total	
<b>Extractions</b>	12.0	30.5	7.2	49.7	11.4	24.1	7.1	42.5	0.0
<b>Grain Crops</b>	26.9	12.5	10.9	50.3	18.4	11.5	10.5	40.3	1.0
<b>Heavy Manufacturing</b>	16.9	26.7	21.1	64.6	13.0	18.3	20.2	51.5	0.0
<b>Light Manufacturing</b>	10.7	15.4	11.8	37.9	10.5	14.0	11.6	36.1	1.0
<b>Meat &amp; Livestock</b>	28.5	16.9	13.0	58.4	22.7	15.3	11.6	49.6	0.0
<b>Processed Food</b>	19.5	13.9	10.8	44.3	17.0	13.0	10.5	40.5	3.0
<b>Textile &amp; Wearing Apparel</b>	11.1	14.3	11.1	36.5	10.5	11.6	10.9	33.0	10.0
<b>Vegetables &amp; Fruits</b>	28.5	16.9	13.0	58.4	22.7	15.3	11.6	49.6	8.0

Source: Author's estimations, using price gap approach

#### **7.4 Bilateral analysis with mutual recognition**

In this section GTAP simulation results are discussed for Pakistan's bilateral FTAs and other important trading partners. Simulations are run for each country bilaterally and according to the design discussed in the previous chapter. In fact, this section provides a comparison of simulation results for individual countries.

##### **7.4.1 Economy wide effects on Pakistan**

Table (7.7) shows percentage change in macroeconomic indicators of Pakistan in case where Pakistan and individual partners agree to recognize standards of each other. In case of China-Pakistan FTA, home country GDP is growing by 0.29%, while aggregate imports are changing by 2.19%, growth rate of aggregate exports is appreciable at 7.02%. There is no change in import price index, and export price index is declining, which is the reason of deterioration of terms of trade of Pakistan. Government income is decreasing but the encouraging results of GDP, imports and exports show that overall, it is good for Pakistan to negotiate with China on mutual recognition of standards. Results of EU-27 also look good and there is positive change in all indicators. Export

price index is increasing by 0.66% which is also the cause of appreciating terms of trade. Mutual recognition of standards with GCC countries embraces 3.09% growth in exports, though export prices, terms of trade and government income are declining but the rise in GDP and exports is a healthy sign of negotiations with these countries. FTAs and bilateral trade analysis of other countries also revealing encouraging results for Pakistan. Indicator wise results show that government income is increasing in 5 out of 8 scenarios, GDP is increasing in all cases, aggregate imports and aggregate exports are also showing positive change while terms of trade is also appreciating in 5 out of 8 cases. Overall, it is good for Pakistan to engage in negotiations for mutual recognition with these countries as macroeconomic indicators are showing healthy improvement due to mutual recognition.

**Table 7-7:** Macroeconomic effects on Pakistan due to bilateral recognition (%)

Country	G.Income	GDP	Agg Imports	Agg exports	TOT	Export price index	Import price index
<b>China</b>	-1.58	0.29	2.19	7.02	-0.78	-0.78	0
<b>EU-27</b>	0.53	0.19	1.51	1.79	0.67	0.66	-0.01
<b>GCC</b>	-1.85	0.04	0.9	3.09	-0.26	-0.24	0.02
<b>Malaysia</b>	-0.2	0.03	0.16	0.57	-0.04	0.04	0
<b>Sri Lanka</b>	0.08	0.01	0.13	0.15	0.06	0.06	0
<b>Turkey</b>	0.12	0.02	0.15	0.12	0.07	0.07	0
<b>UK</b>	0.84	0.08	1	0.6	0.63	0.62	0
<b>USA</b>	0.25	0.08	0.62	0.72	0.24	0.24	0

Source: Author's simulations using GTAP10a

#### **7.4.2 Effects on sectoral output**

Table (7.8) shows the effects of mutual recognition on sector wise output in Pakistan. Output of grain crops is increasing in all scenarios, while biggest change is coming through trade with EU-27 which is 0.12%. Vegetables & fruits sector is showing positive change only in case of China while output is declining in case of all other countries. Meat & livestock is changing positively only in case of GCC. Extractions are

posting a considerable growth rate of almost 1% in case of China while it is slightly positive in case of Malaysia also. Processed food's output is positive through FTA with China, again it is positive in case of GCC also. Textile & wearing apparel is the leading export sector of Pakistan with a lion share in the employment of labor force, and its output is increasing in majority of the scenarios. Another increasing result is the output of utilities, construction, transport and communication sectors, these groups are showing positive change in output in all cases. Though these sectors are not directly related to non-tariff measures and their mutual recognition but these indirect effects are very important for Pakistan as these sectors substantially contribute to our GDP.

**Table 7-8:** Effects on sectoral output in Pakistan (%)

Sectors	China	EU-27	GCC	Malaysia	Sri Lanka	Turkey	UK	USA
<b>Grain Crops</b>	0.01	0.12	0.03	0.04	0.01	0.01	0.04	0.03
<b>Vegetable &amp; Fruit</b>	0.03	-0.2	-0.01	-0.04	-0.02	-0.01	-0.08	-0.06
<b>Meat &amp; Livestock</b>	-0.01	-0.11	0.08	-0.1	-0.01	-0.01	-0.05	-0.03
<b>Extractions</b>	0.87	-0.33	-0.3	0.06	-0.02	-0.05	-0.46	-0.15
<b>Processed Food</b>	0.25	-0.32	0.03	-0.3	-0.01	-0.02	-0.15	-0.07
<b>Textile &amp; Apparel</b>	-1.25	1.28	0.24	0.09	-0.03	0.04	0.8	0.55
<b>Light Manufacturing</b>	-1.74	-1.77	-0.16	-0.05	-0.08	-0.11	-0.54	-0.73
<b>Heavy Manufacturing</b>	0.68	-0.87	1.14	0.04	0.12	-0.08	-0.59	-0.31
<b>Utilities, Constructions</b>	0.09	0.32	0.25	0.01	0.03	0.04	0.24	0.14
<b>Transport, Communications</b>	0.2	0.12	0.23	0.03	0.01	0.01	0.05	0.05
<b>Services</b>	0.06	0.04	-0.32	-0.01	0	0.01	-0.01	0.01

Source: Author's simulations using GTAP10a

### 7.4.3 Effects on sectoral prices

Table (7.9) shows effects of mutual recognition on sectoral prices in Pakistan. Here by prices, we mean supply prices, and increased price means more profit for supplier and vice versa. Results show that prices of all sectors are increasing in case of EU-27, Sri Lanka, Turkey, UK, and USA. While there are mixed results in case of China, GCC, and Malaysia. These results also verify our previous results for terms of trade, which

means increased prices of our products appreciates our export prices index, resulting in the appreciation of terms of trade. Another encouraging sign for Pakistan is the fact that core Agricultural sectors like grain crops and vegetables & fruits are posting positive results except China. Negative price change results of China can also be used to explain the rise in aggregate exports in case of China, given in Table (7.10).

**Table 7-9: Effects on sectoral prices in Pakistan (%)**

Sectors	China	EU-27	GCC	Malaysia	Sri Lanka	Turkey	UK	USA
<b>Grain Crops</b>	-0.28	1.3	0.58	0.1	0.08	0.08	0.71	0.38
<b>Vegetable &amp; Fruit</b>	-0.34	1.12	0.49	0.04	0.06	0.07	0.68	0.35
<b>Meat &amp; Livestock</b>	-0.44	0.97	0.45	-0.07	0.06	0.07	0.64	0.31
<b>Extractions</b>	0.04	0.1	-0.91	-0.02	0.04	0.02	0.14	0.05
<b>Processed Food</b>	-0.64	0.8	0.05	-0.05	0.06	0.07	0.66	0.28
<b>Textile &amp; Apparel</b>	-0.77	0.79	-0.04	-0.02	0.06	0.07	0.66	0.27
<b>Light Manufacturing</b>	-1.1	0.22	-0.71	-0.1	0.05	0.05	0.52	0.11
<b>Heavy Manufacturing</b>	-0.58	0.15	-1.06	-0.06	0.03	0.03	0.32	0.08
<b>Utilities, Constructions</b>	-0.99	0.19	-0.77	-0.09	0.04	0.05	0.47	0.1
<b>Transport, Communications</b>	-1.03	0.43	-0.63	-0.09	0.06	0.08	0.66	0.2
<b>Services</b>	-1.08	0.43	-0.65	-0.1	0.06	0.08	0.69	0.21

Source: Author's simulations using GTAP10a

#### **7.4.4 Effects on sectoral exports**

Table (7.10) shows the effects on sectoral exports in Pakistan. In previous table we saw prices are decreasing in all sectors, which support rising sectoral exports results in Table(7.10). Biggest change is posted in extractions sector, while textile is at number second with 9.06%. Pakistan's overall exports are increasing by 7% and it is also supported by these sectoral results. Exports to European Union are decreasing in all sectors except extractions and textile, which, at first glance suggest that mutual recognition is not much fruitful for Pakistan if exports promotion is taken as the criteria of success. However, textile sector is the largest exporting sector in case of EU and its 6% growth is overweighing the negative results of other sectors, which is the reason that aggregate exports to EU are increasing by 1.8%. Results of GCC are also according

to the standard economic theory, sectoral prices are declining and as a results exports of all sectors are increasing. Considerable change is noted in case of extractions, meat & livestock, light and heavy manufacturing. Malaysia is also another example where sectoral exports are increasing due to decline in sectoral prices. Results of Sri Lanka, Turkey, UK and USA are also according to the economic theory, due to increase in supply price exports to these countries are declining, however textile sector is showing positive results which is the reason of overall increased exports to these countries.

**Table 7-10:** Effects on sectoral exports in Pakistan (%)

Sectors	China	EU-27	GCC	Malaysia	Sri Lanka	Turkey	UK	USA
<b>Grain Crops</b>	5.45	-1.43	0.08	1.46	0.7	0.11	-2.05	-1.35
<b>Vegetable &amp; Fruit</b>	1.89	-2.54	0.2	0.34	0.03	-0.2	-1.34	-0.87
<b>Meat &amp; Livestock</b>	3.13	-5.22	8.87	0.72	-0.41	-0.38	-4.33	-2.03
<b>Extractions</b>	33.81	9.88	19.66	0.6	-0.38	0.44	-1.16	3.66
<b>Processed Food</b>	2.62	-2.48	0.84	0.23	-0.09	-0.17	-1.83	-0.61
<b>Textile &amp; Apparel</b>	9.06	6	0.84	0.52	-0.02	0.33	3.8	2.45
<b>Light Manufacturing</b>	8.22	-0.52	11.37	0.65	-0.15	0.49	0.4	-0.2
<b>Heavy Manufacturing</b>	6.45	-0.49	9.55	0.54	2.53	-0.1	-1.53	0.76
<b>Utilities, Constructions</b>	4.56	-0.89	3.6	0.41	-0.21	-0.23	-2.2	-0.49
<b>Transport, Communications</b>	3.6	-1.51	2.21	0.33	-0.21	-0.27	-2.31	-0.72
<b>Services</b>	4.09	-1.66	2.49	0.39	-0.24	-0.31	-2.64	-0.82

Source: Author's simulations using GTAP10a

#### 7.4.5 Effects on sectoral imports

Table (7.11) shows the effects of mutual recognition on sectoral imports in Pakistan. In case of China, Pakistan's imports of grain crops, vegetables & fruits, processed food, heavy manufacturing are decreasing while imports of meat & livestock, textile and some other sectors are increasing. A possible explanation for increased textile imports is the enhanced demand for textile raw materials due to increased output and exports. It is also supported by the fact that textile imports are increasing in case negotiations with other countries also. Imports of grain crops are increasing in case of all other



countries except China. Overall, in most of the cases imports of majority sectors are increasing substantiating the fact that sectoral home prices are increasing causing more imports in these sectors.

**Table 7-11:** Effects on sectoral imports in Pakistan (%)

Sectors	China	EU-27	GCC	Malaysia	Sri Lanka	Turkey	UK	USA
<b>Grain Crops</b>	-0.78	3.97	1.74	0.23	0.23	0.23	2.18	1.58
<b>Vegetable &amp; Fruit</b>	-0.12	2.02	0.86	-0.02	0.2	0.13	1.17	0.83
<b>Meat &amp; Livestock</b>	5.95	4.05	2.25	-0.04	0.15	0.31	2.46	2.04
<b>Extractions</b>	0.73	-0.65	2.54	0.01	0.19	-0.04	-0.33	-0.19
<b>Processed Food</b>	-0.61	2.58	0.24	2.9	0.14	0.19	1.37	0.77
<b>Textile &amp; Apparel</b>	26.11	3.52	0.04	0.37	0.25	0.44	2.5	1.3
<b>Light Manufacturing</b>	4.73	3.62	2.25	0.16	0.16	0.28	1.37	1.51
<b>Heavy Manufacturing</b>	-0.08	0.45	0.39	-0.1	0.08	0.07	0.71	0.2
<b>Utilities, Constructions</b>	-2.03	0.68	-1.4	-0.18	0.13	0.14	1.23	0.35
<b>Transport, Communications</b>	-1.78	0.98	-1.03	-0.15	0.13	0.16	1.34	0.45
<b>Services</b>	-1.88	0.88	-1.25	-0.18	0.12	0.16	1.32	0.43

Source: Author's simulations using GTAP10a

#### 7.4.6 Effects on household income in Pakistan

Table (7.12) shows effects of mutual recognition with partner countries on household income in Pakistan. Results are different for different quartiles of households. Except China and to somehow GCC and Malaysia, household income is increasing for all segments. Results of negotiations with China are showing negative effects on household income, which can be attributed to the fact that in case of China, home prices are decreasing, resulting in less profits and hence wages are not increased. This is also supported by factor earnings presented in the next table. Income loss incurred by rural small and medium farmers and non-farmers in all provinces is negligible, while it is considerable in case of rural non farmers and urban workers in all provinces. Overall, decrease in household income is less than 1%. In case of mutual recognition of standards with EU-27, household income of every segment is increasing, highest

increase is recorded for rural medium farmers in all provinces, while other Agri-related households may also enjoy extra income above 1%. Results can be attributed to the fact that Pakistan mainly needs to negotiate on SPS measures with EU countries, and if we are granted some concessions then the positive outcome will be directly gone to the farmers. In case of GCC, again we find positive change in household income mainly to the farmer class, while rural non-farmers and urban households in all provinces are facing a decline in their income, same is the case for Malaysia also. In case of Sri Lanka, Turkey, UK and USA, and the income gain is almost equally distributed among different segments of households in all provinces. Results show that household income is not much affected by post mutual recognition scenario, as maximum decrease or increase in income is around 1%.

**Table 7-12:** Effects on household income in Pakistan (%)

Household type	China	EU-27	GCC	Malaysia	Sri Lanka	Turkey	UK	USA
Rural small farmer (1)	-0.18	1.2	0.57	0.07	0.07	0.07	0.67	0.37
Rural small farmer (234)	-0.17	1.22	0.58	0.07	0.07	0.07	0.67	0.37
Rural medium farmer (1)	-0.07	1.45	0.77	0.14	0.08	0.08	0.71	0.42
Rural medium farmer (234)	-0.07	1.46	0.75	0.14	0.08	0.08	0.72	0.42
Rural landless farmer (1)	-0.17	1.28	0.59	0.1	0.07	0.08	0.7	0.39
Rural landless farmer (234)	-0.21	1.25	0.52	0.09	0.07	0.08	0.7	0.38
Rural farm worker (1)	-0.41	0.74	0.16	-0.07	0.05	0.06	0.56	0.26
Rural farm worker (234)	-0.52	0.68	-0.01	-0.09	0.06	0.07	0.59	0.26
Rural non-farmer (1)	-0.92	0.48	-0.56	-0.1	0.06	0.09	0.7	0.24
Rural non-farmer (2)	-0.91	0.52	-0.59	-0.1	0.07	0.09	0.73	0.26
Rural non-farmer (3)	-0.92	0.54	-0.6	-0.1	0.07	0.09	0.75	0.27
Rural non-farmer (4)	-0.97	0.54	-0.62	-0.1	0.07	0.1	0.77	0.27
Urban (1)	-0.81	0.6	-0.41	-0.07	0.07	0.09	0.71	0.27
Urban (2)	-0.86	0.56	-0.51	-0.09	0.07	0.09	0.72	0.26
Urban (3)	-0.9	0.56	-0.55	-0.09	0.07	0.09	0.74	0.26
Urban (4)	-0.96	0.54	-0.59	-0.1	0.07	0.09	0.76	0.26

Source: Author's simulations using GTAP10a

#### 7.4.7 Effects on factor returns in Pakistan

Factor return results (Table 7.13) can be different from household income results as later may include income from different factors of production. Results show that, in case of China, labor wages of those workers are increasing who are working in farms. While returns to land of all sizes are also increasing, while in case of capital, only agricultural capital is earning more. The same trend is also witnessed in the rest of scenarios also. USA is the only partner with increased returns for each kind of factor. Overall results indicate that returns to those factors are increasing which are employed in agricultural sector. Capital has mixed results, informal capital is getting positive gains in most of the cases, while returns to formal capital are decreasing in case of China, EU-27, GCC, and Malaysia. Results are in line with our previous discussion so far. In Agri-related sectors we witnessed output growth, increase in prices and exports

in most of the cases. As more factors are employed to produce extra output, their wages increase, while in a situation where prices are also increasing, it proves an extra impetus for improved wages.

**Table 7-13:** Effects on factor returns in Pakistan (%)

Factor type	China	EU-27	GCC	Malaysia	Sri Lanka	Turkey	UK	USA
<b>Labor small farmer</b>	0.79	0.79	1.18	0.1	0.01	0.01	0.11	0.19
<b>Labor medium farmer</b>	0.77	0.85	1.2	0.1	0.02	0.01	0.13	0.21
<b>Labor farm worker</b>	0.84	0.69	1.12	0.07	0.01	0	0.04	0.16
<b>Labor non-farm low skilled</b>	-0.23	-0.04	-0.19	-0.04	0.01	0.02	0.18	0.04
<b>Labor non-farm high skilled</b>	-0.03	0.07	-0.31	-0.01	0.02	0.04	0.21	0.08
<b>Land small</b>	0.9	1.04	1.2	0.27	0.02	0.02	0.18	0.25
<b>Land medium</b>	0.91	1.21	1.24	0.31	0.04	0.03	0.24	0.29
<b>Land large</b>	0.92	1.41	1.29	0.37	0.06	0.04	0.31	0.35
<b>Livestock</b>	0.59	0.31	1.14	-0.21	-0.01	-0.01	-0.04	0.08
<b>Capital agriculture</b>	1.06	1.21	1.16	0.34	0.04	0.03	0.18	0.29
<b>Capital formal</b>	-0.13	-0.01	-0.27	-0.02	0.01	0.03	0.17	0.05
<b>Capital informal</b>	0	0.09	-0.28	-0.01	0.02	0.04	0.21	0.09

Source: Author's simulations using GTAP10a

#### 7.4.8 Welfare analysis

Table (7.14) shows welfare effects for Pakistan. Second column shows welfare gained due to allocative efficiency, by which we mean that in a change scenario due to mutual recognition of standards, resource re allocation occurs and are employed to those sectors which are more efficient and export oriented. Allocative efficiency is highest in case of China, while it is lowest in case of Sri Lanka. In Table (7.7) terms of trade of Pakistan is deteriorating with China, GCC and Malaysia, which is evidenced in Table (7.14) also, Pakistan is losing 107 million dollars due to negative terms of trade with China, while in case of Malaysia terms of trade gain is merely \$ 2 million, for rest of the countries gain from terms of trade is positive. Negative terms of trade is again playing its role in negative investment in case of China and Malaysia, while welfare gain due to increased investment is positive in all other cases. In total Pakistan's welfare

gain is the highest if mutual recognition is won with EU-27, while it is the least in case of Sri Lanka. Another important issue is the nature of three different measures of welfare. Gains from allocative efficiency are more stable relative to others, while terms of trade and investment effects are more accurate for short run.

**Table 7-14:** Welfare effects in Pakistan due to bilateral recognition (\$ million)

FTA/partner	Allocative Efficiency	Terms of Trade	Investment	Total
<b>China</b>	693	-107	-187	399
<b>EU-27</b>	582	225	99	905
<b>Malaysia</b>	110	2	-7	105
<b>Sri Lanka</b>	31	22	16	70
<b>Turkey</b>	61	25	16	103
<b>UK</b>	234	172	124	530
<b>USA</b>	216	74	22	312

Source: Author's simulations using GTAP10a

In this section we first analyzed AVEs of non-tariff measures applied by different countries, which are faced by Pakistani traders while exporting to these countries. Then simulation results are discussed where mutual recognition of standards is assumed. AVE results show that Pakistani Agri-related sectors and textile & wearing apparel sectors are facing the most restriction in terms of non-tariff measures, which can be substantially decreased if mutual recognition is adopted. Then with mutual recognition simulation results are discussed, which shows that Pakistan is gaining the higher welfare gains in case of EU-27, UK, and China. Household income is also increasing for each segment of households in case of EU-27, while factor earnings are also growing. On the other hand, in case of UK, welfare gain is appreciable, household income and factor earnings are rising while sectoral exports show negative growth for most of the sectors, though aggregate exports are rising by less than 1% only. In case of China aggregate exports are rising by remarkable 7%, GDP growth is also better than any other scenario, output is also increasing in most of the sectors, sectoral exports are also showing healthy trend, and allocative efficiency is considerably increasing by \$

693 million. Though overall welfare is less than UK's case, mainly due to negative terms of trade, but macroeconomic indicators are much better than any other trade scenario. Pakistan's FTA partners Malaysia and Sri Lanka and potential FTA partner Turkey are not proving much fruitful for mutual recognition.

## **7.5 Analysis of Developing-8 countries**

Table (7.15) shows average AVEs of non-tariff measures applied by members of D-8 except Pakistan. Pakistani exporters face these, on average described AVEs, while exporting to the members of D-8. These countries share many characteristics most importantly their agrarian nature, while they are competitors of each other in many sectors. The highest AVE value is posted against textile & wearing apparel sector which is 89%, while the lowest value is for processed food, 41.5%. Most of the SPS measures are applied on Agri-related products while on average TBT measures have the highest average value. Heavy manufacturing and light manufacturing also face comparatively higher values which looks implausible as these are not technologically advanced countries and so they are not comparatively advantageous in these sectors, if NTMs are decreased on these sectors as is shown by the AVE values with mutual recognition then these countries can get benefit from each other. Agrarian sectors have AVE values in the range of 50%, which can be justified based on agrarian nature of these countries. However, most of the countries are not self-sufficient in food, that is why they import bulk of staple food every year, if SPS measures are rationalized and mutually recognized, their intra-bloc trade can enhance and can result in welfare gains on both sides. If we look at the AVE values after mutual recognition, we see a very encouraging picture as AVE values pertaining to Agri-related sectors are substantially dropping down. Most importantly there is a decrease of 17 percentage points in textile & wearing apparel sector.

**Table 7-15: Average AVEs of NTMs applied by D-8 countries (%)**

Sector	Average AVEs without MR				Average AVEs with MR				Average Tariff
	SPS	TBT	Other	Total	SPS	TBT	Other	Total	
<b>Extractions</b>	17.4	25.2	16.3	58.9	14.4	20.1	15.2	49.7	2.2
<b>Grain Crops</b>	24.2	14.1	12.7	51.0	19.4	13.2	11.0	36.6	16.5
<b>Heavy Manufacturing</b>	19.1	44.5	18.2	78.1	15.7	29.3	19.3	56.6	5.9
<b>Light Manufacturing</b>	15.2	39.1	14.2	65.6	13.8	34.4	13.3	58.9	6.6
<b>Meat &amp; Livestock</b>	24.9	14.8	12.4	52.1	20.6	13.2	11.9	43.3	9.6
<b>Processed Food</b>	21.1	13.6	11.2	41.5	17.7	12.2	10.8	34.2	14.6
<b>Textile &amp; Wearing Apparel</b>	20.8	62.0	12.9	89.0	15.4	42.6	11.3	61.7	8.3
<b>Vegetables &amp; Fruits</b>	24.9	14.8	12.4	52.1	20.6	13.2	11.9	43.3	8.4

Source: Author's estimations, using price gap approach

## **7.6 AVEs, Economy wide and welfare analysis of mutual recognition in D-8**

In this section CGE based simulation results are discussed for D-8 countries. It is assumed that all members of D-8 mutually recognize the NTMs of each other and AVEs are fallen to the MR level given in the Table (xxx) and simulations are run accordingly. In the following, economy wide, sectoral, and welfare analysis is done for all countries, while household income and factor earnings results are quoted for Pakistan only.

### **7.6.1 Economy wide effects for member countries**

Table (7.16) gives results for macroeconomic indicators of member countries. Results show that due to mutual recognition government income in Pakistan is decreasing owing to decreased level of regulations. Pakistan's GDP, aggregate imports and aggregate exports are increasing, while terms of trade is also appreciating. All these indicators are encouraging for Pakistan, especially a considerable increase in exports. Turkey's government income is changing positively, changes in GDP, aggregate imports and TOT are also positive while exports are decreasing. Turkey is relatively more developed country than other members, decrease in exports points towards trade diversion from Turkey to other countries. Malaysia' indicators are all positive, with a

substantial increase in government income, GDP and aggregate imports, its terms of trade is also getting better. For Bangladesh also, all macroeconomic indicators are positive, a better change is observed in government income, while increase in imports and exports is also not ignorable. Indonesia is again posting positive change against all the macroeconomic indicators. Change in government income, aggregate imports and exports is good while terms of trade is causing earning of extra foreign money. In case of Egypt everything looks good except aggregate exports, the reason for 1.18% decline in exports owes to enhanced terms of trade, which means products of Egypt are now more expensive in the international market, causing a decline in overall exports. In summarizing the economy wide results it can be said that mutual recognition with D-8 countries is good for Pakistan as its GDP, imports, and terms of trade are improving, while exports are considerably increasing by 2.25%.

**Table 7-16:** Macroeconomic effects on members of D-8 (%)

Country	G.Income	GDP	Agg Imports	Agg exports	TOT	export price index	import price index
<b>Bangladesh</b>	2.65	0.36	0.35	0.27	0.15	0.15	-0.01
<b>Egypt</b>	3.4	0.46	0.22	-1.18	0.48	0.47	-0.01
<b>Indonesia</b>	0.76	0.13	1	0.34	0.32	0.31	-0.01
<b>Malaysia</b>	1.62	0.53	0.54	0.07	0.26	0.25	-0.01
<b>Pakistan</b>	-0.27	0.14	1	2.25	0.09	0.09	-0.01
<b>Turkey</b>	0.5	0.14	0.23	-0.08	0.15	0.14	-0.02

Source: Author's simulations using GTAP10a

### 7.6.2 Effects on sector wise output

Table (7.17) shows changes in sectoral output due to mutual recognition among the member countries. We find mixed results for all countries and sectors; output of some sectors is increasing in certain countries while these are decreasing in other countries. In Pakistan's case output of key sectors like grain crops and textile & wearing apparel is increasing, while transport, communications, utilities, and construction sectors are also showing slight increase. Growth rate of textile sector is around 1%, while highest



decline is posted against processed food sector. In case of Turkey output of all sectors, except services, utilities, and construction, is declining. Malaysia is producing more in meat & livestock, processed food, services, textile & wearing apparel, transport, communications, utilities, and construction sectors, largest increase is noted in case of textile & wearing apparel. In the same way, Bangladesh, Indonesia, and Egypt all have mixed sectoral results for output.

**Table 7-17:** Effects on sectoral output in D-8 (%)

<b>Sectors</b>	<b>Pakistan</b>	<b>Turkey</b>	<b>Malaysia</b>	<b>Bangladesh</b>	<b>Indonesia</b>	<b>Egypt</b>
<b>Extractions</b>	-0.04	-0.26	-0.58	-0.13	-0.22	-0.37
<b>Grain Crops</b>	0.15	-0.49	-0.35	0.16	0.01	-0.42
<b>Heavy Manufacturing</b>	0.03	-0.02	-0.31	-1.27	-0.16	-0.63
<b>Light Manufacturing</b>	-0.5	-0.29	-0.2	-1.24	-0.51	0.04
<b>Meat &amp; Livestock</b>	-0.29	-0.05	0.18	0.1	-0.09	-0.22
<b>Processed Food</b>	-1.02	-0.07	0.35	-0.61	0.2	-0.16
<b>Services</b>	-0.04	0.07	0.22	0.2	0.09	0.79
<b>Textile &amp; Apparel</b>	0.83	-0.23	2.89	-0.43	0.82	-1.32
<b>Transport, Communications</b>	0.11	-0.01	0.01	0.09	-0.02	-0.21
<b>Utilities, Constructions</b>	0.13	0.2	0.45	-0.28	0.33	0.35
<b>Vegetable &amp; Fruit</b>	-0.2	-0.18	-0.18	-0.19	0.07	-0.17

Source: Author's simulations using GTAP10a

### **7.6.3 Effects on sector wise prices**

Table (7.18) provides results for sector wise prices in D-8 countries. Results show that prices of extractions, grain crops, meat & livestock, processed food, services, textile & wearing apparel, transport, communications, and vegetables & fruits are increasing in all 6 countries, while there are mixed results for other sectors. Increase in Agri-related sectors prices is encouraging in the context of these countries as due to their heavy dependence on agriculture and livestock. We saw in the previous section, output of Agri-related sectors is also increasing, coupled with higher prices these countries can earn considerable income owing to these sectors. If we take the country effects, the most significant change is the increase in prices of grain crops and textile & wearing

apparel sectors. Pakistan is the largest exporter of textile in D-8, though increase in price is only 0.13%, but it means much for Pakistan's textile sector as compared with other countries. In case of prices Turkey, Bangladesh, Indonesia, and Egypt are the higher gainers as prices are increasing in all sectors with considerable magnitude.

**Table 7-18:** Effects on sectoral prices (%)

Sectors	Pakistan	Turkey	Malaysia	Bangladesh	Indonesia	Egypt
Extractions	0	0.05	-0.22	0.4	0.19	0.15
Grain Crops	0.36	0.16	0.13	0.72	0.56	0.64
Heavy Manufacturing	-0.04	0.1	0.2	0.5	0.26	0.31
Light Manufacturing	-0.06	0.12	0.33	0.48	0.35	0.22
Meat & Livestock	-0.1	0.2	0.32	0.68	0.49	0.79
Processed Food	0.03	0.16	0.24	0.53	0.45	0.43
Services	0.01	0.29	0.64	0.64	0.52	0.73
Textile & Apparel	0.13	0.03	0.21	0.1	0.21	0.5
Transport, Communications	0.01	0.26	0.54	0.54	0.43	0.75
Utilities, Constructions	-0.04	0.18	0.36	0.49	0.36	0.46
Vegetable & Fruit	0.19	0.18	0.12	0.69	0.6	0.72

Source: Author's simulations using GTAP10a

#### 7.6.4 Effects on sector wise imports

Table (7.19) shows results for sector wise imports in D-8 countries. There are only 5 instances where imports are decreasing while overall, imports of every sector are increasing in each country. In Pakistan highest increase is posted against processed food sector with 9.76%, while textile & wearing apparel sector's imports are increasing by 2.71%. We saw in the previous sections both output and prices are increasing in textile sector, which means there is better scope for enhanced output. Pakistan is a net importer of textile raw material, so increase in imports is mostly due to enhanced production and increased demand for textile raw materials. In case of Turkey, imports of processed food and textile & wearing apparel are showing considerable increase. In case of Bangladesh imports of textile & wearing apparel are decreasing, it can also be explained with the same argument as Pakistan, Bangladesh is an importer of textile raw materials,

due to decreased prices and output of textile in Bangladesh, demand for textile raw materials is also decreased which is the reason for decline in textile imports.

**Table 7-19:** Effects on sectoral imports (%)

Sectors	Pakistan	Turkey	Malaysia	Bangladesh	Indonesia	Egypt
Extractions	0.12	0.13	-2.87	0.13	0.86	0.48
Grain Crops	1.36	0.1	1.5	1.02	1.51	1.12
Heavy Manufacturing	0.04	0.08	0.27	0.45	0.75	-0.2
Light Manufacturing	1.05	0.26	0.96	0.77	1.26	-0.21
Meat & Livestock	0.51	0.47	1.08	1.56	1.31	1.3
Processed Food	9.76	0.91	0.95	2.15	1.15	1.79
Services	0.1	0.53	1.34	1.64	1.01	0.87
Textile & Apparel	2.71	0.98	1.17	-1.9	1.87	-1.04
Transport, Communications	0.16	0.5	1.12	0.99	0.87	1.16
Utilities, Constructions	0.06	0.48	1.56	0.97	1.17	0.84
Vegetable & Fruit	0.7	0.25	0.24	1.38	1.04	0.87

Source: Author's simulations using GTAP10a

### 7.6.5 Effects on sector wise exports

Table (7.20) shows the effects on sectoral exports in all countries. We saw in Table (7.16) of macroeconomic indicators, that aggregate exports of all countries are increasing except Egypt and Turkey. Sector wise results table also explains this trend as for Pakistan, Malaysia, Bangladesh, and Indonesia in most of the sectors, exports are increasing. In case of Pakistan, largest increase in exports is witnessed for textile & wearing apparel sector which is 4.22%, we saw prices and output of textile is also increasing. Other important result is the increased exports of grain crops mainly due to decrease in SPS measures applied by the partner countries. We also observed in the stakeholder's discussion, Pakistani exporters largely complain about the imposition of SPS measures by the trading partners. Exports of other Pakistani exporting sectors like processed food, meat & livestock, vegetables & fruits, and light manufacturing are also increasing. Sports and leather sectors are also included in the light manufacturing sector, most probably 1.76% growth in this sector is due to enhanced exports of sports

and leather. If we see the sector wise results, grain crops exports are increasing in all countries except Egypt, while highest increase is noticed in case of Bangladesh. Indonesia is posting the largest increase in heavy manufacturing sector, while Pakistan is the biggest gainer in case of light manufacturing. In case of meat & livestock Turkey is the biggest gainer followed by Pakistan, while in processed food highest increase in exports is noted for Indonesia. Overall, in most of the cases sectoral and aggregate exports are increasing in all countries.

**Table 7-20:** Effects on sectoral exports (%)

<b>Sectors</b>	<b>Pakistan</b>	<b>Turkey</b>	<b>Malaysia</b>	<b>Bangladesh</b>	<b>Indonesia</b>	<b>Egypt</b>
<b>Extractions</b>	1.6	-0.29	2.67	-4.08	-0.25	-0.34
<b>Grain Crops</b>	2.02	0.05	3.2	16.98	3.51	-0.78
<b>Heavy Manufacturing</b>	1.16	0.54	0.04	-0.41	2.76	-0.73
<b>Light Manufacturing</b>	1.76	-0.42	0.02	-2.69	-1.16	1.45
<b>Meat &amp; Livestock</b>	0.97	-1.38	-1.21	-4.9	-3.35	-5.46
<b>Processed Food</b>	0.34	-0.38	0.82	-1.83	1.03	-1.22
<b>Services</b>	-0.07	-1.11	-2.47	-2.48	-1.99	-2.82
<b>Textile &amp; Apparel</b>	4.22	1.11	7.7	0.25	3.35	-0.36
<b>Transport, Communications</b>	-0.06	-0.88	-1.76	-2.08	-1.64	-2.71
<b>Utilities, Constructions</b>	0.13	-0.9	-1.74	-2.33	-1.74	-2.17
<b>Vegetable &amp; Fruit</b>	0.37	-0.4	1.05	-0.09	3.12	-1.42

Source: Author's simulations using GTAP10a

### **7.6.6 Effects on household income**

Table (7.21) gives household income effects for Pakistan in case of mutual recognition with D-8 countries. As discussed previously we have incorporated SAM 2011 of Pakistan in our MyGTAP model, so household income and factor earnings results are only given for Pakistan. Table shows that highest gainers from this proposed scenario are those rural households which are involved in agriculture. Rural small farmers in all provinces are having 0.27% more income, while this gain is highest for rural medium farmers in all provinces. Results are justified based on the facts that small farmers have only a sustainable level of land holdings, these have negligible space to sell their

products in the market for domestic use are exporting abroad, while medium farmers have considerable extra produce to sell and get benefits due to increased agricultural prices. Rural landless farmers are also gaining around 0.37% gain in their income in all provinces. These workers mostly work on big farms in partnership or work on rental land, usually they have bigger scale of production, hence these are also able to earn in the presence of better prices and terms of trade. Rural farm workers in all provinces face decline in their income. These workers work on wages, and they have no share in produce and its revenue, results show that positive gains in agriculture sector are unable to raise their wages.

**Table 7-21:** Effects on household income in Pakistan (%)

<b>Household type</b>	<b>income growth</b>	<b>Household type</b>	<b>income growth</b>
Rural small farmer (1)	0.27	Rural non-farmer (1)	0.04
Rural small farmer (234)	0.27	Rural non-farmer (2)	0.05
Rural medium farmer (1)	0.47	Rural non-farmer (3)	0.06
Rural medium farmer (234)	0.48	Rural non-farmer (4)	0.06
Rural landless farmer (1)	0.37	Urban (1)	0.08
Rural landless farmer (234)	0.36	Urban (2)	0.07
Rural farm worker (1)	-0.06	Urban (3)	0.06
Rural farm worker (234)	-0.08	Urban (4)	0.06

Source: Author's simulations using GTAP10a

### **7.6.7 Effects on factor returns**

Table (7.22) shows factor returns in Pakistan. Returns to all factors are increasing except livestock. Highest gain is recorded in case of large land being used in agriculture sector. Returns to labor are relatively smaller, which owes to the fact that labor wages take time to adjust with the new market conditions. Highest increases are recorded in case of rents to land of every size. In case of capital highest gain is going to the capital being used in agriculture sector while return to formal capital is 0.11% and to informal capital is 0.15%. Overall results show that it is beneficial for Pakistan to engage in negotiations with these countries on mutual recognition of standards as along with household income factor returns are also increasing.

**Table 7-22:** Effects on factor returns in Pakistan (%)

<b>Factor type</b>	<b>Return</b>	<b>Factor type</b>	<b>return</b>
Labor small farmer	0.15	Land medium	0.79
Labor medium farmer	0.18	Land large	1
Labor farm worker	0.05	Livestock	-0.71
Labor non-farm low skilled	0.07	Capital agriculture	0.88
Labor non-farm high skilled	0.13	Capital formal	0.11
Land small	0.63	Capital informal	0.15

Source: Author's simulations using GTAP10a

### 7.6.8 Welfare analysis

In Table (7.23) welfare results for each country in D-8 are given. Results show that every country's welfare is increasing due to proposed mutual recognition. Countries are mostly gaining due to allocative efficiency. Terms of trade of all countries is appreciating which is the reason of positive gains for all countries. Investment is increasing for all countries except Indonesia and Malaysia. Country wise results show that Malaysia and Turkey are the largest gainers in terms of welfare, while Pakistan is the least gainer. Pakistan's increase in welfare is only \$ 531 million, much less than any other country. One possible reason is the output and export growth trend witnessed in case of Pakistan. We saw all positive things are going in favor of agriculture and textile sectors, which are already established so reallocation of resources is not occurring, and allocative efficiency gain is only 445 million dollars. Largest reallocation is witnessed in case of Malaysia and Turkey, the two comparatively more developed countries in the bloc.

**Table 7-23:** Welfare effects in D-8 members (\$ million)

<b>Country</b>	<b>Allocative Efficiency</b>	<b>Terms of Trade</b>	<b>Investment</b>	<b>Total</b>
<b>Bangladesh</b>	815	56	61	932
<b>Egypt</b>	1457	264	196	1918
<b>Indonesia</b>	1517	656	-20	2153
<b>Malaysia</b>	2543	648	-75	3117
<b>Pakistan</b>	445	61	25	531
<b>Turkey</b>	1806	480	112	2397

Source: Author's simulations using GTAP10a

Overall results for D-8 countries show that every country is better off with mutual recognition of standards; output, exports and prices are increasing in most of the sectors while welfare results are also encouraging. Pakistan is getting the lowest welfare gain in the bloc; however results may improve for Pakistan in the long run.

## 7.7 South Asian Free Trade Area (SAFTA)

In table (7.24), we have presented results without MR and that with MR, averaged over exporting countries, detailed bilateral AVEs are given in the appendix.

**Table 7-24:** Average AVEs of NTMs applied by SAARC countries (%)

Sector	Average AVEs without MR				Average AVEs with MR				Average Tariff (%)
	SPS	TBT	Other	Total	SPS	TBT	Other	Total	
<b>Extractions</b>	15.1	18.1	16.6	49.8	13.1	15.6	16	44.7	9.75
<b>Grain Crops</b>	23.4	17.7	11.6	52.7	18.4	15.2	11.2	44.8	7.58
<b>Heavy Manufacturing</b>	15.3	33.7	14.6	63.6	13.2	26.2	14.1	53.5	6.83
<b>Light Manufacturing</b>	18.6	31.2	14.7	64.5	14.5	26.9	13.5	54.9	6.83
<b>Meat &amp; Livestock</b>	27.2	14.8	12.8	54.8	22	13	11	46	3.75
<b>Processed Food</b>	19.3	11.8	11.2	42.3	15	10	10.7	35.7	8.41
<b>Textile &amp; Wearing Apparel</b>	18.1	55.7	13.6	87.4	13.6	38.1	11.5	63.2	7.33
<b>Vegetables &amp; Fruits</b>	27.2	14.8	12.8	54.8	22	13	11	46	16.66

Source: Author's estimation, using price gap approach

Table (7.24) shows averages of NTMs by specification by all countries in the region. Results show that Textile & Wearing Apparel is the most protected sector, its average AVE is 87.4 while applied average tariff is only 7.33. Results also show that SPS measures are mostly used in agriculture-related sectors while other sectors are protected mostly through TBT measures. In accordance with our theoretical framework three possible conclusions may be drawn as far as Agri-related sectors are concerned. Application of NTMs will raise the protection in terms of environment and health safety if these are targeted at such objectives. Consequently, those suppliers will export more

who are applying NTMs effectively and attracting cautious consumers. If such sectors are facing NTMs with protectionist motives, then resultant delaying tactics will hurt free trade. The most compelling effect is the price raising effect due to compliance cost. Traditionally, tariffs are considered the most influential instrument to protect against free trade, but if we compare AVEs with average tariff, additional cost due to NTMs looks much higher than that of tariffs.

### **7.7.1 CGE based simulations results**

Values of AVEs calculated using equation (9), that pertains to the baseline situation where no mutual recognition exists, are first incorporated in “altermat” file of GTAP, after updating the data, based on new dataset AVE values with mutual recognition (retrieved after estimating equation 13) are introduced as shocks and simulations are run. Results presented in this sub-section are based on the assumption that member countries are recognizing each other’s standards and hence post mutual recognition situation is depicted.

### **7.7.2 Macroeconomic indicators**

Table (7.25) presents macroeconomic results for sample countries. Sri Lanka is getting more with mutual recognition in terms of real GDP while India is getting the least. This is explainable due to economic size of respective countries, though India is the largest economy within SAARC and hence its real GDP gain may be higher than any country in real terms however due to economic size its GDP is growing at only 0.025%. Almost all country’s exports and imports are growing except Sri Lanka which maintains a negative rate for exports. However, export price index shows that Sri Lanka’s are now more expensive in international market that is why its terms of trade is also better off, which has positive effect over real GDP through better balance of trade. The same



channel is working for Pakistan also, both export and import prices are better off and hence resulting in improvement of terms of trade. As predicted by theory, with lowering of NTMs import prices should go down, this is also witnessed in case of India and Pakistan, while there is no change in case of Bangladesh and Sri Lanka. Table shows that government income is also increasing for all countries, with larger percentage changes for smaller economies and vice versa.

**Table 7-25:** Macroeconomic effects on SAFTA countries (%)

	<b>Bangladesh</b>	<b>India</b>	<b>Pakistan</b>	<b>Sri Lanka</b>
<b>Real GDP</b>	0.9	0.025	0.195	1.232
<b>Agg. Exports</b>	0.123	0.152	0.305	-0.634
<b>Agg. Imports</b>	0.313	0.391	0.711	0.407
<b>TOT</b>	0.078	0.195	0.235	0.372
<b>Export Price Index</b>	0.083	0.182	0.226	0.395
<b>Import Price Index</b>	0	-0.01	-0.01	0.02
<b>Govt Income</b>	6.803	0.302	1.343	2.55

Source: Author's Simulation using GTAP 10a

### 7.7.3 Sector wise results for SAFTA countries

In Table (7.26) sectoral results for sample countries are given for individual countries. Results for Bangladesh show that three major and leading sectors of Bangladeshi economy i.e., grain crops, textile and fruits & vegetable are exporting more, which is the reason for overall increase in aggregate exports by 0.123%, decrease in textile imports is also contributing to this change. Further for most of the sector's imports are also increasing with no change on import price index, though imports have increased but these are not affecting terms of trade. A slight negative change is witnessed for some of the sectors in case of India, however exports are increasing in most of the sectors due to reallocation of resources. Grain crops, heavy manufacturing, processed food, textile, and fruits & vegetable sectors have shown increase in exports. In the meantime, imports in all sectors have also increased, which India is importing from member countries, and it is also witnessed in exports growth of these countries.

Sectoral results for Pakistan exhibit a better scenario with positive growth rate of exports for extraction, grain crops, heavy manufacturing, livestock, textile, and fruits & vegetables sectors. While there are slight changes in output of all sectors except textile sector, however effect on trade is positive. Almost 1% increase in exports of textile sector means much for Pakistan as it is the largest exporting sector. Pakistan is an importer of primary and intermediate textile items, almost 1% increase in Pakistani imports should be read with textile related exports growth of India and Bangladesh. Results for grain crops and vegetables & fruits groups show that if SPS and TBT measure are mutually recognized by SAARC countries then Pakistan's export will increase by more than 2% in each sector. For Sri Lanka, in case of mutual recognition, output is increasing for many Agri-related sectors with decreased prices, while prices of other sectors are increasing. Exports show growth rate for grain crops, heavy manufacturing, livestock, processed food, and vegetables & fruits. Largest increase in imports pertains to grain crops, stemming from lower regulatory restrictions and hence resulting in increased grain crops exports of other SAARC countries.

**Table 7-26:** Sectoral results for SAFTA countries (%)

	Bangladesh				India			
	output	prices	exports	imports	output	prices	exports	imports
<b>Extractions</b>	-0.2	0.94	-1.84	0	-0.13	0.07	-0.4	0.24
<b>Grain Crops</b>	-0.52	0.88	0.7	4.19	0.14	0.31	1.88	2.49
<b>Heavy Manufacturing</b>	-2.97	1.06	-5.57	0.69	0.15	0.11	1.18	0.41
<b>Light Manufacturing</b>	-2.81	0.98	-5.59	1.29	-0.04	0.15	-0.07	0.49
<b>Meat &amp; Livestock</b>	0.35	0.73	-3.84	1.61	-0.07	0.28	-1.49	1.02
<b>Processed food</b>	-0.12	0.76	-2.05	1.99	-0.03	0.23	0.08	0.58
<b>Services</b>	0.56	1.34	-5.13	3.6	-0.06	0.24	-0.91	0.47
<b>Textile &amp; Wearing Apparel</b>	-0.88	-0.03	0.59	-4.88	0.28	0.19	1.48	1.04
<b>Transport &amp; Communication</b>	0.22	1.12	-4.29	2.12	-0.01	0.22	-0.7	0.48
<b>Utilities &amp; Construction</b>	-0.62	1.02	-4.81	2.12	0.1	0.19	-0.93	0.53
<b>Veg &amp; Fruits</b>	-0.03	0.92	3.17	2.18	-0.03	0.31	1.67	0.64
	Pakistan				Sri Lanka			
	output	prices	exports	imports	output	prices	exports	imports
<b>Extractions</b>	-0.29	0.12	0.96	-0.01	-0.92	0.48	-3.05	-4.43
<b>Grain Crops</b>	0.03	-0.04	2.12	1.18	-1.81	-0.57	5.59	10.32
<b>Heavy Manufacturing</b>	-0.23	0.21	1.71	0.45	-6.79	0.26	2.25	-0.86
<b>Light Manufacturing</b>	-1.23	0.31	-1.29	1.04	-1.77	0.41	-0.72	1.84
<b>Meat &amp; Livestock</b>	-0.01	0.03	0.68	0.28	0.48	0.35	2.13	1.63
<b>Processed food</b>	-0.12	0.16	-0.35	1.08	0.22	0.39	0.2	2.09
<b>Services</b>	0.22	0.53	-2.04	1.1	0.6	1.41	-5.37	3.01
<b>Textile &amp; Wearing Apparel</b>	0	0.18	0.88	0.93	-1.06	0.21	-0.15	-2.09
<b>Transport &amp; Communication</b>	0.01	0.49	-1.72	1	0.45	0.48	-1.75	1.6
<b>Utilities &amp; Construction</b>	0.26	0.31	-1.49	0.91	1.4	0.3	-1.45	2.06
<b>Veg &amp; Fruits</b>	-0.16	-0.04	2.09	1.54	0.78	-0.31	4.98	0.41

Source: Author's Simulation using GTAP 10a

#### 7.7.4 Household income effects

As discussed earlier, in this research instead of using a single regional household we have used separate government household and 16 private households based on SAM 2010-11. As the SAM is incorporated only for Pakistan so for rest of the countries only main household results are given. Results show that Sri Lanka is relatively getting the most with average household income growth of 1.52%, average is least for India. These

measures are given in relative terms and due to lower per capita income in Sri Lanka and Bangladesh the growth rate is looking higher than rest of two countries. For this study we used Social Accounting Matrix for Pakistan only that is why disaggregated household results are available for Pakistan. A closer look at the results reveals that income of urban and rural non farmer households is growing more than any other quantile. These groups of households mostly belong to services sector. Results in Table(7.26) show that prices and output in these sectors are changing positively and hence getting higher earnings for such households. Though exports in Agri-related sectors are growing but due to decrease in prices small farmers are not well off. A chunk of labor force is employed in textile sector which is showing a robust increase in exports coupled with better prices, which may be another reason for income growth of urban and rural non-farmer households.

**Table 7-27:** Effects on household income in SAFTA countries (%)

Household type (quartile)	Pakistan	India	Sri Lanka	Bangladesh
<b>Main Household</b>	0.43	0.26	1.52	1.28
<b>Rural small farmer (1)</b>	-0.02	0.26	1.52	1.28
<b>Rural small farmer (234)</b>	-0.03	0.26	1.52	1.28
<b>Rural medium farmer (1)</b>	-0.06	0.26	1.52	1.28
<b>Rural medium farmer (234)</b>	-0.04	0.26	1.52	1.28
<b>Rural landless farmer (1)</b>	-0.03	0.26	1.52	1.28
<b>Rural landless farmer (234)</b>	0.03	0.26	1.52	1.28
<b>Rural farm worker (1)</b>	0.15	0.26	1.52	1.28
<b>Rural farm worker (234)</b>	0.27	0.26	1.52	1.28
<b>Rural non-farmer (1)</b>	0.57	0.26	1.52	1.28
<b>Rural non-farmer (2)</b>	0.62	0.26	1.52	1.28
<b>Rural non-farmer (3)</b>	0.65	0.26	1.52	1.28
<b>Rural non-farmer (4)</b>	0.66	0.26	1.52	1.28
<b>Urban (1)</b>	0.5	0.26	1.52	1.28
<b>Urban (2)</b>	0.57	0.26	1.52	1.28
<b>Urban (3)</b>	0.61	0.26	1.52	1.28
<b>Urban (4)</b>	0.62	0.26	1.52	1.28

Source: Author's Simulation using GTAP 10a

### 7.7.5 Welfare analysis

A good and popular use of CGE models is to gauge the welfare effects of any policy change. We have calculated welfare effects for sample countries using three different measure which are combined to show the overall welfare effects. Allocative efficiency tells us how a change in policy, say trade taxes, can cause the reallocation of resources from less efficient sectors to more productive sectors and due to such reallocation how much extra earnings we are getting. Terms of trade represents the ratio of export and import prices. If export prices go up, while import prices go down or remain the same then terms of trade will get better resulting in a positive effect on balance of trade. In Table (7.25) we saw that terms of trade is growing positively for all countries, this is also witnessed in positive values of gains due to terms of trade. India is gaining 925 million dollars, which is explainable by the fact that for such a large economy a small change in terms of trade can cause huge change in welfare gains. Due to allocative efficiency, Bangladesh has gained the most among member countries with an absolute value of 1983 million. For Sri Lanka this value is 1341 million. It means in these countries it is relatively easy to move investment from one sector to the other with purpose of getting efficiency and to take the advantage of favorable policy change. Results of allocative efficiency are also supported by the ease of doing business ratings, frequently issued by international organizations. Results also show that India and Bangladesh are attracting more investment in a changed policy scenario, while Sri Lanka, somehow, is facing capital flight. Overall welfare results show that Bangladesh will gain the most if countries agree to mutually recognize the Non-Tariff Measures. Pakistan is getting the least with only 520 million.

**Table 7-28:** Welfare effects for SAFTA countries (\$ million)

	<b>allocative efficiency</b>	<b>terms of trade</b>	<b>investment</b>	<b>Total</b>
<b>Pakistan</b>	400	79	41	520
<b>India</b>	509	925	144	1578
<b>Sri Lanka</b>	1341	98	-8	1431
<b>Bangladesh</b>	1983	32	117	2132

Source: Author's Simulation using GTAP 10a

## **7.8 AVEs, Economy wide and welfare analysis of mutual recognition in**

### **RCEP**

In this section, firstly, AVEs of non-tariff measures applied by the members of RCEP are discussed, then simulation results with mutual recognition are given. Simulation results are further divided into two parts, where, in first scenario we have analyzed if current 15 member of RCEP successfully negotiate on mutual recognition of NTMs then what will happen to the trade and economy of Pakistan. In second scenario, we have proposed the inclusion of Pakistan into RCEP and again effects on Pakistan's trade and economy are discussed.

## **7.9 AVEs of NTMs applied by RCEP members**

Table (7.29) shows average AVEs of non-tariff measures applied by the members of RCEP. We see textile & wearing apparel and heavy manufacturing are the most protected sectors. This bloc includes many developed and Asian Tiger economies equipped with latest technologies. Heavy manufacturing and light manufacturing are the most relevant sectors in the context of RCEP, but textile & wearing apparel is also the important sector, and we see these sectors are also heavily protected. Extractions face AVE value of 48.7%, whereas AVE value of applied TBT measures is 20.4%. Grain crops is relatively less protected with AVE value of 44.8%. Meat & livestock again faced a relatively higher value due to traceability type requirements and the AVE value is 50%. Processed food is also much protected with imposition of strict SPS

measures, and the AVE value is 48%. Again vegetables & fruits sector faces the AVE value of 50. If we see the values mutual recognition, we find great scope for enhancing trade due to more liberalized non-tariff measures. Biggest decline is occurring in case of textile & wearing apparel, and grain crops and the new value of AVE are only 45.3% and 31.7%. In the same way decline in the values of other sectors is also appreciable.

**Table 7-29: Average AVEs of NTMs applied by RCEP countries (%)**

Sector	Average AVEs without MR				Average AVEs with MR				Average Tariff
	SPS	TBT	Other	Total	SPS	TBT	Other	Total	
<b>Extractions</b>	15.3	20.4	14.3	48.7	13.7	16.2	13.0	40.5	0.6
<b>Grain Crops</b>	24.6	12.8	11.7	44.8	17.2	12.2	10.5	31.7	8.9
<b>Heavy Manufacturing</b>	14.9	31.2	16.2	60.8	12.8	25.0	14.9	50.0	0.7
<b>Light Manufacturing</b>	12.7	31.8	13.3	56.7	11.8	25.4	12.3	48.3	2.3
<b>Meat &amp; Livestock</b>	24.8	16.3	12.2	50.0	19.1	14.0	11.7	39.5	3.3
<b>Processed Food</b>	22.4	16.8	11.8	47.9	19.8	15.7	11.0	41.1	5.5
<b>Textile &amp; Wearing Apparel</b>	19.5	35.6	13.4	61.3	15.6	25.1	11.8	45.3	2.6
<b>Vegetables &amp; Fruits</b>	24.8	16.3	12.2	50.0	19.1	14.0	11.6	39.5	8.3

Source: Author's estimations, using price gap approach

## 7.10 Simulation results with current RCEP members, effects on Pakistan

In this section we have run simulations according to the simulation design given in the previous chapter. This is one of the objectives of our study to check the effects of mutual recognition among current 15 members of RCEP, non-only on these countries but on the Pakistan also.

### 7.10.1 Economy wide effects of recognition among RCEP members

Table (7.30) provides economy wide effects of mutual recognition among RCEP countries on these countries and on Pakistan. As expected, all of the macroeconomic indicators of Pakistan are declining due to trade diversion occurring as a result of mutual recognition of standards in RCEP. Exports are declining by 1.01% while declining in government income is also of the same magnitude, while rest of the

variable are declining with less than 1% margin. If we look at the macroeconomic indicators of other countries, or current members of RCEP, Malaysia is the highest gainer in terms of government income and this increase is recorded at 10.02%. Government income of all other countries is also increasing, while the gain of Brunei and Singapore is very high. In case of GDP, again Malaysia is posting a very large increase in its GDP due to mutual recognition and its GDP is increasing by 4.6%, while Singapore and Vietnam are following with 3.33% and 3.04% respectively. GDP gain of Thailand, Indonesia, South Korea, and Brunei is also considerable. Aggregate imports of all countries are also increasing, depicting a case of trade creation, largest increase is seen in case of Australia and its imports are increasing by 6.74%, while imports of Thailand, Malaysia, Indonesia, South Korea, Vietnam, and Brunei are also substantially increasing. In case of aggregate exports, Singapore's exports are increasing by 3.71%, while the exports of other countries are also considerably increasing except Brunei and Japan. A good thing for RCEP is the appreciation of terms of trade for all countries, it means mutual recognition of standards is decreasing the cost and extra investment incurred by the traders.

**Table 7-30: Macroeconomic effects on RCEP countries and Pakistan (%)**

Country	Gincome	GDP	Agg Imports	Agg exports	TOT	Export price index	Import price index
<b>Australia</b>	3.13	0.91	6.74	0.17	2.55	2.43	-0.12
<b>Brunei</b>	8.13	1.98	6.87	-4.19	3.17	3.29	0.12
<b>China</b>	1.33	0.57	2.04	1.11	0.22	0	-0.23
<b>Indonesia</b>	3.27	1.26	6.13	3.08	1.3	1.16	-0.14
<b>Japan</b>	2.22	0.54	3.52	-0.08	1.28	1.06	-0.23
<b>Malaysia</b>	10.02	4.6	5.03	0.17	1.7	1.58	-0.11
<b>New Zealand</b>	1.63	0.58	3.58	1.5	1.06	1.07	0.01
<b>Pakistan</b>	<b>-1.01</b>	<b>-0.09</b>	<b>-0.62</b>	<b>-1.01</b>	<b>-0.15</b>	<b>-0.49</b>	<b>-0.34</b>
<b>Singapore</b>	7.83	3.33	3.98	3.71	1.19	0.95	-0.24
<b>South Korea</b>	5.27	1.84	4.23	0.37	1.43	1.12	-0.31
<b>Thailand</b>	2.26	1.15	5.09	1.28	1.06	0.94	-0.12
<b>Viet Nam</b>	2.96	3.04	6.41	-1.29	1.28	1.28	0.01

Source: Author's simulations using GTAP10a



### **7.10.2 Effects on sector wise output**

Table (7.31) shows sector wise effects on output in all countries of RCEP and while trade diversion effects on Pakistan. We see output of all of the key sectors of Pakistan is decreasing due to mutual recognition among RCEP countries. This bloc encompassed a large share of global output and trade, which is the reason that such blocs have severe effects on small economies like Pakistan. A look at the sectoral outputs of current RCEP members reveals that output reallocation is also occurring among the RCEP members also. Output of grain crops is decreasing in many countries while it is considerably increasing in Australia. China and New Zealand are now producing more vegetables and fruits while its production is declining in other countries. Meat & livestock is again reallocating from Australia and other countries to China, New Zealand, and Vietnam. Production of processed food is also shifting to China, Singapore, South Korea, and Thailand. In case of textile & wearing apparel, we see more concrete results, Vietnam is the largest producers of this sector among current RCEP members, due to comparative advantage and economies of scale much of the production from other countries is shifting to Vietnam, its sectoral output growth is 19.68%, while production is decreasing in all other countries except Singapore. We see the same trend in heavy manufacturing also, resource allocation is mostly occurring in Singapore and its sectoral output is increasing by 18%.

**Table 7-31:** effects on sector wise output in RCEP countries (%)

Sectors	GC	VF	ML	EE	PF	TA	LM	HM	UC	TC	SS
<b>Australia</b>	5.19	-2.53	-0.91	0.78	-0.11	-32.83	-2.65	-9.88	2.23	-0.01	0.31
<b>Brunei</b>	-1.26	-4.46	-6.28	-1.91	-0.62	-4.89	-16.91	-10.79	6.16	3.94	1
<b>China</b>	-0.44	0.25	0.14	-1.08	0.35	-0.76	-0.35	-0.47	0.68	0.01	0.31
<b>Indonesia</b>	-0.37	-0.87	-0.29	-0.02	-0.79	-2.1	-1.68	-6.68	2.12	0.16	0.87
<b>Japan</b>	-1.7	-1.73	-2.53	-2.26	-1.64	-3.13	-1.49	-0.83	1.37	0.11	0.18
<b>Malaysia</b>	-2.62	-2.46	-0.89	-1.99	-2.24	-14.46	-2.04	-2.94	4.62	0.95	1.25
<b>New Zealand</b>	-12.58	1.62	0.17	0.92	-0.48	-5.42	-1.15	-1.7	0.99	-0.09	0.07
<b>Pakistan</b>	<b>-0.02</b>	<b>0.04</b>	<b>0.09</b>	<b>-0.27</b>	<b>0.28</b>	<b>-0.14</b>	<b>0.68</b>	<b>0.38</b>	<b>-0.24</b>	<b>0.02</b>	<b>-0.1</b>
<b>Singapore</b>	0.61	-3.45	-2.31	-0.96	2.48	0.57	0.22	17.69	2.61	-1.75	-1.84
<b>South Korea</b>	-1.8	-1.14	-0.89	-2.67	0.75	-2.41	-5.57	0.36	2.86	-0.25	0.89
<b>Thailand</b>	-0.99	0.17	-0.44	-1.55	0.17	-4.15	0.54	2.22	4.11	-0.4	-0.6
<b>Viet Nam</b>	-2.76	-3.53	1.68	-1.94	-1.43	19.68	-7.16	-5.24	7.48	1.67	-0.54

Source: Author's simulations using GTAP10a

GC = grain crops, VF = vegetables & fruits, ML = meat & livestock, EE = Extractions, PF = processed food, TA = textile & wearing apparel, LM = large manufacturing, HM = heavy manufacturing, UC = utilities and construction, TC = transport and communications, SS = services

### 7.10.3 Effects on sector wise prices

Table (7.32) provides effects on sectoral prices due to mutual recognition of standards in RCEP countries. Sectoral prices are important due to their boosting effect on output. Results show that, as expected, prices of all sectors are decreasing in Pakistan, owing decreased profits to the producers and exporters. Within RCEP effects are mostly positive, prices of grain crops are increasing in most of the countries, biggest gainers are Vietnam and Australia. In vegetables and fruits sector, again prices in Australia and Vietnam are substantially increasing while in other countries growth rate of prices is around 1%. In case of extractions, prices are considerably increasing in Brunei, Malaysia, New Zealand, and Vietnam. In case of processed food, prices are again considerably increasing in Vietnam and Australia. Results of textile sector are again according to expectations, Vietnam being the largest producer of textile, due to comparative advantage prices are substantially decreasing and this decline is recorded at 3.62%. In the same way prices in other sectors, like light and heavy manufacturing

and all services sectors are increasing in all countries. Overall, prices are mostly increasing for all sectors in Vietnam, except textile, in which it has substantial comparative advantage, while prices of all sectors are declining in Pakistan.

**Table 7-32:** Effects on sector wise prices in RCEP countries (%)

<b>Sectors</b>	<b>GC</b>	<b>VF</b>	<b>ML</b>	<b>EE</b>	<b>PF</b>	<b>TA</b>	<b>LM</b>	<b>HM</b>	<b>UC</b>	<b>TC</b>	<b>SS</b>
<b>Australia</b>	2.96	2.49	2.32	2.96	2.15	0.37	1.55	1.47	2.1	2.12	2.36
<b>Brunei</b>	-0.05	-0.28	-0.3	3.07	-0.35	-1.06	3.86	3.48	4.11	5.02	6.51
<b>China</b>	0.31	0.49	0.45	-0.88	0.31	0.32	0.11	-0.21	0.12	0.45	0.49
<b>Indonesia</b>	1.09	0.79	1.45	2.05	1.46	-1.25	0.78	0.83	1.03	1.28	1.97
<b>Japan</b>	1.16	1.02	0.93	-0.82	1.07	0.8	1.21	0.65	1.27	1.79	1.81
<b>Malaysia</b>	0.39	-0.23	1.51	2.22	1.85	1.37	1.94	0.57	2.65	3.44	4.66
<b>New Zealand</b>	0.41	1.13	1.04	2.21	0.94	0.77	1.01	0.62	1.14	1.2	1.31
<b>Pakistan</b>	<b>-0.26</b>	<b>-0.27</b>	<b>-0.22</b>	<b>-0.95</b>	<b>-0.38</b>	<b>-0.42</b>	<b>-0.57</b>	<b>-0.83</b>	<b>-0.62</b>	<b>-0.62</b>	<b>-0.63</b>
<b>Singapore</b>	0.63	1.65	2.16	-0.41	1.14	1.25	1.05	-1.56	1.23	1.92	2.54
<b>South Korea</b>	0.5	0.15	1.35	-0.1	1.17	0.54	1.08	0.57	1.78	2.61	3.04
<b>Thailand</b>	1.57	1.7	1.98	0.34	1.37	1.28	0.66	0.11	1.06	2.36	2.49
<b>Viet Nam</b>	3.49	2.55	2.62	3.6	3.5	-3.62	1.84	1.24	3.63	5.41	7

Source: Author's simulations using GTAP10a

#### **7.10.4 Effects on sector wise exports**

Table (7.33) shows effects on sectoral exports due to mutual recognition of standards in RCEP countries. We see exports of all major sectors of Pakistan are declining, due to trade diversion occurring because of RCEP, we find mixed results within bloc. In previous section we analyzed the sectoral prices for all countries, and the exports results are following the basic economic relationship of price and demand, it means in sectors where prices are increasing, demand for such sectors exports is decreasing and vice versa. In case of grain crops, though Brunei is showing the largest increase in exports, but the 8.83% increase in case of Australia is causing much more volume to change as compared with Brunei. Malaysia, South Korea, and Japan are the largest gainers in terms of sectoral exports. In case of vegetables & fruits exports of all countries are increasing except Australia, Singapore, and Vietnam. While exports of extractions are

changing by considerably percentage and biggest change is posted against South Korea with 37.48%. There is a moderate increase in exports of processed food, while its exports are declining in almost half of the countries. Textile & wearing apparel sector shows comparative advantage gains for Vietnam and its exports are increasing by substantial 30%. We saw prices of textile sector were decreasing in Vietnam's case, so the impact of decreased prices is exhibiting on the exports also. Due to changes in prices and output reallocation we see the same mixed results in other sectors also.

**Table 7-33:** Effects on sector wise prices in RCEP countries (%)

Sectors	GC	VF	ML	EE	PF	TA	LM	HM	UC	TC	SS
<b>Australia</b>	8.83	-6.32	-1.19	5.58	-0.27	5.05	-4.19	-3.34	-10.08	-8.06	-9.02
<b>Brunei</b>	22.46	0.4	25.01	-2.26	8.91	11.18	-15.32	-10.53	-21.03	-14.25	-25.23
<b>China</b>	3.04	5.6	6.75	17.76	6.91	-0.76	0.69	1.81	-1.28	-1.22	-2.1
<b>Indonesia</b>	6.8	2.28	-1.64	7	-3.59	11.64	1.85	6.65	-5.63	-5.44	-8.09
<b>Japan</b>	11.93	0.96	17.75	27.84	-2.04	6.16	-2.03	3.39	-6.88	-3.58	-7.17
<b>Malaysia</b>	15.24	5.4	8.36	8.1	-3.71	-2.76	-3.37	5.52	-13.37	-11.37	-18.13
<b>New Zealand</b>	3.11	3.89	1.25	14.65	0.43	21.44	3.6	10.08	-5.92	-3.75	-4.74
<b>Pakistan</b>	<b>-0.45</b>	<b>-0.7</b>	<b>-0.72</b>	<b>-5.35</b>	<b>1.01</b>	<b>-1.23</b>	<b>0.89</b>	<b>0.54</b>	<b>1.11</b>	<b>1.71</b>	<b>1.58</b>
<b>Singapore</b>	10.29	-0.13	2.87	-0.54	4.59	5.95	2.36	25.3	-5.08	-4.21	-9.9
<b>South Korea</b>	10.97	7.45	12.31	37.48	7.51	6.05	-3.29	5.44	-8.74	-3.93	-11.94
<b>Thailand</b>	-1.7	4.83	-1.94	11.89	1.05	-4.73	2.7	6.64	-6.27	-8.6	-9.84
<b>Viet Nam</b>	-9.81	-3.56	-10.8	-2.57	-7.63	30.05	-7.54	-4.53	-18.49	-17.48	-27.1

Source: Author's simulations using GTAP10a

### 7.10.5 Effects on sector wise imports

Table (7.34) shows the effects of mutual recognition on imports of Pakistan and members of RCEP. We see imports of all sectors are decreasing except extractions. The largest decrease in imports of Pakistan is posted against textile & wearing apparel sector. Pakistan is a net importer of textile raw material, due to decrease in output and exports Pakistan needs fewer quantities of raw textile which is the reason of decline in sectoral imports of textile sector. For RCEP members, effects on sectoral imports are mostly positive with only few exceptions. This shows the case of trade creation due to full implementation of RCEP agreement with successful recognition of standards. Grain crops imports are increasing substantially in Vietnam followed by Australia.

Increase in Australian imports owes to increase in output and exports of processed food also. While for other countries import changes are also considerable. In case of vegetables & fruits biggest increase is seen for Thailand and its sectoral imports are rising by 12.27%. In meat & livestock sector positive changes are substantial for Vietnam and Malaysia, while these considerable for Indonesia and Australia. Textile & wearing apparel results also support the theory, output and exports are increasing in Vietnam and hence its imports of textile raw materials are also increasing by 13.1%. If we look at the results with country perspective, we see Vietnam is the country with substantial increase in imports of all sectors. While Thailand, South Korea, and Malaysia are also importing much more than before.

**Table 7-34:** Effects on sector wise imports in RCEP countries (%)

Sectors	GC	VF	ML	EE	PF	TA	LM	HM	UC	TC	SS
<b>Australia</b>	7.89	5.04	9.98	6.85	5.5	2.49	5.56	9.48	4.78	4.91	4.96
<b>Brunei</b>	-0.04	-0.73	1.05	25.73	1.88	5.29	1.36	9.72	16.67	11.79	12.09
<b>China</b>	2.85	1.73	3.66	0.01	1.45	5.05	2.76	3.06	0.93	1.17	1.26
<b>Indonesia</b>	2.67	5.92	9.4	7.74	4.48	14.71	6.64	6.22	4.56	3.36	4.33
<b>Japan</b>	0.68	2.32	4.54	-1.97	9.85	3.83	5.28	6.99	5.25	3.95	3.83
<b>Malaysia</b>	4.42	1.64	10.14	8.06	4.92	9.4	6.96	1.74	13.85	8.12	10.37
<b>New Zealand</b>	2.83	2.1	4.9	4.74	3.43	7.52	2.95	4.71	3.12	2.48	2.3
<b>Pakistan</b>	-0.07	-0.19	-1.16	0.85	-2.27	-1.75	-1.06	-0.43	-0.65	-0.67	-0.86
<b>Singapore</b>	1.94	-0.57	5.19	9.93	3.41	3.5	3.26	4.41	4.67	1.81	2.84
<b>South Korea</b>	3.14	-0.05	6.8	-0.51	4.56	9	8.12	4.91	8.61	4.78	6.17
<b>Thailand</b>	4.15	12.27	5.61	4.44	3.07	8.43	5.3	4.86	6.45	6.46	6.42
<b>Viet Nam</b>	10.29	3.97	10.2	18.45	8.46	13.09	4.71	3.57	12.1	14.2	13.69

Source: Author's simulations using GTAP10a

### 7.10.6 Effects of mutual RCEP on household income and factor returns in

#### Pakistan

Table (7.35) describes effects of mutual recognition in RCEP on household income and factor returns in Pakistan. These are not direct effect, as Pakistan is not a member of RCEP, however these arrangements may affect household income and factor returns in

Pakistan indirectly through trade diversion effects. In previous tables we saw trade diversion effects are changing the output, exports, government income and terms of trade negatively, this trend is also evident in the results of household income and factor returns. First part of Table (xxx) shows that household income of all segments is decreasing, while largest decrease is witnessed in rural not farmer and urban households in all provinces. Majority of these households earns its income from manufacturing sectors like textile, leather and light manufacturing, due to decrease in exports, output is decreased, wages are fallen, and hence household income is exhibiting negative changes.

**Table 7-35:** Effects on household income and factor returns in Pakistan (%)

<b>Household type</b>	<b>income growth</b>	<b>Household type</b>	<b>income growth</b>
Rural small farmer (1)	-0.27	Rural non-farmer (1)	-0.62
Rural small farmer (234)	-0.26	Rural non-farmer (2)	-0.65
Rural medium farmer (1)	-0.23	Rural non-farmer (3)	-0.66
Rural medium farmer (234)	-0.24	Rural non-farmer (4)	-0.68
Rural landless farmer (1)	-0.28	Urban (1)	-0.58
Rural landless farmer (234)	-0.3	Urban (2)	-0.62
Rural farm worker (1)	-0.33	Urban (3)	-0.64
Rural farm worker (234)	-0.4	Urban (4)	-0.66
Effects on Factor returns in Pakistan (in %)			
<b>Factor type</b>	<b>Return</b>	<b>Factor type</b>	<b>return</b>
Labor small farmer	0.33	Land medium	0.22
Labor medium farmer	0.34	Land large	0.2
Labor farm worker	0.32	Livestock	0.5
Labor non-farm low skilled	-0.12	Capital agriculture	0.14
Labor non-farm high skilled	-0.22	Capital formal	-0.19
Land small	0.24	Capital informal	-0.21

Source: Author's simulations using GTAP10a

### 7.10.7 Welfare analysis

Table (7.36) shows the welfare effects on RCEP countries, while indirect effects on different measures of welfare in Pakistan are also quoted. As expected, due to mutual recognition of standards in RCEP, Pakistan is losing 285 million dollars in terms of allocative efficiency, which means due to decrease in exports resources are being

reallocated to those sectors which are less efficient. Due to negative terms of trade Pakistan is losing 43 million dollars, in the same way investment is also decreasing in Pakistan by 60 million dollars. As far as, results within RCEP bloc are concerned, China is the largest gainer with around \$ 71 billion, followed by Japan with \$ 39 billion. Overall welfare gains are according to the size of the economies and much of these is coming from allocative efficiency. These results are expected for RCEP, as these countries have strong standardization bodies, and it is easy for them to mutually recognize the standards of each other.

**Table 7-36:** Welfare effects in RCEP countries and Pakistan (%)

Country	Allocative Efficiency	Terms of Trade	Investment	Total
<b>Australia</b>	13218	6063	-286	18994
<b>Brunei</b>	328	215	-30	513
<b>China</b>	65101	6207	-489	70819
<b>Indonesia</b>	12834	1992	43	14870
<b>Japan</b>	27455	11004	248	38708
<b>Malaysia</b>	21027	3752	282	25061
<b>New Zealand</b>	1222	468	7	1697
<b>Pakistan</b>	-285	-43	-60	-389
<b>Singapore</b>	11973	4765	-11	16727
<b>South Korea</b>	21026	8486	-948	28564
<b>Thailand</b>	4976	2838	-67	7748
<b>Viet Nam</b>	8072	1428	836	10336

Source: Author's simulations using GTAP10a

### **7.11 Pakistan's proposed MR with RCEP, Effects on trade and economy**

In this section we have analyzed the scenario of Pakistan's proposed mutual recognition of standards with RCEP countries, if it happens successfully Pakistan may gain multiple benefits in terms of enhanced trade, output, and welfare. In the previous section we discussed the scenario where current RCEP countries are recognizing the standards of each other, while we saw trade diversion effects on Pakistan. As Pakistan is a small open economy so the inclusion of Pakistan in some agreement with RCEP will have

minor effects on the economies and trade of these countries. So in this section we have mainly concentrated on Pakistan's results.

### 7.11.1 Economy wide effects

Table (7.37) shows macroeconomic results for Pakistan and member of RCEP. We see government income is decreasing by 2.13%, as Pakistan will grant some specific regulatory concessions to the traders of these countries which is causing the decline in government revenue. GDP of Pakistan is increasing by 0.61%, which is a substantial figure for a country like Pakistan where GDP growth rate has been less than 4% in previous years. Encouraging results are seen in aggregate imports and exports both are rising by 3.1% and 9.5% respectively. Such increase in aggregate exports can boost up the almost stagnant exports of Pakistan. Terms of trade is declining, which means Pakistani products are now less expensive in international market, which may be a possible reason of enhanced exports of Pakistan.

**Table 7-37:** Macroeconomic effects in Pakistan's MR with RCEP case (%)

Country	G.Income	GDP	Agg Imports	Agg exports	TOT	Export price index	Import price index
<b>Australia</b>	3.14	0.91	6.74	0.18	2.55	2.43	-0.12
<b>Brunei</b>	8.11	1.98	6.85	-4.17	3.16	3.28	0.13
<b>China</b>	1.36	0.58	2.1	1.13	0.24	0.01	-0.23
<b>Indonesia</b>	3.34	1.26	6.24	3.11	1.34	1.21	-0.13
<b>Japan</b>	2.24	0.54	3.55	-0.08	1.3	1.07	-0.23
<b>Malaysia</b>	10.06	4.61	5.09	0.19	1.71	1.61	-0.11
<b>New Zealand</b>	1.63	0.58	3.6	1.51	1.06	1.08	0.02
<b>Pakistan</b>	-2.13	0.61	3.1	9.5	-0.96	-1.3	-0.34
<b>Singapore</b>	7.86	3.33	4.03	3.75	1.21	0.97	-0.24
<b>South Korea</b>	5.29	1.84	4.25	0.37	1.44	1.13	-0.31
<b>Thailand</b>	2.31	1.16	5.15	1.28	1.08	0.96	-0.12
<b>Viet Nam</b>	2.95	3.04	6.43	-1.29	1.27	1.29	0.01

Source: Author's simulations using GTAP10a



### 7.11.2 Effects on sector wise output

Table (7.38) show effects of mutual recognition with RCEP on sector wise output in Pakistan and other countries. Results are mixed for Pakistan, output of grain crops is increasing by only 0.1%, while output of vegetables & fruits is decreasing by 0.12%, output of meat & livestock is also decreasing by 0.13%. Output of extractions is increasing by 0.49%, while output of processed food is decreasing by 0.46%. The most welcoming sign is the increase in output of textile & wearing apparel by 1.17%, and light manufacturing which contain sports and leather also, is showing an increase in output by 3.43%. It means mutual recognition with RCEP is boosting up the output of exporting sectors of Pakistan. We see positive changes in output of heavy manufacturing, utilities, constructions, transport and communications, and services.

**Table 7-38:** Effects on sector wise output (%)

Sectors	GC	VF	ML	EE	PF	TA	LM	HM	UC	TC	SS
<b>Australia</b>	5.2	-2.43	-0.93	0.77	-0.1	-33.35	-2.63	-9.86	2.23	-0.01	0.31
<b>Brunei</b>	-1.29	-4.47	-6.26	-1.9	-0.62	-4.95	-16.83	-10.76	6.15	3.93	1
<b>China</b>	-0.47	0.25	0.15	-1.1	0.35	-0.77	-0.33	-0.49	0.69	0.01	0.31
<b>Indonesia</b>	-0.37	-0.78	-0.3	-0.06	-0.6	-2.18	-1.71	-6.76	2.14	0.16	0.87
<b>Japan</b>	-1.71	-1.74	-2.54	-2.28	-1.64	-3.25	-1.48	-0.83	1.38	0.11	0.18
<b>Malaysia</b>	-2.63	-2.47	-0.83	-2.01	-1.89	-14.4	-1.99	-3.01	4.64	0.94	1.24
<b>New Zealand</b>	-	1.63	0.17	0.91	-0.46	-5.76	-1.14	-1.68	0.99	-0.09	0.07
<b>Pakistan</b>	0.1	-0.12	-0.13	0.49	-0.46	1.17	3.43	0.77	0.26	0.38	0.21
<b>Singapore</b>	0.59	-3.35	-2.33	-0.97	2.48	1.1	0.31	17.8	2.62	-1.76	-1.87
<b>South Korea</b>	-1.82	-1.13	-0.89	-2.68	0.75	-2.49	-5.57	0.36	2.87	-0.25	0.89
<b>Thailand</b>	-1.02	0.16	-0.47	-1.58	0.14	-4.12	0.6	2.21	4.16	-0.42	-0.61
<b>Viet Nam</b>	-2.76	-3.52	1.66	-1.94	-1.38	19.64	-7.13	-5.26	7.49	1.67	-0.55

Source: Author's simulations using GTAP10a

### 7.11.3 Effects on sector wise prices

Table (7.39) provides the results for sector wise effects on prices due to proposed mutual recognition with RCEP. Results show that prices in all sectors are declining. Prices of grain crops are decreasing by 0.57% while of vegetables & fruits by 0.71%.

In the same way prices of meat & livestock sector are decreasing by around 1% while same decrease is happening to the prices of extractions sector. Most severe cases of price decline are reported for processed food, textile & wearing apparel, light manufacturing, heavy manufacturing, utilities & constructions, transport & communications, and services sectors. We saw, aggregate exports of Pakistan are rising by 9% with decrease in sectoral output of many groups, however overall GDP is rising by 0.61%, decreased prices are a cause of enhanced exports of Pakistan.

**Table 7-39:** Effects on sector wise prices (%)

Sectors	GC	VF	ML	EE	PF	TA	LM	HM	UC	TC	SS
<b>Australia</b>	2.97	2.52	2.33	2.96	2.16	0.34	1.55	1.47	2.1	2.13	2.36
<b>Brunei</b>	-0.05	-0.28	-0.3	3.07	-0.35	-1.06	3.86	3.47	4.1	5.01	6.5
<b>China</b>	0.33	0.51	0.47	-0.88	0.32	0.33	0.13	-0.2	0.14	0.48	0.51
<b>Indonesia</b>	1.18	0.92	1.52	2.05	1.53	-1.22	0.84	0.87	1.08	1.34	2.05
<b>Japan</b>	1.18	1.03	0.94	-0.82	1.09	0.82	1.23	0.66	1.28	1.81	1.83
<b>Malaysia</b>	0.42	-0.2	1.56	2.22	1.86	1.36	1.97	0.6	2.68	3.47	4.69
<b>New Zealand</b>	0.41	1.13	1.05	2.21	0.94	0.76	1.01	0.63	1.15	1.21	1.32
<b>Pakistan</b>	-0.57	-0.71	-0.94	-0.94	-1.13	-1.23	-1.87	-1.49	-1.75	-1.55	-1.59
<b>Singapore</b>	0.62	1.7	2.17	-0.41	1.16	1.25	1.07	-1.55	1.24	1.93	2.56
<b>South Korea</b>	0.49	0.15	1.36	-0.1	1.18	0.54	1.09	0.58	1.79	2.63	3.06
<b>Thailand</b>	1.57	1.71	2	0.35	1.39	1.31	0.68	0.13	1.09	2.41	2.53
<b>Viet Nam</b>	3.48	2.55	2.61	3.61	3.5	-3.63	1.84	1.24	3.64	5.42	7.01

Source: Author's simulations using GTAP10a

#### 7.11.4 Effects on sector wise exports

Table (7.40) shows sector wise effects on exports for Pakistan and other countries. The most encouraging results for Pakistan so far are the sector wise exports results. We see exports in every sector are increasing with impressive rates. Grain crops exports are increasing by 8.38% while exports of vegetables & fruits are increasing by 2.34%. In the same way exports of meat & livestock are increasing at good rate of 11%, the export growth rate of extractions is enormous. Textile, which is the leading exporting sector of Pakistan is growing at an excellent rate of 10.78%, further export growth rate in light

manufacturing and heavy manufacturing is also good. These results validate our previous discussion on aggregate variables and sector wise output and prices. Aggregate exports are increasing by 9%, with decreasing output and decreasing prices, a clear case for enhanced exports. Further, these exports are also largely contributing to the growth rate of GDP, which is anticipated at 0.61%.

**Table 7-40:** Effects on sector wise exports (%)

Sectors	GC	VF	ML	EE	PF	TA	LM	HM	UC	TC	SS
<b>Australia</b>	8.86	-5.95	-1.24	5.56	-	5.25	-4.07	-3.3	-10.1	-8.08	-9.04
<b>Brunei</b>	22.28	0.38	24.92	-2.26	8.93	10.85	-15.24	-10.42	-21	-14.21	-25.18
<b>China</b>	3	5.63	6.92	17.72	6.9	-0.62	0.85	1.74	-1.37	-1.28	-2.2
<b>Indonesia</b>	6.4	3.91	-2.19	6.93	-	11.56	1.85	6.44	-5.89	-5.7	-8.37
<b>Japan</b>	12.88	0.97	17.54	27.79	-2.0	5.77	-1.98	3.38	-6.94	-3.6	-7.25
<b>Malaysia</b>	15	5.53	8.18	8.07	-3.1	-2.33	-3.24	5.44	-13.51	-11.47	-18.27
<b>New Zealand</b>	3.12	3.9	1.24	14.61	0.46	20.83	3.66	10.14	-5.95	-3.76	-4.77
<b>Pakistan</b>	8.38	2.34	10.9	34.61	5.47	10.78	13.77	11.83	6.29	4.97	5.21
<b>Singapore</b>	10.31	0.14	2.78	-0.57	4.61	7	2.49	25.45	-5.15	-4.23	-9.99
<b>South Korea</b>	10.95	7.52	12.3	37.43	7.5	5.98	-3.26	5.44	-8.79	-3.94	-12.02
<b>Thailand</b>	-1.78	4.81	-2.08	11.79	0.99	-4.57	2.83	6.6	-6.4	-8.74	-10.01
<b>Viet Nam</b>	-9.82	-3.56	-10.67	-2.62	-7.4	30.02	-7.47	-4.57	-18.54	-17.51	-27.15

Source: Author's simulations using GTAP10a

### 7.11.5 Effects on sector wise imports

Table (7.41) shows the results of sector wise imports in Pakistan and other countries.

Results show that imports are declining in grain crops by 0.31%, while imports of vegetables and fruits are increasing by 0.46%. Imports of meat & livestock are increasing by 5.06%, the reason for such increase in imports is the increase in exports of processed food by Pakistan, as meat & livestock is used as raw material in the processed food sector, while imports of processed food are also increasing. Rise in imports of textile is as expected, Pakistan's exports may rise due to mutual recognition with RCEP region, which is the reason of increase in imports of textile as Pakistan is the net importer of textile raw materials. Imports of light manufacturing are also rising,

while sectoral imports of heavy manufacturing, utilities & construction, transport & communications, and services sectors are declining.

**Table 7-41:** Effects on sector wise imports (%)

<b>Sectors</b>	<b>GC</b>	<b>VF</b>	<b>ML</b>	<b>EE</b>	<b>PF</b>	<b>TA</b>	<b>LM</b>	<b>HM</b>	<b>UC</b>	<b>TC</b>	<b>SS</b>
<b>Australia</b>	8.01	5.09	10	6.88	5.51	2.34	5.57	9.48	4.79	4.93	4.97
<b>Brunei</b>	-0.04	-0.73	1.07	25.71	1.87	5.27	1.34	9.7	16.63	11.77	12.07
<b>China</b>	2.95	1.76	3.73	0.01	1.49	5.71	2.83	3.1	0.98	1.22	1.31
<b>Indonesia</b>	3.01	6.16	9.56	7.72	4.68	14.81	6.78	6.29	4.71	3.49	4.46
<b>Japan</b>	0.71	2.34	4.57	-1.96	9.88	3.84	5.32	7.04	5.29	3.98	3.86
<b>Malaysia</b>	4.8	1.69	10.28	8.04	5.03	9.46	7.01	1.77	13.94	8.2	10.44
<b>New Zealand</b>	2.86	2.12	4.89	4.77	3.44	7.62	2.96	4.72	3.13	2.49	2.32
<b>Pakistan</b>	-0.31	0.46	5.06	1.28	7.72	29.08	6.94	-0.65	-2.61	-2.06	-2.3
<b>Singapore</b>	1.95	-0.57	5.22	10.03	3.43	3.57	3.32	4.48	4.71	1.83	2.86
<b>South Korea</b>	3.11	-0.04	6.83	-0.5	4.58	9.04	8.15	4.94	8.65	4.81	6.21
<b>Thailand</b>	4.2	12.27	5.67	4.45	3.1	8.57	5.39	4.9	6.54	6.55	6.51
<b>Viet Nam</b>	10.34	3.97	10.28	18.49	8.49	13.08	4.72	3.57	12.11	14.22	13.71

Source: Author's simulations using GTAP10a

### 7.11.6 Effects on household income and factor earnings in Pakistan

Table (7.42) provides the effects of proposed mutual recognition of non-tariff measures with RCEP countries on household income and factor earnings in Pakistan. Upper part of the table shows that household income of most of the segments in Pakistan is increasing, against the case in the previous section where we assumed that RCEP countries mutually recognize the standards of each other while Pakistan is not included in such negotiations. So, with Pakistan's mutual recognition with RCEP household income is positively changing, it means the benefits of such arrangements are reaching at the gross level. One possible explanation may be the fact that exports of specific sectors are increasing while output in these sectors is also increasing, which means these sectors are creating further employment and hence wages are also increasing, boosting up the household income.

Factor earnings are given in the lower part of the table which validate the results of household income. We see wages of every factor are increasing except non-farm labor which is less skilled. Overall increase in factor earnings for most of the cases is validating our results in the upper part of this table and proving that increase in wage earnings are causing the rise in household income.

**Table 7-42:** Effects on household income and factor wages in Pakistan (%)

<b>Household type</b>	<b>income growth</b>	<b>Household type</b>	<b>income growth</b>
Rural small farmer (1)	0.44	Rural non-farmer (1)	1.29
Rural small farmer (234)	0.42	Rural non-farmer (2)	1.25
Rural medium farmer (1)	0.2	Rural non-farmer (3)	-1.23
Rural medium farmer (234)	0.2	Rural non-farmer (4)	-1.31
Rural landless farmer (1)	0.38	Urban (1)	1.15
Rural landless farmer (234)	0.41	Urban (2)	1.2
Rural farm worker (1)	-0.85	Urban (3)	1.23
Rural farm worker (234)	-0.94	Urban (4)	-1.34
Effects on Factor returns in Pakistan (in %)			
<b>Factor type</b>	<b>Return</b>	<b>Factor type</b>	<b>return</b>
Labor small farmer	1.09	Land medium	1.55
Labor medium farmer	1.12	Land large	1.71
Labor farm worker	1.06	Livestock	0.49
Labor non-farm low skilled	-0.15	Capital agriculture	1.69
Labor non-farm high skilled	0.31	Capital formal	0.04
Land small	1.42	Capital informal	0.36

Source: Author's simulations using GTAP10a

### 7.11.7 Welfare analysis

Table (7.43) provides the results of welfare effects in Pakistan and other countries. In case where Pakistan was not included in the discussions of RCEP on non-tariff measures, Pakistan was losing \$ 389 million of welfare. While in current scenario with proposed mutual recognition with RCEP countries, Pakistan is gaining \$ 1.137 billion in terms of welfare. This welfare is totally coming from allocative efficiency, which means due to RCEP negotiations resources are being reallocated to more efficient sectors causing a net benefit of \$ 1.58 billion. On the subsection of macroeconomic indicators, we saw terms of trade of Pakistan was deteriorating due to which Pakistan

is incurring loss equal to 107 million dollars. On the other hand, investment is also decreasing by 336 million dollars. Overall, Pakistan's gain is appreciable and is equal to \$ 1.137 billion.

**Table 7-43:** Welfare effects in Pakistan's MR with RCEP case (\$ million)

Country	Allocative Efficiency	Terms of Trade	Investment	Total
<b>Australia</b>	13275	6059	-279	19055
<b>Brunei</b>	328	215	-30	512
<b>China</b>	65521	6426	-403	71544
<b>Indonesia</b>	12894	2053	49	14995
<b>Japan</b>	27453	11093	260	38806
<b>Malaysia</b>	21085	3785	278	25148
<b>New Zealand</b>	1226	469	8	1703
<b>Pakistan</b>	1580	-107	-336	1137
<b>Singapore</b>	11984	4804	-9	16779
<b>South Korea</b>	21059	8524	-943	28640
<b>Thailand</b>	5014	2875	-66	7823
<b>Viet Nam</b>	8084	1424	839	10347

Source: Author's simulations using GTAP10a

## 7.12 Sensitivity Analysis

In this section we conduct sensitivity analysis to examine the impact of some of the key modeling assumptions on the overall macroeconomic results. The base model and closure discussed in the previous chapter provides a framework where many key variables like unemployment, current account deficit, government savings and others are assumed exogenous, whereas in alternative setting these assumptions are relaxed one by one and simulations are run. This analysis also provides a way to check the robustness of our previous results. The following alternative assumptions are considered:

### 7.12.1 Unemployment

The unemployment rate in Pakistan, while improving, was reported to be 4.45 in 2021. Keeping this in mind, we test the assumption of unemployment of unskilled labor by

fixing the real wage of unskilled labor, namely farm workers and low skilled non-farm workers.

**Table 7-44:** Impact of mutual recognition on Pakistan’s economy under alternative assumption of unemployment (%)

	Alternative Assumptions			Base Case		
	Output	Exports	Imports	Output	Exports	Imports
<b>Pak China</b>	0.22	10.41	2.77	0.29	7.02	2.19
<b>Pak D-8</b>	0.16	3.58	1.52	0.14	2.25	1
<b>Pak Srilanka</b>	0.01	0.28	0.23	0.01	0.15	0.13
<b>RCEP With Pakistan</b>	0.63	10.2	4.58	0.61	9.5	3.1
<b>RCEP without Pakistan</b>	-0.1	-0.1	-0.69	-0.09	-1.01	-0.62
<b>EU-27</b>	0.21	2.6	1.93	0.19	1.79	1.51
<b>Pak Malaysia</b>	0.06	0.98	0.23	0.03	0.57	0.16
<b>Pak Turkey</b>	0.03	0.14	0.2	0.02	0.12	0.15
<b>Pak-UK</b>	0.14	0.87	1.87	0.08	0.6	1
<b>Pak-USA</b>	0.34	1.31	0.72	0.25	0.72	0.62

Source: Author’s simulations using GTAPI0a

Under the alternative assumption of unemployment, we see that in the long run output is increasing in all trade liberalization scenarios except China. We also witness considerable gains in terms of enhanced trade in all of the FTAs.

### 7.12.2 Trade Balance

It is generally argued that developing countries, such as Pakistan, do not have easy access to foreign capital and hence any increase in investment will not occur due to lack of funding through domestic savings. To examine the impact of this, we assume a fixed trade balance and that investment will be limited.

**Table 7-45:** Impact of mutual recognition on Pakistan’s economy under the alternative assumption of fixed current account balance (%)

	Alternative Assumptions			Base Case		
	Output	Exports	Imports	Output	Exports	Imports
<b>Pak China</b>	0.27	10.21	2.88	0.29	7.02	2.19
<b>Pak D-8</b>	0.16	3.41	1.59	0.14	2.25	1
<b>Pak Sri Lanka</b>	0.01	0.28	0.22	0.01	0.15	0.13
<b>RCEP With Pakistan</b>	0.65	10.2	4.68	0.61	9.5	3.1
<b>RCEP without Pakistan</b>	-0.07	-0.8	-0.4	-0.09	-1.01	-0.62
<b>EU-27</b>	0.19	2.5	1.99	0.19	1.79	1.51
<b>Pak Malaysia</b>	0.03	0.88	0.28	0.03	0.57	0.16
<b>Pak Turkey</b>	0.02	0.26	0.19	0.02	0.12	0.15
<b>Pak-UK</b>	0.13	0.75	1.8	0.08	0.6	1
<b>Pak-USA</b>	0.26	1.33	0.72	0.25	0.72	0.62

Source: Author’s simulations using GTAP10a

Somewhat interesting is that the restriction of foreign savings to fund investment, that is, fixed trade balance scenario, tends to increase the output in most scenarios. This is due to the fact that very poor households benefit directly from the increase in demand for capital goods, primarily heavy manufacturing and utilities & construction, and hence their income rises further when investment is restricted. This effect is also witnessed on the performance of exports and imports in the long run.

### 7.13 Summary

This chapter provides AVE results, simulations results and a detailed discussion. We saw overall textile & wearing apparel sector is facing much of the NTMs manifested in the higher AVE values for this sector. Developed countries, especially EU-27 impose strict SPS measures on Agri- related sectors, meat & livestock, and processed food. While TBT measures are mostly imposed on textile & wearing apparel, extractions, heavy and light manufacturing sectors. In case of GCC, AVE values are in moderate range while in case of UK, again textile sector faces heavy imposition of non-tariff measures while grain crops and other Agri-related sectors face moderate range of



NTMs. In case of USA again AVEs pertain bigger values for Agri-related sectors while value for textile sector is relatively low. In case of D-8 countries, again textile sector faces large non-tariff measures and values for other exporting sectors of Pakistan like grain crops, meat & livestock, and vegetable & fruits are also higher. In case of SAFTA, we see largest average AVE value against textile sector while other sectors are also considerably protected. Results of AVEs for RCEP countries show that on average AVE value of textile sector is highest among all sectors while other sectors are moderately protected. Overall, we see developed countries use SPS measures against agriculture, livestock, and processed food excessively, which is a reason of genuine concern for developing countries like Pakistan. However, one good thing coming out of results is the substantial decrease in AVE values in case of mutual recognition of standards, which means Pakistan can get its traders facilitated if such arrangements are negotiated.

Our CGE results for bilateral FTAs show that in case of China, Pakistan is gaining the highest in terms of aggregate exports and GDP rise, while aggregate imports are also rising. Exports are rising by a big 7.02%, while overall welfare gain is equal to \$ 399 million. However, in case of EU-27, exports are rising by only 1.79% but the welfare gain is above \$ 900 million, and GDP is rising by 0.19%. In case of GCC, Pakistan's exports are rising by 3.09% while imports are rising by 0.9%, mutual recognition arrangements with GCC pertains good effects on household income and factor wages. Though in case of UK, aggregate exports are rising by 0.6% only and imports by 1% while GDP by 0.08% but welfare gains are substantial and equal to \$530 million, mainly due to substantial increase in household income and impressive returns to factors of production. In case of D-8 countries Pakistan is getting the highest gain among member countries in terms of aggregate exports and aggregate imports, though

Pakistan's welfare gains are lowest among members but mutual recognition arrangements with D-8 countries have strong impacts on our household income and factor earnings. In the same way in case of SAFTA, Pakistan is gaining substantially in terms of aggregate exports and aggregate imports, while government income is also increasing substantially, however, Pakistan is gaining the least among member countries in terms of welfare. The encouraging aspect for Pakistan is the increase in exports of its leading sectors.

We have analyzed the results of RCEP in two different scenarios, first where Pakistan is not part of the negotiations on mutual recognition of standards, and then we analyzed the situation where Pakistan successfully negotiates with RCEP countries. In the first case we saw, Pakistan is facing the situation of trade diversion, our exports are decreased, GDP, ToT, and other macroeconomic indicators are also declining, while with decreasing household income and factor wages, overall Pakistan is losing \$ 389 million of welfare. In this case, all the existing members of RCEP are gaining in terms of exports, imports, GDP and welfare, while China and Japan are the highest gainers in respect of welfare with \$ 71 billion and \$ 39 billion respectively. In the second case where Pakistan engages in negotiations with RCEP countries, Pakistan's gains are substantial, exports are rising by 9.5%, imports by 3.1%, GDP by 0.61%, while there is considerable increase in household income. Overall, due to successful proposed negotiations with RCEP Pakistan will gain welfare equal to \$ 1.14 billion, which is enormous for countries like Pakistan. Results are in consensus with Akram *et al.* (2020) which found that in case of agreement with RCEP, exports of cotton, made-up textiles and clothing, fish, cereals, leather products, pharmaceutical products, sugar and sugar confectionary, and light manufacturing will increase, while Pakistan will be able to get necessary raw materials with some concessions from Indonesia and Malaysia.

## CHAPTER 8

### CONCLUSION

This study analyzes the effects of non-tariff measures on the economy, trade, and welfare by estimating the AVEs of NTMs, then as a solution to the problems attached with non-tariff measures, hypothesis of mutual recognition of standards between Pakistan and its trading partners is tested. Price Gap approach is utilized with latest data on NTMs available through ITC. Then MyGTAP model of CGE family is developed to gauge the economy wide effects of these NTMs. Using price gap approach, AVE values, under the assumption of mutual recognition are also estimated. Then both sets of AVEs are incorporated in MyGTAP model and simulation results are taken for the situation where Pakistan and its trade partners are mutually recognizing each other's standards pertaining to NTMs. This chapter concludes the study by summarizing the results of research and based on results and after consultation with the stakeholders, policy recommendations are advanced.

#### 8.1 Conclusions of the study

In this study we have two types of results, firstly, AVEs of non-tariff measures are estimated and then we have CGE simulations results which provide the tool to check whether Pakistan can benefit from mutual recognition of standards with partners. Both types of results are summarized, in bullets, as follows:

- Overall textile & wearing apparel sector is facing much of the NTMs manifested in the higher AVE values for this sector. Developed countries, especially EU27 impose strict SPS measures on Agri- related sectors, meat & livestock, and processed food. While TBT measures are mostly imposed on textile & wearing apparel, extractions, heavy and light manufacturing sectors. It shows that

Pakistan is facing non-tariff barriers for almost all of its leading exporting sectors, which are hindering market access for Pakistani exporters.

- In case of GCC, AVE values are in moderate range, which is also evidenced by the data on NTMs, and it is also a possible reason behind better Pakistani exports to these countries. While in case of UK, again textile sector faces heavy imposition of non-tariff measures while grain crops and other Agri-related sectors face moderate range of NTMs. It shows that Pakistani Agri-traders are facing less problems while exporting to UK markets.
- In case of USA again AVEs pertain bigger values for Agri-related sectors while value for textile sector is relatively low. In case of D-8 countries, again textile sector faces large non-tariff measures and values for other exporting sectors of Pakistan like grain crops, meat & livestock, and vegetable & fruits are also higher. Same is the case for SAFTA and RCEP where textile sector pertains the largest AVE value.
- Overall, we see developed countries use SPS measures against agriculture, livestock, and processed food excessively, which is a reason of genuine concern for developing countries like Pakistan.
- Results show a substantial decrease in AVEs values in case of mutual recognition of standards, which means Pakistan can get its traders facilitated if such arrangements are negotiated.
- CGE results for bilateral FTAs show that in case of China, Pakistan is gaining the highest in terms of aggregate exports and GDP rise, while aggregate imports are also rising. Exports are rising by a big 7.02%, while overall welfare gain is equal to \$ 399 million.

- In case of EU-27, exports are rising by only 1.79% but the welfare gain is above \$ 900 million, and GDP is rising by 0.19%. In case of GCC, Pakistan's exports are rising by 3.09% while imports are rising by 0.9%, mutual recognition arrangements with GCC pertains good effects on household income and factor wages.
- In case of UK, aggregate exports are rising by 0.6% only and imports by 1% while GDP by 0.08% but welfare gains are substantial and equal to \$530 million, mainly due to substantial increase in household income and impressive returns to factors of production. In case of D-8 countries Pakistan is getting the highest gain among member countries in terms of aggregate exports and aggregate imports.
- In case of SAFTA, Pakistan is gaining substantially in terms of aggregate exports and aggregate imports, while government income is also increasing substantially, however, Pakistan is gaining the least among member countries in terms of welfare. The encouraging aspect for Pakistan is the increase in exports of its leading sectors.
- In RCEP, when Pakistan is not part of the negotiations on mutual recognition of standards, then trade diversion is occurring, exports are decreased, GDP, government income, terms of trade and other macroeconomic indicators are facing a decline, while with decreasing household income and factor wages, Pakistan is losing \$ 389 million of welfare.
- When Pakistan engages in proposed negotiations with RCEP countries, Pakistan's gains are substantial, exports are rising by 9.5%, imports by 3.1%, GDP by 0.61%, while there is considerable increase in household income of

majority of the segments and factor wages are also increasing, overall, Pakistan's welfare increases by \$ 1.14 billion.

## **8.2 Policy Recommendations**

This section provides policy recommendations based on the results of the study and consultations with stakeholders.

- Based on the results Pakistan is gaining substantially in terms of exports and welfare, if standards are mutually recognized with GCC, EU-27 and UK. It is recommended that negotiations in the context of non-tariff measures should be started with these countries. GCC markets are easier to enter and due to their proximity deserve special attention. If Pakistan is able to reach some agreement with GCC countries on NTMs for its leading exporting sectors then trade can substantially increase.
- We saw a clear diversion of trade due to current RCEP arrangement, in the long run Pakistan need to expand its export base and destinations. Pakistan needs to negotiate with these countries and if finds some recognition for its local certifications and standards then it will benefit trade and overall economy.
- Survey of the business community given in chapter 2 shows that port restrictions pose a big challenge for South Asian traders, this is even bigger problem in case of landlocked countries. Bangladesh, India, and Pakistan should work to recognize the testing and clearance standards of Afghanistan, Bhutan, and Nepal, so that traders can avoid doubling of procedure.
- SAFTA should proceed to establish such a mechanism that enable member countries to recognize the certificates and tests approved by the equivalent agencies of exporting countries. For example, currently specific food items which require testing for radioactive particles are allowed to be tested by any of

the atomic laboratories in Bangladesh, India, Pakistan. Such agreements should be made for other feasible products also.

- Business community and especially traders are facing various issues due to current tariff regime. It is recommended that tariffs should be rationalized, and slabs should be formed in such a way that basic raw materials necessary for the exporting sectors should be easily and cheaply available. Every type of biases present in current tariff regime must be abolished.
- Laboratories in Pakistan lack the required infrastructure and staff is not well strained, as a result exporter get certifications and sampling testing process in foreign laboratories which again creates extra time wastage. Laboratories must be upgraded according to the international standards, staff must be adequately trained, and Pakistan should make such arrangements with partners that can facilitate the acceptance of these certifications globally.
- Another major problem faced by business community is the unavailability of information regarding regulations and standards. Government bodies should maintain an online portal that guides on local requirements and country specific partner's requirements.
- A major concern on NTMs is related to the low quality of Pakistani certifications and testing. That is why, Pakistani certificates are not generally accepted in the importing markets. It is recommended that the quality and services structure must be improved. These bodies complain about the unavailability of proper budget as the basic reason of low service quality. Government and relevant ministries must show their commitment in this regard.
- It is highly needed to establish a mechanism for testing of pesticides and fertilizers whether locally produced or imported. Pakistan's most NTMs

affected sector is the agriculture sector, and the major obstacle to its exports stem from the issue of maximum residue limit. Pakistani labs test pesticides and fertilizers with only traditional technologies, which are unable to capture the new variants. Scientific research is needed and upgraded technologies must be adopted so that instead of consignment certification in the final round of export process, pesticides can be detected for maximum residue limits in the early stage of checking.

- Mutual recognition of standards with partner countries is only possible if Pakistani laboratories are at par with that of partner countries. So, Pakistan must establish laboratories and other testing services which are accredited internationally, their staff is well trained, and their management system is accountable and transparent. Only after this Pakistan can negotiate with FTA and other trading partners.
- One possible way of establishing such laboratories is the collaboration with other countries and international bodies. For example, TTI is the international laboratory for testing textile and textile fabric. TTI has branches in many countries including Pakistan. In the same way Pakistan can attract laboratories related to agriculture sector, for example AGQ-USA, in Pakistan to time and cost of Agri-Exporters. Further, foreign investment can be attracted to uplift the standard of existing laboratories in Pakistan.
- Once Pakistan can establish internationally accredited laboratories at home then it will be able to negotiate with bilateral partners on the mutual recognition of standards. It can be started from GCC, D-8 and countries of SAFTA. This will make it easier to negotiate with trading blocs like RCEP and EU later on.



### **8.3 Limitations of the study**

Like any other research, present study also have some limitations which mainly pertain to data, methodology, model and scope of the study.

#### **1. FTAs are not fully analyzed**

Whenever trade and welfare analysis of any FTA is analyzed then the first thing which grasp the attention of researcher is the proposed rates of tariff by the partner countries for specific sectors. Concessions also come in the form reduced tariffs or by granting the status of MFN. Keeping in view a lot of research already done in this area, for present study we have only analyzed the NTMs applied by the partners of any FTA, in which Pakistan enters as a member. Tariffs are taken as they prevail in the year of analysis, FTA proposed tariffs or rates for MFN or ignored, as if these are also taken into account then we would be unable to segregate the effect of NTMs from that of tariffs.

#### **2. Data limitations**

For this study we have used the data of ICT, which is basically an updated version of 2016 data, collected and developed by the collaborated effort of UNCTAD, WTO, World Bank and Asian Development Bank. Data on NTMs have been improving over time yet all the datasets being used now a days have some limitations. Some of the limitations of the data used for this study are given in the following:

- I. The data is not comprehensive, in the sense that, sometimes the most important measures are missed while others are counted many times. The reason for double counting is the presence of multiple sources of information.

- II. Data lacks precision. This implies that collected data only talks about the presence of some specific NTM on any specific product. The text which is used to ascertain such presence does not tell anything about the stringency of that regulation. So, we get only a binary number and real extent of this NTM is not translated into the data and hence does not become part of the analysis.
- III. The data is very rich, as it provides information on import related 15 chapters of NTMs from A to O, and all these measures are applied with the same purpose, or they have theoretical same effect on trade. Thus, if every single NTM is added in the estimation equation separately then the problem of multicollinearity and measurement error arise. That is why, NTMs are aggregated in 3 broader categories.
- IV. Another limitation of this data is inapplicability for the time series analysis. The reason is omission of some of the NTMs from the data. Dataset recorded the existing number of notifications at the time of collection. So in the previous year data if for specific NTMs were present but these have been minutely changed, then the researcher will only add up the new notifications in the new data while he has no information about the NTM which is replaced.

### **3. Limitations of methodology**

For this research, price gap approach is used which gives the value of average bilateral AVE of NTMs for a specific sector. From this we can know much about the quantitative effect of NTMs applied, and this information can be used for policy recommendations and for taking specific actions for any sector. However, if for any specific NTM implemented, we can measure the time and

cost involved that a trader must bear, and the sludge is also taken into account then a clearer picture emerges. But such analysis requires a mega business survey and big budget.

#### **4. Limitations of GTAP model**

CGE modeling is a very powerful tool, allowing economists to explore numerically a huge range of issues on which econometric estimation would be impossible; in particular GTAP mode which is used to forecast the effects of future policy changes for the whole economy. Still this model has some limitations:

- I. 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.
- II. While CGE models are quantitative, they are not empirical in the sense of econometric modeling: they are basically theoretical, with limited possibilities for rigorous testing against experience.
- III. 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 behavior, 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 modeling, and therefore, while imperfect, CGE models remain the preferred tool for analysis of global trade policy issues.

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## APPENDIX A: BILATERAL AVES OF NTMS

**Appendix: A1:** Bilateral AVEs of NTMs imposed by Australia on its trading partners

Reporter	Partner	Sector	AVEs without MR			AVEs with MR		
			SPS	TBT	Other	SPS	TBT	Other
Australia	Brunei	extraction	13.7	17.3	13.7	11.7	13.2	13.1
Australia	China	extraction	12.5	10.2	10.7	10.7	7.8	10.3
Australia	Indonesia	extraction	13.6	16.8	13.5	11.6	12.8	12.9
Australia	Japan	extraction	13.3	15.0	12.8	11.4	11.4	12.2
Australia	Korea	extraction	13.4	15.5	13.0	11.5	11.8	12.5
Australia	Malaysia	extraction	13.5	16.5	13.4	11.6	12.6	12.8
Australia	New Zealand	extraction	13.6	17.2	13.6	11.7	13.1	13.1
Australia	Pakistan	extraction	13.6	17.3	13.7	11.7	13.2	13.1
Australia	Singapore	extraction	13.5	16.0	13.2	11.5	12.2	12.6
Australia	Thailand	extraction	13.5	16.5	13.4	11.6	12.6	12.8
Australia	Viet Nam	extraction	13.5	16.4	13.3	11.6	12.5	12.8
Australia	Brunei	Grain crops	17.7	11.4	11.0	15.7	11.0	10.6
Australia	China	Grain crops	15.4	11.0	11.0	13.6	10.6	10.6
Australia	Indonesia	Grain crops	17.6	11.4	11.0	15.6	11.0	10.6
Australia	Japan	Grain crops	17.1	11.3	11.0	15.1	10.9	10.6
Australia	Korea	Grain crops	17.2	11.3	11.0	15.2	10.9	10.6
Australia	Malaysia	Grain crops	17.5	11.4	11.0	15.5	11.0	10.6
Australia	New Zealand	Grain crops	17.7	11.4	11.0	15.7	11.0	10.6
Australia	Pakistan	Grain crops	17.7	11.4	11.0	15.7	11.0	10.6
Australia	Singapore	Grain crops	17.4	11.3	11.0	15.4	10.9	10.6
Australia	Thailand	Grain crops	17.5	11.4	11.0	15.5	11.0	10.6
Australia	Viet Nam	Grain crops	17.5	11.4	11.0	15.5	11.0	10.6
Australia	Brunei	H. Manufacturing	12.8	14.9	10.8	11.9	12.1	
Australia	China	H. Manufacturing	11.6	9.1	9.8	10.8	7.4	
Australia	Indonesia	H. Manufacturing	12.7	14.4	10.8	11.9	11.7	
Australia	Japan	H. Manufacturing	12.4	13.0	10.5	11.6	10.5	
Australia	Korea	H. Manufacturing	12.5	13.4	10.6	11.7	10.9	
Australia	Malaysia	H. Manufacturing	12.7	14.2	10.7	11.8	11.5	
Australia	New Zealand	H. Manufacturing	12.8	14.8	10.8	11.9	12.0	
Australia	Pakistan	H. Manufacturing	12.8	14.9	10.8	11.9	12.0	
Australia	Singapore	H. Manufacturing	12.6	13.8	10.7	11.8	11.2	
Australia	Thailand	H. Manufacturing	12.7	14.2	10.7	11.8	11.5	
Australia	Viet Nam	H. Manufacturing	12.6	14.2	10.7	11.8	11.5	
Australia	Brunei	L. Manufacturing	10.9	13.0	13.0	9.9	11.4	12.5
Australia	China	L. Manufacturing	10.1	11.8	11.2	9.1	10.3	10.8
Australia	Indonesia	L. Manufacturing	10.9	13.0	12.9	9.9	11.4	12.4
Australia	Japan	L. Manufacturing	10.7	12.7	12.5	9.7	11.1	12.0

<b>Australia</b>	Korea	L. Manufacturing	10.7	12.8	12.6	9.7	11.2	12.1
<b>Australia</b>	Malaysia	L. Manufacturing	10.8	12.9	12.8	9.8	11.3	12.3
<b>Australia</b>	New Zealand	L. Manufacturing	10.9	13.0	13.0	9.9	11.4	12.5
<b>Australia</b>	Pakistan	L. Manufacturing	10.9	13.0	13.0	9.9	11.4	12.5
<b>Australia</b>	Singapore	L. Manufacturing	10.8	12.8	12.7	9.8	11.3	12.2
<b>Australia</b>	Thailand	L. Manufacturing	10.8	12.9	12.8	9.8	11.3	12.3
<b>Australia</b>	Viet Nam	L. Manufacturing	10.8	12.9	12.8	9.8	11.3	12.3
<b>Australia</b>	Brunei	Meat & L Stock	36.4	18.5	14.4	27.2	16.4	12.9
<b>Australia</b>	China	Meat & L Stock	29.0	17.8	13.9	21.5	15.8	12.6
<b>Australia</b>	Indonesia	Meat & L Stock	35.9	18.5	14.3	26.8	16.4	12.9
<b>Australia</b>	Japan	Meat & L Stock	34.2	18.3	14.2	25.5	16.3	12.8
<b>Australia</b>	Korea	Meat & L Stock	34.7	18.4	14.3	25.9	16.3	12.8
<b>Australia</b>	Malaysia	Meat & L Stock	35.7	18.5	14.3	26.6	16.4	12.9
<b>Australia</b>	New Zealand	Meat & L Stock	36.3	18.5	14.3	27.1	16.4	12.9
<b>Australia</b>	Pakistan	Meat & L Stock	36.4	18.5	14.4	27.2	16.4	12.9
<b>Australia</b>	Singapore	Meat & L Stock	35.2	18.4	14.3	26.2	16.3	12.9
<b>Australia</b>	Thailand	Meat & L Stock	35.7	18.5	14.3	26.6	16.4	12.9
<b>Australia</b>	Viet Nam	Meat & L Stock	35.6	18.5	14.3	26.6	16.4	12.9
<b>Australia</b>	Brunei	P. Food	13.0	13.0	11.8	11.5	12.1	11.7
<b>Australia</b>	China	P. Food	10.1	11.9	11.0	9.0	11.1	10.9
<b>Australia</b>	Indonesia	P. Food	12.8	12.9	11.8	11.3	12.1	11.6
<b>Australia</b>	Japan	P. Food	12.1	12.7	11.6	10.7	11.8	11.5
<b>Australia</b>	Korea	P. Food	12.3	12.7	11.6	10.9	11.9	11.5
<b>Australia</b>	Malaysia	P. Food	12.7	12.9	11.7	11.3	12.0	11.6
<b>Australia</b>	New Zealand	P. Food	12.9	13.0	11.8	11.5	12.1	11.7
<b>Australia</b>	Pakistan	P. Food	13.0	13.0	11.8	11.5	12.1	11.7
<b>Australia</b>	Singapore	P. Food	12.5	12.8	11.7	11.1	12.0	11.6
<b>Australia</b>	Thailand	P. Food	12.7	12.9	11.7	11.3	12.0	11.6
<b>Australia</b>	Viet Nam	P. Food	12.7	12.9	11.7	11.2	12.0	11.6
<b>Australia</b>	Brunei	Tex. W. Apparel	53.6	71.5	12.3	39.6	37.3	
<b>Australia</b>	China	Tex. W. Apparel	44.4	63.5	10.7	32.2	31.6	
<b>Australia</b>	Indonesia	Tex. W. Apparel	52.9	71.0	12.2	39.1	36.9	
<b>Australia</b>	Japan	Tex. W. Apparel	50.9	69.3	11.9	37.4	35.6	
<b>Australia</b>	Korea	Tex. W. Apparel	51.5	69.8	12.0	37.9	36.0	
<b>Australia</b>	Malaysia	Tex. W. Apparel	52.7	70.7	12.2	38.8	39.1	
<b>Australia</b>	New Zealand	Tex. W. Apparel	53.4	71.4	12.3	39.5	37.2	
<b>Australia</b>	Pakistan	Tex. W. Apparel	53.5	71.4	12.3	39.5	37.2	
<b>Australia</b>	Singapore	Tex. W. Apparel	52.1	70.3	12.1	38.4	36.3	
<b>Australia</b>	Thailand	Tex. W. Apparel	52.7	70.7	12.2	38.8	36.7	
<b>Australia</b>	Viet Nam	Tex. W. Apparel	52.6	70.7	12.2	38.8	36.7	
<b>Australia</b>	Brunei	Vegetables & Fruits	36.4	18.5	14.4	27.2	16.4	12.9
<b>Australia</b>	China	Vegetables & Fruits	29.0	17.8	13.9	21.5	15.8	12.6

<b>Australia</b>	Indonesia	Vegetables & Fruits	35.9	18.5	14.3	26.8	16.4	12.9
<b>Australia</b>	Japan	Vegetables & Fruits	34.2	18.3	14.2	25.5	16.3	12.8
<b>Australia</b>	Korea	Vegetables & Fruits	34.7	18.4	14.3	25.9	16.3	12.8
<b>Australia</b>	Malaysia	Vegetables & Fruits	35.7	18.5	14.3	26.6	16.4	12.9
<b>Australia</b>	New Zealand	Vegetables & Fruits	36.3	18.5	14.3	27.1	16.4	12.9
<b>Australia</b>	Pakistan	Vegetables & Fruits	36.4	18.5	14.4	27.2	16.4	12.9
<b>Australia</b>	Singapore	Vegetables & Fruits	35.2	18.4	14.3	26.2	16.3	12.9
<b>Australia</b>	Thailand	Vegetables & Fruits	35.7	18.5	14.3	26.6	16.4	12.9
<b>Australia</b>	Viet Nam	Vegetables & Fruits	35.6	18.5	14.3	26.6	16.4	12.9

**Appendix A2: Bilateral AVEs of NTMs imposed by Bangladesh on its trading partners**

Reporter	Partner	Sector	AVEs without MR			AVEs with MR		
			SPS	TBT	Other	SPS	TBT	Other
Bangladesh	Egypt	extraction	17.1	19.2	16.2	14.0	17.1	15.6
Bangladesh	India	extraction	16.5	18.3	15.7	13.5	16.3	15.1
Bangladesh	Indonesia	extraction	16.8	18.8	16.0	13.8	16.7	15.4
Bangladesh	Malaysia	extraction	16.7	18.5	15.9	13.6	16.5	15.3
Bangladesh	Pakistan	extraction	17.2	19.2	16.2	14.0	17.1	15.6
Bangladesh	Sri Lanka	extraction	17.2	19.2	16.2	14.0	17.1	15.6
Bangladesh	Turkey	extraction	16.8	18.8	16.0	13.8	16.7	15.4
Bangladesh	Egypt	Grain crops	19.5	15.7	11.5	19.0	14.2	
Bangladesh	India	Grain crops	19.2	15.7	11.5	18.7	14.1	
Bangladesh	Indonesia	Grain crops	19.3	15.7	11.5	18.9	14.1	
Bangladesh	Malaysia	Grain crops	19.3	15.7	11.5	18.8	14.1	
Bangladesh	Pakistan	Grain crops	19.5	15.7	11.5	19.0	14.2	
Bangladesh	Sri Lanka	Grain crops	19.5	15.7	11.5	19.0	14.2	
Bangladesh	Turkey	Grain crops	19.3	15.7	11.5	18.9	14.1	
Bangladesh	Egypt	H. Manufacturing	12.9	46.8	20.4	11.6	30.8	19.9
Bangladesh	India	H. Manufacturing	12.6	45.6	20.3	11.3	29.9	19.8
Bangladesh	Indonesia	H. Manufacturing	12.8	46.2	20.3	11.5	30.4	19.8
Bangladesh	Malaysia	H. Manufacturing	12.7	45.9	20.3	11.4	30.1	19.8
Bangladesh	Pakistan	H. Manufacturing	13.0	46.9	20.4	11.6	30.8	19.9
Bangladesh	Sri Lanka	H. Manufacturing	13.0	46.9	20.4	11.6	30.8	19.9
Bangladesh	Turkey	H. Manufacturing	12.8	46.2	20.3	11.5	30.4	19.8
Bangladesh	Egypt	L. Manufacturing	23.1	48.4	16.8	21.4	44.4	16.0
Bangladesh	India	L. Manufacturing	22.9	47.4	16.6	21.1	43.5	15.8
Bangladesh	Indonesia	L. Manufacturing	23.0	47.9	16.7	21.2	44.0	15.9
Bangladesh	Malaysia	L. Manufacturing	22.9	47.7	16.7	21.2	43.7	15.9
Bangladesh	Pakistan	L. Manufacturing	23.2	48.4	16.8	21.4	44.5	16.0
Bangladesh	Sri Lanka	L. Manufacturing	23.2	48.4	16.8	21.4	44.5	16.0
Bangladesh	Turkey	L. Manufacturing	23.0	47.9	16.7	21.2	44.0	15.9
Bangladesh	Egypt	Meat & L Stock	30.6	17.7	13.5	25.7	14.5	12.6
Bangladesh	India	Meat & L Stock	28.4	17.5	13.3	23.9	14.4	12.5
Bangladesh	Indonesia	Meat & L Stock	29.5	17.6	13.4	24.9	14.5	12.6
Bangladesh	Malaysia	Meat & L Stock	29.0	17.6	13.4	24.4	14.4	12.5
Bangladesh	Pakistan	Meat & L Stock	30.7	17.7	13.5	25.9	14.5	12.6
Bangladesh	Sri Lanka	Meat & L Stock	30.7	17.7	13.5	25.9	14.5	12.6
Bangladesh	Turkey	Meat & L Stock	29.5	17.6	13.4	24.9	14.5	12.6
Bangladesh	Egypt	P. Food	16.8	12.4	11.4	12.7	11.2	10.5
Bangladesh	India	P. Food	16.4	12.1	11.4	12.4	10.9	10.5
Bangladesh	Indonesia	P. Food	16.6	12.3	11.4	12.5	11.1	10.5
Bangladesh	Malaysia	P. Food	16.5	12.2	11.4	12.5	11.0	10.5
Bangladesh	Pakistan	P. Food	16.8	12.4	11.4	12.7	11.2	10.5

<b>Bangladesh</b>	Sri Lanka	P. Food	16.8	12.4	11.4	12.7	11.2	10.5
<b>Bangladesh</b>	Turkey	P. Food	16.6	12.3	11.4	12.5	11.1	10.5
<b>Bangladesh</b>	Egypt	Tex. W. Apparel	15.2	75.6	12.2	11.5	50.7	10.6
<b>Bangladesh</b>	India	Tex. W. Apparel	15.1	74.2	12.2	11.4	49.3	10.6
<b>Bangladesh</b>	Indonesia	Tex. W. Apparel	15.2	74.9	12.2	11.5	50.1	10.6
<b>Bangladesh</b>	Malaysia	Tex. W. Apparel	15.1	74.6	12.2	11.5	49.7	10.6
<b>Bangladesh</b>	Pakistan	Tex. W. Apparel	15.2	75.7	12.2	11.5	50.8	10.6
<b>Bangladesh</b>	Sri Lanka	Tex. W. Apparel	15.2	75.7	12.2	11.5	50.8	10.6
<b>Bangladesh</b>	Turkey	Tex. W. Apparel	15.2	74.9	12.2	11.5	50.1	10.6
<b>Bangladesh</b>	Egypt	Vegetables & Fruits	30.6	17.7	13.5	25.7	14.5	12.6
<b>Bangladesh</b>	India	Vegetables & Fruits	28.4	17.5	13.3	23.9	14.4	12.5
<b>Bangladesh</b>	Indonesia	Vegetables & Fruits	29.5	17.6	13.4	24.9	14.5	12.6
<b>Bangladesh</b>	Malaysia	Vegetables & Fruits	29.0	17.6	13.4	24.4	14.4	12.5
<b>Bangladesh</b>	Pakistan	Vegetables & Fruits	30.7	17.7	13.5	25.9	14.5	12.6
<b>Bangladesh</b>	Sri Lanka	Vegetables & Fruits	30.7	17.7	13.5	25.9	14.5	12.6
<b>Bangladesh</b>	Turkey	Vegetables & Fruits	29.5	17.6	13.4	24.9	14.5	12.6

### Appendix A3: Bilateral AVEs of NTMs imposed by Brunei on its trading partners

Reporter	Partner	Sector	AVEs without MR			AVEs with MR		
			SPS	TBT	Other	SPS	TBT	Other
<b>Brunei</b>	Australia	extraction	16.3	20.6	10.8	15.0	16.3	10.5
<b>Brunei</b>	China	extraction	16.0	14.4	0.2	14.7	11.4	0.2
<b>Brunei</b>	Indonesia	extraction	16.3	20.9	13.3	15.0	16.6	12.9
<b>Brunei</b>	Japan	extraction	16.2	19.2	4.9	14.9	15.2	4.7
<b>Brunei</b>	Korea	extraction	16.3	19.7	6.7	15.0	15.6	6.5
<b>Brunei</b>	Malaysia	extraction	16.3	20.7	11.6	15.0	16.4	11.3
<b>Brunei</b>	New Zealand	extraction	16.3	21.4	16.9	15.0	16.9	16.4
<b>Brunei</b>	Pakistan	extraction	16.3	21.4	17.5	15.0	17.0	17.0
<b>Brunei</b>	Singapore	extraction	16.3	20.2	8.8	15.0	16.0	8.6
<b>Brunei</b>	Thailand	extraction	16.3	20.7	11.6	15.0	16.4	11.3
<b>Brunei</b>	Viet Nam	extraction	16.3	20.6	11.2	15.0	16.4	10.9
<b>Brunei</b>	Australia	Grain crops	18.8	14.3	11.6	15.2	12.7	10.4
<b>Brunei</b>	China	Grain crops	15.2	13.8	11.2	12.2	12.2	10.1
<b>Brunei</b>	Indonesia	Grain crops	19.0	14.3	11.6	15.4	12.7	10.5
<b>Brunei</b>	Japan	Grain crops	18.0	14.2	11.5	14.6	12.6	10.4
<b>Brunei</b>	Korea	Grain crops	18.3	14.2	11.5	14.8	12.6	10.4
<b>Brunei</b>	Malaysia	Grain crops	18.9	14.3	11.6	15.2	12.7	10.4
<b>Brunei</b>	New Zealand	Grain crops	19.2	14.3	11.6	15.6	12.7	10.5
<b>Brunei</b>	Pakistan	Grain crops	19.3	14.4	11.6	15.6	12.7	10.5
<b>Brunei</b>	Singapore	Grain crops	18.6	14.3	11.6	15.0	12.6	10.4
<b>Brunei</b>	Thailand	Grain crops	18.9	14.3	11.6	15.2	12.7	10.4
<b>Brunei</b>	Viet Nam	Grain crops	18.8	14.3	11.6	15.2	12.7	10.4
<b>Brunei</b>	Australia	H. Manufacturing	14.5	51.3	15.1	12.4	38.4	14.6

<b>Brunei</b>	China	H. Manufacturing	14.0	11.7	13.9	12.0	8.4	13.4
<b>Brunei</b>	Indonesia	H. Manufacturing	14.5	54.7	15.1	12.4	41.3	14.7
<b>Brunei</b>	Japan	H. Manufacturing	14.4	39.6	14.8	12.3	29.0	14.4
<b>Brunei</b>	Korea	H. Manufacturing	14.5	43.9	14.9	12.3	32.5	14.5
<b>Brunei</b>	Malaysia	H. Manufacturing	14.5	52.4	15.1	12.4	39.4	14.6
<b>Brunei</b>	New Zealand	H. Manufacturing	14.6	58.7	15.2	12.4	44.7	14.7
<b>Brunei</b>	Pakistan	H. Manufacturing	14.6	59.3	15.2	12.4	45.2	14.7
<b>Brunei</b>	Singapore	H. Manufacturing	14.5	48.1	15.0	12.4	35.8	14.5
<b>Brunei</b>	Thailand	H. Manufacturing	14.5	52.4	15.1	12.4	39.4	14.6
<b>Brunei</b>	Viet Nam	H. Manufacturing	14.5	51.9	15.1	12.4	38.9	14.6
<b>Brunei</b>	Australia	L. Manufacturing	14.0	60.6	15.3	12.3	43.9	14.0
<b>Brunei</b>	China	L. Manufacturing	13.0	32.6	14.2	11.4	22.3	13.1
<b>Brunei</b>	Indonesia	L. Manufacturing	14.0	62.3	15.3	12.3	45.3	14.1
<b>Brunei</b>	Japan	L. Manufacturing	13.8	54.4	15.1	12.1	38.8	13.8
<b>Brunei</b>	Korea	L. Manufacturing	13.9	56.8	15.1	12.2	40.7	13.9
<b>Brunei</b>	Malaysia	L. Manufacturing	14.0	61.2	15.3	12.3	44.4	14.1
<b>Brunei</b>	New Zealand	L. Manufacturing	14.1	64.2	15.4	12.4	47.0	14.1
<b>Brunei</b>	Pakistan	L. Manufacturing	14.1	64.5	15.4	12.4	47.3	14.2
<b>Brunei</b>	Singapore	L. Manufacturing	13.9	59.0	15.2	12.2	42.5	14.0
<b>Brunei</b>	Thailand	L. Manufacturing	14.0	61.2	15.3	12.3	44.4	14.1
<b>Brunei</b>	Viet Nam	L. Manufacturing	14.0	60.9	15.3	12.3	44.1	14.0
<b>Brunei</b>	Australia	Meat & L Stock	41.9	22.9	11.7	32.2	19.8	11.5
<b>Brunei</b>	China	Meat & L Stock	34.4	22.9	11.5	26.2	19.8	11.4
<b>Brunei</b>	Indonesia	Meat & L Stock	42.3	22.9	11.7	32.6	19.8	11.5
<b>Brunei</b>	Japan	Meat & L Stock	40.4	22.9	11.7	31.0	19.8	11.5
<b>Brunei</b>	Korea	Meat & L Stock	41.0	22.9	11.7	31.5	19.8	11.5
<b>Brunei</b>	Malaysia	Meat & L Stock	42.0	22.9	11.7	32.3	19.8	11.5
<b>Brunei</b>	New Zealand	Meat & L Stock	42.8	22.9	11.7	33.0	19.8	11.6
<b>Brunei</b>	Pakistan	Meat & L Stock	42.9	22.9	11.7	33.0	19.8	11.6
<b>Brunei</b>	Singapore	Meat & L Stock	41.5	22.9	11.7	31.9	19.8	11.5
<b>Brunei</b>	Thailand	Meat & L Stock	42.0	22.9	11.7	32.3	19.8	11.5
<b>Brunei</b>	Viet Nam	Meat & L Stock	42.0	22.9	11.7	32.3	19.8	11.5
<b>Brunei</b>	Australia	P. Food	19.6	12.6	14.7	15.6	11.9	12.7
<b>Brunei</b>	China	P. Food	15.5	11.8	14.7	12.4	11.1	12.7
<b>Brunei</b>	Indonesia	P. Food	19.8	12.6	14.8	15.8	11.9	12.7
<b>Brunei</b>	Japan	P. Food	18.7	12.4	14.7	15.0	11.7	12.7
<b>Brunei</b>	Korea	P. Food	19.0	12.5	14.7	15.2	11.8	12.7
<b>Brunei</b>	Malaysia	P. Food	19.6	12.6	14.7	15.7	11.9	12.7
<b>Brunei</b>	New Zealand	P. Food	20.1	12.7	14.8	16.1	12.0	12.7
<b>Brunei</b>	Pakistan	P. Food	20.1	12.7	14.8	16.1	12.0	12.7
<b>Brunei</b>	Singapore	P. Food	19.3	12.5	14.7	15.5	11.8	12.7
<b>Brunei</b>	Thailand	P. Food	19.6	12.6	14.7	15.7	11.9	12.7



<b>Brunei</b>	Viet Nam	P. Food	19.6	12.6	14.7	15.7	11.9	12.7
<b>Brunei</b>	Australia	Tex. W. Apparel	13.2	45.5	11.8	11.4	33.6	11.6
<b>Brunei</b>	China	Tex. W. Apparel	12.2	21.6	11.5	10.6	15.5	11.3
<b>Brunei</b>	Indonesia	Tex. W. Apparel	13.2	47.1	11.9	11.4	34.8	11.6
<b>Brunei</b>	Japan	Tex. W. Apparel	13.0	39.7	11.8	11.2	29.0	11.5
<b>Brunei</b>	Korea	Tex. W. Apparel	13.1	41.9	11.8	11.3	30.7	11.5
<b>Brunei</b>	Malaysia	Tex. W. Apparel	13.2	46.0	11.8	11.4	34.0	11.6
<b>Brunei</b>	New Zealand	Tex. W. Apparel	13.3	49.0	11.9	11.5	36.4	11.6
<b>Brunei</b>	Pakistan	Tex. W. Apparel	13.3	49.3	11.9	11.5	36.6	11.6
<b>Brunei</b>	Singapore	Tex. W. Apparel	13.1	43.9	11.8	11.4	32.3	11.6
<b>Brunei</b>	Thailand	Tex. W. Apparel	13.2	46.0	11.8	11.4	34.0	11.6
<b>Brunei</b>	Viet Nam	Tex. W. Apparel	13.2	45.7	11.8	11.4	33.8	11.6
<b>Brunei</b>	Australia	Vegetables & Fruits	41.9	22.9	11.7	32.2	19.8	11.5
<b>Brunei</b>	China	Vegetables & Fruits	34.4	22.9	11.5	26.2	19.8	11.4
<b>Brunei</b>	Indonesia	Vegetables & Fruits	42.3	22.9	11.7	32.6	19.8	11.5
<b>Brunei</b>	Japan	Vegetables & Fruits	40.4	22.9	11.7	31.0	19.8	11.5
<b>Brunei</b>	Korea	Vegetables & Fruits	41.0	22.9	11.7	31.5	19.8	11.5
<b>Brunei</b>	Malaysia	Vegetables & Fruits	42.0	22.9	11.7	32.3	19.8	11.5
<b>Brunei</b>	New Zealand	Vegetables & Fruits	42.8	22.9	11.7	33.0	19.8	11.6
<b>Brunei</b>	Pakistan	Vegetables & Fruits	42.9	22.9	11.7	33.0	19.8	11.6
<b>Brunei</b>	Singapore	Vegetables & Fruits	41.5	22.9	11.7	31.9	19.8	11.5
<b>Brunei</b>	Thailand	Vegetables & Fruits	42.0	22.9	11.7	32.3	19.8	11.5
<b>Brunei</b>	Viet Nam	Vegetables & Fruits	42.0	22.9	11.7	32.3	19.8	11.5

#### Appendix A4: Bilateral AVEs of NTMs imposed by China on its trading partners

Reporter	Partner	Sector	AVEs without MR			AVEs with MR		
			SPS	TBT	Other	SPS	TBT	Other
<b>China</b>	Australia	extraction	18.0	25.3	15.0	16.7	20.3	12.1
<b>China</b>	Brunei	extraction	18.1	25.6	15.0	16.8	20.6	12.2
<b>China</b>	Indonesia	extraction	18.0	25.4	15.0	16.7	20.5	12.1
<b>China</b>	Japan	extraction	17.8	24.7	14.9	16.5	19.9	12.0
<b>China</b>	Korea	extraction	17.9	24.9	14.9	16.5	20.1	12.1
<b>China</b>	Malaysia	extraction	18.0	25.3	15.0	16.7	20.4	12.1
<b>China</b>	New Zealand	extraction	18.1	25.6	15.0	16.8	20.6	12.2
<b>China</b>	Pakistan	extraction	18.1	25.6	15.0	16.8	20.6	12.2
<b>China</b>	Singapore	extraction	17.9	25.1	14.9	16.6	20.2	12.1
<b>China</b>	Thailand	extraction	18.0	25.3	15.0	16.7	20.4	12.1
<b>China</b>	Viet Nam	extraction	18.0	25.3	15.0	16.7	20.4	12.1
<b>China</b>	Australia	Grain crops	20.1	13.3	10.7	13.9	12.2	
<b>China</b>	Brunei	Grain crops	20.4	13.4	10.7	14.1	12.3	
<b>China</b>	Indonesia	Grain crops	20.2	13.4	10.7	14.0	12.2	
<b>China</b>	Japan	Grain crops	19.6	13.2	10.7	13.5	12.1	

<b>China</b>	Korea	Grain crops	19.8	13.3	10.7	13.7	12.2		
<b>China</b>	Malaysia	Grain crops	20.1	13.4	10.7	13.9	12.2		
<b>China</b>	New Zealand	Grain crops	20.4	13.4	10.7	14.1	12.3		
<b>China</b>	Pakistan	Grain crops	20.4	13.4	10.7	14.1	12.3		
<b>China</b>	Singapore	Grain crops	20.0	13.3	10.7	13.8	12.2		
<b>China</b>	Thailand	Grain crops	20.1	13.4	10.7	13.9	12.2		
<b>China</b>	Viet Nam	Grain crops	20.1	13.3	10.7	13.9	12.2		
<b>China</b>	Australia	H. Manufacturing	13.4	45.3	12.5	12.1	40.0	11.0	
<b>China</b>	Brunei	H. Manufacturing	13.6	45.7	13.1	12.3	40.5	11.5	
<b>China</b>	Indonesia	H. Manufacturing	13.5	45.5	12.7	12.2	40.2	11.2	
<b>China</b>	Japan	H. Manufacturing	13.2	44.5	11.6	11.9	39.4	10.2	
<b>China</b>	Korea	H. Manufacturing	13.3	44.8	11.9	12.0	39.6	10.5	
<b>China</b>	Malaysia	H. Manufacturing	13.4	45.3	12.5	12.1	40.1	11.0	
<b>China</b>	New Zealand	H. Manufacturing	13.5	45.7	13.0	12.3	40.4	11.4	
<b>China</b>	Pakistan	H. Manufacturing	13.6	45.7	13.0	12.3	40.5	11.5	
<b>China</b>	Singapore	H. Manufacturing	13.4	45.1	12.2	12.1	39.9	10.8	
<b>China</b>	Thailand	H. Manufacturing	13.4	45.3	12.5	12.1	40.1	11.0	
<b>China</b>	Viet Nam	H. Manufacturing	13.4	45.3	12.5	12.1	40.1	11.0	
<b>China</b>	Australia	L. Manufacturing	13.0	36.4	12.8	12.4	31.9	11.7	
<b>China</b>	Brunei	L. Manufacturing	13.1	37.0	12.9	12.5	32.4	11.8	
<b>China</b>	Indonesia	L. Manufacturing	13.1	36.7	12.8	12.4	32.1	11.8	
<b>China</b>	Japan	L. Manufacturing	12.8	35.5	12.6	12.2	31.1	11.5	
<b>China</b>	Korea	L. Manufacturing	12.9	35.9	12.7	12.2	31.4	11.6	
<b>China</b>	Malaysia	L. Manufacturing	13.0	36.5	12.8	12.4	32.0	11.7	
<b>China</b>	New Zealand	L. Manufacturing	13.1	37.0	12.9	12.5	32.4	11.8	
<b>China</b>	Pakistan	L. Manufacturing	13.1	37.0	12.9	12.5	32.4	11.8	
<b>China</b>	Singapore	L. Manufacturing	12.9	36.2	12.7	12.3	31.7	11.7	
<b>China</b>	Thailand	L. Manufacturing	13.0	36.5	12.8	12.4	32.0	11.7	
<b>China</b>	Viet Nam	L. Manufacturing	13.0	36.5	12.8	12.4	31.9	11.7	
<b>China</b>	Australia	Meat & L Stock	19.9	17.9	13.4	15.8	16.2	13.0	
<b>China</b>	Brunei	Meat & L Stock	20.2	17.9	13.4	16.0	16.2	13.1	
<b>China</b>	Indonesia	Meat & L Stock	20.0	17.9	13.4	15.9	16.2	13.0	
<b>China</b>	Japan	Meat & L Stock	19.6	17.9	13.2	15.5	16.2	12.9	
<b>China</b>	Korea	Meat & L Stock	19.7	17.9	13.3	15.6	16.2	12.9	
<b>China</b>	Malaysia	Meat & L Stock	20.0	17.9	13.4	15.8	16.2	13.0	
<b>China</b>	New Zealand	Meat & L Stock	20.2	17.9	13.4	16.0	16.2	13.1	
<b>China</b>	Pakistan	Meat & L Stock	20.2	17.9	13.4	16.0	16.2	13.1	
<b>China</b>	Singapore	Meat & L Stock	19.9	17.9	13.3	15.7	16.2	12.9	
<b>China</b>	Thailand	Meat & L Stock	20.0	17.9	13.4	15.8	16.2	13.0	
<b>China</b>	Viet Nam	Meat & L Stock	20.0	17.9	13.4	15.8	16.2	13.0	
<b>China</b>	Australia	P. Food	16.8	15.1	10.5	15.8	14.6	10.2	
<b>China</b>	Brunei	P. Food	16.9	15.1	10.5	15.9	14.6	10.2	

<b>China</b>	Indonesia	P. Food	16.8	15.1	10.5	15.9	14.6	10.2
<b>China</b>	Japan	P. Food	16.6	15.0	10.5	15.7	14.5	10.2
<b>China</b>	Korea	P. Food	16.7	15.0	10.5	15.7	14.5	10.2
<b>China</b>	Malaysia	P. Food	16.8	15.1	10.5	15.8	14.6	10.2
<b>China</b>	New Zealand	P. Food	16.9	15.1	10.5	15.9	14.6	10.2
<b>China</b>	Pakistan	P. Food	16.9	15.1	10.5	15.9	14.6	10.2
<b>China</b>	Singapore	P. Food	16.8	15.1	10.5	15.8	14.6	10.2
<b>China</b>	Thailand	P. Food	16.8	15.1	10.5	15.8	14.6	10.2
<b>China</b>	Viet Nam	P. Food	16.8	15.1	10.5	15.8	14.6	10.2
<b>China</b>	Australia	Tex. W. Apparel	14.3	35.7	11.3	12.9	31.6	11.0
<b>China</b>	Brunei	Tex. W. Apparel	14.6	36.6	11.4	13.1	32.3	11.1
<b>China</b>	Indonesia	Tex. W. Apparel	14.5	36.1	11.3	13.0	31.9	11.0
<b>China</b>	Japan	Tex. W. Apparel	13.9	34.4	11.2	12.4	30.4	10.9
<b>China</b>	Korea	Tex. W. Apparel	14.0	34.9	11.3	12.6	30.9	11.0
<b>China</b>	Malaysia	Tex. W. Apparel	14.4	35.8	11.3	12.9	31.7	11.0
<b>China</b>	New Zealand	Tex. W. Apparel	14.6	36.5	11.4	13.1	32.3	11.1
<b>China</b>	Pakistan	Tex. W. Apparel	14.6	36.5	11.4	13.1	32.3	11.1
<b>China</b>	Singapore	Tex. W. Apparel	14.2	35.4	11.3	12.7	31.3	11.0
<b>China</b>	Thailand	Tex. W. Apparel	14.4	35.8	11.3	12.9	31.7	11.0
<b>China</b>	Viet Nam	Tex. W. Apparel	14.4	35.8	11.3	12.9	31.6	11.0
<b>China</b>	Australia	Vegetables & Fruits	19.9	17.9	13.4	15.8	16.2	13.0
<b>China</b>	Brunei	Vegetables & Fruits	20.2	17.9	13.4	16.0	16.2	13.1
<b>China</b>	Indonesia	Vegetables & Fruits	20.0	17.9	13.4	15.9	16.2	13.0
<b>China</b>	Japan	Vegetables & Fruits	19.6	17.9	13.2	15.5	16.2	12.9
<b>China</b>	Korea	Vegetables & Fruits	19.7	17.9	13.3	15.6	16.2	12.9
<b>China</b>	Malaysia	Vegetables & Fruits	20.0	17.9	13.4	15.8	16.2	13.0
<b>China</b>	New Zealand	Vegetables & Fruits	20.2	17.9	13.4	16.0	16.2	13.1
<b>China</b>	Pakistan	Vegetables & Fruits	20.2	17.9	13.4	16.0	16.2	13.1
<b>China</b>	Singapore	Vegetables & Fruits	19.9	17.9	13.3	15.7	16.2	12.9
<b>China</b>	Thailand	Vegetables & Fruits	20.0	17.9	13.4	15.8	16.2	13.0
<b>China</b>	Viet Nam	Vegetables & Fruits	20.0	17.9	13.4	15.8	16.2	13.0

#### Appendix A5: Bilateral AVEs of NTMs imposed by Egypt on its trading partners

Reporter	Partner	Sector	AVEs without MR			AVEs with MR		
			SPS	TBT	Other	SPS	TBT	Other
<b>Egypt</b>	Bangladesh	extraction	16.4	20.5	17.9	15.0	16.8	16.7
<b>Egypt</b>	Indonesia	extraction	16.2	20.4	17.5	14.8	16.6	16.4
<b>Egypt</b>	Malaysia	extraction	16.0	20.2	17.3	14.7	16.5	16.2
<b>Egypt</b>	Pakistan	extraction	16.5	20.6	18.0	15.1	16.8	16.8
<b>Egypt</b>	Turkey	extraction	16.2	20.4	17.5	14.8	16.6	16.4
<b>Egypt</b>	Bangladesh	Grain crops	22.1	13.3	14.1	18.7	11.2	11.1
<b>Egypt</b>	Indonesia	Grain crops	21.8	13.2	14.1	18.5	11.1	11.1

<b>Egypt</b>	Malaysia	Grain crops	21.6	13.1	14.1	18.3	11.0	11.1
<b>Egypt</b>	Pakistan	Grain crops	22.2	13.4	14.1	18.8	11.3	11.1
<b>Egypt</b>	Turkey	Grain crops	21.8	13.2	14.1	18.5	11.1	11.1
<b>Egypt</b>	Bangladesh	H. Manufacturing	12.1	34.9	10.6	11.5	32.1	
<b>Egypt</b>	Indonesia	H. Manufacturing	12.0	34.6	10.6	11.4	31.8	
<b>Egypt</b>	Malaysia	H. Manufacturing	12.0	34.4	10.6	11.3	31.6	
<b>Egypt</b>	Pakistan	H. Manufacturing	12.1	35.0	10.6	11.5	32.2	
<b>Egypt</b>	Turkey	H. Manufacturing	12.0	34.6	10.6	11.4	31.8	
<b>Egypt</b>	Bangladesh	L. Manufacturing	15.2	59.9	14.6	13.0	52.0	14.1
<b>Egypt</b>	Indonesia	L. Manufacturing	15.2	59.8	14.5	13.0	51.9	14.1
<b>Egypt</b>	Malaysia	L. Manufacturing	15.2	59.7	14.5	12.9	51.8	14.0
<b>Egypt</b>	Pakistan	L. Manufacturing	15.2	59.9	14.6	13.0	52.0	14.2
<b>Egypt</b>	Turkey	L. Manufacturing	15.2	59.8	14.5	13.0	51.9	14.1
<b>Egypt</b>	Bangladesh	Meat & L Stock	18.0	15.4	12.1	15.3	14.1	11.7
<b>Egypt</b>	Indonesia	Meat & L Stock	18.0	15.3	12.1	15.3	14.1	11.6
<b>Egypt</b>	Malaysia	Meat & L Stock	18.0	15.2	12.0	15.3	14.0	11.6
<b>Egypt</b>	Pakistan	Meat & L Stock	18.0	15.4	12.1	15.3	14.2	11.7
<b>Egypt</b>	Turkey	Meat & L Stock	18.0	15.3	12.1	15.3	14.1	11.6
<b>Egypt</b>	Bangladesh	P. Food	45.2	12.4		35.1	10.9	
<b>Egypt</b>	Indonesia	P. Food	44.8	11.5		34.8	10.1	
<b>Egypt</b>	Malaysia	P. Food	44.6	10.9		34.7	9.7	
<b>Egypt</b>	Pakistan	P. Food	45.3	12.7		35.2	11.2	
<b>Egypt</b>	Turkey	P. Food	44.8	11.5		34.8	10.1	
<b>Egypt</b>	Bangladesh	Tex. W. Apparel	30.9	79.2	14.5	21.8	49.3	
<b>Egypt</b>	Indonesia	Tex. W. Apparel	30.9	78.3	14.4	21.7	48.3	
<b>Egypt</b>	Malaysia	Tex. W. Apparel	30.9	77.6	14.3	21.7	47.7	
<b>Egypt</b>	Pakistan	Tex. W. Apparel	30.9	79.5	14.6	21.8	49.6	
<b>Egypt</b>	Turkey	Tex. W. Apparel	30.9	78.3	14.4	21.7	48.3	
<b>Egypt</b>	Bangladesh	Vegetables & Fruits	18.0	15.4	12.1	15.3	14.1	11.7
<b>Egypt</b>	Indonesia	Vegetables & Fruits	18.0	15.3	12.1	15.3	14.1	11.6
<b>Egypt</b>	Malaysia	Vegetables & Fruits	18.0	15.2	12.0	15.3	14.0	11.6
<b>Egypt</b>	Pakistan	Vegetables & Fruits	18.0	15.4	12.1	15.3	14.2	11.7
<b>Egypt</b>	Turkey	Vegetables & Fruits	18.0	15.3	12.1	15.3	14.1	11.6

#### Appendix A6: Bilateral AVEs of NTMs imposed by EU-27 on its trading partners

Reporter	Partner	Sector	AVEs without MR			AVEs with MR		
			SPS	TBT	Other	SPS	TBT	Other
<b>EU-27</b>	Pakistan	extraction	29.3	28.5	12.8	22.0	20.7	12.5
<b>EU-27</b>	Pakistan	Grain crops	65.0	12.5	11.0	39.9	12.1	
<b>EU-27</b>	Pakistan	H. Manufacturing	10.9	14.5	11.0	10.4	13.9	10.2
<b>EU-27</b>	Pakistan	L. Manufacturing	10.8	13.2	10.3	10.8	12.4	10.3
<b>EU-27</b>	Pakistan	Meat & L Stock	20.2	17.9	11.6	18.0	16.2	11.3
<b>EU-27</b>	Pakistan	P. Food	13.5	13.7	10.9	11.6	12.4	10.4
<b>EU-27</b>	Pakistan	Tex. W. Apparel	13.9	44.5	14.7	13.3	35.3	13.6

EU-27	Pakistan	Vegetables & Fruits	20.2	17.9	11.6	18.0	16.2	11.3
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#### Appendix A7: Bilateral AVEs of NTMs imposed by GCC on its trading partners

Reporter	Partner	Sector	AVEs without MR			AVEs with MR		
			SPS	TBT	Other	SPS	TBT	Other
GCC	Pakistan	extraction	19.6	21.4	17.9	16.8	14.2	17.1
GCC	Pakistan	Grain crops	21.5	13.9	11.1	19.0	12.2	10.9
GCC	Pakistan	H. Manufacturing	12.6	16.9	11.0	12.2	13.2	10.2
GCC	Pakistan	L. Manufacturing	11.5	49.8	11.7	10.8	21.4	11.0
GCC	Pakistan	Meat & L Stock	11.6	10.4	11.4	10.3	9.7	9.9
GCC	Pakistan	P. Food	24.8	11.6		20.3	10.6	
GCC	Pakistan	Tex. W. Apparel	11.0	19.6	10.5	10.3	17.4	9.9
GCC	Pakistan	Vegetables & Fruits	11.6	10.4	11.4	10.3	9.7	9.9

#### Appendix A8: Bilateral AVEs of NTMs imposed by India on its trading partners

Reporter	Partner	Sector	AVEs without MR			AVEs with MR		
			SPS	TBT	Other	SPS	TBT	Other
India	Bangladesh	extraction	16.1	19.2	17.0	14.4	15.7	16.4
India	Pakistan	extraction	16.2	19.3	17.2	14.5	15.8	16.5
India	Sri Lanka	extraction	16.2	19.3	17.2	14.5	15.8	16.5
India	Bangladesh	Grain crops	17.7	17.7	11.6	17.0	15.9	
India	Pakistan	Grain crops	17.8	17.7	11.6	17.0	15.9	
India	Sri Lanka	Grain crops	17.8	17.7	11.6	17.0	15.9	
India	Bangladesh	H. Manufacturing	20.3	46.7	13.0	18.3	43.7	12.7
India	Pakistan	H. Manufacturing	20.4	46.9	13.0	18.3	43.8	12.7
India	Sri Lanka	H. Manufacturing	20.4	46.9	13.0	18.3	43.8	12.7
India	Bangladesh	L. Manufacturing	30.0	36.3	14.0	29.1	31.3	13.5
India	Pakistan	L. Manufacturing	30.0	36.5	14.0	29.2	31.4	13.5
India	Sri Lanka	L. Manufacturing	30.0	36.5	14.0	29.2	31.4	13.5
India	Bangladesh	Meat & L Stock	30.0	17.6	11.7	25.2	16.6	9.6
India	Pakistan	Meat & L Stock	30.6	17.7	11.7	25.7	16.6	9.6
India	Sri Lanka	Meat & L Stock	30.6	17.7	11.7	25.7	16.6	9.6
India	Bangladesh	P. Food	12.7	11.7	11.4	10.8	11.1	
India	Pakistan	P. Food	12.7	11.8	11.4	10.8	11.1	
India	Sri Lanka	P. Food	12.7	11.8	11.4	10.8	11.1	
India	Bangladesh	Tex. W. Apparel	15.2	74.1	12.2	10.5	56.6	
India	Pakistan	Tex. W. Apparel	15.2	74.2	12.2	10.5	56.6	
India	Sri Lanka	Tex. W. Apparel	15.2	74.2	12.2	10.5	56.6	
India	Bangladesh	Vegetables & Fruits	30.0	17.6	11.7	25.2	16.6	9.6
India	Pakistan	Vegetables & Fruits	30.6	17.7	11.7	25.7	16.6	9.6
India	Sri Lanka	Vegetables & Fruits	30.6	17.7	11.7	25.7	16.6	9.6

**Appendix A9: Bilateral AVEs of NTMs imposed by Indonesia on its trading partners**

Reporter	Partner	Sector	AVEs without MR			AVEs with MR		
			SPS	TBT	Other	SPS	TBT	Other
Indonesia	Australia	extraction	16.6	18.7	15.3	13.6	16.7	14.7
Indonesia	Bangladesh	extraction	17.1	19.1	15.9	14.0	17.1	15.3
Indonesia	Brunei	extraction	17.2	19.2	16.1	14.0	17.2	15.4
Indonesia	China	extraction	12.5	14.9	10.4	10.2	13.3	10.0
Indonesia	Egypt	extraction	17.1	19.2	16.0	14.0	17.1	10.9
Indonesia	Japan	extraction	15.7	17.9	14.2	12.8	16.0	13.7
Indonesia	Korea	extraction	16.1	18.2	14.6	13.1	16.2	14.1
Indonesia	Malaysia	extraction	16.7	18.8	15.4	13.6	16.7	14.8
Indonesia	New Zealand	extraction	17.1	19.2	16.0	14.0	17.1	15.4
Indonesia	Pakistan	extraction	17.2	19.2	16.0	14.0	17.1	15.4
Indonesia	Singapore	extraction	16.4	18.5	15.0	13.4	16.5	14.5
Indonesia	Thailand	extraction	16.7	18.8	15.4	13.6	16.7	14.8
Indonesia	Turkey	extraction	16.8	18.9	15.6	13.8	16.9	15.0
Indonesia	Viet Nam	extraction	16.6	18.8	15.4	13.6	16.7	14.8
Indonesia	Australia	Grain crops	30.8	16.0	12.8	25.5	15.3	10.9
Indonesia	Bangladesh	Grain crops	30.9	16.1	12.8	25.5	15.4	10.9
Indonesia	Brunei	Grain crops	30.9	16.1	12.8	25.5	15.4	10.9
Indonesia	China	Grain crops	30.2	15.1	12.8	25.0	14.4	10.9
Indonesia	Egypt	Grain crops	30.9	16.1	12.8	25.5	15.4	10.9
Indonesia	Japan	Grain crops	30.7	15.8	12.8	25.4	15.1	10.9
Indonesia	Korea	Grain crops	30.7	15.9	12.8	25.4	15.2	10.9
Indonesia	Malaysia	Grain crops	30.8	16.0	12.8	25.5	15.3	10.9
Indonesia	New Zealand	Grain crops	30.9	16.1	12.8	25.5	15.4	10.9
Indonesia	Pakistan	Grain crops	30.9	16.1	12.8	25.5	15.4	10.9
Indonesia	Singapore	Grain crops	30.8	16.0	12.8	25.5	15.3	10.9
Indonesia	Thailand	Grain crops	30.8	16.0	12.8	25.5	15.3	10.9
Indonesia	Turkey	Grain crops	30.8	16.1	12.8	25.5	15.3	10.9
Indonesia	Viet Nam	Grain crops	30.8	16.0	12.8	25.5	15.3	10.9
Indonesia	Australia	H. Manufacturing	23.6	36.0		22.0	25.7	
Indonesia	Bangladesh	H. Manufacturing	23.8	36.3		22.3	26.0	
Indonesia	Brunei	H. Manufacturing	23.9	36.4		22.3	26.0	
Indonesia	China	H. Manufacturing	21.1	32.4		19.7	23.1	
Indonesia	Egypt	H. Manufacturing	23.9	36.4		22.3	26.0	
Indonesia	Japan	H. Manufacturing	23.1	35.3		21.5	25.2	
Indonesia	Korea	H. Manufacturing	23.3	35.5		21.7	25.4	
Indonesia	Malaysia	H. Manufacturing	23.6	36.0		22.1	25.8	
Indonesia	New Zealand	H. Manufacturing	23.9	36.4		22.3	26.0	
Indonesia	Pakistan	H. Manufacturing	23.9	36.4		22.3	26.0	
Indonesia	Singapore	H. Manufacturing	23.4	35.8		21.9	25.6	

<b>Indonesia</b>	Thailand	H. Manufacturing	23.6	36.0		22.1	25.8		
<b>Indonesia</b>	Turkey	H. Manufacturing	23.7	36.2		22.1	25.8		
<b>Indonesia</b>	Viet Nam	H. Manufacturing	23.6	36.0		22.0	25.7		
<b>Indonesia</b>	Australia	L. Manufacturing	14.5	57.9	13.4	12.4	50.1	13.0	
<b>Indonesia</b>	Bangladesh	L. Manufacturing	14.6	58.0	13.5	12.4	50.3	13.1	
<b>Indonesia</b>	Brunei	L. Manufacturing	14.6	58.1	13.5	12.4	50.3	13.1	
<b>Indonesia</b>	China	L. Manufacturing	14.0	56.1	12.3	12.0	48.5	12.0	
<b>Indonesia</b>	Egypt	L. Manufacturing	14.6	58.1	13.5	12.4	50.3	13.1	
<b>Indonesia</b>	Japan	L. Manufacturing	14.4	57.5	13.2	12.3	49.8	12.8	
<b>Indonesia</b>	Korea	L. Manufacturing	14.5	57.7	13.3	12.3	49.9	12.9	
<b>Indonesia</b>	Malaysia	L. Manufacturing	14.5	57.9	13.4	12.4	50.1	13.0	
<b>Indonesia</b>	New Zealand	L. Manufacturing	14.6	58.1	13.5	12.4	50.3	13.1	
<b>Indonesia</b>	Pakistan	L. Manufacturing	14.6	58.1	13.5	12.4	50.3	13.1	
<b>Indonesia</b>	Singapore	L. Manufacturing	14.5	57.8	13.3	12.4	50.0	13.0	
<b>Indonesia</b>	Thailand	L. Manufacturing	14.5	57.9	13.4	12.4	50.1	13.0	
<b>Indonesia</b>	Turkey	L. Manufacturing	14.5	58.0	13.5	12.4	50.2	13.1	
<b>Indonesia</b>	Viet Nam	L. Manufacturing	14.5	57.9	13.4	12.4	50.1	13.0	
<b>Indonesia</b>	Australia	Meat & L Stock	28.5	16.0	14.0	24.0	14.4	12.0	
<b>Indonesia</b>	Bangladesh	Meat & L Stock	28.7	16.4	14.1	24.2	14.7	12.1	
<b>Indonesia</b>	Brunei	Meat & L Stock	28.7	16.5	14.1	24.2	14.8	12.1	
<b>Indonesia</b>	China	Meat & L Stock	27.2	12.6	13.2	22.9	11.3	11.3	
<b>Indonesia</b>	Egypt	Meat & L Stock	28.7	16.4	14.1	24.2	14.8	12.1	
<b>Indonesia</b>	Japan	Meat & L Stock	28.3	15.3	13.9	23.8	13.7	11.9	
<b>Indonesia</b>	Korea	Meat & L Stock	28.4	15.6	13.9	23.9	14.0	12.0	
<b>Indonesia</b>	Malaysia	Meat & L Stock	28.5	16.1	14.0	24.1	14.4	12.1	
<b>Indonesia</b>	New Zealand	Meat & L Stock	28.7	16.4	14.1	24.2	14.8	12.1	
<b>Indonesia</b>	Pakistan	Meat & L Stock	28.7	16.5	14.1	24.2	14.8	12.1	
<b>Indonesia</b>	Singapore	Meat & L Stock	28.5	15.8	14.0	24.0	14.2	12.0	
<b>Indonesia</b>	Thailand	Meat & L Stock	28.5	16.1	14.0	24.1	14.4	12.1	
<b>Indonesia</b>	Turkey	Meat & L Stock	28.6	16.2	14.1	24.1	14.6	12.1	
<b>Indonesia</b>	Viet Nam	Meat & L Stock	28.5	16.0	14.0	24.0	14.4	12.1	
<b>Indonesia</b>	Australia	P. Food	11.5	14.3	11.3	11.0	11.6	11.1	
<b>Indonesia</b>	Bangladesh	P. Food	11.5	14.3	11.4	11.0	11.7	11.1	
<b>Indonesia</b>	Brunei	P. Food	11.5	14.4	11.4	11.0	11.7	11.1	
<b>Indonesia</b>	China	P. Food	11.3	14.1	10.8	10.8	11.4	6.1	
<b>Indonesia</b>	Egypt	P. Food	11.5	14.3	11.4	11.0	11.7	11.1	
<b>Indonesia</b>	Japan	P. Food	11.5	14.3	11.2	11.0	11.6	11.0	
<b>Indonesia</b>	Korea	P. Food	11.5	14.3	11.3	11.0	11.6	11.0	
<b>Indonesia</b>	Malaysia	P. Food	11.5	14.3	11.3	11.0	11.6	11.1	
<b>Indonesia</b>	New Zealand	P. Food	11.5	14.3	11.4	11.0	11.7	11.1	
<b>Indonesia</b>	Pakistan	P. Food	11.5	14.4	11.4	11.0	11.7	11.1	
<b>Indonesia</b>	Singapore	P. Food	11.5	14.3	11.3	11.0	11.6	11.1	
<b>Indonesia</b>	Thailand	P. Food	11.5	14.3	11.3	11.0	11.6	11.1	

<b>Indonesia</b>	Turkey	P. Food	11.5	14.3	11.4	11.0	11.7	11.1
<b>Indonesia</b>	Viet Nam	P. Food	11.5	14.3	11.3	11.0	11.6	11.1
<b>Indonesia</b>	Australia	Tex. W. Apparel	15.1	73.5	12.2	10.5	56.0	12.2
<b>Indonesia</b>	Bangladesh	Tex. W. Apparel	15.2	73.7	12.2	10.5	56.2	12.2
<b>Indonesia</b>	Brunei	Tex. W. Apparel	15.2	73.8	12.2	10.6	56.2	12.2
<b>Indonesia</b>	China	Tex. W. Apparel	14.2	71.4	12.2	9.8	53.9	7.7
<b>Indonesia</b>	Egypt	Tex. W. Apparel	15.2	73.7	12.2	10.5	56.2	12.2
<b>Indonesia</b>	Japan	Tex. W. Apparel	14.9	73.1	12.2	10.3	55.6	12.2
<b>Indonesia</b>	Korea	Tex. W. Apparel	15.0	73.3	12.2	10.4	55.7	12.2
<b>Indonesia</b>	Malaysia	Tex. W. Apparel	15.1	73.5	12.2	10.5	56.0	12.2
<b>Indonesia</b>	New Zealand	Tex. W. Apparel	15.2	73.7	12.2	10.5	56.2	12.2
<b>Indonesia</b>	Pakistan	Tex. W. Apparel	15.2	73.8	12.2	10.5	56.2	12.2
<b>Indonesia</b>	Singapore	Tex. W. Apparel	15.1	73.4	12.2	10.4	55.9	12.2
<b>Indonesia</b>	Thailand	Tex. W. Apparel	15.1	73.5	12.2	10.5	56.0	12.2
<b>Indonesia</b>	Turkey	Tex. W. Apparel	15.2	73.6	12.2	10.5	56.1	12.2
<b>Indonesia</b>	Viet Nam	Tex. W. Apparel	15.1	73.5	12.2	10.5	56.0	12.2
<b>Indonesia</b>	Australia	Vegetables & Fruits	28.5	16.0	14.0	24.0	14.4	12.0
<b>Indonesia</b>	Bangladesh	Vegetables & Fruits	28.7	16.4	14.1	24.2	14.7	12.1
<b>Indonesia</b>	Brunei	Vegetables & Fruits	28.7	16.5	14.1	24.2	14.8	12.1
<b>Indonesia</b>	China	Vegetables & Fruits	27.2	12.6	13.2	22.9	11.3	8.8
<b>Indonesia</b>	Egypt	Vegetables & Fruits	28.7	16.4	14.1	24.2	14.8	12.1
<b>Indonesia</b>	Japan	Vegetables & Fruits	28.3	15.3	13.9	23.8	13.7	11.9
<b>Indonesia</b>	Korea	Vegetables & Fruits	28.4	15.6	13.9	23.9	14.0	12.0
<b>Indonesia</b>	Malaysia	Vegetables & Fruits	28.5	16.1	14.0	24.1	14.4	12.1
<b>Indonesia</b>	New Zealand	Vegetables & Fruits	28.7	16.4	14.1	24.2	14.8	12.1
<b>Indonesia</b>	Pakistan	Vegetables & Fruits	28.7	16.5	14.1	24.2	14.8	12.1
<b>Indonesia</b>	Singapore	Vegetables & Fruits	28.5	15.8	14.0	24.0	14.2	12.0
<b>Indonesia</b>	Thailand	Vegetables & Fruits	28.5	16.1	14.0	24.1	14.4	12.1
<b>Indonesia</b>	Turkey	Vegetables & Fruits	28.6	16.2	14.1	24.1	14.6	12.1

#### Appendix A10: Bilateral AVEs of NTMs imposed by Japan on its trading partners

Reporter	Partner	Sector	AVEs without MR			AVEs with MR		
			SPS	TBT	Other	SPS	TBT	Other
<b>Japan</b>	Australia	extraction	14.6	19.0	14.0	14.5	10.8	13.6
<b>Japan</b>	Brunei	extraction	14.7	19.4	14.0	14.6	11.0	13.6
<b>Japan</b>	China	extraction	13.7	16.1	14.0	13.6	9.1	13.6
<b>Japan</b>	Indonesia	extraction	14.7	19.1	14.0	14.5	10.9	13.6
<b>Japan</b>	Korea	extraction	14.5	18.6	14.0	14.4	10.6	13.6
<b>Japan</b>	Malaysia	extraction	14.6	19.0	14.0	14.5	10.8	13.6
<b>Japan</b>	New Zealand	extraction	14.7	19.3	14.0	14.6	11.0	13.6
<b>Japan</b>	Pakistan	extraction	14.7	19.4	14.0	14.6	11.0	13.6
<b>Japan</b>	Singapore	extraction	14.6	18.8	14.0	14.5	10.7	13.6



<b>Japan</b>	Thailand	extraction	14.6	19.0	14.0	14.5	10.8	13.6
<b>Japan</b>	Viet Nam	extraction	14.6	19.0	14.0	14.5	10.8	13.6
<b>Japan</b>	Australia	Grain crops	13.3	13.4	10.7	11.3	13.3	10.5
<b>Japan</b>	Brunei	Grain crops	13.4	13.4	10.7	11.3	13.3	10.5
<b>Japan</b>	China	Grain crops	12.9	13.1	10.7	10.9	13.0	10.5
<b>Japan</b>	Indonesia	Grain crops	13.4	13.4	10.7	11.3	13.3	10.5
<b>Japan</b>	Korea	Grain crops	13.3	13.4	10.7	11.2	13.3	10.5
<b>Japan</b>	Malaysia	Grain crops	13.4	13.4	10.7	11.3	13.3	10.5
<b>Japan</b>	New Zealand	Grain crops	13.4	13.4	10.7	11.3	13.3	10.5
<b>Japan</b>	Pakistan	Grain crops	13.4	13.4	10.7	11.3	13.3	10.5
<b>Japan</b>	Singapore	Grain crops	13.3	13.4	10.7	11.3	13.3	10.5
<b>Japan</b>	Thailand	Grain crops	13.4	13.4	10.7	11.3	13.3	10.5
<b>Japan</b>	Viet Nam	Grain crops	13.4	13.4	10.7	11.3	13.3	10.5
<b>Japan</b>	Australia	H. Manufacturing	13.4	45.3	12.5	11.7	41.5	11.0
<b>Japan</b>	Brunei	H. Manufacturing	13.6	45.7	13.1	11.8	41.9	11.5
<b>Japan</b>	China	H. Manufacturing	12.2	41.9	8.5	10.6	38.3	7.5
<b>Japan</b>	Indonesia	H. Manufacturing	13.5	45.5	12.7	11.7	41.7	11.2
<b>Japan</b>	Korea	H. Manufacturing	13.2	44.9	11.9	11.5	41.1	10.5
<b>Japan</b>	Malaysia	H. Manufacturing	13.4	45.4	12.5	11.7	41.6	11.0
<b>Japan</b>	New Zealand	H. Manufacturing	13.5	45.7	13.0	11.8	41.9	11.4
<b>Japan</b>	Pakistan	H. Manufacturing	13.6	45.7	13.0	11.8	41.9	11.5
<b>Japan</b>	Singapore	H. Manufacturing	13.3	45.1	12.2	11.6	41.3	10.8
<b>Japan</b>	Thailand	H. Manufacturing	13.4	45.4	12.5	11.7	41.6	11.0
<b>Japan</b>	Viet Nam	H. Manufacturing	13.4	45.3	12.5	11.7	41.5	11.0
<b>Japan</b>	Australia	L. Manufacturing	14.2	19.3	13.0	13.8	16.9	12.5
<b>Japan</b>	Brunei	L. Manufacturing	14.3	21.2	13.0	13.9	18.6	12.5
<b>Japan</b>	China	L. Manufacturing	13.1	8.6	13.0	12.7	7.6	12.5
<b>Japan</b>	Indonesia	L. Manufacturing	14.3	20.1	13.0	13.9	17.6	12.5
<b>Japan</b>	Korea	L. Manufacturing	14.1	17.6	13.0	13.7	15.4	12.5
<b>Japan</b>	Malaysia	L. Manufacturing	14.2	19.5	13.0	13.8	17.1	12.5
<b>Japan</b>	New Zealand	L. Manufacturing	14.3	21.0	13.0	13.9	18.5	12.5
<b>Japan</b>	Pakistan	L. Manufacturing	14.3	21.2	13.0	13.9	18.6	12.5
<b>Japan</b>	Singapore	L. Manufacturing	14.2	18.5	13.0	13.7	16.2	12.5
<b>Japan</b>	Thailand	L. Manufacturing	14.2	19.5	13.0	13.8	17.1	12.5
<b>Japan</b>	Viet Nam	L. Manufacturing	14.2	19.4	13.0	13.8	17.0	12.5
<b>Japan</b>	Australia	Meat & L Stock	21.0	23.5		18.8	17.5	
<b>Japan</b>	Brunei	Meat & L Stock	21.5	23.7		19.2	17.6	
<b>Japan</b>	China	Meat & L Stock	17.1	22.0		15.3	16.3	
<b>Japan</b>	Indonesia	Meat & L Stock	21.2	23.6		19.0	17.5	
<b>Japan</b>	Korea	Meat & L Stock	20.5	23.4		18.3	17.3	
<b>Japan</b>	Malaysia	Meat & L Stock	21.1	23.6		18.8	17.5	
<b>Japan</b>	New Zealand	Meat & L Stock	21.5	23.7		19.2	17.6	

<b>Japan</b>	Pakistan	Meat & L Stock	21.5	23.7		19.2	17.6		
<b>Japan</b>	Singapore	Meat & L Stock	20.8	23.5		18.6	17.4		
<b>Japan</b>	Thailand	Meat & L Stock	21.1	23.6		18.8	17.5		
<b>Japan</b>	Viet Nam	Meat & L Stock	21.0	23.6		18.8	17.5		
<b>Japan</b>	Australia	P. Food	29.5	10.4	11.9	28.0			
<b>Japan</b>	Brunei	P. Food	30.6	10.4	11.9	29.0			
<b>Japan</b>	China	P. Food	21.9	10.4	11.9	20.7			
<b>Japan</b>	Indonesia	P. Food	29.9	10.4	11.9	28.4			
<b>Japan</b>	Korea	P. Food	28.5	10.4	11.9	27.0			
<b>Japan</b>	Malaysia	P. Food	29.6	10.4	11.9	28.1			
<b>Japan</b>	New Zealand	P. Food	30.5	10.4	11.9	28.9			
<b>Japan</b>	Pakistan	P. Food	30.5	10.4	11.9	29.0			
<b>Japan</b>	Singapore	P. Food	29.1	10.4	11.9	27.6			
<b>Japan</b>	Thailand	P. Food	29.6	10.4	11.9	28.1			
<b>Japan</b>	Viet Nam	P. Food	29.6	10.4	11.9	28.1			
<b>Japan</b>	Australia	Tex. W. Apparel	20.0	20.8	11.3	17.6	20.2	10.9	
<b>Japan</b>	Brunei	Tex. W. Apparel	20.4	20.9	11.4	17.9	20.3	11.0	
<b>Japan</b>	China	Tex. W. Apparel	16.9	19.6	10.5	14.8	19.0	10.1	
<b>Japan</b>	Indonesia	Tex. W. Apparel	20.2	20.8	11.3	17.7	20.2	10.9	
<b>Japan</b>	Korea	Tex. W. Apparel	19.6	20.6	11.2	17.2	20.0	10.8	
<b>Japan</b>	Malaysia	Tex. W. Apparel	20.1	20.8	11.3	17.6	20.2	10.9	
<b>Japan</b>	New Zealand	Tex. W. Apparel	20.4	20.9	11.4	17.9	20.3	11.0	
<b>Japan</b>	Pakistan	Tex. W. Apparel	20.4	20.9	11.4	17.9	20.3	11.0	
<b>Japan</b>	Singapore	Tex. W. Apparel	19.9	20.7	11.2	17.4	20.1	10.8	
<b>Japan</b>	Thailand	Tex. W. Apparel	20.1	20.8	11.3	17.6	20.2	10.9	
<b>Japan</b>	Viet Nam	Tex. W. Apparel	20.1	20.8	11.3	17.6	20.2	10.9	
<b>Japan</b>	Australia	Vegetables & Fruits	21.0	23.5		18.8	17.5		
<b>Japan</b>	Brunei	Vegetables & Fruits	21.5	23.7		19.2	17.6		
<b>Japan</b>	China	Vegetables & Fruits	17.1	22.0		15.3	16.3		
<b>Japan</b>	Indonesia	Vegetables & Fruits	21.2	23.6		19.0	17.5		
<b>Japan</b>	Korea	Vegetables & Fruits	20.5	23.4		18.3	17.3		
<b>Japan</b>	Malaysia	Vegetables & Fruits	21.1	23.6		18.8	17.5		
<b>Japan</b>	New Zealand	Vegetables & Fruits	21.5	23.7		19.2	17.6		
<b>Japan</b>	Pakistan	Vegetables & Fruits	21.5	23.7		19.2	17.6		
<b>Japan</b>	Singapore	Vegetables & Fruits	20.8	23.5		18.6	17.4		
<b>Japan</b>	Thailand	Vegetables & Fruits	21.1	23.6		18.8	17.5		
<b>Japan</b>	Viet Nam	Vegetables & Fruits	21.0	23.6		18.8	17.5		

**Appendix A11: Bilateral AVEs of NTMs imposed by South Korea on its trading partners**

Reporter	Partner	Sector	AVEs without MR			AVEs with MR		
			SPS	TBT	Other	SPS	TBT	Other
Korea	Australia	extraction	19.5	23.1		15.5	18.0	
Korea	Brunei	extraction	19.6	23.5		15.6	18.3	
Korea	China	extraction	18.7	20.2		14.9	15.7	
Korea	Indonesia	extraction	19.5	23.3		15.5	18.1	
Korea	Japan	extraction	19.4	22.6		15.4	17.5	
Korea	Malaysia	extraction	19.5	23.2		15.5	18.0	
Korea	New Zealand	extraction	19.6	23.5		15.6	18.2	
Korea	Pakistan	extraction	19.6	23.5		15.6	18.3	
Korea	Singapore	extraction	19.5	23.0		15.5	17.9	
Korea	Thailand	extraction	19.5	23.2		15.5	18.0	
Korea	Viet Nam	extraction	19.5	23.2		15.5	18.0	
Korea	Australia	Grain crops	34.2	15.9		18.8	13.9	
Korea	Brunei	Grain crops	37.8	16.1		20.8	14.1	
Korea	China	Grain crops	14.6	14.2		7.8	12.5	
Korea	Indonesia	Grain crops	35.7	15.9		19.6	14.0	
Korea	Japan	Grain crops	29.2	15.5		15.9	13.6	
Korea	Malaysia	Grain crops	34.7	15.9		19.0	13.9	
Korea	New Zealand	Grain crops	37.4	16.0		20.6	14.1	
Korea	Pakistan	Grain crops	37.7	16.1		20.8	14.1	
Korea	Singapore	Grain crops	32.9	15.8		18.0	13.8	
Korea	Thailand	Grain crops	34.7	15.9		19.0	13.9	
Korea	Viet Nam	Grain crops	34.5	15.9		18.9	13.9	
Korea	Australia	H. Manufacturing	12.2	32.6	20.2	11.5	30.0	18.3
Korea	Brunei	H. Manufacturing	12.3	34.0	20.2	11.5	31.3	18.3
Korea	China	H. Manufacturing	11.9	22.7	20.2	11.2	20.8	18.3
Korea	Indonesia	H. Manufacturing	12.2	33.2	20.2	11.5	30.5	18.3
Korea	Japan	H. Manufacturing	12.2	30.4	20.2	11.5	28.0	18.3
Korea	Malaysia	H. Manufacturing	12.2	32.8	20.2	11.5	30.2	18.3
Korea	New Zealand	H. Manufacturing	12.3	33.9	20.2	11.5	31.2	18.3
Korea	Pakistan	H. Manufacturing	12.3	34.0	20.2	11.5	31.3	18.3
Korea	Singapore	H. Manufacturing	12.2	32.0	20.2	11.5	29.5	18.3
Korea	Thailand	H. Manufacturing	12.2	32.8	20.2	11.5	30.2	18.3
Korea	Viet Nam	H. Manufacturing	12.2	32.7	20.2	11.5	30.1	18.3
Korea	Australia	L. Manufacturing	17.5	40.4	14.9	15.2	23.1	10.6
Korea	Brunei	L. Manufacturing	17.6	40.8	14.9	15.3	23.4	10.6
Korea	China	L. Manufacturing	16.8	37.3	14.9	14.6	21.2	10.6
Korea	Indonesia	L. Manufacturing	17.6	40.6	14.9	15.2	23.2	10.6
Korea	Japan	L. Manufacturing	17.4	39.8	14.9	15.1	22.7	10.6
Korea	Malaysia	L. Manufacturing	17.5	40.5	14.9	15.2	23.2	10.6

<b>Korea</b>	New Zealand	L. Manufacturing	17.6	40.8	14.9	15.3	23.3	10.6
<b>Korea</b>	Pakistan	L. Manufacturing	17.6	40.8	14.9	15.3	23.4	10.6
<b>Korea</b>	Singapore	L. Manufacturing	17.5	40.3	14.9	15.2	23.0	10.6
<b>Korea</b>	Thailand	L. Manufacturing	17.5	40.5	14.9	15.2	23.2	10.6
<b>Korea</b>	Viet Nam	L. Manufacturing	17.5	40.4	14.9	15.2	23.1	10.6
<b>Korea</b>	Australia	Meat & L Stock	21.0	10.6	10.6	15.6	10.0	
<b>Korea</b>	Brunei	Meat & L Stock	21.5	10.6	10.6	16.0	10.1	
<b>Korea</b>	China	Meat & L Stock	17.1	9.9	10.6	12.6	9.4	
<b>Korea</b>	Indonesia	Meat & L Stock	21.2	10.6	10.6	15.7	10.1	
<b>Korea</b>	Japan	Meat & L Stock	20.2	10.4	10.6	14.9	9.9	
<b>Korea</b>	Malaysia	Meat & L Stock	21.1	10.6	10.6	15.6	10.0	
<b>Korea</b>	New Zealand	Meat & L Stock	21.5	10.6	10.6	15.9	10.1	
<b>Korea</b>	Pakistan	Meat & L Stock	21.5	10.6	10.6	15.9	10.1	
<b>Korea</b>	Singapore	Meat & L Stock	20.8	10.5	10.6	15.4	10.0	
<b>Korea</b>	Thailand	Meat & L Stock	21.1	10.6	10.6	15.6	10.0	
<b>Korea</b>	Viet Nam	Meat & L Stock	21.0	10.6	10.6	15.6	10.0	
<b>Korea</b>	Australia	P. Food	20.7	12.0		17.6	10.3	
<b>Korea</b>	Brunei	P. Food	21.0	12.1		17.9	10.4	
<b>Korea</b>	China	P. Food	18.3	11.3		15.5	9.7	
<b>Korea</b>	Indonesia	P. Food	20.8	12.0		17.7	10.4	
<b>Korea</b>	Japan	P. Food	20.2	11.8		17.2	10.2	
<b>Korea</b>	Malaysia	P. Food	20.7	12.0		17.6	10.3	
<b>Korea</b>	New Zealand	P. Food	21.0	12.1		17.8	10.4	
<b>Korea</b>	Pakistan	P. Food	21.0	12.1		17.9	10.4	
<b>Korea</b>	Singapore	P. Food	20.6	11.9		17.5	10.3	
<b>Korea</b>	Thailand	P. Food	20.7	12.0		17.6	10.3	
<b>Korea</b>	Viet Nam	P. Food	20.7	12.0		17.6	10.3	
<b>Korea</b>	Australia	Tex. W. Apparel	18.3	19.4		15.7	10.8	
<b>Korea</b>	Brunei	Tex. W. Apparel	18.3	23.1		15.7	12.9	
<b>Korea</b>	China	Tex. W. Apparel	18.3	4.5		15.7	2.5	
<b>Korea</b>	Indonesia	Tex. W. Apparel	18.3	20.9		15.7	11.6	
<b>Korea</b>	Japan	Tex. W. Apparel	18.3	14.7		15.7	8.1	
<b>Korea</b>	Malaysia	Tex. W. Apparel	18.3	19.9		15.7	11.0	
<b>Korea</b>	New Zealand	Tex. W. Apparel	18.3	22.7		15.7	12.6	
<b>Korea</b>	Pakistan	Tex. W. Apparel	18.3	23.0		15.7	12.8	
<b>Korea</b>	Singapore	Tex. W. Apparel	18.3	18.0		15.7	10.0	
<b>Korea</b>	Thailand	Tex. W. Apparel	18.3	19.9		15.7	11.0	
<b>Korea</b>	Viet Nam	Tex. W. Apparel	18.3	19.6		15.7	10.9	
<b>Korea</b>	Australia	Vegetables & Fruits	21.0	10.6	10.6	15.6	10.0	
<b>Korea</b>	Brunei	Vegetables & Fruits	21.5	10.6	10.6	16.0	10.1	
<b>Korea</b>	China	Vegetables & Fruits	17.1	9.9	10.6	12.6	9.4	
<b>Korea</b>	Indonesia	Vegetables & Fruits	21.2	10.6	10.6	15.7	10.1	

<b>Korea</b>	Japan	Vegetables & Fruits	20.2	10.4	10.6	14.9	9.9
<b>Korea</b>	Malaysia	Vegetables & Fruits	21.1	10.6	10.6	15.6	10.0
<b>Korea</b>	New Zealand	Vegetables & Fruits	21.5	10.6	10.6	15.9	10.1
<b>Korea</b>	Pakistan	Vegetables & Fruits	21.5	10.6	10.6	15.9	10.1
<b>Korea</b>	Singapore	Vegetables & Fruits	20.8	10.5	10.6	15.4	10.0
<b>Korea</b>	Thailand	Vegetables & Fruits	21.1	10.6	10.6	15.6	10.0
<b>Korea</b>	Viet Nam	Vegetables & Fruits	21.0	10.6	10.6	15.6	10.0

## Appendix A12: Bilateral AVEs of NTMs imposed by Malaysia on its trading partners

Reporter	Partner	Sector	AVEs without MR			AVEs with MR		
			SPS	TBT	Other	SPS	TBT	Other
<b>Malaysia</b>	Australia	extraction	25.2	43.5	18.6	18.2	34.7	17.9
<b>Malaysia</b>	Bangladesh	extraction	25.4	45.3	18.8	18.4	36.2	18.1
<b>Malaysia</b>	Brunei	extraction	25.5	45.7	18.8	18.4	36.5	18.2
<b>Malaysia</b>	China	extraction	23.2	28.4	16.6	16.7	22.3	16.0
<b>Malaysia</b>	Egypt	extraction	25.4	45.5	18.8	18.4	36.3	18.1
<b>Malaysia</b>	Indonesia	extraction	25.3	44.4	18.7	18.3	35.4	18.0
<b>Malaysia</b>	Japan	extraction	24.8	40.2	18.2	17.9	31.9	17.5
<b>Malaysia</b>	Korea	extraction	25.0	41.5	18.3	18.0	33.0	17.7
<b>Malaysia</b>	New Zealand	extraction	25.4	45.5	18.8	18.4	36.3	18.1
<b>Malaysia</b>	Pakistan	extraction	25.4	45.6	18.8	18.4	36.5	18.1
<b>Malaysia</b>	Singapore	extraction	25.1	42.6	18.5	18.1	33.9	17.8
<b>Malaysia</b>	Thailand	extraction	25.2	43.8	18.6	18.2	34.9	17.9
<b>Malaysia</b>	Turkey	extraction	25.3	44.4	18.7	18.3	35.4	18.0
<b>Malaysia</b>	Viet Nam	extraction	25.2	43.7	18.6	18.2	34.8	17.9
<b>Malaysia</b>	Australia	Grain crops	21.5	12.7	14.1	15.3		11.1
<b>Malaysia</b>	Bangladesh	Grain crops	22.0	13.0	14.1	15.7		11.1
<b>Malaysia</b>	Brunei	Grain crops	22.2	13.1	14.1	15.8		11.1
<b>Malaysia</b>	China	Grain crops	16.6	10.2	13.5	11.8		10.6
<b>Malaysia</b>	Egypt	Grain crops	22.1	13.0	14.1	15.8		11.1
<b>Malaysia</b>	Indonesia	Grain crops	21.8	12.8	14.1	15.5		11.1
<b>Malaysia</b>	Japan	Grain crops	20.4	12.2	13.9	14.6		11.0
<b>Malaysia</b>	Korea	Grain crops	20.8	12.4	14.0	14.9		11.0
<b>Malaysia</b>	New Zealand	Grain crops	22.1	13.0	14.1	15.8		11.1
<b>Malaysia</b>	Pakistan	Grain crops	22.1	13.0	14.1	15.8		11.1
<b>Malaysia</b>	Singapore	Grain crops	21.2	12.6	14.0	15.1		11.1
<b>Malaysia</b>	Thailand	Grain crops	21.6	12.8	14.1	15.4		11.1
<b>Malaysia</b>	Turkey	Grain crops	21.8	12.8	14.1	15.5		11.1
<b>Malaysia</b>	Viet Nam	Grain crops	21.5	12.7	14.1	15.4		11.1
<b>Malaysia</b>	Australia	H. Manufacturing	31.1	42.4	27.0	20.0	23.7	25.7
<b>Malaysia</b>	Bangladesh	H. Manufacturing	32.6	49.4	27.4	21.0	28.2	26.1
<b>Malaysia</b>	Brunei	H. Manufacturing	32.9	51.0	27.4	21.2	29.2	26.2

<b>Malaysia</b>	China	H. Manufacturing	19.7	7.6	23.6	12.5	4.0	22.5
<b>Malaysia</b>	Egypt	H. Manufacturing	32.7	50.0	27.4	21.1	28.6	26.1
<b>Malaysia</b>	Indonesia	H. Manufacturing	31.8	45.8	27.2	20.5	25.9	25.9
<b>Malaysia</b>	Japan	H. Manufacturing	28.5	31.0	26.3	18.3	17.0	25.1
<b>Malaysia</b>	Korea	H. Manufacturing	29.5	35.1	26.6	19.0	19.3	25.3
<b>Malaysia</b>	New Zealand	H. Manufacturing	32.7	50.0	27.4	21.1	28.6	26.1
<b>Malaysia</b>	Pakistan	H. Manufacturing	32.8	50.6	27.4	21.2	29.0	26.1
<b>Malaysia</b>	Singapore	H. Manufacturing	30.4	39.1	26.8	19.6	21.7	25.6
<b>Malaysia</b>	Thailand	H. Manufacturing	31.4	43.5	27.1	20.2	24.4	25.8
<b>Malaysia</b>	Turkey	H. Manufacturing	31.8	45.8	27.2	20.5	25.9	25.9
<b>Malaysia</b>	Viet Nam	H. Manufacturing	31.2	42.9	27.0	20.1	24.1	25.8
<b>Malaysia</b>	Australia	L. Manufacturing	11.7	12.3		11.6	11.6	
<b>Malaysia</b>	Bangladesh	L. Manufacturing	11.7	12.4		11.6	11.7	
<b>Malaysia</b>	Brunei	L. Manufacturing	11.7	12.4		11.6	11.7	
<b>Malaysia</b>	China	L. Manufacturing	11.2	11.4		11.1	10.8	
<b>Malaysia</b>	Egypt	L. Manufacturing	11.7	12.4		11.6	11.7	
<b>Malaysia</b>	Indonesia	L. Manufacturing	11.7	12.3		11.6	11.7	
<b>Malaysia</b>	Japan	L. Manufacturing	11.6	12.1		11.5	11.5	
<b>Malaysia</b>	Korea	L. Manufacturing	11.6	12.2		11.5	11.5	
<b>Malaysia</b>	New Zealand	L. Manufacturing	11.7	12.4		11.6	11.7	
<b>Malaysia</b>	Pakistan	L. Manufacturing	11.7	12.4		11.6	11.7	
<b>Malaysia</b>	Singapore	L. Manufacturing	11.6	12.3		11.5	11.6	
<b>Malaysia</b>	Thailand	L. Manufacturing	11.7	12.3		11.6	11.7	
<b>Malaysia</b>	Turkey	L. Manufacturing	11.7	12.3		11.6	11.7	
<b>Malaysia</b>	Viet Nam	L. Manufacturing	11.7	12.3		11.6	11.6	
<b>Malaysia</b>	Australia	Meat & L Stock	16.5	12.1	11.0	16.1	11.5	
<b>Malaysia</b>	Bangladesh	Meat & L Stock	16.6	12.1	11.0	16.2	11.5	
<b>Malaysia</b>	Brunei	Meat & L Stock	16.6	12.1	11.0	16.2	11.5	
<b>Malaysia</b>	China	Meat & L Stock	16.0	12.1	11.0	15.6	11.5	
<b>Malaysia</b>	Egypt	Meat & L Stock	16.6	12.1	11.0	16.2	11.5	
<b>Malaysia</b>	Indonesia	Meat & L Stock	16.6	12.1	11.0	16.1	11.5	
<b>Malaysia</b>	Japan	Meat & L Stock	16.4	12.1	11.0	16.0	11.5	
<b>Malaysia</b>	Korea	Meat & L Stock	16.5	12.1	11.0	16.1	11.5	
<b>Malaysia</b>	New Zealand	Meat & L Stock	16.6	12.1	11.0	16.2	11.5	
<b>Malaysia</b>	Pakistan	Meat & L Stock	16.6	12.1	11.0	16.2	11.5	
<b>Malaysia</b>	Singapore	Meat & L Stock	16.5	12.1	11.0	16.1	11.5	
<b>Malaysia</b>	Thailand	Meat & L Stock	16.5	12.1	11.0	16.1	11.5	
<b>Malaysia</b>	Turkey	Meat & L Stock	16.6	12.1	11.0	16.1	11.5	
<b>Malaysia</b>	Viet Nam	Meat & L Stock	16.5	12.1	11.0	16.1	11.5	
<b>Malaysia</b>	Australia	P. Food	17.3	17.7		15.6	16.9	
<b>Malaysia</b>	Bangladesh	P. Food	17.5	17.7		15.8	17.0	
<b>Malaysia</b>	Brunei	P. Food	17.6	17.7		15.8	17.0	
<b>Malaysia</b>	China	P. Food	15.1	17.4		13.6	16.6	

<b>Malaysia</b>	Egypt	P. Food	17.6	17.7	15.8	17.0	
<b>Malaysia</b>	Indonesia	P. Food	17.4	17.7	15.7	17.0	
<b>Malaysia</b>	Japan	P. Food	16.9	17.6	15.2	16.9	
<b>Malaysia</b>	Korea	P. Food	17.0	17.6	15.3	16.9	
<b>Malaysia</b>	New Zealand	P. Food	17.6	17.7	15.8	17.0	
<b>Malaysia</b>	Pakistan	P. Food	17.6	17.7	15.8	17.0	
<b>Malaysia</b>	Singapore	P. Food	17.2	17.7	15.5	16.9	
<b>Malaysia</b>	Thailand	P. Food	17.3	17.7	15.6	16.9	
<b>Malaysia</b>	Turkey	P. Food	17.4	17.7	15.7	17.0	
<b>Malaysia</b>	Viet Nam	P. Food	17.3	17.7	15.6	16.9	
<b>Malaysia</b>	Australia	Tex. W. Apparel		52.7		34.5	
<b>Malaysia</b>	Bangladesh	Tex. W. Apparel		54.5		35.8	
<b>Malaysia</b>	Brunei	Tex. W. Apparel		54.8		36.1	
<b>Malaysia</b>	China	Tex. W. Apparel		37.3		23.6	
<b>Malaysia</b>	Egypt	Tex. W. Apparel		54.6		35.9	
<b>Malaysia</b>	Indonesia	Tex. W. Apparel		53.6		35.2	
<b>Malaysia</b>	Japan	Tex. W. Apparel		49.5		32.1	
<b>Malaysia</b>	Korea	Tex. W. Apparel		50.8		33.0	
<b>Malaysia</b>	New Zealand	Tex. W. Apparel		54.6		35.9	
<b>Malaysia</b>	Pakistan	Tex. W. Apparel		54.8		36.1	
<b>Malaysia</b>	Singapore	Tex. W. Apparel		51.9		33.9	
<b>Malaysia</b>	Thailand	Tex. W. Apparel		53.0		34.7	
<b>Malaysia</b>	Turkey	Tex. W. Apparel		53.6		35.2	
<b>Malaysia</b>	Viet Nam	Tex. W. Apparel		52.9		34.6	
<b>Malaysia</b>	Australia	Vegetables & Fruits	16.5	12.1	11.0	16.1	11.5
<b>Malaysia</b>	Bangladesh	Vegetables & Fruits	16.6	12.1	11.0	16.2	11.5
<b>Malaysia</b>	Brunei	Vegetables & Fruits	16.6	12.1	11.0	16.2	11.5
<b>Malaysia</b>	China	Vegetables & Fruits	16.0	12.1	11.0	15.6	11.5
<b>Malaysia</b>	Egypt	Vegetables & Fruits	16.6	12.1	11.0	16.2	11.5
<b>Malaysia</b>	Indonesia	Vegetables & Fruits	16.6	12.1	11.0	16.1	11.5
<b>Malaysia</b>	Japan	Vegetables & Fruits	16.4	12.1	11.0	16.0	11.5
<b>Malaysia</b>	Korea	Vegetables & Fruits	16.5	12.1	11.0	16.1	11.5
<b>Malaysia</b>	New Zealand	Vegetables & Fruits	16.6	12.1	11.0	16.2	11.5
<b>Malaysia</b>	Pakistan	Vegetables & Fruits	16.6	12.1	11.0	16.2	11.5
<b>Malaysia</b>	Singapore	Vegetables & Fruits	16.5	12.1	11.0	16.1	11.5
<b>Malaysia</b>	Thailand	Vegetables & Fruits	16.5	12.1	11.0	16.1	11.5
<b>Malaysia</b>	Turkey	Vegetables & Fruits	16.6	12.1	11.0	16.1	11.5
<b>Malaysia</b>	Viet Nam	Vegetables & Fruits	16.5	12.1	11.0	16.1	11.5

**Appendix A13: Bilateral AVEs of NTMs imposed by New Zealand on its trading partners**

Reporter	Partner	Sector	AVEs without MR			AVEs with MR		
			SPS	TBT	Other	SPS	TBT	Other
New Zealand	Australia	extraction	12.7	21.8	21.4	11.9	18.9	17.8
New Zealand	Brunei	extraction	12.9	22.3	21.7	12.1	19.3	18.1
New Zealand	China	extraction	11.4	18.3	18.7	10.7	15.9	15.6
New Zealand	Indonesia	extraction	12.8	22.0	21.5	12.0	19.1	17.9
New Zealand	Japan	extraction	12.5	21.1	20.8	11.7	18.3	17.3
New Zealand	Korea	extraction	12.6	21.4	21.0	11.8	18.5	17.5
New Zealand	Malaysia	extraction	12.8	21.9	21.4	11.9	19.0	17.8
New Zealand	Pakistan	extraction	12.9	22.3	21.7	12.1	19.3	18.0
New Zealand	Singapore	extraction	12.7	21.6	21.2	11.8	18.8	17.6
New Zealand	Thailand	extraction	12.8	21.9	21.4	11.9	19.0	17.8
New Zealand	Viet Nam	extraction	12.8	21.9	21.4	11.9	18.9	17.8
New Zealand	Australia	Grain crops	64.8	12.5		33.5		
New Zealand	Brunei	Grain crops	65.5	12.5		34.0		
New Zealand	China	Grain crops	58.3	12.5		29.3		
New Zealand	Indonesia	Grain crops	65.1	12.5		33.7		
New Zealand	Japan	Grain crops	63.5	12.5		32.6		
New Zealand	Korea	Grain crops	64.0	12.5		33.0		
New Zealand	Malaysia	Grain crops	64.9	12.5		33.6		
New Zealand	Pakistan	Grain crops	65.5	12.5		34.0		
New Zealand	Singapore	Grain crops	64.4	12.5		33.3		
New Zealand	Thailand	Grain crops	64.9	12.5		33.6		
New Zealand	Viet Nam	Grain crops	64.8	12.5		33.5		
New Zealand	Australia	H. Manufacturing	11.8	16.1	12.2	10.2	14.0	10.4
New Zealand	Brunei	H. Manufacturing	11.8	16.6	12.2	10.3	14.4	10.4
New Zealand	China	H. Manufacturing	11.3	12.3	12.2	9.9	10.7	10.4
New Zealand	Indonesia	H. Manufacturing	11.8	16.3	12.2	10.3	14.1	10.4
New Zealand	Japan	H. Manufacturing	11.7	15.3	12.2	10.2	13.3	10.4
New Zealand	Korea	H. Manufacturing	11.7	15.6	12.2	10.2	13.5	10.4
New Zealand	Malaysia	H. Manufacturing	11.8	16.1	12.2	10.3	14.0	10.4
New Zealand	Pakistan	H. Manufacturing	11.8	16.6	12.2	10.3	14.4	10.4
New Zealand	Singapore	H. Manufacturing	11.7	15.9	12.2	10.2	13.8	10.4
New Zealand	Thailand	H. Manufacturing	11.8	16.1	12.2	10.3	14.0	10.4
New Zealand	Viet Nam	H. Manufacturing	11.8	16.1	12.2	10.3	14.0	10.4
New Zealand	Australia	L. Manufacturing	10.1	43.1	14.7	9.9	39.5	14.4
New Zealand	Brunei	L. Manufacturing	10.3	44.0	14.7	10.1	40.3	14.4
New Zealand	China	L. Manufacturing	8.6	36.6	14.7	8.4	33.5	14.4
New Zealand	Indonesia	L. Manufacturing	10.2	43.5	14.7	10.0	39.8	14.4
New Zealand	Japan	L. Manufacturing	9.8	41.8	14.7	9.6	38.3	14.4
New Zealand	Korea	L. Manufacturing	9.9	42.3	14.7	9.7	38.8	14.4
New Zealand	Malaysia	L. Manufacturing	10.1	43.2	14.7	9.9	39.6	14.4



<b>New Zealand</b>	Pakistan	L. Manufacturing	10.3	43.9	14.7	10.1	40.3	14.4
<b>New Zealand</b>	Singapore	L. Manufacturing	10.0	42.8	14.7	9.8	39.2	14.4
<b>New Zealand</b>	Thailand	L. Manufacturing	10.1	43.2	14.7	9.9	39.6	14.4
<b>New Zealand</b>	Viet Nam	L. Manufacturing	10.1	43.2	14.7	9.9	39.6	14.4
<b>New Zealand</b>	Australia	Meat & L Stock	21.7	13.7	11.1	19.1	12.0	10.9
<b>New Zealand</b>	Brunei	Meat & L Stock	21.8	13.8	11.1	19.2	12.1	10.9
<b>New Zealand</b>	China	Meat & L Stock	20.8	12.3	11.1	18.4	10.8	10.9
<b>New Zealand</b>	Indonesia	Meat & L Stock	21.7	13.7	11.1	19.2	12.1	10.9
<b>New Zealand</b>	Japan	Meat & L Stock	21.5	13.4	11.1	19.0	11.7	10.9
<b>New Zealand</b>	Korea	Meat & L Stock	21.6	13.5	11.1	19.0	11.8	10.9
<b>New Zealand</b>	Malaysia	Meat & L Stock	21.7	13.7	11.1	19.1	12.0	10.9
<b>New Zealand</b>	Pakistan	Meat & L Stock	21.8	13.8	11.1	19.2	12.1	10.9
<b>New Zealand</b>	Singapore	Meat & L Stock	21.6	13.6	11.1	19.1	11.9	10.9
<b>New Zealand</b>	Thailand	Meat & L Stock	21.7	13.7	11.1	19.1	12.0	10.9
<b>New Zealand</b>	Viet Nam	Meat & L Stock	21.7	13.7	11.1	19.1	12.0	10.9
<b>New Zealand</b>	Australia	P. Food	68.2	57.5	10.8	58.8	48.9	9.7
<b>New Zealand</b>	Brunei	P. Food	69.6	58.6	11.1	60.2	50.0	10.0
<b>New Zealand</b>	China	P. Food	56.9	48.7	8.2	48.1	40.9	7.4
<b>New Zealand</b>	Indonesia	P. Food	68.8	58.0	10.9	59.4	49.4	9.8
<b>New Zealand</b>	Japan	P. Food	66.0	55.8	10.2	56.7	47.3	9.2
<b>New Zealand</b>	Korea	P. Food	66.9	56.4	10.4	57.5	47.9	9.4
<b>New Zealand</b>	Malaysia	P. Food	68.4	57.7	10.8	59.0	49.1	9.7
<b>New Zealand</b>	Pakistan	P. Food	69.5	58.6	11.1	60.2	49.9	10.0
<b>New Zealand</b>	Singapore	P. Food	67.6	57.1	10.6	58.3	48.5	9.6
<b>New Zealand</b>	Thailand	P. Food	68.4	57.7	10.8	59.0	49.1	9.7
<b>New Zealand</b>	Viet Nam	P. Food	68.3	57.6	10.8	58.9	49.0	9.7
<b>New Zealand</b>	Australia	Tex. W. Apparel	16.2	18.7	11.7	13.1	12.4	11.2
<b>New Zealand</b>	Brunei	Tex. W. Apparel	16.7	18.9	13.0	13.5	12.5	12.4
<b>New Zealand</b>	China	Tex. W. Apparel	12.5	17.2	5.0	10.1	11.4	4.7
<b>New Zealand</b>	Indonesia	Tex. W. Apparel	16.4	18.8	12.2	13.3	12.5	11.7
<b>New Zealand</b>	Japan	Tex. W. Apparel	15.4	18.4	9.9	12.4	12.2	9.5
<b>New Zealand</b>	Korea	Tex. W. Apparel	15.7	18.6	10.6	12.7	12.3	10.1
<b>New Zealand</b>	Malaysia	Tex. W. Apparel	16.3	18.8	11.9	13.1	12.4	11.3
<b>New Zealand</b>	Pakistan	Tex. W. Apparel	16.7	18.9	12.9	13.5	12.5	12.3
<b>New Zealand</b>	Singapore	Tex. W. Apparel	16.0	18.7	11.2	12.9	12.4	10.7
<b>New Zealand</b>	Thailand	Tex. W. Apparel	16.3	18.8	11.9	13.1	12.4	11.3
<b>New Zealand</b>	Viet Nam	Tex. W. Apparel	16.2	18.8	11.8	13.1	12.4	11.2
<b>New Zealand</b>	Australia	Vegetables & Fruits	21.7	13.7	11.1	19.1	12.0	10.9
<b>New Zealand</b>	Brunei	Vegetables & Fruits	21.8	13.8	11.1	19.2	12.1	10.9
<b>New Zealand</b>	China	Vegetables & Fruits	20.8	12.3	11.1	18.4	10.8	10.9
<b>New Zealand</b>	Indonesia	Vegetables & Fruits	21.7	13.7	11.1	19.2	12.1	10.9
<b>New Zealand</b>	Japan	Vegetables & Fruits	21.5	13.4	11.1	19.0	11.7	10.9
<b>New Zealand</b>	Korea	Vegetables & Fruits	21.6	13.5	11.1	19.0	11.8	10.9
<b>New Zealand</b>	Malaysia	Vegetables & Fruits	21.7	13.7	11.1	19.1	12.0	10.9

<b>New Zealand</b>	Pakistan	Vegetables & Fruits	21.8	13.8	11.1	19.2	12.1	10.9
<b>New Zealand</b>	Singapore	Vegetables & Fruits	21.6	13.6	11.1	19.1	11.9	10.9
<b>New Zealand</b>	Thailand	Vegetables & Fruits	21.7	13.7	11.1	19.1	12.0	10.9
<b>New Zealand</b>	Viet Nam	Vegetables & Fruits	21.7	13.7	11.1	19.1	12.0	10.9

#### Appendix A14: Bilateral AVEs of NTMs imposed by Pakistan on its trading partners

Reporter	Partner	Sector	AVEs without MR			AVEs with MR		
			SPS	TBT	Other	SPS	TBT	Other
<b>Pakistan</b>	Australia	extraction	10.8	14.3		9.8	12.1	
<b>Pakistan</b>	Bangladesh	extraction	11.6	16.1		10.6	13.7	
<b>Pakistan</b>	Brunei	extraction	11.8	16.5		10.8	14.1	
<b>Pakistan</b>	China	extraction	5.1	4.2		4.6	3.6	
<b>Pakistan</b>	Egypt	extraction	11.7	16.3		10.7	13.8	
<b>Pakistan</b>	EU-27	extraction	5.2	4.4		4.8	3.7	
<b>Pakistan</b>	GCC	extraction	9.0	10.6		8.2	9.0	
<b>Pakistan</b>	India	extraction	10.7	14.0		9.7	11.9	
<b>Pakistan</b>	Indonesia	extraction	11.2	15.2		10.2	12.9	
<b>Pakistan</b>	Japan	extraction	9.3	11.3		8.5	9.6	
<b>Pakistan</b>	Korea	extraction	9.9	12.4		9.0	10.5	
<b>Pakistan</b>	Malaysia	extraction	10.9	14.5		10.0	12.4	
<b>Pakistan</b>	New Zealand	extraction	11.7	16.3		10.7	13.8	
<b>Pakistan</b>	Singapore	extraction	10.4	13.4		9.5	11.4	
<b>Pakistan</b>	Sri Lanka	extraction	11.8	16.4		10.7	14.0	
<b>Pakistan</b>	Thailand	extraction	10.9	14.5		10.0	12.4	
<b>Pakistan</b>	Turkey	extraction	11.2	15.2		10.2	12.9	
<b>Pakistan</b>	USA	extraction	6.3	6.0		5.8	5.1	
<b>Pakistan</b>	Viet Nam	extraction	10.9	14.4		9.9	12.3	
<b>Pakistan</b>	Australia	Grain crops	18.6	16.2	12.6	15.6	14.1	11.4
<b>Pakistan</b>	Bangladesh	Grain crops	21.3	17.5	12.6	17.9	15.3	11.4
<b>Pakistan</b>	Brunei	Grain crops	21.9	17.8	12.6	18.4	15.6	11.4
<b>Pakistan</b>	China	Grain crops	4.8	7.2	12.6	4.0	6.3	11.4
<b>Pakistan</b>	Egypt	Grain crops	21.5	17.6	12.6	18.1	15.4	11.4
<b>Pakistan</b>	EU-27	Grain crops	5.0	7.4	12.6	4.2	6.5	11.4
<b>Pakistan</b>	GCC	Grain crops	13.3	13.3	12.6	11.2	11.6	11.4
<b>Pakistan</b>	India	Grain crops	18.2	16.0	12.6	15.3	13.9	11.4
<b>Pakistan</b>	Indonesia	Grain crops	19.9	16.8	12.6	16.7	14.7	11.4
<b>Pakistan</b>	Japan	Grain crops	14.4	13.8	12.6	12.0	12.1	11.4
<b>Pakistan</b>	Korea	Grain crops	15.9	14.7	12.6	13.3	12.8	11.4
<b>Pakistan</b>	Malaysia	Grain crops	19.0	16.4	12.6	16.0	14.3	11.4
<b>Pakistan</b>	New Zealand	Grain crops	21.5	17.6	12.6	18.1	15.4	11.4
<b>Pakistan</b>	Singapore	Grain crops	17.4	15.5	12.6	14.6	13.5	11.4
<b>Pakistan</b>	Sri Lanka	Grain crops	21.8	17.8	12.6	18.3	15.5	11.4

<b>Pakistan</b>	Thailand	Grain crops	19.0	16.4	12.6	16.0	14.3	11.4
<b>Pakistan</b>	Turkey	Grain crops	19.9	16.8	12.6	16.7	14.7	11.4
<b>Pakistan</b>	USA	Grain crops	7.1	9.1	12.6	5.9	7.9	11.4
<b>Pakistan</b>	Viet Nam	Grain crops	18.8	16.3	12.6	15.8	14.2	11.4
<b>Pakistan</b>	Australia	H. Manufacturing	13.2	22.1	14.4	11.2	15.8	13.4
<b>Pakistan</b>	Bangladesh	H. Manufacturing	13.3	23.2	14.5	11.3	16.7	13.5
<b>Pakistan</b>	Brunei	H. Manufacturing	13.3	23.5	14.5	11.3	16.9	13.5
<b>Pakistan</b>	China	H. Manufacturing	12.4	13.0	13.4	10.5	9.3	12.5
<b>Pakistan</b>	Egypt	H. Manufacturing	13.3	23.3	14.5	11.3	16.8	13.5
<b>Pakistan</b>	EU-27	H. Manufacturing	12.4	13.3	13.5	10.6	9.5	12.5
<b>Pakistan</b>	GCC	H. Manufacturing	13.0	19.4	14.1	11.0	13.9	13.2
<b>Pakistan</b>	India	H. Manufacturing	13.2	21.9	14.4	11.2	15.7	13.4
<b>Pakistan</b>	Indonesia	H. Manufacturing	13.2	22.6	14.4	11.2	16.3	13.5
<b>Pakistan</b>	Japan	H. Manufacturing	13.0	19.9	14.2	11.1	14.3	13.2
<b>Pakistan</b>	Korea	H. Manufacturing	13.1	20.7	14.3	11.1	14.9	13.3
<b>Pakistan</b>	Malaysia	H. Manufacturing	13.2	22.2	14.4	11.2	16.0	13.4
<b>Pakistan</b>	New Zealand	H. Manufacturing	13.3	23.3	14.5	11.3	16.8	13.5
<b>Pakistan</b>	Singapore	H. Manufacturing	13.1	21.5	14.3	11.2	15.4	13.4
<b>Pakistan</b>	Sri Lanka	H. Manufacturing	13.3	23.4	14.5	11.3	16.9	13.5
<b>Pakistan</b>	Thailand	H. Manufacturing	13.2	22.2	14.4	11.2	16.0	13.4
<b>Pakistan</b>	Turkey	H. Manufacturing	13.2	22.6	14.4	11.2	16.3	13.5
<b>Pakistan</b>	USA	H. Manufacturing	12.6	15.2	13.7	10.7	10.8	12.8
<b>Pakistan</b>	Viet Nam	H. Manufacturing	13.2	22.1	14.4	11.2	15.9	13.4
<b>Pakistan</b>	Australia	L. Manufacturing	10.8	24.5	15.8		17.7	13.5
<b>Pakistan</b>	Bangladesh	L. Manufacturing	10.9	25.4	15.9		18.3	13.6
<b>Pakistan</b>	Brunei	L. Manufacturing	11.0	25.6	15.9		18.5	13.6
<b>Pakistan</b>	China	L. Manufacturing	9.6	17.1	15.1		12.3	12.9
<b>Pakistan</b>	Egypt	L. Manufacturing	10.9	25.5	15.9		18.4	13.6
<b>Pakistan</b>	EU-27	L. Manufacturing	9.6	17.3	15.1		12.4	12.9
<b>Pakistan</b>	GCC	L. Manufacturing	10.5	22.5	15.7		16.1	13.4
<b>Pakistan</b>	India	L. Manufacturing	10.8	24.4	15.8		17.6	13.5
<b>Pakistan</b>	Indonesia	L. Manufacturing	10.9	25.0	15.9		18.0	13.5
<b>Pakistan</b>	Japan	L. Manufacturing	10.6	22.9	15.7		16.5	13.4
<b>Pakistan</b>	Korea	L. Manufacturing	10.6	23.5	15.8		16.9	13.4
<b>Pakistan</b>	Malaysia	L. Manufacturing	10.8	24.7	15.9		17.8	13.5
<b>Pakistan</b>	New Zealand	L. Manufacturing	10.9	25.5	15.9		18.4	13.6
<b>Pakistan</b>	Singapore	L. Manufacturing	10.7	24.1	15.8		17.3	13.5
<b>Pakistan</b>	Sri Lanka	L. Manufacturing	11.0	25.6	15.9		18.4	13.6
<b>Pakistan</b>	Thailand	L. Manufacturing	10.8	24.7	15.9		17.8	13.5
<b>Pakistan</b>	Turkey	L. Manufacturing	10.9	25.0	15.9		18.0	13.5
<b>Pakistan</b>	USA	L. Manufacturing	9.9	19.0	15.3		13.6	13.1
<b>Pakistan</b>	Viet Nam	L. Manufacturing	10.8	24.6	15.8		17.7	13.5
<b>Pakistan</b>	Australia	Meat & L Stock	28.5	12.0	11.7	19.2	10.7	11.3

<b>Pakistan</b>	Bangladesh	Meat & L Stock	30.2	12.2	11.8	20.4	10.9	11.4
<b>Pakistan</b>	Brunei	Meat & L Stock	30.5	12.2	11.9	20.7	10.9	11.4
<b>Pakistan</b>	China	Meat & L Stock	15.8	10.0	10.7	10.5	9.0	10.3
<b>Pakistan</b>	Egypt	Meat & L Stock	30.3	12.2	11.8	20.5	10.9	11.4
<b>Pakistan</b>	EU-27	Meat & L Stock	16.1	10.1	10.8	10.8	9.0	10.3
<b>Pakistan</b>	GCC	Meat & L Stock	24.6	11.5	11.5	16.6	10.2	11.0
<b>Pakistan</b>	India	Meat & L Stock	28.2	11.9	11.7	19.0	10.7	11.2
<b>Pakistan</b>	Indonesia	Meat & L Stock	29.3	12.1	11.8	19.8	10.8	11.3
<b>Pakistan</b>	Japan	Meat & L Stock	25.4	11.6	11.5	17.1	10.3	11.1
<b>Pakistan</b>	Korea	Meat & L Stock	26.6	11.7	11.6	17.9	10.5	11.1
<b>Pakistan</b>	Malaysia	Meat & L Stock	28.7	12.0	11.7	19.4	10.7	11.3
<b>Pakistan</b>	New Zealand	Meat & L Stock	30.3	12.2	11.8	20.5	10.9	11.4
<b>Pakistan</b>	Singapore	Meat & L Stock	27.7	11.9	11.7	18.7	10.6	11.2
<b>Pakistan</b>	Sri Lanka	Meat & L Stock	30.5	12.2	11.8	20.6	10.9	11.4
<b>Pakistan</b>	Thailand	Meat & L Stock	28.7	12.0	11.7	19.4	10.7	11.3
<b>Pakistan</b>	Turkey	Meat & L Stock	29.3	12.1	11.8	19.8	10.8	11.3
<b>Pakistan</b>	USA	Meat & L Stock	18.7	10.6	11.0	12.5	9.4	10.6
<b>Pakistan</b>	Viet Nam	Meat & L Stock	28.6	12.0	11.7	19.3	10.7	11.3
<b>Pakistan</b>	Australia	P. Food	16.3	10.7	10.6	14.2		9.9
<b>Pakistan</b>	Bangladesh	P. Food	16.6	10.7	10.6	14.4		9.9
<b>Pakistan</b>	Brunei	P. Food	16.6	10.7	10.6	14.4		9.9
<b>Pakistan</b>	China	P. Food	14.1	10.7	10.6	12.2		9.9
<b>Pakistan</b>	Egypt	P. Food	16.6	10.7	10.6	14.4		9.9
<b>Pakistan</b>	EU-27	P. Food	14.2	10.7	10.6	12.3		9.9
<b>Pakistan</b>	GCC	P. Food	15.7	10.7	10.6	13.7		9.9
<b>Pakistan</b>	India	P. Food	16.3	10.7	10.6	14.2		9.9
<b>Pakistan</b>	Indonesia	P. Food	16.4	10.7	10.6	14.3		9.9
<b>Pakistan</b>	Japan	P. Food	15.9	10.7	10.6	13.8		9.9
<b>Pakistan</b>	Korea	P. Food	16.0	10.7	10.6	13.9		9.9
<b>Pakistan</b>	Malaysia	P. Food	16.4	10.7	10.6	14.2		9.9
<b>Pakistan</b>	New Zealand	P. Food	16.6	10.7	10.6	14.4		9.9
<b>Pakistan</b>	Singapore	P. Food	16.2	10.7	10.6	14.1		9.9
<b>Pakistan</b>	Sri Lanka	P. Food	16.6	10.7	10.6	14.4		9.9
<b>Pakistan</b>	Thailand	P. Food	16.4	10.7	10.6	14.2		9.9
<b>Pakistan</b>	Turkey	P. Food	16.4	10.7	10.6	14.3		9.9
<b>Pakistan</b>	USA	P. Food	14.7	10.7	10.6	12.8		9.9
<b>Pakistan</b>	Viet Nam	P. Food	16.3	10.7	10.6	14.2		9.9
<b>Pakistan</b>	Australia	Tex. W. Apparel	27.0	42.5	14.1	20.0	24.0	11.5
<b>Pakistan</b>	Bangladesh	Tex. W. Apparel	27.4	43.4	14.2	20.3	24.6	11.6
<b>Pakistan</b>	Brunei	Tex. W. Apparel	27.4	43.6	14.3	20.4	24.7	11.7
<b>Pakistan</b>	China	Tex. W. Apparel	23.8	33.9	12.4	17.6	18.8	10.1
<b>Pakistan</b>	Egypt	Tex. W. Apparel	27.4	43.5	14.3	20.3	24.6	11.6
<b>Pakistan</b>	EU-27	Tex. W. Apparel	23.9	34.2	12.5	17.7	19.0	10.2

<b>Pakistan</b>	GCC	Tex. W. Apparel	26.2	40.2	13.6	19.4	22.6	11.1
<b>Pakistan</b>	India	Tex. W. Apparel	27.0	42.3	14.0	20.0	23.9	11.5
<b>Pakistan</b>	Indonesia	Tex. W. Apparel	27.2	42.9	14.2	20.2	24.3	11.6
<b>Pakistan</b>	Japan	Tex. W. Apparel	26.4	40.7	13.7	19.6	22.9	11.2
<b>Pakistan</b>	Korea	Tex. W. Apparel	26.6	41.4	13.9	19.7	23.3	11.3
<b>Pakistan</b>	Malaysia	Tex. W. Apparel	27.1	42.6	14.1	20.1	24.1	11.5
<b>Pakistan</b>	New Zealand	Tex. W. Apparel	27.4	43.5	14.3	20.3	24.6	11.6
<b>Pakistan</b>	Singapore	Tex. W. Apparel	26.9	42.0	14.0	19.9	23.7	11.4
<b>Pakistan</b>	Sri Lanka	Tex. W. Apparel	27.4	43.6	14.3	20.3	24.7	11.7
<b>Pakistan</b>	Thailand	Tex. W. Apparel	27.1	42.6	14.1	20.1	24.1	11.5
<b>Pakistan</b>	Turkey	Tex. W. Apparel	27.2	42.9	14.2	20.2	24.3	11.6
<b>Pakistan</b>	USA	Tex. W. Apparel	24.7	36.2	12.9	18.3	20.2	10.5
<b>Pakistan</b>	Viet Nam	Tex. W. Apparel	27.1	42.5	14.1	20.1	24.0	11.5
<b>Pakistan</b>	Australia	Vegetables & Fruits	28.5	12.0	11.7	19.2	10.7	11.3
<b>Pakistan</b>	Bangladesh	Vegetables & Fruits	30.2	12.2	11.8	20.4	10.9	11.4
<b>Pakistan</b>	Brunei	Vegetables & Fruits	30.5	12.2	11.9	20.7	10.9	11.4
<b>Pakistan</b>	China	Vegetables & Fruits	15.8	10.0	10.7	10.5	9.0	10.3
<b>Pakistan</b>	Egypt	Vegetables & Fruits	30.3	12.2	11.8	20.5	10.9	11.4
<b>Pakistan</b>	EU-27	Vegetables & Fruits	16.1	10.1	10.8	10.8	9.0	10.3
<b>Pakistan</b>	GCC	Vegetables & Fruits	24.6	11.5	11.5	16.6	10.2	11.0
<b>Pakistan</b>	India	Vegetables & Fruits	28.2	11.9	11.7	19.0	10.7	11.2
<b>Pakistan</b>	Indonesia	Vegetables & Fruits	29.3	12.1	11.8	19.8	10.8	11.3
<b>Pakistan</b>	Japan	Vegetables & Fruits	25.4	11.6	11.5	17.1	10.3	11.1
<b>Pakistan</b>	Korea	Vegetables & Fruits	26.6	11.7	11.6	17.9	10.5	11.1
<b>Pakistan</b>	Malaysia	Vegetables & Fruits	28.7	12.0	11.7	19.4	10.7	11.3
<b>Pakistan</b>	New Zealand	Vegetables & Fruits	30.3	12.2	11.8	20.5	10.9	11.4
<b>Pakistan</b>	Singapore	Vegetables & Fruits	27.7	11.9	11.7	18.7	10.6	11.2
<b>Pakistan</b>	Sri Lanka	Vegetables & Fruits	30.5	12.2	11.8	20.6	10.9	11.4
<b>Pakistan</b>	Thailand	Vegetables & Fruits	28.7	12.0	11.7	19.4	10.7	11.3
<b>Pakistan</b>	Turkey	Vegetables & Fruits	29.3	12.1	11.8	19.8	10.8	11.3
<b>Pakistan</b>	USA	Vegetables & Fruits	18.7	10.6	11.0	12.5	9.4	10.6
<b>Pakistan</b>	Viet Nam	Vegetables & Fruits	28.6	12.0	11.7	19.3	10.7	11.3
<b>Pakistan</b>	UK	extraction	9.8	12.9		8.9	8.2	
<b>Pakistan</b>	UK	Grain crops	16.6	15.1	12.6	13.9	8.8	11.4
<b>Pakistan</b>	UK	H. Manufacturing	13.1	21.1	14.3	11.1	15.2	13.3
<b>Pakistan</b>	UK	L. Manufacturing	10.7	23.8	15.8		17.1	13.5
<b>Pakistan</b>	UK	Meat & L Stock	27.1	11.8	11.6	18.3	10.5	11.2
<b>Pakistan</b>	UK	P. Food	16.1	10.7	10.6	14.0		9.9
<b>Pakistan</b>	UK	Tex. W. Apparel	26.8	41.7	13.9	19.8	23.5	11.4
<b>Pakistan</b>	UK	Vegetables & Fruits	27.1	11.8	11.6	18.3	10.5	11.2

**Appendix A15: Bilateral AVEs of NTMs imposed by Singapore on its trading partners**

Reporter	Partner	Sector	AVEs without MR			AVEs with MR		
			SPS	TBT	Other	SPS	TBT	Other
Singapore	Australia	extraction	10.8	10.8	13.1		8.6	10.9
Singapore	Brunei	extraction	10.8	11.7	13.3		9.4	11.1
Singapore	China	extraction	10.8	5.3	11.6		4.2	9.6
Singapore	Indonesia	extraction	10.8	11.2	13.2		8.9	11.0
Singapore	Japan	extraction	10.8	9.4	12.8		7.5	10.7
Singapore	Korea	extraction	10.8	9.9	12.9		7.9	10.8
Singapore	Malaysia	extraction	10.8	10.9	13.1		8.7	10.9
Singapore	New Zealand	extraction	10.8	11.6	13.3		9.3	11.1
Singapore	Pakistan	extraction	10.8	11.7	13.3		9.3	11.1
Singapore	Thailand	extraction	10.8	10.9	13.1		8.7	10.9
Singapore	Viet Nam	extraction	10.8	10.8	13.1		8.7	10.9
Singapore	Australia	Grain crops	12.3	11.1		11.1		
Singapore	Brunei	Grain crops	12.6	11.2		11.3		
Singapore	China	Grain crops	10.2	9.8		9.2		
Singapore	Indonesia	Grain crops	12.5	11.1		11.2		
Singapore	Japan	Grain crops	11.9	10.8		10.7		
Singapore	Korea	Grain crops	12.1	10.9		10.8		
Singapore	Malaysia	Grain crops	12.4	11.1		11.1		
Singapore	New Zealand	Grain crops	12.6	11.2		11.3		
Singapore	Pakistan	Grain crops	12.6	11.2		11.3		
Singapore	Thailand	Grain crops	12.4	11.1		11.1		
Singapore	Viet Nam	Grain crops	12.4	11.1		11.1		
Singapore	Australia	H. Manufacturing	12.7	26.9	21.8	10.8	19.2	16.0
Singapore	Brunei	H. Manufacturing	12.7	28.1	22.4	10.8	20.1	16.5
Singapore	China	H. Manufacturing	12.5	18.6	17.4	10.7	13.2	12.7
Singapore	Indonesia	H. Manufacturing	12.7	27.4	22.1	10.8	19.5	16.2
Singapore	Japan	H. Manufacturing	12.6	25.1	20.9	10.8	17.8	15.3
Singapore	Korea	H. Manufacturing	12.7	25.8	21.3	10.8	18.4	15.6
Singapore	Malaysia	H. Manufacturing	12.7	27.1	21.9	10.8	19.3	16.1
Singapore	New Zealand	H. Manufacturing	12.7	28.0	22.4	10.8	20.0	16.4
Singapore	Pakistan	H. Manufacturing	12.7	28.1	22.4	10.8	20.0	16.5
Singapore	Thailand	H. Manufacturing	12.7	27.1	21.9	10.8	19.3	16.1
Singapore	Viet Nam	H. Manufacturing	12.7	27.0	21.9	10.8	19.2	16.0
Singapore	Australia	L. Manufacturing	11.2	29.1	13.1	10.6	21.3	11.9
Singapore	Brunei	L. Manufacturing	11.3	29.6	13.1	10.7	21.7	11.9
Singapore	China	L. Manufacturing	10.2	25.4	13.1	9.7	18.5	11.8
Singapore	Indonesia	L. Manufacturing	11.2	29.3	13.1	10.7	21.5	11.9
Singapore	Japan	L. Manufacturing	11.0	28.3	13.1	10.4	20.8	11.9
Singapore	Korea	L. Manufacturing	11.0	28.6	13.1	10.5	21.0	11.9

<b>Singapore</b>	Malaysia	L. Manufacturing	11.2	29.2	13.1	10.6	21.4	11.9
<b>Singapore</b>	New Zealand	L. Manufacturing	11.3	29.5	13.1	10.7	21.7	11.9
<b>Singapore</b>	Pakistan	L. Manufacturing	11.3	29.6	13.1	10.7	21.7	11.9
<b>Singapore</b>	Thailand	L. Manufacturing	11.2	29.2	13.1	10.6	21.4	11.9
<b>Singapore</b>	Viet Nam	L. Manufacturing	11.2	29.1	13.1	10.6	21.4	11.9
<b>Singapore</b>	Australia	Meat & L Stock	16.8	12.5		12.3	11.3	
<b>Singapore</b>	Brunei	Meat & L Stock	17.1	12.9		12.5	11.6	
<b>Singapore</b>	China	Meat & L Stock	14.9	10.1		10.9	9.1	
<b>Singapore</b>	Indonesia	Meat & L Stock	16.9	12.7		12.4	11.4	
<b>Singapore</b>	Japan	Meat & L Stock	16.5	12.0		12.1	10.8	
<b>Singapore</b>	Korea	Meat & L Stock	16.6	12.2		12.2	11.0	
<b>Singapore</b>	Malaysia	Meat & L Stock	16.9	12.6		12.4	11.3	
<b>Singapore</b>	New Zealand	Meat & L Stock	17.1	12.8		12.5	11.5	
<b>Singapore</b>	Pakistan	Meat & L Stock	17.1	12.8		12.5	11.5	
<b>Singapore</b>	Thailand	Meat & L Stock	16.9	12.6		12.4	11.3	
<b>Singapore</b>	Viet Nam	Meat & L Stock	16.9	12.6		12.4	11.3	
<b>Singapore</b>	Australia	P. Food	30.1	10.3		25.5	9.9	
<b>Singapore</b>	Brunei	P. Food	31.2	10.3		26.5	9.9	
<b>Singapore</b>	China	P. Food	22.1	10.3		18.7	9.9	
<b>Singapore</b>	Indonesia	P. Food	30.6	10.3		25.9	9.9	
<b>Singapore</b>	Japan	P. Food	28.4	10.3		24.0	9.9	
<b>Singapore</b>	Korea	P. Food	29.0	10.3		24.6	9.9	
<b>Singapore</b>	Malaysia	P. Food	30.3	10.3		25.6	9.9	
<b>Singapore</b>	New Zealand	P. Food	31.1	10.3		26.4	9.9	
<b>Singapore</b>	Pakistan	P. Food	31.2	10.3		26.4	9.9	
<b>Singapore</b>	Thailand	P. Food	30.3	10.3		25.6	9.9	
<b>Singapore</b>	Viet Nam	P. Food	30.2	10.3		25.6	9.9	
<b>Singapore</b>	Australia	Tex. W. Apparel		18.4			14.8	
<b>Singapore</b>	Brunei	Tex. W. Apparel		19.8			16.0	
<b>Singapore</b>	China	Tex. W. Apparel		10.1			8.1	
<b>Singapore</b>	Indonesia	Tex. W. Apparel		19.0			15.3	
<b>Singapore</b>	Japan	Tex. W. Apparel		16.4			13.2	
<b>Singapore</b>	Korea	Tex. W. Apparel		17.2			13.8	
<b>Singapore</b>	Malaysia	Tex. W. Apparel		18.6			15.0	
<b>Singapore</b>	New Zealand	Tex. W. Apparel		19.7			15.8	
<b>Singapore</b>	Pakistan	Tex. W. Apparel		19.8			15.9	
<b>Singapore</b>	Thailand	Tex. W. Apparel		18.6			15.0	
<b>Singapore</b>	Viet Nam	Tex. W. Apparel		18.5			14.9	
<b>Singapore</b>	Australia	Vegetables & Fruits	16.8	12.5		12.3	11.3	
<b>Singapore</b>	Brunei	Vegetables & Fruits	17.1	12.9		12.5	11.6	
<b>Singapore</b>	China	Vegetables & Fruits	14.9	10.1		10.9	9.1	
<b>Singapore</b>	Indonesia	Vegetables & Fruits	16.9	12.7		12.4	11.4	

<b>Singapore</b>	Japan	Vegetables & Fruits	16.5	12.0	12.1	10.8
<b>Singapore</b>	Korea	Vegetables & Fruits	16.6	12.2	12.2	11.0
<b>Singapore</b>	Malaysia	Vegetables & Fruits	16.9	12.6	12.4	11.3
<b>Singapore</b>	New Zealand	Vegetables & Fruits	17.1	12.8	12.5	11.5
<b>Singapore</b>	Pakistan	Vegetables & Fruits	17.1	12.8	12.5	11.5
<b>Singapore</b>	Thailand	Vegetables & Fruits	16.9	12.6	12.4	11.3
<b>Singapore</b>	Viet Nam	Vegetables & Fruits	16.9	12.6	12.4	11.3

**Appendix A16: Bilateral AVEs of NTMs imposed by Sri Lanka on its trading partners**

Reporter	Partner	Sector	AVEs without MR			AVEs with MR		
			SPS	TBT	Other	SPS	TBT	Other
<b>Sri Lanka</b>	Bangladesh	extraction	15.8	18.8	16.8	14.0	16.8	16.1
<b>Sri Lanka</b>	India	extraction	15.3	18.8	16.4	13.5	16.8	15.8
<b>Sri Lanka</b>	Pakistan	extraction	15.9	18.9	16.8	14.0	16.8	16.2
<b>Sri Lanka</b>	Bangladesh	Grain crops	36.1	20.5	10.4	20.6	16.0	
<b>Sri Lanka</b>	India	Grain crops	35.9	19.9	10.4	20.5	15.5	
<b>Sri Lanka</b>	Pakistan	Grain crops	36.1	20.6	10.4	20.6	16.0	
<b>Sri Lanka</b>	Bangladesh	H. Manufacturing	14.9	18.8	10.6	11.9	14.0	
<b>Sri Lanka</b>	India	H. Manufacturing	14.7	18.5	10.4	11.7	13.8	
<b>Sri Lanka</b>	Pakistan	H. Manufacturing	14.9	18.8	10.6	11.9	14.0	
<b>Sri Lanka</b>	Bangladesh	L. Manufacturing	10.6	15.2	12.2	10.0	13.9	11.0
<b>Sri Lanka</b>	India	L. Manufacturing	10.4	14.9	12.2	9.8	13.6	11.0
<b>Sri Lanka</b>	Pakistan	L. Manufacturing	10.6	15.3	12.2	10.0	13.9	11.0
<b>Sri Lanka</b>	Bangladesh	Meat & L Stock	19.2	11.6	14.3	17.3	10.3	10.5
<b>Sri Lanka</b>	India	Meat & L Stock	18.7	11.6	14.3	16.9	10.3	10.5
<b>Sri Lanka</b>	Pakistan	Meat & L Stock	19.3	11.6	14.4	17.4	10.3	10.5
<b>Sri Lanka</b>	Bangladesh	P. Food	31.5	12.6	11.5	22.4	11.5	11.1
<b>Sri Lanka</b>	India	P. Food	31.0	12.4	11.5	22.0	11.3	11.1
<b>Sri Lanka</b>	Pakistan	P. Food	31.6	12.7	11.5	22.4	11.5	11.1
<b>Sri Lanka</b>	Bangladesh	Tex. W. Apparel	14.6	30.6	15.9	12.2	21.3	11.8
<b>Sri Lanka</b>	India	Tex. W. Apparel	14.4	29.1	15.5	12.0	20.3	11.6
<b>Sri Lanka</b>	Pakistan	Tex. W. Apparel	14.6	30.8	15.9	12.2	21.5	11.9
<b>Sri Lanka</b>	Bangladesh	Vegetables & Fruits	19.2	11.6	14.3	17.3	10.3	10.5
<b>Sri Lanka</b>	India	Vegetables & Fruits	18.7	11.6	14.3	16.9	10.3	10.5
<b>Sri Lanka</b>	Pakistan	Vegetables & Fruits	19.3	11.6	14.4	17.4	10.3	10.5



**Appendix A17: Bilateral AVEs of NTMs imposed by Thailand on its trading partners**

Reporter	Partner	Sector	AVEs without MR			AVEs with MR		
			SPS	TBT	Other	SPS	TBT	Other
Thailand	Australia	extraction	10.4	17.1	11.6	9.5	14.4	10.0
Thailand	Brunei	extraction	10.6	17.4	11.6	9.7	14.6	10.0
Thailand	China	extraction	9.0	14.8	11.6	8.3	12.4	10.0
Thailand	Indonesia	extraction	10.5	17.2	11.6	9.6	14.5	10.0
Thailand	Japan	extraction	10.1	16.6	11.6	9.3	14.0	10.0
Thailand	Korea	extraction	10.2	16.8	11.6	9.4	14.1	10.0
Thailand	Malaysia	extraction	10.4	17.1	11.6	9.5	14.4	10.0
Thailand	New Zealand	extraction	10.6	17.4	11.6	9.7	14.6	10.0
Thailand	Pakistan	extraction	10.6	17.4	11.6	9.7	14.6	10.0
Thailand	Singapore	extraction	10.3	17.0	11.6	9.5	14.3	10.0
Thailand	Viet Nam	extraction	10.4	17.1	11.6	9.5	14.4	10.0
Thailand	Australia	Grain crops	20.6	10.9		15.1	10.0	
Thailand	Brunei	Grain crops	20.8	10.9		15.2	10.1	
Thailand	China	Grain crops	18.9	10.2		13.9	9.4	
Thailand	Indonesia	Grain crops	20.6	10.9		15.1	10.0	
Thailand	Japan	Grain crops	20.2	10.7		14.8	9.9	
Thailand	Korea	Grain crops	20.4	10.8		14.9	9.9	
Thailand	Malaysia	Grain crops	20.6	10.9		15.1	10.0	
Thailand	New Zealand	Grain crops	20.7	10.9		15.2	10.1	
Thailand	Pakistan	Grain crops	20.7	10.9		15.2	10.1	
Thailand	Singapore	Grain crops	20.5	10.8		15.0	10.0	
Thailand	Viet Nam	Grain crops	20.6	10.9		15.1	10.0	
Thailand	Australia	H. Manufacturing	10.3	22.9	14.6	10.0	20.4	13.3
Thailand	Brunei	H. Manufacturing	10.4	24.0	14.6	10.1	21.4	13.3
Thailand	China	H. Manufacturing	9.4	15.8	14.6	9.2	14.0	13.3
Thailand	Indonesia	H. Manufacturing	10.3	23.4	14.6	10.0	20.8	13.3
Thailand	Japan	H. Manufacturing	10.1	21.3	14.6	9.8	19.0	13.3
Thailand	Korea	H. Manufacturing	10.2	21.9	14.6	9.9	19.5	13.3
Thailand	Malaysia	H. Manufacturing	10.3	23.1	14.6	10.0	20.5	13.3
Thailand	New Zealand	H. Manufacturing	10.3	23.9	14.6	10.1	21.3	13.3
Thailand	Pakistan	H. Manufacturing	10.4	23.9	14.6	10.1	21.3	13.3
Thailand	Singapore	H. Manufacturing	10.2	22.5	14.6	9.9	20.0	13.3
Thailand	Viet Nam	H. Manufacturing	10.3	23.0	14.6	10.0	20.5	13.3
Thailand	Australia	L. Manufacturing	11.5	25.0	11.6	10.8	20.3	10.9
Thailand	Brunei	L. Manufacturing	11.5	25.7	11.6	10.8	20.9	10.9
Thailand	China	L. Manufacturing	11.3	19.6	11.6	10.6	15.9	10.9
Thailand	Indonesia	L. Manufacturing	11.5	25.3	11.6	10.8	20.5	10.9
Thailand	Japan	L. Manufacturing	11.5	23.8	11.6	10.7	19.4	10.9
Thailand	Korea	L. Manufacturing	11.5	24.3	11.6	10.7	19.7	10.9

<b>Thailand</b>	Malaysia	L. Manufacturing	11.5	25.1	11.6	10.8	20.4	10.9
<b>Thailand</b>	New Zealand	L. Manufacturing	11.5	25.6	11.6	10.8	20.8	10.9
<b>Thailand</b>	Pakistan	L. Manufacturing	11.5	25.7	11.6	10.8	20.9	10.9
<b>Thailand</b>	Singapore	L. Manufacturing	11.5	24.7	11.6	10.7	20.0	10.9
<b>Thailand</b>	Viet Nam	L. Manufacturing	11.5	25.0	11.6	10.8	20.3	10.9
<b>Thailand</b>	Australia	Meat & L Stock	30.8	16.4	11.7	18.6	13.7	9.9
<b>Thailand</b>	Brunei	Meat & L Stock	30.9	16.4	11.8	18.7	13.7	10.0
<b>Thailand</b>	China	Meat & L Stock	30.1	16.3	10.9	18.2	13.6	9.3
<b>Thailand</b>	Indonesia	Meat & L Stock	30.8	16.4	11.7	18.6	13.7	9.9
<b>Thailand</b>	Japan	Meat & L Stock	30.7	16.4	11.5	18.5	13.7	9.8
<b>Thailand</b>	Korea	Meat & L Stock	30.7	16.4	11.6	18.6	13.7	9.8
<b>Thailand</b>	Malaysia	Meat & L Stock	30.8	16.4	11.7	18.6	13.7	9.9
<b>Thailand</b>	New Zealand	Meat & L Stock	30.9	16.4	11.8	18.7	13.7	10.0
<b>Thailand</b>	Pakistan	Meat & L Stock	30.9	16.4	11.8	18.7	13.7	10.0
<b>Thailand</b>	Singapore	Meat & L Stock	30.8	16.4	11.6	18.6	13.7	9.9
<b>Thailand</b>	Viet Nam	Meat & L Stock	30.8	16.4	11.7	18.6	13.7	9.9
<b>Thailand</b>	Australia	P. Food	11.7	11.7	12.6	10.6	11.0	11.9
<b>Thailand</b>	Brunei	P. Food	12.4	11.9	12.6	11.3	11.1	11.9
<b>Thailand</b>	China	P. Food	6.8	10.8	12.1	6.2	10.1	11.5
<b>Thailand</b>	Indonesia	P. Food	12.0	11.8	12.6	10.9	11.0	11.9
<b>Thailand</b>	Japan	P. Food	10.5	11.6	12.5	9.5	10.8	11.8
<b>Thailand</b>	Korea	P. Food	10.9	11.6	12.5	9.9	10.9	11.8
<b>Thailand</b>	Malaysia	P. Food	11.8	11.8	12.6	10.7	11.0	11.9
<b>Thailand</b>	New Zealand	P. Food	12.4	11.8	12.6	11.2	11.1	11.9
<b>Thailand</b>	Pakistan	P. Food	12.4	11.9	12.6	11.3	11.1	11.9
<b>Thailand</b>	Singapore	P. Food	11.3	11.7	12.5	10.3	10.9	11.9
<b>Thailand</b>	Viet Nam	P. Food	11.7	11.7	12.6	10.6	11.0	11.9
<b>Thailand</b>	Australia	Tex. W. Apparel	12.2	14.0	14.2	9.5	10.4	11.9
<b>Thailand</b>	Brunei	Tex. W. Apparel	14.6	16.8	14.3	11.4	12.5	12.0
<b>Thailand</b>	China	Tex. W. Apparel	2.8	3.2	12.9	2.1	2.4	10.8
<b>Thailand</b>	Indonesia	Tex. W. Apparel	13.1	15.1	14.2	10.2	11.2	11.9
<b>Thailand</b>	Japan	Tex. W. Apparel	9.2	10.5	13.9	7.1	7.8	11.6
<b>Thailand</b>	Korea	Tex. W. Apparel	10.2	11.8	14.0	8.0	8.8	11.7
<b>Thailand</b>	Malaysia	Tex. W. Apparel	12.5	14.4	14.2	9.7	10.7	11.9
<b>Thailand</b>	New Zealand	Tex. W. Apparel	14.3	16.4	14.3	11.1	12.3	12.0
<b>Thailand</b>	Pakistan	Tex. W. Apparel	14.5	16.6	14.3	11.3	12.4	12.0
<b>Thailand</b>	Singapore	Tex. W. Apparel	11.3	13.0	14.1	8.8	9.7	11.8
<b>Thailand</b>	Viet Nam	Tex. W. Apparel	12.3	14.2	14.2	9.6	10.6	11.9
<b>Thailand</b>	Australia	Vegetables & Fruits	30.8	16.4	11.7	18.6	13.7	9.9
<b>Thailand</b>	Brunei	Vegetables & Fruits	30.9	16.4	11.8	18.7	13.7	10.0
<b>Thailand</b>	China	Vegetables & Fruits	30.1	16.3	10.9	18.2	13.6	9.3
<b>Thailand</b>	Indonesia	Vegetables & Fruits	30.8	16.4	11.7	18.6	13.7	9.9

<b>Thailand</b>	Japan	Vegetables & Fruits	30.7	16.4	11.5	18.5	13.7	9.8
<b>Thailand</b>	Korea	Vegetables & Fruits	30.7	16.4	11.6	18.6	13.7	9.8
<b>Thailand</b>	Malaysia	Vegetables & Fruits	30.8	16.4	11.7	18.6	13.7	9.9
<b>Thailand</b>	New Zealand	Vegetables & Fruits	30.9	16.4	11.8	18.7	13.7	10.0
<b>Thailand</b>	Pakistan	Vegetables & Fruits	30.9	16.4	11.8	18.7	13.7	10.0
<b>Thailand</b>	Singapore	Vegetables & Fruits	30.8	16.4	11.6	18.6	13.7	9.9
<b>Thailand</b>	Viet Nam	Vegetables & Fruits	30.8	16.4	11.7	18.6	13.7	9.9

#### Appendix A18: Bilateral AVEs of NTMs imposed by UK on its trading partners

Reporter	Partner	Sector	AVEs without MR			AVEs with MR		
			SPS	TBT	Other	SPS	TBT	Other
<b>UK</b>	Pakistan	extraction	16.4	36.8	17.0		26.5	12.4
<b>UK</b>	Pakistan	Grain crops	42.3	21.6	12.8	20.5	15.2	10.4
<b>UK</b>	Pakistan	H. Manufacturing	12.7	18.0	10.7	11.1	14.2	10.2
<b>UK</b>	Pakistan	L. Manufacturing	12.2	19.5	12.4	11.5	15.1	11.4
<b>UK</b>	Pakistan	Meat & L Stock	19.7	16.1	13.8	16.2	13.7	12.1
<b>UK</b>	Pakistan	P. Food	22.1	15.5	11.8	16.1	11.6	10.9
<b>UK</b>	Pakistan	Tex. W. Apparel	18.5	30.7	15.6	14.2	16.0	14.2
<b>UK</b>	Pakistan	Vegetables & Fruits	19.7	16.1	13.8	16.2	13.7	12.1

#### Appendix A19: Bilateral AVEs of NTMs imposed by USA on its trading partners

Reporter	Partner	Sector	AVEs without MR			AVEs with MR		
			SPS	TBT	Other	SPS	TBT	Other
<b>USA</b>	Pakistan	extraction	12.0	30.5	7.2	11.4	24.1	7.1
<b>USA</b>	Pakistan	Grain crops	26.9	12.5	10.9	18.4	11.5	10.5
<b>USA</b>	Pakistan	H. Manufacturing	16.9	26.7	21.1	13.0	18.3	20.2
<b>USA</b>	Pakistan	L. Manufacturing	10.7	15.4	11.8	10.5	14.0	11.6
<b>USA</b>	Pakistan	Meat & L Stock	28.5	16.9	13.0	22.7	15.3	11.6
<b>USA</b>	Pakistan	P. Food	19.5	13.9	10.8	17.0	13.0	10.5
<b>USA</b>	Pakistan	Tex. W. Apparel	11.1	14.3	11.1	10.5	11.6	10.9
<b>USA</b>	Pakistan	Vegetables & Fruits	28.5	16.9	13.0	22.7	15.3	11.6

**Appendix A20: Bilateral AVEs of NTMs imposed by Turkey on its trading partners**

Reporter	Partner	Sector	AVEs without MR			AVEs with MR		
			SPS	TBT	Other	SPS	TBT	Other
Turkey	Bangladesh	extraction	11.4	22.5	13.6	11.2	13.9	11.7
Turkey	Egypt	extraction	11.4	22.6	13.6	11.2	13.9	11.7
Turkey	Indonesia	extraction	11.4	22.5	13.5	11.2	13.9	11.6
Turkey	Malaysia	extraction	11.3	22.5	13.4	11.2	13.9	11.6
Turkey	Pakistan	extraction	11.4	22.6	13.6	11.2	13.9	11.7
Turkey	Bangladesh	Grain crops	27.2	12.5	11.0	18.6	12.1	
Turkey	Egypt	Grain crops	27.2	12.5	11.0	18.6	12.1	
Turkey	Indonesia	Grain crops	27.0	12.5	10.9	18.4	12.1	
Turkey	Malaysia	Grain crops	26.9	12.5	10.9	18.3	12.1	
Turkey	Pakistan	Grain crops	27.2	12.5	11.0	18.6	12.1	
Turkey	Bangladesh	H. Manufacturing	14.5	58.2	14.5	12.3	31.7	12.1
Turkey	Egypt	H. Manufacturing	14.5	58.7	14.5	12.3	32.1	12.1
Turkey	Indonesia	H. Manufacturing	14.5	54.7	14.5	12.3	29.4	12.1
Turkey	Malaysia	H. Manufacturing	14.4	52.4	14.5	12.3	28.0	12.1
Turkey	Pakistan	H. Manufacturing	14.5	59.3	14.5	12.4	32.5	12.1
Turkey	Bangladesh	L. Manufacturing	11.4	17.1	12.0	10.8	14.0	10.2
Turkey	Egypt	L. Manufacturing	11.4	17.1	12.0	10.8	14.0	10.2
Turkey	Indonesia	L. Manufacturing	11.3	17.0	12.0	10.7	13.9	10.2
Turkey	Malaysia	L. Manufacturing	11.3	16.9	12.0	10.7	13.9	10.2
Turkey	Pakistan	L. Manufacturing	11.4	17.2	12.0	10.8	14.1	10.2
Turkey	Bangladesh	Meat & L Stock	31.4	12.6	11.5	22.3	11.5	11.1
Turkey	Egypt	Meat & L Stock	31.5	12.7	11.5	22.4	11.5	11.1
Turkey	Indonesia	Meat & L Stock	31.0	12.5	11.5	22.0	11.4	11.1
Turkey	Malaysia	Meat & L Stock	30.7	12.5	11.5	21.8	11.3	11.1
Turkey	Pakistan	Meat & L Stock	31.5	12.7	11.5	22.4	11.5	11.1
Turkey	Bangladesh	P. Food	15.1	11.9	10.9	14.0	10.8	
Turkey	Egypt	P. Food	15.1	11.9	10.9	14.0	10.8	
Turkey	Indonesia	P. Food	15.0	11.9	10.9	14.0	10.8	
Turkey	Malaysia	P. Food	15.0	11.9	10.9	14.0	10.8	
Turkey	Pakistan	P. Food	15.1	11.9	10.9	14.0	10.8	
Turkey	Bangladesh	Tex. W. Apparel	21.9	28.7	12.7	17.9	22.2	11.1
Turkey	Egypt	Tex. W. Apparel	21.9	28.7	12.7	18.0	22.2	11.1
Turkey	Indonesia	Tex. W. Apparel	21.8	28.4	12.6	17.8	22.0	11.1
Turkey	Malaysia	Tex. W. Apparel	21.7	28.3	12.6	17.7	21.8	11.1
Turkey	Pakistan	Tex. W. Apparel	22.0	28.8	12.7	18.0	22.2	11.1
Turkey	Bangladesh	Vegetables & Fruits	31.4	12.6	11.5	22.3	11.5	11.1
Turkey	Egypt	Vegetables & Fruits	31.5	12.7	11.5	22.4	11.5	11.1
Turkey	Indonesia	Vegetables & Fruits	31.0	12.5	11.5	22.0	11.4	11.1
Turkey	Malaysia	Vegetables & Fruits	30.7	12.5	11.5	21.8	11.3	11.1
Turkey	Pakistan	Vegetables & Fruits	31.5	12.7	11.5	22.4	11.5	11.1

**Appendix A21: Bilateral AVEs of NTMs imposed by Vietnam on its trading partners**

Reporter	Partner	Sector	AVEs without MR			AVEs with MR		
			SPS	TBT	Other	SPS	TBT	Other
Viet Nam	Australia	extraction	11.7	12.1	12.0	11.2	10.6	11.1
Viet Nam	Brunei	extraction	11.8	12.1	12.1	11.3	10.6	11.1
Viet Nam	China	extraction	11.0	12.0	11.6	10.6	10.5	10.6
Viet Nam	Indonesia	extraction	11.7	12.1	12.1	11.3	10.6	11.1
Viet Nam	Japan	extraction	11.5	12.1	12.0	11.1	10.6	11.0
Viet Nam	Korea	extraction	11.6	12.1	12.0	11.2	10.6	11.0
Viet Nam	Malaysia	extraction	11.7	12.1	12.1	11.3	10.6	11.1
Viet Nam	New Zealand	extraction	11.8	12.1	12.1	11.3	10.6	11.1
Viet Nam	Pakistan	extraction	11.8	12.1	12.1	11.3	10.6	11.1
Viet Nam	Singapore	extraction	11.6	12.1	12.0	11.2	10.6	11.1
Viet Nam	Thailand	extraction	11.7	12.1	12.1	11.3	10.6	11.1
Viet Nam	Australia	Grain crops	20.1	10.3	10.9	16.2	9.3	9.6
Viet Nam	Brunei	Grain crops	20.3	10.4	11.0	16.4	9.4	9.6
Viet Nam	China	Grain crops	18.0	9.8	10.9	14.5	8.8	9.5
Viet Nam	Indonesia	Grain crops	20.2	10.3	11.0	16.3	9.4	9.6
Viet Nam	Japan	Grain crops	19.7	10.2	10.9	15.9	9.2	9.6
Viet Nam	Korea	Grain crops	19.8	10.3	10.9	16.0	9.3	9.6
Viet Nam	Malaysia	Grain crops	20.1	10.3	10.9	16.2	9.3	9.6
Viet Nam	New Zealand	Grain crops	20.3	10.4	11.0	16.4	9.4	9.6
Viet Nam	Pakistan	Grain crops	20.3	10.4	11.0	16.4	9.4	9.6
Viet Nam	Singapore	Grain crops	20.0	10.3	10.9	16.1	9.3	9.6
Viet Nam	Thailand	Grain crops	20.1	10.3	10.9	16.2	9.3	9.6
Viet Nam	Australia	H. Manufacturing	9.5	19.9	16.2	9.3	17.1	14.8
Viet Nam	Brunei	H. Manufacturing	9.5	19.9	16.2	9.3	17.1	14.8
Viet Nam	China	H. Manufacturing	9.4	19.7	16.2	9.2	17.0	14.8
Viet Nam	Indonesia	H. Manufacturing	9.5	19.9	16.2	9.3	17.1	14.8
Viet Nam	Japan	H. Manufacturing	9.5	19.8	16.2	9.3	17.1	14.8
Viet Nam	Korea	H. Manufacturing	9.5	19.8	16.2	9.3	17.1	14.8
Viet Nam	Malaysia	H. Manufacturing	9.5	19.9	16.2	9.3	17.1	14.8
Viet Nam	New Zealand	H. Manufacturing	9.5	19.9	16.2	9.3	17.1	14.8
Viet Nam	Pakistan	H. Manufacturing	9.5	19.9	16.2	9.3	17.1	14.8
Viet Nam	Singapore	H. Manufacturing	9.5	19.9	16.2	9.3	17.1	14.8
Viet Nam	Thailand	H. Manufacturing	9.5	19.9	16.2	9.3	17.1	14.8
Viet Nam	Australia	L. Manufacturing	12.1	18.0	12.2	11.4	13.4	11.7
Viet Nam	Brunei	L. Manufacturing	12.1	18.0	12.2	11.4	13.4	11.7
Viet Nam	China	L. Manufacturing	12.1	18.0	12.2	11.4	13.4	11.7
Viet Nam	Indonesia	L. Manufacturing	12.1	18.0	12.2	11.4	13.4	11.7
Viet Nam	Japan	L. Manufacturing	12.1	18.0	12.2	11.4	13.4	11.7
Viet Nam	Korea	L. Manufacturing	12.1	18.0	12.2	11.4	13.4	11.7

<b>Viet Nam</b>	Malaysia	L. Manufacturing	12.1	18.0	12.2	11.4	13.4	11.7
<b>Viet Nam</b>	New Zealand	L. Manufacturing	12.1	18.0	12.2	11.4	13.4	11.7
<b>Viet Nam</b>	Pakistan	L. Manufacturing	12.1	18.0	12.2	11.4	13.4	11.7
<b>Viet Nam</b>	Singapore	L. Manufacturing	12.1	18.0	12.2	11.4	13.4	11.7
<b>Viet Nam</b>	Thailand	L. Manufacturing	12.1	18.0	12.2	11.4	13.4	11.7
<b>Viet Nam</b>	Australia	Meat & L Stock	21.9	16.4		13.3	12.5	
<b>Viet Nam</b>	Brunei	Meat & L Stock	22.7	16.5		13.8	12.6	
<b>Viet Nam</b>	China	Meat & L Stock	16.4	16.0		9.9	12.2	
<b>Viet Nam</b>	Indonesia	Meat & L Stock	22.2	16.4		13.5	12.5	
<b>Viet Nam</b>	Japan	Meat & L Stock	20.7	16.3		12.6	12.5	
<b>Viet Nam</b>	Korea	Meat & L Stock	21.2	16.4		12.9	12.5	
<b>Viet Nam</b>	Malaysia	Meat & L Stock	22.0	16.4		13.4	12.5	
<b>Viet Nam</b>	New Zealand	Meat & L Stock	22.6	16.5		13.7	12.6	
<b>Viet Nam</b>	Pakistan	Meat & L Stock	22.7	16.5		13.8	12.6	
<b>Viet Nam</b>	Singapore	Meat & L Stock	21.6	16.4		13.1	12.5	
<b>Viet Nam</b>	Thailand	Meat & L Stock	22.0	16.4		13.4	12.5	
<b>Viet Nam</b>	Australia	P. Food	12.5	11.9	11.5	11.4	11.2	10.5
<b>Viet Nam</b>	Brunei	P. Food	12.5	12.2	11.5	11.4	11.5	10.5
<b>Viet Nam</b>	China	P. Food	12.5	9.8	11.5	11.4	9.2	10.5
<b>Viet Nam</b>	Indonesia	P. Food	12.5	12.0	11.5	11.4	11.3	10.5
<b>Viet Nam</b>	Japan	P. Food	12.5	11.5	11.5	11.4	10.8	10.5
<b>Viet Nam</b>	Korea	P. Food	12.5	11.6	11.5	11.4	10.9	10.5
<b>Viet Nam</b>	Malaysia	P. Food	12.5	12.0	11.5	11.4	11.2	10.5
<b>Viet Nam</b>	New Zealand	P. Food	12.5	12.2	11.5	11.4	11.5	10.5
<b>Viet Nam</b>	Pakistan	P. Food	12.5	12.2	11.5	11.4	11.5	10.5
<b>Viet Nam</b>	Singapore	P. Food	12.5	11.8	11.5	11.4	11.1	10.5
<b>Viet Nam</b>	Thailand	P. Food	12.5	12.0	11.5	11.4	11.2	10.5
<b>Viet Nam</b>	Australia	Tex. W. Apparel	15.7	29.3	23.5	13.1	19.3	14.9
<b>Viet Nam</b>	Brunei	Tex. W. Apparel	15.8	29.5	23.5	13.2	19.5	14.9
<b>Viet Nam</b>	China	Tex. W. Apparel	15.0	27.7	23.5	12.5	18.2	14.9
<b>Viet Nam</b>	Indonesia	Tex. W. Apparel	15.7	29.4	23.5	13.1	19.4	14.9
<b>Viet Nam</b>	Japan	Tex. W. Apparel	15.6	29.0	23.5	13.0	19.1	14.9
<b>Viet Nam</b>	Korea	Tex. W. Apparel	15.6	29.1	23.5	13.0	19.2	14.9
<b>Viet Nam</b>	Malaysia	Tex. W. Apparel	15.7	29.3	23.5	13.1	19.3	14.9
<b>Viet Nam</b>	New Zealand	Tex. W. Apparel	15.8	29.5	23.5	13.2	19.4	14.9
<b>Viet Nam</b>	Pakistan	Tex. W. Apparel	15.8	29.5	23.5	13.2	19.5	14.9
<b>Viet Nam</b>	Singapore	Tex. W. Apparel	15.7	29.2	23.5	13.1	19.3	14.9
<b>Viet Nam</b>	Thailand	Tex. W. Apparel	15.7	29.3	23.5	13.1	19.3	14.9
<b>Viet Nam</b>	Australia	Vegetables & Fruits	21.9	16.4		13.3	12.5	
<b>Viet Nam</b>	Brunei	Vegetables & Fruits	22.7	16.5		13.8	12.6	
<b>Viet Nam</b>	China	Vegetables & Fruits	16.4	16.0		9.9	12.2	
<b>Viet Nam</b>	Indonesia	Vegetables & Fruits	22.2	16.4		13.5	12.5	

<b>Viet Nam</b>	Japan	Vegetables & Fruits	20.7	16.3	12.6	12.5
<b>Viet Nam</b>	Korea	Vegetables & Fruits	21.2	16.4	12.9	12.5
<b>Viet Nam</b>	Malaysia	Vegetables & Fruits	22.0	16.4	13.4	12.5
<b>Viet Nam</b>	New Zealand	Vegetables & Fruits	22.6	16.5	13.7	12.6
<b>Viet Nam</b>	Pakistan	Vegetables & Fruits	22.7	16.5	13.8	12.6
<b>Viet Nam</b>	Singapore	Vegetables & Fruits	21.6	16.4	13.1	12.5
<b>Viet Nam</b>	Thailand	Vegetables & Fruits	22.0	16.4	13.4	12.5

## **APPENDIX B: Methodology of Business Survey**

This appendix provides the methodology used for qualitative part of the paper. For this purpose, survey of exporting and importing companies is conducted using random sampling. Here, only goods are included while services trade is not part of this research. As a starting point, we have identified those sectors which have greater share in exports and imports. These sectors include textile, textile related sectors, agriculture, leather, processed food, surgical equipment, sugar, fisheries, livestock, plastic and fiber, light and heavy manufacturing, edible oil, cereals, coffee and tea and others. Minerals including fuels are excluded due to their entirely different trade dynamics.

Using lists of Securities and Exchange Commission of Pakistan, Pakistan Stock Exchange, and ministry of commerce we constructed a dataset of companies involved in international trade. Then based on sectoral weights we have selected companies through random sampling. Through this process we were able to get a list of 200 companies. These companies were contacted through telephone and email, survey consent could be taken only from 102 companies. Finally, when interviews started only 71 companies were able to complete the questionnaire and participate in the telephonic interviews.

The questionnaire used to structure the detailed interviews consists of three parts. Part 1 covers the characteristics of the company, number of employees, turnover and share of exports in total sale, share of imports in total raw materials and related questions. Part 2 contains the questions about import and export related activities of the company, details of trading partners and products. Part 3 includes questions about the problems faced due to specific NTMs, government regulations at home, issues related to specific trade and regulatory bodies. Respondents were also allowed to give details of the issues and problems that were not covered in the questionnaire.

Finally, after concluding findings of these interviews, we were able to pinpoint the problems and issues faced by the traders. Business community have lot of concerns about government officials and respective bodies. These issues and grievances were put before the respective officials of Ministry of Commerce, Ministry of Finance, Trade Development Authority of Pakistan, Federal Board of Revenue, PCSIR and Port authorities. Through these discussions we recorded the official stance, some further problems were also highlighted, and some inefficiencies of trading firms were also



reported. In the final stage of survey, detailed discussions were conducted with trade experts in academia and research, problems highlighted by both sides and some supposed remedies were also discussed which helped us frame the recommendations of this paper.

## APPENDIX B: List of GTAP regions

The following table provides the list of regions and their description covered in GTAP10.

<b>Number</b>	<b>Code</b>	<b>Description</b>
1	AUS	Australia
2	NZL	New Zealand
3	XOC	Rest of Oceania
4	CHN	China
5	HKG	Hong Kong, Special Administrative Region of China
6	JPN	Japan
7	KOR	Korea, Republic of
8	MNG	Mongolia
9	TWN	Taiwan
10	XEA	Rest of East Asia
11	BRN	Brunei Darussalam
12	KHM	Cambodia
13	IDN	Indonesia
14	LAO	Lao PDR
15	MYS	Malaysia
16	PHL	Philippines
17	SGP	Singapore
18	THA	Thailand
19	VNM	Viet Nam
20	XSE	Rest of Southeast Asia
21	BGD	Bangladesh
22	IND	India
23	NPL	Nepal
24	PAK	Pakistan
25	LKA	Sri Lanka
26	XSA	Rest of South Asia
27	CAN	Canada
28	USA	United States of America
29	MEX	Mexico
30	XNA	Rest of North America
31	ARG	Argentina
32	BOL	Bolivia
33	BRA	Brazil
34	CHL	Chile
35	COL	Colombia
36	ECU	Ecuador
37	PRY	Paraguay
38	PER	Peru

39	URY	Uruguay
40	VEN	Venezuela (Bolivarian Republic of)
41	XSM	Rest of South America
42	CRI	Costa Rica
43	GTM	Guatemala
44	HND	Honduras
45	NIC	Nicaragua
46	PAN	Panama
47	SLV	El Salvador
48	XCA	Rest of Central America
49	DOM	Dominican Republic P
50	JAM	Jamaica
51	PRI	Puerto Rico
52	TTO	Trinidad and Tobago P
53	XCB	Rest of Caribbean
54	AUT	Austria
55	BEL	Belgium
56	CYP	Cyprus
57	CZE	Czech Republic
58	DNK	Denmark
59	EST	Estonia
60	FIN	Finland
61	FRA	France
62	DEU	Germany
63	GRC	Greece
64	HUN	Hungary
65	IRL	Ireland
66	ITA	Italy
67	LVA	Latvia
68	LTU	Lithuania
69	LUX	Luxembourg
70	MLT	Malta
71	NLD	Netherlands
72	POL	Poland
73	PRT	Portugal
74	SVK	Slovakia
75	SVN	Slovenia
76	ESP	Spain
77	SWE	Sweden
78	GBR	United Kingdom
79	CHE	Switzerland
80	NOR	Norway
81	XEF	Rest of European Free Trade Association
82	ALB	Albania

83	BGR	Bulgaria
84	BLR	Belarus
85	HRV	Croatia
86	ROU	Romania
87	RUS	Russian Federation
88	UKR	Ukraine
89	XEE	Rest of Eastern Europe
90	XER	Rest of Europe
91	KAZ	Kazakhstan
92	KGZ	Kyrgyzstan
93	TJK	Tajikistan
94	XSU	Rest of Former Soviet Union
95	ARM	Armenia
96	AZE	Azerbaijan
97	GEO	Georgia
98	BHR	Bahrain
99	IRN	Iran, Islamic Republic of
100	ISR	Israel
101	JOR	Jordan
102	KWT	Kuwait
103	OMN	Oman
104	QAT	Qatar
105	SAU	Saudi Arabia
106	TUR	Turkey
107	ARE	United Arab Emirates
108	XWS	Rest of Western Asia
109	EGY	Egypt
110	MAR	Morocco
111	TUN	Tunisia
112	XNF	Rest of North Africa
113	BEN	Benin
114	BFA	Burkina Faso
115	CMR	Cameroon
116	CIV	Côte d'Ivoire
117	GHA	Ghana
118	GIN	Guinea
119	NGA	Nigeria
120	SEN	Senegal
121	TGO	Togo
122	XWF	Rest of Western Africa
123	XCF	Rest of Central Africa
124	XAC	South Central Africa
125	ETH	Ethiopia
126	KEN	Kenya

<b>127</b>	<b>MDG</b>	<b>Madagascar</b>
<b>128</b>	<b>MWI</b>	<b>Malawi</b>
<b>129</b>	<b>MUS</b>	<b>Mauritius</b>
<b>130</b>	<b>MOZ</b>	<b>Mozambique</b>
<b>131</b>	<b>RWA</b>	<b>Rwanda</b>
<b>132</b>	<b>TZA</b>	<b>Tanzania, United Republic of</b>
<b>133</b>	<b>UGA</b>	<b>Uganda</b>
<b>134</b>	<b>ZMB</b>	<b>Zambia</b>
<b>135</b>	<b>ZWE</b>	<b>Zimbabwe</b>
<b>136</b>	<b>XEC</b>	<b>Rest of Eastern Africa</b>
<b>137</b>	<b>BWA</b>	<b>Botswana</b>
<b>138</b>	<b>NAM</b>	<b>Namibia</b>
<b>139</b>	<b>ZAF</b>	<b>South Africa</b>
<b>140</b>	<b>XSC</b>	<b>Rest of South African Customs Union</b>
<b>141</b>	<b>XTW</b>	<b>Rest of the World</b>

## APPENDIX C: Complete list of GTAP sectors

In this appendix sectors of GTAP 10 are defined in detail.

S.No	Sector	Description
1	pdr	Rice: seed, paddy (not husked)
2	wht	Wheat: seed, other
3	gro	Other Grains: maize (corn), sorghum, barley, rye, oats, millets, other cereals
4	v_f	Veg & Fruit: vegetables, fruit and nuts, edible roots and tubers, pulses
5	osd	Oil Seeds: oil seeds and oleaginous fruit
6	c_b	Cane & Beet: sugar crops
7	pfb	Fibres crops
8	ocr	Other Crops: stimulant; spice and aromatic crops; forage products; plants and parts of plants used primarily in perfumery, pharmacy, or for insecticidal, fungicidal or similar purposes; beet seeds (excluding sugar beet seeds) and seeds of forage plants; natural rubber in primary forms or in plates, sheets or strip, living plants; cut flowers and flower buds; flower seeds, unmanufactured tobacco; other raw vegetable materials nec
9	ctl	Cattle: bovine animals, live, other ruminants, horses and other equines, bovine semen
10	oap	Other Animal Products: swine; poultry; other live animals; eggs of hens or other birds in shell, fresh; reproductive materials of animals; natural honey; snails, fresh, chilled, frozen, dried, salted or in brine, except sea snails; edible products of animal origin n.e.c.; hides, skins and furskins, raw; insect waxes and spermaceti, whether or not refined or coloured
11	rmk	Raw milk
12	wol	Wool: wool, silk, and other raw animal materials used in textile
13	frs	Forestry: forestry, logging and related service activities
14	fsh	Fishing: hunting, trapping and game propagation including related service activities, fishing, fish farms; service activities incidental to fishing
15	coa	Coal: mining and agglomeration of hard coal, lignite and peat
16	oil	Oil: extraction of crude petroleum, service activities incidental to oil and gas extraction excluding surveying (part)
17	gas	Gas: extraction of natural gas, service activities incidental to oil and gas extraction excluding surveying (part)
18	oxt	Other Mining Extraction (formerly omn): mining of metal ores; other mining and quarrying

<b>19</b>	cmt	Cattle Meat: fresh or chilled; meat of buffalo, fresh or chilled; meat of sheep, fresh or chilled; meat of goat, fresh or chilled; meat of camels and camelids, fresh or chilled; meat of horses and other equines, fresh or chilled; other meat of mammals, fresh or chilled; meat of mammals, frozen; edible offal of mammals, fresh, chilled or frozen
<b>20</b>	omt	Other Meat: meat of pigs, fresh or chilled; meat of rabbits and hares, fresh or chilled; meat of poultry, fresh or chilled; meat of poultry, frozen; edible offal of poultry, fresh, chilled or frozen; other meat and edible offal, fresh, chilled or frozen; preserves and preparations of meat, meat offal or blood; flours, meals and pellets of meat or meat offal, inedible; greaves
<b>21</b>	vol	Vegetable Oils: margarine and similar preparations; cotton linters; oil-cake and other residues resulting from the extraction of vegetable fats or oils; flours and meals of oil seeds or oleaginous fruits, except those of mustard; vegetable waxes, except triglycerides; degreas; residues resulting from the treatment of fatty substances or animal or vegetable waxes; animal fats
<b>22</b>	mil	Milk: dairy products
<b>23</b>	pcr	Processed Rice: semi- or wholly milled, or husked
<b>24</b>	sgr	Sugar and molasses
<b>25</b>	ofd	Other Food: prepared and preserved fish, crustaceans, molluscs and other aquatic invertebrates; prepared and preserved vegetables, pulses and potatoes; prepared and preserved fruits and nuts; wheat and meslin flour; other cereal flours; groats, meal and pellets of wheat and other cereals; other cereal grain products (including corn flakes); other vegetable flours and meals; mixes and doughs for the preparation of bakers' wares; starches and starch products; sugars and sugar syrups n.e.c.; preparations used in animal feeding; lucerne (alfalfa) meal and pellets; bakery products; cocoa, chocolate and sugar confectionery; macaroni, noodles, couscous and similar farinaceous products; food products n.e.c.
<b>26</b>	b_t	Beverages and Tobacco products
<b>27</b>	tex	Manufacture of textiles
<b>28</b>	wap	Manufacture of wearing apparel
<b>29</b>	lea	Manufacture of leather and related products
<b>30</b>	lum	Lumber: manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials
<b>31</b>	ppp	Paper & Paper Products: includes printing and reproduction of recorded media

32	p_c	Petroleum & Coke: manufacture of coke and refined petroleum products
33	chm	Manufacture of chemicals and chemical products
34	bph	Manufacture of pharmaceuticals, medicinal chemical and botanical products
35	rpp	Manufacture of rubber and plastics products
36	nmm	Manufacture of other non-metallic mineral products
37	i_s	Iron & Steel: basic production and casting
38	nfm	Non-Ferrous Metals: production and casting of copper, aluminium, zinc, lead, gold, and silver
39	fmp	Manufacture of fabricated metal products, except machinery and equipment
40	ele	Manufacture of computer, electronic and optical products
41	eeq	Manufacture of electrical equipment
42	ome	Manufacture of machinery and equipment n.e.c.
43	mvh	Manufacture of motor vehicles, trailers and semi-trailers
44	otn	Manufacture of other transport equipment
45	omf	Other Manufacturing: includes furniture
46	ely	Electricity; steam and air conditioning supply
47	gdt	Gas manufacture, distribution
48	wtr	Water supply; sewerage, waste management and remediation activities
49	cns	Construction: building houses factories offices and roads
50	trd	Wholesale and retail trade; repair of motor vehicles and motorcycles
51	afs	Accommodation, Food and service activities
52	otp	Land transport and transport via pipelines
53	wtp	Water transport
54	atp	Air transport
55	whs	Warehousing and support activities
56	cmn	Information and communication
57	ofi	Other Financial Intermediation: includes auxiliary activities but not insurance and pension funding
58	ins	Insurance (formerly isr): includes pension funding, except compulsory social security
59	rsa	Real estate activities
60	obs	Other Business Services nec
61	ros	Recreation & Other Services: recreational, cultural and sporting activities, other service activities; private households with employed persons (servants)



<b>62</b>	osg	Other Services (Government): public administration and defense; compulsory social security, activities of membership organizations n.e.c., extra-territorial organizations and bodies
<b>63</b>	edu	Education
<b>64</b>	hht	Human health and social work
<b>65</b>	dwe	Dwellings: ownership of dwellings (imputed rents of houses occupied by owners)