AGRICULTURAL TRADE POLICIES AND WELFARE IMPLICATIONS:

Pakistan's General Equilibrium Analysis

By

Saud Ahmad
19/Phd-eco/pide/2014

Supervisor

Prof. Dr. Usman Mustafa
Dr. Muhammad Aamir Khan

Department of Economics and Econometrics,
Pakistan Institute of Development Economics,
Islamabad
Year 2021


بسم الله الرحمن الرحيم

Certificate of Approval

This is to certify that the research work presented in this thesis, entitled: **"Agricultural Trade Policies and Welfare Implications: Pakistan's General Equilibrium Analysis"** was conducted by Mr. Saud Ahmad under the supervision of Dr. Usman Mustafa & Dr. Muhammad Aamir. No part of this thesis has been submitted anywhere else for any other degree. This thesis is submitted in partial fulfillment of the requirements for the degree of Doctor of Philosophy in Economics from **Pakistan Institute of Development Economics, Islamabad.**

Student Name: Mr. Saud Ahmad
19/PhD-Eco/PIDE/2014

Signature: _____

Examination Committee:

a) **External Examiner: Dr. Zafar Mahmood**
Professor
School of Social Sciences & Humanities
NUST, Islamabad

Signature: _____

b) **Internal Examiner: Dr. Abedullah**
Chief of Research
PIDE, Islamabad

Signature: _____

Supervisor: Dr. Usman Mustafa
Ex-Professor
PIDE, Islamabad

Signature: _____

Co-Supervisor: Dr. Muhammad Aamir Khan
Assistant Professor
COMSATS University, Islamabad

Signature: _____

Dr. Shujaat Farooq
Head, Department of Economics & Econometrics
PIDE, Islamabad

Signature: _____

Author's Declaration

I Mr. Saud Ahmad hereby state that my PhD thesis titled **"Agricultural Trade Policies and Welfare Implications: Pakistan's General Equilibrium Analysis"** is my own work and has not been submitted previously by me for taking any degree from **Pakistan Institute of Development Economics, Islamabad'** or anywhere else in the country/world.

At any time if my statement is found to be incorrect even after my Graduation the university has the right to withdraw my PhD degree.

Mr. Saud Ahmad

19/PhD-Eco/PIDE/2014

Plagiarism Undertaking

I solemnly declare that research work presented in the thesis titled **"Agricultural Trade Policies and Welfare Implications: Pakistan's General Equilibrium Analysis"** is solely my research work with no significant contribution from any other person. Small contribution/help wherever taken has been duly acknowledged and that complete thesis has been written by me.

I understand the zero tolerance policy of the **HEC** and **Pakistan Institute of Development Economics, Islamabad** towards plagiarism. Therefore I as an Author of the above titled thesis declare that no portion of my thesis has been plagiarized and any material used as reference is properly cited.

I undertake that if I am found guilty of any formal plagiarism in the above titled thesis even after award of PhD degree, the University reserves the rights to withdraw/revoke my PhD degree and that HEC and the University has the right to publish my name on the HEC/University Website on which names of students are placed who submitted plagiarized thesis.

Students/Author Signature: _____

Name: Mr. Saud Ahmad

19/PhD-Eco/PIDE/2014

Dedicated to my Parents and Family

ACKNOWLEDGEMENTS

All praise be to Allah, the lord of the Universe, the most gracious and the most merciful. I am extremely grateful to Allah for providing me means and capability of achieving the milestone of Ph.D. which would not have been possible without the will of Allah.

I would also like to extend my deepest gratitude to Professor Dr. Usman Mustafa and Dr. Aamir khan for the patience, kindness and invaluable guidance. The extended discussions and suggestion have contributed greatly to the completion of my thesis. Once again thank you for being my mentors. I am also grateful to Dr. Zafar Mehmood for reviewing my thesis and providing very constructive comments and suggestions for improving my work.

Special thanks to my friends who are helpful to me during this time, especially Muhammad Mohsin Latif Kiani, Hamid Haroon, Hassam Shahid, Ali Raza, Irfan Talib and Dr. Shoaib Ali among many others. I would like to express my deepest appreciation to my lovely wife, who has been morally supporting and encouraging me throughout the long journey of Ph.D. with patience. I have received great amount of encouragement and support from my siblings as well and I would like to have an opportunity to express my sincere appreciation for all of them.

I also have great pleasure of working in a nurturing environment, provided by Pakistan Institute of Development Economics (PIDE), Islamabad and thanks should also go to Higher Education Commission (HEC) of Pakistan for granting me indigenous scholarship for my Ph.D.

I cannot begin to express my thanks to two very important person in my life, my mother and my father. Their prayers, moral support and financial support make this milestone possible for me. I am greatly indebted to them for their relentless support, contribution in my life and helping me through all of the difficulties and challenges.

Saud Ahmad

Abstract

In modern integrated world, synthesis of countries for trade is often viewed as a crucial source of income and growth disparities across nations. Well-known channels of economic theory can trace the growth effects of trade. However, there is a substantial conflict among empirical studies regarding gains from agricultural trade especially for developing countries like Pakistan. Therefore, this study examine the economy-wide impact of agriculture trade liberalisation, protection and tariff rationalisation on agriculture production, agriculture trade, income redistribution and public welfare. Moreover, Pakistan agricultural exports are facing many challenges and problems along with trade deficit. For this purpose, particular study also explore potential trade negotiations and estimate export potential for primary and secondary agriculture sectors.

An extension of GTAP model known as MyGTAP is employed and the world economy is disaggregated into 20 regions and 13 sectors with Pakistan as a home country. Results explore substantial gains from increased level of protection towards agriculture sector in terms of agriculture production, real factors' wage, terms of trade and households welfare. Rural households enjoy relatively higher real income and income inequality declines in Pakistan due to agriculture protection. Agriculture sector of Pakistan exhibits improvement in terms of production, households' income, income equality and public welfare by employing 15 percent uniform tariff across the selected sectors. However, protection and 15 percent uniform tariff result in considerable loss of consumer surplus and said study also point out trade-off between agricultural exports and terms of trade. Finally, we estimated $3873 million of export potential among primary and secondary agriculture sectors of Pakistan.

JEL Classifications: *Q17, C68, D3.*

Keywords: *Agriculture Trade policy, Tariff rationalisation, Export Potential, CGE Modelling, Income Redistribution, Pakistan.*

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

CHAPTER I

INTRODUCTION

1.1 Overview

In modern global economic order, synthesis of countries for trade is often viewed as a critical source of income and growth disparities across nations. Well-known channels of economic theory can trace the growth effects of trade. Krueger (1978) believed that trade provides the necessary bases for a fast track of growth by enabling an economy not only to allocate the resources in more efficient manner but also to gain from spill over effects triggered by integration such as diffusion of knowledge, new techniques and methods along with technological advancement. Ben-David & Loewy (2000) contemplated knowledge and technological diffusion with efficient resource allocation as a source of optimisation of the production process. Further, optimal level of production and diversities in production can be made possible by boosting competition in domestic and international markets by a higher level of integration (Balassa, 1978 and Dollar, 1992).

In particular for less-developed countries, trade economists considered the transfer of technology as a foundation of gains from trade and trade patterns, (Edwards, 1998). Also, the process of international product cycle can be prompted by trade openness, as less advanced countries would become capable of manufacturing certain goods that were produced by developed countries beforehand (Feder, 1983). The process can be termed as “product migration” and results in boosting up the volume of trade and

widens the opportunities for less developed countries to gain advanced production technologies.

Achieving an economic system with a higher level of integration required considerable trade liberalisation. The essential features of trade liberalisation contain the complete removal or partial elimination of trade barriers among nations. Or a country can also achieve trade liberalisation through imposing uniform tariff. Through liberalization tariff (duties, surcharges) and non-tariff restrictions (quotas, licensing rules, technical requirements, and others) are eliminated entirely or partially (Krueger, 2009, and Krugman, Melitz & Obstfeld, 2012) and uniform tariff liberalisation calls for simplification of the tariff structure and non-discriminatory tariff is imposed on products by a country for every nation. So far after Uruguay round under General Agreement on Tariffs and Trade (GATT) and World Trade Organisation (WTO) came to existence, we have witnessed an increase in globalization in which both developing and developed nations have eliminated trade barriers as per recommendations of WTO or because of bilateral or multilateral free trade agreements among them. However, relatively, the case of integration is rather new for developing nations which can be traced back to 1980s and onwards.

Trade liberalisation and a higher level of integration of the global economies have created several important implications for economic development through trade and strengthen the economic partnership between developing and developed countries. Therefore, advocates of liberalisation believed positive relationship between economic growth and trade openness. In the view of arguments in favour of trade liberalisation, export-oriented policies are regarded as a beneficial deal for an open economy in a variety of ways (Balassa, 1985 and Dornbusch, 1992).

But many times, in trade literature the claims of proponents are indicated to be exaggerated as recognized by Rodríguez & Rodrik (2000). Though, trade liberalisation might expand the material wellbeing but there are going to be some losers whose gains are so much smaller that they would have been better off with less trade (Sachs, 1989 and Taylor, 1991).

The empirical literature based on previous three decades have established growth to be directly proportional to free trade (Greenaway, Morgan & Wright, 2002, Wacziarg & Welch, 2008 and Zakaria & Ahmed, 2013). Some studies like Harrison & Hanson (1999), Rodríguez & Rodrik (2001) and Rodrik (1998) on the other hand disapproved the empirical studies and show serious apprehensions regarding positive linkage between liberalization and economic growth. Krugman (1994) and Rodrik (1995) provided the most projecting work regarding gains from trade and suggested that at best there is an unsubstantial effect of free trade on growth and in least bad scenario the effect of free trade on growth is dubious. Trade liberalization was identified as a beneficial tool for growth by Vamvakidis (2002) but he argued that it is only a very recent pattern and in early period of twentieth century, he emphasised a negative association between growth and free trade. A model formulated by Grossman & Helpman (1991) and Romer (1992) suggested adverse effects on growth on an economy chooses to open up borders for trade. Mosley (2000) added up in the favour of protectionist views by postulating favourable outcomes of higher degree of protection on economic growth. He argued that the benefits are likely to be higher if an economy could encourage investments in sectors related to research and development and provide protection to such sectors.

Agricultural sector has received relatively more serious and concerning doubts regarding gains and losses from trade. Proponents of free trade explained the similar

channels of technological advancement, specialisation and improvement in production through which agricultural trade liberalization could boast economic growth. However, the doubts regarding agricultural trade liberalization is not only limited to dubious nature of trade gains but also to the possibility of jeopardizing the income status of already low-income, vulnerable and sensitive population associated with agriculture. The redistribution impact of agricultural trade policies remained mixed and often criticised by empirics (Acharya, 2011).

The gains from trade are associated with comparative advantage. Traditional theories of comparative advantage often failed to explain wellbeing of vulnerable households retained by agricultural trade liberalization even if the sector have comparative advantage over competitors. Trade might increase the improvement in production along with efficiency but it also raised serious apprehensions apropos of how it might affect the poor segment of the society (Keleman, 2010). For less developed countries agricultural trade liberalization might harm the rural welfare in several ways. Major segment of rural population depends upon grain production and in production of grain, developed or high-income countries already enjoy comparative advantage along with very high level of supports for production in the form of subsidies or other programs. From this point, exposing agricultural sector to the foreign competition by less developed economies would inflict a huge deal of damage to their agricultural sectors and population associated with it (Brooks, Dyer & Taylor, 2008).

Second, in several cases less developed countries already have market access towards developed markets for their exports of agricultural products and when they opened up their border then they are likely to gain less in terms of increase in market access to the markets of developed countries as compare to the possible loss incurred by them by putting the grain producers in cut throat foreign competition. On the other hand,

developed nations are most likely to remain unaffected from trade liberalization and effect might be muted. Tangermann (2005) goes on to argue about the adverse effects of liberalization on less developed countries due to preference erosion[1].

1.2 Problem Statement

Some evidence from aggregate economy-wide models suggests that the impact of agricultural trade reforms in less developed countries would be positive; however, the reasons for this lie mostly in the effects that such reforms would have on the non-agricultural sector. Microeconomic agricultural household theory suggests that the effects of agricultural market liberalization on LDC rural welfare are not clear cut, because rural households lose as producers but gain as consumers when food prices fall. Whether the negative production or positive consumption effect dominates is an empirical question, and the answer is likely to vary between different rural household groups. On the production side, a decrease in price (for example, of food grains) may benefit households engaged in other crop activities (for example, fruits and vegetables) if factor prices (for example, wages) decrease. Even the impacts of agricultural trade reforms on factor prices are ambiguous; they depend on the relative factor intensities of the directly- and indirectly-affected activities.

Therefore, the effect of agricultural trade liberalisation (whether through tariff elimination or tariff simplification) on welfare is highly contested in the development economics literature (Cassel & Patel, 2003 and Rakotoarisoa, 2011). Trade liberalization and international integration may also cause some negative

[1] "Preference erosion" refers to declines in the competitive advantage that some exporters enjoy in foreign markets as a result of preferential trade treatment. Preference erosion can occur when export partners eliminate preferences, expand the number of preference beneficiaries, or lower their most-favoured-nation (MFN) tariff without lowering preferential tariffs proportionately.

socioeconomic impacts; Left unaddressed, these can impose serious challenges to sustainable development of less developed rural economies like Pakistan. Moreover, it is preposterous to suggest that trade openness by itself is sufficient to stimulate growth. For instance, in the absence of macroeconomic stability, policy credibility and enforcement of contracts, it is quite unlikely that a country specially developing or less developed countries will be able to register significantly high growth rates for a sustained period.

Last but not least Pakistan also faces the problem of continuous deterioration of terms of trade along with declining exports over the last few years. Therefore, this study also focuses on the trade policy option to boost exports and improving terms of trade.

1.3 Research Questions

Following research questions are formulated on the bases of problem statements mentioned in subsection 1.2:

I. Should Pakistan adopt agriculture trade liberating/protectionist or tariff rationalisation policies?

II. What would be the impact of agriculture trade liberalisation/protection and tariff rationalisation on macroeconomic variables like, Government income, real GDP, export volume, import volume and terms of trade?

III. What would be the impact of agriculture trade liberalisation/protection and tariff rationalisation on output, prices, exports, imports and factors' real wages at sectoral level?

IV. What would be the impact of agriculture trade liberalisation/protection and tariff rationalisation on socio-economic variables like, household's real income and within households' income inequality?

V. Would the negative production or positive consumption effect dominate for rural households' welfare in case of agriculture trade liberalisation?

VI. Would the positive production or negative consumption effect dominate for rural households' welfare in case of agriculture trade protection?

VII. What would be the impact of agriculture trade liberalisation/protection and tariff rationalisation on overall public welfare?

VIII. Is there any export potential in primary and secondary agriculture sector that can be achieved?

1.4 Pakistan Trade Policy

During the early 1980s Pakistan was persuaded to implement trade reforms along with structural adjustment policies, enforced by the International Monetary Fund, the World Bank and other international institutions, as an imperative step towards free-market economy. During the period of its debt crisis (1980s) Pakistan showed grave proclivity for a free-market economy and conceded all kind of conditions imposed by the world organizations to acquire financial support. Consequently, during the mid-1980s trade reforms were implemented and trade liberalization was institutionalized. Pakistan became member of the World Trade Organization (WTO) as a result of the Uruguay Round on trade negotiations (1986–1994) to elicit gains from implementation of the new regime of multilateral trade liberalization like other countries, under the ambit of the WTO. It involved policy measures that called for reducing the level of tariffs,

replacing quantitative restrictions with tariffs, introducing uniformity in tariff structures and levels, and reducing the severity of other kinds of taxes on international trade.

This process of trade liberalization continued in 1990s and early 2000s as well. In the post-2000 period, Pakistan oriented its policy towards signing Regional Trade Agreements (RTAs) and in the process signed its first Free Trade Agreements (FTA) with Sri Lanka in 2005. In later years, the FTAs with South Asia (2004), China (2007) and Malaysia (2007) and the preferential trade agreements (PTAs) with Iran (2004) and Indonesia (2005) and Mauritius (2007) were signed.

1.5 Objectives

This study aims to provide a comprehensive welfare analysis of Pakistan's agricultural trade policy options to understand the economy-wide impacts of agricultural trade reforms on rural economies.

The specific objectives of the study are to quantify economy-wide impact of:

a) Complete agricultural trade liberalization on agriculture and public welfare of Pakistan.
b) Agricultural trade liberalization by different percentages on agriculture and public welfare of Pakistan.
c) Agricultural trade protectionism on agriculture and public welfare of Pakistan.
d) Uniform tariff rationalization on agriculture and public welfare of Pakistan.
e) Potential trade negotiations based on sectoral export potential on agriculture and public welfare of Pakistan.

Last but not least, this study also aim to estimate product and market wise export potential based on the results obtained from objective "e".

1.6 Significance of the Study

This research provides advisers, government and authorities with an improved basis from which to develop suitable policies for restructuring and directing the development of the agricultural sector and improving the empowerment and welfare of the public especially poor and vulnerable people belongs to agricultural sector. This study offers a better understanding of changes brought about by tariff liberalization and rationalization on welfare, redistribution of income across different households, agricultural sector and Pakistan as a whole. Furthermore, our study also provides bases to negotiate trade deals with several nations in order to boost agricultural exports of Pakistan.

1.7 Organisation of the Study

Chapter I, presents a brief introduction, the rest of study is composed of chapter II with title “Pakistan Primary Agriculture Trade Performance”. With title of “Background and Literature Review”, Chapter III has been divided into two subsections containing theoretical foundations of general equilibrium (GE) models and review of empirical literature. Chapter IV provides overview of Global trade analysis project (GTAP) model, MyGTAP model, data source, aggregation schemes and experiment designs, respectively with tittle “Data and Methodology”. Results are discussed in chapter V and chapter VI presents the “Conclusion and Policy Recommendations”. Reference are provided at the end of this study.

CHAPTER II

PAKISTAN PRIMARY AGRICULTURE TRADE PERFORMANCE

This chapter aims to provide current situation of trade performance and growth patterns of Pakistan agriculture sector in last several years.

Over the last year, Pakistan agriculture sector has underperformed with growth rate of merely 0.85 percent as compared to the desired level of 3.8 percent. Against the target of 3.6 percent growth, crop sector shrinks by 4.43 percent. Crop sector suffered mainly due to negative growth (-6.55 percent) of important crops like wheat, rice, cotton, sugarcane and maize. Sugarcane production dropped by huge percentage of 19.4 along with -17.5 and -3.3 percent growth rate of cotton and rice production. On the other hand, maize and wheat crop experienced positive growth by 6.9 and 0.5 percent, respectively. Moreover, other crops having contribution of 11.21 percent in agriculture total value addition and in GDP by 2.08 percent, exhibited 1.95 percent growth basically because of raise in production of oilseeds and pulses.

Livestock manage to retain the growth rate of 4 percent little above from the target level of 3.8 percent. Growth rate of 0.79 has been witnessed by fisheries and forestry grew by 6.47 percent primarily due to boost in timber production (Agricultural Statistics of Pakistan 2019).

2.1 Cereal and Cash Crops

Wheat, rice and maize are important cereals of the mass population of the Pakistan and cotton along with sugarcane is considered as high valued cash crops. These cereals and cash crops contribute around 21.90 percent in the value addition of agriculture sector and 4.06 percent in GDP. The other crops account 11.21 percent in the value addition of agriculture sector and 2.08 percent in GDP.

2.1.1 Cereals

Wheat backs 8.9 percent value added in agriculture and 1.6 percent of GDP. Wheat crop experienced a raise of just 0.5 percent to 25.195 million tonnes as compared to the last year's production of 25.076 million tonnes and missed the target by 4.9 percent. Rice is second main staple crop for Pakistan and also vital for earning external reserves. It accounts for 3.0 percent of the value added in agriculture and 0.6 percent of GDP. During 2018-19, quantity of rice crop shrinks by 3.3 percent and manage 7,202 thousand tonnes of production against the target of 7.0 million tonnes.

Maize comes at number three on the list of most important staple crop of Pakistan. The production increased from 6309 thousand tonnes as compared to the production account for 5902 thousand tonnes in last year. Contribution of maize crop in agriculture value addition and GDP is 2.6 and 0.5 percent respectively. Production of staple crops over last five year has been presented in Figure 2.1.

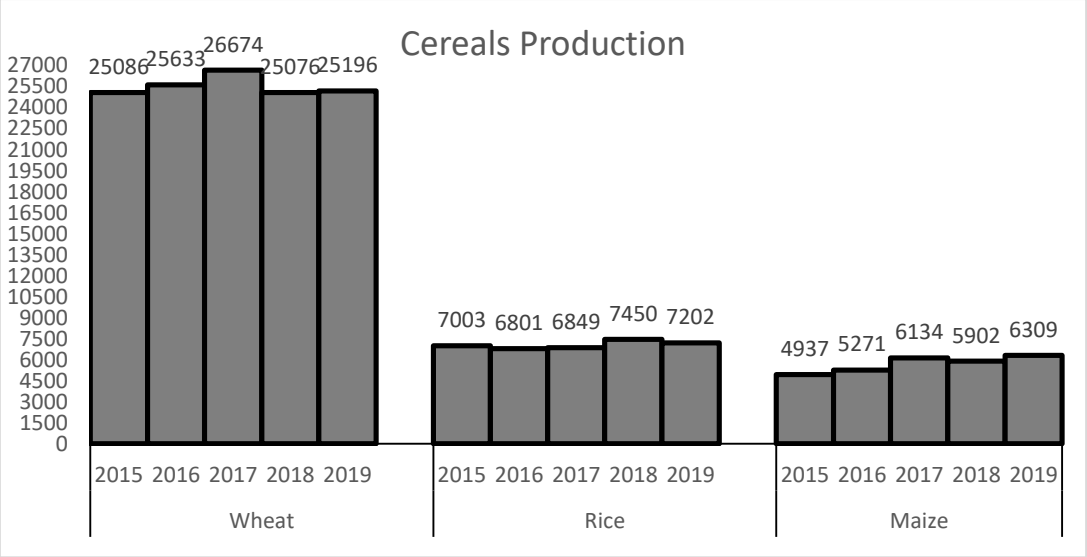

Figure 2.1: Cereals Production: Values from 2015-19 in thousand tonnes, extracted from Agricultural statistics of Pakistan.

Furthermore, external balance of wheat crop mostly remain positive over the last five years. Net export remains US$ 322,417 in 2018 as compared to US$ 1075 in 2017. Wheat sector showed a high degree of self-sufficiency as imports declined to insignificant amount over the last period along with continuous increase in export. Pakistan wheat export experienced a dramatic increase in 2018 even after decline in output in 2018 due to subsidy provided by the Government on wheat export. Further, prior to 2018 the export of wheat was restricted to particular limit keeping in view the shrinking cultivated area. Import also reduce significantly after 2014. Last five years of cereals' trade Balance is shown in Figure 2.2.

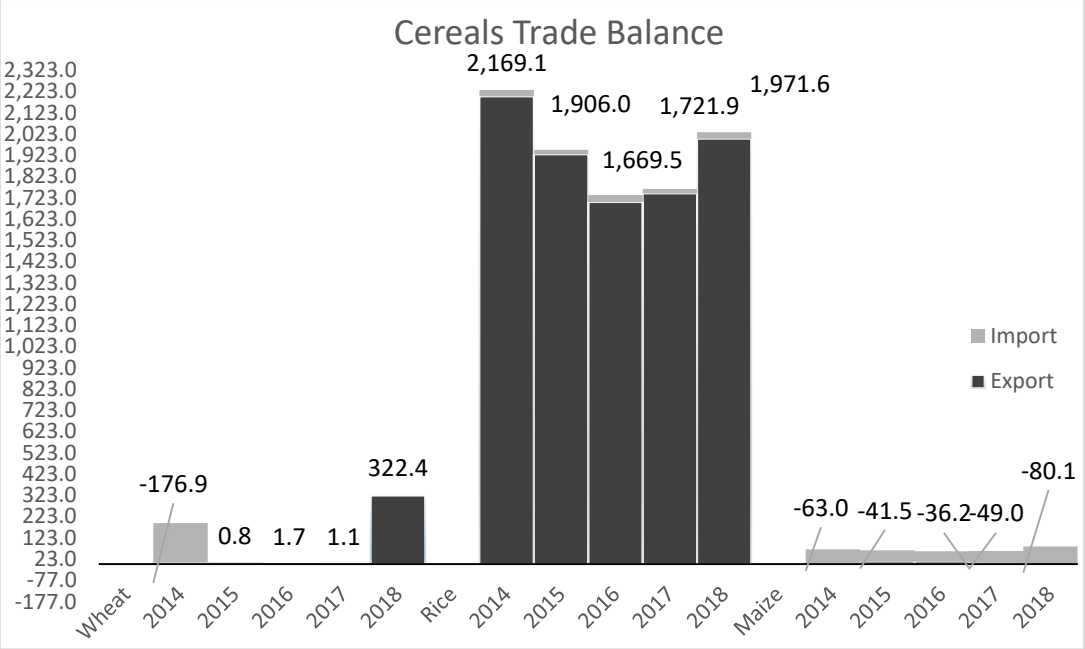

Figure 2.2: Cereals Trade Balance; values from 2014-2018 in US$ million, extracted from trademap Pakistan. Further net exports are in numeric.

Rice is an important crop not only as cereal but also vital for earning foreign reserves for Pakistan. Pakistan is ranked 4 in world ranking and contributes 7.6% in world's total exports for rice and on the other hand contributes only 0.1% of world's imports and ranked at 108 position. Pakistan is a net exporter of rice and exported around worth of $2199.6 million in 2014. Export declined for few years but again experience an increase in 2018. Imports of rice by Pakistan amount for $30, 000 thousand on average over the last five years results in huge gains for Pakistan in terms of trade balance.

Over the last five years, Pakistan is not self-sufficient in maize crop. External balance remained negative reaching all high in 2018 and account for $80.1 million loss of net exports. Exports remain stagnant and only increase to $11.7 million and $12.2 million in 2015 and 2016 respectively. Later exports continue to decline and witness minimal exports in 2018 and accounted for only $1 million. On the other hand, imports witness a decline for two years after 2014 but again climbed up by worth of $81.1 million in 2018.

2.1.2 Cash Crops

Other than rice, cotton and sugarcane are consider as cash crops of Pakistan. Cotton contributes 4.5 percent in agriculture value addition and is a main input for most of the textile's products and has only share 0.8% in GDP. Over the last five years, significant contraction in cotton production has took place and also suffer lower price in international market. During last year, cotton witness negative growth rate of 17.5 percent and manage 9.9 million bales and missed the target of 14.4 million bales by 31.5 percent. (See Figure 2.3)

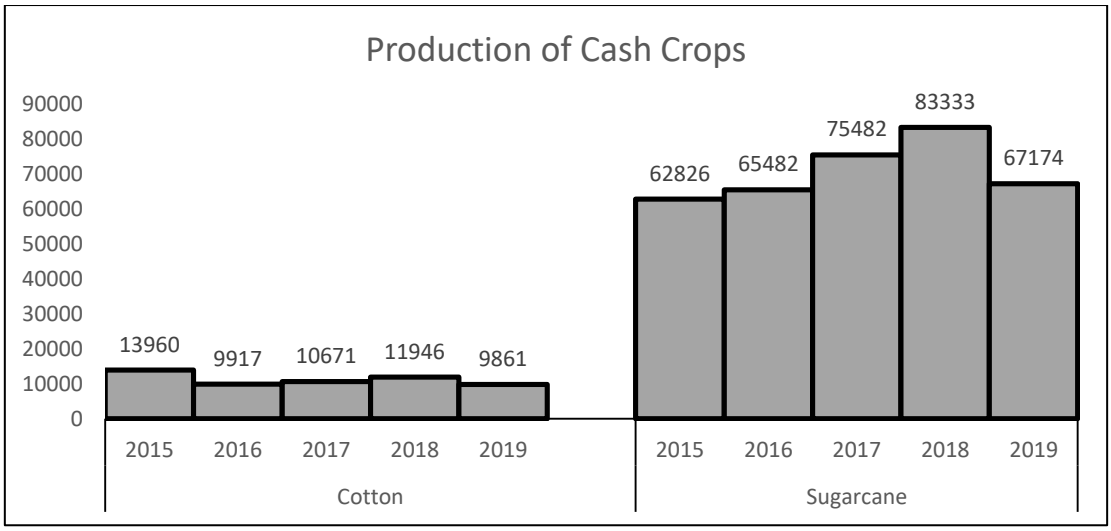

Figure 2.3: Cash Crops Production; Values from 2015-19 in thousand tonnes and thousand bales for cotton. Data has been extracted from Agricultural Statistics of Pakistan.

Similarly, sugarcane being another high valued cash crop also faces 19.4 percent losses in production from 83.3 million tonnes to 67.2 million tonnes. Sugarcane accounts for 0.5 percent of GDP and 2.9 percent in agriculture value addition.

Figure 2.4 shows the exports, imports and net export for cotton and sugarcane. Cotton experienced a continuous decline in exports and raise in imports but net exports remain positive over the last five years. Similarly, exports and imports of sugarcane remain relatively stagnant.

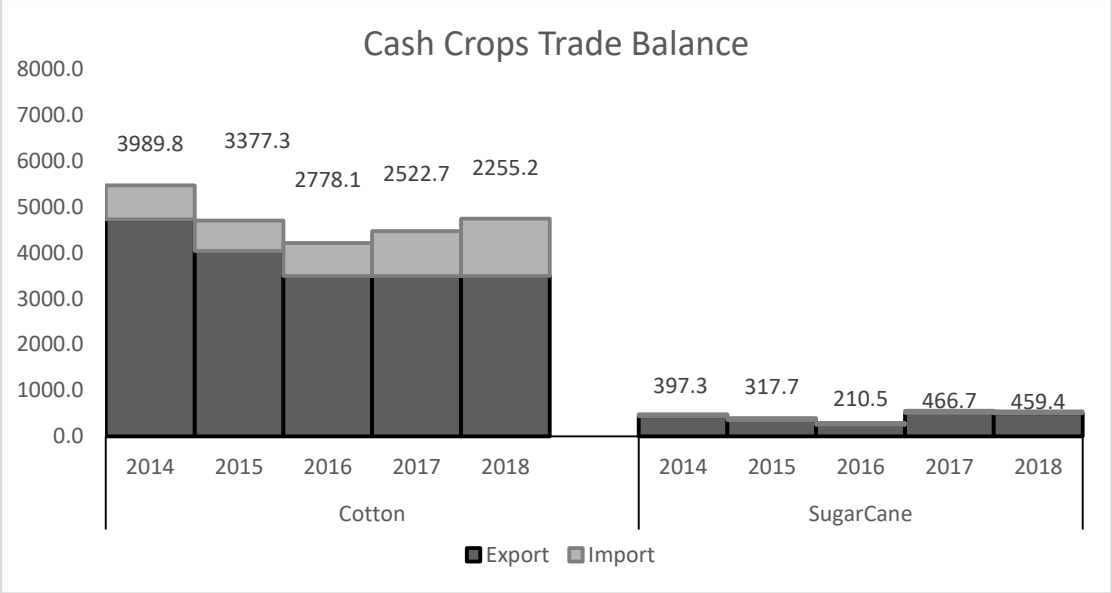

Figure 2.4: Cash crops Trade Balance; values from 2014-18 in US$ million and extracted from trademap. Whereas, net exports are in numeric.

2.2 Other Crops

Vegetables, fruits and oil seeds are also famous crops of Pakistan. The importance of these crops are recognised by domestic producers due to tremendous potential of these crops to earn foreign reserves.

Figure 2.5 presents the total production of each selected crops. Vegetables and fruits production show continues increase but output of oil seeds increase from 200.3 thousand tonnes to 900.15 thousand tonnes from 2014 to 2016 but contracts dramatically after 2016 to 105.7 thousand tonnes in 2018.

Vegetables crop increase by 10.76 percent in 2018 from 7131.3 thousand tonnes to 7898.3 thousand tonnes. While fruits witness growth of 8.1 percent and production expands from 6520.1 thousand tonnes to 7048.2 thousand tonnes in 2018.

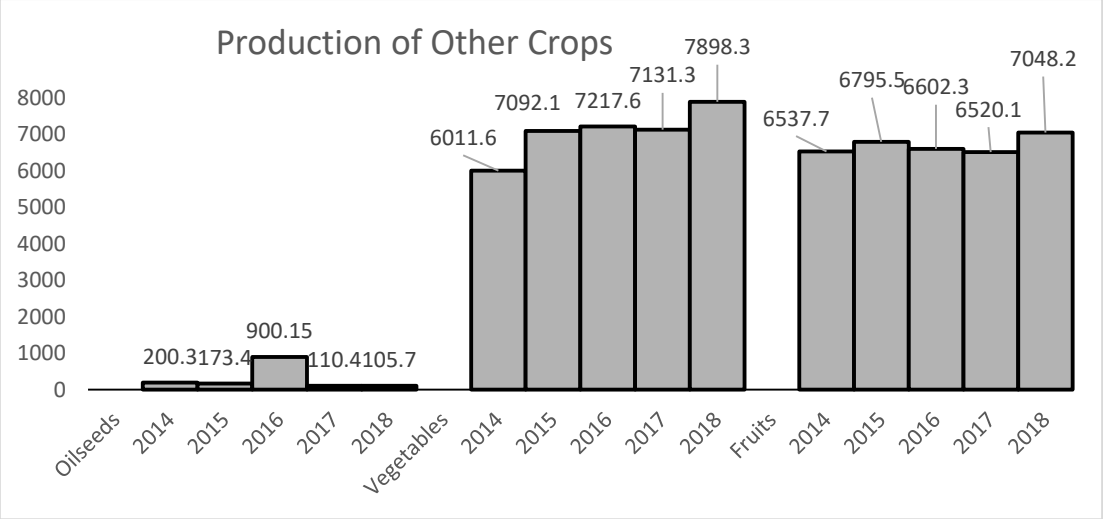

Figure 2.5: Production of Other Crops; values from 2015-19 in thousand tonnes. Data has been extracted from Agricultural Statistics of Pakistan.

Oil seeds are one of the largest agricultural imports of Pakistan. Pakistan is 17th largest importer of oil seeds and imports 1.4 percent of world oil seeds total imports. Over the last five years, oil seeds import is continuously rising. In 2014 the total import accounted for $780.7 million and increase to $1467.2 million in 2018. Whereas, export of oil seeds remain stagnant over the last five years that result in massive trade imbalance in oil seeds sector as shown in Figure 2.6.

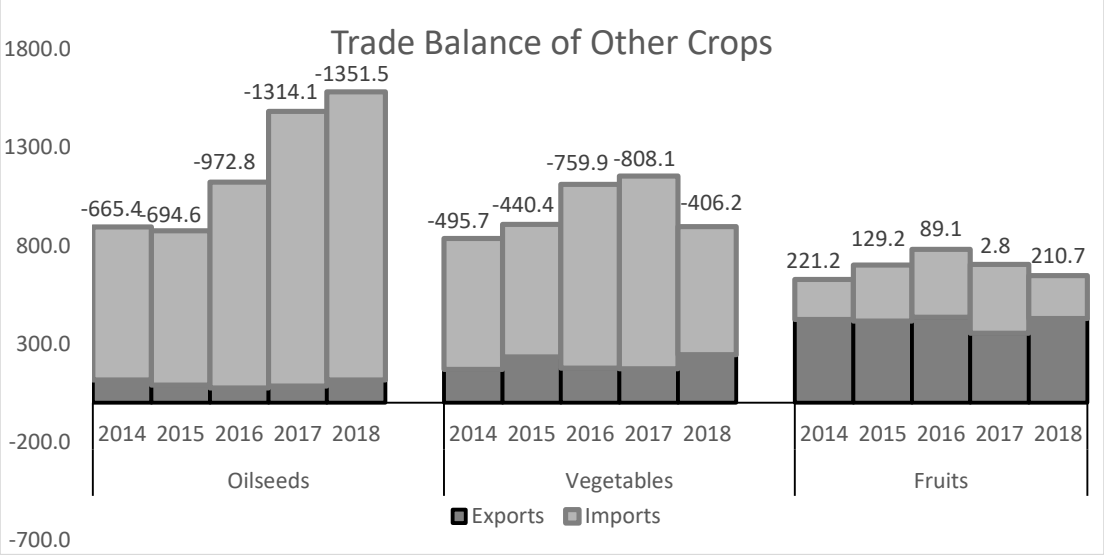

***Figure 2.6*:** Trade Balance of Other Crops; values from 2014-18 in US$ million and extracted from trademap Pakistan. Whereas, net exports are in numeric.

Although export of vegetables increase from $173.1 million to $245.4 million and imports decline by a massive percentage of 33.6 percent yet there is significant loss in trade balance. Vegetables exports by Pakistan account for 0.3 percent of world exports and Pakistan import 0.9 percent of total world's imports. The rankings of Pakistan as an exporter and importer of vegetables are 38 and 25 respectively.

Similarly, Pakistan ranked at 42nd in fruit exports and contributes 0.3 percent in world's exports. Whereas, Pakistan imports 0.2 percent of world imports of fruits and is 66th largest importer of fruits. Furthermore, imports and exports of fruit sector remain relatively constant over the past five years but shows continuous improvement in net exports. Especially in 2018 where net exports increase from $2.8 million to $210.7 million. Moreover, exports increase by 21.13 percent an imports decline by impressive percentage of 37.9.

2.3 Livestock, Meat and Fisheries

Livestock has an important contribution in agriculture sector. It provide day to day labour and meat to the human population of Pakistan. Population of livestock stands at 197.7 million in 2018. And witness a growth of 2.75 percent in 2018 as compare to 2.8 percent growth in 2017 as shown in Figure 2.7.

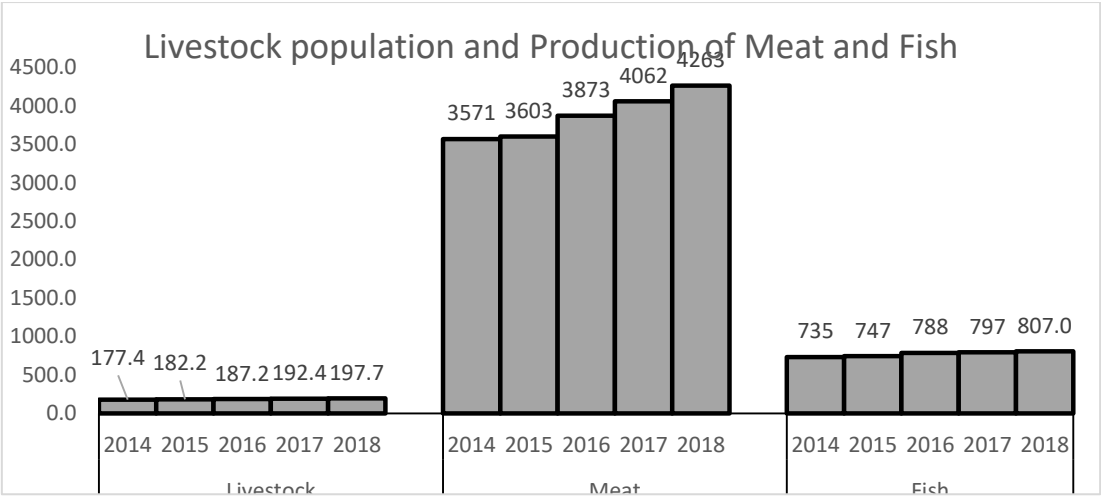

Figure 2.7: Livestock Population and Production of Meat and Fish; values are from 2014-18 and extracted from Agricultural Statistics of Pakistan. Further, Livestock population is in million head and production of meat and fish is in thousand tonnes.

Furthermore, livestock provides 4263 thousand tonnes of meat in 2018 as compare to 4062 thousand tonnes in 2017 and meat production grew by 4.95 percent. Similarly. Pakistan witness a growth rate of 1.25 percent in fish production that account for 807 thousand tonnes in 2018 as compare to 797 thousand tonnes in 2017.

Pakistan remains net importer of livestock over the last five years. Exports of livestock stand up at $9.8 million and grew enormously by 5265 percent in 2018 as compared to $6.42 million and 9 percent growth rate in 2017. Rise is exports look very impressive and imports decline by 0.85 percent in 2018. Yet Pakistan has a huge external deficit of $17.13 million in 2018 as compared to $20.72 million of trade imbalance in 2017 as shown in Figure 2.8.

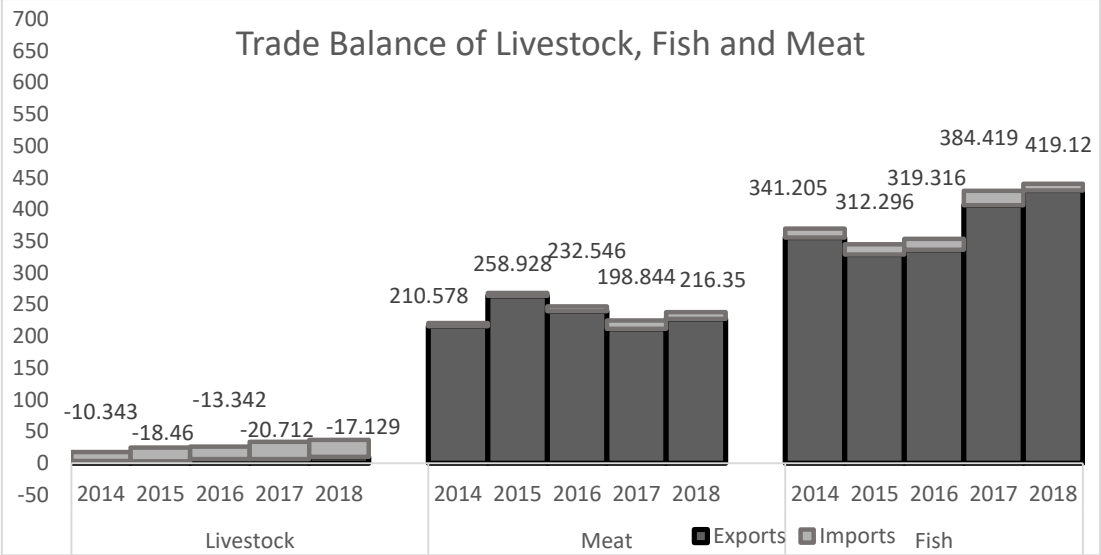

Figure 2.8: Trade Balance of Livestock, Meat and Fish; values from 2014-18 in US$ million and extracted from trademap Pakistan. Whereas, net exports are in numeric.

Pakistan is 39th largest meat exporter in the world and account for 0.2 percent of world's export. Over the last five years, trade balance remain positive and increase to $216.35 million in 2018 as compared to $184.85 million in 2017. Pakistan meat sector witness growth rate of 7.17 percent in growth in 2018 as compared to growth rate of -11.57 percent in 2017. Imports of meat also decline from $13.14 million to $10.75 million in 2018 that make Pakistan's imports for meat insignificant at zero percent of total world's imports.

Pakistan exports of fisheries sector have increase by 5.65 percent to $429.87 million in 2018. The exports of seafood industry of Pakistan remained at $406.9 million in 2017. Whereas, imports also decline from $22.5 million to $10.75 million and in this way Pakistan has achieve $419.12 million of trade balance in 2018. Moreover, Pakistan is 47th largest country to export 0.3 percent of world's exports of fisheries.

2.4 Conclusion

Over the years Pakistan agriculture sector has consistently missed the growth target for each agriculture sector except for livestock. The output remains stagnant for major crops like wheat, rice, sugarcane, fruits and vegetables. Sector like oil seeds and cotton experienced decline in the output.

Export performance and trade balance does not provide satisfactory picture as well. Not a single agriculture sector has shown continues improvement in trade balance. The trade balance is either worsening for most of the sectors or exhibiting almost a horizontal line for other sectors. This is a point of serious concern for rural development. Suitable policies must be devise to boast up the output along with improvement in trade balance of each agriculture sector so, that associated poor segment of the society can be uplifted from the vulnerabilities and poverty.

Chapter III

BACKGROUND AND LITERATURE REVIEW

In this section the review of previous work based upon theoretical foundations of general equilibrium (GE) models as well as empirical work is presented. Further the section has been divided into two subsection with headings of "Theoretical Foundations of GE Models" and "Review of Empirical Literature" respectively.

3.1 Theoretical Foundations of GE Models

Central framework of general equilibrium theory can be traced back to Walrasian general-equilibrium theory. Which is now classified as "the ultimate model of the market" by Shoven & Whalley (1973) and the "Magna Carta" of economics by Schumpeter (1954).

In the birth period of GE models in 1950s and 1960s, design of the GE models were small enough to be apprehended analytically. Those models were utilised for weighing applied policy issues by Johnson (1951, 1952 and 1956), and Harberger (1962). Later the Development of models with larger size and complexity for which computer was essential for analytical solution take place in 1970s. The computational models have come to be known as applied general-equilibrium (AGE) or computational GE or computable GE (CGE) models. We will refer to the computational models as AGE models, even though the analytical models also fall under the rubric of applied work.

Walras (1899) can be accredited as a forerunner for GE analyses by his signification of an economy as a system of simultaneous equations. Though Walras believed in the capability of his framework to find an equilibrium but failed to prove. Shortcoming of

Walres ground-breaking work therefore raised serious perturbation among analyst as general equilibrium models cannot be employed with assurance without being certain regarding the existence of a solution (Blaug 1992).

Later in mid-20th century, attempt to fulfil the shortcoming of Walras's work was made by Leontief (1936), who is often classified as grandfather AGE model. Leontief (1936) pursued to supply "an empirical background for the study of the interdependence between different parts [of the economy] on the basis of the theory of general economic equilibrium." However, the simplest Leontief input-output models are quite mechanical. In Scarf (1994)'s judgment, the Leontief model was indeed "a disaggregated version of a general equilibrium model," although it was "deficient in its treatment of consumer demand" and in the modelling of production. Later Bjerkholt (2009) and Dixon & Rimmer (2010) also utilised model similar to Leontief model of general equilibrium. General equilibrium analyse witnessed a major boast after development of linear programing techniques by Kantorovich (1939), Nicholas (1950), Koopman (1951) and Dantzig, Orden & Wolfe (1955). Beside linear programming techniques the foundations of AGE analysis were strengthen by McKenzie (1954) and Arrow & Debreu (1954).

Development of general equilibrium analysis and inclusion of international trade into AGE analyses was contributed by Samuelson (1948), Heckscher (1949), Johnson (1951, 1952 and 1956), and Meade (1955) and provided bases for multi country and multi sector GE model. These analyst developed models consist of maximum two sectors, two factors and two countries to study issues regarding international economics and trade.

Johansen (1960) made a significant contribution by formulating multi-sector, computer-base model. He designed an AGE model to study the long-run growth of the

Norwegian economy. He incorporates the behavioural equations to fulfil the gap in previous input-output models and provide specified depiction of utility- maximizing individuals and cost minimizing industries' behaviour. Bjerkholt. (2009) and Halsmayer & Hoover (2016) identifies Johansen's intellectual heritage in macro-growth models and Leontief input-output analysis, rather than the Walrasian general-equilibrium tradition. However, Johansen (1960) understood that his model was severely constrained by data availability and computing power.

The influence of Johanson (1960) model can be identified by Dixon (1982) through formulating ORANI model for Australian economy and also by Australian MONASH model developed by Dixon & Parmenter (2010). ORANI was a unique model which was result of IMPACT project of Australian government in 1975. The purpose was to establish an AGE model to assess the impact of industrial, trade and development policies intended by authorities to adopt. Australian authorities gave special attention towards sectoral employment changes and to variety of the implications of reducing tariffs. MONASH is the dynamic version of ORANI model.

World Bank utilised he AGE models developed by Taylor (1983) and Adelman (1978). The approach of Adelman (1978) was employed by World Bank to investigate the implications of macroeconomic policies on distribution of income and on welfare of developing and transitional countries. In Bjerkholt (2009) judgment these models are also motivated by Johanson (1960) AGE model.

Last but not least Global Trade Analysis Project (GTAP) (which was also inspired from the study of Johanson (1960)) was founded by Hertel (1997) with the collaboration of Prudue University and Centre of Policy Studies, Monash University. Due to public availability, large data set and distinguished advantages GTAP is now dominant and

popular tool for analysing General equilibrium and became major tool to quantifying issues related to international trade, bilateral and multilateral trade agreements.

3.2 Review of Empirical Literature on GTAP

This section has been further divided into two sub sections namely “Literature based on International Economies” and “Literature based on Pakistan”

3.2.1 Literature Based on International Economies

The following studies have relied on examining the impact of the bilateral and multilateral trade agreements in the CGE framework and given as follow:

In order to assess the economic impacts of bilateral free trade agreements related to Japan; Abe & Wilson (2008) employed the GTAP model (version. 6.2) with aggregation of sectors and regions into 25 sectors and 24 regions respectively. The experiments included simulations for all bilateral FTAs of Japan and simulations for the regional/multilateral trade agreements related to Japan. The first analysis was made for Japan’s bilateral FTAs with Malaysia, Singapore and Mexico in which Japan followed asymmetry in tariff elimination in terms of commodities while, its partners were assumed to abolish all their tariffs against Japan. The study showed that all the bilateral FTAs’ partners of Japan gained from FTA in terms of increase in their GDPs and EVs. Japan gained from FTA with Malaysia and Mexico only and experienced loss in its welfare from its ‘FTA’ with Singapore. Rest of the world got suffered due to the loss in share of market in Japan and its FTA partners but overall world welfare increased. Mexico led in gains in sectoral production as compared to the other economies. The study also carried out a number of simulations to examine the static as

well as dynamic impacts of all the possible future bilateral FTAs of Japan as well as regional FTAs in the similar fashion. The results revealed that Japan's gain increased with increase in the number bilateral FTAs. Rest of the world suffered due to loss in welfare gains.

GTAP (version.6) was also employed to assess the impacts of FTA between Mercosur and EU in the framework of CGE model with the aggregation scheme of 33 commodity groups and 21 regions by Boyer & Schuschny (2010). Two policy experiments were carried out; 1st: "full liberalization" and 2nd "partial liberalization". The simulation results revealed that the inter-regional as well as intra-regional trade increased along with increase in GDP, exports and imports of the Mercosur region with improvement in the terms of trade (TOT). However, Mercosur experienced negative impact on its trade balance with differential impacts on various sectors across the member economies. The GDP of EU decreased exports and imports increased with improvements in the trade balance. Trade flows to rest of the world decreased for both the regions. The production of agriculture and light manufacturing sectors increased and of the heavy manufactured decreased for Mercosur. Both the regions gained as shown by efficiency changes in terms of re-allocation of resources, change in terms of the TOT and change in saving-investment balance.

Following same methodology Sikdar & Nag (2011) employed the higher version of GTAP model (version. 7) with the aggregation of regions and sectors into 20 regions and 35 sectors; to assess the impacts of India's FTA with ASEAN. Results showed that India's exports to the AEAN member economies increased significantly. However, increase in imports was higher than exports and so India suffered due to loss in its terms of trade. The findings highlighted that Thailand, Singapore and Malaysia welfare increased. Total production of the ASEAN region increased along with increase in input

demand and input prices. The simulations results also pointed out that rest of the world stood worst due to its loss in the market share in the ASEAN region.

To calculate the impact of food and nutrition security on multiple household of Ghana Ahmed, Abbas & Ahmed (2013), employed MyGTAP database of Minor & Walmsley (2013). The study involved a multiple household to study the effects of food policy on the most vulnerable sector of the society helping the government to design intervention in order to provide relief to the poor segment of the society. The study embedded 19 commodities and 9 households. In the study, the following three approaches were used to incorporate multiple household data in GTAP data base. Firstly, user weights have been assigned to household and incorporate in GTAP. Secondly, the study included household data through national SAM. Thirdly, they directly place household survey in GTAP analysis. The result suggested that the removal of export subsidy is useful to the poor people of Ghana.

Jensen & Sandrey (2015) showed promising results for tariff removal on intra-African trade. They employed standard GTAP model and GTAP database pre-released version 9.2 for simulating the cases of tariff elimination, 50% reduction in traditional NTB and 20% reduction in red tapism. Study found removal of NTBs to be more beneficial as compare to elimination of tariff barriers. Same results were attained by Badri, Sen & Srivastava (2019) by adopting similar database and methodology.

Tanaka & Karapinar (2019) construct a stochastic global CGE model and employed version 9 of GTAP database to show the positive impact of raising import tariff and case of full protection for wheat sector on Egyptian's households. On contrary, Warr (2011) analysed the impact of adopting protectionist policy on Indonesian's rice sector and suggested adverse effects of such policies on domestic consumers of rice, mainly due to inflated prices. Similarly, Tanaka & Hosoe (2011) quantify the case of tariff

elimination for Japan's agriculture by using stochastic global CGE and GTAP database. They argued that Japan would more likely to be influenced by international competition by eliminating tariff on agriculture sector but gains from increased trade would surpass the negative impact.

Igesa, Okiyama & Tokunaga (2018) combined SAM (2009) of Kenya and CGE model to evaluate the impact of tariff reduction on agricultural and food sector of Kenya. Results showed substantial increase in consumption due to reduced imported prices and hence improvement in social welfare. Using Global CGE model Aredo, Fekadu & Kebede (2012) and Yimer (2012) evaluated trade liberalization and poverty in Ethiopia. Aredo et al. (2012) indicated only a marginal effect on overall welfare by eliminating trade distortions but found substantial effect on textile and leather industries. Likewise, Yimer (2012) revealed that trade liberating policies results in reduced welfare and real consumption of households in short run but in long run economy gained in terms of real GDP, welfare, real output and real exports.

Rakotoarisoa, Khorana & Narayanan (2019) relied on GTAP database and CGE framework to quantify the welfare effects of reducing trade barriers between industrial countries and Sub-Sahara African economies. Results confirms empirically that trade liberalisation does not necessary improve welfare as Sub-Sahara Africa loose more as compared to what they gained. Among loosing sectors of Sub-Sahara African economies, manufacturing sector suffered a lot mainly due to low labour productivity growth as compare to trading industrialised partners.

Agbahey (2018) employed applied general equilibrium analysis to show the possible impact of different trade policies on Palestinian economy. The model was modified to allow multiple trade partners setup and differentiated treatment for large and small trade shares and tariff rate quotas. Welfare gains turned out to be highest if Palestine opts for

trade liberating policies for each trading partner without any discrimination. However, agriculture sector seemed to suffer in terms of welfare. Especially domestic agricultural and food producers along with small sized households suffered in terms of income and hence need compensation by the authorities.

Valverde & Latorre (2020) conducted a study to investigate the impact of increase in tariff and non-tariff barriers by United Kingdom and European Union after Brexit. Alternatively they also inquire the case when United Kingdom remove all tariff for her trading partners. Study employed GTAP database version 9 and Standard GTAP model to indicate significant welfare loose from trade restrictions and also tariff removal for each trading partners by United Kingdom failed to surpass the negatives impact of such restrictions. Theurer, López Ruiz & Latorre (2018) also suggested negative impact of trade restrictions on United Kingdom by following similar methodology. Opposite observations were made by Minford (2016). He argued that trade gains from increasing volume of trade with other trading economies would surpass the losses of trade with European Union under the World Trade Organization (WTO) conditions.

Kawasaki, Narayanan, Guimbard & Kuno (2019) incorporated the HS6-level tariff concession dataset in the GTAP Database version 9. They investigated future trade integration for East Asian economies. Results suggested positive effects of partial and full enforcement of tariff elimination by East Asian economies. Similarly, following identical methodology and dataset Shamakhi, Akintola & Boughanmi (2018) argued that Oman would achieve improvement in welfare as well as in GDP by eliminating trade barriers for trading partners as recommended by WTO. Moreover, results revealed lower gains for Oman compared to neighbouring countries like Bahrain, UAE and Qatar in case when Golf cooperation council (GCC) countries eliminate trade barriers among themselves.

Studies based on quantitative analysis using CGE models concluded adverse effect of Trans-Atlantic Trade Partnership (TTP) on China. TTP may lead to decline in China's GDP ranging from -0.01% to -3.35%. Areerat, Kameyama, Ito & Yamauchi (2012) estimated a substantial drop in China GDP. Further he revealed that several agricultural sectors like meat, animal products and other crop might face severe impact. Further, they argued that gains from TTP agreement might be understated because of focusing only on tariff elimination and ignoring non-trade barriers. These results were confirm by Li & Whalley (2014), Chen & Haynes (2015).

Guo & Li (2019) studied regional trade agreements of China with Trans-Atlantic Trade and Investment Partnership (TTIP), Regional Comprehensive Economic Partnership (RCEP), China-Japan-South Korea Free Trade Agreement (CJK), Free Trade Area of the Asia-Pacific (FTAAP) and China-ASEAN Free Trade Area (CAFTA). They developed CGE model and simulated results revealed that China would benefit from such agreements with highest gains coming from RCEP. Similarly, Narayanan, Sen & Srivastava (2019) suggested positive effect on overall Indian economy by liberating her trade for RCEP with improvement in trade balance. However, second simulation for automobiles and auto-parts showed adverse effect of liberalisation unless India improves in terms of production and efficiency.

With GTAP database version 9 Lee & Itakura (2018) disaggregated world into 23 countries and 29 sectors and constructed dynamic GTAP model. Their objectives was to evaluate the impact of mega-regional trade agreements on ASEAN countries. They concluded that ASEAN countries would have highest welfare gains from RCEP followed by RCEP + Taiwan and FTAAP. Further, they estimated significant increase in output of textile. Appeal and electronic equipment sectors.

Positive effects were estimated for India joining RCEP by Lee & Itakura (2014) and Gilbert, Furusawa & Scollay (2018). Lee & Itakura (2014) utilized a dynamic version of the GTAP model suggest that India will experience a welfare gain in the case of joining the RCEP. They considered a scenario of full tariff liberalization in all commodities, except rice, over 2017-2025. More recently Gilbert et al. (2018) in a comprehensive survey of CGE studies utilizing GTAP, they estimated that India will experience a welfare gain if they join RCEP in a scenario of full tariff liberalization.

Further, Narayanan & Sharma (2016) studied the general equilibrium effects of a mega regional trade agreement, such as the original TPP agreement on a non-member such as India. Using the GTAP 8.2 version of the model on 18 tradable commodities and 16 regions of the world, they observed that focusing only on tariff reduction, there are no strong reasons for India to join the membership of TPP even in future. Their study concludes that agricultural sector itself would be adversely affected through strong trade diversion even if India were to become a TPP member.

Free trade agreement (FTA) among China, Japan, and South Korea was studied by Cui, Song & Zhu (2019). They employed standard GTAP model and GTAP database version 9 to show that free trade agreement with agriculture protection would benefit these three economies. Further, results in boast in export volume of non-agriculture products and especially energy-intensive products.

Wei, Chen & Rose (2018) calculated welfare effects of free trade agreements between USA and South Korea. Employing GTAP model they suggested positive effects on welfare and GDP of both countries. However, gains were not homogeneous, as they predicted larger share of gains for South Korea. Further, they argued that USA would incur production loss for several manufacturing sector, based mainly in concentrated geographic areas.

Robinson & Thierfelder (2019) analysed the protectionist trade policy adopted by USA. They developed a GTAP model and incurred that USA would only get benefits from raising Import tariff when trading partners don't retaliate. In case of retaliation, USA would lose in terms of trade. Moreover, all traded sector along with manufacturing sector would likely to suffer damage rather than resulting in increased output level. Another study by Chepeliev, Tyner & Mensbrugghe (2019) employed standard GTAP model and GTAP database version 9 to study the effect of withdrawal of USA from Trans-Pacific Partnership (TPP) agreement and North American Free Trade Agreement (NAFTA) on agriculture sector of USA. The analysis suggested that the U.S. withdrawal from the TPP and NAFTA would reduce U.S. food and agriculture exports and hence results in income loss for farmers. Moreover, these cases would results in aggregate loss of economics betterment.

Mandal (2018) investigated Free Trade Agreement (FTA) between India and ASEAN by utilising standard GTAP model and GTAP database version 6. According to the study said FTA would results in adverse effects on India and positive effects on other ASEAN's members. The effect would mainly due to the change in terms of trade. Kustiari (2018) evaluated potential impact of FTA between Indonesia and India on Indonesian agriculture sector and economy as a whole. Utilising input-out table (2005) and GTAP model as a methodological tool. They proposed the agreement to be beneficial for both economies. They further argued that the welfare gains for India would be larger and on the other hands Indonesia would enjoy higher gains in terms of trade balance.

Devadoss & Luckstead (2018) investigated effect of Comprehensive Economic and Trade Agreement (CETA) between Canada and EU on processed food markets. By employing four-region CGE model with GTAP database version 9 they revealed

positive impact of CETA on net bilateral trade flows, number of firms and welfare for both regions. Moreover, they argued that if both region also decided to eliminate NTBs under CETA then the magnitude of these benefit would climb up substantially.

Greenville, Kawasaki, Flaig & Carrico (2019) constructed inter-country input-output tables and linked it with GTAP database 9 to develop Global CGE model known as METRO OECD model to study impact of trade liberalisation and domestic support policies on participation in agro-food global value chains (GVC). They revealed that trade distortions including domestic support adversely affect the welfare. They argued that eliminating barriers to trade would results in value addition and promotes trade flows of agro-food products. Increased trade flows would translated in positive welfare for participants of GVC.

With the aim of modification and replacing North American Free trade agreement (NAFTA), US, Mexico and Canada has recently signed a new agreement called the United States-Mexico-Canada agreement (USMCA). To investigate the success of the agreement Burfisher, Lambert & Matheson (2019) conducted a study to analyse tighter trade policy for automotive, textile and appeal sector along with agricultural trade liberalisation and other trade facilitation policies. By using GTAP model with GTAP database version 10, they argued that imposition of higher tariff on automotive, textile and sector would bring negative impact on trade in these sectors. Though, we could expect modest improvement in welfare and real GDP but those benefit would be enhanced significantly by the elimination of the tariff on steel and aluminium imported by US and import surcharge imposed by Canada and Mexico.

Thompson & Leister (2015) utilized GTAP modelling framework for studying Japan's participation in The Trans-Pacific Partnership (TPP) free trade agreement. They simulated 25 percent decrease in tariff on agricultural tariff by Japan. Results of the

study provided the case for trade liberalisation by predicting welfare gains for Japan from such concessions. On the other hand Todsadee, Kameyama & Lutes (2012) conducted a study in favour of protectionist policies towards agricultural sector of Japan. They used the standard global trade analysis project (GTAP) model using the GTAP v7.0 database which is based on the 2004 global economy. Using 17 regions and 15 sectors, global macro changes were reported with emphasis on the livestock sector of Japan. They estimated a decline in livestock output mainly due to reduction in domestic share of markets and agricultural prices and hence resulted in contraction of farmers' income.

Gilbert, Furusawa & Scollay (2018) observed in their study that members of TTP would gain largely from tariff elimination and trade facilitation between TTP members. Although gains are substantially large but not even for each members. By employing GTAP model with GTAP database version 9 they argued that members with larger economy would likely to have bigger share of benefit from TTP.

They study of Qi & Zhang (2018) was Based on a well-known GTAP model and its updated database, this paper attempts to assess the economic impact of the China-Australia free trade agreement not only on the Australasian and the Chinese economies, but also on the rest of the world. Results showed that China and Australia could benefit greatly in terms of raising the growth rates of their GDP, exports, factor prices and economic welfare through either a full or even a partially implementation of free trade agreement. But the rest of the world, may suffer as there would be some trade diversion effect.

Beckman & Zahniser (2018) evaluated the possible effects of ending NAFTA by using GTAP model with GTAP database version 10. They explored two scenarios of MFN tariff applied by North American for each other and increase in NTBs through increase

in transactions cost on agricultural sectors of United states, Canada and Mexico. Both scenarios revealed adverse effects on almost every agricultural products involved in bilateral trade by member countries of NAFTA. Furthermore, they argued that transaction cost would boast up adverse effects on trade flows and well-being of NAFTA members.

The GTAP model using GTAP database version 9 were constructed to simulate partial and full trade liberalisation for free trade agreements of ASEAN with China, Korea, Japan, Australia and New Zealand respectively by Nugraheni & Widodo (2018). They concluded that each free trade agreement would benefit respective regions. In both scenarios welfare, volume of export and import would increase. Further, they argued that FTA between ASEAN and China would bring highest gains as compared to other FTAs.

Multilateral and sector specific trade agreement have been gaining importance after Doha development round. In this regard a study by Bertelsmann-Scott, Jansen van Rensburg, Viviers, Parshotam, Parry, Rossouw…& Nkhata (2018) suggested developing countries to actively participate in such agreements. They employed GTAP model with GTAP database version 9 to simulate the case of trade liberalisation for selected developing countries. They concluded that active participants could gain great deal of benefits in terms of real GDP and general welfare.

To quantify the impact of tariff imposition by Iowa on her imports on Iowa economy Balistreri, Böhringer & Rutherford (2018) conducted a research and used GTAP model with GTAP database version 9. They reported overall losses in manufacturing sector. Although major looser turned out to be manufacturing sector but the study also pointed out considerable revenue loses for several agricultural sectors. Hence imposing higher tariff would not be a desirable policy option for the economy of Iowa.

Olekseyuk & Balistreri (2018) investigated Trade agreement between Ukraine and EU known as Deep and Comprehensive Free Trade Area (DCFTA) by using GTAP model with GTAP database 8.1. They pointed out positive impact on Ukraine but threat of contraction in manufacturing sector surpass overall welfare gain by a modest magnitude.

Ouraich, Dudu, Tyner & Cakmak (2018) conducted a study to point out the impact of agricultural trade liberalisation on global welfare. They took Morocco and Turkey as a case study and employed GTAP model with GTAP database 9. Eliminating tariff on agricultural products by Morocco and Turkey would results in overall increase in global welfare. Morocco would lose in terms of trade and the deteriorating terms of trade would outweigh the positive impact on welfare due to agricultural trade liberalisation. On the other hand Turkey would enjoy greater increase in welfare as compare to decrease in terms of trade, results in offsetting negative impact due to deteriorating terms of trade.

3.2.2 Literature Based on Pakistan's Economy

Despite the worldwide trend of global trade integration, in Pakistan most of the trade is done without free trade agreements. Currently Pakistan has a number of free and preferential trade agreements, however, they have not been operational according the terms and conditions. In this way, they have not been helpful in enhancing the trade performance. Pakistan also is the member of various regional trade agreements such as Economic Cooperation Organization Trade Agreement (ECOTA) and South Asian Free Trade Area (SAFTA). But they also have not been effective in boosting up the trade.

In Pakistan, there are only few research studies which have undertaken the general equilibrium analysis of Pakistan's trade liberalization reforms. Shaikh, Syed, Shah & Shah (2012) in their study, attempted to investigate the impacts of trade liberalization between Pakistan and the SAFTA member economies. The study utilized the modified version of the GTAP (version.4) database with aggregation of regions into 10 regions and commodities into 10 commodity groups. The policy experiments included 'unilateral trade liberalization', 'regional trade liberalization' and simultaneously 'unilateral and regional trade liberalization' with three additional experiments associated with one each to the initial three experiments. The study also employed the conditional sensitivity analysis (CSSA) associated with the three policy experiments to check the sensitivity results. The results indicated that Pakistan received a welfare gain of 1.53% in terms of increase in GDP. Overall imports increased and exports decreased (textile exports increased while food, mining and manufacturing exports decreased) with improvement in its terms of trade (TOT). On the other hand, due to the regional trade liberalization or equivalently reduction in import tariff by SAFTA, the volume of trade in the SAFTA region increased with highest welfare gain to India followed by Pakistan which received relatively less gain. However, rest of the Asia adversely affected due to the trade diversion effect. The results also showed that the unilateral and regional trade liberalization simultaneously increased the welfare of both Pakistan and India with greater improvement in TOT. Rest of the Asia got suffered with loss in their terms of trade (TOT) and trade volumes.

Minor & Mureverwi (2013) examined the potential trade effects between Pakistan and India, by utilizing GTAP analysis to investigate the welfare effect of Pakistan Most favoured Nation (MFN) status to India. The study discussed the major trade barriers to bilateral trade as well as for regional trade. The simulation has been studied in 10

regions and 29 commodities. The study presented the comprehensive assessment of the trade relations between India and Pakistan with detailed analysis of trade modalities. The study concluded that the welfare effect of MFN status for both countries is higher if it is supported by improved trade facilitation across the borders. This can not only increase the trade volume but also exports between the two countries. The GTAP simulation further analysed that Pak-India trade cooperation would have positive affects for other South Asian countries.

The same issue of trade liberalization between Pakistan and India was further studied by employing the GTAP' (version 8) by Pohit (2013) with aggregation of regions and commodities into 13 regions and 20 commodity sectors. The policy simulations included (i) 'full liberalization of trade against each other', (ii) "simulation 1 plus 50% productivity improvement in all modes of transportation services" and (iii) "simulation 2 plus full liberalization**.** The analysis revealed that due to trade liberalization, the welfare of both India and Pakistan increased with higher benefit to India under policy experiment 1. Welfare increased for both the economies when a 50% productivity improvement was introduced in the modes of transportation engaged in trade between Pakistan and India. The welfare for India increased by 4 times when full liberalization was included in FTA whereas the welfare of Pakistan decreased as compared to simulation 2. All the three types of policy experiments showed an increase in exports to each other.

Chishti, Zulfiqar & Naqvi (2008) used the global CGE model and carried out a more detailed analysis. They analysed the possible impact of the EU-free trade agreements [with the Asian economies such as India, Korea and ASEAN] on Pakistan. It is revealed by the simulation results that the EU bilateral FTAs in Asia [EU-India FTA, EU-Korea FTA and EU-ASEAN FTA] have a smaller impact on Pakistan. Their results show that

Pakistan could be impacted by the increased competition in the EU market in the textile, leather and clothing products. According to them "it does not appear likely that the EU's regional trade agreements with India, Korea, or ASEAN would have any significant impact on Pakistan".

Durongkaveroj (2015) by using the CGE model, shows that Pakistan's bilateral FTA with ASEAN would lead to increase in real GDP, real exports and real imports of Pakistan and also ASEAN members. According to the results, it is shown that households related to all ASEAN economies except for the households of Lao PDR and Cambodia, would be benefitted due to Pakistan's trade liberalization with ASEAN economies under the proposed Pakistan-ASEAN FTA.

Irshad, Xin, Xuan & Arsahd (2016) extends the analysis by focusing on the triangular type FTA [Pakistan-China-ASEAN FTA. According to the findings, it is shown that due to Pakistan's strategic and natural importance, Pakistan's integration with China and ASEAN would be beneficial for enhancing the bilateral trade flows of all the members. It is also revealed from the findings that Pakistan's joining the ASEAN-China FTA would facilitate a rapid and cheap access to multiple markets such as Middle East and Central Asia. It is also indicated that Pakistan's FTA with ASEAN is a win-win development, i.e. it would yield gains to all members.

Nufile, Santhirasegaram & Ismail (2013) by using the gravity model, find that Sri Lanka has high trade potential with Pakistan. According to the findings, Sri Lanka can enhance trade flows with Pakistan by exploring new ways of bilateral trade and also by producing new industrial products according to the Pakistan demand pattern. According to the findings, the current volume of bilateral trade is very low. The factors are diminishing marginal return to the bilateral trade integration between the two economies, product similarities [homogeneity], non-tariff barriers and also the lack of

leadership in Pakistan. The results further point out that Sri Lanka has been facing largest trade deficit with Pakistan, mainly due to the negative list. They point out that Sri Lanka can enhance the performance of international trade with Pakistan by switching domestic production from traditional exports towards new production.

Iqbal, Anwar & Khan (2017) linked Social Accounting Matrix (SAM) of Pakistan for 2008 and MyGTAP model to simulate the results of agriculture trade liberalisation along with Pakistan's multilateral and bilateral agreements. They tested three scenarios of 50% and 100% reduction in Import tariff and export tariff for all tradable in each region respectively and eliminating import tariff and export subsidies on agricultural sector. They suggested overall improvement in welfare mainly due to decrease in import prices and increased consumption. Moreover, all urban households gained in terms of income but results are mixed for rural household. Large and medium sized rural households remained beneficiaries in term of land income while small rural farmers and other non-farm rural households were on losing side. Moreover, similar conclusions were made by Khan *et al*. (2015) for Pakistan. Using same Methodology and database, Iqbal *et al.* (2018) used eight different simulations to calculate the impact of trade agreements with EU, SAARC, China and India and found a significant rise in economic growth.

Khan, Mehmood, Zakaria & Husnain (2018) analysed the Pakistan-Malaysia free trade agreement (FTA) by linking social accounting matrix for 2011 of Pakistan with GTAP database 9. By employing MyGTAP model they quantify the impact of increasing trade concessions provided by both countries to each other and impact of non-tariff barriers removal on both economies. Study showed that by granting trade concession Malaysia would likely to be on losing side in term of GDP and welfare but when both countries

reduced barriers of trade along with trade concessions then both countries would gain substantial rise in their GDP and welfare.

3.3 Literature Gap and Conclusion

After comprehensive review of previous literature, it is evident that trade liberalization does not necessarily boost economic growth or general level of welfare nor does the protectionist policies. Therefore a detailed analysis is required to enhance the understanding of the topic.

From the literature it can also be inquired that trade liberalization lead towards different magnitude of gains from trade in case for developed and developing countries and sometime could hurt least develop or developing countries. Therefore at most caution is needed for least develop and developing economies while adopting strategic trade policies. Pakistan being a developing country and opening up its borders is an interesting case of study. Moreover there are marginal amount of literature that quantify the impact of different trade policies on general welfare of Pakistan. Further, most of the studies only focus on free trade agreements of Pakistan using several datasets of GTAP DATABASE. But there is hand full of studies that conducted a comprehensive attempt to evaluate multiple trade policy options for Pakistan.

Further, it is often argued that agriculture sector might show positive results if we quantify the impact of trade liberalisation on overall economy but might be affected adversely if we quantify the impact of liberalisation on agriculture itself. The present literature on Pakistan only focused on manufacturing sector but ignored or did not put major emphasis on agricultural trade policy and concluded that liberalisation brings positive impacts for agriculture sector as well but these implications might be wrong

because it might be possible that agriculture sector get benefited because of other sectors but liberalisation of agriculture sector can harm the population associated with agriculture and whole sector itself. Therefore this study fills the gap by a quantitative assessment of agricultural trade policy reforms on Pakistan agriculture sectors and public welfare.

This study also contributes in literature by extending standard GTAP model by splitting regional household into government and private household identities and further by cooperating 16 categories of households and 12 categories of factor of production using addition data from latest Pakistani SAM provided by International Food Policy Research Institute (IFPRI). Advantage of splitting regional household into multiple categories is that we can judge the distributional impact of policy across multiple households. Further, 12 categories of rural household are incorporated for this study that give an extra advantage of distribution of income among multiple rural families.

Last but not least, there are study based upon free trade agreements of Pakistan but no study is present that identify and quantify the market and product wise export potential of Pakistan at sectoral level. This is the first study in this regard to not only identify potential markets for raising export but also purpose trade negotiation and then estimate product and market wise export potential of Pakistan's sectors associated with agriculture.

CHAPTER IV

DATA AND METHODOLOGY

4.1 Background

Computable general equilibrium (CGE) models are one of the analytical approaches to calculate the economic impact in a country or region as a result of the monetary shock or policy change. CGE models' ability to link the macro and microeconomic performance of an influence shock make CGE models the useful tool for quantify the economy-wide impact of a policy (Davies, 2009). Even some economists, like Dixon & Jorgenson (2012) classify CGE models as the analytical approach that sees the economy as a comprehensive system with components that are related to one another (industry, households, investors, governments, importers, and exporters).

4.2 Standard Global Trade Analysis Project (GTAP) Model

Like each family of CGE model, standard GTAP model utilised exhaustive list of mathematical equations to specify the functional form of the behaviour and characteristics of multiple economic agents following several theories regarding production technology, producer and consumer choices, the structure of private and public final demand, the zero profit and market clearance conditions etc., (Avinas & Norman, 2002). Necessary behavioural equations of Standard GTAP model by Hertel (1997) can be briefly articulated as follow:

4.2.1 Producer Behaviour

GTAP model recognised two kind of goods segregated by the production of goods, either for domestic market or for export to any foreign market. These goods are assumed to be imperfect substitute for each other and produce under constant elasticity of transformation as joint products. Let D_{ir} represent output of domestic good and X_{ir} be the output of exported product, then:

$$Y_{ir} = \left[\alpha_{ir}^{Y} D_{ir}^{1+1/\eta} + \beta_{ir}^{Y} X_{ir}^{1+1/\eta}\right]^{1/(1+1/\eta)} \quad (4.1)$$

Where, Y_{ir} is a notation for total output of good 'i' in region 'r'. In the standard GTAP model, producers are operating under perfectly competitive markets, therefore, at a certain level of output Y_{ir}, the supply of a specific good for domestic market and export can express as:

$$D_{ir} = Y_{ir}\alpha_{ir}^{D}(p_{ir}^{D}, p_{ir}^{X}) \quad (4.2)$$

$$X_{ir} = Y_{ir}\alpha_{ir}^{X}(p_{ir}^{D}, p_{ir}^{X}) \quad (4.3)$$

Demand for Primary factors such as capital, land, and labour along with other intermediate inputs, assumed to be directly proportional to the total level of production and can be stated as follow:

$$ID_{ir} = \sum_{j} Y_{jr}\alpha_{ijr} \quad (4.4)$$

Where, α_{ijr} is a coefficient of the demand for all of the intermediate input and assumed to be price inelastic in core model. In the production of a product 'i', region 'r' utilises domestic as well as imported intermediate goods and following Armington (1969) both kind of inputs are assumed to be imperfect substitute. Therefore, demand for the composite intermediate goods can be written as:

$$ID_{ir} = \left[\alpha_{ir}^{I} DI_{ir}^{\rho} + \beta_{ir}^{I} MI_{ir}^{\rho}\right]^{1/\rho} \quad (4.5)$$

Where, DI_{ir} and MI_{ir} are demand for domestic intermediate goods and imported intermediate goods respectively.

The functional form of the relationship between level of output and inputs can be represented by a Cobb-Douglas production function. Given the taxes and factor input prices a producer minimizes unit cost of production as:

$$min \sum_f p_{fr}^{F}\left(1 + t_{fr}^{F}\right) FD_{fir} \quad s.t \quad \psi_{ir} \prod_f FD_{fir}^{\theta_{jir}} = Y_{ir} \quad (4.6)$$

Assuming Y_{jr} as given and condition of linear homogeneity holds then above-mentioned production function can be restated as compensated demand function depending on factor prices and taxes applied on those factor inputs as:

$$FD_{fir} = Y_{ir}\alpha_{fir}^{F}(p_r^F, t_{ir}^F) \quad (4.7)$$

Total public sector output can be termed as Cobb-Douglas aggregation of production of each commodity 'i' in region 'r' and represented by G_r as below:

$$G_r = \Gamma_r \prod_i GD_{ir}^{\theta_{ir}^{G}} \quad (4.8)$$

And demand for factor and intermediate goods by public sector can be defined by Armington aggregation of all the domestic and imported inputs and represented by GD_{ir} as:

$$GD_{ir} = \left[\alpha_{ir}^{G} DG_{ir}^{\rho} + \beta_{ir}^{G} MG_{ir}^{\rho}\right]^{1/\rho} \quad (4.9)$$

Total output of public sector is assumed to exogenous and hence is fixed for given period of time. And input used for production are elastic to prices and applicable taxes, hence:

$$GD_{ir} = \bar{G}_r \alpha_{ir}^{G}\left(p_{ir}^{D}, p_{ir}^{M}, t_{ir}^{G}\right) \quad (4.10)$$

4.2.2 Consumer Behaviour

Let be consumers endowed with primary factors, tax revenue and income from net transfer from another region. Then income is reallocated to investment and to fulfill the demand of public and private sectors. Like output of public sector, investment is also kept constant over a given period of time. Hence final demand is determined by demand of commodity 'i' by a representative agent in region 'r'.

A representative consumer is assumed to behave in utility maximizing manner and functional form is assumed to be a Cobb-Douglas utility function as follow:

$$U_r = \sum_i \theta_{ir}^{C} \log(CD_{ir}) \quad (4.11)$$

Each commodity is defined by an Armington aggregation of domestic and imported commodity and both products are assumed to be imperfect substitute of each other. Demand for commodity by a representative agent can be expressed as CD_{ir} as below:

$$CD_{ir} = \left[\alpha_{ir}^{C} DC_{ir}^{\rho} + \beta_{ir}^{C} MC_{ir}^{\rho}\right]^{1/\rho} \quad (4.12)$$

Above equation can be rewritten to obtain aggregate final demand as follow:

$$CD_{ir} = \frac{\theta_{ir}^{C} M_r}{p_{ir}^{C}(1+t_{ir}^{C})} \quad (4.13)$$

. p_{ir} represents unit price of composite commodity (aggregate of domestic and imported goods) and t_{ir} is a notation for tax. Where: M_r is a total expenditures of region 'r', and includes net capital flows B_r , tax revenues(expression 2-8 in below equation), cost of investment $p_{ir}^{G} I_{ir}$, public expenditures (expression 9) and factor income $p_{fr}^{F} F_{fr}$We can articulate M_r by following expression:

$$M_r = \sum_f p_{fr}^F F_{fr} + \sum_i t_{ir}^Y (p_{ir}^D D_{ir} + p_{ir}^X X_{ir}) + \sum_{ij} t_{ijr}^{ID} p_{ir}^{ID} Y_{jr} \alpha_{ijr} + \sum_{fi} t_{fir}^F p_{fr}^F FD_{fir} +$$

$$\sum_i t_{ir}^G p_{ir}^{GD} GD_{ir} + \sum_i t_{ir}^C p_{ir}^{CD} CD_{ir} + \sum_{is} t_{irs}^X p_{irs}^X M_{irs} + \sum_{is} t_{isr}^M (p_{is}^X M_{isr}(1 + t_{isr}^X) +$$

$$p^T T_{isr}) - \sum_i p_{ir}^G I_{ir} - \sum_i p_{ir}^G \left(1 + t_{ir}^G\right) GD_{ir} - p_n^C B_r \quad (4.14)$$

In core GTAP model capital flow is also assumed to be exogenous and hence held fixed.

4.2.3 Transport and external Sector

Based upon demand of imports, the model differentiate between imports if intermediate goods MI_{ir}, imports of public sector MG_{ir} and imports of final products from consumers MC_{ir}. Further, Constant elasticity of subsititution (CES) is assumed across imports from multiple regions. Moreover, share of aggregate import may differ for all three types of imports. The mathematical notation can be given as:

$$MI_{ir} + MG_{ir} + MC_{ir} = \left[\sum_s \alpha_{isr}^M M_{isr}^\rho\right]^{1/\rho} \quad (4.15)$$

In the basic model transport cost is directly proportional to the trade and transportation cost along with two types of tax apply on trade between two regions. Supply of transportation services can be defined by Cobb-Douglas aggregation of single transportation service supplied by international transport supplier.

$$T_{irs} = \mathrm{T}_{irs} M_{irs} \quad (4.16)$$

$$\sum_{irs} T_{irs} = \psi \mathrm{T} \prod_{i,r} T_{ir}^{\theta_{ir}^{\mathrm{T}}} \quad (4.17)$$

The transportation providers from all over the regions operate under perfect competition and the sevices from different producers are perfect substitute with elasticity of substitution equat to one. The production of services by transportation sector exhibits

constant returns to scale, that make it easy to specify a price p^T denoting the unit cost of services provision for each level of trade flows.

Trade flows between two regions can be determined by cost minimizing behaviour as:

$$M_{irs} = M_{is}\alpha_{irs}^{M}(p_{irs}^{X}, t_{irs}^{X}, p^{T}, t_{irs}^{M}) \quad (4.18)$$

Where, p_{irs}^{X} is the export price of good 'i' from region 'r' to region 's'. t_{irs}^{X} is the rate of export tax and similarly t_{irs}^{M} is a import tarif rate.

4.2.4 Market Equilibrium conditions

In order to hold the market clearance conditions, the total level of domestic production should equate goods demand for intermediatory, public and consumer use along with total level of investment in a region. It is given as follow:

$$D_{ir} = DI_{ir} + DG_{ir} + DC_{ir} + I_{ir} \quad (4.19)$$

$$= ID_{ir}\alpha_{ir}^{D,I} + GD_{ir}\alpha_{ir}^{D,G} + CD_{ir}\alpha_{ir}^{D,C} + I_{ir} \quad (4.20)$$

Where, $\alpha_{ir}^{D,I}$, $\alpha_{ir}^{D,G}$ and $\alpha_{ir}^{D,C}$ denoted compensated demand for domestic inputs at disaggregated markets, and are functions of p_{ir}^{D} and p_{ir}^{M}.

The aggregate supply of imports, defined by the Armington aggregation across imports from different regions must equal aggregate import demand for intermediate, public and private consumption

Similarly, total supply of imports for a product from each region must be equal to demand for total imports as shown below:

$$M_{ir} = MI_{ir} + MG_{ir} + MC_{ir} \quad (4.21)$$

$$= ID_{ir}\alpha_{ir}^{M,I} + GD_{ir}\alpha_{ir}^{M,G} + CD_{ir}\alpha_{ir}^{M,C} \quad (4.22)$$

Again, $\alpha_{ir}^{M,I}$, $\alpha_{ir}^{M,G}$ and $\alpha_{ir}^{M,C}$ are function of p_{ir}^{D} and p_{ir}^{M}. And representing compensated demand for imported inputs by submarket.

In the external sector supply of exports, must equate the demand for imports along with the demand for transport services.

$$X_{ir} = \sum_s M_{irs} + TD_{ir} \tag{4.23}$$

$$= \sum_s M_{is}\alpha_{irs}^{M} + T\alpha_{ir}^{\mathrm{T}} \tag{4.24}$$

Where, α_{irs}^{M} is a coefficient of demand for imports of region 's' for region 'r' exports.

Standard GTAP model also requires equilibrium in supply and demand of primary factors market and can be expressed as:

$$F_{fr} = \sum_i Y_{ir}\alpha_{fir}^{F} \tag{4.25}$$

Where, α_{fir}^{F} is a coefficient of primary factors demanded in regard to output.

In general equilibrium of the standard GTAP model, producer operating in a competitive environment earns zero profit. Zero profit condition for a producer can be stated as below:

$$(p_{ir}^{D}\alpha_{ir}^{D} + p_{ir}^{X}\alpha_{ir}^{X})\,(1 - t_{ir}^{Y}) = \sum_f \alpha_{fir}^{F}p_{fr}^{F}\left(1 + t_{fir}^{F}\right) + \sum_j \alpha_{jir}p_{jr}^{ID}\left(1 + t_{jir}^{ID}\right) \tag{4.26}$$

Where, t_{ir}^{Y}, t_{fir}^{F} and t_{jir}^{ID} are tax rate applies on output, primary factor inputs and intermediate goods respectively.

Similarly, zero profit condition also applies to the external sector and can be shown as follow:

$$p_{ir}^{M} = \sum_s \alpha_{irs}^{M}[p_{is}^{X}(1 + t_{isr}^{X}) + \mathrm{T}_{irs}p^{T}]\,(1 + t_{isr}^{M}) \tag{4.27}$$

For the case of composite commodity, zero profit condition can be articulated by the following equations:

$$p_{ir}^{I} = \mathrm{C}(p_{ir}^{D}, p_{ir}^{M}, \alpha_{ir}^{I}, \beta_{ir}^{I}) \quad (4.28)$$

$$p_{ir}^{G} = \mathrm{C}\left(p_{ir}^{D}, p_{ir}^{M}, \alpha_{ir}^{G}, \beta_{ir}^{G}\right) \quad (4.29)$$

$$p_{ir}^{C} = \mathrm{C}\left(p_{ir}^{D}, p_{ir}^{M}, \alpha_{ir}^{C}, \beta_{ir}^{C}\right) \quad (4.30)$$

The cost function based upon constant elasticity of substitution between domestic and imported input used in the production process can be expressed as:

$$\mathrm{C}(p^{D}, p^{M}, \alpha, \beta) \equiv min_{D,M}\ p^{D}D + p^{M}M \qquad s.t \qquad (\alpha D^{\rho} + \beta M^{\rho})^{1/\rho} = 1 \quad (4.31)$$

$$= (\alpha^{\sigma} p_{D}^{1-\sigma} + \beta^{\sigma} p_{M}^{1-\sigma})^{1/1-\sigma} \quad (4.32)$$

If these markets are in equilibrium, then the core model assumed Warles law to hold and hence remaining market would also be in equilibrium.

4.3 MyGTAP Model

In this section we discuss the expressions for extending GTAP model into MyGTAP model as follow:

4.3.1 Removal of Regional Household

Minor & Walmsley (2013) made an extension to the standard GTAP model by removing a single regional household and replacing it with separate identities for Government and private household. The extended model is known as MyGTAP model.

In MyGTAP model, taxes and foreign aid cash flows are now sources of income of Government. So, Reginal Government would receive foreign aid directly instead of a private household. Thus net government income can be obtained by a difference

between taxes, foreign aid cash flow and transfer from government to private households as shown in the equation below:

$$GOVINC_r = AIDI_r - AIDO_r + TTAX_r - \sum_h TRNG_{h,r} \quad (4.33)$$

Where,

r ∈ REG, h ∈ HHLD

GOVINC = Income earned by the government.

AIDI = Value of foreign aid inflows.

AIDO = Value of foreign aid outflows.

TTAX = Tax receipts.

TRNG = Transfers from the government to private households.

REG = Region.

HHLD = Private Household.

Government utilise the income (gincome) to meet government expenditures (yg), government savings (psave + qgsave or govdef). Where govdef is a notation for government deficit that is the difference between government income and consumption. In the core model, either government expenditure or government deficit is kept constant for simplicity. It is given as:

$$yg_r - gincome_r = dpgov_r - dpgav_r \quad (4.34)$$

$$psave_r + qgsave_r - gincome_r = dpgsave_r - dpgav_r \quad (4.35)$$

$$govdef_r = gincome_r - yg_r \quad (4.36)$$

Where:

yg= Government expenditure.

gincome = Government income in percentage change.

qgsave = Real government saving/deficit.

dpgav = Average distribution parameter shift for government.

dpgsave = Government saving distribution parameter.

As shown in the equation below an income of a private household is given as income from factor endowment less depreciation. Further net remittances along with transfers between households and government are also included in households' income.

$$HHLDINC_{h,r} = \sum_i EVOAH_{i,h,r} - VDEPH_{h,r} + REMIH_{h,r} - REMOH_{h,r} + FYIH_{h,r} - FYOH_{h,r} + \sum_k (TRNH_{k,h,r} - TRNH_{h,k,r}) + TRNG_{h,r} \quad (4.37)$$

Where: r ∈ REG, h ∈ HHLD, i ∈ ENDW_COMM

HHLDINC = Income of private household in level.

EVOAH = Earning from employing 'i' ENDW_COMM

ENDW_COMM = Endowment commodities.

REMIH = Foreign labour remittances inflows.

REMOH = Foreign labour remittances outflows.

FYIH = Foreign capital income inflows.

FYOH = Foreign capital income outflows.

Following Cobb-Douglas functions, households spend their income to meet the demand for consumption and savings. Hence, accumulation of total savings by households (SAV_HHLD) and government (SAV_GOV) can be expressed in terms of regional savings as:

$$SAVE_r \times qsave_r = SAV\_GOV_r \times qgsave_r + \sum_h (SAV\_HHLD_{h,r} \times qhsave_{h,r}) \quad (4.38)$$

Where: r ∈ REG, h ∈ HHLD

SAVE = Value of total regional savings

qsave = Real savings

qgsave = Real saving by government.

qhsave = Real saving by private household.

4.3.2 Multiple Households and Endowments

Various changes have to consider in order to include multiple regional households into the standard GTAP model. First, identify the supply and possession of factor endowments by household and also adjust for the possibility of some factors being unemployed. Second, the inclusion of several additional types of endowments and third is to consider a transfer from household to government. The last point to consider is the possible difference between income and taxes on the commodity.

Let households have some level of factor endowments and supply it to the firm to earn income. The aggregate supply of endowments is an aggregation of endowment supplied by each household. Let's further assumed that ownership of capital by household is known and hence household net income would be a difference between income and depreciation as shown below:

$$qo_{i,r} = \sum_h (SHREVOMH_{i,h,r} \times qoh_{i,h,r}) \quad (4.39)$$

Where:

qo = Total supply of endowments.

SHREVOMH = Share of household in value of the endowment.

qoh = Supply of endowment owned by households.

In MyGTAP model it is possible to consider unemployment in macroeconomic closures and hence in equations below emplh(i,h,r) and empl(i,r) denote the employment of labour by a single household or each household equally as:

$$qoh_{i,h,r} = qoh\_s_{i,h.r} + semplh_{i,h,r} \quad (4.40)$$

$$semplh_{i,h,r} = emplh_{i,h,r} + empl_{i,r} \quad (4.41)$$

Where:

qoh_s = Supply of endowment from household including unemployment.

semplh = Employment of endowment from households.

emplh = Shift parameter of employment of endowment from households.

empl = Shift parameter of employment of endowment from households (equal across all households).

Once the supply of each endowment (qo(i,r)) is determined, then we can label a endowment as a mobile or sluggish endowment. Further, MyGTAP model fulfils the necessity of separating endowments concerning their demand. As homogenous endowments from different locations are less likely to be easily substitutable, therefore we can split such endowments to separate the demands for homogenous endowments belong to different locations. After the said extension and splitting endowments no changes required to the underlying standard GTAP model.

Further, MyGTAP model allows us to incorporate multiple households for one country and leave regional households as such for other regions that are not of much importance to our analysis. Thus provide essential flexibility for reducing data requirements.

4.4.3 Private Household Expenditure

Unlike GTAP model, MyGTAP provides a flexibility to use Constant Difference of Elasticity (CDE) or Linear Expenditure System (LES) to determine consumption behaviour of a household. We used LES for estimating consumption patterns of agricultural products; keeping in view that most of the agricultural products such as wheat, rice, vegetables etc. are considered as necessities and they are least elastic towards income. LES provides necessary liberty to keep consumption of agricultural product constant and only changes with changes in taste, population or number of household in a region.

4.4 Measures of Income Inequality

This study further extended MyGTAP model to capture the changes in income inequality. Inequality can be defined as income gap among different households of a region, (Litchfield, 1999). Out of several inequality measures, this study incorporated following measures:

4.4.1 Gini Coefficient

GINI coefficient (Gini) is most widely used and easy to compute measure of inequality. It is based upon the comparison of the distribution of a variable (i.e. Income, Expenditure, etc.) with hypothetical uniform distribution (45 degree line) representing perfect equality. Gini ranges from 0 (perfect equality) t0 1 (maximum inequality) and can be expressed as:

$$Gini(r) = \frac{2}{H_r{}^2\,\overline{HHLDINC_r}} \sum_{h=0}^{H} (HHLDINC_{h,r} - \overline{HHLDINC_r}) \qquad (4.42)$$

Where: r ∈ REG, h ∈ HHLD

H = Total number of households in region ‘r’.

HHLDINC = Income of household ‘h’ in region ‘r’.

$\overline{HHLDINC}$ = Mean household income in region ‘r’.

4.4.2 Hoover Index

Hoover index (HI), also known as Robin Hood index measures the vertical gap between Lorenz curve and 45 degree line of uniform distribution. HI also ranges from 0 (no redistribution required) to 1 (maximum redistribution required) and can be interpreted as proportion of income need to be redistributed from household having income above the mean to those below the mean income of total households. HI can be articulated as:

$$HI_r = \frac{1}{2}\frac{\sum_h HHLDINC_{h,r} - \overline{HHLDINC_r}}{\sum_h HHLDINC_{h,r}} \quad (4.43)$$

Other measures of inequality such as theil index is not used because of it ranged from zero to infinity. No upper limit of theil index makes it hard to judge level of inequality.

4.5 Model Closure and Decomposition of Regional Welfare

The study employed the method of equivalent variation for quantifying the welfare decomposition as documented in Huff & Hertel (1996). Instead of utilising regional household’s expenditure function, the procedure consists of changes in term of trade and various efficiency sources. The following equation can express the equivalent variation measure as:

$$EV_s = (\Psi_s)\begin{Bmatrix} \sum_{i=1}^{N} \sum_{r=1}^{R}(\tau_{Mirs}\, PCIF_{irs}\, dQMS_{irs}) \\ +\sum_{i=1}^{N}(\tau_{CDis}\, PD_{is}\, dQD_{is}) \\ +\sum_{i=1}^{N}(\tau_{CMis}\, PM_{is}\, dQM_{is}) \\ +\sum_{i=1}^{N}(\tau_{Ois}\, PD_{is}\, dQO_{is}) \\ +\sum_{i=1}^{N} \sum_{r=1}^{R}(\, QMS_{irs}\, dPFOB_{irs}) \\ -\sum_{i=1}^{N} \sum_{r=1}^{R}(\, QMS_{irs}\, dPCIF_{irs}) \end{Bmatrix} \quad (4.44)$$

On the right-hand side of the equation, the first four expressions denote the changes in efficiency of resource utilisation in region s. These involve the interaction of tax/subsidy distortions with the change in associated quantities. The remaining two terms refer to the terms of trade (ToT) effects for regions.

Finally, the solution of the model requires the exogenous variable to be equal to endogenous variables. Closure of the model consists of markets in equilibrium where a firm has zero real profit and consumers are on their budget Constraints. Furthermore, employment is assumed to full.

Policy scenario changes the parameters of the model, thus results in a shift from original equilibrium to a new equilibrium level. The change in equilibrium level is measured and termed as the impact of the policy.

4.6 Data Requirements

CGE based models usually require exhaustive data requirements and most of the CGE models used social accounting matrixes to quantify the impact of any policy. However, Global Trade Analysis Project (GTAP) made an excellent effort in obtaining and collecting all of the require data in the form of input-output tables of 140 regions. GTAP Data Base also provides data of bilateral trade for 57 commodities, services and intermediate inputs among sectors. Furthermore, data of taxes and subsidies imposed by the Governments is also given. Other than that data base presents data on

consumption, production and international trade (including transportation and protection data), energy data and carbon dioxide (CO2) emissions for three benchmark years (2004, 2007 and 2011), (Aguiar, Narayanan & McDougall, 2016). Tariff information has been converted into ad-valorem and for subsidy rates, domestic support payments have been used. Moreover, the different economic flows are taken in millions of current US$.

MyGTAP model has been employed and it requires additional data in order to split a regional household into multiple households. Therefore, we used Pakistan Social Accounting Matrix (SAM) for 2010-11 (IFPRI, 2016) to extract data on different types of households along with real factors and then integrate it to the GTAP Data Base version 9.2 with reference year 2011. Real factors used for this study are given in Table (4.1).

Table 4.1: Real Factors of Production and Their Codes

Codes	Description	Codes	Description
flab-s	Labour-small farmer	flnd-m	Land – medium
flab-m	Labour-medium farmer	flnd-l	Land – large
flab-w	Labour-farm worker	Fliv	Livestock
flab-l	Labour- non-farm low skilled	fcap-a	Capital – agriculture
flab-h	Labour- non-farm high skilled	fcap-f	Capital – formal
flnd-s	Land – small	fcap-i	Capital – informal

Source: *IFPRI (2016)*

Pakistani SAM for is also used to split household into 16 categories of private households (see Table 4.2). Households are split on two bases. Geographical zones (such as urban, rural and provinces) and size of the land own. Small farmers own land less than or equal to 12.5 acres and medium farm owner has land greater than 12.5 acres.

Table 4.2: Household Types and Their HH Codes

Sr. No	Household types	HH Codes	Sr. No	Household types	HH Codes	Sr. No	Household types	HH Codes
1	Rural small farmer (Quantile 1)	hhd-rs1	7	Rural farm worker (Quantile 1)	hhd-rn1	13	Urban (Quantile 1)	hhd-u1
2	Rural Small farmer (Quantile 234)	hhd-rs234	8	Rural farm worker (Quantile 234)	hhd-rn2	14	Urban (Quantile 2)	hhd-u2
3	Rural medium farmer (Quantile 1)	hhd-rm1	9	Rural non-farm worker (Quantile 1)	hhd-rn3	15	Urban (Quantile 3)	hhd-u3
4	Rural medium farmer (Quantile 234)	hhd-rm234	10	Rural non-farm worker (Quantile 2)	hhd-rn4	16	Urban (Quantile 4)	hhd-u4
5	Rural landless farmer (Quantile 1)	hhd-rl1	11	Rural non-farm worker (Quantile 3)	hhd-u1			
6	Rural landless farmer (Quantile 234)	hhd-rl234	12	Rural non-farm worker (Quantile 4)	hhd-u2			

***Source**: IFPRI (2016)*

Non-farm workers own no land but may work on the farm own by other household to earn profit and give the rent to the owner, (IFPRI, 2016). Quantile 1 represents largest province of Pakistan (i.e. Punjab) and quantile 2, 3 and 4 represents Sindh, Khyber Phaktunkhwa and Balochistan respectively. Further, most vulnerable segment of Pakistan are rural farm workers and rural non-farm workers from quantile 1 and composed of 14 percent of total population of Pakistan. Further, dataset of IFRI (2016) revealed that 89 percent of poor households (earnings below $2 per day) belong to rural areas.

4.7 Regional and Sectoral Aggregation

GTAP Data base 9.2 consists of 140 regions and 57 sectors. For conducting this research, we aggregate data into 20 regions and 13 sectors as shown in Table (4.3) and (4.4) respectively**,** (see appendix for complete description of sectoral aggregation).

Table 4.3: Regional Aggregation

Sr.No.	Code	Description	Sr.No.	Code	Description
1	Pak	Pakistan	11	SriLanka	Sri Lanka
2	China	China	12	India	India
3	Viet	Vietnam	13	Indonesia	Indonesia
4	Thailand	Thailand	14	Malaysia	Malaysia
5	UAE	United Arab Emirates	15	EU25	Europion Union
6	UK	United Kingdom	16	Indo	Indonesia
7	Turk	Turkey	17	Ban	Bangladesh
8	Korea	South Korea	18	KSA	SaudiArabia
9	Iran	Iran	19	ROA	Rest of Asia
10	USA	United States	20	ROW	Rest of World

Source: Author's own Aggregation

Table 4.4: Sectoral Aggregation

Sr. No	Code	Description	Sr. No	Code	Description
1	Pdr	Paddy Rice	8	Livestock	Livestock
2	Wht	Wheat	9	Frs	Forestry
3	Gro	Maize	10	Fsh	Fisheries
4	v_f	Vegetables & Fruits	11	Ofd	Processed Food
5	Osd	Oil Seeds	12	Tex	Textile
6	c_b	Sugar Crops	13	Lea	Leather
7	Pfb	Fibre Crops			

Source: Author's own Aggregation

Sectoral aggregation includes ten primary agriculture sectors. Processed food, textile and leather are recognised as secondary agriculture sectors as these sectors utilised raw material that are mainly composed of primary agriculture products. Therefore, impact of any policies on these sector will likely to affect primary agriculture sector as well.

4.8 Simulation Designs

This study considers multiple trade policy options for the agricultural sector of Pakistan. Development of agriculture sector is important for well-being of less fortunate segments of a region as well as for food security reasons. Therefore, experiments are designed to evaluate trade policy as a tool of boasting up the income of households associated with agriculture. Further, this study aimed to evaluate the impact of different policies on imports, exports and output at disaggregated agricultural sectors. At macro level the performance of policies will be evaluated by the chance in indicators such as government income, Gross domestic product, terms of trade, aggregate import and export. Last but not least, method of equivalent variation will be used to determine the change in overall welfare linked with a trade policy.

Pakistan has adopted policy measures such as tariffs, input subsidies and support prices for agricultural development. However, Tariff remains the dominant policy measure for most of the time and domestic support in Pakistan has been limited to few agricultural product-mostly wheat and sugarcane. Furthermore, world trade organisation (WTO) has reported negative Aggregate Measure of Support (AMS) in case of Pakistan. Therefore, it is difficult to quantify the impact of domestic support measure with very few observations on a sectoral level. Keeping in view the limitations this study only focuses on tariff related trade policies and the scenarios under examination are as follow:

4.8.1 Trade Liberalisation vs Protectionist Policies

For liberalisation scenario, we reduce ad-valorem tariff by 100%, 50% and 10% respectively. The simulations are carried out by reducing tariff rate first on overall

agricultural sector and then on disaggregated sectors as well. So that we can have exact shares of each sector in associated changes resulting from tariff elimination.

Similarly, we increase ad-valorem tariff rate by 75%, 50% and 10% respectively. The main objective of this experiment is to compare the effectiveness of both contradictory theories of trade liberalisation and protectionist policies in the case of Pakistan's agricultural sector.

4.8.2 Uniform Tariff Rationalization

In many circumstances where tariffs are second best policy instruments, such as to raise public revenue or to cope with balance of payments problems, a uniform tariff rate is the most practical and efficient alternative. Differentiated tariff protection in support of infant or restructuring industries is typically assumed to be ineffective at addressing the alleged market failure problem; governments are not very good at picking winners and there are serious dangers that the policy would be overwhelmed by requests for protection from vested interests irrespective of its economic merits.

To test uniform tariff rationalisation as a policy instrument for Pakistan agricultural development, we designed experiments and set uniform tariff rates at 8%, 10% and 15% across agricultural sectors respectively.

4.8.3 Export Potential by Sectors and Trade Negotiations

Since several decades, economies around the globe indulge in bilateral or multilateral trade deals more than ever. Trade negotiations are recognised as an effective instrument to improve and develop a structure of tax and income. Moreover, such deals also play

important part in designing trade policies by countries and could be a pivotal tool of boosting exports.

This study uses GTAP DATABASE version 9.2 of agricultural exports of Pakistan to top ten importers by sectors. Moreover, tariff rates imposed by importing partner on Pakistan and other nations competing in any market are compared. Then this study proposes to negotiate and simulate the lowest tariff rate imposed on any competing economies by importing partner of Pakistan.

Finally, based upon the simulated results, we estimate product and market wise export potential for agriculture sector of Pakistan. Export potential is simply a difference between pre and post simulation export value in US million Dollars.

Chapter V

RESULTS AND DISCUSSION

This section presents the estimated results of experiments under consideration. Each experiment has been discussed in separate sub-sections. First section presents the results of trade liberalisation and protectionist policies and provides comparison based upon multiple indicators. Second section reports changes in the economy due to tariff simplification and rationalisation. For last section, we identify the export potential for each selected sector and propose potential trade deals with several nations. Simulations based on such trade deals are provided in section three.

5.1 Trade Liberalisation and Protectionist Policies

For quantifying the impact of trade liberalisation and protectionism policies, this study considered six scenarios. A complete agricultural trade liberalisation, Liberalisation by 50 percent and 10 percent respectively as well as tariff increased by 10 percent, 50 percent and 75 percent respectively. Simulated results are as follow:

5.1.1 Impact on Macroeconomic Indicators

The results show substantial changes in macroeconomic indicators. Government losses income as we decrease the tariff rates due to straight forward reason of decline in revenues from imposition of tariff. Real GDP tends to increase with a little margin with trade liberalisation. Increase in GDP might be explained through increased consumption expenditure as both real exports and imports also increases due to reduction of tariffs. Interestingly, volume of real exports and imports are moving in

same direction with exports having greater magnitude. However, terms of trade turn out to be deteriorating with higher level of liberalisation. The price of imports at international markets do not affected but Pakistan's exports price index decreases as we liberalise our trade which results in higher trade imbalance. Table (5.1), (5.2) and (5.3) presents the simulated results of tariff elimination by 100 percent, 50 percent and 10 percent on macroeconomic indicators.

Table 5.1: Complete trade liberalisation (%change in macroeconomic indicators)

Sectors	Govt Income	Real GDP	Export Volume	Import Volume	Import Price Index	Export price index	Terms of Trade
Pdr	-0.02	0.00	0.07[2]	0.03	0.00	-0.01	-0.01
Wht	-0.01	0.00	0.05	0.02	0.00	-0.01	-0.01
Osd	-0.01	0.00	0.01	0.00	0.00	0.00	0.00
Pfd	0.00	0.00	0.00	0.00	0.00	0.00	0.00
v_f	-0.14	0.00	0.15	0.04	0.00	-0.02	-0.02
c_b	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Lea	-0.96	0.00	1.47	0.04	0.00	-0.24	-0.24
Gro	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ofd	-0.57	0.00	0.62	0.13	0.00	-0.10	-0.10
Tex	-2.74	0.02	5.29	1.00	0.00	-0.52	-0.52
Lstk	-0.13	0.00	0.14	0.01	0.00	-0.02	-0.02
Fsh	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Frs	-0.03	0.00	0.03	0.01	0.00	0.00	0.00
Total	**-4.60**	**0.02**	**5.81**	**1.27**	**0.00**	**-0.94**	**-0.94**

Author's own simulations based upon GTAP Data Base version 9.2.

Contribution of each sector towards change in selected macro indictors is also provided. It can be seen that real GDP has increased only due to textile sector. As textile sector uses agricultural product such as cotton as an input and with trade liberalisation textile sector enjoys cheaper input and hence results in increase in competitiveness and real exports. It can also be seen that contribution of textile sector is greatest among the shares of other sectors. Leather (lea) and processed food sector (ofd) are followed by

[2] Note that the value does not necessarily represent percent change in real exports of rice sector. It indicates percentage change due to rice sector in overall real exports in response to a policy imposed only on the rice sector. Rest of the Tables are also interpreted in similar manner.

textile sector. These three sectors are contributing the most in the loss of govt income and also have a greater impact on other indictors as well.

Table 5.2: Tariff Elimination by 50 percent (%change in macroeconomic indicators)

Sectors	Govt Income	Real GDP	Export Volume	Import Volume	Import Price Index	Export price index	Terms of Trade
Pdr	-0.01	0.00	0.03	0.01	0.00	0.00	0.00
Wht	0.00	0.00	0.02	0.01	0.00	0.00	0.00
Osd	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pfd	0.00	0.00	0.00	0.00	0.00	0.00	0.00
v_f	-0.06	0.00	0.07	0.02	0.00	-0.01	-0.01
c_b	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Lea	-0.34	0.00	0.57	0.01	0.00	-0.10	-0.10
Gro	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ofd	-0.24	0.00	0.27	0.05	0.00	-0.05	-0.05
Tex	-1.17	0.01	1.48	0.46	0.00	-0.24	-0.24
Lstk	-0.06	0.00	0.06	0.01	0.00	-0.01	-0.01
Fsh	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Frs	-0.01	0.00	0.01	0.00	0.00	0.00	0.00
Total	**-1.89**	**0.02**	**2.52**	**0.57**	**0.00**	**-0.42**	**-0.42**

Author's own simulations based upon GTAP Data Base version 9.2.

Table 5.3: Tariff Elimination by 10 percent (%change in macroeconomic indicators)

Sectors	Govt Income	Real GDP	Export Volume	Import Volume	Import Price Index	Export price index	Terms of Trade
Pdr	0.00	0.00	0.01	0.00	0.00	0.00	0.00
Wht	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Osd	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pfd	0.00	0.00	0.00	0.00	0.00	0.00	0.00
v_f	-0.01	0.00	0.01	0.00	0.00	0.00	0.00
c_b	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Lea	-0.05	0.00	0.09	0.00	0.00	-0.02	-0.02
Gro	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ofd	-0.04	0.00	0.05	0.01	0.00	-0.01	-0.01
Tex	-0.20	0.00	0.27	0.09	0.00	-0.05	-0.05
Lstk	-0.01	0.00	0.01	0.00	0.00	0.00	0.00
Fsh	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Frs	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	**-0.32**	**0.01**	**0.45**	**0.11**	**0.00**	**-0.08**	**-0.08**

Author's own simulations based upon GTAP Data Base version 9.2.

Similarly, Table (5.4), (5.5) and (5.6) show the results of increase in tariff rate by 10 percent, 50 percent and 75 percent respectively. Government earns income by collecting import tax. Therefore, govt income shows positive relationship with tariff hikes.

Table 5.4: Tariff Increase by 10 percent (%change in macroeconomic indicators)

Sectors	Govt Income	Real GDP	Export Volume	Import Volume	Import Price Index	Export price index	Terms of Trade
Pdr	0.00	0.00	-0.01	0.00	0.00	0.00	0.00
Wht	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Osd	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pfd	0.00	0.00	0.00	0.00	0.00	0.00	0.00
v_f	0.01	0.00	-0.01	0.00	0.00	0.00	0.00
c_b	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Lea	0.04	0.00	-0.08	0.00	0.00	0.01	0.01
Gro	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ofd	0.04	0.00	-0.05	-0.01	0.00	0.01	0.01
Tex	0.19	0.00	-0.26	-0.08	0.00	0.04	0.04
Lstk	0.01	0.00	-0.01	0.00	0.00	0.00	0.00
Fsh	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Frs	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	**0.30**	**0.00**	**-0.43**	**-0.10**	**0.00**	**0.07**	**0.07**

Author's own simulations based upon GTAP Data Base version 9.2.

Table 5.5: Tariff Increased by 50 percent (%change in macroeconomic indicators)

Sectors	Govt Income	Real GDP	Export Volume	Import Volume	Import Price Index	Export price index	Terms of Trade
Pdr	0.01	0.00	-0.02	-0.01	0.00	0.00	0.00
Wht	0.00	0.00	-0.02	-0.01	0.00	0.00	0.00
Osd	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pfd	0.00	0.00	0.00	0.00	0.00	0.00	0.00
v_f	0.05	0.00	-0.06	-0.02	0.00	0.01	0.01
c_b	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Lea	0.17	-0.01	-0.35	0.00	0.00	0.06	0.06
Gro	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ofd	0.17	-0.01	-0.21	-0.04	0.00	0.04	0.04
Tex	0.83	-0.02	-1.22	-0.40	0.00	0.20	0.20
Lstk	0.05	0.00	-0.06	0.00	0.00	0.01	0.01
Fsh	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Frs	0.01	0.00	-0.01	0.00	0.00	0.00	0.00
Total	**1.28**	**-0.04**	**-1.95**	**-0.49**	**0.00**	**0.33**	**0.33**

Author's own simulations based upon GTAP Data Base version 9.2.

Real GDP, Real exports and import decline as tariff increase again mainly due to secondary agricultural sectors such as textile, leather and processed food. Import price

index seems to irresponsive again but export price index increased. And terms of trade shows improvements along with the increase in tariff rates.

Table 5.6: Tariff increased by 75 percent (%change in macroeconomic indicators)

Sectors	Govt Income	Real GDP	Export Volume	Import Volume	Import Price Index	Export price index	Terms of Trade
Pdr	0.01	0.00	-0.03	-0.01	0.00	0.01	0.01
Wht	0.00	0.00	-0.03	-0.01	0.00	0.00	0.00
Osd	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pfd	0.00	0.00	0.00	0.00	0.00	0.00	0.00
v_f	0.06	0.00	-0.08	-0.03	0.00	0.01	0.01
c_b	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Lea	0.21	-0.01	-0.47	0.00	0.00	0.08	0.08
Gro	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ofd	0.24	-0.01	-0.30	-0.06	0.00	0.05	0.05
Tex	1.15	-0.04	-1.75	-0.58	0.00	0.29	0.29
Lstk	0.07	0.00	-0.08	-0.01	0.00	0.01	0.01
Fsh	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Frs	0.01	0.00	-0.01	0.00	0.00	0.00	0.00
Total	**1.75**	**-0.06**	**-2.76**	**-0.71**	**0.00**	**0.47**	**0.47**

Author's own simulations based upon GTAP Data Base version 9.2.

5.1.2 Change in Sectoral Exports and Imports

Overall Aggregate export and import of agricultural products are moving upward in response to a reduction in tariff rates. Both exports and imports are on their lowest point at 75 percent increase in tariff rate and highest at complete removal of tariff barriers. It is interesting to note that imports and exports are moving in a same direction. Aggregate export increases due to increase in foreign demand in response to lower export prices and aggregate import increases due to higher domestic demand for imports in response of lower domestic prices.

However, trade liberalisation results in increasing imports by greater magnitude relative to exports. So, relatively minor increase in exports and lower price obtained from

exports results in worsening terms of trade, as shown in appendix B (see Table (B.1), (B.2), (B.3), (B.7), (B.8) and (B.9)). Similarly, (see appendix B, Table (B.4), (B.5), (B.6), (B.10), (B.11) and (B.12)) shows that protectionist policy reduces the level of exports and imports but imports are reduced by relatively greater extent. Higher export price index along with reduction in imports translate into improvement in terms of trade. Parallel trends can be seen in the case of each disaggregated sector.

At sectoral level, exports and imports of each sector declined with higher level of protection. And increase with higher level of liberalisation. Parallel trends as discussed above regarding difference in magnitude of imports and exports resulting from two contradicting policies can also be observed in the case of each disaggregated sector. Moreover, textile, leather and processed food sector are most responsive to the simulated experiment and contributing most in a policy impact. Further, oil and oil seeds (osd), cotton or plant-based fibres (pfb) and sugarcane and beets (c_b) sector are showing exception as compared to rest of the selected sectors.

Each sector's exports and imports are rising in response of liberalisation and declining in case of protectionism. Exports for osd, pfb and c_b increased while we liberate the trade and decrease otherwise just like other sectors but imports of these sectors decline with trade liberalisation and increase in response to higher level of protection. On the contrary, when we simulate the effect of higher level of liberalisation, then other sectors tend to have higher level of exports and imports and vice versa.

Furthermore, a sector will be affected most by the policy imposed on the sector itself. For example, if we eliminate tariff by 100 percent on paddy rice (pdr) and leave other as such then exports and imports of paddy rice will be increases more as compare to if we impose 100 percent tariff removal policy on any other sector.

Similarly, imposition of a liberalisation policy on any single sector will cause exports of that sector along with other sectors to increase and decrease in the case of protectionist policy. However, a sector will witness increase in its imports in response to trade liberating policy imposed on that sector but results in decline in imports of other sectors. Likewise, higher degree of protection on any single sector will results in reducing imports of the sector while causing an increase in imports of other sectors.

5.1.3 Change in Sectoral Output and Prices

Trade liberalisation results in cheaper imports and cheaper import results in increase in demand for imported goods leaving domestic producers in the state of unfavourable conditions. Such shift of demand results in reduction of overall domestic agricultural output as shown in appendix B (see Table (B.13), (B.14) and (B.15)). On the other hand, demand of domestic goods will be increase due to increase in tariff rate. The increased demand would encourage domestic producers to produce more and hence output will be increased as shown in appendix B (see Table (B.16), (B.17) and (B.18)).

Table (B.19), (B.20) and (B.21) in appendix B, presents the change in prices for the case of tariff elimination by 100 percent, 50 percent and 10 percent respectively. Overall domestic prices of agricultural products tend to decrease with the process of liberalisation. And increase in the case of higher degree of protection as shown in appendix B (see Table (B.22), (B.23) and (B.24)).

At disaggregated sectoral level. Liberating any single sector at a time will likely to reduce the sectoral output due to fall in price. At the same time prices of other products will also fall but by less proportion to that of certain product. Which finally results in a producer to shift towards other sectors and output of these sectors will increase.

Moreover, by liberating each selected sector, output of grains crops like paddy rice (pdr), wheat (wht) and maize and corn (gro) along with fisheries (fsh) increased while all other sectors loss in term of output. The inverse is true if we increase the protection level.

Liberating textile sector is mainly responsible for contraction in overall output. Because by liberating textile, not only textile sector suffers but also cotton (pfd) sector. And these magnitudes are highest among others. Textile sector is also a major contributor in increased in output due to provision of higher protection to textile sector

Moreover, liberating pdr, v_f, gro and frs also results in loss in overall reduction in domestic agricultural output. And liberating wht, lea, ofd and livestock are likely to increase the domestic output. On contrary, protecting pdr, v_f, gro and frs results in increase in total output and wht, lea, ofd and livestock are likely to affect output inversely.

Effect of general trade policies on domestic prices are likely to be homogeneous. Trade liberalisation likely to reduce prices and prices increase by imposing higher tariff rates. However, change in prices differ in magnitude across sectors.

5.1.4 Change in Real Factors wages

Changes in output level alter the supply of a certain product and total supply determined the demand for factors such as labour, capital and land. Changes in demand for real factors also affect the income earned by real factors. As sectoral output increased, demand for real factors of production used in that sector also increase and hence result in higher wages. Table (A.3) in appendix presents source of factors' income (in percentage) by sectors.

By complete liberalisation, total agricultural output contracts along with total wages. However, among these factors, income earned by capital increases. Capital has been disaggregated into capital for agriculture, informal and formal. Under each classification, capital earns greater return as a result of higher level of liberalisation due to increase in output of sectors like paddy rice, wheat and oil seeds. Since these sectors utilise capital by greater proportion (13, 29 and 14 percent respectively) as compare to other sectors therefore net change in wage of capital remain positive.

For similar reason small, medium and large lands also tend to earn more but the labours associated directly with agricultural sector in the form of farm workers, small and medium farmers lose a part of their wages because these factors are utilised by almost every agricultural sector and most of the sectors lose their output that reduced the income of the factors and outweigh the gain in form of higher wages due to increase in production of sectors like rice, wheat, oil seeds, maize, corn and fisheries. However, labours those are not associated with agriculture either low or high skilled are likely to earn more by a very minimal amount because these are least endowed factor of agricultural production. Therefore, any policy or reform that is directed toward agricultural sector will have least impact on non-farm labours. We have identified livestock as another factor which has been utilised only by livestock sector. As liberalisation decreases the output of livestock sector therefore, has an adverse effect on earnings of livestock as shown in appendix B, (see Table B.25, B.26 and B.27).

In addition, by 50 percent removal of import tariff, wages of capital used in agricultural sector and small land also decline and medium land also came into list of losing factors if we liberate trade to 10 percent. However, overall loss in wages decline with lower level of liberalisation. This happens due to fact that at complete liberalisation the gain in output for sectors like wheat, rice and oil seeds was high enough to manage positive

change in wages of agricultural capital, small and medium land but with lower degree of liberalisation the increase in output of gaining sectors could not contest with adverse impact of decline in output of other sectors that utilised these factors. However, overall loss in wages decline with lower level of liberalisation due to lower loss in output across sectors. Other reason might be the factors reallocation across sectors to earn more wages. Higher the differences in prices across sectors result in higher opportunities of shifting from one sector to another and demands for factor associated with those sectors will increase the factor's wages. With lower level of liberalisation, the difference between prices reduces. Hence opportunities and options of shifting from one sector to another sector also decline. At 10 percent reduction of tariff rates reduces prices homogeneously across whole primary agricultural sector. Therefore, all of the factors employed in agricultural sector earns less wages and factor associated with non-agricultural sector such as formal and informal capital earns more income.

Increasing the degree of protection will results in an increase of factors' wages associated with agriculture. Those factors include, small, medium farmers and farm workers, small, medium and large land, livestock and capital associated with agricultural sectors. While, non-agricultural capital along with low and highly skilled non-farm workers earn lower wages. This can be explained by the increase in overall production of agricultural sectors that caused demand for factors of agricultural production to increase. The impacts of increase in tariff rate by 10 percent, 50 percent and 75 percent are presented in appendix B (see Table (B.28), (B.29) and (B.30)) respectively.

5.1.5 Change in Household's Real Income

Redistribution and net change in households' income is an important aspect of agricultural policies. Population associated with agriculture sector are usually small or medium farmers and face series of vulnerabilities in the form of fluctuations of income. Specially, small farmers and farm workers live close to the line of poverty. Therefore, policies towards agriculture have great significance in regards to such segment of the society.

Table (B.31), (B.32) and (B.33) in appendix B, presents the results of change in income in response to liberalisation for households disaggregated into several types. According to the simulations, liberalisation of trade affect income of all households adversely. And the adverse effect gets worse if we keep on liberating trade. At complete liberalisation, households loss 20.6 percent of their real income as compare to 9.18 percent and 1.65 percent, when we liberalise trade by 50 percent and 10 percent respectively.

Among households, people belong to urban areas are least effected by agricultural liberalisation as compare to their rural counterparts. Further, under classification of rural families, people linked directly to the agricultural farms tend to be affected more adversely as compare to rural non-farm workers. So, rural small and medium farmers, rural landless farmers and rural farm workers can be classified as households directly linked with primary agricultural sector.

This might be a result of cheaper imports and decline in demand for domestic product. Further decrease in prices, discourages domestic supplier to produce more and finally translate into lowering the demands and wages of factors used in agricultural production. Table (A.4) in appendix shows that the factors that are affected by agricultural trade policies are mostly owned by rural population. Therefore, income of

rural households also gets most part of adverse effect as compare to their urban counterparts.

On a contrary, households gain extra income with provision of higher level of protection to the primary agriculture sector. Highest benefit could be achieved by raising tariff by 75 percent. Around 10 percent increase in real income can be credit to protectionism at 75 percent as compare to 7 percent and 1.5 percent increase in income due to increase in tariff by 50 percent and 10 percent respectively.

Appendix B (see Table (B.34), (B.35) and (B.36)) demonstrate that household across whole Pakistan gets benefits from protection. However, habitants of rural areas get more part of gain in income as compare to the household belongs to urban areas. Within rural areas, household directly related to agriculture are main beneficiaries as income of rural non-farm workers increased by less proportion as compare to that of rural small and medium farmers, landless farmers and farm workers.

5.1.6 Change in Income Inequality

It is shown above that complete agriculture liberalisation results in asymmetrical adverse effect on households' real income. As, families belong to rural areas faced greater loss as compare to their urban counterparts and even further, within rural households income of farm workers decline by larger magnitude as compare to other rural inhabitants. Therefore, liberating agriculture sector would likely to increase income dispersion across Pakistan and vice versa.

Both Gini and Hoover index (HI) in Table 5.7 reveal that income inequality is likely to increase more as we move towards higher liberalisation in case of Pakistan and decline

by 0.02 percent, 0.12 percent and 0.26 percent with rise in level of protection by 10 percent, 50 percent and 75 percent, accordingly.

Table 5.7: Change in income inequality

Simulations	Gini	HI
Base level	0.482131	0.379002
Complete Liberalisation	0.483013 0.18%	0.380018 0.27%
50 percent reduction of tariff	0.482719 0.12%	0.379679 0.18%
10 percent reduction of tariff	0.482249 0.02%	0.379137 0.04%
10 percent increase in tariff	0.482014 -0.02%	0.378866 -0.04%
50 percent increase in tariff	0.481544 -0.12%	0.378324 -0.18%
75 percent increase in tariff	0.480843 -0.26%	0.377524 -0.39%

Author's own simulations based upon GTAP Data Base version 9.2.

5.1.7 Decomposition of Total Welfare

Huff and Hertal (2000) presents method of decomposition of welfare based upon equivalent variation. This study utilised decomposition of welfare into allocative efficiency effect, terms of trade effect, investment-saving effect and capital stock effect.

Table 5.8, demonstrates decomposition of equivalent variation measure. Results show $490.37 million loss in public welfare due to complete liberalisation. Tariff reduction by 50 percent and 10 percent reduces welfare by $126.94 million and $18.36 million respectively.

Welfare loss is mainly contributed by continuous deterioration in terms of trade as we move towards liberalisation. Terms of trade deteriorates by $25.52 million due to 10 percent reduction of tariff and get even worse with 50 percent and 100 percent removal

of tariff rates. Loss in terms of trade increases to $131.45 million and $387.34 million due to 50 percent and 100 percent elimination of import taxes.

Table 5.8: Decomposition of Estimated Equivalent Variations (US$ millions)

Simulations	AE effect	ToT effect	I-S effect	CS effect	Total
Complete Liberalisation	34.50	-387.34	-172.28	34.75	**-490.37**
50 percent reduction of tariff	47.34	-131.45	-55.19	10.36	**-126.94**
10 percent reduction of tariff	12.74	-25.52	-9.35	1.79	**-18.36**
10 percent increase in tariff	-14.05	22.32	8.80	-1.67	**15.40**
50 percent increase in tariff	-80.91	101.01	39.04	-7.26	**51.87**
75 percent increase in tariff	-129.22	142.82	54.46	-10.03	**58.03**

Author's own simulations based upon GTAP Data Base version 9.2.

Pakistan is expected to gain in term of allocative efficiency due to liberalisation. This might be due to a shift of factors from inefficient sector to an efficient sector resulting in decline in wastage coupled with decline in domestic prices. Factors wages reduces cost of production and shift of factors from inefficient to efficient sectors coupled with decrease in domestic prices help market forces to reduce the gap between unit prices of product and consumer willingness to pay. And hence reduces dead weight loss. Through allocative efficiency, Pakistan likely to gain $34.5 million, $47.34 million and $12.74 million due to removal of tariff distortions by 100 percent, 50 percent and 10 percent.

Decline in domestic prices discourages supply of a product by a firm. Prices and output reduction decoded in decline of new investments opportunities and discourage capital owners to invest capital into existing or new investments. Therefore, Pakistan is likely to face losses in the form of decline return from investment by $172.28 million, $55.19 million and $9.35 million due to tariff elimination by 100 percent, 50 percent and 10 percent, respectively.

In a given time period there is fix level of capital available for investments and saving. If a policy result in reduction in investments/return on investments, then savings/return on savings will be assumed to increase to equate saving and investment relationship.

Moreover, at new equilibrium level return on capital is expected to increase available due to decline in the earnings of investment. Thus we can expect an increase in welfare in the form of capital earnings by $34.45 million, $10.36 million and $1.79 million in case of 100 percent, 50 percent and 10 percent removal of import tariff, accordingly.

Terms of trade effect also dominated other effects in the case of tariff hikes. Overall public welfare of Pakistan increases with higher degree of protection. However, allocative efficiency will be reduced and the cost of inefficiency will be transfer to consumers in the form of higher prices.

Raise in domestic prices and output provide favourable conditions for investors to invest. Therefore, Pakistan gains in term of returns on investment due to protection. Further, higher returns on investments results in decline in capital return at given time period.

5.1.8 Conclusions

Conclusion can be drawn from above experiments that protecting agriculture sector unable policy makers to achieve the several objectives of agricultural policies like increasing output, rural household's income. Socio-economic indictor like income inequality could be also reduced. Moreover, from trade policy point of view there is trade-off between terms of trade and exports. It indicates that in order to achieve improved TOT along with raise in exports, policy makers would require additional trade instruments along with protectionism. Or could opt alternative trade policy instead of general trade policies based on increasing or decreasing tariff rates. Last but not least public welfare and agricultural sector's performance is directly proportional to tariff rates or inversely related to degree of agricultural trade liberalisation.

5.2 Uniform Tariff Rationalisation

This section presents the estimates of quantitative impact of non-discriminatory tariff structure adopted by Pakistan on public welfare and agriculture sector. For a starting point, 8 percent non-discriminated tariff rate applied by Pakistan is simulated. We keep on increasing tariff unless public welfare shows improvement. Simulated results for uniform tariff of 8 percent, 10 percent and 15 percent respectively has been presented here.

5.2.1 Impact on Macroeconomic Indicators

Macroeconomic variable varies quite marginally in response to uniform tariff of 8 percent as shown in Table (5.9). Government income shrinks down by 0.68 percent. Volume of real exports increase by 0.94 percent and real imports decline. However, Pakistan is likely to get lower price for her exports by 0.18 percent. With no change in Pakistan's import price index, terms of trade deteriorate by 0.18 percent. Further, real GDP does not show any fluctuation.

Table 5.9: Uniform tariff at 8 percent (%change in macroeconomic indicators)

Sectors	Govt Income	Real GDP	Export Volume	Import Volume	Import Price Index	Export price index	Terms of Trade
Pdr	0.00	0.00	0.01	0.00	0.00	0.00	0.00
Wht	0.00	0.00	0.01	0.00	0.00	0.00	0.00
Osd	0.29	0.00	-0.21	-0.08	0.00	0.04	0.04
Pfd	0.26	-0.01	-0.68	-0.38	0.00	0.08	0.08
v_f	0.26	0.00	-0.25	-0.07	0.00	0.05	0.05
c_b	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Lea	-0.48	0.00	0.78	0.01	0.00	-0.13	-0.13
Gro	0.02	0.00	-0.01	0.00	0.00	0.00	0.00
Ofd	-0.29	0.00	0.32	0.06	0.00	-0.06	-0.06
Tex	-0.79	0.01	1.03	0.32	0.00	-0.17	-0.17
Lstk	0.04	0.00	-0.04	0.00	0.00	0.01	0.01
Fsh	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Frs	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	**-0.68**	**0.00**	**0.94**	**-0.13**	**0.00**	**-0.18**	**-0.18**

Author's own simulations based upon GTAP Data Base version 9.2.

Government gains more tariff revenues due to 8 percent uniform tariff on sectors like osd, pfd, v_f, gro and livestock. But loss in income due to leather, textile and processed food sectors outweigh the gains. Real exports increase mainly due to textile sector followed by leather and processed food sector. Wheat and rice sector contribute a little in boosting real exports by only 0.01 percent and osd, pfd, v_f, gro and livestock cause real exports to decline. However, overall uniformity raises real exports.

Increase in imports due to textile, leather and processed food sector outweighed by decline in real imports cause by osd, pfd and v_f. Though real export volume expands and real import volume shrinks but 8 percent uniform tariff causes exports prices to decrease down by 18 percent. Which translate into deterioration of ToT by 18 percent. Mainly, textile, leather and processed food sectors are responsible for worsening terms of trade.

Uniform tariff of 10 percent causes only a trivial impact on macroeconomic variables as shown in Table (5.10). Therefore, such small changes might consider as insignificant impact caused by 10 percent uniform tariff.

15 percent non-discretionary tariff shows encouraging results as some macroeconomic variables indicate some improvement. Government income expected to increase by 1.86 percent and real GDP witnessed a slight decline by 0.03 percent. Export and import volume shrink by 2.54 percent and 1.17 percent but price index of export increases with no change in import prices. Finally, ToT improves by 0.39 percent due to higher export prices index.

Table 5.10: Uniform tariff at 10 percent (%change in macroeconomic indicators)

Sectors	Govt Income	Real GDP	Export Volume	Import Volume	Import Price Index	Export price index	Terms of Trade
Pdr	6E-05	0E+00	-1E-04	-5E-05	0E+00	2E-05	2E-05
Wht	2E-04	0E+00	-8E-04	-3E-04	0E+00	1E-04	1E-04
Osd	4E-01	-3E-03	-3E-01	-1E-01	2E-05	4E-02	4E-02
Pfd	3E-01	-8E-03	-8E-01	-5E-01	-6E-04	1E-01	1E-01
v_f	3E-01	-6E-04	-3E-01	-9E-02	3E-04	7E-02	7E-02
c_b	5E-05	0E+00	-3E-05	-1E-05	0E+00	6E-06	6E-06
Lea	-4E-01	3E-03	6E-01	4E-03	4E-04	-1E-01	-1E-01
Gro	3E-02	-1E-04	-2E-02	-5E-03	7E-06	4E-03	4E-03
Ofd	-2E-01	3E-03	3E-01	5E-02	1E-04	-4E-02	-4E-02
Tex	-4E-01	8E-03	5E-01	2E-01	-4E-05	-9E-02	-9E-02
Lstk	7E-02	1E-03	-8E-02	-7E-03	-3E-05	1E-02	1E-02
Fsh	8E-04	0E+00	-5E-04	-4E-05	0E+00	9E-05	9E-05
Frs	1E-02	2E-04	-9E-03	-2E-03	-6E-05	1E-03	1E-03
Total	**1E-01**	**5E-03**	**-1E-01**	**-4E-01**	**1E-04**	**-1E-02**	**-1E-02**

Author's own simulations based upon GTAP Data Base version 9.2.

Table (5.11) presents the impact of 15 percent uniform tariff on macroeconomic indicators. Results show that uniform tariff rate of 15 percent cause just a 0.01 percent increase in government income earned from paddy rice sector. Vegetables and fruits sector contribute the most by 0.54 percent followed by Osd, tex, pfd, livestock, gro and frs. Fsh, c_b and wht sector caused no impact on government earnings from imposition of 15 percent uniform tariff on certain sectors.

Leather and processed food sector cause Govt income to decline by 0.16 percent and -0.09 percent respectively. Similarly, Osd, pfd and tex sectors are responsible for contraction of real GDP. All of these sectors cause real GDP to decline by 0.1 percent individually.

Export volume increases slightly due to leather and processed food sectors but all of the other sectors cause real exports to either decline or show no changes at all. Real import volume declines slightly due to each sector except ofd. Increase in export price index triggered mainly by imposition of 15 percent uniform tariff on pfd, v_f and tex cause terms of trade to improve by 0.39 percent in total.

Table 5.11: Uniform tariff at 15 percent (%change in macroeconomic indicators)

Sectors	Govt Income	Real GDP	Export Volume	Import Volume	Import Price Index	Export price index	Terms of Trade
Pdr	0.01	0.00	-0.02	-0.01	0.00	0.00	0.00
Wht	0.00	0.00	-0.02	-0.01	0.00	0.00	0.00
Osd	0.50	-0.01	-0.37	-0.14	0.00	0.06	0.06
Pfd	0.41	-0.01	-1.18	-0.68	0.00	0.14	0.15
v_f	0.54	0.00	-0.56	-0.15	0.00	0.11	0.11
c_b	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Lea	-0.16	0.00	0.29	0.00	0.00	-0.05	-0.05
Gro	0.04	0.00	-0.03	-0.01	0.00	0.01	0.01
Ofd	-0.09	0.00	0.11	0.02	0.00	-0.02	-0.02
Tex	0.43	-0.01	-0.57	-0.18	0.00	0.10	0.10
Lstk	0.15	0.00	-0.16	-0.01	0.00	0.03	0.03
Fsh	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Frs	0.03	0.00	-0.02	0.00	0.00	0.00	0.00
Total	**1.86**	**-0.03**	**-2.54**	**-1.17**	**0.00**	**0.38**	**0.39**

Author's own simulations based upon GTAP Data Base version 9.2.

5.2.2 Change in Sectoral Export and Import

Aggregate export shows downward trend in response to higher level of uniform tariff rate. 8 percent tariff rate results in 4.04 percent decline in exports as compare to 22.31 percent and 65.27 percent decline caused by 10 percent and 15 percent non-discretionary tariff rates respectively as shown in appendix C (see Tables (C.1), (C.2) and (C.3). On the other hand, Table (C.4) in appendix C, shows that aggregate import will increase by 35.19 percent due to 8 percent uniform tariff but declined by a considerable percentage of 15.33 and 122.10 due to 10 and 15 percent tariff rate applied by Pakistan irrespective of any exporting nation as shown in appendix C (see Table (C.5) and (C.6)).

Sectors like leather, processed food, livestock and fisheries enjoy raise in aggregate exports by imposing 8 percent uniform tariff on all selected sectors. frs sector faces most loss of aggregate export by 2.68 percent followed by wht, osd, c_b and pfd. Exports of remaining sectors also decline by considerable magnitude as shown. Overall

decline in exports is caused mainly due to 8 percent uniform tariff imposed on osd, pfd and v_f. On the other hand, processed food, leather and textile sector caused overall exports to increase but could not outweigh the loss.

Furthermore, aggregate imports of sectors like pdr, wht, lea, ofd and tex would fall and increased for rest of the sectors. The decline in sectoral imports are much less as compare to the increase in imports of rest of the sectors and hence results in raise in overall aggregate imports. Lea, ofd, wht, pdr and tex sectors contributed major part of increase in imports and 8 percent uniform tariff on pfd, c_b, gro and osd respectively caused most of the decline in overall imports due to any sector.

Imposition of 10 percent uniform tariff rate would once again benefit leather, processed food, livestock and fisheries sectors in the form of increased sectoral exports but the gain is expected to be lower as compare to the case of 8 percent uniform tariff scenario. With lessor gains and higher loss of the rest of the sectors' exports, resulted in decline of overall export by even greater magnitude. The positive impact on sector's exports restricted only to lea and fsh in the case of 15 percent uniform tariff scenario and rest of the sectors found themselves losing their exports.

10 percent uniform tariff applied on lea, ofd and tex sectors individually caused overall exports to raise. Moreover, lea and ofd sector are only two sectors remaining causing overall exports to raise when 15 percent uniform tariff is applied on each sector separately.

Applying 10 percent uniform tariff rate on every sector collectively results in increase in aggregate imports of sectors like pdr, wht, lea, ofd and tex and decreased sectoral imports of all of the remaining sectors.

However, In the case of 15 percent uniform tariff, only lea and ofd witnessed increase in sectoral imports. Furthermore, impact of uniform tariff of 10 percent applied individually on lea, ofd and tex sector caused increase in overall imports and results in decline in imports due to the imposition of 10 percent uniform tariff on remaining sectors accordingly. If we apply 15 percent uniform tariff one by one on each sector than lea and ofd would cause a raise in aggregate imports while all other sector would move aggregate imports downward.

5.2.3 Change in Sectoral Output and Prices

Experiment based on 8 percent uniform tariff shows decline in total output by 1.75 percent and increase in domestic prices by 1.13 percent as shown in appendix C (see Table (C.7) and (C.10). Sectors like osd, pfd, v_f, gro and frs witnessed increase in sectoral output and all other sector would loss in the form of contraction in their output. Policy measure applied individually on pfd, tex, osd and livestock causes total output to contract and overall agricultural output would decline despite of the positive influence on agricultural production by the policy imposed on rest of the sectors discretely.

Domestic sectoral prices of lea, ofd, livestock and fsh tend downwards and prices went up for the rest of the sectors. Individually, lea, tex, ofd, pdr and wht sector cause overall prices to decline but outweigh by the price hikes caused by other sectors.

Degree of contraction of output reduced down to 1.41 percent and 0.50 percent respectively from 1.75 percent in the case of 10 percent and 15 percent uniform tariff imposition as shown in appendix C (see Table (C.8) and (C.9)). However, price hike increased further from 1.13 percent to 4.69 percent and 15.35 percent as shown in

appendix C (see Table (C.11) and (C.12)). Sectors like lea, ofd, livestock and fsh sector would witness lower sectoral prices in the case of 10 percent uniform tariff scenario and for the 15 percent uniform tariff scenario only lea and fisheries sector would experience a marginal decline in sectoral prices.

Individually, lea, tex and ofd sector would cause domestic prices to fall in the case of 10 percent uniform tariff scenario and if we apply 15 percent uniform tariff on each sector one by one than the policy applied on lea and ofd sector would cause prices to decline while imposition of a particular policy on each of the remaining sectors separately result in either no change in prices or raise in prices.

5.2.4 Change in Real Factors' Wage

Table (C.13) in appendix C, presents the impact of 8 percent uniform tariff measure on wages of real factors. Results indicated a substantial increase in overall wages by 6.15 percent. Among factors, capital and land associated with agriculture (these factors are utilised by sectors such as osd, pfd, v_f, gro and frs to greater extend as compare to other factors as shown in Table A.2 in appendix A and increase in output of these sector boast the demand for factors) witness increase in wages by higher percentage as compare to the labours. Further, among labours, non-farm either low skilled or high skilled are expected to lose in the form of lower wages and small or medium farmer along with farm workers turn out to be winners. Similarly, there will be decline in wages of capital utilised in formal or informal sector and capital employed in agricultural sector would gain in terms of wages. Among small, medium and large land, each category is expected to have higher level of wages in response to the policy. 8 percent

uniform tariff imposed on individual sector one by one would cause increase in overall wages due to each sector except from pdr, wht and tex.

Real factors' wages increased by 7.96 percent and 12.66 percent respectively under 10 percent and 15 percent uniform tariff measure as shown in appendix C (see Table (C.14) and (C.15)). Among factors, losers and winners remained same as in the case of 8 percent uniform tariff measure and only differ in magnitude. However, if we apply 10 percent uniform tariff on each sector individually then only tex sector would cause decline in wages. Furthermore, wages would raise due to each sector in the case if 15 percent uniform tariff is applied on every sector one by one.

5.2.5 Change in Household Real Income

Appendix C (see Table (C.16) reflects the impact of imposing 8 percent uniform tariff on households' real income. It can be shown from the results that the said policy accounted for 6.81 percent loss in households' income. Amongst each household, rural medium farmer (quantile 1), rural medium farmer (quantile 234) and rural landless farmer (quantile 1) gain a marginal increase (because they own larger proportion of agricultural capital and land as shown in Table A.3 in appendix A and wages of these factors increase at 8% uniform tariff) in their income by 0.24 percent, 0.03 percent and 0.03 percent, correspondingly. Furthermore, rural farm workers face relatively most adverse effect of the policy followed by rural non-farm workers and urban population belongs to all four quantiles. overall, 8 percent uniform tariff on Pakistan agriculture sector results in lowering income of both urban and rural population but rural household losses by a greater extend as compare to that of urban households.

Sectors like osd, v_f, gro and livestock cause household income to increase when we apply 8 percent uniform tariff on these sectors respectively. While other sectors affect income adversely except sectors that showed no impact at all such as c_b, fsh and frs.

Rural small farmer (quantile 1) and rural landless farmer (quantile 234) along with rural medium farmer (quantile 1), rural medium farmer (quantile 234) and rural landless farmer (quantile 1) gain income as a result of 10 percent uniform tariff (see appendix C, Table (C.17)). However, there is decline in overall household income by 5.53 percent. Once again, the labour class belong to rural families face greatest loss followed by urban population and overall, both urban and rural families lost some percentage of their income but household belong to urban area loss a bit more as compare to its rural counterpart.

Moreover, the policy imposed on pfd, lea, ofd and tex sectors is the main cause of loss in households' income. While pdr, c_b and fsh sectors have no impact and all other sectors contributed a little in raising income.

15 percent uniform tariff policy indicates encouraging results as shown in appendix C (see Table (C.18). Overall real income of households increases by 4.21 percent. Main beneficiaries are rural farmers with their own land and rural land less farmers. Their income increases by a percentage ranging from 0.81 percent to 1.75 percent. However, still rural farm or non-farm workers loss their income along with urban households but relatively the magnitude of loss has been reduced slightly and overall, rural population gains positive real income and urban families remain on losing side.

Policy measure on individual sectors shows mixed results. Policy on sectors like pfd, lea and ofd still cause real income to decline but relatively by a lower magnitude. All

other sectors contributed positively ranging from 0.06 percent to 5.04 percent except c_b and fsh having no impact at all.

5.2.6 Change in Income Inequality

Gini and hoover index indicated decline in inequality in case of each experiment of uniform tariff. Gini coefficient indicated 0.34 percent decline in inequality if we impose 8 percent uniform tariff across agriculture sector of Pakistan. Similarly, 10 percent and 15 percent uniform tariff results in 0.37 percent and 0.39 percent decline in income inequality among households of Pakistan, (see Table 5.12)

Table 5.12: Change in Income Inequality

Simulations	Gini	HI
Base Level	0.482131	0.379002
8% uniform tariff	0.480483 -0.34 %	0.376784 -0.59%
10% uniform tariff	0.480365 -0.37%	0.376569 -0.64
15% Uniform Tariff	0.480246 -0.39	0.376353 -0.7%

Author's own calculations

Hoover index shows similar results and indicated highest decline in inequality among considered experiment in case of imposition of 15 percent uniform tariff on agricultural imports.

5.2.7 Decomposition of Total Welfare

Table (5.13) shows the results of decomposition of total welfare estimated through equivalent variation. Public welfare declines by $92.63 million as compare to loss of $47.32 million as a result of imposing 8 percent and 10 percent uniform tariff on

agricultural sector respectively. From all of these three scenarios, public welfare is expected to increase by $32.57 million by applying 15 percent uniform tariff rate.

Table 5.13: Decomposition of Estimated Equivalent Variations (US$ millions)

Simulations	AE effect	ToT effect	I-S effect	CS effect	Total
Uniform Tariff at 8 percent	25.96	-57.36	-71.65	10.41	**-92.63**
Uniform Tariff at 10 percent	9.90	-5.72	-60.74	7.44	**-47.32**
Uniform Tariff at 15 percent	-47.71	117.80	-38.59	1.07	**32.57**

Author's own simulations based upon GTAP Data Base version 9.2.

Results shows gain in welfare by $25.96 million and $9.90 million due to improvement in allocative efficiency caused by employing 8 percent and 10 percent uniform tariff respectively. However, these policies affect total welfare adversely due to deterioration in terms of trade and decline in return on investment, though capital earnings increased by $10.41 million and $7.44 million. Terms of trade worsen by $57.36 million and $5.72 million and there will be loss in investment earnings that accounted for $71.65 million and $60.74 million respectively. Finally, the adverse effects of these policies outweigh the gains and decline in investment earnings dominate all other effects.

Pakistan is expected to gain in terms of total welfare by imposing 15 percent uniform tariff on agriculture sector. The gain is mainly due to improved terms of trade amount for $117.80 million rise in total welfare. Welfare declines due to decline in return on investment and allocative efficiency by $38.59 million and $47.71 million respectively but the loss in welfare is dominated by gain caused by improved terms of trade.

5.2.8 Conclusions

We can conclude that by uniform tariff rationalisation we cannot achieve any objective of food policy except self-sufficiency. Exports and income inequality is likely to reduce

in any case and we can improve terms of trade, total welfare, household income by employing 15 percent uniform tariff on each agricultural sector.

5.3 Potential Trade Negotiations

This section employed GTAP DATABASE version 9.2 to identify sector-wise export potential among top ten importing markets of a sector. The top competitors of a sector in a same market was compared on the bases of tariff imposed by importing country. If tariff rate turns out to be higher for Pakistan as compared to any competitor then it is purpose to negotiate at least minimal tariff rate applied on any country[3] by importing nation. Further, if there is a free trade agreement among Pakistan and importing country then tariff rate equivalent to zero has been purposed. Based upon such criteria the purposed sector-wise trade deals and simulated results are as follow:

Pakistan is quite self-sufficient in the production of cereals. With few exceptions over the last few years, Pakistan remains net exporter of the cereal crop specially rice. However, on the bases of above mentioned criteria, wheat and rice do not exhibit export potential in any market as homogeneous tariff rate were imposed on Pakistan's wheat and rice export as well as on competitors' product by each importing markets. In a similar fashion, we do not recognize export potential for cotton, livestock, fish, sugar cane and sugar beet (c_b) and forestry (frs) as well. For rest of the nine sectors, potential deals can be listed as:

[3] Only those countries are consider that have greater export volume than Pakistan's export of same product to any importing market and then tariff rate applied by the importer are compared.

5.3.1 Maize (gro)

We recognize export potential for maize sector in three markets like China, Indonesia and Vietnam**.** The actual applied tariff on Pakistan maize sector by these countries are 0.2 percent by china, 5 percent by Indonesia and 10.5 percent by Vietnam. The purposed tariff rates negotiations are as follow:

I. 0 percent Tariff rate applied by China on Pakistan's maize sector.

II. 4 percent Tariff rate applied by Indonesia on Pakistan's maize sector.

III. 6 percent Tariff rate applied by Vietnam on Pakistan's maize sector.

The difference in purposed tariff and actual tariff is quite marginal. Therefore, the impact of such deals turns out to be very small. Table (5.14) presents the change in macroeconomic indicators such as Government Income, real GDP, volume of exports, volume of imports and terms of trade. Results reveals no significant changes in any macroeconomic variable.

Table 5.14: Change in Macroeconomic Indicators (in percentage)

Indicators	PAK-CHINA		PAK-INDONESIA		PAK-VIETNAM	
	Pak	China	Pak	Indo	Pak	Viet
Govt. Income	0	0	0	0	0	0
Real GDP	0	0	0	0	0	0
Export Volume	0	0	0	0	0	0
Import Volume	0	0	0	0	0	0
Terms of Trade	0	0	0	0	0	0

Author's own simulation based upon GTAP DATABASE 9.2.

Though Pakistan and China shared a border and if China impose zero percent tariff rate on Pakistan's maize sector. Even then there would be a marginal increase in aggregate exports of Pakistan by 1.003 percent. The increase in export is likely to be solely contributed by maize sector with no significant changes in aggregate export of any other sector. However, maize sector of Pakistan would enjoy a raise by 9.55 percent of exports and that of Vietnam by 0.03 percent if Pakistan negotiate 6 percent tariff rate by Vietnam on its maize sector. Said deal is likely to reduce export by rest of the

selected sectors of Pakistan by a negligible percentage but overall, exports of Pakistan and Vietnam increase by 9.33 percent and 0.04 percent respectively.

Negotiation with Indonesia results in increase of aggregate maize export of Pakistan and Indonesia by 5.91 percent and 0.01 percent respectively. With marginal decline of export of other sectors of Pakistan and no change in export of Indonesia, overall, raise in aggregate export of both nations would be amount for 5.84 percent and 0.01 percent respectively as shown in Table (5.15).

Table 5.15: Change in Aggregate Export (in percentage)

	PAK-CHINA		**PAK-INDONESIA**		**PAK-VIETNAM**	
Sectors	**Pak**	**China**	**Pak**	**Indo**	**Pak**	**Viet**
Pdr	0	0	-0.01	0	-0.03	0
Wht	0	0	-0.01	0	-0.04	0.01
Osd	0	0	-0.01	0	-0.02	0
Pfb	0	0	-0.01	0	-0.02	0
v_f	0	0	0	0	-0.01	0
c_b	0	0	-0.01	0	-0.03	0
Lea	0	0	0	0	-0.01	0
Gro	**1.003**	**0**	**5.91**	**0.01**	**9.55**	**0.03**
Ofd	0	0	0	0	0	0
Tex	0	0	0	0	-0.01	0
Lstk	0	0	-0.01	0	-0.02	0
Fsh	0	0	0	0	0	0
Frs	0	0	-0.01	0	-0.03	0
Total	**1.003**	**0**	**5.84**	**0.01**	**9.33**	**0.04**

Author's own simulation based upon GTAP DATABASE 9.2.

Table (5.16) reveals change in aggregate imports due to negotiation by Pakistan with China, Indonesia and Vietnam. Pak-China trade deal does not affect aggregate import of any sector for both countries but Pakistan's deal with Indonesia and Vietnam results in raising overall imports of Pakistan by 0.04 percent and 0.14 percent correspondingly. Among Pakistan's sectors, maize imports increase by merely 0.02 percent and wheat and rice sector also witness marginal increase by 0.01 percent. On the other hand Indonesia and Vietnam witness greater raise in import as compare to Pakistan but the raise in aggregate import is solely contributed by maize sector of both countries. Maize

sector's import of Indonesia increases by 1.02 percent and that of Vietnam experiences 5.04 percent increase.

Table 5.16: Change in Aggregate Import (in percentage)

	PAK-CHINA		PAK-INDONESIA		PAK-VIETNAM	
Sectors	**Pak**	**China**	**Pak**	**Indo**	**Pak**	**Viet**
Pdr	0	0	0.01	0	0.01	0
Wht	0	0	0.01	0	0.02	0
Osd	0	0	0	0	0.01	0
Pfb	0	0	0	0	0	0
v_f	0	0	0	0	0.01	0
c_b	0	0	0	0	0.01	0
Lea	0	0	0	0	0.01	0
Gro	**0**	**0**	**0.02**	**1.02**	**0.05**	**5.04**
Ofd	0	0	0	0	0	0
Tex	0	0	0	0	0	0
Lstk	0	0	0	0	0.01	0
Fsh	0	0	0	0	0	0
Frs	0	0	0	0	0.01	0
Total	**0**	**0**	**0.04**	**1.02**	**0.14**	**5.04**

Author's own simulation based upon GTAP DATABASE 9.2.

Output of maize sector of Pakistan observe 0.01 percent, 2.12 percent and 5.33 percent increase in response of striking deals with China, Indonesia and Vietnam accordingly. On the other hand Vietnam is likely to loss maize production by 0.04 percent. Further, neither China nor Indonesia experience any change in maize production as shown in Table (5.17). Similarly, none of the other sector face any change in their production for any country expect for Pak-Vietnam trade deal, where output of Pakistan's output contract by 0.01 percent.

Table (5.18) shows that domestic prices of maize raise by 0.2 percent and 0.05 percent in Pakistan in response of Pak-Indonesia and Pak-Vietnam trade negotiations. Prices decline by 0.1 percent in Vietnam and there is no price changes in china nor in Indonesia. Pakistan sectors like sugarcane and forestry also witness increase in domestic price by 0.01 percent each in case of Pak-Vietnam trade deal.

Table 5.17: Change in Total Output (in percentage)

Sectors	PAK-CHINA		PAK-INDONESIA		PAK-VIETNAM	
	Pak	**China**	**Pak**	**Indo**	**Pak**	**viet**
Pdr	0	0	0	0	0	0
Wht	0	0	0	0	0	0
Osd	0	0	0	0	0	0
Pfb	0	0	0	0	-0.01	0
v_f	0	0	0	0	0	0
c_b	0	0	0	0	0	0
Lea	0	0	0	0	0	0
Gro	**0.01**	**0**	**2.12**	**0**	**5.33**	**-0.04**
Ofd	0	0	0	0	0	0
Tex	0	0	0	0	0	0
Lstk	0	0	0	0	0	0
Fsh	0	0	0	0	0	0
Frs	0	0	0	0	0	0
Total	**0.01**	**0**	**2.12**	**0**	**5.32**	**-0.04**

Author's own simulation based upon GTAP DATABASE 9.2.

Table 5.18: Change in Domestic Price (in percentage)

Sectors	PAK-CHINA		PAK-INDONESIA		PAK-VIETNAM	
	Pak	**China**	**Pak**	**Indo**	**Pak**	**Viet**
Pdr	0	0	0	0	0	0
Wht	0	0	0	0	0	0
Osd	0	0	0	0	0	0
Pfb	0	0	0	0	0	0
v_f	0	0	0	0	0	0
c_b	0	0	0	0	0.01	0
Lea	0	0	0	0	0	0
Gro	**0**	**0**	**0.2**	**0**	**0.05**	**-0.1**
Ofd	0	0	0	0	0	0
Tex	0	0	0	0	0	0
Lstk	0	0	0	0	0	0
Fsh	0	0	0	0	0	0
Frs	0	0	0	0	0.01	0
Total	**0**	**0**	**0.2**	**0**	**0.07**	**-0.1**

Author's own simulation based upon GTAP DATABASE 9.2.

Table (5.19) and (5.20) represent percentage change in real factor's wage and household real income. Results reveal no significant changes in wages nor in household's real income in response to any trade deal except to the negotiation between Pakistan and Vietnam.

Factor like labour in the form of small and medium farmer in Pakistan gain a marginal raise in wages by 0.01 percent along with 0.01 percent raise in land and agricultural capital earnings. Moreover, real factors' wage in Vietnam remain unchanged.

Table 5.19: Change in Real Factor Wage (in percentage)

Real Factors	PAK-CHINA		PAK-INDONESIA		PAK-VIETNAM	
	Pak	China	Pak	Indo	Pak	Viet
Labour-small farmer	0	0	0	0	0.01	0
Labour-medium farmer	0	0	0	0	0.01	0
Labour-farm worker	0	0	0	0	0	0
Labour- non-farm low skilled	0	0	0	0	0	0
Labour- non-farm high skilled	0	0	0	0	**0**	0
Land – small	0	0	0	0	0.01	0
Land – medium	0	0	0	0	0.01	0
Land – large	0	0	0	0	0.01	0
Livestock	0	0	0	0	0	0
Capital – agriculture	0	0	0	0	0.01	0
Capital – formal	0	0	0	0	0	0
Capital – informal	0	0	0	0	0	0
Total	**0**	**0**	**0**	**0**	**0.06**	**0**

Author's own simulation based upon GTAP DATABASE 9.2.

Table 5.20: Change in Household Real Income (in percentage)

Household Types	PAK-CHINA		PAK-INDONESIA		PAK-VIETNAM	
	Pak	China	Pak	Indo	Pak	Viet
Rural small farmer (Quantile 1)	0	0	0	0	0.01	0
Rural Small farmer (Quantile 234)	0	0	0	0	0.01	0
Rural medium farmer (Quantile 1)	0	0	0	0	0.02	0
Rural medium farmer (Quantile 234)	0	0	0	0	0.02	0
Rural landless farmer (Quantile 1)	0	0	0	0	0.01	0
Rural landless farmer (Quantile 234)	0	0	0	0	0.01	0
Rural farm worker (Quantile 1)	0	0	0	0	0	0
Rural farm worker (Quantile 234)	0	0	0	0	0	0
Rural non-farm worker (Quantile 1)	0	0	0	0	0	0
Rural non- farm worker (Quantile 2)	0	0	0	0	0	0
Rural non- farm worker (Quantile 3)	0	0	0	0	0	0
Rural non- farm worker (Quantile 4)	0	0	0	0	0	0
Urban (Quantile 1)	0	0	0	0	0	0
Urban (Quantile 2)	0	0	0	0	0	0
Urban (Quantile 3)	0	0	0	0	0	0
Urban (Quantile 4)	0	0	0	0	0	0
Total	**0**	**0**	**0**	**0**	**0.08**	**0**

Author's own simulation based upon GTAP DATABASE 9.2.

Among various households, farmers in Pakistan enjoy raise in real income but small and landless farmers only gain 0.01 percent higher income as compare to 0.02 percent raise in real income of medium farmers. Overall, there will be 0.08 percent increase in Pakistan's households. Household belongs to Vietnam is unlikely to gain or lose real income. And as mentioned above there will be no significant impact on real income of any country in case of negotiation by Pakistan with China and Indonesia.

Finally, among these three trade deal based upon maize sector, Pakistan's deal with Vietnam turns out to be most beneficial in terms of public welfare. Such deal will result in raise in public welfare of Pakistan accounted for 35.42 million US dollars and US$15.35 million for Vietnam's public welfare. Further, Pakistan would gain mainly due to improvement in TOT and Vietnam would gain due to improvement in allocative efficiency. Investment earnings in Pakistan as well as in Vietnam increase and allocative efficiency along with TOT of both countries are expected to improve simultaneously as shown in Table (5.21).

Table 5.21: Change in Welfare Decomposition (US$ million)

	PAK-CHINA		**PAK-INDONESIA**		**PAK-VIETNAM**	
Effects	**Pak**	**China**	**Pak**	**Indo**	**Pak**	**Viet**
AE effect	0.00	0.00	0.02	0.03	8.06	10.21
TOT effect	0.00	0.00	0.12	-0.03	19.34	4.13
I-S effect	0.00	0.00	0.01	0.00	6.04	1.02
CS effect	0.00	0.00	0.00	0.01	-0.01	-0.01
Total	**0.00**	**0.00**	**0.15**	**0.01**	**35.42**	**15.35**

Author's own simulation based upon GTAP DATABASE 9.2.

Pakistan deal with Indonesia also raise public welfare of both countries but only amount for $0.15 million in case of Pakistan and $0.01 million for Indonesia and on the other hand, deal among China and Pakistan exhibits negligible variation in public welfare of any country.

5.3.2 Vegetables and fruits (v_f)

Vegetables and fruit sector has an export potential in four markets such as European Union, Iran, UAE and Srilanka. EU25 has imposed 1.06 percent tariff on Pakistan v_f sector and tariff rate equivalent to 27.6 percent, 0.4 percent and 47.6 percent has been imposed by Iran, UAE and Srilanka respectively. The purposed tariff rates and simulations for trade negotiations are as follow:

I. 0.15 percent Tariff rate applied by EU25 on Pakistan's v_f sector.

II. 8 percent Tariff rate applied by Iran on Pakistan's v_f sector.

III. 0 percent Tariff rate applied by UAE on Pakistan's v_f sector.

IV. 0 percent Tariff rate applied by Srilanka on Pakistan's v_f sector.

All of the four experiments listed above are then simulated to capture the economy wide impact. Macroeconomic variables show no variation in the case of Pak-EU25 and Pak-UAE negotiations as shown in Table (5.22). Pakistan's trade deal with Iran result in contraction of government income of both countries, however, Iran lose 0.02 percent of government income as compare to 0.01 percent lose by Pakistan. Export and import volume of Iran increases by 0.01 percent with no change in term of trade. On the other hand, Pakistan's export volume remains unchanged and though import volume witness an increase of 0.01 percent, term of trade improves slightly by 0.01 percent.

Table 5.22: Change in Macroeconomic Indicators (in percentage)

	PAK-EU25		**PAK-IRAN**		**PAK-UAE**		**PAK-SRILANKA**	
Indicators	**Pak**	**EU**	**Pak**	**Iran**	**Pak**	**UAE**	**Pak**	**Sri Lanka**
Govt. Income	0	0	-0.01	-0.02	0	0	-0.02	-0.06
Real GDP	0	0	0	0	0	0	0	0.03
Export Volume	0	0	0	0.01	0	0	0	0.14
Import Volume	0	0	0.01	0.01	0	0	0.02	0.08
Terms of Trade	0	0	0.01	0	0	0	0.02	-0.03

Author's own simulation based upon GTAP DATABASE 9.2.

As a result of Pak-Srilanka experiment, government income of Pakistan decline by 0.02 percent as compare to the decline of 0.06 percent in income of Srilanka. With unchanged real GDP and export volume, Pakistan observe boost in import volume by 0.02 percent but manage to improve term of trade by 0.02 percent. Srilanka enjoy expansion in real GDP by 0.03 percent, export and import volume by 0.14 percent and 0.08 percent respectively but face deterioration of term of trade by 0.03 percent.

Pakistan aggregate exports increase as a result of each negotiation. Highest benefit comes from Pak-Srilanka's agreement that account for 10.55 percent and 8.19 percent raise in aggregate exports of Pakistan and Srilanka respectively. VegeTable and fruit sector gains 15.03 percent more exports for Pakistan and 5.37 percent for that of Srilanka. Among rest of the sectors, export of wheat, cotton and fish by Srilanka decline but all of the other sector experience a significant boost in their respective exports. In case of Pakistan however, all of the other sector except v_f are likely to face decline in their exports, (See Table 5.23).

Table 5.23: Change in Aggregate Export (in percentage)

	PAK-EU25		**PAK-IRAN**		**PAK-UAE**		**PAK-SRILANKA**	
Sectors	**Pak**	**EU**	**Pak**	**Iran**	**Pak**	**UAE**	**Pak**	**Sri Lanka**
Pdr	-0.05	0.01	-0.42	0.24	-0.01	0	-0.7	1.89
Wht	-0.06	0	-0.51	0.16	-0.01	0	-0.84	-0.15
Osd	-0.03	0	-0.28	0.07	0	0	-0.47	0.8
Pfb	-0.03	0	-0.23	0.05	**0**	0	-0.39	-0.07
v_f	**1.37**	**0**	**10.04**	**0.07**	**1.05**	**0**	**15.03**	**5.37**
c_b	-0.05	0	-0.42	0.06	-0.01	0	-0.7	0.82
Lea	-0.02	0	-0.19	0.04	0	0	-0.32	0.08
Gro	-0.01	0	-0.11	0.04	0	0	-0.18	0.37
Ofd	-0.01	0	-0.06	0.03	**0**	0	-0.1	0.19
Tex	-0.01	0	-0.09	0.03	0	0	-0.15	0.07
livestock	-0.03	0	-0.24	0.09	0	0	-0.39	0.77
Fsh	0	0	-0.03	0	0	0	-0.05	-0.01
Frs	-0.01	0	-0.12	0.03	0	0	-0.19	0.06
Total	**1.06**	**0.01**	**7.34**	**0.91**	**1.02**	**0**	**10.55**	**8.19**

Author's own simulation based upon GTAP DATABASE 9.2.

Similarly, Pakistan and Iran get benefit of higher aggregate export resulting from the understanding between Pak-Iran. All of the sector belongs to Pakistan except V_f lose their exports to some extent but the loss is covered by 10.04 percent raise in v_f sector's exports. The benefit outweigh the loss and Pakistan experience 7.34 percent increase in aggregate exports in total. On the other hand, aggregate export of Iran also increases slightly by 0.91 percent with almost each of the sectors contributing positively. Remaining two trade deals show similar patterns except for much lower in magnitude.

Table (5.24) presents the change in aggregate import in response to the above mentioned experiments. It can be shown that import of v_f along with aggregate imports of Pakistan increase in each scenario. Agreements like Pak-Iran and Pak-Srilanka are likely to lift aggregate imports of each sector of Pakistan upward. In both scenarios, partner countries of Pakistan experience relatively higher boost in imports. For Iran v_f import raises but total import of rest of the sectors decline or remain unchanged. Six sectors belong to Srilanka exhibit downward shift while seven sectors including vegetable and fruit sector show positive shift in their imports.

Table 5.24: Change in Aggregate Import (in percentage)

	PAK-EU25		**PAK-IRAN**		**PAK-UAE**		**PAK-SRILANKA**	
Sectors	**Pak**	**EU**	**Pak**	**Iran**	**Pak**	**UAE**	**Pak**	**Sri Lanka**
Pdr	0.02	0	0.2	-0.09	0	0	0.33	-1.99
Wht	0.04	0	0.3	-0.05	0.01	0	0.51	0.08
Osd	0.01	0	0.09	-0.01	0	0	0.14	-0.7
Pfb	0	0	0.04	-0.01	0	0	0.07	0.05
v_f	**0.03**	**0**	**0.21**	**8.44**	**0**	**1.01**	**0.36**	**8.31**
c_b	0.01	0	0.09	-0.03	0	0	0.14	-0.63
Lea	0.01	0	0.09	-0.01	0	0	0.15	0.02
Gro	0.01	0	0.05	-0.01	0	0	0.09	-0.42
Ofd	0.01	0	0.04	-0.01	0	0	0.07	-0.31
Tex	0	0	0.03	-0.01	0	0	0.05	0.13
Livestock	0.01	0	0.09	-0.03	0	0	0.15	-0.4
Fsh	0	0	0.02	0	0	0	0.03	0.02
Frs	0.01	0	0.05	0	0	0	0.08	0.03
Total	**0.16**	**0**	**1.3**	**8.18**	**0.01**	**1.01**	**2.17**	**4.19**

Author's own simulation based upon GTAP DATABASE 9.2.

Pak-UAE potential trade agreement does not exert any influence on sectoral imports of both partners with one exception for each nation. Pakistan wheat import raise by minute percentage of 0.01 and UAE only notice increase in v_f imports. Similarly, with unchanged aggregate imports of EU25, Pakistan's import of each sector raises by a range of 0 to 0.04 percent.

Pakistan v_f production increases considerably in all cases. While production of other sectors remain unaltered or decrease by a slight amount. Total agricultural production of EU25 and UAE do not significantly vary in case of agreement with Pakistan. Iran and Srilanka can raise their output by 0.74 percent and 0.12 percent respectively in case they have an agreement with Pakistan related to v_f sector. However, both countries lose some part of their v_f production but the loss is likely to cover by increase in output of the rest of sectors as shown in Table (5.25).

Table 5.25: Change in Output (in percentage)

	PAK-EU25		**PAK-IRAN**		**PAK-UAE**		**PAK-SRILANKA**	
Sectors	**Pak**	**EU**	**Pak**	**Iran**	**Pak**	**UAE**	**Pak**	**Sri Lanka**
Pdr	0	0	-0.02	0.1	0	0	-0.03	0.05
Wht	-0.01	0	-0.06	0.1	0	0	-0.1	0.06
Osd	0	0	-0.01	0.1	0	0	-0.02	0.17
Pfb	-0.01	0	-0.08	0.1	0	0	-0.14	-0.07
v_f	**1.04**	**0**	**4.35**	**-0.09**	**0.97**	**0**	**4.58**	**-0.54**
c_b	0	0	0	0.01	0	0	0	0.16
Lea	0	0	-0.01	0.2	0	0	-0.01	0.03
Gro	0	0	-0.01	0.01	0	0	-0.02	0.04
Ofd	0	0	0	0	0	0	0	0.07
Tex	-0.01	0	-0.06	0.1	0	0	-0.1	0.05
Livestock	0	0	-0.01	0.1	0	0	-0.02	0.05
Fsh	0	0	0	0	0	0	0	0.01
Frs	0	0	0	0.01	0	0	-0.01	0.04
Total	**1.01**	**0**	**4.09**	**0.74**	**0.97**	**0**	**4.13**	**0.12**

Author's own simulation based upon GTAP DATABASE 9.2.

Domestic consumer of Pakistan agricultural products might be affected inversely by the trade agreements as there price hikes cause consumer surplus to decline. Consumers are likely to affect most by agreement like Pak-Srilanka followed by Pak-Iran. However,

Iran and Srilanka notice a substantial decline in domestic prices of agricultural sector. Domestic price of agricultural consumables remain same in EU25 after the agreement with Pakistan and same pattern is observed by both partner in case of trade deal among Pakistan and UAE as shown in Table (5.26).

Table 5.26: Change in Domestic Price (in percentage)

	PAK-EU25		PAK-IRAN		PAK-UAE		PAK-SRILANKA	
Sectors	**Pak**	**EU**	**Pak**	**Iran**	**Pak**	**UAE**	**Pak**	**Sri Lanka**
Pdr	0.01	0	0.05	-0.02	0	0	0.09	-0.2
Wht	0.01	0	0.07	-0.02	0	0	0.12	0.02
Osd	0.01	0	0.06	-0.02	0	0	0.11	-0.15
Pfb	0.01	0	0.05	-0.01	0	0	0.08	0.02
v_f	**0.02**	**0**	**0.15**	**-1.2**	**0**	**0**	**0.24**	**-0.4**
c_b	0.01	0	0.08	-0.01	0	0	0.13	-0.15
Lea	0	0	0.02	0	0	0	0.04	-0.01
Gro	0.01	0	0.04	-0.01	0	0	0.07	-0.14
Ofd	0	0	0.02	-0.01	0	0	0.03	-0.05
Tex	0	0	0.01	0	0	0	0.02	-0.01
Livestock	0	0	0.03	-0.01	0	0	0.06	-0.11
Fsh	0	0	0.01	0	0	0	0.02	0
Frs	0	0	0.03	-0.01	0	0	0.04	-0.01
Total	**0.08**	**0**	**0.62**	**-1.32**	**0**	**0**	**1.05**	**-1.19**

Author's own simulation based upon GTAP DATABASE 9.2.

Table (5.27) suggests that overall wage of real factor of production in Pakistan shift upward by small proportion after an agreement with EU25, Iran and Srilanka but wages in Pakistan's respective trade partner decline in each case. There is no change in wages in Pakistan and wages in UAE decline by 0.03 percent as a result of trade deal between UAE and Pakistan.

In Pakistan real factors like land, livestock, agricultural capital and labour owning their own farms get benefited from trade agreement with any of the four nations. While all other factors earn lower wages or same wages as before.

Table 5.27: Change in Real Factor Wage (in percentage)

Real Factors	PAK-EU25		PAK-IRAN		PAK-UAE		PAK-SRILANKA	
	Pak	EU	Pak	Iran	Pak	UAE	Pak	Sri
Labour-small farmer	0.01	0	0.11	-0.01	0	0	0.18	0.06
Labour-medium farmer	0.01	0	0.03	-0.01	0	0	0.05	0.06
Labour-farm worker	0.01	0	0.1	-0.01	0	0	0.17	0.06
Labour- non-farm low skilled	0	0	-0.02	-0.01	0	0	-0.03	0.06
Labour- non-farm high skilled	**0**	0	-0.02	0	0	0	-0.03	0.09
Land – small	0.03	0	0.24	-0.09	0	-0.01	0.4	-0.5
Land – medium	0.01	0	0.09	-0.09	0	-0.01	0.16	-0.5
Land – large	0.01	0	0.04	-0.09	0	-0.01	0.06	-0.5
Livestock	0.01	0	0.01	0.01	0	0	0.02	0.1
Capital – agriculture	0.01	0	0.02	0.01	0	0	0.03	0.1
Capital – formal	0	0	-0.01	0.01	0	0	-0.02	0.1
Capital – informal	0	0	-0.01	0.01	0	0	-0.02	0.1
Total	**0.1**	**0**	**0.54**	**-0.27**	**0**	**-0.03**	**0.91**	**-0.77**

Author's own simulation based upon GTAP DATABASE 9.2.

Furthermore, Farmers with their own farms and landless farmers along with farm workers in Pakistan enjoy more real income if Pakistan came into an agreement with EU25, Iran and Srilanka accordingly, while there is no change in real income of households belongs to EU25 or Iran. Pak-UAE deal brings no variation in real income for both nation and beneficiaries among Pakistan households get highest benefit from Pak-Srilanka trade agreement leaving families belong to Srilanka at the losing end as shown in Table (5.28).

Table 5.28: Change in Household Real Income (in percentage)

Household Types	PAK-EU25		PAK-IRAN		PAK-UAE		PAK-SRILANKA	
	Pak	EU	Pak	Iran	Pak	UAE	Pak	Sri
Rural small farmer (Quantile 1)	0.01	0	0.09	0	0	0	0.16	-0.06
Rural Small farmer (Quantile 234)	0.01	0	0.09	0	0	0	0.15	-0.06
Rural medium farmer (Quantile 1)	0.01	0	0.06	0	0	0	0.1	-0.06
Rural medium farmer (Quantile 234)	0.01	0	**0.05**	0	0	0	0.08	-0.06
Rural landless farmer (Quantile 1)	0.01	0	0.11	0	0	0	0.18	-0.06
Rural landless farmer (Quantile 234)	0.01	0	0.07	0	0	0	0.12	-0.06
Rural farm worker (Quantile 1)	0.01	0	0.04	0	0	0	0.07	-0.06
Rural farm worker (Quantile 234)	0.01	0	0.04	0	0	0	0.07	-0.06
Rural non-farm worker (Quantile 1)	0	0	0	0	0	0	0	-0.06
Rural non- farm worker (Quantile 2)	0	0	0	0	0	0	0	-0.06
Rural non- farm worker (Quantile 3)	0	0	0	0	0	0	0	-0.06
Rural non- farm worker (Quantile 4)	0	0	**0**	0	0	0	**0**	-0.06
Urban (Quantile 1)	**0**	0	0	0	0	0	0	-0.06
Urban (Quantile 2)	0	0	0	0	0	0	0	-0.06
Urban (Quantile 3)	0	0	0	0	0	0	0	-0.06
Urban (Quantile 4)	0	0	0	0	0	0	0	-0.06
Total	**0.08**	**0**	**0.55**	**0**	**0**	**0**	**0.93**	**-0.96**

Author's own simulation based upon GTAP DATABASE 9.2.

Pakistan negotiation based on recognized export potential of v_f sector with EU25, Iran, UAE and Srilanka bring welfare gains for both trading partner except for UAE. Decomposition of total welfare reveals that improved term of trade is a main contributor in Pakistan's welfare gain and trading partners of Pakistan such as EU25, Iran and Srilanka's welfare gains are mainly due to improvement of efficiency in resource allocation as shown in Table (5.29).

Table 5.29: Change in Public Welfare (US$ million)

Effects	PAK-EU25		PAK-IRAN		PAK-UAE		PAK-SRILANKA	
	Pak	EU	Pak	Iran	Pak	UAE	Pak	Srilanka
AE effect	-0.01	0.40	-0.07	4.12	0.00	0.00	-0.16	15.44
TOT effect	0.49	-0.29	4.09	-2.32	0.07	-0.01	6.76	-5.81
I-S effect	0.00	-0.01	0.01	5.21	0.00	-0.01	0.00	-1.10
CS effect	0.00	0.02	-0.03	0.27	0.00	0.00	-0.04	0.34
Total	**0.48**	**0.13**	**4.00**	**5.28**	**0.07**	**-0.03**	**6.56**	**10.88**

Author's own simulation based upon GTAP DATABASE 9.2.

Among these four agreements, Srilanka is the greatest winner of welfare gain that account for $10.88 million and highest possible gain of $6.56 million by Pakistan from same deal among Pakistan and Srilanka make Pak-Srilanka trade agreement best among other three deals.

Iran also get welfare gain amount for $5.28 million greater than welfare gain of $4 million by Pakistan in case of Pak-Iran simulated experiment. Pak-EU25 also bring welfare gain of $0.48 million and $0.13 million for Pakistan and EU25 respectively but Pak-UAE is expected to be a undesirable agreement from UAE point of view due to decline in UAE's public welfare by $0.03 million.

5.3.3 Oil Seeds (osd)

Oil seed is one of the largest agricultural product imported by Pakistan and Pakistan also export a considerable quantity. However, we only noticed its export potential in two markets such as Thailand and Turkey. Applied Tariff rate on Pakistan osd sector by Thailand is 24 percent and 17 percent has been imposed by Turkey. Suggested tariff rate for negotiation are as follow:

I. 13 percent Tariff rate applied by Thailand on Pakistan's osd sector.

II. 4 percent Tariff rate applied by Turkey on Pakistan's osd sector.

Table (5.30) provides percentage change in macroeconomic indicators caused by above mentioned experiments. In both experiments there is no significant shift in any indicator for any country.

Table 5.30: Change in Macroeconomic Indicators (in percentage)

Indicators	PAK-THAILAND		PAK-TURKEY	
	Pak	Thailand	Pak	Turkey
Govt. Income	0	0	0	0
Real GDP	0	0	0	0
Export Volume	0	0	0	0
Import Volume	0	0	0	0
Terms of Trade	0	0	0	0

Author's own simulation based upon GTAP DATABASE 9.2.

Though macroeconomic variables do not show any variation but aggregate export of both partners increase in both simulations. Gain in aggregate export of Pakistan amount for 4.86 percent in case of agreement with Thailand and an impressive 16.08 percent in the case of Pak-Turkey simulation. Meanwhile, Thailand and Turkey experiences 0.01 percent increase in aggregate export as shown in Table (5.31).

Table 5.31: Change in Aggregate Export (in percentage)

Sectors	PAK-THAILAND		PAK-TURKEY	
	Pak	Thailand	Pak	Turkey
Pdr	-0.01	0	-0.05	0
Wht	-0.01	0	-0.07	0
Osd	**4.92**	**0.01**	**16.44**	**0.01**
Pfb	-0.01	0	-0.03	0
v_f	0	0	-0.02	0
c_b	-0.01	0	-0.06	0
Lea	0	0	-0.02	0
Gro	0	0	-0.01	0
Ofd	0	0	-0.01	0
Tex	0	0	-0.01	0
Livestock	-0.01	0	-0.03	0
Fsh	0	0	0	0
Frs	-0.01	0	-0.05	0
Total	**4.86**	**0.01**	**16.08**	**0.01**

Author's own simulation based upon GTAP DATABASE 9.2.

Pakistan agriculture sectors like wheat, paddy rice, cotton, sugarcane and sugar beets, livestock and forestry face decline in exports by 0.01 percent each but around 5 percent raise in export of oil seeds manage to cover the loss while Thailand only manage to boost 0.01 percent of its osd sector's exports in case of Pak-Thailand simulation. Similarly, In simulated results for Pak-Turkey scenario once again shows that sectors other than osd loose some portion of their exports but overall exports still increase by a huge margin due to 16.5 percent expansion in export of Pakistan's oil seeds and on the other hand Turkey enjoy a small raise of 0.01 percent in osd's export.

Aggregate imports of Pakistan also shift upward beside expansion in its exports. In the case of Pak-Thailand scenario, Pakistan's Imports increase slightly by 0.02 percent and also shift up by 0.16 percent in the case of Pak-Turkey simulated experiment. Partners of Pakistan in both cases however, face greater raise in their imports that amount for 2.01 percent for Thailand and 4.01 percent for Turkey as shown in Table (5.32).

Table 5.32: Change in Aggregate Import (in percentage)

Sectors	PAK-THAILAND		PAK-TURKEY	
	Pak	**Thailand**	**Pak**	**Turkey**
Pdr	0.01	0	0.03	0
Wht	0.01	0	0.04	0
Osd	**0**	**2.01**	**0.02**	**4.01**
Pfb	0	0	0.01	0
v_f	0	0	0.01	0
c_b	0	0	0.01	0
Lea	0	0	0.01	0
Gro	0	0	0	0
Ofd	0	0	0	0
Tex	0	0	0	0
livestock	0	0	0.01	0
Fsh	0	0	0	0
Frs	0	0	0.02	0
Total	**0.02**	**2.01**	**0.16**	**4.01**

Author's own simulation based upon GTAP DATABASE 9.2.

Pakistan manage to avoid any change in osd's imports along with all other sectors except for 0.01 percent increase in imports of wheat and rice while Thailand as a

Pakistan trade partner only witness an increase in osd imports by 2.01 percent. Similarly, Pak-Turkey partnership results in expansion of Pakistan sectoral imports of each sector including 0.02 percent raise in osd imports except for gro, ofd, tex and fsh. On the other hand, 4.01 percent increase in aggregate imports of Turkey is contributed by only osd sector.

Table (5.33) shows 4.03 percent growth in agriculture production of Pakistan and zero percent decline in Thailand's output due to purposed trade agreement of Pak-Thailand. On the other hand, understanding between Pakistan and Turkey stemmed output growth by 7.01 percent and -0.2 respectively.

Table 5.33: Change in Total Output (in percentage)

Sectors	PAK-THAILAND		PAK-TURKEY	
	Pak	**Thailand**	**Pak**	**Turkey**
Pdr	0	0	0	0
Wht	0	0	-0.01	0
Osd	**4.03**	**0**	**7.04**	**-0.2**
Pfb	0	0	-0.01	0
v_f	0	0	0	0
c_b	0	0	0	0
Lea	0	0	0	0
Gro	0	0	0	0
Ofd	0	0	0	0
Tex	0	0	-0.01	0
livestock	0	0	0	0
Fsh	0	0	0	0
Frs	0	0	0	0
Total	**4.03**	**0**	**7.01**	**-0.2**

Author's own simulation based upon GTAP DATABASE 9.2.

Moreover, Pakistan osd sector manage to increase the production by 4.03 percent and 7.04 percent against the deal with Thailand and Turkey singly. However, Pakistan sectors such as wheat, cotton and textile undergo decline in their production by 0.01 percent each in the case of Pak-Turkey agreement.

Domestic prices in the partner countries of Pakistan remain stagnant, while Pakistan witnesses 0.4 percent inflated price of Oil seeds with no change in other sectors in the case of agreement with Thailand.

Further, Table (5.34) reveals 0.02 percent hike in price of osd sector in Pakistan and 0.01 percent growth in prices of rice, wheat, cotton, vegetables and fruits and sugarcane and sugar beets along with products originate from forestry sector. Therefore, scenario of Pak-Turkey trade deal results in 0.08 percent growth in Pakistan agriculture sector's prices.

Table 5.34: Change in Domestic Price (in percentage)

Sectors	PAK-THAILAND		PAK-TURKEY	
	Pak	**Thailand**	**Pak**	**Turkey**
Pdr	0	0	0.01	0
Wht	0	0	0.01	0
Osd	**0.4**	**0**	**0.02**	**0**
Pfb	0	0	0.01	0
v_f	0	0	0.01	0
c_b	0	0	0.01	0
Lea	0	0	0	0
Gro	0	0	0	0
Ofd	0	0	0	0
Tex	0	0	0	0
Livestock	0	0	0	0
Fsh	0	0	0	0
Frs	0	0	0.01	0
Total	**0.4**	**0**	**0.08**	**0**

Author's own simulation based upon GTAP DATABASE 9.2.

As a result of increase in output and prices of osd sectors, wages of real factors used in production will increase. Production of osd involve land, labour and capital. Therefore, Table (5.35) shows raise in factors' wage utilised by agriculture production such as labour in the form of farmers, farm workers, land and agriculture capital. However, there is no change in wage in case of Pak-Thailand trade deal while only Pakistan witness 0.12 percent boost in wages in simulated results of Pak-Turkey. Further, among

factors, large land enjoy highest growth by 0.03 percent followed by 0.02 percent growth for small land, medium land and agriculture capital.

Table 5.35: Change in Real Factor Wage (in percentage)

Real Factors	PAK-THAILAND		PAK-TURKEY	
	Pak	Thailand	Pak	Turkey
Labour-small farmer	0	0	0.01	0
Labour-medium farmer	0	0	0.01	0
Labour-farm worker	0	0	0.01	0
Labour- non-farm low skilled	0	0	0	0
Labour- non-farm high skilled	0	0	0	0
Land – small	0	0	0.02	0
Land – medium	0	0	0.02	0
Land – large	0	0	0.03	0
Livestock	0	0	0	0
Capital – agriculture	0	0	0.02	0
Capital – formal	0	0	0	0
Capital – informal	0	0	0	0
Total	**0**	**0**	**0.12**	**0**

Author's own simulation based upon GTAP DATABASE 9.2.

Table (5.36) suggests no significant change in household's real income for any country in both simulations. Except for Pakistan in Pak-Turkey experiment. Where household belongs to Pakistan gain 0.2 percent higher real income. However, among multiple families only, farmers and farm workers are the beneficiaries. Medium farmers from both quantile (1 and 234) stand on top by 0.04 percent increase in their income and followed by small farmers, landless farmers and farm workers respectively.

Decomposition of total welfare highlights positive gain in public welfare of Pakistan and its trading partners in both simulations. However, gain of Pakistan is likely to be slightly higher than that of partner country. For example, Pak-Thailand scenario increase public welfare of Pakistan by $0.08 million as compared to $0.06 million for that of Thailand.

Similarly, Turkey gain in terms of welfare by $0.34 million and Pakistan by $0.37 million. Moreover, major source of welfare gain for Pakistan in both cases, consist of

improved terms of trade while trading partners are expected to gain mainly from better reallocation of resources, (See Table 5.37).

Table 5.36: Change in Household Real Income (in percentage)

Household Types	PAK-THAILAND		PAK-TURKEY	
	Pak	Thailand	Pak	Turkey
Rural small farmer (Quantile 1)	0	0	0.03	0
Rural Small farmer (Quantile 234)	0	0	0.03	0
Rural medium farmer (Quantile 1)	0	0	0.04	0
Rural medium farmer (Quantile 234)	0	0	0.04	0
Rural landless farmer (Quantile 1)	0	0	0.02	0
Rural landless farmer (Quantile 234)	0	0	0.02	0
Rural farm worker (Quantile 1)	0	0	0.01	0
Rural farm worker (Quantile 234)	0	0	0.01	0
Rural non-farm worker (Quantile 1)	0	0	0	0
Rural non- farm worker (Quantile 2)	0	0	0	0
Rural non- farm worker (Quantile 3)	0	0	0	0
Rural non- farm worker (Quantile 4)	0	0	0	0
Urban (Quantile 1)	0	0	0	0
Urban (Quantile 2)	0	0	0	0
Urban (Quantile 3)	0	0	0	0
Urban (Quantile 4)	0	0	0	0
Total	**0**	**0**	**0.2**	**0**

Author's own simulation based upon GTAP DATABASE 9.2.

Table 5.36: Change in Total Welfare (US$ million)

Effects	PAK-THAILAND		PAK-TURKEY	
	Pak	Thailand	Pak	Turkey
AE effect	0.01	0.07	0.03	0.24
TOT effect	0.08	-0.01	0.38	0.06
I-S effect	-0.01	0.00	-0.04	0.06
CS effect	0.00	0.00	0.00	-0.01
Total	**0.08**	**0.06**	**0.37**	**0.34**

Author's own simulation based upon GTAP DATABASE 9.2.

5.3.4 Processed Food (ofd)

Processed food sector of Pakistan has a potential of export in five markets such as China, EU25, Malaysia, UAE and USA. China has imposed 5.41 percent import tariff on Pakistan ofd while 6.72 percent tariff has been imposed by EU25. Actual tariff levied

by Malaysia, UAE and USA is 0.2 percent, 1.01 percent and 2.71 percent respectively. The purposed tariff rates for experimenting trade negotiations are as follow:

I. 0 percent Tariff rate applied by China on Pakistan's ofd sector.

II. 0 percent Tariff rate applied by EU25 on Pakistan's ofd sector.

III. 0 percent Tariff rate applied by Malaysia on Pakistan's ofd sector.

IV. 0 percent Tariff rate applied by UAE on Pakistan's ofd sector.

V. 0.01 percent Tariff rate applied by USA on Pakistan's ofd sector.

Macroeconomic indicators once again do not vary significantly in each case for any country.

However, Table (5.38) reveals 0.01 percent increase in Pakistan's government income, import volume and improvement in ToT in the case of Pak-EU25 simulation.

Table 5.38: Change in Macroeconomic Indicators (in percentage)

	PAK-CHINA		PAK-EU25		PAK-MALAYSIA		PAK-UAE		PAK-USA	
Indicators	**Pak**	**Chi**	**Pak**	**EU**	**Pak**	**Mala**	**Pak**	**UAE**	**Pak**	**US**
Govt. Income	0	0	0.01	0	0	0	0	0	0	0
Real GDP	0	0	0	0	0	0	0	0	0	0
Export Volume	0	0	0	0	0	0	0	0	0	0
Import Volume	0	0	0.01	0	0	0	0	0	0	0
Terms of Trade	0	0	0.01	0	0	0	0	0	0	0

Author's own simulation based upon GTAP DATABASE 9.2.

Pakistan is expected to export processed food items more in case of each simulation. However, the exports of rest of the Pakistan sector declined but aggregate exports remain positive. On the other hand, there is no impact on aggregate export of trading partners of Pakistan due to the agreement except for 0.3 percent growth in UAE's agriculture exports as shown in Table (5.39).

Table 5.39: Change in Aggregate Export (in percentage)

	PAK-CHINA		PAK-EU25		PAK-MALAYSIA		PAK-UAE		PAK-USA	
Sect	**Pak**	**Chi**	**Pak**	**EU**	**Pak**	**Mal**	**Pak**	**UAE**	**Pak**	**US**
Pdr	-0.04	0	-0.08	0	0	0	-0.03	0.2	-0.04	0
Wht	-0.08	0	-0.14	0	0	0	-0.06	0.03	-0.06	0
Osd	-0.03	0	-0.06	0	0	0	-0.02	0	-0.03	0
Pfb	-0.01	0	-0.02	0	0	0	-0.01	0	-0.01	0
v_f	-0.02	0	-0.03	0	0	0	-0.01	0	-0.01	0
c_b	-0.04	0	-0.07	0	0	0	-0.03	0	-0.03	0
Lea	-0.04	0	-0.08	0	0	0	-0.03	0	-0.04	0
Gro	-0.01	0	-0.02	0	0	0	-0.01	0.05	-0.01	0
Ofd	**1.73**	**0**	**2.36**	**0**	**0.98**	**0**	**1.53**	**0**	**2.59**	**0**
Tex	-0.03	0	-0.05	0	0	0	-0.02	0	-0.02	0
Lstk	-0.04	0	-0.08	0	0	0	-0.03	0.02	-0.03	0
Fsh	-0.02	0	-0.04	0	0	0	-0.01	0	-0.02	0
Frs	-0.03	0	-0.05	0	0	0	-0.02	0	-0.02	0
Total	**1.34**	**0**	**1.64**	**0**	**0.98**	**0**	**1.25**	**0.3**	**2.27**	**0**

Author's own simulation based upon GTAP DATABASE 9.2.

Highest gain for Pakistan is caused by Pak-USA case followed by Pak-EU, Pak-China, Pak-UAE and Pak-Malaysia accordingly. Further, only ofd sector is likely to get benefit while wheat sector will endure most adverse effect among Pakistan sectors.

Along with Higher exports of Pakistan ofd sector, import also raises in each case except in Pak-Malaysia where there is no change in aggregate imports of both partners as shown in Table (5.40). But raise in imports is lower as compare to increase in export of that sector.

Overall, aggregate agriculture imports of Pakistan declines in the case of Pak-China and Pak-EU25 by 0.2 percent and 0.22 percent respectively. On the other hand, Pak-UAE and Pak-USA simulated results indicate increase in aggregate imports by 0.07 percent and 0.01 percent. Further, in most cases ofd sector's imports raise along with other sectors except for decline in cotton sector's import range from 0.01 to 0.6 percent.

Imports of China, UAE and USA's ofd sector increase by 0.03 percent, 0.02 percent and 0.01 percent respectively. Furthermore, the rest of the sectors of above mentioned countries bear no change at all.

Table 5.40: Change in Aggregate Import (in percentage)

	PAK-CHINA		PAK-EU25		PAK-MALAYSIA		PAK-UAE		PAK-USA	
Sect	**Pak**	**Chi**	**Pak**	**EU**	**Pak**	**Mal**	**Pak**	**UAE**	**Pak**	**US**
Pdr	.02	0	.04	0	0	0	.02	-.05	.02	0
Wht	.07	0	0.1	0	0	0	0.1	0	0.1	0
Osd	.01	0	.02	0	0	0	.01	0	.01	0
Pfb	-0.4	0	-0.6	0	0	0	-0.1	0	-.01	0
v_f	.01	0	.02	0	0	0	.01	0	.01	0
c_b	.01	0	.02	0	0	0	.01	0	.01	0
Lea	.02	0	.04	0	0	0	.02	0	.02	0
Gro	0	0	.01	0	0	0	0	0	0	0
Ofd	**.01**	**.03**	**.02**	**0**	**0**	**0**	**.01**	**.07**	**.01**	**.01**
Tex	.01	0	.02	0	0	0	.01	0	0.01	0
Lstk	.02	0	.03	0	0	0	.01	0	.01	0
Fsh	.01	0	.02	0	0	0	.01	0	.01	0
Frs	.01	0	.02	0	0	0	.01	0	.01	0
Total	**-0.2**	**0.03**	**-0.2**	**0**	**0**	**0**	**0.1**	**0.02**	**0.2**	**.01**

Author's own simulation based upon GTAP DATABASE 9.2.

Table (5.41) presents the change in sectoral output due to purposed agreements of Pakistan with five countries, including China, EU25, Malaysia, UAE and USA. In each scenario overall agriculture production as well as that of Pakistan ofd sector increases. While there is no change in total output of any partner country of Pakistan except for UAE, for which output also increases by 0.2 percent.

Pakistan wheat production will increase, while Cotton and tex sectors have to face contraction in their output in each simulation except for Pak-Malaysia. Output of ofd sector of Pakistan increases in each case ranging from 0.07 to 1.05 percent. Additionally, no other country as a trade partner of Pakistan except UAE witness any

significant change in their agriculture production. In UAE, sectors such as Rice, Wheat, Maize and livestock notice positive growth in production while ofd sector experiences -0.02 percent growth.

Table 5.41: Change in Total Output (in percentage)

	PAK-CHINA		PAK-EU25		PAK-MALAYSIA		PAK-UAE		PAK-USA	
Sect	**Pak**	**Chi**	**Pak**	**EU**	**Pak**	**Mal**	**Pak**	**UAE**	**Pak**	**US**
Pdr	0	0	0	0	0	0	0	0.14	0	0
Wht	0.8	0	0.7	0	0	0	0.1	0.02	0.71	0
Osd	0	0	0	0	0	0	0	0	0	0
Pfb	-0.02	0	-0.03	0	0	0	-0.01	0	-0.01	0
v_f	0	0	0	0	0	0	0	0	0	0
c_b	0	0	0	0	0	0	0	0	0	0
Lea	0	0	0	0	0	0	0	0	0	0
Gro	0	0	-0.01	0	0	0	0	0.05	0	0
Ofd	**1.03**	**0**	**1.05**	**0**	**0.07**	**0**	**1.02**	**-0.02**	**1.2**	**0**
Tex	-0.02	0	-0.03	0	0	0	-0.01	0	-0.01	0
Lstk	0	0	0	0	0	0	0	0.01	0	0
Fsh	0	0	0	0	0	0	0	0	0	0
Frs	0	0	-0.01	0	0	0	0	0	0	0
Total	**1.79**	**0**	**1.67**	**0**	**0.07**	**0**	**1.1**	**0.2**	**1.89**	**0**

Author's own simulation based upon GTAP DATABASE 9.2

Similarly, Price of agriculture products increase in Pakistan in each simulated experiments. Pak-China trade deal results in 0.11 percent raise in overall prices in Pakistan. Among sectors, only cotton and textile sector's prices remained unchanged while other sectors observe inflation by 0.01 percent accordingly.

Prices of each sector related to Pakistan agriculture witness 0.01 percent hike in case of Pak-EU25 simulated results and overall agriculture inflation is accounted for 0.13 percent. Prices remain stagnant in case of Pak-Malaysia for both countries and there is 0.04 percent and 0.05 percent price hike for Pak-UAE and Pak-USA scenario. Besides,

price decline by 0.04 percent in UAE and there is no change in domestic prices of any other partner of Pakistan in any case as shown in Table (5.42).

Table 5.42: Change in Domestic Price (in percentage)

	PAK-CHINA		PAK-EU25		PAK-MALAYSIA		PAK-UAE		PAK-USA	
Sect	**Pak**	**Chi**	**Pak**	**EU**	**Pak**	**Mal**	**Pak**	**UAE**	**Pak**	**US**
Pdr	0.01	0	0.01	0	0	0	0	-0.02	0	0
Wht	0.01	0	0.01	0	0	0	0.01	0	0.01	0
Osd	0.01	0	0.01	0	0	0	0.01	0	0.01	0
Pfb	0	0	0.01	0	0	0	0	0	0	0
v_f	0.01	0	0.01	0	0	0	0	0	0	0
c_b	0.01	0	0.01	0	0	0	0.01	0	0.01	0
Lea	0.01	0	0.01	0	0	0	0	0	0	0
Gro	0.01	0	0.01	0	0	0	0	-0.02	0	0
Ofd	**0.01**	**0**	**0.01**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Tex	0	0	0.01	0	0	0	0	0	0	0
Lstk	0.01	0	0.01	0	0	0	0	0	0	0
Fsh	0.01	0	0.01	0	0	0	0.01	0	0.01	0
Frs	0.01	0	0.01	0	0	0	0	0	0.01	0
Total	**0.11**	**0**	**0.13**	**0**	**0**	**0**	**0.04**	**-0.04**	**0.05**	**0**

Author's own simulation based upon GTAP DATABASE 9.2.

Table (5.43) reveal no change in wages of real factor of production for any country in Pak-Malaysia simulation results. Pak-China only leads to growth of land's earning in Pakistan with no change in wages of any factor in China. Pak-EU25 agreement results in higher wages of labours in form of farmers, land and capital-agriculture of Pakistan but EU25 is expected to have no gain in term of factor wages.

In case of Pak-UAE, land in UAE is likely to earn more wage while in Pakistan the wage rate remain same and Pak-USA trade negotiation lead to increase in wage of land of any size in Pakistan with no noticeable impact on factor's wage in USA.

Table 5.43: Change in Real Factor Wage (in percentage)

Real Factors	PAK-CHINA		PAK-EU25		PAK-MALAYSIA		PAK-UAE		PAK-USA	
	Pak	Chi	Pak	EU	Pak	Mal	Pak	UAE	Pak	US
Labour-small farmer	0	0	0.01	0	0	0	0	0	0	0
Labour-medium farmer	0	0	0.01	0	0	0	0	0	0	0
Labour-farm worker	0	0	0.01	0	0	0	0	0	0	0
Labour-non-farm low skilled	0	0	0	0	0	0	0	0	0	0
Labour-non-farm high skilled	0	0	0	0	0	0	0	0	0	0
Land – small	0.01	0	0.01	0	0	0	0	0.01	0.01	0
Land – medium	0.01	0	0.01	0	0	0	0	0.01	0.01	0
Land – large	0.01	0	0.03	0	0	0	0	0.01	0.01	0
Livestock	0	0	0	0	0	0	0	0	0	0
Capital – agriculture	0	0	0.01	0	0	0	0	0	0	0
Capital – formal	0	0	0	0	0	0	0	0	0	0
Capital – informal	0	0	0	0	0	0	0	0	0	0
Total	**0.03**	**0**	**0.09**	**0**	**0**	**0**	**0**	**0.03**	**0.03**	**0**

Author's own simulation based upon GTAP DATABASE 9.2.

Household belongs to Pakistan enjoy higher income ranging from 0.06 percent to 0.18 percent due to four simulations such as Pak-China, Pak-EU25, Pak-UAE and Pak-USA while there is no change in real income of households belongs to partner countries of Pakistan as shown in Table (5.44). Further, Pak-China simulated experiment leads to increase in real income of Framers with their own land, landless farmers and farm workers in Pakistan by 0.01 percent individually. Pak-EU25 increases real income of each Pakistan's household but medium farmers are likely to gain more as compared to rest of the families. In Pak-UAE and Pak-USA only farmers with or without their own land and belongs to Pakistan enjoy raise in real income.

Table 5.44: Change in Household Real Income (in percentage)

Household Types	PAK-CHINA		PAK-EU25		PAK-MALAY		PAK-UAE		PAK-USA	
	Pak	Ch	Pak	EU	Pak	Mal	Pak	UAE	Pak	US
Rural small farmer (Quantile 1)	0.01	0	0.01	0	0	0	0.01	0	0.01	0
Rural Small farmer (Quantile 234)	0.01	0	0.01	0	0	0	0.01	0	0.01	0
Rural medium farmer (Quantile 1)	0.01	0	0.02	0	0	0	0.01	0	0.01	0
Rural medium farmer (Quantile 234)	0.01	0	0.02	0	0	0	0.01	0	0.01	0
Rural landless farmer (Quantile 1)	0.01	0	0.01	0	0	0	0.01	0	0.01	0
Rural landless farmer (Quantile 234)	0.01	0	0.01	0	0	0	0.01	0	0.01	0
Rural farm worker (Quantile 1)	0.01	0	0.01	0	0	0	0	0	0	0
Rural farm worker (Quantile 234)	0.01	0	0.01	0	0	0	0	0	0	0
Rural non-farm worker (Quantile 1)	0	0	0.01	0	0	0	0	0	0	0
Rural non- farm worker (Quantile 2)	0	0	0.01	0	0	0	0	0	0	0
Rural non- farm worker (Quantile 3)	0	0	0.01	0	0	0	0	0	0	0
Rural non- farm worker (Quantile 4)	0	0	0.01	0	0	0	**0**	0	**0**	0
Urban (Quantile 1)	0	0	0.01	0	0	0	0	0	0	0
Urban (Quantile 2)	0	0	0.01	0	0	0	0	0	0	0
Urban (Quantile 3)	0	0	0.01	0	0	0	0	0	0	0
Urban (Quantile 4)	0	0	0.01	0	0	0	0	0	0	0
Total	**0.08**	**0**	**0.18**	**0**	**0**	**0**	**0.06**	**0**	**0.06**	**0**

Author's own simulation based upon GTAP DATABASE 9.2.

Public welfare of both partners of several deals enjoy raise except for Pak-Malaysia, where Malaysia endure welfare loss accounted for $0.01 million. In each scenario, Pakistan welfare gain is higher as compare to its partner. For example in Pak-china agreement, Pakistan has $2.17 million of welfare gain as compare to $0.28 million of welfare gain for China.

Similarly, Pakistan enjoy highest gain of $4.05 million as compared to $0.41 million increase in welfare of EU25 caused by Pak- EU25 trade deal and least gain occurs in case of Pak-Malaysia trade agreement. Further, Pakistan mostly get benefitted from improved terms of trade while the partner countries enjoy welfare gain mainly due to better efficiency in resource allocation. The results for change in total welfare are presented in Table (5.45).

Table 5.45: Change in Total Welfare (US$ million)

	PAK-CHINA		PAK-EU25		PAK-MALAYSIA		PAK-UAE		PAK-USA	
Effect	**Pak**	**Chi**	**Pak**	**EU**	**Pak**	**Mal**	**Pak**	**UAE**	**Pak**	**US**
AE	0.32	0.64	0.59	1.68	0.02	-0.01	0.23	0.28	0.15	0.19
TOT	1.30	-0.57	2.43	-1.90	0.07	-0.03	0.94	-0.16	1.15	-0.01
I-S	0.64	-0.14	1.19	-0.21	0.03	0.00	0.46	-0.05	0.51	-0.23
CS	-0.09	0.34	-0.16	0.84	0.00	0.03	-0.06	0.08	-0.07	0.18
Total	**2.17**	**0.28**	**4.05**	**0.41**	**0.11**	**-0.01**	**1.57**	**0.15**	**1.74**	**0.12**

Author's own simulation based upon GTAP DATABASE 9.2.

5.3.5 Textile (tex)

Textile is vital sector of Pakistan due to its contribution in earning foreign exchange reserves. Textile sector is also important for agriculture sector because of the direct impact on cotton sector. The sector has great potential of export in several markets such as China. Bangladesh, EU25, Korea, Turkey and USA. China imposed around 3 percent of import tariff on Pakistan textile but under free trade agreement, Pakistan can negotiates for zero percent tariff. EU25 is one of the major importing market of Pakistan

textile exports and actual tariff on Pakistan textile by EU25 is 7.6 percent. While EU25 has imposed zero tariff on turkey and Bangladesh.

Korea and Turkey imposed 8.34 percent and 5.83 percent tariff on textile sector of Pakistan. Bangladesh has imposed highest tariff as compare to other trade partners of Pakistan and accounted for 21.1 percent of import tariff while there is a 17 percent import tariff on India's textile exports by Bangladesh. Last but not lease actual tariff of 9 percent has been imposed by USA on Pakistan export of textile. The experimental designs for simulating export potential of Pakistan textile sector are as follow:

I. 0 percent Tariff rate applied by China on Pakistan's textile sector.
II. 17 percent Tariff rate applied by Bangladesh on Pakistan's textile sector.
III. 0 percent Tariff rate applied by EU25 on Pakistan's textile sector.
IV. 5 percent Tariff rate applied by Korea on Pakistan's textile sector.
V. 3 percent Tariff rate applied by Turkey on Pakistan's textile sector.
VI. 7 percent Tariff rate applied by USA on Pakistan's textile sector.

Table (5.46) indicates variation in macroeconomic variables. It can be shown that macroeconomic indicators such as government income, real GDP, export volume and import volume shifted upward in each case. Government income hits highest growth of 0.77 percent in Pak-EU25 scenario. Real GDP increase by range from 0 to 0.03 percent. Export volume witnesses highest boost of 0.21 percent in case of Pak-USA trade negotiation. Import volume raise in between 0.04 percent to 1.47 percent. While terms of trade also improve in each simulation.

Table 5.46: Change in Macroeconomic Indicators (in percentage)

Indicators	PAK-BAN		PAK-CHINA		PAK-EU25		PAK-KOREA		PAK-TURKEY		PAK-USA	
	Pak	Ban	Pak	Chi	Pak	EU	Pak	Ko	Pak	Tur	Pak	US
Govt. Income	0.1	-.01	0.1	0	0.8	-.01	.02	0	0.1	-.02	0.3	0
Real GDP	0.00	0.01	0.00	0	0.03	0	0	0	0	0.00	0.01	0
Export Vol	.04	0.17	0.08	.01	0.05	0	.01	0	0.1	0.04	0.21	.01
Import Vol	0.1	0.18	0.20	.01	1.47	0	.04	0	0.2	0.03	0.55	.01
Terms of Trade	0.1	-.02	0.12	0	0.85	0	.02	0	0.1	-.01	0.3	0

Author's own simulation based upon GTAP DATABASE 9.2.

As a trading Partner of Pakistan, Bangladesh's income shrinks by 0.01 percent. Real GDP, export volume and import volume expand by 0.01 percent, 0.17 percent and 0.18 percent respectively. However, terms of trade deteriorate by 0.02 percent. China and USA only witness expansion in export and import volume by 0.01 percent and EU25 only experience contraction in government income by 0.01 percent. Terms of trade of Turkey worsen by 0.01 percent with 0.04 percent and 0.03 percent raise in export and import volume respectively. Further, government income of turkey is expected to decline by 0.02 percent and there is no impact on macroeconomic indicators of Korea.

Pakistan can boost textile exports up to 15 percent by negotiating zero percent import tariff with EU25. In same scenario, maize export remain stagnant and shrink for other sectors of Pakistan including cotton. On the other hand, EU25 sectoral export of textile contracts by 0.5 percent and fsh and frs sector experience no significant impact at all. Export of EU25 cotton increases by 0.3 percent and rest of the sector also enjoy raise in their exports, (See Table 5.47)

Table 5.47: Change in Aggregate Export (in percentage)

Sectors	PAK-BAN		PAK-CHINA		PAK-EU25		PAK-KOREA		PAK-TURKEY		PAK-USA	
	Pak	**Ban**	**Pak**	**Chi**	**Pak**	**EU**	**Pak**	**Kor**	**Pak**	**Tur**	**Pak**	**US**
Pdr	0	-0.2	-0.1	0.1	-0.1	1.0	-.01	0.01	-0.1	0.1	-0.7	0.1
Wht	-0.01	-0.17	-.05	0.03	-0.6	0.1	-.01	0	-0.1	0.02	-0.6	.03
Osd	0	-0.1	-.01	0.01	-0.1	.02	-.03	0	-0.1	0.01	-0.7	0
Pfb	**-0.6**	**0.11**	**-0.2**	**0.04**	**-0.1**	**0.3**	**-0.2**	**0**	**-1.0**	**0.03**	**-0.7**	**0.1**
v_f	-.01	-0.1	-.01	0.01	-2.6	.01	-0.1	0	-.01	0.01	-0.1	0
c_b	-.01	-0.14	-.01	0.01	-.04	.01	-0.1	0	-.01	0.01	-.04	-.01
Lea	-0.6	-0.20	-0.4	0.01	-0.5	0.1	-0.1	0.01	0	0.04	-0.8	0.1
Gro	-.01	-.04	-.01	0	0	.01	-0.1	0	-.01	0.01	-.01	0
Ofd	-0.2	-0.1	-0.3	0	-0.3	.01	-0.1	0	-.03	.01	-0.1	0
Tex	**2.87**	**0.07**	**6.27**	**0.04**	**15.2**	**-0.5**	**5.24**	**0.15**	**2.90**	**0.18**	**10.4**	**0.1**
Lstk	-0.49	-0.17	0	0	-0.7	.01	-0.1	0	-0.1	0.02	-0.5	0
Fsh	-0.1	-0.1	-.03	0	-0.4	0	-0.1	0	0	0	-0.1	0
Frs	-0.1	-0.3	-0.2	0.00	-0.1	0	-0.1	0	-0.01	0	-0.1	0
Total	**0.88**	**-1.36**	**5.01**	**0.21**	**9.63**	**1.0**	**2.35**	**0.15**	**1.60**	**0.43**	**6.15**	**0.3**

Author's own simulation based upon GTAP DATABASE 9.2.

Pak-Bangladesh scenario leads towards increase in textile imports of Pakistan and Bangladesh by 0.15 percent and 0.84 percent. With no change in imports of Pakistan sectors such as osd, ofd, livestock.fsh and frs, rest of the sectors including cotton observe higher imports. However, Bangladesh cotton import shrinks by 0.11 percent and osd import remain unchanged. Further, imports of the rest of the sectors of Bangladesh increases.

Similarly, aggregate import as well as textile import of each country expanded except for 0.18 percent decline in aggregate import of EU25. Moreover, except Korea every country as a trade partner of Pakistan witness decline in their cotton imports and cotton imported by Pakistan increases in each case as shown in Table (5.48).

Table 5.48: Change in Aggregate Import (in percentage)

Sectors	PAK-BAN		PAK-CHINA		PAK-EU25		PAK-KOREA		PAK-TURKEY		PAK-USA	
	Pak	**Ban**	**Pak**	**Chi**	**Pak**	**EU**	**Pak**	**Ko**	**Pak**	**Tu**	**Pak**	**US**
Pdr	.04	0.1	0.01	-.01	0.1	-0.2	0.1	0	0.04	0	0.3	-0.1
Wht	.01	-.03	0.06	-.01	0.2	0	0.02	0	0.05	-.01	**0.7**	-.01
Osd	0	0	0.1	0	0.2	.01	0.04	0	0.07	-.01	0.02	0.00
Pfb	**0.60**	**-0.11**	**1.14**	**-.02**	**5.30**	**-0.2**	**0.22**	**0.1**	**0.67**	**-0.1**	**1.10**	**-.02**
v_f	0.03	0.06	0.00	0	0.07	0	0.1	0	0.01	-.02	0.1	0
c_b	0.09	0.06	0.06	0	0.20	0	0.03	0	0.04	-.01	0.05	0
Lea	0.17	0.07	0.00	-.01	0.67	-.01	0.10	0	0.04	0	0.38	0
Gro	0.09	0.00	0.05	0	0	0	0.03	0	0.05	-.01	0.07	0
Ofd	0.00	0.06	0.27	0	0.37	0	0.05	0	0	0	0.01	0
Tex	**0.15**	**0.84**	**0.30**	**0.5**	**0.12**	**0.2**	**0.06**	**0.2**	**0.01**	**0.8**	**0.01**	**0.34**
Lstk	0	0.06	0.02	0	0.11	0	0.08	.01	0.04	0	1.09	0.00
Fsh	0.00	0.07	0.02	0	-1.36	0	0.04	0	0.01	0	0.01	0.00
Frs	0.00	0.16	0.09	0	-0.81	0	0.05	0	0.02	.01	0.01	0
Total	**1.19**	**1.37**	**2.10**	**0.4**	**5.09**	**-0.2**	**0.83**	**0.2**	**1.04**	**0.7**	**5.76**	**0.19**

Author's own simulation based upon GTAP DATABASE 9.2.

Aggregate production of agriculture sector of Pakistan increases along with output of textile and cotton sector in each trade agreement. However, as trading partner of Pakistan, Bangladesh lose total output by 0.5 percent along with decline in output of textile and cotton as well. Agriculture production growth of china shrink by 0.01 percent and output of textile and cotton also contract by 0.01 percent. However, China manage to increase the production of leather by 0.01 percent.

EU25 loses textile production by 0.37 percent but manage to boost overall output sue to positive change in production of other sectors including cotton. Korea only manage to raise 0.07 percent of textile output with no change in any other sector. Turkey witnesses decline in agricultural production along with decline in textile and cotton output. Agricultural output of USA also increases but textile sector face contraction in output by 0.12 percent. Changes in output of Pakistan sectors due to purposed trade negotiations are shown in Table (5.49).

Domestic prices in Pakistan for every sector increase significantly in each simulated experiments as shown in Table (5.50). The highest price hike by 14 percent can be witness in Pak-EU25 case followed by 5.23 percent in case of Pak-USA and 1.92 percent in the case of Pak-China trade deal.

Table 5.49: Change in Total Output (in percentage)

Sectors	PAK-BAN		PAK-CHINA		PAK-EU25		PAK-KOREA		PAK-TURKEY		PAK-USA	
	Pak	**Ban**	**Pak**	**Chi**	**Pak**	**EU**	**Pak**	**Kor**	**Pak**	**Tur**	**Pak**	**US**
Pdr	0.1	.03	0.1	0	0.9	.03	.02	0	0.1	0	0.4	0
Wht	.07	.02	.14	0	1.1	0	.03	0	.12	0	0.4	0
Osd	0.1	.02	.15	0	1.1	0	.03	0	0.1	0	0.4	0
Pfb	**.13**	**.01**	**.24**	**0**	**1.8**	**.01**	**0.1**	**0**	**0.2**	**0**	**0.7**	**0**
v_f	1.0	.03	0.2	0	0.1	0	.03	0	0.1	0	0.4	0
c_b	0.1	.03	0.2	0	1.2	0	.03	0	0.1	0	0.5	0
Lea	0.1	.03	0.1	0	0.97	-.01	0.03	0.00	0.12	0.00	0.36	0.00
Gro	0.07	0.02	0.12	0.00	0.90	0.00	0.02	0.00	0.11	0.00	0.34	0.00
Ofd	0.07	0.03	0.12	0.00	0.90	0.00	0.02	0.00	0.11	0.00	0.34	0.00
Tex	**0.07**	**-0.01**	**0.13**	**-0.01**	**0.96**	**-.03**	**0.02**	**-0.02**	**0.11**	**-0.03**	**0.36**	**-.01**
Lstk	0.07	0.02	0.14	0.00	0.99	0.00	0.03	0.00	0.12	0.00	0.37	0.00
Fsh	0.08	0.05	0.15	0.00	1.06	0.00	0.03	0.00	0.13	0.00	0.40	0.00
Frs	0.08	0.06	0.16	0.00	1.14	0.00	0.03	0.00	0.14	0.00	0.43	0.00
Total	**1.02**	**0.34**	**1.92**	**-0.01**	**15.9**	**0.00**	**0.36**	**-0.02**	**1.67**	**-0.03**	**5.23**	**-.01**

Author's own simulation based upon GTAP DATABASE 9.2.

Bangladesh witness upward shift in domestic prices of agriculture products but price of textile products decline by 0.01 percent and raise by 0.01 percent for cotton sector. There is 0.01 percent decline in prices of textile items in China with no impact on any other sector. Domestic prices of EU25's textile sector grow by -0.03 percent but overall, there is no change in prices due to increase in prices by same amount in other sectors of EU25. Domestic prices in Korea, Turkey and USA shift downward mainly due to decline in textile prices and there is no impact on domestic prices of any other sector for these nations.

Table 5.50: Change in Domestic Price (in percentage)

Sectors	PAK-BAN		PAK-CHINA		PAK-EU25		PAK-KOREA		PAK-TURKEY		PAK-USA	
	Pak	**Ban**	**Pak**	**Chi**	**Pak**	**EU**	**Pak**	**Kor**	**Pak**	**Tu**	**Pak**	**US**
Pdr	-.03	0.01	-.06	0	-0.4	0.5	0.01	0	-.05	.02	-0.2	.04
Wht	-.06	-.04	-.11	0	-.81	0.03	-.02	0	-.10	0	-.13	.02
Osd	0	-.05	-.01	0	-.05	0.01	0	0	-.01	.01	-.02	0
Pfb	**0.2**	**-0.1**	**0.38**	**-.01**	**2.78**	**0.14**	**0.07**	**0**	**0.93**	**-.01**	**2.04**	**.07**
v_f	-.03	0	-.05	0	-0.4	0.01	-.01	0	-.05	0	-.05	0
c_b	.01	-.01	0.02	0	0.16	0.01	0	0	0.02	0	0.06	0.
Lea	-.01	-0.2	-.02	0.01	-.13	0.04	0	0	-.02	.03	-.05	.02
Gro	-.01	-.02	-.02	0	-.14	0	0	0	-.02	0	-.05	0.
Ofd	0	-.03	0.01	0	0.06	0	0	0	0.01	0	0.02	0
Tex	**1.4**	**-0.1**	**4.69**	**-.01**	**8.01**	**-0.4**	**2.13**	**0.07**	**1.83**	**-0.1**	**4.88**	**-.1**
Lstk	-.01	-.01	-.02	0	-.14	0	0	0.00	-.02	0	-.05	0
Fsh	.01	.01	0.02	0	0.13	0	0	0.00	0.02	0	0.05	0
Frs	-.04	.02	-.07	0	-.50	0	-.01	0	-.06	0	-.19	0
Total	**1.4**	**-0.5**	**4.8**	**-.01**	**8.6**	**0.37**	**2.14**	**.07**	**2.48**	**-.05**	**6.4**	**.03**

Author's own simulation based upon GTAP DATABASE 9.2.

Real Factors of production all over the countries in each case gain in terms of wages. However, in each scenario Pakistan enjoy higher raise in wages as shown in appendix D (see Table (D.1). Pak-EU25 simulated experiment brings highest gain in factor wages for Pakistan that account for 8.8 percent. On the other hand. EU25 only manage to get benefit of 0.09 percent raise in total wage that is only contributed by 0.03 percent increase by each category of land earning. In Pakistan each factor contributed more or less in raising total wage of factors of production. Capital utilised in agriculture sector enjoy highest raise in wage followed by land, labours and livestock.

Factors' wages in Pakistan increase by 2.75 percent and that of USA increase by 0.06 percent in case of Pak-USA simulated experiment. However, in USA only land of each category earn more wage by 0.02 percent. On the other hand, Pakistan enjoys raise in wages of every factors used in production process but the gains are asymmetric among factors. Land receive highest raise in wages followed by capital utilized for agriculture purpose. Labours such as Small and medium farmers witness 0.22 percent and 0.28 percent boost in their wages accordingly. Similarly, Labour work in farms also get more

benefit as compare to unskilled or skilled non-farm workers. Similar, pattern can be observed in case of Pak-Turkey with difference in magnitude of percentage change in factor wages in Pakistan and Turkey. Like USA, Turkey is expected to gain in terms of higher wages by 0.03 percent and that of Pakistan amount for 0.86 percent in Total.

Factors wages in Pakistan increase by 0.57 percent, 1 percent and 0.2 percent in case of agreements such as Pak-Bangladesh, Pak-China and Pak-Korea respectively. However, in respective case, Korea and China experience no impact on factors' Wages. Bangladesh loses a part of their land earning by 0.04 percent for each size but the loss is covered by raise in wages of other factors and there is 0.13 percent total raise in wages of factors in Bangladesh.

Table (D.2) in appendix D, demonstrates the impact of simulated trade agreements on household's real income. Household belong to Pakistan gain a substantial raise in real income across each experiments. Pak-EU25 scenario brings highest raise of 19.22 percent in real income of Pakistan households followed by 7.64 percent increase for the case of Pak-USA and 2.68 percent, 2.46 percent, 1.38 percent and 0.44 percent for Pak-China, Pak-Turkey, Pak-Bangladesh and Pak-Korea experimental trade deals respectively. On the other hand, only Bangladesh witness increase in household income by 0.8 percent as a trade partner of Pakistan in respective simulation. There is 0.05 percent increase in each household belong to Bangladesh and real income of households belong to China, EU25, Turkey, Korea and USA remain unchanged.

In each scenario, in Pakistan rural medium farmers get highest rise in their real income. Moreover, rural medium farmers are followed by rural small farmers, rural landless farmers, rural farm workers, and rural non-farm worker along with households belong to urban areas of Pakistan respectively.

Pakistan can increase public welfare up to $440.8 million by formulating a deal related to textile sector with EU25 and EU25 can also gain public welfare accounted for $5.5 million. Further, Pak-USA trade agreement leads to $165.2 million increase in public welfare for Pakistan and $19.91 million for that of USA. Simulations of trade deal of Pakistan with Bangladesh, China, Turkey and Korea cause increase in public welfare by $32 million, $61 million, $52.6 million and $11.5 million respectively. On the other hand, these trading partners of Pakistan also gain in terms of public welfare by considerable amount as shown in Table (5.51).

Table 5.51: Change in Total Welfare (US$ million)

	PAK-BAN		PAK-CHINA		PAK-EU25		PAK-KOREA		PAK-TURKEY		PAK-USA	
Effect	**Pak**	**Ban**	**Pak**	**Chi**	**Pak**	**EU**	**Pak**	**Kor**	**Pak**	**Tur**	**Pak**	**US**
AE	5.3	15.1	10.1	19.1	75.1	81.0	1.9	2.4	8.7	15.8	27.4	47
TOT	19.1	-7.1	36.3	-19	263	-125	6.9	-1.6	31.3	-12	98.4	-19
I-S	8.7	0.6	16.5	-2.7	120	-2.9	5.1	-0.2	14.3	-1.9	44.9	-12
CS	-1.1	-0.2	-2.0	5.5	-15	48.7	-0.4	0.2	-1.8	5.3	-5.5	4
Total	**32.0**	**8.4**	**60.9**	**1.1**	**441**	**5.5**	**11.5**	**0.8**	**52.6**	**5.7**	**165**	**20**

Author's own simulation based upon GTAP DATABASE 9.2.

The gain for Pakistan in each scenario is caused mainly due to improvement in ToT and partner countries enjoy higher welfare predominantly due to positive impact on allocative efficiency of resources.

5.3.6 Leather (lea)

Leather sector is also believe to be an important source of foreign earnings for Pakistan. We identified export potential for leather sector in at least six markets namely, China, EU25, Indonesia, Turkey and USA.

China has applied 5.87 percent of import tariff on average on leather and leather products of Pakistan and merely 2.53 percent by EU25. Import tariff imposed by EU25

is quite minimal yet there is zero percent tariff on several country including Turkey and Bangladesh by EU25. Turkey and Indonesia have imposed 1.81 percent and 0.51 percent tariff on Pakistan respectively while Pakistan face import tariff of 4.21 percent by USA and 8.24 percent by Vietnam. The purposed tariff rates for simulating experiments are as follow:

I. 0 percent Tariff rate applied by China on Pakistan's leather sector.

II. 0 percent Tariff rate applied by EU25 on Pakistan's leather sector.

III. 0 percent Tariff rate applied by Indonesia on Pakistan's leather sector.

IV. 0.05 percent Tariff rate applied by Turkey on Pakistan's leather sector.

V. 2 percent Tariff rate applied by USA on Pakistan's leather sector.

VI. 2.7 percent Tariff rate applied by Vietnam on Pakistan's leather sector.

As a results of above mentioned experiments, fluctuations in macroeconomic variables are provided in Table (5.52). As shown in the Table, there is no variation in macroeconomic indicator in case of any partner country of Pakistan in any simulation and there is no impact on Pakistan's indicators in case of Pak-Indonesia experiment.

Table 5.52: Change in Macroeconomic Indicators (in percentage)

Indicator	PAK-CHINA		PAK-EU25		PAK-INDONES		PAK-TURKEY		PAK-USA		PAK-VIETNAM	
	Pak	Chi	Pak	EU	Pak	Ind	Pak	Tu	Pak	US	Pak	Viet
Govt. Income	0.09	0	0.10	0	0	0	0.01	0	0.02	0	0.02	0
Real GDP	0.00	0	0.00	0	0	0	0.00	0	0.00	0	0.00	0
Export Volume	0.07	0	0.08	0	0	0	0.01	0	0.01	0	0.01	0
Import Volume	0.03	0	0.04	0	0	0	0.01	0	0.01	0	0.01	0
Terms of Trade	0.04	0	0.04	0	0	0	0.00	0	0.01	0	0.01	0

Author's own simulation based upon GTAP DATABASE 9.2.

In rest of the cases, each indicator of Pakistan except real GDP turns out to be positively affected but with different magnitudes. Government income vary from 0.01 to 0.1 percent, export volume get effected in range from 0.01 to 0.08 percent and fluctuation in volume of import and ToT lies between 0.01 to 0.04 percent.

Leather Industry of Pakistan has a fair level of export potential in each scenario as shown in Table (5.53). In each case aggregate export of leather increases but effect the livestock along with other sectors adversely but overall raise in aggregate exports of Pakistan remain positive. For instance, simulated experiments such as Pak-China and Pak-EU25 lead to 6.53 percent and 7.12 percent increase in Pakistan leather export but that of livestock decline by 1.13 percent and 1.26 percent respectively. Similarly, all other sectors also witness contraction in their sectoral exports. Furthermore, parallel pattern has been observed for Pakistan in rest of the experiments as well.

Table 5.53: Change in Aggregate Export (in percentage)

Sectors	PAK-CHINA		PAK-EU25		PAK-INDONES		PAK-TURKEY		PAK-USA		PAK-VIETNAM	
	Pak	**Chi**	**Pak**	**EU**	**Pak**	**Indo**	**Pak**	**Turk**	**Pak**	**US**	**Pak**	**Viet**
Pdr	-0.22	.02	-0.24	.04	0	0	-0.02	0	-0.04	0	-0.05	-0.01
Wht	-0.22	.01	-0.25	0	0	0	-0.02	0	-0.04	0	-0.05	0
Osd	-0.14	0	-0.15	0	0	0	-0.01	0	-0.02	0	-0.03	0
Pfb	-0.02	0	-0.02	0	0	0	0	0	0	0	0	0
v_f	-0.09	0	-0.1	0	0	0	-0.01	0	-0.02	0	-0.02	0
c_b	-0.19	0	-0.01	0	0	0	-0.02	0	-0.03	0	-0.04	-0.01
Lea	**6.53**	**.01**	**7.12**	**-.02**	**1.3**	**0**	**4.46**	**0.02**	**4.57**	**0**	**5.19**	**0.08**
Gro	-0.07	0	-0.08	0	0	0	-0.01	0	-0.01	0	-0.02	0
Ofd	-0.13	0	-0.14	0	0	0	-0.01	0	-0.02	0	-0.03	0
Tex	-0.2	.01	-0.22	.01	0	0	-0.02	0	-0.04	0	-0.04	-0.01
Lstk	**-1.13**	**0**	**-1.26**	**0**	**-0.01**	**0**	**-0.09**	**0**	**-0.2**	**0**	**-0.25**	**-0.01**
Fsh	-0.14	0	-0.16	0	0	0	-0.01	0	-0.03	0	-0.03	0
Frs	0.05	0	0.5	0	0	0	0	0	0.01	0	0.1	0
Total	**6.03**	**0.1**	**4.99**	**.03**	**1.29**	**0**	**4.24**	**0.02**	**4.13**	**0**	**4.73**	**0.04**

Author's own simulation based upon GTAP DATABASE 9.2.

Trade partners of Pakistan such as China, turkey and Vietnam also enjoy a marginal increase in their leather export but export of EU25 leather decline by 0.02 percent. While Indonesia and USA experience no change in exports of any sector.

Leather import of each partner in every simulation increases with increase in aggregate imports as well. Further, Pakistan trade partner in these experiments face no change in their sectoral imports for any other sector except for leather sector.

On the other hand, in each case Pakistan witness no change in imports of rice and maize. Sectoral imports of cotton and forestry decline but for the rest of the sectors including leather and livestock, imports raise in each simulation except for Pak-Indonesia, where only leather and livestock imports increase by 0.01 percent, (See Table 5.54).

Table 5.54: Change in Aggregate Import (in percentage)

Sectors	PAK-CHINA		PAK-EU25		PAK-INDONES		PAK-TURKEY		PAK-USA		PAK-VIETNAM	
	Pak	**Chi**	**Pak**	**EU**	**Pak**	**Indo**	**Pak**	**Turk**	**Pak**	**US**	**Pak**	**Viet**
Pdr	0	0	0	0	0	0	0	0	0	0	0	0
Wht	0.15	0	0.17	0	0	0	0.01	0	0.03	0	0.03	0
Osd	0.05	0	0.05	0	0	0	0.01	0	0.01	0	0.01	0
Pfb	-0.13	0	-0.14	0	0	0	-0.01	0	-0.02	0	-0.03	0
v_f	0.06	0	0.07	0	0	0	0.01	0	0.01	0	0.01	0
c_b	0.05	0	0.05	0	0	0	0.01	0	0.01	0	0.01	0
Lea	**0.73**	**0.4**	**0.8**	**.01**	**0.01**	**0.02**	**0.06**	**0.08**	**0.13**	**.01**	**0.16**	**0.23**
Gro	0	0	0	0	0	0	0	0	0	0	0	0
Ofd	0.1	0	0.11	0	0	0	0.01	0	0.02	0	0.02	0
Tex	0.06	0	0.06	0	0	0	0.01	0	0.01	0	0.01	0
lstk	0.51	0	0.57	0	0.01	0	0.04	0	0.09	0	0.11	0
Fsh	0.08	0	0.09	0	0	0	0.01	0	0.01	0	0.02	0
Frs	-0.03	0	-0.3	0	0	0	-0.01	0	-0.01	0	-0.01	0
Total	**1.63**	**0.4**	**1.53**	**.01**	**0.02**	**0.02**	**0.15**	**0.08**	**0.29**	**.01**	**0.34**	**0.23**

Author's own simulation based upon GTAP DATABASE 9.2.

Sectoral output shows only a marginal fluctuations across the countries and simulations. In each scenario, trading partner of Pakistan such as China, EU25 and Turkey loss their leather production by 0.01 percent, 0.02 percent and 0.02 percent respectively. Vietnam witness 0.05 percent increase in leather production and all of these nations witness no

change in production of any other sector while sectoral output of each sector in USA and Indonesia remain unchanged.

Leather and livestock production in Pakistan increase in each case as shown in Table (5.55). However, Pakistan's output of cotton, vegetables and fruits and textile decline in case of Pak-China and Pak-EU25 trade negotiations. In same experiments, output of Pakistan sectors such as processed food, maize and sugarcane and sugar beet raise. For the rest of the experiments, Pakistan experience no change in production of any sector except for leather and livestock.

Table 5.55: Change in Total Output (in percentage)

Sectors	PAK-CHINA		PAK-EU25		PAK-INDONES		PAK-TURKEY		PAK-USA		PAK-VIETNAM	
	Pak	**Chi**	**Pak**	**EU**	**Pak**	**Ind**	**Pak**	**Tur**	**Pak**	**US**	**Pak**	**Viet**
Pdr	0	0	0	0	0	0	0	0	0	0	0	0
Wht	0	0	0	0	0	0	0	0	0	0	0	0
Osd	0	0	0	0	0	0	0	0	0	0	0	0
Pfb	-.01	0	-0.12	0	0	0	0	0	0	0	0	0
v_f	-.01	0	-0.01	0	0	0	0	0	0	0	0	0
c_b	0.02	0	0.2	0	0	0	0	0	0	0	0	0
Lea	**1.15**	**-.01**	**1.17**	**-.02**	**0.02**	**0**	**.01**	**-0.02**	**0.08**	**0**	**1.03**	**0.05**
Gro	0.02	0	0.02	0	0	0	0	0	0	0	0	0
Ofd	0.01	0	0.01	0	0	0	0	0	0	0	0	0
Tex	-.14	0	-0.15	0	0	0	0	0	0	0	0	0
Lstk	**1.07**	**0**	**1.07**	**0**	**0.01**	**0**	**.01**	**0**	**0.04**	**0**	**0.19**	**0**
Fsh	0	0	0	0	0	0	0	0	0	0	0	0
Frs	0	0	0	0	0	0	0	0	0	0	0	0
Total	**2.11**	**-.01**	**2.62**	**-.02**	**0.03**	**0**	**.02**	**-0.02**	**0.12**	**0**	**1.22**	**0.05**

Author's own simulation based upon GTAP DATABASE 9.2.

Domestic prices in Pakistan are expected to raise in each agreement except for Pak-Indonesia. Table (5.56) indicates that Pak-China, Pak-EU25, Pak-USA and Pak Vietnam simulated experiments cause no change in domestic price of Pakistan cotton sector and that of forestry decline by 0.01 percent. However, domestic prices in Pakistan raise for the rest of the sectors including leather and livestock.

In case of Pak-Turkey, there is raise in domestic price of Pakistan leather and livestock sector and Pak-Indonesia cause no variations in any sectors of both partners. Moreover, among partner nations of Pakistan, Vietnam witness decline in domestic price of leather and leather products and the rest of the trading partners bear no change at all.

Table 5.56: Change in Domestic Prices (in percentage)

Sectors	PAK-CHINA		PAK-EU25		PAK-INDONESIA		PAK-TURKEY		PAK-USA		PAK-VIETNAM	
	Pak	China	Pak	EU	Pak	Indo	Pak	Turk	Pak	USA	Pak	Viet
Pdr	0.03	0	0.03	0	0	0	0	0	0.01	0	0.01	0
Wht	0.03	0	0.03	0	0	0	0	0	0.01	0	0.01	0
Osd	0.03	0	0.03	0	0	0	0	0	0.01	0	0.01	0
Pfb	0	0	0	0	0	0	0	0	0	0	0	0
v_f	0.03	0	0.04	0	0	0	0	0	0.01	0	0.01	0
c_b	0.04	0	0.04	0	0	0	0	0	0.01	0	0.01	0
Lea	**0.2**	**0**	**0.22**	**0**	**0**	**0**	**0.02**	**0**	**0.04**	**0**	**0.04**	**-0.01**
Gro	0.03	0	0.03	0	0	0	0	0	0.01	0	0.01	0
Ofd	0.04	0	0.04	0	0	0	0	0	0.01	0	0.01	0
Tex	0.03	0	0.03	0	0	0	0	0	0.01	0	0.01	0
Livestock	0.17	0	0.19	0	0	0	0.01	0	0.03	0	0.04	0
Fsh	0.06	0	0.07	0	0	0	0	0	0.01	0	0.01	0
Frs	-0.01	0	-0.01	0	0	0	0	0	-0.01	0	-0.01	0
Total	**0.68**	**0**	**0.74**	**0**	**0**	**0**	**0.03**	**0**	**0.15**	**0**	**0.16**	**-0.01**

Author's own simulation based upon GTAP DATABASE 9.2

Wages of real factors in Pakistan such as livestock and labour in the form of farmers raise in most cases and decline for rest of the factors such as capital, land and labour not working as farmers as shown in appendix D (see Table (D.3). However, overall factor wages manage to get rise in case of Pak-China and Pak-EU25 by 0.07 percent and 0.08 percent respectively. In each other case either there is no change in wage of any factor or the raise in wage of livestock and labour-farmers exactly equate by decline in wages of other factors so that there is zero percent change in overall real factor

Wages. Furthermore, there is no change in real factor's wage in partner country of Pakistan in any case.

Table (D.4) in appendix D, indicated increase in real income of household belong to each class of Pakistan and no change for any trading partner of Pakistan in any scenario. However, among households rural farmers and farm workers are likely to gain more followed by urban families and rural non-farm workers. Further, real income of Pakistan household is likely to increase by 1.7 percent, 1.87 percent, 0 percent, 0.36 percent, 0.32 percent and 0.41 percent in case of trade negotiation of Pakistan with China, EU25, Indonesia, Turkey, USA and Vietnam respectively.

Table (5.57) presents changes in total welfare of Pakistan and Pakistan's trading partner in each simulation. Public welfare of Pakistan increases in each scenario, however in Pak-USA and Pak- Indonesia purposed trade agreement USA and Indonesia loss public welfare accounted for $1.04 million and $0.03 million respectively.

Table 5.57: Change in Total Welfare (US$ million)

	PAK-CHINA		**PAK-EU25**		**PAK-INDONES**		**PAK-TURKEY**		**PAK-USA**		**PAK-VIETNAM**	
Effect	**Pak**	**Chi**	**Pak**	**EU**	**Pak**	**Indo**	**Pak**	**Tur**	**Pak**	**US**	**Pak**	**Viet**
AE	6.43	4.4	7.1	5.7	0.07	0.00	0.53	0.85	1.2	-.5	1.39	0.60
TOT	11.3	-0.9	13	-6	0.12	-0.03	0.93	-0.18	2.1	-.3	2.44	-0.14
I-S	5.63	-1	6.2	-1	0.06	0.00	0.46	-0.07	1	-.5	1.22	0.16
CS	-1.4	0.1	-1.5	1.8	-0.01	0.00	-0.11	0.01	-.3	0.2	-0.30	-0.08
Total	**22**	**2.6**	**24**	**.1**	**0.24**	**-0.03**	**1.81**	**0.62**	**6**	**-1**	**4.75**	**0.54**

Author's own simulation based upon GTAP DATABASE 9.2

In the rest of the simulated results, both trading partners gain in terms of public welfare. Pakistan got more share in the benefit as compare to its partner and gain mostly due to improved terms of trade. On the other hand, gain in welfare of trading counterpart of Pakistan is contributed mainly by improvement in the efficiency of resource allocation.

5.4: Estimated Export Potential of Pakistan Agriculture Sector

This section presents the estimated raise in export of primary and secondary agriculture sector of Pakistan. From all of the above experiments difference between previous net values of total export of each sector is subtracted from post simulated net value of exports to get change in exports for each sector.

We have estimated $3872.97 million of export potential in agriculture sector of Pakistan in total. The highest contribution is made by EU25 that accounts for $1649.05 million of export opportunities in sectors like textile, processed food, leather and vegetables and fruits. EU25 is followed by USA, China, Turkey, Srilanka, Vietnam, Korea, Iran, Bangladesh, Indonesia, UAE and Malaysia.

In USA, Pakistan agriculture sector has potential to increase exports by $661.05 million and highest potential is in textile followed by processed food and leather sector. China can contribute in Pakistan's exports by $399 million by increasing export of sectors like textile, leather, processed food and maize. Similarly, Textile, leather and oil seeds sector of Pakistan has export potential in the market of Turkey that accounts for $270.04 million. In UAE, Indonesia and Vietnam, Pakistan has export potential in two products while in rest of the countries there is potential for export for at least one product.

Among secondary agricultural products, Pakistan has greatest potential of exports equivalent to $2412.02 million in textile products followed by $586.81 million of export potential in leather products and $235.36 million in processed food sector. And among primary agriculture sector, vegetables and fruits sector possess highest export potential of $381.8 million followed by maize and oil seeds sector. Moreover, we cannot find any significant amount of export potential in rest of the sectors including cotton and rice.

Table 5.58: Estimated Product and Market wise Export Potential of Pakistan Agriculture Sector (US$ million)

Sector	China	Malaysia	Srilanka	USA	EU25	Iran	Vietnam	Thailand	Turk	Kor	Indonesia	Bang	UAE	Total
Pdr	---	---	---	---	---	---	---	---	---	---	---	---	---	**0**
Wht	---	---	---	---	---	---	---	---	---	---	---	---	---	**0**
Osd	---	---	---	---	---	---	---	38.5	84.33	---	---	---	---	**122.83**
Pfb	---	---	---	---	---	---	---	---	---	---	---	---	---	**0**
v_f	---	---	185.6	---	52.75	117	---	---	---	---	---	---	28.45	**381.8**
c_b	---	---	---	---	---	---	---	---	---	---	---	---	---	**0**
Lea	126.1	---	---	78.68	185.5	---	97.77	---	65.71	---	37.05	---	---	**586.81**
Gro	14.5	---	---	---	---	---	81.82	---	---	---	39.65	---	---	**135.97**
Ofd	42.37	15.37	---	80.37	71.8	---	---	---	---	---	---	---	25.5	**235.36**
Tex	216	---	---	502	1341	---	---	---	122	147.8	---	85.4	---	**2412.2**
Lstk	---	---	---	---	---	---	---	---	---	---	---	---	---	**0**
Fsh	---	---	---	---	---	---	---	---	---	---	---	---	---	**0**
Frs	---	---	---	---	---	---	---	---	---	---	---	---	---	**0**
Total	**398.97**	**15.37**	**185.6**	**661.1**	**1649.1**	**117**	**179.59**	**38.5**	**270.04**	**147.8**	**76.7**	**85.4**	**55.9**	**3872.97**

Author's own calculations based upon GTAP DATABASE 9.2.

CHAPTER VI

Conclusion and Policy Recommendations

6.1: Conclusions

In most developing economies, the agricultural sector is of key importance to the economy as a whole. It represents the main source of income for the majority of the population. In addition, via the substantial contribution of this sector to GDP and export earnings it determines the course and the success of the overall process of economic development, especially in the less developed countries like Pakistan.

Agriculture sector plays a strategic role in process of economic development of Pakistan. Almost 70 percent of Pakistan population is directly or indirectly linked with agriculture and 48 percent of labour force is estimated to be engaged directly with agriculture. Agriculture sector is not only the major source of food for mass population but also contributes 25 percent in whole GDP of Pakistan which highest among other sectors.

These facts have been known to Pakistan research for many years. More recently, they have been substantiated by the findings of econometric analyses of the interrelationship between agricultural production and the growth of the economy as a whole but yet there are not much comprehensive empirical studies that focuses on implications of agriculture trade policies on agriculture sector of Pakistan and economy as a whole. Either there are qualitative research in this area that only show one side of the picture or focus mostly on industrial sector with secondary focus on agriculture sector.

Implications of trade liberalisation in the form of tariff removal or simplification of tariff structure is of vital importance because of the more serious and concerning doubts

regarding gains and losses from trade. The doubts regarding agricultural trade liberalization is not only limited to dubious nature of trade gains but also to the possibility of jeopardizing the income status of already low-income, vulnerable and sensitive population associated with agriculture.

Some evidence from aggregate economy-wide models suggests that the impact of agricultural trade reforms in less developed countries would be positive; however, the reasons for this lie mostly in the effects that such reforms would have on the non-agricultural sector. Microeconomic agricultural household theory suggests that the effects of agricultural market liberalization on LDC rural welfare are not clear cut, because rural households lose as producers but gain as consumers when food prices fall. Whether the negative production or positive consumption effect dominates is an empirical question, and the answer is likely to vary between different rural household groups. On the production side, a decrease in price (for example, of food grains) may benefit households engaged in other crop activities (for example, fruits and vegetables) if factor prices (for example, wages) decrease. Even the impacts of agricultural trade reforms on factor prices are ambiguous; they depend on the relative factor intensities of the directly- and indirectly-affected activities. Therefore, the effect of agricultural trade liberalisation on welfare is highly contested in the development economics literature and should be studied carefully and extensively.

The study focus primarily on agriculture sector and quantify the welfare impact of multiple trade policy instruments on agriculture at sectoral level. We utilised extension of standard GTAP model and GTAP DATABASE version 9.2 with base year 2011 and also employ Pakistani SAM to split households into 16 categories to grasp the distributional impact. Among 16 categories, there are 12 categories of rural household and utilised Gini and Hoover index to evaluate re-distributional impact of certain

policy. Further, we have also quantify the impact of policy imposed on single sector and other agricultural sectors as well to capture the real source of benefit or loss. Finally, several experiments have been design to compare the impact of agriculture trade liberalisation and protection. We also design experiment by imposing 8 percent, 10 percent and 15 percent non-discriminatory tariff for rest of the world to study the impact of uniform tariff rationalisation. Last but not least this study purposed several trade negotiation between Pakistan and multiple countries for boosting agricultural exports.

Results suggested that agriculture sector is likely to perform better under protection. As a result of protection Pakistan can enhance public welfare, agricultural output, real factor wages and household real income and income equality.

Self-sufficiency in agricultural products can also be improved by protecting agriculture sector. Terms of trade also improve but the improvement is mainly caused by decline of imports rather than increase in exports. Exports increase as a result of trade liberalisation but imports also increases dramatically which results in deterioration of terms of trade. Further, public welfare decline tremendously as degree of liberalisation increases and increase by the level of protection. Therefore, this study concluded trade protection is a better policy option as compare to trade liberating policies towards agriculture sector of Pakistan.

This study find 15 percent uniform tariff beneficial for the agriculture sector of Pakistan. 8 percent or 10 percent uniform tariff cause public welfare to decrease but at 15 percent uniform tariff, public welfare increased significantly. Agriculture production increases along with factors wages and household income along with income equality among households. But still gains were higher in case of higher level of protection as compare to imposition of 15 percent uniform tariff on agriculture sectors.

Although public welfare increases in case of protectionist and 15 percent uniform tariff policy but these policies failed to boost exports. Aggregate export increases but price received from these exports decline in both scenarios and result in zero to negative impact on volume of exports but imports also declined significantly and by more proportion of that of exports therefore results in improvement of terms of Trade. Therefore, we require a trade policy instrument other than import tariff. For this purpose, study on hands purposed several trade negotiations based upon export potential of agriculture sector across ton ten importing markets.

Results of such simulations suggested promising potential in agricultural export that accounts for $3872.97 million. We have recognized highest potential of export in textile sector followed by leather sector. Among primary agriculture sectors, vegetables and fruits sector along with oil and seeds sector show significant export potential in several markets all over the world. However, among cereals and top five crops of Pakistan, only maize sector has a potential to boost its exports.

6.2: Policy Recommendation

Based on the simulations' results discussed in previous chapter the policy recommendations are as follow:

Through agricultural trade protection and 15 percent uniform import tariff Pakistan can:

- Overcome the balance of payment crises. Agriculture trade protection or applying 15 percent uniform import tariff leads towards contraction in imports and exports but decrease in exports are much lower as compare to decline in imports, which translate into improved terms of trade.
- Expand agriculture production by increasing producer surplus and enhance self-sufficiency of agriculture sector. But other objectives of food security like

affordability in form of lower prices can be compromised in these cases and consumer suffered due to higher prices and lower level of consumer surplus.

- Increase real factors' wages along with real income of household and can also reduce inequality among urban and rural households.
- Increase government income along with the international export prices of Pakistan agricultural exports.
- Can increase public welfare mainly due to improved terms of trade and higher level of investment in agriculture sector.

By agricultural trade liberalisation or uniform tariff lower than 15 percent we can:

- Enhance real GDP growth but Public welfare decline tremendously.
- Increase the efficiency of resource allocation.
- Boost up aggregate exports of agriculture but on the expense of deterioration in terms of trade.
- Decrease domestic prices significantly on the cost of producer surplus which then results in reduction of agricultural output and self-sufficiency.

By negotiating minimum tariff rate applied by top ten importers of Pakistan agricultural products on any other competitor of Pakistan in any importing market, Pakistan can:

- Boost up aggregate exports of agriculture sector by US$3872.97 million.
- Improve terms of trade and hence overcome the balance of payment crises.
- Expand agriculture output with minimal effect on domestic prices.
- Enhance real factor wages and real income of household.
- Increase efficiency of resource allocation.

6.3: Limitations and Direction for Future Research

This section presents the limitations faced by the study and offer directions for further research as follow:

6.5.1: Limitations of the study

The first and foremost limitation of this study arises due to lack of transparency of GTAP DATABASE. GTAP DATABASE is very large and data in it is collected by several individuals or organisations. This fact can cause several inconsistencies across the data and might create problem of lower level of data coverage for many regions. Further, DATASET obtained from GTAP is quite outdated specially for splitting households and real factors of production we need additional data from social Accounting matrixes (SAM). Since updated SAM are not available for most of the countries therefore, user is left with no choice except to use old data.

Second limitation is of non-availability of data on non-tariff measure such as custom duties, red tapism, sanitary and phytosanitary (SPS) measures, technical barriers to trade (TBT) and all other related non-tariff barriers. For agricultural trade analysis SPS and TBT are very important to evaluate and could have greater impact on flow of trade as compare to tariff measures.

CGE based models are commonly used for trade analysis but there is no proper test of assessment regarding validity of results. Therefore, concerns could be raised about the quality of the output as in CGE based models key parameters are not econometrically estimated and have uncertain empirical foundation.

6.5.2: Direction for Future Research

GTAP model is quite flexible to extent and therefore one can extent the GTAP model by incorporating data of NTBs to quantify the impact of Non-tariff barriers effectively.

One way in literature is to separately estimate tariff equivalence of NTBs by econometric method and then feeding the tariff equivalence into GTAP DATABASE.

For agriculture trade analysis, impact of policy on poverty is quite important. Since there is no direct method involved in GTAP to estimate poverty, therefore one can extend the GTAP model by incorporating the measure of poverty (preferably multidimensional poverty).

Gains from trade are often associated with innovation and technological advancement. Without incorporating these effects the gains from trade might be underestimated and therefore, future research can extend the GTAP model using additional data.

References

Abe, K., & Wilson, J. S. (2008). *Governance, corruption, and trade in the Asia Pacific region* (No. 4731). The World Bank.

Acharya, S. (2011). Making unilateral trade liberalisation beneficial to the poor. *Socio-Economic Planning Sciences*, *45*(2), 60-71.

Adelman, I. (1978). *Income distribution policy in developing countries; a case study of Korea* (No. 04; HC470. I5, A3.).

Agbahey, J. U. I. (2018). *Barriers to trade and labour mobility in conflict-affected regions: an economy-wide analysis with applications to the Palestinian economy* (No. 671-2019-1845).

Aguiar, Angel, Narayanan, Gopalakrishnan Badri & McDougall, Robert. (2016). An Overview of the GTAP 9 Data Base. Journal of Global Economic Analysis. 1. 181-208.

Ahmed, V., Abbas, A., & Ahmed, S. (2013). Public infrastructure and economic growth in Pakistan: a dynamic CGE-microsimulation analysis. In *Infrastructure and economic growth in Asia* (pp. 117-143).

Aredo, D., Fekadu, B., & Kebede, S. W. (2012). *Trade Liberalization and Poverty: a Macro-Micro Analysis in Ethiopia* (No. 2012-04). PEP-MPIA.

Areerat, T., Kameyama, H., Ito, S., & Yamauchi, K. E. (2012). Trans Pacific strategic economic partnership with Japan, South Korea and China Integrate: general equilibrium approach. *American Journal of Economics and Business Administration*, *4*(1), 40-46.

Armington, P. S. (1969). A theory of demand for products distinguished by place of production. *Staff Papers*, *16*(1), 159-178.

Arrow, K. J., & Debreu, G. (1954). Existence of an equilibrium for a competitive economy. *Econometrica: Journal of the Econometric Society*, 265-290.

Avinash K. Dixit & Victor D. Norman (2002). Theory of international trade: a dual, general equilibrium approach. Cambridge University Press.

Balassa, B. (1978). Exports and economic growth: further evidence. *Journal of development Economics*, *5*(2), 181-189.

Balassa, B. (1985). Exports, policy choices, and economic growth in developing countries after the 1973 oil shock. *Journal of development economics*, *18*(1), 23-35.

Balistreri, E. J., Bohringer, C., & Rutherford, T. F. (2018). *Quantifying Disruptive Trade Policies* (No. 592). University of Wisconsin, Agricultural and Applied Economics.

Beckman, J., & Zahniser, S. (2018). The effects on intraregional agricultural trade of ending NAFTA's market access provisions. *Canadian Journal of Agricultural Economics/Revue canadienne d'agroeconomie*, *66*(4), 599-612.

Ben-David, D., & Loewy, M. B. (2000). Knowledge dissemination, capital accumulation, trade, and endogenous growth. *Oxford Economic Papers*, *52*(4), 637-650.

Bertelsmann-Scott, T., Jansen van Rensburg, S. J., Viviers, W., Parshotam, A., Parry, A., Rossouw, R., ... & Nkhata, D. P. (2018). The impact of plurilateral trade agreements on developing countries–to participate or not to participate? *South African Journal of International Affairs*, *25*(2), 177-198.

Bjerkholt, O. (2009). The making of the Leif Johansen multi-sectoral model. *History of Economic Ideas*, *17*(3), 103-126.

Blaug, M. (1992). *The methodology of economics: Or, how economists explain*. Cambridge University Press.

Boyer, I., & Schuschny, A. R. (2010). *Quantitative assessment of a free trade agreement between MERCOSUR and the European Union* (No. 69). Naciones Unidas Comisión Económica para América Latina y el Caribe (CEPAL).

Brooks, J., & Dyer, G. (2008). *Modelling Agricultural Trade and Policy Impacts in Less Developed Countries* (No. 11). OECD Publishing.

Burfisher, M. E., Lambert, F., & Matheson, T. D. (2019). *NAFTA to USMCA: What is Gained?* (No. 19/73). International Monetary Fund.

Cassel, A., & Patel, R. (2003). Agricultural trade liberalization and Brazil's rural poor: Consolidating inequality. *Food First Policy Brief, 8*.

Chen, Z., & Haynes, K. E. (2013). Spatial Impact of Transportation Infrastructure: A Spatial Econometric Computable General Equilibrium Approach. *GMU School of Public Policy Research Paper*, (2013-07).

Chepeliev, M., Tyner, W. E., & van der Mensbrugghe, D. (2019). Possible Implications for US Agriculture of US Trade Policies. *Choices*, *34*(2), 1-8.

Chishti, D. A., Zulfiqar, D. M., & Naqvi, D. Z. (2008). The impact of trade policies on Pakistan's preferential access to the European Union. *Reference no: TRADE08 C*, *5*.

Cui, L., Song, M., & Zhu, L. (2019). Economic evaluation of the trilateral FTA among China, Japan, and South Korea with big data analytics. *Computers & Industrial Engineering*, *128*, 1040-1051.

Dantzig, G. B., Orden, A., & Wolfe, P. (1955). The generalized simplex method for minimizing a linear form under linear inequality restraints. *Pacific Journal of Mathematics*, *5*(2), 183-195.

Davies, J. B. (2009). Combining microsimulation with CGE and macro modelling for distributional analysis in developing and transition countries. *International Journal of Microsimulation*, *2*(1), 49-65.

Devadoss, S., & Luckstead, J. (2018). Implications of the Comprehensive Economic and Trade Agreement for Processed Food Markets. *Canadian Journal of Agricultural Economics/Revue canadienne d'agroeconomie*, *66*(3), 415-440.

Dixon, P. B. (1982). *Orani, a multi-sectoral model of the Australian economy* (Vol. 142). North Holland.

Dixon, P. B., & Rimmer, M. T. (2010). Validating a detailed, dynamic CGE model of the USA. *Economic Record*, *86*, 22-34.

Dixon, P., & Jorgenson, D. (2012). *Handbook of Computable General Equilibrium Modeling* (Vol. 1). Elsevier.

Dollar, D. (1992). Outward-oriented developing economies really do grow more rapidly: evidence from 95 LDCs, 1976-1985. *Economic development and cultural change*, *40*(3), 523-544.

Dornbusch, R. (1992). The case for trade liberalization in developing countries. *Journal of Economic Perspectives*, *6*(1), 69-85.

Durongkaveroj, W. (2015). *The Next Chapter of ASEAN Economic Community through Integrating with the existing FTA partners (RCEP), Turkey, and Pakistan*. University Library of Munich, Germany.

Edwards, S. (1998). Openness, productivity and growth: what do we really know?. *The economic journal*, *108*(447), 383-398.

Feder, G. (1983). On exports and economic growth. *Journal of development economics*, *12*(1-2), 59-75.

Fernández-Pacheco Theurer, C., López Ruiz, J. L., & Latorre, M. C. (2018). Multinationals' effects: a nearly unexplored aspect of Brexit. *Journal of International Trade Law and Policy*, *17*(1/2), 2-18.

Gilbert, J., Furusawa, T., & Scollay, R. (2018). The economic impact of the Trans-Pacific Partnership: What have we learned from CGE simulation?. *The World Economy*, *41*(3), 831-865.

Greenaway, D., Morgan, W., & Wright, P. (2002). Trade liberalisation and growth in developing countries. *Journal of development economics*, *67*(1), 229-244.

Greenville, J., & Carrico, C. (2019). *Influencing GVCs through Agro-Food Policy and Reform* (No. 125). OECD Publishing.

Grossman, G. M., & Helpman, E. (1991). Trade, knowledge spillovers, and growth. *European economic review*, *35*(2-3), 517-526.

Guo, Z., & Li, C. (2019). China's welfare gain from involved mega-regional trade agreements. *Applied Economics Letters*, *26*(8), 650-656.

Halsmayer, V., & Hoover, K. D. (2016). Solow's Harrod: Transforming macroeconomic dynamics into a model of long-run growth. *The European Journal of the History of Economic Thought*, *23*(4), 561-596.

Harberger, A. C. (1962). The incidence of the corporation income tax. *Journal of Political economy*, *70*(3), 215-240.

Harrison, A., & Hanson, G. (1999). Who gains from trade reform? Some remaining puzzles. *Journal of development Economics*, *59*(1), 125-154.

Heckscher, E. (1949). The effect of foreign trade on the distribution of income 1919. *Readings in the theory of international trade*, 272-300.

Hertel, T. (1997). *Global Trade Analysis: Modeling and applications*. Center for Global Trade Analysis, Department of Agricultural Economics, Purdue University.

Huff, K. M., & Hertel, T. W. (1996). Decomposition of Welfare Effects in the GTAP Model. *GTAP technical Paper*, *5*.

Igesa, B. S., Okiyama, M., & Tokunaga, S. (2018). Impacts of Tariff Reduction and Mixed Fiscal Policy on the Kenyan Agricultural and Food Industry: Using the Macro CGE Model. *Japanese Journal of Agricultural Economics*, *20*, 51-56.

Iqbal, M. S., Anwar, S., & Khan, M. A. (2017). Using CGE Modeling as an Alternative Approach to measure the Performance of Trade and Economic Development: The Evidences So Far. *J. Appl. Environ. Biol. Sci*, *7*(9), 59-69.

Irshad, Muhammad Saqib & Xin, Qi & Xuan, Li & Arshad, Hamza. (2016). Deltoid Analysis of Pakistan-ASEAN-China Free Trade Agreements and Opportunities for Pakistan. Asian Economic and Financial Review. 6. 228-237.

Jensen, H. G., & Sandrey, R. (2015). African agricultural trade: Recent and the future. *African Journal of Agricultural and Resource Economics*, *10*(311-2016-5627), 146-157.

Johansen, L. (1960). Multi-sectoral study of economic growth.

Kantorovich, L. V. (1960). English translation of Kantorovich (1939). *Manage Sci*, *6*(4), 363-422.

Kawasaki, K., Narayanan, B. G., Guimbard, H., & Kuno, A. (2019). Analysis of the Role of Tariff Concessions in East Asia. *Margin: The Journal of Applied Economic Research*, *13*(2), 141-167.

Keleman, A. (2010). Institutional support and in situ conservation in Mexico: biases against small-scale maize farmers in post-NAFTA agricultural policy. *Agriculture and Human Values*, *27*(1), 13-28.

Khan, M. A., Abdul, S., & Mohsin, A. Q. (2015). Impact of agricultural trade liberalization on income inequality in Pakistan. *Pakistan Journal of Agricultural Research*, *28*(1), 28-37.

Khan, M. A., Mehmood, Q., Zakaria, M., & Husnain, M. I. U. (2018). A Household Level Analysis of the Pakistan–Malaysia Free Trade Agreement. *Journal of Asian and African Studies*, *53*(7), 1062-1085.

Koopmans, T. C. (1951). EFFICIENT ALLOCATION OF RESOURCES. *Econometrica (pre-1986)*, *19*(4), 455.

Krueger, A. O. (1978). *Liberalization, Direction of Bias, and Economic Growth* (pp. 277-300). National Bureau of Economic Research, Inc.

Krueger, A. O. (2009). Trade openness is now more important than ever. *Development Outreach*, *11*(3), 37-38.

Krugman, P. R. (1994). *Rethinking international trade*. MIT press.

Krugman, P., Obstfeld, M., & Melitz, M. (2017). *International Economics: Theory and Policy, the latest edition*. Addison-Wesley.

Kustiari, R. (2018). Impacts of Indonesia-India Free Trade Agreements on Agricultural Sector of Indonesia: A CGE Analysis. *Jurnal Agro Ekonomi*, *35*(1), 33-48.

Lee, H., & Itakura, K. (2014). *TPP, RCEP, and Japan's Agricultural Policy Reforms* (No. 14E003). Osaka School of International Public Policy, Osaka University.

Lee, H., & Itakura, K. (2018). The welfare and sectoral adjustment effects of mega-regional trade agreements on ASEAN countries. *Journal of Asian Economics*, *55*(C), 20-32.

LEONTIEF, W. (1936). Quantitative Input-output Relations in The Economic System of The United States. *Review of Economy and Statistics*, *18*(3), 105-125.

Li, C., & Whalley, J. (2014). China and the Trans-Pacific Partnership: A Numerical Simulation Assessment of the Effects Involved. *The World Economy*, *37*(2), 169-192.

Mandal, A. (2018). Impact of India ASEAN FTA on Welfare: A GTAP Model Approach. *International Journal of Social Science and Economic Research*, *3*(5), 2097-2118.

MCKENZIE, L. (1954). On Equilibrium in Graham's Model of World Trade and Other Competitive Systems. *Econometrica*, *22*, 147-161.

Meade, J. E. (1955). *Trade and welfare* (Vol. 2). Oxford University Press.

Minford, P. (2016). Brexit and trade: what are the options?. *The economy after brexit*, 13-15.

Minor, P., & Mureverwi, B. (2013). A household level analysis of African trade liberalization: The case of Mozambique Vulnerability of low income households. *World Bank, BNPP Program. 44p*.

Minor, P., & Walmsley, T. (2013). *MyGTAP: A Program for Customizing and Extending the GTAP Database for Multiple Households, Split Factors, Remittances, Foreign Aid and Transfers* (No. 4321). Center for Global Trade Analysis, Department of Agricultural Economics, Purdue University.

Mosley, P. (2000). Globalisation, economic policy and convergence. *The World Economy*, *23*(5), 613-613.

Narayanan, B. G., Sen, R., & Srivastava, S. (2019). *Tariff liberalization in the RCEP trade agreement and impact on India's automobile industry: An applied general equilibrium analysis* (No. 183). ARTNeT Working Paper Series.

Narayanan, B. G., Sen, R., & Srivastava, S. (2019). *Tariff liberalization in the RCEP trade agreement and impact on India's automobile industry: An applied general equilibrium analysis* (No. 183). ARTNeT Working Paper Series.

Narayanan, B., & Sharma, S. K. (2016). An analysis of tariff reductions in the Trans-Pacific Partnership (TPP): Implications for the Indian economy. *Margin: The Journal of Applied Economic Research*, *10*(1), 1-34.

Nufile, A. A. M., Santhirasegaram, S., & Ismail, S. M. M. (2013). Pakistan-Sri Lanka Free Trade Agreement (PSFTA), A Comparison with SAARC and SAFTA. *International journal of Accounting and Management (IJABM) VOL*, *1*.

Nugraheni, R. D., & Widodo, T. (2018). *The Impact of ASEAN'S FTAs with China, Japan, Korea and Australia-New Zealand: An Analysis in GTAP Framework* (No. 86693). University Library of Munich, Germany.

Olekseyuk, Z., & Balistreri, E. J. (2018). Trade liberalization gains under different trade theories: A case study for Ukraine. *Empirica*, *45*(3), 507-542.

Ortiz Valverde, G, Latorre, MC. (2020). A computable general equilibrium analysis of Brexit: Barriers to trade and immigration restrictions. *The World Economy*, 43(3), 705 - 728.

Ouraich, I., Dudu, H., Tyner, W. E., & Cakmak, E. H. (2019). Agriculture, trade, and climate change adaptation: a global CGE analysis for Morocco and Turkey. *The Journal of North African Studies*, *24*(6), 961-991.

Pohit, S. (2013). *India-Pakistan Trade Liberalization: A CGE Modelling Apporach* (No. 45878). University Library of Munich, Germany.

Qi, C., & Zhang, J. X. (2018). The economic impacts of the China-Australia Free Trade Agreement-A general equilibrium analysis. *China Economic Review*, *47*(C), 1-11.

Rakotoarisoa, M. A. (2011). The impact of agricultural policy distortions on the productivity gap: Evidence from rice production. *Food Policy*, *36*(2), 147-157.

Rakotoarisoa, Manitra. (2019). Trade Liberalization – Labor Productivity Nexus: The Case of Sub Saharan Africa. Socio-Economic Challenges. 3. 5-26.

Robinson, S., & Thierfelder, K. (2019). Global adjustment to US disengagement from the world trading system. *Journal of Policy Modeling*, *41*(3), 522-536.

Rodriguez, F. and Rodrik, D. (2001) Trade Policy and Economic Growth: A Skeptic's Guide to the Cross-National Evidence. In: Bernanke, B. and Rogoff, K.S., Eds., NBER Macroeconomics Annual 2000, Volume 15, The MIT Press, Cambridge, 261-338.

Rodrik, D. (1995). Political economy of trade policy. *Handbook of international economics*, *3*, 1457-1494.

Rodrik, D. (1998). Has globalization gone too far?. *Challenge*, *41*(2), 81-94.

Romer, P. M. (1992). Two strategies for economic development: using ideas and producing ideas. *The World Bank Economic Review*, *6*(suppl_1), 63-91.

Sachs, J. D. (1989). Developing Country Debt and Economic Performance. The International Financial System. In *Developing Country Debt and Economic Performance, Volume 1: The International Financial System* (pp. 12-0). University of Chicago Press.

Samuelson, P. A. (1948). International trade and the equalisation of factor prices. *The Economic Journal*, *58*(230), 163-184.

Scarf, H. (1994). The allocation of resources in the presence of indivisibilities. *Journal of Economic Perspectives*, *8*(4), 111-128.

Schumpeter, J. (1954). History of Economic Analysis. Oxford University Press, New York.

Shaikh, F. M., Syed, A. A. S. G., Shah, H., & Shah, A. A. (2012). Observing Impact of SAFTA on Pakistan's Economy by Using CGE Model. *Pakistan Journal of Commerce & Social Sciences*, *6*(2), 185-209.

Shoven, J. B., & Whalley, J. (1973). General equilibrium with taxes: A computational procedure and an existence proof. *The Review of Economic Studies*, *40*(4), 475-489.

Sikdar, C., & Nag, B. (2011). *Impact of India-ASEAN Free Trade Agreement: A cross-country analysis using applied general equilibrium modelling* (No. 107). ARTNeT Working Paper Series.

Tanaka, T., & Hosoe, N. (2011). Does agricultural trade liberalization increase risks of supply-side uncertainty?: Effects of productivity shocks and export restrictions on welfare and food supply in Japan. *Food Policy*, *36*(3), 368-377.

Tanaka, T., & Karapinar, B. (2019). How to improve world food supply stability under future uncertainty: Potential role of WTO regulation on export restrictions in rice. *Journal of Food Security*, *7*(4), 129-150.

Tangermann, S. (2005). Organisation for Economic Co-operation and Development area agricultural policies and the interests of developing countries. *American Journal of Agricultural Economics*, *87*(5), 1128-1144.

Taylor, L. (1983). *Structuralist macroeconomics: Applicable models for the third world*. Basic Books.

Taylor, L. (1991). Economic openness: problems to the century's end. *Economic Liberalization: no panacea, 1989*, 99-147.

Thompson, J. M., & Leister, A. M. (2015). Potential impacts of an exclusionary Trans-Pacific Partnership agreement on agriculture in the US and Japan. *Margin: The Journal of Applied Economic Research*, *9*(4), 362-378.

Todsadee, A., Kameyama, H., & Lutes, P. (2012). The implications of trade liberalization on TPP countries' livestock product sector. *Technical Bulletin of the Faculty of Agriculture, Kagawa University*, *64*, 1-6.

Vamvakidis, A. (2002). How robust is the growth-openness connection? Historical evidence. *Journal of Economic Growth*, *7*(1), 57-80.

Wacziarg, R., & Welch, K. H. (2008). Trade liberalization and growth: New evidence. *The World Bank Economic Review*, *22*(2), 187-231.

Walras, L. (1899). *Equations de la circulation* (Doctoral dissertation).

Warr, P. G. (2011). Food security vs. Food self-sufficiency: the Indonesian case. *Crawford School Research Paper*, (2011/04).

Wei, D., Chen, Z., & Rose, A. (2019). Estimating economic impacts of the US-South Korea free trade agreement. *Economic Systems Research*, *31*(3), 305-323.

Yimer, S. (2012). Impacts of Trade Liberalization on Growth and Poverty in Ethiopia: Dynamic Computable General Equilibrium Simulation Model. *International Journal of Business and Social Science*, *3*(11), 288-298.

Zakaria, M., & Ahmed, E. (2013). Openness–growth nexus in Pakistan: A macro–econometric analysis. *Argumenta Oeconomica*, *1*(30), 47-85.

APPENDICIES

Appendix A

Table A.1: Sectoral Aggregation and their description

Sr. No	Code	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 and crop nec
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	Livestock	Cattle: bovine animals, live, other ruminants, horses and other equines, bovine semen, 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
9	Frs	Forestry: forestry, logging and related service activities
10	Fsh	Fishing: hunting, trapping and game propagation including related service activities, fishing, fish farms; service activities incidental to fishing
11	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, Animal products nec, Bovine meat products, meat products nec, dairy products, processed rice, food products, Beverages and Tobacco products
12	Tex	Textiles and wearing apparel
13	Lea	Manufacture of leather and related products

Source: Author's own aggregation based on GTAP data base 9.

Table A.2: Source of real factor income by sectors (in percentage)

Sec	flab_s	flab_m	flab_w	flab_l	flab_h	flnd_s	flnd_m	flnd_l	Fliv	fcap_a	fcap_f	fcap_i
Pdr	9	14	9	0	0	13	14	17	0	13	0	0
Wht	22	25	20	0	0	29	31	37	0	29	0	0
Osd	12	10	10	0	0	14	15	20	0	14	0	0
Pfb	10	14	9	0	0	14	18	11	0	14	0	0
v_f	12	6	11	0	0	19	10	1	0	5	0	0
c_b	9	5	6	0	0	9	11	14	0	10	0	0
Lea	0	0	0	0	0	0	0	0	0	0	0	0
Gro	1	1	1	0	0	1	1	1	0	1	0	0
Ofd	0	0	0	3	1	0	0	0	0	0	9	3
Tex	0	0	0	9	2	0	0	0	0	0	4	1
Livestock	16	9	16	3	0	0	0	0	21	0	0	0
Fsh	0	0	6	0	0	0	0	0	0	0	1	0
Frs	0	0	0	0	0	0	0	0	0	11	0	0

Table A.3: Real factor endowment by Households (In percentage of total factor)

HH Type	flab_s	flab_m	flab_w	flab_l	flab_h	flnd_s	flnd_m	flnd_l	Fliv	fcap_a	fcap_f	fcap_i
hhd_rs1	9.5	0.0	0.0	0.8	0.2	7.9	0.0	0.0	4.9	4.5	0.0	0.5
hhd_rs234	67.4	0.0	0.0	3.2	2.2	58.1	0.0	0.0	45.5	38.2	0.0	3.8
hhd_rm1	0.0	1.4	0.0	0.0	0.0	0.0	1.7	0.4	0.1	0.4	0.0	0.0
hhd_rm234	0.0	65.2	0.0	0.3	1.0	0.0	75.6	63.4	11.3	24.0	0.0	0.2
hhd_rl1	4.0	2.2	0.0	1.0	0.1	7.8	1.5	0.0	1.9	4.9	0.0	0.4
hhd_rl234	15.4	24.0	0.0	3.3	1.8	21.9	13.0	31.6	10.7	22.8	0.0	2.7
hhd_rw1	0.0	0.0	30.5	2.8	0.1	0.0	0.0	0.0	4.8	0.0	0.0	0.6
hhd_rw234	0.0	0.0	49.7	5.5	2.5	0.0	0.0	0.0	17.9	0.0	0.0	2.1
hhd_rn1	0.0	0.0	0.0	12.0	1.5	0.0	0.0	0.0	0.0	0.0	0.0	3.7
hhd_rn2	0.0	0.0	0.0	11.1	3.5	0.0	0.0	0.0	0.0	0.0	0.1	6.9
hhd_rn3	0.0	0.0	0.0	9.4	5.8	0.0	0.0	0.0	0.0	0.0	1.0	10.3
hhd_rn4	0.0	0.0	0.0	5.5	8.2	0.0	0.0	0.0	0.0	0.0	10.5	12.4
hhd_u1	0.8	0.1	2.5	5.6	1.0	0.9	0.3	0.0	0.1	0.3	0.0	2.6
hhd_u2	0.6	0.1	4.5	11.2	3.8	0.9	0.6	0.0	0.4	0.4	0.5	6.7
hhd_u3	0.8	1.1	4.2	13.8	11.0	0.9	1.2	0.0	1.4	0.6	4.6	13.5
hhd_u4	1.5	5.9	8.6	14.5	57.2	1.5	6.2	4.6	0.8	3.9	83.2	33.6

Source: IFRI (2016) and GTAP Data Base 9.2.

Appendix B

Simulated Results of Agriculture Trade Liberalisation and Protectionism

Table B.1: Complete Trade liberalisation (percentage change in exports)

Sectors	Total	pdr	Wht	Osd	Pfb	v_f	c_b	Lea	gro	ofd	Tex	livestock	fsh	frs
Pdr	6.66	1.08	0.40	0.06	0.00	0.52	0.00	1.14	0.00	0.64	2.36	0.19	0.00	0.26
Wht	7.34	0.55	0.81	0.07	0.00	0.63	0.00	1.10	0.00	1.26	2.37	0.24	0.00	0.30
Osd	4.11	0.29	0.25	0.09	0.00	0.36	0.00	0.71	0.00	0.50	1.64	0.12	0.00	0.16
Pfb	4.86	0.25	0.22	0.03	0.00	0.26	0.00	-0.09	0.00	0.01	5.96	0.08	0.00	0.14
v_f	2.90	0.12	0.11	0.02	0.00	0.86	0.00	0.51	0.00	0.27	0.94	0.06	0.00	0.01
c_b	5.36	0.43	0.39	0.06	0.00	0.52	0.00	0.96	0.01	0.51	2.06	0.17	0.00	0.24
Lea	14.66	0.18	0.14	0.02	0.00	0.16	0.00	11.28	0.00	0.62	1.35	0.94	0.00	-0.02
Gro	1.99	0.10	0.09	0.01	0.00	0.15	0.00	0.41	0.04	0.23	0.86	0.05	0.00	0.06
Ofd	5.13	0.06	0.10	0.01	0.00	0.22	0.00	0.82	0.00	0.46	1.37	0.08	0.00	0.02
Tex	5.93	0.08	0.06	0.01	0.00	0.16	0.00	1.32	0.00	0.64	5.48	0.14	0.00	0.04
Livestock	11.22	0.32	0.24	0.06	0.00	0.27	0.00	7.72	0.00	0.60	1.42	0.56	0.00	0.02
Fsh	1.98	0.05	0.01	0.00	0.00	0.02	0.00	0.85	0.00	0.38	0.61	0.07	0.01	-0.01
Frs	5.47	0.45	0.39	0.06	0.00	0.05	0.00	-0.61	0.00	0.29	1.67	0.00	0.00	5.16
Total	**70.14**	**5.50**	**2.81**	**0.43**	**0.00**	**4.14**	**0.00**	**26.74**	**0.06**	**6.12**	**22.42**	**2.69**	**0.01**	**1.21**

Note: Author's own simulations based on GTAP Data Base version 9.2.

Table B.2: Tariff Eliminated by 50% (percentage change in exports)

Sectors	Total	pdr	wht	osd	pfb	v_f	c_b	lea	gro	ofd	Tex	livestock	fsh	frs
Pdr	3.14	0.48	0.18	0.03	0.00	0.25	0.00	0.50	0.00	0.30	1.18	0.09	0.00	0.12
Wht	3.50	0.25	0.36	0.03	0.00	0.30	0.00	0.50	0.00	0.59	1.21	0.12	0.00	0.14
Osd	1.95	0.13	0.12	0.04	0.00	0.17	0.00	0.31	0.00	0.24	0.82	0.06	0.00	0.07
Pfb	2.42	0.11	0.10	0.01	0.00	0.13	0.00	0.00	0.00	0.02	1.94	0.04	0.00	0.06
v_f	1.34	0.05	0.05	0.01	0.00	0.39	0.00	0.22	0.00	0.13	0.46	0.03	0.00	0.00
c_b	2.56	0.20	0.18	0.03	0.00	0.25	0.00	0.43	0.00	0.25	1.04	0.08	0.00	0.11
Lea	5.89	0.08	0.06	0.01	0.00	0.07	0.00	4.40	0.00	0.26	0.61	0.42	0.00	-0.01
Gro	0.93	0.05	0.04	0.01	0.00	0.07	0.00	0.17	0.02	0.11	0.42	0.03	0.00	0.03
Ofd	1.37	0.03	0.04	0.00	0.00	0.10	0.00	0.33	0.00	0.20	0.63	0.04	0.00	0.01
Tex	2.62	0.03	0.03	0.00	0.00	0.07	0.00	0.52	0.00	0.28	1.60	0.06	0.00	0.02
Live	4.66	0.14	0.10	0.02	0.00	0.12	0.00	3.07	0.00	0.26	0.66	0.26	0.00	0.01
Fsh	0.85	0.02	0.00	0.00	0.00	0.01	0.00	0.34	0.00	0.16	0.27	0.03	0.01	-0.01
Frs	2.67	0.21	0.18	0.03	0.00	0.03	0.00	-0.22	0.00	0.15	0.87	0.00	0.00	1.42
Total	**33.89**	**1.78**	**1.44**	**0.22**	**0.00**	**1.97**	**0.00**	**10.56**	**0.03**	**2.95**	**11.71**	**1.26**	**0.01**	**1.96**

Note: Author's own simulations based on GTAP Data Base version

Table B.3: Tariff Eliminated by 10% (percentage change in exports)

Sectors	Total	pdr	wht	osd	pfb	v_f	c_b	lea	gro	ofd	tex	livestock	fsh	Frs
Pdr	0.60	0.09	0.03	0.01	0.00	0.05	0.00	0.09	0.00	0.06	0.23	0.02	0.00	0.02
Wht	0.67	0.05	0.07	0.01	0.00	0.06	0.00	0.09	0.00	0.11	0.24	0.02	0.00	0.03
Osd	0.37	0.02	0.02	0.01	0.00	0.03	0.00	0.05	0.00	0.04	0.16	0.01	0.00	0.01
Pfb	0.48	0.02	0.02	0.00	0.00	0.02	0.00	0.00	0.00	0.01	0.38	0.01	0.00	0.01
v_f	0.25	0.01	0.01	0.00	0.00	0.07	0.00	0.04	0.00	0.02	0.09	0.01	0.00	0.00
c_b	0.49	0.04	0.03	0.01	0.00	0.05	0.00	0.08	0.00	0.05	0.21	0.02	0.00	0.02
Lea	1.01	0.01	0.01	0.00	0.00	0.01	0.00	0.73	0.00	0.05	0.11	0.08	0.00	0.00
Gro	0.17	0.01	0.01	0.00	0.00	0.01	0.00	0.03	0.00	0.02	0.08	0.00	0.00	0.00
Ofd	0.25	0.00	0.01	0.00	0.00	0.02	0.00	0.05	0.00	0.04	0.12	0.01	0.00	0.00
Tex	0.47	0.01	0.00	0.00	0.00	0.01	0.00	0.08	0.00	0.05	0.30	0.01	0.00	0.00
livestock	0.81	0.03	0.02	0.00	0.00	0.02	0.00	0.51	0.00	0.05	0.13	0.05	0.00	0.00
Fsh	0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.00	0.03	0.05	0.01	0.00	0.00
Frs	0.52	0.04	0.03	0.01	0.00	0.01	0.00	-0.03	0.00	0.03	0.18	0.00	0.00	0.26
Total	**6.23**	**0.33**	**0.27**	**0.04**	**0.00**	**0.38**	**0.00**	**1.79**	**0.01**	**0.55**	**2.28**	**0.24**	**0.00**	**0.36**

Note: Author's own simulations based on GTAP Data Base version 9.

Table B.4: Tariff Increased by 10% (percentage change in exports)

Sectors	Total	pdr	wht	osd	pfb	v_f	c_b	lea	Gro	Ofd	tex	livestock	fsh	Frs
Pdr	-0.58	-0.09	-0.03	0.00	0.00	-0.05	0.00	-0.08	0.00	-0.06	-0.23	-0.02	0.00	-0.02
Wht	-0.65	-0.04	-0.06	-0.01	0.00	-0.06	0.00	-0.08	0.00	-0.11	-0.24	-0.02	0.00	-0.02
Osd	-0.36	-0.02	-0.02	-0.01	0.00	-0.03	0.00	-0.05	0.00	-0.04	-0.16	-0.01	0.00	-0.01
Pfb	-0.47	-0.02	-0.02	0.00	0.00	-0.02	0.00	-0.01	0.00	-0.01	-0.38	-0.01	0.00	-0.01
v_f	-0.24	-0.01	-0.01	0.00	0.00	-0.07	0.00	-0.03	0.00	-0.02	-0.09	-0.01	0.00	0.00
c_b	-0.48	-0.04	-0.03	-0.01	0.00	-0.05	0.00	-0.07	0.00	-0.05	-0.21	-0.02	0.00	-0.02
Lea	-0.94	-0.01	-0.01	0.00	0.00	-0.01	0.00	-0.67	0.00	-0.04	-0.11	-0.08	0.00	0.00
Gro	-0.17	-0.01	-0.01	0.00	0.00	-0.01	0.00	-0.03	0.00	-0.02	-0.08	0.00	0.00	0.00
Ofd	-0.24	0.00	-0.01	0.00	0.00	-0.02	0.00	-0.05	0.00	-0.04	-0.11	-0.01	0.00	0.00
Tex	-0.45	-0.01	0.00	0.00	0.00	-0.01	0.00	-0.08	0.00	-0.05	-0.29	-0.01	0.00	0.00
Livestock	-0.76	-0.02	-0.02	0.00	0.00	-0.02	0.00	-0.47	0.00	-0.05	-0.12	-0.05	0.00	0.00
Fsh	-0.14	0.00	0.00	0.00	0.00	0.00	0.00	-0.05	0.00	-0.03	-0.05	-0.01	0.00	0.00
Frs	-0.51	-0.04	-0.03	-0.01	0.00	-0.01	0.00	0.03	0.00	-0.03	-0.18	0.00	0.00	-0.25
Total	**-5.99**	**-0.32**	**-0.26**	**-0.04**	**0.00**	**-0.37**	**0.00**	**-1.65**	**-0.01**	**-0.54**	**-2.24**	**-0.23**	**0.00**	**-0.35**

Note: Author's own simulations based on GTAP Data Base version 9.2.

Table B.5: Tariff Increased by 50% (percentage change in exports)

Sectors	Total	pdr	wht	osd	pfb	v_f	c_b	lea	gro	ofd	tex	livestock	fsh	frs
Pdr	-2.76	-0.40	-0.15	-0.02	0.00	-0.23	0.00	-0.36	0.00	-0.27	-1.15	-0.08	0.00	-0.10
Wht	-3.13	-0.21	-0.30	-0.03	0.00	-0.28	0.00	-0.37	0.00	-0.52	-1.21	-0.10	0.00	-0.11
Osd	-1.73	-0.11	-0.10	-0.03	0.00	-0.16	0.00	-0.23	0.00	-0.21	-0.79	-0.05	0.00	-0.06
Pfb	-2.31	-0.09	-0.08	-0.01	0.00	-0.12	0.00	-0.04	0.00	-0.04	-1.83	-0.04	0.00	-0.05
v_f	-1.14	-0.05	-0.04	-0.01	0.00	-0.34	0.00	-0.15	0.00	-0.11	-0.42	-0.03	0.00	0.00
c_b	-2.30	-0.16	-0.15	-0.02	0.00	-0.23	0.00	-0.32	0.00	-0.22	-1.03	-0.07	0.00	-0.09
Lea	-4.07	-0.06	-0.05	0.00	0.00	-0.06	0.00	-2.86	0.00	-0.20	-0.49	-0.37	0.00	0.01
Gro	-0.80	-0.04	-0.03	-0.01	0.00	-0.07	0.00	-0.12	-0.02	-0.09	-0.38	-0.02	0.00	-0.02
Ofd	-1.07	-0.02	-0.04	0.00	0.00	-0.08	0.00	-0.20	0.00	-0.16	-0.52	-0.03	0.00	-0.01
Tex	-2.07	-0.03	-0.02	0.00	0.00	-0.06	0.00	-0.32	0.00	-0.22	-1.34	-0.06	0.00	-0.01
Livestock	-3.35	-0.11	-0.08	-0.02	0.00	-0.11	0.00	-2.01	0.00	-0.21	-0.57	-0.23	0.00	0.00
Fsh	-0.61	-0.02	0.00	0.00	0.00	-0.01	0.00	-0.21	0.00	-0.13	-0.21	-0.03	-0.01	0.01
Frs	-2.49	-0.17	-0.15	-0.02	0.00	-0.03	0.00	0.10	0.00	-0.15	-0.90	0.00	0.00	-1.16
Total	**-27.82**	**-1.47**	**-1.19**	**-0.18**	**0.00**	**-1.76**	**0.00**	**-7.08**	**-0.03**	**-2.54**	**-10.85**	**-1.12**	**-0.01**	**-1.60**

Note: Author's own simulations based on GTAP Data Base version 9.2

Table B.6: Tariff Increased by 75% (percentage change in exports)

Sectors	Total	pdr	wht	osd	Pfb	v_f	c_b	lea	gro	ofd	Tex	livestock	fsh	frs
Pdr	-4.01	-0.57	-0.22	-0.03	0.00	-0.34	0.00	-0.50	0.00	-0.40	-1.70	-0.12	0.00	-0.14
Wht	-4.57	-0.30	-0.43	-0.04	0.00	-0.41	0.00	-0.52	0.00	-0.76	-1.81	-0.15	0.00	-0.16
Osd	-2.52	-0.16	-0.14	-0.05	0.00	-0.23	0.00	-0.31	0.00	-0.30	-1.17	-0.08	0.00	-0.08
Pfb	-3.40	-0.14	-0.12	-0.02	0.00	-0.17	0.00	-0.06	0.00	-0.07	-2.69	-0.05	0.00	-0.08
v_f	-1.65	-0.07	-0.06	-0.01	0.00	-0.49	0.00	-0.20	0.00	-0.16	-0.62	-0.04	0.00	0.00
c_b	-3.35	-0.24	-0.21	-0.03	0.00	-0.33	0.00	-0.44	-0.01	-0.33	-1.53	-0.11	0.00	-0.13
Lea	-5.63	-0.09	-0.07	-0.01	0.00	-0.09	0.00	-3.89	0.00	-0.28	-0.69	-0.53	0.00	0.01
Gro	-1.16	-0.06	-0.05	-0.01	0.00	-0.10	0.00	-0.16	-0.03	-0.13	-0.57	-0.03	0.00	-0.03
Ofd	-1.52	-0.03	-0.05	0.00	0.00	-0.12	0.00	-0.28	0.00	-0.23	-0.75	-0.05	0.00	-0.01
Tex	-2.95	-0.04	-0.03	0.00	0.00	-0.09	0.00	-0.43	0.00	-0.31	-1.94	-0.08	0.00	-0.02
Livestock	-4.67	-0.16	-0.12	-0.03	0.00	-0.16	0.00	-2.74	0.00	-0.30	-0.83	-0.34	0.00	-0.01
Fsh	-0.84	-0.03	0.00	0.00	0.00	-0.01	0.00	-0.28	0.00	-0.18	-0.29	-0.04	-0.01	0.01
Frs	-3.66	-0.25	-0.21	-0.03	0.00	-0.05	0.00	0.13	0.00	-0.23	-1.35	-0.01	0.00	-1.65
Total	**-36.28**	**-1.86**	**-1.49**	**-0.23**	**0.00**	**-2.52**	**0.00**	**-9.82**	**-0.04**	**-3.45**	**-14.58**	**-1.62**	**-0.01**	**-0.64**

Note: Author's own simulations based on GTAP Data Base version 9.2.

Table B.7: Complete Liberalisation (percentage change in imports)

Sectors	Total	pdr	wht	osd	Pfb	v_f	c_b	lea	gro	ofd	tex	livestock	fsh	frs
Pdr	38.96	42.37	-0.22	-0.03	0.00	-0.27	0.00	-0.92	0.00	-0.40	-1.23	-0.19	0.00	-0.14
Wht	44.73	-0.38	49.82	-0.05	0.00	-0.41	0.00	-0.93	0.00	-1.40	-1.49	-0.22	0.00	-0.21
Osd	-0.16	-0.08	-0.07	0.36	0.00	-0.09	0.00	-0.24	0.00	-0.09	0.18	-0.09	0.00	-0.04
Pfb	-3.16	-0.05	-0.05	0.00	0.00	-0.01	0.00	0.95	0.00	0.44	-4.46	0.06	0.00	-0.03
v_f	2.75	-0.06	-0.06	-0.01	0.00	4.00	0.00	-0.34	0.00	-0.19	-0.54	-0.04	0.00	0.00
c_b	-0.89	-0.07	-0.07	-0.01	0.00	-0.10	0.00	-0.23	0.00	-0.14	-0.19	-0.05	0.00	-0.04
Lea	84.00	-0.10	-0.08	-0.01	0.00	-0.08	0.00	85.91	0.00	-0.36	-0.78	-0.52	0.00	0.01
Gro	0.48	-0.03	-0.03	0.00	0.00	-0.06	0.00	-0.03	0.98	-0.04	-0.29	-0.01	0.00	-0.02
Ofd	38.22	-0.04	-0.07	0.00	0.00	-0.08	0.00	-0.70	0.00	40.09	-0.90	-0.06	0.00	-0.01
Tex	31.61	-0.03	-0.02	0.00	0.00	-0.05	0.00	-0.35	0.00	-0.16	32.27	-0.04	0.00	-0.01
Livestock	12.29	-0.12	-0.09	-0.02	0.00	-0.09	0.00	-3.47	0.00	-0.20	-0.61	16.89	0.00	0.00
Fsh	3.49	-0.02	0.00	0.00	0.00	-0.01	0.00	-0.47	0.00	-0.22	-0.26	-0.04	4.51	0.01
Frs	11.81	-0.20	-0.17	-0.03	0.00	-0.04	0.00	0.34	0.00	-0.05	-0.38	0.01	0.00	12.31
Total	**264.12**	**41.19**	**48.89**	**0.20**	**0.00**	**2.70**	**0.00**	**79.51**	**0.98**	**37.27**	**21.33**	**15.72**	**4.52**	**11.81**

Note: Author's own simulations based on GTAP Data Base version 9.2

Table B.8: Tariff Eliminated by 50% (percentage change in imports)

Sectors	Total	pdr	wht	osd	Pfb	v_f	c_b	lea	gro	ofd	tex	livestock	fsh	frs
Pdr	17.25	18.71	-0.09	-0.01	0.00	-0.12	0.00	-0.36	0.00	-0.17	-0.57	-0.08	0.00	-0.06
Wht	19.67	-0.16	21.88	-0.02	0.00	-0.18	0.00	-0.37	0.00	-0.59	-0.71	-0.09	0.00	-0.09
Osd	-0.11	-0.03	-0.03	0.15	0.00	-0.05	0.00	-0.11	0.00	-0.04	0.06	-0.04	0.00	-0.02
Pfb	-1.70	-0.02	-0.02	0.00	0.00	-0.01	0.00	0.36	0.00	0.19	-2.20	0.03	0.00	-0.02
v_f	1.22	-0.03	-0.03	0.00	0.00	1.80	0.00	-0.14	0.00	-0.09	-0.26	-0.02	0.00	0.00
c_b	-0.43	-0.03	-0.03	0.00	0.00	-0.05	0.00	-0.10	0.00	-0.07	-0.11	-0.02	0.00	-0.02
Lea	31.89	-0.04	-0.03	0.00	0.00	-0.03	0.00	32.65	0.00	-0.14	-0.31	-0.21	0.00	0.01
Gro	0.22	-0.01	-0.01	0.00	0.00	-0.03	0.00	-0.02	0.48	-0.02	-0.15	0.00	0.00	-0.01
Ofd	16.80	-0.02	-0.03	0.00	0.00	-0.04	0.00	-0.26	0.00	17.56	-0.38	-0.03	0.00	-0.01
Tex	14.58	-0.01	-0.01	0.00	0.00	-0.02	0.00	-0.14	0.00	-0.07	14.86	-0.02	0.00	-0.01
Livestock	5.81	-0.05	-0.04	-0.01	0.00	-0.04	0.00	-1.41	0.00	-0.09	-0.29	7.75	0.00	0.00
Fsh	1.73	-0.01	0.00	0.00	0.00	0.00	0.00	-0.19	0.00	-0.10	-0.11	-0.02	2.16	0.00
Frs	4.86	-0.09	-0.07	-0.01	0.00	-0.02	0.00	0.12	0.00	-0.03	-0.22	0.01	0.00	5.18
Total	**111.80**	**18.21**	**21.48**	**0.08**	**0.00**	**1.21**	**0.00**	**30.04**	**0.47**	**16.33**	**9.60**	**7.25**	**2.16**	**4.97**

Note: Author's own simulations based on GTAP Data Base version 9.2

Table B.9: Tariff Eliminated by 10% (percentage change in imports)

Sectors	Total	pdr	wht	Osd	pfb	v_f	c_b	lea	gro	ofd	tex	livestock	fsh	frs
Pdr	3.15	3.41	-0.02	0.00	0.00	-0.02	0.00	-0.06	0.00	-0.03	-0.11	-0.01	0.00	-0.01
Wht	3.58	-0.03	3.98	0.00	0.00	-0.03	0.00	-0.06	0.00	-0.10	-0.14	-0.02	0.00	-0.01
Osd	-0.03	-0.01	-0.01	0.03	0.00	-0.01	0.00	-0.02	0.00	-0.01	0.01	-0.01	0.00	0.00
Pfb	-0.36	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.00	0.03	-0.44	0.01	0.00	0.00
v_f	0.23	-0.01	0.00	0.00	0.00	0.33	0.00	-0.02	0.00	-0.02	-0.05	0.00	0.00	0.00
c_b	-0.08	-0.01	-0.01	0.00	0.00	-0.01	0.00	-0.02	0.00	-0.01	-0.02	0.00	0.00	0.00
Lea	5.14	-0.01	0.00	0.00	0.00	-0.01	0.00	5.27	0.00	-0.02	-0.05	-0.04	0.00	0.00
Gro	0.04	0.00	0.00	0.00	0.00	-0.01	0.00	0.00	0.09	0.00	-0.03	0.00	0.00	0.00
Ofd	3.06	0.00	0.00	0.00	0.00	-0.01	0.00	-0.04	0.00	3.18	-0.07	0.00	0.00	0.00
Tex	2.74	0.00	0.00	0.00	0.00	0.00	0.00	-0.02	0.00	-0.01	2.79	0.00	0.00	0.00
Livestock	1.12	-0.01	-0.01	0.00	0.00	-0.01	0.00	-0.23	0.00	-0.02	-0.06	1.45	0.00	0.00
Fsh	0.34	0.00	0.00	0.00	0.00	0.00	0.00	-0.03	0.00	-0.02	-0.02	0.00	0.42	0.00
Frs	0.84	-0.02	-0.01	0.00	0.00	0.00	0.00	0.02	0.00	-0.01	-0.05	0.00	0.00	0.91
Total	**19.78**	**3.32**	**3.91**	**0.01**	**0.00**	**0.22**	**0.00**	**4.83**	**0.09**	**2.96**	**1.77**	**1.36**	**0.42**	**0.87**

Note: Author's own simulations based on GTAP Data Base version 9.2

Table B.10: Tariff Increased by 10% (percentage change in imports)

Sectors	Total	pdr	wht	osd	pfb	v_f	c_b	lea	gro	ofd	tex	livestock	fsh	frs
Pdr	-3.02	-3.27	0.01	0.00	0.00	0.02	0.00	0.05	0.00	0.03	0.10	0.01	0.00	0.01
Wht	-3.42	0.03	-3.80	0.00	0.00	0.03	0.00	0.06	0.00	0.10	0.13	0.02	0.00	0.01
Osd	0.03	0.01	0.01	-0.02	0.00	0.01	0.00	0.02	0.00	0.01	-0.01	0.01	0.00	0.00
Pfb	0.36	0.00	0.00	0.00	0.00	0.00	0.00	-0.05	0.00	-0.03	0.43	-0.01	0.00	0.00
v_f	-0.22	0.01	0.00	0.00	0.00	-0.32	0.00	0.02	0.00	0.02	0.05	0.00	0.00	0.00
c_b	0.08	0.01	0.01	0.00	0.00	0.01	0.00	0.02	0.00	0.01	0.02	0.00	0.00	0.00
Lea	-4.64	0.01	0.00	0.00	0.00	0.01	0.00	-4.75	0.00	0.02	0.05	0.03	0.00	0.00
Gro	-0.04	0.00	0.00	0.00	0.00	0.01	0.00	0.00	-0.09	0.00	0.03	0.00	0.00	0.00
Ofd	-2.92	0.00	0.00	0.00	0.00	0.01	0.00	0.04	0.00	-3.04	0.06	0.00	0.00	0.00
Tex	-2.65	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.01	-2.70	0.00	0.00	0.00
Livestock	-1.10	0.01	0.01	0.00	0.00	0.01	0.00	0.21	0.00	0.02	0.05	-1.41	0.00	0.00
Fsh	-0.34	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.02	0.02	0.00	-0.41	0.00
Frs	-0.78	0.02	0.01	0.00	0.00	0.00	0.00	-0.01	0.00	0.01	0.05	0.00	0.00	-0.86
Total	**-18.67**	**-3.18**	**-3.73**	**-0.01**	**0.00**	**-0.21**	**0.00**	**-4.35**	**-0.09**	**-2.83**	**-1.70**	**-1.32**	**-0.41**	**-0.82**

Note: Author's own simulations based on GTAP Data Base version 9.2

Table B.11: Tariff Increased by 50% (percentage change in imports)

Sectors	Total	pdr	wht	osd	Pfb	v_f	c_b	lea	gro	ofd	tex	livestock	fsh	frs
Pdr	-13.89	-14.99	0.06	0.01	0.00	0.10	0.00	0.22	0.00	0.14	0.47	0.06	0.00	0.04
Wht	-15.69	0.11	-17.40	0.01	0.00	0.14	0.00	0.24	0.00	0.44	0.62	0.07	0.00	0.06
Osd	0.15	0.03	0.03	-0.11	0.00	0.04	0.00	0.08	0.00	0.04	-0.02	0.04	0.00	0.02
Pfb	1.84	0.02	0.02	0.00	0.00	0.01	0.00	-0.21	0.00	-0.14	2.13	-0.02	0.00	0.01
v_f	-1.01	0.02	0.02	0.00	0.00	-1.50	0.00	0.10	0.00	0.08	0.24	0.02	0.00	0.00
c_b	0.40	0.03	0.03	0.00	0.00	0.04	0.00	0.08	0.00	0.06	0.12	0.02	0.00	0.02
Lea	-19.01	0.02	0.02	0.00	0.00	0.02	0.00	-19.50	0.00	0.08	0.20	0.15	0.00	0.00
Gro	-0.20	0.01	0.01	0.00	0.00	0.03	0.00	0.02	-0.45	0.02	0.16	0.00	0.00	0.01
Ofd	-13.41	0.01	0.02	0.00	0.00	0.03	0.00	0.14	0.00	-13.91	0.28	0.02	0.00	0.00
Tex	-12.48	0.01	0.01	0.00	0.00	0.02	0.00	0.08	0.00	0.06	-12.68	0.01	0.00	0.00
Livestock	-5.31	0.04	0.03	0.01	0.00	0.04	0.00	0.90	0.00	0.07	0.25	-6.65	0.00	0.00
Fsh	-1.68	0.01	0.00	0.00	0.00	0.00	0.00	0.12	0.00	0.08	0.08	0.02	-1.97	0.00
Frs	-3.40	0.07	0.06	0.01	0.00	0.02	0.00	-0.06	0.00	0.04	0.25	0.00	0.00	-3.79
Total	**-83.68**	**-14.60**	**-17.09**	**-0.06**	**0.00**	**-1.00**	**0.00**	**-17.79**	**-0.45**	**-12.94**	**-7.88**	**-6.27**	**-1.97**	**-3.63**

Note: Author's own simulations based on GTAP Data Base version 9.2

Table B.12: Tariff Increased by 75% (percentage change in imports)

Sectors	Total	pdr	wht	osd	Pfb	v_f	c_b	lea	gro	ofd	tex	livestock	fsh	frs
Pdr	-19.81	-21.36	0.09	0.01	0.00	0.13	0.00	0.29	0.00	0.19	0.68	0.09	0.00	0.06
Wht	-22.34	0.16	-24.75	0.02	0.00	0.21	0.00	0.32	0.00	0.62	0.90	0.10	0.00	0.09
Osd	0.23	0.04	0.04	-0.15	0.00	0.06	0.00	0.11	0.00	0.06	-0.02	0.05	0.00	0.02
Pfb	2.78	0.03	0.03	0.00	0.00	0.02	0.00	-0.27	0.00	-0.19	3.16	-0.03	0.00	0.02
v_f	-1.46	0.04	0.03	0.00	0.00	-2.16	0.00	0.13	0.00	0.11	0.36	0.03	0.00	0.00
c_b	0.60	0.04	0.04	0.01	0.00	0.07	0.00	0.11	0.00	0.09	0.19	0.03	0.00	0.02
Lea	-25.32	0.03	0.03	0.00	0.00	0.03	0.00	-25.99	0.00	0.11	0.27	0.21	0.00	-0.01
Gro	-0.30	0.02	0.02	0.00	0.00	0.04	0.00	0.02	-0.67	0.03	0.23	0.00	0.00	0.01
Ofd	-19.11	0.02	0.03	0.00	0.00	0.04	0.00	0.18	0.00	-19.80	0.38	0.03	0.00	0.00
Tex	-18.04	0.01	0.01	0.00	0.00	0.02	0.00	0.11	0.00	0.08	-18.30	0.02	0.00	0.01
Livestock	-7.78	0.06	0.04	0.01	0.00	0.06	0.00	1.23	0.00	0.10	0.36	-9.64	0.00	0.00
Fsh	-2.49	0.01	0.00	0.00	0.00	0.00	0.00	0.16	0.00	0.11	0.11	0.02	-2.90	0.00
Frs	-4.68	0.10	0.09	0.01	0.00	0.03	0.00	-0.07	0.00	0.06	0.39	0.00	0.00	-5.29
Total	**-117.72**	**-20.80**	**-24.31**	**-0.08**	**0.00**	**-1.44**	**0.00**	**-23.67**	**-0.67**	**-18.43**	**-11.28**	**-9.09**	**-2.90**	**-5.06**

Author's own simulations based on GTAP Data Base version 9.2

Table B.13: Complete Liberalisation (percentage change in output)

Sectors	Total	pdr	wht	osd	Pfb	v_f	c_b	lea	gro	ofd	tex	livestock	fsh	Frs
Pdr	0.05	-0.36	0.02	0.00	0.00	0.04	0.00	0.02	0.00	0.03	0.28	-0.01	0.00	0.01
Wht	0.24	0.07	-0.09	0.01	0.00	0.08	0.00	0.01	0.00	-0.24	0.37	-0.01	0.00	0.04
Osd	0.19	0.02	0.02	-0.05	0.00	0.02	0.00	0.05	0.00	-0.03	0.14	0.01	0.00	0.01
Pfb	-0.20	0.08	0.07	0.01	0.00	0.14	0.00	0.72	0.00	0.38	-1.73	0.09	0.00	0.04
v_f	-0.15	0.03	0.03	0.01	0.00	-0.56	0.00	0.08	0.00	0.03	0.21	0.01	0.00	0.00
c_b	-0.01	0.00	0.00	0.00	0.00	0.01	0.00	-0.11	0.00	0.02	0.08	-0.01	0.00	0.00
Lea	-0.85	0.01	0.01	0.00	0.00	0.01	0.00	-1.03	0.00	0.02	0.07	0.05	0.00	0.00
Gro	0.30	0.03	0.02	0.00	0.00	0.03	0.00	0.12	-0.09	0.08	0.09	0.01	0.00	0.01
Ofd	-0.43	0.00	0.01	0.00	0.00	0.02	0.00	-0.04	0.00	-0.56	0.14	0.00	0.00	0.00
Tex	-1.17	0.05	0.04	0.01	0.00	0.12	0.00	0.95	0.00	0.46	-2.93	0.10	0.00	0.03
Livestock	-0.41	0.01	0.01	0.00	0.00	0.02	0.00	-0.43	0.00	0.03	0.11	-0.17	0.00	0.00
Fsh	0.01	0.00	0.00	0.00	0.00	0.01	0.00	-0.03	0.00	-0.02	0.05	0.00	0.00	0.00
Frs	-0.55	0.02	0.02	0.00	0.00	0.01	0.00	0.00	0.00	0.09	0.30	0.01	0.00	-1.00
Total	**-2.96**	**-0.01**	**0.15**	**0.00**	**0.00**	**-0.06**	**0.00**	**0.31**	**-0.09**	**0.29**	**-2.80**	**0.08**	**0.00**	**-0.84**

Note: Author's own simulations based on GTAP Data Base version 9.2

Table B.14: Tariff Eliminated by 50% (percentage change in output)

Sectors	Total	pdr	wht	osd	Pfb	v_f	c_b	Lea	gro	ofd	tex	livestock	fsh	Frs
Pdr	0.03	-0.16	0.01	0.00	0.00	0.02	0.00	0.01	0.00	0.02	0.13	0.00	0.00	0.01
Wht	0.13	0.03	-0.04	0.00	0.00	0.04	0.00	0.01	0.00	-0.11	0.18	0.00	0.00	0.02
Osd	0.09	0.01	0.01	-0.02	0.00	0.01	0.00	0.02	0.00	-0.02	0.07	0.00	0.00	0.01
Pfb	-0.19	0.04	0.03	0.01	0.00	0.06	0.00	0.29	0.00	0.17	-0.85	0.04	0.00	0.02
v_f	-0.07	0.01	0.01	0.00	0.00	-0.26	0.00	0.03	0.00	0.01	0.10	0.01	0.00	0.00
c_b	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.05	0.00	0.01	0.04	0.00	0.00	0.00
Lea	-0.34	0.00	0.00	0.00	0.00	0.01	0.00	-0.42	0.00	0.01	0.03	0.02	0.00	0.00
Gro	0.13	0.01	0.01	0.00	0.00	0.01	0.00	0.05	-0.05	0.04	0.04	0.01	0.00	0.01
Ofd	-0.19	0.00	0.00	0.00	0.00	0.01	0.00	-0.01	0.00	-0.26	0.06	0.00	0.00	0.00
Tex	-0.70	0.02	0.02	0.00	0.00	0.05	0.00	0.37	0.00	0.20	-1.44	0.05	0.00	0.01
Livestock	-0.17	0.01	0.00	0.00	0.00	0.01	0.00	-0.17	0.00	0.01	0.05	-0.08	0.00	0.00
Fsh	0.01	0.00	0.00	0.00	0.00	0.00	0.00	-0.01	0.00	-0.01	0.03	0.00	0.00	0.00
Frs	-0.24	0.01	0.01	0.00	0.00	0.01	0.00	0.00	0.00	0.04	0.14	0.00	0.00	-0.45
Total	**-1.52**	**-0.01**	**0.07**	**0.00**	**0.00**	**-0.03**	**0.00**	**0.11**	**-0.04**	**0.12**	**-1.40**	**0.04**	**0.00**	**-0.38**

Note: Author's own simulations based on GTAP Data Base version 9.2

Table B.15: Tariff Eliminated by 10% (percentage change in output)

Sectors	Total	Pdr	wht	osd	Pfb	v_f	c_b	lea	gro	ofd	tex	livestock	fsh	frs
Pdr	0.01	-0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00
Wht	0.03	0.01	-0.01	0.00	0.00	0.01	0.00	0.00	0.00	-0.02	0.04	0.00	0.00	0.00
Osd	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00
Pfb	-0.05	0.01	0.01	0.00	0.00	0.01	0.00	0.05	0.00	0.03	-0.17	0.01	0.00	0.00
v_f	-0.01	0.00	0.00	0.00	0.00	-0.05	0.00	0.01	0.00	0.00	0.02	0.00	0.00	0.00
c_b	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.01	0.00	0.00	0.01	0.00	0.00	0.00
Lea	-0.06	0.00	0.00	0.00	0.00	0.00	0.00	-0.07	0.00	0.00	0.01	0.00	0.00	0.00
Gro	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.01	-0.01	0.01	0.01	0.00	0.00	0.00
Ofd	-0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.05	0.01	0.00	0.00	0.00
Tex	-0.16	0.00	0.00	0.00	0.00	0.01	0.00	0.06	0.00	0.04	-0.28	0.01	0.00	0.00
Livestock	-0.03	0.00	0.00	0.00	0.00	0.00	0.00	-0.03	0.00	0.00	0.01	-0.02	0.00	0.00
Fsh	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Frs	-0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.03	0.00	0.00	-0.08
Total	**-0.31**	**0.00**	**0.01**	**0.00**	**0.00**	**-0.01**	**0.00**	**0.02**	**-0.01**	**0.02**	**-0.28**	**0.01**	**0.00**	**-0.07**

Note: Author's own simulations based on GTAP Data Base version 9.2

Table B.16: Tariff Increased by 10% (percentage change in output)

Sectors	Total	pdr	wht	osd	Pfb	v_f	c_b	lea	gro	Ofd	tex	livestock	fsh	frs
Pdr	-0.01	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.02	0.00	0.00	0.00
Wht	-0.03	-0.01	0.01	0.00	0.00	-0.01	0.00	0.00	0.00	0.02	-0.04	0.00	0.00	0.00
Osd	-0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.01	0.00	0.00	0.00
Pfb	0.06	-0.01	-0.01	0.00	0.00	-0.01	0.00	-0.04	0.00	-0.03	0.16	-0.01	0.00	0.00
v_f	0.01	0.00	0.00	0.00	0.00	0.05	0.00	-0.01	0.00	0.00	-0.02	0.00	0.00	0.00
c_b	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	-0.01	0.00	0.00	0.00
Lea	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.00	0.00	-0.01	0.00	0.00	0.00
Gro	-0.02	0.00	0.00	0.00	0.00	0.00	0.00	-0.01	0.01	-0.01	-0.01	0.00	0.00	0.00
Ofd	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	-0.01	0.00	0.00	0.00
Tex	0.16	0.00	0.00	0.00	0.00	-0.01	0.00	-0.06	0.00	-0.04	0.28	-0.01	0.00	0.00
Livestock	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	-0.01	0.02	0.00	0.00
Fsh	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Frs	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.01	-0.03	0.00	0.00	0.08
Total	**0.31**	**0.00**	**-0.01**	**0.00**	**0.00**	**0.01**	**0.00**	**-0.01**	**0.01**	**-0.02**	**0.28**	**-0.01**	**0.00**	**0.07**

Note: Author's own simulations based on GTAP Data Base version 9.2

Table B.17: Tariff Increased by 50% (percentage change in output)

Sectors	Total	pdr	wht	osd	pfb	v_f	c_b	lea	gro	ofd	tex	livestock	fsh	frs
Pdr	-0.03	0.13	-0.01	0.00	0.00	-0.02	0.00	-0.01	0.00	-0.01	-0.12	0.00	0.00	-0.01
Wht	-0.14	-0.02	0.03	0.00	0.00	-0.04	0.00	-0.01	0.00	0.09	-0.18	0.00	0.00	-0.01
Osd	-0.08	-0.01	-0.01	0.02	0.00	-0.01	0.00	-0.01	0.00	0.01	-0.06	0.00	0.00	0.00
Pfb	0.32	-0.03	-0.03	0.00	0.00	-0.06	0.00	-0.18	0.00	-0.14	0.80	-0.04	0.00	-0.02
v_f	0.07	-0.01	-0.01	0.00	0.00	0.24	0.00	-0.02	0.00	-0.01	-0.10	-0.01	0.00	0.00
c_b	-0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	-0.01	-0.03	0.00	0.00	0.00
Lea	0.21	0.00	0.00	0.00	0.00	0.00	0.00	0.29	0.00	-0.01	-0.03	-0.02	0.00	0.00
Gro	-0.09	-0.01	-0.01	0.00	0.00	-0.01	0.00	-0.03	0.05	-0.03	-0.03	-0.01	0.00	-0.01
Ofd	0.16	0.00	0.00	0.00	0.00	-0.01	0.00	0.01	0.00	0.22	-0.06	0.00	0.00	0.00
Tex	0.85	-0.02	-0.01	0.00	0.00	-0.04	0.00	-0.23	0.00	-0.16	1.37	-0.04	0.00	-0.01
Livestock	0.12	-0.01	0.00	0.00	0.00	-0.01	0.00	0.12	0.00	-0.01	-0.05	0.07	0.00	0.00
Fsh	-0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.01	-0.02	0.00	0.00	0.00
Frs	0.19	-0.01	-0.01	0.00	0.00	0.00	0.00	0.00	0.00	-0.03	-0.12	0.00	0.00	0.37
Total	**1.56**	**0.01**	**-0.06**	**0.00**	**0.00**	**0.03**	**0.00**	**-0.04**	**0.04**	**-0.08**	**1.38**	**-0.03**	**0.00**	**0.31**

Note: Author's own simulations based on GTAP Data Base version 9.2

Table B.18: Tariff Increased by 75% (percentage change in output)

Sectors	Total	pdr	wht	osd	pfb	v_f	c_b	lea	gro	ofd	tex	livestock	fsh	frs
Pdr	-0.04	0.19	-0.01	0.00	0.00	-0.02	0.00	-0.01	0.00	-0.02	-0.17	0.00	0.00	-0.01
Wht	-0.20	-0.04	0.05	-0.01	0.00	-0.05	0.00	-0.01	0.00	0.13	-0.26	0.01	0.00	-0.02
Osd	-0.11	-0.01	-0.01	0.03	0.00	-0.02	0.00	-0.02	0.00	0.02	-0.09	0.00	0.00	-0.01
Pfb	0.50	-0.04	-0.04	-0.01	0.00	-0.08	0.00	-0.24	0.00	-0.19	1.19	-0.05	0.00	-0.02
v_f	0.10	-0.02	-0.02	0.00	0.00	0.35	0.00	-0.03	0.00	-0.02	-0.15	-0.01	0.00	0.00
c_b	-0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00	-0.01	-0.05	0.01	0.00	0.00
Lea	0.29	-0.01	0.00	0.00	0.00	-0.01	0.00	0.39	0.00	-0.01	-0.05	-0.03	0.00	0.00
Gro	-0.12	-0.01	-0.01	0.00	0.00	-0.02	0.00	-0.04	0.07	-0.04	-0.04	-0.01	0.00	-0.01
Ofd	0.23	0.00	0.00	0.00	0.00	-0.01	0.00	0.01	0.00	0.32	-0.08	0.00	0.00	0.00
Tex	1.30	-0.03	-0.02	0.00	0.00	-0.07	0.00	-0.31	0.00	-0.23	2.03	-0.06	0.00	-0.01
Livestock	0.16	-0.01	-0.01	0.00	0.00	-0.01	0.00	0.17	0.00	-0.02	-0.07	0.11	0.00	0.00
Fsh	-0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.01	-0.03	0.00	0.00	0.00
Frs	0.27	-0.01	-0.01	0.00	0.00	-0.01	0.00	0.00	0.00	-0.05	-0.18	0.00	0.00	0.53
Total	**2.33**	**0.01**	**-0.08**	**0.00**	**0.00**	**0.05**	**0.00**	**-0.04**	**0.06**	**-0.11**	**2.05**	**-0.05**	**0.00**	**0.45**

Note: Author's own simulations based on GTAP Data Base version 9.2

Table B.19: Complete Liberalisation (percentage change in prices)

Sectors	Total	pdr	wht	osd	pfb	v_f	c_b	lea	gro	ofd	tex	livestock	fsh	Frs
Pdr	-0.84	-0.13	-0.05	-0.01	0.00	-0.06	0.00	-0.14	0.00	-0.08	-0.30	-0.02	0.00	-0.03
Wht	-0.96	-0.07	-0.10	-0.01	0.00	-0.08	0.00	-0.14	0.00	-0.16	-0.31	-0.03	0.00	-0.04
Osd	-0.91	-0.06	-0.06	-0.02	0.00	-0.08	0.00	-0.16	0.00	-0.11	-0.36	-0.03	0.00	-0.03
Pfb	-1.04	-0.05	-0.05	-0.01	0.00	-0.06	0.00	0.02	0.00	0.00	-0.84	-0.02	0.00	-0.03
v_f	-0.97	-0.04	-0.04	-0.01	0.00	-0.21	0.00	-0.19	0.00	-0.10	-0.35	-0.03	0.00	0.00
c_b	-0.96	-0.08	-0.07	-0.01	0.00	-0.09	0.00	-0.17	0.00	-0.09	-0.37	-0.03	0.00	-0.04
Lea	-1.68	-0.02	-0.02	0.00	0.00	-0.02	0.00	-1.29	0.00	-0.07	-0.15	-0.11	0.00	0.00
Gro	-0.77	-0.04	-0.03	0.00	0.00	-0.06	0.00	-0.16	-0.01	-0.08	-0.34	-0.02	0.00	-0.02
Ofd	-0.94	-0.02	-0.03	0.00	0.00	-0.04	0.00	-0.25	0.00	-0.14	-0.42	-0.02	0.00	-0.01
Tex	-0.83	-0.01	-0.01	0.00	0.00	-0.02	0.00	-0.18	0.00	-0.09	-0.49	-0.02	0.00	-0.01
Livestock	-1.52	-0.04	-0.03	-0.01	0.00	-0.03	0.00	-1.04	0.00	-0.08	-0.19	-0.08	0.00	0.00
Fsh	-0.86	-0.02	0.00	0.00	0.00	-0.01	0.00	-0.37	0.00	-0.16	-0.27	-0.03	-0.01	0.01
Frs	-1.21	-0.10	-0.09	-0.01	0.00	-0.01	0.00	0.14	0.00	-0.06	-0.37	0.00	0.00	-0.70
Total	**-13.48**	**-0.69**	**-0.58**	**-0.09**	**0.00**	**-0.77**	**0.00**	**-3.96**	**-0.02**	**-1.24**	**-4.78**	**-0.43**	**-0.01**	**-0.92**

Note: Author's own simulations based on GTAP Data Base version 9.2

Table B.20: Tariff Elimination by 50% (percentage change in prices)

Sectors	Total	pdr	wht	osd	Pfb	v_f	c_b	lea	gro	ofd	tex	livestock	fsh	frs
Pdr	-0.40	-0.06	-0.02	0.00	0.00	-0.03	0.00	-0.06	0.00	-0.04	-0.15	-0.01	0.00	-0.01
Wht	-0.46	-0.03	-0.05	0.00	0.00	-0.04	0.00	-0.07	0.00	-0.08	-0.16	-0.02	0.00	-0.02
Osd	-0.43	-0.03	-0.03	-0.01	0.00	-0.04	0.00	-0.07	0.00	-0.05	-0.18	-0.01	0.00	-0.02
Pfb	-0.52	-0.02	-0.02	0.00	0.00	-0.03	0.00	0.00	0.00	-0.01	-0.42	-0.01	0.00	-0.01
v_f	-0.45	-0.02	-0.02	0.00	0.00	-0.10	0.00	-0.08	0.00	-0.05	-0.17	-0.01	0.00	0.00
c_b	-0.47	-0.04	-0.03	-0.01	0.00	-0.05	0.00	-0.08	0.00	-0.04	-0.19	-0.01	0.00	-0.02
Lea	-0.74	-0.01	-0.01	0.00	0.00	-0.01	0.00	-0.55	0.00	-0.03	-0.08	-0.05	0.00	0.00
Gro	-0.36	-0.02	-0.02	0.00	0.00	-0.03	0.00	-0.07	-0.01	-0.04	-0.17	-0.01	0.00	-0.01
Tex	-0.38	0.00	0.00	0.00	0.00	-0.01	0.00	-0.07	0.00	-0.04	-0.23	-0.01	0.00	0.00
Livestock	-0.67	-0.02	-0.01	0.00	0.00	-0.02	0.00	-0.44	0.00	-0.04	-0.10	-0.04	0.00	0.00
Fsh	-0.37	-0.01	0.00	0.00	0.00	0.00	0.00	-0.15	0.00	-0.07	-0.12	-0.01	0.00	0.00
Frs	-0.59	-0.05	-0.04	-0.01	0.00	-0.01	0.00	0.05	0.00	-0.03	-0.19	0.00	0.00	-0.32
Total	**-5.85**	**-0.31**	**-0.25**	**-0.04**	**0.00**	**-0.35**	**0.00**	**-1.59**	**-0.01**	**-0.52**	**-2.16**	**-0.20**	**0.00**	**-0.41**

Note: Author's own simulations based on GTAP Data Base version 9.2.

Table B.21: Tariff Elimination by 10% (percentage change in prices)

Sectors	Total	pdr	Wht	osd	Pfb	v_f	c_b	lea	gro	ofd	Tex	livestock	fsh	frs
Pdr	-0.08	-0.01	0.00	0.00	0.00	-0.01	0.00	-0.01	0.00	-0.01	-0.03	0.00	0.00	0.00
Wht	-0.09	-0.01	-0.01	0.00	0.00	-0.01	0.00	-0.01	0.00	-0.02	-0.03	0.00	0.00	0.00
Osd	-0.08	-0.01	0.00	0.00	0.00	-0.01	0.00	-0.01	0.00	-0.01	-0.04	0.00	0.00	0.00
Pfb	-0.10	0.00	0.00	0.00	0.00	-0.01	0.00	0.00	0.00	0.00	-0.08	0.00	0.00	0.00
v_f	-0.09	0.00	0.00	0.00	0.00	-0.02	0.00	-0.01	0.00	-0.01	-0.03	0.00	0.00	0.00
c_b	-0.09	-0.01	-0.01	0.00	0.00	-0.01	0.00	-0.01	0.00	-0.01	-0.04	0.00	0.00	0.00
Lea	-0.13	0.00	0.00	0.00	0.00	0.00	0.00	-0.09	0.00	-0.01	-0.01	-0.01	0.00	0.00
Gro	-0.07	0.00	0.00	0.00	0.00	-0.01	0.00	-0.01	0.00	-0.01	-0.03	0.00	0.00	0.00
Ofd	-0.08	0.00	0.00	0.00	0.00	0.00	0.00	-0.02	0.00	-0.01	-0.04	0.00	0.00	0.00
Tex	-0.07	0.00	0.00	0.00	0.00	0.00	0.00	-0.01	0.00	-0.01	-0.04	0.00	0.00	0.00
Livestock	-0.12	0.00	0.00	0.00	0.00	0.00	0.00	-0.08	0.00	-0.01	-0.02	-0.01	0.00	0.00
Fsh	-0.06	0.00	0.00	0.00	0.00	0.00	0.00	-0.02	0.00	-0.01	-0.02	0.00	0.00	0.00
Frs	-0.12	-0.01	-0.01	0.00	0.00	0.00	0.00	0.01	0.00	-0.01	-0.04	0.00	0.00	-0.06
Total	**-1.17**	**-0.06**	**-0.05**	**-0.01**	**0.00**	**-0.07**	**0.00**	**-0.29**	**0.00**	**-0.11**	**-0.46**	**-0.04**	**0.00**	**-0.08**

Note: Author's own simulations based on GTAP Data Base version 9.2

Table B.22: Tariff Increased by 10% (percentage change in prices)

Sectors	Total	pdr	Wht	osd	Pfb	v_f	c_b	lea	gro	ofd	tex	livestock	fsh	Frs
Pdr	0.08	0.01	0.00	0.00	0.00	0.01	0.00	0.01	0.00	0.01	0.03	0.00	0.00	0.00
Wht	0.09	0.01	0.01	0.00	0.00	0.01	0.00	0.01	0.00	0.01	0.03	0.00	0.00	0.00
Osd	0.08	0.01	0.00	0.00	0.00	0.01	0.00	0.01	0.00	0.01	0.04	0.00	0.00	0.00
Pfb	0.10	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.08	0.00	0.00	0.00
v_f	0.08	0.00	0.00	0.00	0.00	0.02	0.00	0.01	0.00	0.01	0.03	0.00	0.00	0.00
c_b	0.09	0.01	0.01	0.00	0.00	0.01	0.00	0.01	0.00	0.01	0.04	0.00	0.00	0.00
Lea	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.00	0.01	0.01	0.01	0.00	0.00
Gro	0.07	0.00	0.00	0.00	0.00	0.01	0.00	0.01	0.00	0.01	0.03	0.00	0.00	0.00
Ofd	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.01	0.04	0.00	0.00	0.00
Tex	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.01	0.04	0.00	0.00	0.00
Livestock	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.00	0.01	0.02	0.01	0.00	0.00
Fsh	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.01	0.02	0.00	0.00	0.00
Frs	0.12	0.01	0.01	0.00	0.00	0.00	0.00	-0.01	0.00	0.01	0.04	0.00	0.00	0.06
Total	**1.14**	**0.06**	**0.05**	**0.01**	**0.00**	**0.07**	**0.00**	**0.27**	**0.00**	**0.11**	**0.46**	**0.04**	**0.00**	**0.07**

Note: Author's own simulations based on GTAP Data Base version 9.2.

Table B.23: Tariff Increased by 50% (percentage change in prices)

Sectors	Total	pdr	wht	osd	Pfb	v_f	c_b	lea	gro	Ofd	tex	livestock	fsh	frs
Pdr	0.36	0.05	0.02	0.00	0.00	0.03	0.00	0.05	0.00	0.04	0.15	0.01	0.00	0.01
Wht	0.43	0.03	0.04	0.00	0.00	0.04	0.00	0.05	0.00	0.07	0.17	0.01	0.00	0.02
Osd	0.39	0.02	0.02	0.01	0.00	0.03	0.00	0.05	0.00	0.05	0.18	0.01	0.00	0.01
Pfb	0.51	0.02	0.02	0.00	0.00	0.03	0.00	0.01	0.00	0.01	0.40	0.01	0.00	0.01
v_f	0.40	0.02	0.02	0.00	0.00	0.09	0.00	0.06	0.00	0.04	0.16	0.01	0.00	0.00
c_b	0.43	0.03	0.03	0.00	0.00	0.04	0.00	0.06	0.00	0.04	0.19	0.01	0.00	0.02
Lea	0.54	0.01	0.01	0.00	0.00	0.01	0.00	0.38	0.00	0.03	0.06	0.05	0.00	0.00
Gro	0.32	0.02	0.01	0.00	0.00	0.02	0.00	0.05	0.01	0.03	0.15	0.01	0.00	0.01
Ofd	0.33	0.01	0.01	0.00	0.00	0.02	0.00	0.07	0.00	0.05	0.17	0.01	0.00	0.00
Tex	0.30	0.00	0.00	0.00	0.00	0.01	0.00	0.05	0.00	0.03	0.20	0.01	0.00	0.00
Livestock	0.50	0.02	0.01	0.00	0.00	0.01	0.00	0.30	0.00	0.03	0.09	0.03	0.00	0.00
Fsh	0.27	0.01	0.00	0.00	0.00	0.00	0.00	0.09	0.00	0.06	0.09	0.01	0.00	0.00
Frs	0.57	0.04	0.03	0.01	0.00	0.01	0.00	-0.02	0.00	0.03	0.21	0.00	0.00	0.27
Total	**5.36**	**0.27**	**0.23**	**0.04**	**0.00**	**0.35**	**0.00**	**1.18**	**0.01**	**0.51**	**2.23**	**0.19**	**0.00**	**0.35**

Note: Author's own simulations based on GTAP Data Base version 9.2

Table B.24: Tariff Increased by 75% (percentage change in prices)

Sectors	Total	pdr	Wht	osd	Pfb	v_f	c_b	lea	gro	ofd	Tex	livestock	fsh	frs
Pdr	0.53	0.07	0.03	0.00	0.00	0.04	0.00	0.07	0.00	0.05	0.23	0.02	0.00	0.02
Wht	0.63	0.04	0.06	0.01	0.00	0.06	0.00	0.07	0.00	0.10	0.25	0.02	0.00	0.02
Osd	0.58	0.04	0.03	0.01	0.00	0.05	0.00	0.07	0.00	0.07	0.27	0.02	0.00	0.02
Pfb	0.76	0.03	0.03	0.00	0.00	0.04	0.00	0.01	0.00	0.01	0.60	0.01	0.00	0.02
v_f	0.58	0.03	0.02	0.00	0.00	0.14	0.00	0.08	0.00	0.06	0.24	0.02	0.00	0.00
c_b	0.63	0.04	0.04	0.01	0.00	0.06	0.00	0.08	0.00	0.06	0.29	0.02	0.00	0.02
Lea	0.75	0.01	0.01	0.00	0.00	0.01	0.00	0.52	0.00	0.04	0.09	0.07	0.00	0.00
Gro	0.46	0.02	0.02	0.00	0.00	0.04	0.00	0.06	0.01	0.05	0.23	0.01	0.00	0.01
Ofd	0.47	0.01	0.02	0.00	0.00	0.02	0.00	0.09	0.00	0.07	0.24	0.02	0.00	0.00
Tex	0.44	0.01	0.00	0.00	0.00	0.01	0.00	0.06	0.00	0.05	0.29	0.01	0.00	0.00
Livestock	0.71	0.02	0.02	0.00	0.00	0.02	0.00	0.42	0.00	0.05	0.13	0.05	0.00	0.00
Fsh	0.37	0.01	0.00	0.00	0.00	0.00	0.00	0.13	0.00	0.08	0.13	0.02	0.00	0.00
Frs	0.85	0.06	0.05	0.01	0.00	0.01	0.00	-0.03	0.00	0.05	0.31	0.00	0.00	0.38
Total	**7.76**	**0.39**	**0.33**	**0.05**	**0.00**	**0.51**	**0.00**	**1.63**	**0.01**	**0.75**	**3.29**	**0.29**	**0.00**	**0.50**

Note: Author's own simulations based on GTAP Data Base version 9.2

Table B.25: Complete Liberalisation (percentage change in real factor wages)

Real Factors	Total	Pdr	wht	osd	pfb	v_f	c_b	lea	gro	ofd	tex	livestock	fsh	Frs
Labour-small farmer	-0.32	-0.06	-0.06	-0.01	0.00	-0.13	0.00	-0.30	0.00	0.06	0.23	-0.07	0.00	0.02
Labour-medium farmer	-0.35	-0.09	-0.06	0.00	0.00	0.00	0.00	-0.36	0.00	0.09	0.09	-0.04	0.00	0.02
Labour-farm worker	-0.44	-0.06	-0.05	-0.01	0.00	-0.11	0.00	-0.49	0.00	0.07	0.27	-0.08	0.00	0.01
Labour- non-farm low skilled	0.05	0.02	0.02	0.00	0.00	0.03	0.00	0.17	0.00	0.01	-0.21	0.01	0.00	0.01
Labour- non-farm high skilled	0.15	0.01	0.01	0.00	0.00	0.01	0.00	0.16	0.00	-0.01	-0.05	0.01	0.00	0.00
Land – small	0.19	-0.13	-0.12	-0.02	0.00	-0.32	0.00	0.84	0.00	0.01	-0.15	0.05	0.00	0.04
Land – medium	0.23	-0.14	-0.13	-0.02	0.00	-0.09	0.00	0.92	0.00	0.03	-0.44	0.06	0.00	0.04
Land – large	0.46	-0.21	-0.18	-0.03	0.00	0.12	0.00	0.69	0.00	-0.15	0.15	0.02	0.00	0.03
Livestock	-1.54	0.02	0.00	0.01	0.00	0.04	0.00	-2.30	0.00	0.13	0.68	-0.13	0.00	0.01
Capital – agriculture	0.13	-0.14	-0.12	-0.02	0.00	0.03	0.00	0.80	0.00	0.04	-0.09	0.05	0.00	-0.43
Capital – formal	0.24	0.02	0.02	0.00	0.00	0.03	0.00	0.20	0.00	-0.03	-0.02	0.02	0.00	0.01
Capital – informal	0.47	0.02	0.02	0.00	0.00	0.03	0.00	0.23	0.00	0.01	0.14	0.02	0.00	0.01
Total	**-0.74**	**-0.74**	**-0.66**	**-0.09**	**0.00**	**-0.37**	**0.00**	**0.56**	**0.00**	**0.28**	**0.59**	**-0.09**	**0.00**	**-0.22**

Note: Author's own simulations based on GTAP Data Base version 9.2

Table B.26: Tariff Elimination by 50% (percentage change in real factor wages)

Real Factors	Total	pdr	wht	osd	pfb	v_f	c_b	lea	gro	ofd	tex	livestock	fsh	Frs
Labour-small farmer	-0.17	-0.03	-0.03	0.00	0.00	-0.06	0.00	-0.14	0.00	0.02	0.09	-0.04	0.00	0.01
Labour-medium farmer	-0.19	-0.04	-0.03	0.00	0.00	0.00	0.00	-0.16	0.00	0.04	0.02	-0.02	0.00	0.01
Labour-farm worker	-0.22	-0.03	-0.02	0.00	0.00	-0.05	0.00	-0.21	0.00	0.03	0.11	-0.04	0.00	0.00
Labour- non-farm low skilled	0.03	0.01	0.01	0.00	0.00	0.01	0.00	0.08	0.00	0.01	-0.09	0.01	0.00	0.00
Labour- non-farm high skilled	0.09	0.01	0.01	0.00	0.00	0.01	0.00	0.08	0.00	0.00	-0.01	0.00	0.00	0.00
Land – small	-0.01	-0.06	-0.05	-0.01	0.00	-0.16	0.00	0.34	0.00	0.00	-0.10	0.02	0.00	0.02
Land - medium	0.00	-0.06	-0.06	-0.01	0.00	-0.04	0.00	0.37	0.00	0.01	-0.25	0.03	0.00	0.02
Land – large	0.13	-0.09	-0.08	-0.02	0.00	0.05	0.00	0.27	0.00	-0.07	0.04	0.01	0.00	0.01
Livestock	-0.63	0.01	0.00	0.00	0.00	0.02	0.00	-0.97	0.00	0.06	0.31	-0.06	0.00	0.01
Capital – agriculture	-0.03	-0.06	-0.05	-0.01	0.00	0.01	0.00	0.32	0.00	0.01	-0.07	0.02	0.00	-0.19
Capital – formal	0.12	0.01	0.01	0.00	0.00	0.01	0.00	0.09	0.00	-0.01	0.00	0.01	0.00	0.00
Capital – informal	0.22	0.01	0.01	0.00	0.00	0.01	0.00	0.10	0.00	0.00	0.07	0.01	0.00	0.00
Total	**-0.67**	**-0.34**	**-0.30**	**-0.04**	**0.00**	**-0.19**	**0.00**	**0.15**	**0.00**	**0.09**	**0.10**	**-0.04**	**0.00**	**-0.10**

Note: Author's own simulations based on GTAP Data Base version 9

Table B.27: Tariff Elimination by 10% (percentage change in real factor wages)

Real Factors	Total	pdr	wht	osd	pfb	v_f	c_b	lea	gro	ofd	tex	livestock	fsh	Frs
Labour-small farmer	-0.04	0.00	-0.01	0.00	0.00	-0.01	0.00	-0.02	0.00	0.00	0.01	-0.01	0.00	0.00
Labour-medium farmer	-0.04	-0.01	-0.01	0.00	0.00	0.00	0.00	-0.03	0.00	0.01	0.00	0.00	0.00	0.00
Labour-farm worker	-0.04	-0.01	0.00	0.00	0.00	-0.01	0.00	-0.04	0.00	0.00	0.02	-0.01	0.00	0.00
Labour- non-farm low skilled	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	-0.02	0.00	0.00	0.00
Labour- non-farm high skilled	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00
Land - small	-0.02	-0.01	-0.01	0.00	0.00	-0.03	0.00	0.06	0.00	0.00	-0.03	0.00	0.00	0.00
Land – medium	-0.02	-0.01	-0.01	0.00	0.00	-0.01	0.00	0.06	0.00	0.00	-0.05	0.01	0.00	0.00
Land – large	0.01	-0.02	-0.02	0.00	0.00	0.01	0.00	0.04	0.00	-0.01	0.00	0.00	0.00	0.00
Livestock	-0.10	0.00	0.00	0.00	0.00	0.00	0.00	-0.17	0.00	0.01	0.06	-0.01	0.00	0.00
Capital – agriculture	-0.02	-0.01	-0.01	0.00	0.00	0.00	0.00	0.05	0.00	0.00	-0.02	0.00	0.00	-0.04
Capital – formal	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00
Capital – informal	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.01	0.00	0.00	0.00
Total	**-0.17**	**-0.06**	**-0.06**	**-0.01**	**0.00**	**-0.04**	**0.00**	**0.02**	**0.00**	**0.01**	**-0.01**	**-0.01**	**0.00**	**-0.02**

Note: Author's own simulations based on GTAP Data Base version 9.2

Table B.28: Tariff Increased by 10% (percentage change in real factor wages)

Real Factors	Total	pdr	wht	osd	pfb	v_f	c_b	lea	gro	Ofd	tex	livestock	fsh	Frs
Labour-small farmer	0.04	0.00	0.01	0.00	0.00	0.01	0.00	0.02	0.00	0.00	-0.01	0.01	0.00	0.00
Labour-medium farmer	0.04	0.01	0.01	0.00	0.00	0.00	0.00	0.03	0.00	-0.01	0.00	0.00	0.00	0.00
Labour-farm worker	0.04	0.01	0.00	0.00	0.00	0.01	0.00	0.04	0.00	0.00	-0.02	0.01	0.00	0.00
Labour- non-farm low skilled	-0.01	0.00	0.00	0.00	0.00	0.00	0.00	-0.01	0.00	0.00	0.02	0.00	0.00	0.00
Labour- non-farm high skilled	-0.02	0.00	0.00	0.00	0.00	0.00	0.00	-0.01	0.00	0.00	0.00	0.00	0.00	0.00
Land – small	0.02	0.01	0.01	0.00	0.00	0.03	0.00	-0.05	0.00	0.00	0.03	0.00	0.00	0.00
Land – medium	0.03	0.01	0.01	0.00	0.00	0.01	0.00	-0.05	0.00	0.00	0.06	-0.01	0.00	0.00
Land – large	-0.01	0.02	0.01	0.00	0.00	-0.01	0.00	-0.04	0.00	0.01	0.00	0.00	0.00	0.00
Livestock	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.15	0.00	-0.01	-0.06	0.01	0.00	0.00
Capital – agriculture	0.03	0.01	0.01	0.00	0.00	0.00	0.00	-0.05	0.00	0.00	0.02	0.00	0.00	0.03
Capital – formal	-0.02	0.00	0.00	0.00	0.00	0.00	0.00	-0.01	0.00	0.00	0.00	0.00	0.00	0.00
Capital – informal	-0.04	0.00	0.00	0.00	0.00	0.00	0.00	-0.02	0.00	0.00	-0.01	0.00	0.00	0.00
Total	**0.19**	**0.06**	**0.05**	**0.01**	**0.00**	**0.04**	**0.00**	**-0.01**	**0.00**	**-0.01**	**0.02**	**0.01**	**0.00**	**0.02**

Note: Author's own simulations based on GTAP Data Base version 9.2

Table B.29: Tariff Increased by 50% (percentage change in real factor wages)

Real Factors	Total	pdr	wht	osd	Pfb	v_f	c_b	lea	gro	Ofd	tex	livestock	fsh	Frs
Labour-small farmer	0.19	0.02	0.03	0.00	0.00	0.06	0.00	0.11	0.00	-0.01	-0.04	0.03	0.00	-0.01
Labour-medium farmer	0.20	0.04	0.02	0.00	0.00	0.00	0.00	0.12	0.00	-0.02	0.02	0.02	0.00	-0.01
Labour-farm worker	0.20	0.02	0.02	0.00	0.00	0.05	0.00	0.16	0.00	-0.02	-0.06	0.04	0.00	0.00
Labour- non-farm low skilled	-0.03	-0.01	-0.01	0.00	0.00	-0.01	0.00	-0.06	0.00	-0.01	0.07	-0.01	0.00	0.00
Labour- non-farm high skilled	-0.11	-0.01	-0.01	0.00	0.00	-0.01	0.00	-0.06	0.00	0.00	-0.02	0.00	0.00	0.00
Land – small	0.17	0.05	0.05	0.01	0.00	0.14	0.00	-0.21	0.00	0.01	0.15	-0.02	0.00	-0.01
Land – medium	0.19	0.05	0.05	0.01	0.00	0.04	0.00	-0.23	0.00	0.01	0.29	-0.02	0.00	-0.01
Land – large	0.01	0.08	0.07	0.01	0.00	-0.05	0.00	-0.17	0.00	0.07	0.02	-0.01	0.00	-0.01
Livestock	0.38	-0.01	0.00	0.00	0.00	-0.01	0.00	0.67	0.00	-0.05	-0.27	0.06	0.00	-0.01
Capital – agriculture	0.17	0.05	0.05	0.01	0.00	-0.01	0.00	-0.20	0.00	0.00	0.13	-0.02	0.00	0.16
Capital – formal	-0.11	-0.01	-0.01	0.00	0.00	-0.01	0.00	-0.07	0.00	0.01	-0.01	-0.01	0.00	0.00
Capital – informal	-0.19	-0.01	-0.01	0.00	0.00	-0.01	0.00	-0.07	0.00	-0.01	-0.07	-0.01	0.00	0.00
Total	**1.08**	**0.29**	**0.26**	**0.04**	**0.00**	**0.19**	**0.00**	**-0.02**	**0.00**	**-0.03**	**0.22**	**0.04**	**0.00**	**0.09**

Note: Author's own simulations based on GTAP Data Base version 9.2

Table B.30: Tariff Increased by 75% (percentage change in real factor wages)

Real Factors	Total	pdr	wht	osd	Pfb	v_f	c_b	lea	gro	Ofd	tex	livestock	fsh	Frs
Labour-small farmer	0.28	0.03	0.04	0.01	0.00	0.08	0.00	0.15	0.00	-0.02	-0.05	0.05	0.00	-0.01
Labour-medium farmer	0.30	0.05	0.04	0.00	0.00	0.01	0.00	0.17	0.00	-0.03	0.05	0.03	0.00	-0.01
Labour-farm worker	0.30	0.03	0.03	0.00	0.00	0.07	0.00	0.22	0.00	-0.02	-0.08	0.05	0.00	0.00
Labour- non-farm low skilled	-0.05	-0.01	-0.01	0.00	0.00	-0.02	0.00	-0.08	0.00	-0.02	0.10	-0.01	0.00	-0.01
Labour- non-farm high skilled	-0.17	-0.01	-0.01	0.00	0.00	-0.01	0.00	-0.09	0.00	-0.01	-0.03	-0.01	0.00	0.00
Land – small	0.30	0.08	0.07	0.01	0.00	0.21	0.00	-0.29	0.00	0.02	0.24	-0.03	0.00	-0.02
Land – medium	0.32	0.08	0.07	0.01	0.00	0.07	0.00	-0.31	0.00	0.01	0.45	-0.04	0.00	-0.02
Land – large	0.06	0.11	0.10	0.02	0.00	-0.07	0.00	-0.23	0.00	0.11	0.04	-0.01	0.00	-0.02
Livestock	0.51	-0.01	0.00	0.00	0.00	-0.02	0.00	0.92	0.00	-0.07	-0.38	0.09	0.00	-0.01
Capital – agriculture	0.29	0.08	0.07	0.01	0.00	-0.01	0.00	-0.27	0.00	0.00	0.21	-0.03	0.00	0.23
Capital – formal	-0.15	-0.01	-0.01	0.00	0.00	-0.02	0.00	-0.09	0.00	0.01	-0.01	-0.01	0.00	-0.01
Capital – informal	-0.27	-0.01	-0.01	0.00	0.00	-0.02	0.00	-0.10	0.00	-0.01	-0.10	-0.01	0.00	-0.01
Total	**1.73**	**0.42**	**0.37**	**0.06**	**0.00**	**0.28**	**0.00**	**0.00**	**0.00**	**-0.02**	**0.42**	**0.07**	**0.00**	**0.13**

Note: Author's own simulations based on GTAP Data Base version 9.2.

Table B.31: Complete Liberalisation (percentage change in household real income)

Household Types	Total	pdr	wht	osd	Pfb	v_f	c_b	lea	gro	ofd	tex	livestock	fsh	Frs
Rural small farmer (Quantile 1)	-1.74	-0.05	-0.05	-0.01	0.00	-0.11	0.00	-1.12	0.00	-0.08	-0.22	-0.08	0.00	-0.01
Rural Small farmer (Quantile 234)	-1.81	-0.05	-0.05	0.00	0.00	-0.10	0.00	-1.26	0.00	-0.07	-0.17	-0.09	0.00	-0.01
Rural medium farmer (Quantile 1)	-1.47	-0.11	-0.09	-0.01	0.00	-0.05	0.00	-0.57	0.00	-0.08	-0.49	-0.04	0.00	-0.03
Rural medium farmer (Quantile 234)	-1.58	-0.10	-0.09	-0.01	0.00	-0.03	0.00	-0.79	0.00	-0.09	-0.39	-0.06	0.00	-0.03
Rural landless farmer (Quantile 1)	-1.45	-0.07	-0.07	-0.01	0.00	-0.14	0.00	-0.62	0.00	-0.10	-0.37	-0.05	0.00	-0.03
Rural landless farmer (Quantile 234)	-1.44	-0.07	-0.06	-0.01	0.00	-0.08	0.00	-0.72	0.00	-0.10	-0.33	-0.06	0.00	-0.02
Rural farm worker (Quantile 1)	-1.92	-0.01	-0.01	0.00	0.00	-0.04	0.00	-1.54	0.00	-0.07	-0.15	-0.11	0.00	0.01
Rural farm worker (Quantile 234)	-1.97	-0.01	-0.01	0.00	0.00	-0.02	0.00	-1.67	0.00	-0.07	-0.10	-0.11	0.00	0.01
Rural non-farm worker (Quantile 1)	-0.93	0.01	0.01	0.00	0.00	-0.01	0.00	-0.29	0.00	-0.14	-0.49	-0.02	0.00	0.01
Rural non- farm worker (Quantile 2)	-0.87	0.00	0.01	0.00	0.00	-0.01	0.00	-0.28	0.00	-0.14	-0.44	-0.02	0.00	0.01
Rural non- farm worker (Quantile 3)	-0.84	0.00	0.01	0.00	0.00	-0.01	0.00	-0.27	0.00	-0.14	-0.41	-0.02	0.00	0.01
Rural non- farm worker (Quantile 4)	-0.86	0.00	0.01	0.00	0.00	-0.01	0.00	-0.27	0.00	-0.15	-0.42	-0.02	0.00	0.01
Urban (Quantile 1)	-0.94	0.00	0.00	0.00	0.00	-0.02	0.00	-0.31	0.00	-0.13	-0.46	-0.03	0.00	0.01
Urban (Quantile 2)	-0.93	0.00	0.00	0.00	0.00	-0.01	0.00	-0.31	0.00	-0.14	-0.45	-0.02	0.00	0.01
Urban (Quantile 3)	-0.93	0.00	0.00	0.00	0.00	-0.01	0.00	-0.33	0.00	-0.14	-0.43	-0.02	0.00	0.01
Urban (Quantile 4)	-0.94	0.00	0.01	0.00	0.00	-0.01	0.00	-0.29	0.00	-0.16	-0.47	-0.02	0.00	0.00
Total	**-20.60**	**-0.45**	**-0.39**	**-0.04**	**0.00**	**-0.67**	**0.00**	**-10.63**	**0.00**	**-1.79**	**-5.78**	**-0.78**	**0.00**	**-0.07**

Note: Author's own simulations based on GTAP Data Base version 9.

Table B.32: Tariff Elimination by 50% (percentage change in household real income)

Household types	Total	Pdr	wht	osd	pfb	v_f	c_b	Lea	gro	ofd	tex	livestock	fsh	frs
Rural small farmer (Quantile 1)	-0.78	-0.02	-0.02	0.00	0.00	-0.05	0.00	-0.48	0.00	-0.04	-0.11	-0.04	0.00	-0.01
Rural Small farmer (Quantile 234)	-0.81	-0.02	-0.02	0.00	0.00	-0.05	0.00	-0.54	0.00	-0.03	-0.09	-0.04	0.00	-0.01
Rural medium farmer (Quantile 1)	-0.71	-0.05	-0.04	-0.01	0.00	-0.03	0.00	-0.25	0.00	-0.04	-0.25	-0.02	0.00	-0.01
Rural medium farmer (Quantile 234)	-0.74	-0.05	-0.04	-0.01	0.00	-0.02	0.00	-0.34	0.00	-0.04	-0.20	-0.03	0.00	-0.01
Rural landless farmer (Quantile 1)	-0.68	-0.03	-0.03	0.00	0.00	-0.07	0.00	-0.27	0.00	-0.05	-0.19	-0.02	0.00	-0.01
Rural landless farmer (Quantile 234)	-0.66	-0.03	-0.03	0.00	0.00	-0.04	0.00	-0.31	0.00	-0.05	-0.17	-0.03	0.00	-0.01
Rural farm worker (Quantile 1)	-0.83	-0.01	-0.01	0.00	0.00	-0.02	0.00	-0.65	0.00	-0.03	-0.07	-0.05	0.00	0.00
Rural farm worker (Quantile 234)	-0.85	0.00	0.00	0.00	0.00	-0.01	0.00	-0.70	0.00	-0.03	-0.05	-0.05	0.00	0.00
Rural non-farm worker (Quantile 1)	-0.40	0.00	0.00	0.00	0.00	0.00	0.00	-0.11	0.00	-0.06	-0.22	-0.01	0.00	0.00
Rural non- farm worker (Quantile 2)	-0.37	0.00	0.00	0.00	0.00	0.00	0.00	-0.11	0.00	-0.06	-0.20	-0.01	0.00	0.00
Rural non- farm worker (Quantile 3)	-0.36	0.00	0.00	0.00	0.00	0.00	0.00	-0.11	0.00	-0.06	-0.19	-0.01	0.00	0.00
Rural non- farm worker (Quantile 4)	-0.37	0.00	0.00	0.00	0.00	0.00	0.00	-0.11	0.00	-0.06	-0.19	-0.01	0.00	0.00
Urban (Quantile 1)	-0.41	0.00	0.00	0.00	0.00	-0.01	0.00	-0.12	0.00	-0.06	-0.21	-0.01	0.00	0.00
Urban (Quantile 2)	-0.40	0.00	0.00	0.00	0.00	-0.01	0.00	-0.12	0.00	-0.06	-0.20	-0.01	0.00	0.00
Urban (Quantile 3)	-0.40	0.00	0.00	0.00	0.00	-0.01	0.00	-0.13	0.00	-0.06	-0.20	-0.01	0.00	0.00
Urban (Quantile 4)	-0.40	0.00	0.00	0.00	0.00	0.00	0.00	-0.12	0.00	-0.07	-0.21	-0.01	0.00	0.00
Total	**-9.18**	**-0.20**	**-0.18**	**-0.02**	**0.00**	**-0.32**	**0.00**	**-4.47**	**0.00**	**-0.81**	**-2.76**	**-0.38**	**0.00**	**-0.03**

Note: Author's own simulations based on GTAP Data Base version 9.2.

Table B.33: Tariff Elimination by 10% (percentage change in household real income)

Household Types	Total	pdr	wht	osd	pfb	v_f	c_b	Lea	gro	ofd	tex	livestock	fsh	Frs
Rural small farmer (Quantile 1)	-0.14	0.00	0.00	0.00	0.00	-0.01	0.00	-0.08	0.00	-0.01	-0.02	-0.01	0.00	0.00
Rural Small farmer (Quantile 234)	-0.15	0.00	0.00	0.00	0.00	-0.01	0.00	-0.09	0.00	-0.01	-0.02	-0.01	0.00	0.00
Rural medium farmer (Quantile 1)	-0.13	-0.01	-0.01	0.00	0.00	-0.01	0.00	-0.04	0.00	-0.01	-0.05	0.00	0.00	0.00
Rural medium farmer (Quantile 234)	-0.14	-0.01	-0.01	0.00	0.00	0.00	0.00	-0.06	0.00	-0.01	-0.04	-0.01	0.00	0.00
Rural landless farmer (Quantile 1)	-0.13	-0.01	-0.01	0.00	0.00	-0.01	0.00	-0.05	0.00	-0.01	-0.04	0.00	0.00	0.00
Rural landless farmer (Quantile 234)	-0.12	-0.01	-0.01	0.00	0.00	-0.01	0.00	-0.05	0.00	-0.01	-0.03	-0.01	0.00	0.00
Rural farm worker (Quantile 1)	-0.15	0.00	0.00	0.00	0.00	0.00	0.00	-0.11	0.00	-0.01	-0.01	-0.01	0.00	0.00
Rural farm worker (Quantile 234)	-0.15	0.00	0.00	0.00	0.00	0.00	0.00	-0.12	0.00	-0.01	-0.01	-0.01	0.00	0.00
Rural non-farm worker (Quantile 1)	-0.07	0.00	0.00	0.00	0.00	0.00	0.00	-0.02	0.00	-0.01	-0.04	0.00	0.00	0.00
Rural non- farm worker (Quantile 2)	-0.07	0.00	0.00	0.00	0.00	0.00	0.00	-0.02	0.00	-0.01	-0.04	0.00	0.00	0.00
Rural non- farm worker (Quantile 3)	-0.06	0.00	0.00	0.00	0.00	0.00	0.00	-0.02	0.00	-0.01	-0.03	0.00	0.00	0.00
Rural non- farm worker (Quantile 4)	-0.06	0.00	0.00	0.00	0.00	0.00	0.00	-0.02	0.00	-0.01	-0.03	0.00	0.00	0.00
Urban (Quantile 1)	-0.07	0.00	0.00	0.00	0.00	0.00	0.00	-0.02	0.00	-0.01	-0.04	0.00	0.00	0.00
Urban (Quantile 2)	-0.07	0.00	0.00	0.00	0.00	0.00	0.00	-0.02	0.00	-0.01	-0.04	0.00	0.00	0.00
Urban (Quantile 3)	-0.07	0.00	0.00	0.00	0.00	0.00	0.00	-0.02	0.00	-0.01	-0.04	0.00	0.00	0.00
Urban (Quantile 4)	-0.07	0.00	0.00	0.00	0.00	0.00	0.00	-0.02	0.00	-0.01	-0.04	0.00	0.00	0.00
Total	**-1.65**	**-0.04**	**-0.03**	**0.00**	**0.00**	**-0.06**	**0.00**	**-0.76**	**0.00**	**-0.15**	**-0.52**	**-0.07**	**0.00**	**-0.01**

Note: Author's own simulations based on GTAP Data Base version 9.2

Table B.34: Tariff Increased by 10% (percentage change in household real income)

Household Types	Total	pdr	wht	osd	pfb	v_f	c_b	lea	gro	ofd	tex	livestock	fsh	Frs
Rural small farmer (Quantile 1)	0.14	0.00	0.00	0.00	0.00	0.01	0.00	0.08	0.00	0.01	0.02	0.01	0.00	0.00
Rural Small farmer (Quantile 234)	0.14	0.00	0.00	0.00	0.00	0.01	0.00	0.09	0.00	0.01	0.02	0.01	0.00	0.00
Rural medium farmer (Quantile 1)	0.13	0.01	0.01	0.00	0.00	0.01	0.00	0.04	0.00	0.01	0.05	0.00	0.00	0.00
Rural medium farmer (Quantile 234)	0.13	0.01	0.01	0.00	0.00	0.00	0.00	0.06	0.00	0.01	0.04	0.01	0.00	0.00
Rural landless farmer (Quantile 1)	0.12	0.01	0.01	0.00	0.00	0.01	0.00	0.04	0.00	0.01	0.04	0.00	0.00	0.00
Rural landless farmer (Quantile 234)	0.12	0.01	0.00	0.00	0.00	0.01	0.00	0.05	0.00	0.01	0.03	0.01	0.00	0.00
Rural farm worker (Quantile 1)	0.14	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.00	0.01	0.01	0.01	0.00	0.00
Rural farm worker (Quantile 234)	0.14	0.00	0.00	0.00	0.00	0.00	0.00	0.11	0.00	0.01	0.01	0.01	0.00	0.00
Rural non-farm worker (Quantile 1)	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.01	0.04	0.00	0.00	0.00
Rural non- farm worker (Quantile 2)	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.01	0.03	0.00	0.00	0.00
Rural non- farm worker (Quantile 3)	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.01	0.03	0.00	0.00	0.00
Rural non- farm worker (Quantile 4)	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.01	0.03	0.00	0.00	0.00
Urban (Quantile 1)	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.01	0.04	0.00	0.00	0.00
Urban (Quantile 2)	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.01	0.04	0.00	0.00	0.00
Urban (Quantile 3)	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.01	0.03	0.00	0.00	0.00
Urban (Quantile 4)	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.01	0.04	0.00	0.00	0.00
Total	**1.57**	**0.04**	**0.03**	**0.00**	**0.00**	**0.06**	**0.00**	**0.70**	**0.00**	**0.14**	**0.51**	**0.07**	**0.00**	**0.01**

Note: Author's own simulations based on GTAP Data Base version 9.2.

Table B.35: Tariff Increased by 50% (percentage change in household real income)

Household Types	Total	pdr	wht	osd	pfb	v_f	c_b	lea	gro	ofd	tex	livestock	fsh	Frs
Rural small farmer (Quantile 1)	0.62	0.02	0.02	0.00	0.00	0.05	0.00	0.33	0.00	0.03	0.12	0.04	0.00	0.00
Rural Small farmer (Quantile 234)	0.64	0.02	0.02	0.00	0.00	0.05	0.00	0.37	0.00	0.03	0.10	0.04	0.00	0.01
Rural medium farmer (Quantile 1)	0.63	0.04	0.04	0.00	0.00	0.03	0.00	0.18	0.00	0.04	0.26	0.02	0.00	0.01
Rural medium farmer (Quantile 234)	0.63	0.04	0.03	0.00	0.00	0.02	0.00	0.24	0.00	0.04	0.21	0.03	0.00	0.01
Rural landless farmer (Quantile 1)	0.58	0.03	0.03	0.00	0.00	0.06	0.00	0.19	0.00	0.04	0.19	0.02	0.00	0.01
Rural landless farmer (Quantile 234)	0.55	0.03	0.02	0.00	0.00	0.04	0.00	0.21	0.00	0.04	0.17	0.03	0.00	0.01
Rural farm worker (Quantile 1)	0.60	0.01	0.01	0.00	0.00	0.02	0.00	0.44	0.00	0.03	0.06	0.05	0.00	0.00
Rural farm worker (Quantile 234)	0.60	0.00	0.00	0.00	0.00	0.01	0.00	0.48	0.00	0.02	0.04	0.05	0.00	0.00
Rural non-farm worker (Quantile 1)	0.29	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.00	0.05	0.18	0.01	0.00	0.00
Rural non- farm worker (Quantile 2)	0.27	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.00	0.05	0.16	0.01	0.00	0.00
Rural non- farm worker (Quantile 3)	0.26	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.00	0.05	0.15	0.01	0.00	0.00
Rural non- farm worker (Quantile 4)	0.26	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.00	0.05	0.15	0.01	0.00	0.00
Urban (Quantile 1)	0.31	0.00	0.00	0.00	0.00	0.01	0.00	0.07	0.00	0.05	0.17	0.01	0.00	0.00
Urban (Quantile 2)	0.29	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.00	0.05	0.16	0.01	0.00	0.00
Urban (Quantile 3)	0.29	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.00	0.05	0.15	0.01	0.00	0.00
Urban (Quantile 4)	0.29	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.00	0.05	0.16	0.01	0.00	0.00
Total	**7.11**	**0.17**	**0.15**	**0.01**	**0.00**	**0.29**	**0.00**	**3.01**	**0.00**	**0.67**	**2.43**	**0.35**	**0.00**	**0.02**

Note: Author's own simulations based on GTAP Data Base version 9.2

Table B.36: Tariff Increased by 75% (percentage change in household real income)

Household Types	Total	pdr	wht	osd	pfb	v_f	c_b	lea	gro	ofd	tex	livestock	fsh	Frs
Rural small farmer (Quantile 1)	0.89	0.03	0.03	0.00	0.00	0.07	0.00	0.46	0.00	0.05	0.18	0.06	0.00	0.01
Rural Small farmer (Quantile 234)	0.90	0.03	0.03	0.00	0.00	0.07	0.00	0.51	0.00	0.05	0.15	0.06	0.00	0.01
Rural medium farmer (Quantile 1)	0.92	0.06	0.05	0.01	0.00	0.04	0.00	0.25	0.00	0.06	0.40	0.03	0.00	0.02
Rural medium farmer (Quantile 234)	0.92	0.06	0.05	0.01	0.00	0.03	0.00	0.34	0.00	0.06	0.32	0.04	0.00	0.02
Rural landless farmer (Quantile 1)	0.84	0.04	0.04	0.01	0.00	0.09	0.00	0.26	0.00	0.06	0.29	0.03	0.00	0.01
Rural landless farmer (Quantile 234)	0.79	0.04	0.03	0.00	0.00	0.05	0.00	0.30	0.00	0.06	0.25	0.04	0.00	0.01
Rural farm worker (Quantile 1)	0.84	0.01	0.01	0.00	0.00	0.02	0.00	0.61	0.00	0.04	0.09	0.07	0.00	-0.01
Rural farm worker (Quantile 234)	0.83	0.00	0.00	0.00	0.00	0.01	0.00	0.66	0.00	0.03	0.05	0.07	0.00	-0.01
Rural non-farm worker (Quantile 1)	0.41	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.00	0.06	0.25	0.01	0.00	0.00
Rural non- farm worker (Quantile 2)	0.37	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.00	0.07	0.22	0.01	0.00	0.00
Rural non- farm worker (Quantile 3)	0.36	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.00	0.07	0.20	0.01	0.00	0.00
Rural non- farm worker (Quantile 4)	0.37	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.00	0.07	0.21	0.01	0.00	0.00
Urban (Quantile 1)	0.43	0.00	0.00	0.00	0.00	0.01	0.00	0.10	0.00	0.07	0.24	0.02	0.00	0.00
Urban (Quantile 2)	0.41	0.00	0.00	0.00	0.00	0.01	0.00	0.10	0.00	0.07	0.23	0.02	0.00	0.00
Urban (Quantile 3)	0.40	0.00	0.00	0.00	0.00	0.00	0.00	0.11	0.00	0.07	0.22	0.02	0.00	0.00
Urban (Quantile 4)	0.41	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.00	0.08	0.23	0.01	0.00	0.00
Total	**10.07**	**0.25**	**0.22**	**0.02**	**0.00**	**0.42**	**0.00**	**4.13**	**0.00**	**0.97**	**3.52**	**0.52**	**0.00**	**0.03**

Note: Author's own simulations based on GTAP Data Base version 9.2

Appendix C

Simulated Results of Uniform Tariff Rationalization

Table C.1: Uniform tariff at 8% (percentage change in aggregate exports)

Sectors	Total	pdr	wht	osd	pfb	v_f	c_b	lea	gro	Ofd	tex	livestock	fsh	frs
Pdr	-1.69	0.18	0.06	-1.35	-1.43	-0.95	0.00	0.66	-0.02	0.36	0.86	-0.05	0.00	0.00
Wht	-2.30	0.09	0.13	-1.67	-1.86	-1.12	0.00	0.65	-0.03	0.69	0.89	-0.06	0.00	0.00
Osd	-2.28	0.05	0.04	-2.17	-0.79	-0.64	0.00	0.41	-0.02	0.28	0.59	-0.03	0.00	0.00
Pfb	-2.11	0.04	0.04	-0.70	-2.41	-0.46	0.00	-0.01	-0.01	0.03	1.39	-0.02	0.00	0.00
v_f	-0.75	0.02	0.02	-0.41	-0.30	-0.80	0.00	0.29	-0.02	0.15	0.33	-0.03	0.00	-0.01
c_b	-2.16	0.07	0.06	-1.47	-1.42	-0.92	0.00	0.56	-0.05	0.29	0.76	-0.04	0.00	0.00
Lea	6.24	0.03	0.02	-0.41	0.56	-0.37	0.00	5.92	0.00	0.32	0.42	-0.24	0.00	0.00
Gro	-0.33	0.02	0.01	-0.31	-0.19	-0.27	0.00	0.23	-0.23	0.12	0.30	-0.01	0.00	0.00
Ofd	0.96	0.01	0.02	-0.19	0.21	-0.17	0.00	0.45	-0.01	0.24	0.44	-0.03	0.00	-0.01
Tex	-1.18	0.01	0.01	-0.30	-2.65	-0.33	0.00	0.69	-0.02	0.33	1.11	-0.04	0.00	0.00
Livestock	3.09	0.05	0.04	-1.31	0.07	-0.48	0.00	4.09	0.00	0.31	0.47	-0.15	0.00	0.00
Fsh	1.15	0.01	0.00	0.03	0.36	-0.07	0.00	0.46	0.00	0.20	0.18	-0.02	-0.01	0.00
Frs	-2.68	0.08	0.06	-1.41	-1.72	-0.10	0.00	-0.29	-0.03	0.18	0.65	0.00	0.00	-0.10
Total	**-4.04**	**0.66**	**0.51**	**-11.66**	**-11.56**	**-6.68**	**0.00**	**14.11**	**-0.44**	**3.48**	**8.40**	**-0.72**	**-0.01**	**-0.13**

Note: Author's own simulations based on GTAP Data Base version 9.2.

Table C.2: Uniform tariff at 10% (percentage change in aggregate exports)

Sectors	Total	Pdr	wht	osd	pfb	v_f	c_b	lea	gro	ofd	Tex	livestock	fsh	frs
Pdr	-3.64	0.00	-0.01	-1.69	-1.76	-1.29	0.00	0.54	-0.03	0.29	0.47	-0.10	0.00	-0.06
Wht	-4.56	0.00	-0.01	-2.07	-2.29	-1.53	0.00	0.54	-0.04	0.55	0.50	-0.13	0.00	-0.07
Osd	-3.78	0.00	0.00	-2.70	-0.97	-0.87	0.00	0.34	-0.02	0.22	0.33	-0.07	0.00	-0.04
Pfb	-3.77	0.00	0.00	-0.88	-2.96	-0.63	0.00	0.00	-0.01	0.02	0.76	-0.04	0.00	-0.03
v_f	-1.61	0.00	0.00	-0.51	-0.37	-1.18	0.00	0.24	-0.02	0.12	0.18	-0.05	0.00	-0.01
c_b	-3.93	0.00	-0.01	-1.83	-1.74	-1.26	0.00	0.46	-0.06	0.23	0.42	-0.09	0.00	-0.06
Lea	4.46	0.00	0.00	-0.51	0.68	-0.49	0.00	4.80	0.00	0.25	0.22	-0.50	0.00	0.00
Gro	-0.88	0.00	0.00	-0.39	-0.23	-0.37	0.00	0.19	-0.30	0.10	0.16	-0.03	0.00	-0.02
Ofd	0.48	0.00	0.00	-0.23	0.26	-0.26	0.00	0.36	-0.01	0.19	0.23	-0.05	0.00	-0.01
Tex	-2.76	0.00	0.00	-0.37	-3.24	-0.44	0.00	0.56	-0.03	0.26	0.58	-0.08	0.00	-0.01
Livestock	1.30	0.00	0.00	-1.62	0.08	-0.65	0.00	3.32	-0.01	0.25	0.25	-0.31	0.00	-0.01
Fsh	0.97	0.00	0.00	0.04	0.45	-0.09	0.00	0.38	0.00	0.16	0.09	-0.04	-0.02	0.00
Frs	-4.59	0.00	-0.01	-1.75	-2.12	-0.15	0.00	-0.22	-0.04	0.15	0.37	0.00	0.00	-0.82
Total	**-22.31**	**-0.01**	**-0.04**	**-14.51**	**-14.21**	**-9.22**	**0.00**	**11.50**	**-0.56**	**2.81**	**4.55**	**-1.47**	**-0.02**	**-1.14**

Note: Author's own simulations based on GTAP Data Base version 9.2

Table C.3: Uniform tariff at 15% (percentage change in aggregate exports)

Sectors	Total	Pdr	wht	Osd	pfb	v_f	c_b	lea	gro	ofd	tex	livestock	fsh	Frs
Pdr	-8.29	-0.40	-0.16	-2.49	-2.55	-2.12	0.00	0.28	-0.05	0.13	-0.50	-0.23	0.00	-0.20
Wht	-9.94	-0.21	-0.31	-3.05	-3.30	-2.51	0.00	0.28	-0.06	0.24	-0.51	-0.28	0.00	-0.23
Osd	-7.37	-0.11	-0.10	-3.94	-1.42	-1.43	0.00	0.17	-0.03	0.10	-0.34	-0.14	0.00	-0.12
Pfb	-7.76	-0.09	-0.09	-1.30	-4.25	-1.05	0.00	0.02	-0.01	0.01	-0.79	-0.10	0.00	-0.11
v_f	-3.66	-0.05	-0.04	-0.76	-0.54	-2.10	0.00	0.12	-0.03	0.05	-0.19	-0.09	0.00	-0.02
c_b	-8.15	-0.16	-0.15	-2.68	-2.52	-2.06	0.01	0.24	-0.09	0.10	-0.44	-0.20	0.00	-0.19
Lea	0.48	-0.06	-0.05	-0.75	0.97	-0.77	0.00	2.35	0.01	0.11	-0.26	-1.06	0.00	0.01
Gro	-2.21	-0.04	-0.04	-0.58	-0.35	-0.61	0.00	0.09	-0.45	0.04	-0.18	-0.06	0.00	-0.05
Ofd	-0.65	-0.02	-0.04	-0.34	0.37	-0.47	0.00	0.17	-0.02	0.08	-0.25	-0.10	0.00	-0.03
Tex	-6.38	-0.03	-0.02	-0.54	-4.62	-0.70	0.00	0.26	-0.04	0.11	-0.62	-0.16	0.00	-0.03
Livestock	-2.77	-0.12	-0.09	-2.37	0.11	-1.06	0.00	1.62	-0.01	0.11	-0.28	-0.66	0.00	-0.01
Fsh	0.59	-0.02	0.00	0.07	0.65	-0.14	0.00	0.18	0.00	0.07	-0.11	-0.08	-0.03	0.01
Frs	-9.16	-0.17	-0.16	-2.57	-3.05	-0.27	0.00	-0.09	-0.06	0.07	-0.37	-0.01	0.00	-2.48
Total	**-65.27**	**-1.49**	**-1.26**	**-21.30**	**-20.49**	**-15.31**	**0.01**	**5.69**	**-0.84**	**1.21**	**-4.83**	**-3.18**	**-0.03**	**-3.46**

Note: Author's own simulations based on GTAP Data Base version 9.2

Table C.4: Uniform tariff at 8% (percentage change in aggregate imports)

Sectors	Total	Pdr	wht	Osd	pfb	v_f	c_b	lea	gro	ofd	tex	livestock	fsh	frs
Pdr	7.68	6.96	-0.03	0.62	0.67	0.46	0.00	-0.46	0.01	-0.20	-0.41	0.04	0.00	0.00
Wht	8.87	-0.06	7.67	1.00	1.14	0.70	0.00	-0.48	0.02	-0.67	-0.51	0.05	0.00	0.00
Osd	-9.42	-0.01	-0.01	-9.61	0.17	0.18	0.00	-0.14	0.00	-0.05	0.03	0.02	0.00	0.00
Pfb	-15.61	-0.01	-0.01	0.06	-14.77	-0.04	0.00	0.45	-0.01	0.20	-1.48	-0.02	0.00	0.00
v_f	-7.09	-0.01	-0.01	0.20	0.08	-6.90	0.00	-0.19	0.01	-0.10	-0.18	0.01	0.00	0.00
c_b	-7.05	-0.01	-0.01	0.22	0.25	0.16	-7.40	-0.12	0.01	-0.08	-0.08	0.01	0.00	0.00
Lea	44.10	-0.01	-0.01	0.20	-0.36	0.19	0.00	44.37	0.00	-0.17	-0.23	0.13	0.00	0.00
Gro	-6.59	0.00	0.00	0.02	-0.09	0.11	0.00	-0.02	-6.46	-0.02	-0.11	0.00	0.00	0.00
Ofd	20.36	-0.01	-0.01	0.10	-0.19	0.16	0.00	-0.36	0.00	20.91	-0.27	0.02	0.00	0.00
Tex	11.19	0.00	0.00	0.02	1.00	0.10	0.00	-0.19	0.00	-0.09	10.35	0.01	0.00	0.00
Livestock	-6.37	-0.02	-0.01	0.45	-0.02	0.16	0.00	-1.77	0.00	-0.10	-0.20	-4.86	0.00	0.00
Fsh	-4.82	0.00	0.00	-0.03	-0.19	0.03	0.00	-0.25	0.00	-0.11	-0.07	0.01	-4.19	0.00
Frs	-0.07	-0.03	-0.03	0.56	0.76	0.01	0.00	0.16	0.01	-0.04	-0.17	0.00	0.00	-1.30
Total	**35.19**	**6.78**	**7.53**	**-6.18**	**-11.54**	**-4.70**	**-7.40**	**41.02**	**-6.42**	**19.49**	**6.68**	**-4.58**	**-4.19**	**-1.29**

Note: Author's own simulations based on GTAP Data Base version 9.2

Table C.5: Uniform tariff at 10% (percentage change in aggregate imports)

Sectors	Total	Pdr	wht	Osd	pfb	v_f	c_b	lea	gro	ofd	tex	livestock	fsh	Frs
Pdr	1.48	-0.09	0.00	0.76	0.81	0.61	0.00	-0.37	0.01	-0.16	-0.22	0.09	0.00	0.03
Wht	1.79	0.00	-0.70	1.22	1.38	0.92	0.00	-0.39	0.02	-0.53	-0.28	0.10	0.00	0.04
Osd	-11.52	0.00	0.00	-11.88	0.20	0.24	0.00	-0.11	0.00	-0.04	0.01	0.05	0.00	0.01
Pfb	-18.29	0.00	0.00	0.08	-18.01	-0.04	0.00	0.35	-0.01	0.16	-0.80	-0.03	0.00	0.01
v_f	-9.30	0.00	0.00	0.25	0.10	-9.36	0.00	-0.15	0.01	-0.08	-0.10	0.02	0.00	0.00
c_b	-8.41	0.00	0.00	0.27	0.31	0.22	-9.04	-0.10	0.01	-0.06	-0.04	0.02	0.00	0.01
Lea	35.71	0.00	0.00	0.24	-0.43	0.25	0.00	35.65	0.00	-0.13	-0.11	0.25	0.00	0.00
Gro	-8.18	0.00	0.00	0.02	-0.11	0.15	0.00	-0.02	-8.16	-0.02	-0.06	0.00	0.00	0.00
Ofd	16.42	0.00	0.00	0.13	-0.23	0.21	0.00	-0.28	0.01	16.70	-0.14	0.03	0.00	0.00
Tex	6.64	0.00	0.00	0.03	1.21	0.13	0.00	-0.15	0.01	-0.07	5.46	0.02	0.00	0.00
Livestock	-10.34	0.00	0.00	0.55	-0.02	0.21	0.00	-1.41	0.00	-0.08	-0.10	-9.48	0.00	0.00
Fsh	-6.70	0.00	0.00	-0.03	-0.24	0.04	0.00	-0.20	0.00	-0.09	-0.04	0.02	-6.16	0.00
Frs	-2.64	0.00	0.00	0.69	0.93	0.02	0.00	0.12	0.01	-0.03	-0.10	-0.01	0.00	-4.29
Total	**-13.33**	**-0.09**	**-0.69**	**-7.68**	**-14.09**	**-6.40**	**-9.04**	**32.94**	**-8.10**	**15.56**	**3.49**	**-8.91**	**-6.16**	**-4.18**

Note: Author's own simulations based on GTAP Data Base version 9.2

Table C.6: Uniform tariff at 15% (percentage change in aggregate imports)

Sectors	Total	Pdr	wht	Osd	pfb	v_f	c_b	Lea	gro	ofd	tex	livestock	fsh	Frs
Pdr	-11.91	-15.34	0.07	1.06	1.11	0.94	0.00	-0.17	0.02	-0.07	0.21	0.18	0.00	0.09
Wht	-13.44	0.12	-18.82	1.70	1.88	1.43	0.00	-0.19	0.03	-0.21	0.28	0.21	0.00	0.13
Osd	-16.40	0.03	0.03	-17.20	0.30	0.39	0.00	-0.06	0.00	-0.02	-0.01	0.10	0.00	0.03
Pfb	-24.36	0.02	0.02	0.14	-25.48	-0.03	0.00	0.15	-0.02	0.06	0.80	-0.06	0.00	0.02
v_f	-14.45	0.02	0.02	0.37	0.15	-15.08	0.00	-0.07	0.01	-0.03	0.11	0.05	0.00	0.00
c_b	-11.52	0.03	0.03	0.39	0.44	0.36	-12.82	-0.05	0.01	-0.03	0.04	0.05	0.00	0.03
Lea	17.32	0.03	0.02	0.33	-0.57	0.37	0.00	16.57	0.00	-0.05	0.12	0.51	0.00	-0.01
Gro	-11.92	0.01	0.01	0.04	-0.15	0.25	0.00	-0.01	-12.13	-0.01	0.06	0.01	0.00	0.01
Ofd	7.36	0.01	0.02	0.18	-0.31	0.32	0.00	-0.13	0.01	7.03	0.15	0.07	0.00	0.01
Tex	-3.87	0.01	0.01	0.04	1.70	0.20	0.00	-0.07	0.01	-0.03	-5.79	0.04	0.00	0.01
Livestock	-19.26	0.04	0.03	0.77	-0.02	0.33	0.00	-0.66	0.00	-0.03	0.11	-19.83	0.00	0.00
Fsh	-11.13	0.01	0.00	-0.05	-0.34	0.05	0.00	-0.09	0.00	-0.04	0.04	0.04	-10.75	0.00
Frs	-8.52	0.07	0.06	1.01	1.33	0.06	0.00	0.05	0.02	-0.02	0.10	-0.01	0.00	-11.19
Total	**-122.10**	**-14.94**	**-18.49**	**-11.24**	**-19.96**	**-10.41**	**-12.82**	**15.26**	**-12.05**	**6.56**	**-3.77**	**-18.65**	**-10.75**	**-10.85**

Note: Author's own simulations based on GTAP Data Base version 9.2.

Table C.7: Uniform tariff at 8% (percentage change in output)

Sectors	Total	Pdr	wht	Osd	pfb	v_f	c_b	lea	gro	ofd	Tex	livestock	fsh	Frs
Pdr	-0.15	-0.06	0.00	-0.10	-0.06	-0.05	0.00	0.01	-0.01	0.02	0.09	0.00	0.00	0.00
Wht	-0.58	0.01	-0.01	-0.22	-0.23	-0.14	0.00	0.01	0.00	-0.13	0.13	0.00	0.00	0.00
Osd	1.09	0.00	0.00	1.22	-0.14	-0.04	0.00	0.03	0.00	-0.02	0.05	0.00	0.00	0.00
Pfb	0.50	0.01	0.01	-0.31	1.11	-0.26	0.00	0.39	-0.01	0.20	-0.62	-0.02	0.00	0.00
v_f	0.83	0.01	0.00	-0.12	-0.14	0.96	0.00	0.04	-0.01	0.02	0.08	-0.01	0.00	0.00
c_b	-0.10	0.00	0.00	-0.03	-0.04	-0.01	0.00	-0.06	0.00	0.01	0.03	0.00	0.00	0.00
Lea	-0.61	0.00	0.00	-0.04	-0.02	-0.02	0.00	-0.56	0.00	0.01	0.03	-0.01	0.00	0.00
Gro	0.48	0.00	0.00	-0.10	-0.15	-0.04	0.00	0.07	0.63	0.04	0.03	0.00	0.00	0.00
Ofd	-0.35	0.00	0.00	-0.03	-0.02	-0.02	0.00	-0.02	0.00	-0.30	0.05	0.00	0.00	0.00
Tex	-2.59	0.01	0.01	-0.24	-1.81	-0.23	0.00	0.50	-0.02	0.24	-1.02	-0.03	0.00	0.00
Livestock	-0.27	0.00	0.00	-0.07	-0.03	-0.03	0.00	-0.24	0.00	0.02	0.04	0.05	0.00	0.00
Fsh	-0.04	0.00	0.00	-0.01	-0.01	-0.01	0.00	-0.02	0.00	-0.01	0.02	0.00	0.00	0.00
Frs	0.04	0.00	0.00	-0.09	-0.04	-0.02	0.00	0.00	0.00	0.05	0.10	0.00	0.00	0.03
Total	**-1.75**	**0.00**	**0.02**	**-0.14**	**-1.58**	**0.09**	**0.00**	**0.15**	**0.57**	**0.14**	**-1.01**	**-0.03**	**0.00**	**0.02**

Note: Author's own simulations based on GTAP Data Base version 9.2

Table C.8: Uniform tariff at 10% (percentage change in output)

Sectors	Total	Pdr	wht	Osd	pfb	v_f	c_b	lea	gro	ofd	tex	livestock	fsh	Frs
Pdr	-0.20	0.00	0.00	-0.12	-0.07	-0.08	0.00	0.01	-0.01	0.01	0.05	0.00	0.00	0.00
Wht	-0.78	0.00	0.00	-0.27	-0.28	-0.19	0.00	0.01	-0.01	-0.10	0.07	0.01	0.00	-0.01
Osd	1.31	0.00	0.00	1.52	-0.18	-0.06	0.00	0.02	-0.01	-0.01	0.03	0.00	0.00	0.00
Pfb	0.68	0.00	0.00	-0.38	1.36	-0.35	0.00	0.32	-0.02	0.16	-0.34	-0.05	0.00	-0.01
v_f	1.06	0.00	0.00	-0.16	-0.17	1.31	0.00	0.04	-0.01	0.01	0.04	-0.01	0.00	0.00
c_b	-0.13	0.00	0.00	-0.04	-0.05	-0.01	0.00	-0.05	0.00	0.01	0.01	0.01	0.00	0.00
Lea	-0.57	0.00	0.00	-0.05	-0.02	-0.03	0.00	-0.46	0.00	0.01	0.01	-0.03	0.00	0.00
Gro	0.53	0.00	0.00	-0.13	-0.18	-0.06	0.00	0.05	0.80	0.03	0.01	-0.01	0.00	0.00
Ofd	-0.33	0.00	0.00	-0.04	-0.03	-0.02	0.00	-0.02	0.00	-0.25	0.02	0.00	0.00	0.00
Tex	-2.87	0.00	0.00	-0.29	-2.21	-0.31	0.00	0.40	-0.02	0.19	-0.56	-0.05	0.00	-0.01
Livestock	-0.24	0.00	0.00	-0.09	-0.04	-0.04	0.00	-0.19	0.00	0.01	0.02	0.10	0.00	0.00
Fsh	-0.05	0.00	0.00	-0.01	-0.02	-0.01	0.00	-0.01	0.00	-0.01	0.01	0.00	0.00	0.00
Frs	0.17	0.00	0.00	-0.11	-0.04	-0.03	0.00	0.00	0.00	0.04	0.05	0.00	0.00	0.26
Total	**-1.41**	**0.00**	**0.00**	**-0.17**	**-1.93**	**0.13**	**0.00**	**0.11**	**0.73**	**0.11**	**-0.56**	**-0.05**	**0.00**	**0.22**

Note: Author's own simulations based on GTAP Data Base version 9.2

Table C.9: Uniform tariff at 15% (percentage change in output)

Sectors	Total	Pdr	wht	osd	pfb	v_f	c_b	lea	gro	ofd	tex	livestock	fsh	Frs
Pdr	-0.34	0.14	-0.01	-0.18	-0.11	-0.13	0.00	0.00	-0.01	0.01	-0.05	0.01	0.00	-0.01
Wht	-1.25	-0.03	0.04	-0.40	-0.41	-0.32	0.00	0.01	-0.01	-0.04	-0.08	0.01	0.00	-0.03
Osd	1.82	-0.01	-0.01	2.24	-0.26	-0.09	0.00	0.01	-0.01	-0.01	-0.03	-0.01	0.00	-0.01
Pfb	1.18	-0.03	-0.03	-0.57	1.98	-0.58	0.00	0.15	-0.03	0.07	0.35	-0.11	0.00	-0.04
v_f	1.60	-0.01	-0.01	-0.23	-0.25	2.16	0.00	0.02	-0.01	0.01	-0.04	-0.02	0.00	-0.01
c_b	-0.18	0.00	0.00	-0.05	-0.07	-0.02	0.00	-0.03	0.00	0.00	-0.01	0.01	0.00	0.00
Lea	-0.46	0.00	0.00	-0.07	-0.03	-0.05	0.00	-0.23	0.00	0.00	-0.01	-0.06	0.00	0.00
Gro	0.65	-0.01	-0.01	-0.19	-0.26	-0.10	0.00	0.03	1.21	0.01	-0.02	-0.02	0.00	-0.01
Ofd	-0.29	0.00	0.00	-0.06	-0.04	-0.04	0.00	-0.01	0.00	-0.11	-0.02	0.00	0.00	0.00
Tex	-3.44	-0.02	-0.02	-0.43	-3.16	-0.50	0.00	0.19	-0.03	0.08	0.57	-0.12	0.00	-0.02
Livestock	-0.18	-0.01	0.00	-0.14	-0.06	-0.06	0.00	-0.10	0.00	0.01	-0.02	0.21	0.00	0.00
Fsh	-0.08	0.00	0.00	-0.02	-0.03	-0.02	0.00	-0.01	0.00	0.00	-0.01	0.00	0.01	0.00
Frs	0.48	-0.01	-0.01	-0.16	-0.06	-0.04	0.00	0.00	0.00	0.02	-0.06	-0.01	0.00	0.82
Total	**-0.50**	**0.01**	**-0.06**	**-0.25**	**-2.75**	**0.22**	**0.00**	**0.04**	**1.11**	**0.04**	**0.56**	**-0.10**	**0.01**	**0.68**

Note: Author's own simulations based on GTAP Data Base version 9.2

Table C.10: Uniform tariff at 8% (percentage change in prices)

Sectors	Total	Pdr	Wht	osd	Pfb	v_f	c_b	lea	gro	ofd	tex	livestock	fsh	Frs
Pdr	0.21	-0.02	-0.01	0.18	0.18	0.12	0.00	-0.09	0.00	-0.05	-0.11	0.01	0.00	0.00
Wht	0.31	-0.01	-0.02	0.22	0.25	0.15	0.00	-0.09	0.00	-0.09	-0.12	0.01	0.00	0.00
Osd	0.51	-0.01	-0.01	0.49	0.18	0.15	0.00	-0.09	0.00	-0.06	-0.14	0.01	0.00	0.00
Pfb	0.44	-0.01	-0.01	0.16	0.51	0.10	0.00	0.00	0.00	-0.01	-0.31	0.00	0.00	0.00
v_f	0.35	-0.01	-0.01	0.16	0.10	0.38	0.00	-0.11	0.01	-0.06	-0.13	0.01	0.00	0.00
c_b	0.41	-0.01	-0.01	0.28	0.27	0.17	0.00	-0.10	0.01	-0.05	-0.14	0.01	0.00	0.00
Lea	-0.78	0.00	0.00	0.05	-0.07	0.05	0.00	-0.74	0.00	-0.04	-0.05	0.03	0.00	0.00
Gro	0.13	-0.01	-0.01	0.12	0.07	0.11	0.00	-0.09	0.09	-0.05	-0.12	0.01	0.00	0.00
Ofd	-0.29	0.00	0.00	0.06	-0.07	0.08	0.00	-0.14	0.00	-0.08	-0.14	0.01	0.00	0.00
Tex	0.18	0.00	0.00	0.04	0.39	0.05	0.00	-0.10	0.00	-0.05	-0.16	0.01	0.00	0.00
Livestock	-0.45	-0.01	-0.01	0.19	-0.01	0.07	0.00	-0.59	0.00	-0.05	-0.07	0.02	0.00	0.00
Fsh	-0.50	0.00	0.00	-0.02	-0.16	0.03	0.00	-0.20	0.00	-0.08	-0.08	0.01	0.00	0.00
Frs	0.62	-0.02	-0.01	0.32	0.40	0.03	0.00	0.07	0.01	-0.04	-0.15	0.00	0.00	0.02
Total	**1.13**	**-0.12**	**-0.10**	**2.26**	**2.04**	**1.48**	**0.00**	**-2.28**	**0.13**	**-0.70**	**-1.72**	**0.12**	**0.00**	**0.02**

Note: Author's own simulations based on GTAP Data Base version 9.2

Table C.11: Uniform tariff at 10% (percentage change in prices)

Sectors	Total	Pdr	wht	osd	pfb	v_f	c_b	lea	gro	ofd	tex	livestock	fsh	Frs
Pdr	0.47	0.00	0.00	0.22	0.22	0.17	0.00	-0.07	0.00	-0.04	-0.06	0.01	0.00	0.01
Wht	0.62	0.00	0.00	0.28	0.32	0.21	0.00	-0.07	0.01	-0.08	-0.07	0.02	0.00	0.01
Osd	0.86	0.00	0.00	0.61	0.22	0.20	0.00	-0.08	0.00	-0.05	-0.08	0.01	0.00	0.01
Pfb	0.81	0.00	0.00	0.20	0.63	0.14	0.00	0.00	0.00	-0.01	-0.17	0.01	0.00	0.01
v_f	0.67	0.00	0.00	0.20	0.13	0.52	0.00	-0.09	0.01	-0.04	-0.07	0.01	0.00	0.00
c_b	0.75	0.00	0.00	0.35	0.33	0.24	0.00	-0.09	0.01	-0.04	-0.08	0.02	0.00	0.01
Lea	-0.56	0.00	0.00	0.06	-0.09	0.06	0.00	-0.60	0.00	-0.03	-0.03	0.06	0.00	0.00
Gro	0.34	0.00	0.00	0.15	0.09	0.14	0.00	-0.08	0.12	-0.04	-0.07	0.01	0.00	0.01
Ofd	-0.14	0.00	0.00	0.08	-0.09	0.10	0.00	-0.11	0.00	-0.06	-0.07	0.01	0.00	0.00
Tex	0.41	0.00	0.00	0.05	0.48	0.06	0.00	-0.08	0.00	-0.04	-0.09	0.01	0.00	0.00
Livestock	-0.19	0.00	0.00	0.24	-0.01	0.10	0.00	-0.49	0.00	-0.04	-0.04	0.04	0.00	0.00
Fsh	-0.43	0.00	0.00	-0.02	-0.20	0.04	0.00	-0.16	0.00	-0.07	-0.04	0.02	0.01	0.00
Frs	1.07	0.00	0.00	0.41	0.49	0.04	0.00	0.05	0.01	-0.03	-0.09	0.00	0.00	0.19
Total	**4.69**	**0.00**	**0.01**	**2.84**	**2.54**	**2.03**	**0.00**	**-1.88**	**0.17**	**-0.57**	**-0.94**	**0.25**	**0.01**	**0.24**

Note: Author's own simulations based on GTAP Data Base version 9.2

Table C.12: Uniform tariff at 15% (percentage change in prices)

Sectors	Total	Pdr	wht	osd	pfb	v_f	c_b	lea	gro	ofd	tex	livestock	fsh	frs
Pdr	1.10	0.05	0.02	0.33	0.33	0.28	0.00	-0.04	0.01	-0.02	0.07	0.03	0.00	0.03
Wht	1.41	0.03	0.04	0.43	0.47	0.36	0.00	-0.04	0.01	-0.03	0.07	0.04	0.00	0.03
Osd	1.72	0.03	0.02	0.92	0.33	0.34	0.00	-0.04	0.01	-0.02	0.08	0.03	0.00	0.03
Pfb	1.73	0.02	0.02	0.30	0.93	0.24	0.00	0.00	0.00	0.00	0.18	0.02	0.00	0.03
v_f	1.45	0.02	0.02	0.30	0.19	0.87	0.00	-0.05	0.01	-0.02	0.07	0.03	0.00	0.00
c_b	1.59	0.03	0.03	0.52	0.49	0.40	0.00	-0.05	0.02	-0.02	0.09	0.04	0.00	0.04
Lea	-0.06	0.01	0.01	0.10	-0.12	0.10	0.00	-0.30	0.00	-0.01	0.03	0.14	0.00	0.00
Gro	0.88	0.02	0.01	0.23	0.13	0.24	0.00	-0.04	0.18	-0.02	0.07	0.03	0.00	0.02
Ofd	0.22	0.01	0.01	0.11	-0.12	0.17	0.00	-0.06	0.01	-0.03	0.08	0.03	0.00	0.01
Tex	0.97	0.00	0.00	0.08	0.70	0.11	0.00	-0.04	0.01	-0.02	0.09	0.02	0.00	0.00
Livestock	0.41	0.02	0.01	0.36	-0.02	0.16	0.00	-0.24	0.00	-0.02	0.04	0.10	0.00	0.00
Fsh	-0.26	0.01	0.00	-0.03	-0.29	0.06	0.00	-0.08	0.00	-0.03	0.05	0.04	0.01	0.00
Frs	2.20	0.04	0.04	0.62	0.73	0.07	0.00	0.02	0.01	-0.02	0.09	0.00	0.00	0.59
Total	**13.35**	**0.28**	**0.25**	**4.27**	**3.76**	**3.39**	**0.00**	**-0.95**	**0.26**	**-0.25**	**1.01**	**0.55**	**0.01**	**0.77**

Note: Author's own simulations based on GTAP Data Base version 9.2

Table C.13: Uniform tariff at 8% (percentage change in real factor wages)

Real Factors	Total	Pdr	wht	Osd	pfb	v_f	c_b	lea	gro	ofd	tex	livestock	fsh	Frs
Labour-small farmer	0.65	-0.01	-0.01	0.21	0.32	0.22	0.00	-0.18	0.00	0.03	0.05	0.02	0.00	0.00
Labour-medium farmer	0.34	-0.02	-0.01	0.10	0.42	0.01	0.00	-0.22	0.00	0.04	0.00	0.01	0.00	0.00
Labour-farm worker	0.41	-0.01	-0.01	0.12	0.28	0.19	0.00	-0.28	0.00	0.03	0.07	0.02	0.00	0.00
Labour- non-farm low skilled	-0.26	0.00	0.00	-0.06	-0.21	-0.04	0.00	0.10	0.00	0.01	-0.06	0.00	0.00	0.00
Labour- non-farm high skilled	-0.01	0.00	0.00	-0.03	-0.06	-0.02	0.00	0.10	0.00	0.00	0.00	0.00	0.00	0.00
Land – small	1.98	-0.02	-0.02	0.44	0.66	0.57	0.00	0.46	0.01	0.00	-0.09	-0.02	0.00	0.00
Land – medium	1.73	-0.02	-0.02	0.47	0.86	0.16	0.00	0.50	0.00	0.01	-0.20	-0.02	0.00	0.00
Land – large	1.33	-0.04	-0.03	0.80	0.50	-0.20	0.00	0.37	0.01	-0.09	0.01	-0.01	0.00	0.00
Livestock	-1.26	0.00	0.00	-0.18	-0.05	-0.04	0.00	-1.30	-0.01	0.07	0.22	0.04	0.00	0.00
Capital – agriculture	1.43	-0.02	-0.02	0.45	0.68	-0.04	0.00	0.44	0.01	0.02	-0.07	-0.02	0.00	0.01
Capital – formal	-0.14	0.00	0.00	-0.06	-0.14	-0.04	0.00	0.12	0.00	-0.01	0.00	0.00	0.00	0.00
Capital – informal	-0.05	0.00	0.00	-0.06	-0.13	-0.04	0.00	0.13	0.00	0.01	0.05	-0.01	0.00	0.00
Total	**6.15**	**-0.13**	**-0.11**	**2.20**	**3.12**	**0.72**	**0.00**	**0.23**	**0.02**	**0.11**	**-0.03**	**0.02**	**0.00**	**0.00**

Note: Author's own simulations based on GTAP Data Base version 9.2

Table C.14: Uniform tariff at 10% (percentage change in real factor wages)

Real Factors	Total	Pdr	wht	osd	Pfb	v_f	c_b	lea	gro	ofd	tex	livestock	fsh	Frs
Labour-small farmer	0.90	0.00	0.00	0.27	0.39	0.31	0.00	-0.15	0.00	0.02	0.02	0.04	0.00	-0.01
Labour-medium farmer	0.53	0.00	0.00	0.13	0.52	0.01	0.00	-0.18	0.00	0.03	-0.01	0.02	0.00	-0.01
Labour-farm worker	0.63	0.00	0.00	0.15	0.34	0.27	0.00	-0.24	0.00	0.03	0.03	0.05	0.00	0.00
Labour- non-farm low skilled	-0.34	0.00	0.00	-0.08	-0.25	-0.06	0.00	0.08	0.00	0.01	-0.03	-0.01	0.00	0.00
Labour- non-farm high skilled	-0.06	0.00	0.00	-0.03	-0.08	-0.03	0.00	0.08	0.00	0.00	0.00	0.00	0.00	0.00
Land – small	2.44	0.00	0.00	0.55	0.82	0.79	0.00	0.37	0.02	-0.01	-0.06	-0.03	0.00	-0.01
Land – medium	2.13	0.00	0.00	0.59	1.07	0.22	0.00	0.40	0.00	0.01	-0.12	-0.04	0.00	-0.01
Land – large	1.57	0.00	0.00	1.00	0.62	-0.27	0.00	0.30	0.01	-0.07	0.00	-0.01	0.00	-0.01
Livestock	-1.19	0.00	0.00	-0.23	-0.07	-0.06	0.00	-1.07	-0.01	0.06	0.12	0.08	0.00	0.00
Capital – agriculture	1.77	0.00	0.00	0.57	0.84	-0.05	0.00	0.35	0.01	0.01	-0.05	-0.03	0.00	0.11
Capital – formal	-0.24	0.00	0.00	-0.08	-0.18	-0.06	0.00	0.10	0.00	-0.01	0.00	-0.01	0.00	0.00
Capital – informal	-0.18	0.00	0.00	-0.08	-0.16	-0.06	0.00	0.11	0.00	0.00	0.03	-0.01	0.00	0.00
Total	**7.96**	**0.00**	**0.01**	**2.77**	**3.87**	**1.01**	**0.00**	**0.17**	**0.03**	**0.08**	**-0.06**	**0.04**	**0.00**	**0.05**

Note: Author's own simulations based on GTAP Data Base version 9.2

Table C.15: Uniform tariff at 15% (percentage change in real factor wages)

Real Factors	Total	Pdr	Wht	osd	Pfb	v_f	c_b	lea	gro	ofd	tex	livestock	fsh	frs
Labour-small farmer	1.54	0.02	0.03	0.41	0.58	0.52	0.00	-0.08	0.00	0.01	-0.02	0.09	0.00	-0.02
Labour-medium farmer	1.01	0.04	0.03	0.20	0.76	0.03	0.00	-0.10	0.01	0.01	0.00	0.05	0.00	-0.02
Labour-farm worker	1.18	0.02	0.02	0.23	0.51	0.45	0.00	-0.12	0.00	0.01	-0.03	0.10	0.00	-0.01
Labour- non-farm low skilled	-0.55	-0.01	-0.01	-0.12	-0.37	-0.10	0.00	0.04	0.00	0.00	0.03	-0.01	0.00	-0.01
Labour- non-farm high skilled	-0.21	-0.01	-0.01	-0.05	-0.12	-0.06	0.00	0.05	0.00	0.00	0.00	-0.01	0.00	0.00
Land – small	3.63	0.05	0.05	0.84	1.21	1.32	0.00	0.18	0.02	0.00	0.06	-0.07	0.00	-0.03
Land – medium	3.17	0.06	0.05	0.89	1.58	0.39	0.00	0.19	-0.01	0.00	0.12	-0.07	0.00	-0.03
Land – large	2.21	0.08	0.07	1.50	0.92	-0.43	0.00	0.14	0.02	-0.03	0.00	-0.03	0.00	-0.03
Livestock	-1.04	-0.01	0.00	-0.34	-0.10	-0.11	0.00	-0.54	-0.01	0.02	-0.12	0.17	0.00	-0.01
Capital – agriculture	2.66	0.06	0.05	0.86	1.24	-0.07	0.00	0.17	0.02	0.00	0.04	-0.06	0.00	0.35
Capital – formal	-0.47	-0.01	-0.01	-0.12	-0.26	-0.10	0.00	0.05	0.00	0.00	0.00	-0.02	0.00	-0.01
Capital – informal	-0.48	-0.01	-0.01	-0.12	-0.23	-0.11	0.00	0.06	0.00	0.00	-0.03	-0.02	0.00	-0.01
Total	**12.66**	**0.30**	**0.28**	**4.19**	**5.71**	**1.73**	**0.00**	**0.04**	**0.04**	**0.02**	**0.05**	**0.11**	**0.00**	**0.18**

Note: Author's own simulations based on GTAP Data Base version 9.2

Table C.16: Uniform tariff at 8% (percentage change in household real income)

Household Types	Total	Pdr	wht	Osd	Pfb	v_f	c_b	lea	gro	ofd	tex	livestock	Fsh	frs
Rural small farmer (Quantile 1)	-0.29	-0.01	-0.01	0.14	0.14	0.21	0.00	-0.65	0.00	-0.05	-0.09	0.02	0.00	0.00
Rural Small farmer (Quantile 234)	-0.39	-0.01	-0.01	0.12	0.13	0.19	0.00	-0.72	0.00	-0.04	-0.07	0.02	0.00	0.00
Rural medium farmer (Quantile 1)	0.24	-0.02	-0.02	0.29	0.45	0.10	0.00	-0.34	0.00	-0.05	-0.19	0.01	0.00	0.00
Rural medium farmer (Quantile 234)	0.03	-0.02	-0.01	0.27	0.36	0.07	0.00	-0.46	0.00	-0.05	-0.16	0.02	0.00	0.00
Rural landless farmer (Quantile 1)	0.14	-0.01	-0.01	0.22	0.23	0.25	0.00	-0.36	0.01	-0.06	-0.14	0.01	0.00	0.00
Rural landless farmer (Quantile 234)	-0.08	-0.01	-0.01	0.19	0.18	0.16	0.00	-0.41	0.00	-0.06	-0.12	0.02	0.00	0.00
Rural farm worker (Quantile 1)	-0.98	0.00	0.00	-0.03	-0.09	0.08	0.00	-0.87	0.00	-0.04	-0.05	0.03	0.00	0.00
Rural farm worker (Quantile 234)	-1.11	0.00	0.00	-0.06	-0.12	0.05	0.00	-0.95	0.00	-0.04	-0.03	0.03	0.00	0.00
Rural non-farm worker (Quantile 1)	-0.59	0.00	0.00	-0.02	-0.23	0.02	0.00	-0.16	0.00	-0.07	-0.15	0.01	0.00	0.00
Rural non- farm worker (Quantile 2)	-0.55	0.00	0.00	-0.02	-0.21	0.02	0.00	-0.15	0.00	-0.07	-0.14	0.01	0.00	0.00
Rural non- farm worker (Quantile 3)	-0.53	0.00	0.00	-0.02	-0.20	0.02	0.00	-0.15	0.00	-0.07	-0.13	0.01	0.00	0.00
Rural non- farm worker (Quantile 4)	-0.54	0.00	0.00	-0.02	-0.20	0.02	0.00	-0.15	0.00	-0.08	-0.13	0.01	0.00	0.00
Urban (Quantile 1)	-0.51	0.00	0.00	0.00	-0.19	0.05	0.00	-0.17	0.00	-0.07	-0.14	0.01	0.00	0.00
Urban (Quantile 2)	-0.55	0.00	0.00	-0.01	-0.20	0.03	0.00	-0.17	0.00	-0.07	-0.14	0.01	0.00	0.00
Urban (Quantile 3)	-0.55	0.00	0.00	-0.01	-0.19	0.03	0.00	-0.18	0.00	-0.08	-0.13	0.01	0.00	0.00
Urban (Quantile 4)	-0.55	0.00	0.00	-0.01	-0.20	0.03	0.00	-0.16	0.00	-0.08	-0.14	0.01	0.00	0.00
Total	**-6.81**	**-0.08**	**-0.06**	**1.02**	**-0.35**	**1.37**	**0.00**	**-6.03**	**0.03**	**-0.98**	**-1.96**	**0.22**	**0.00**	**0.00**

Note: Author's own simulations based on GTAP Data Base version 9.2

Table C.17: Uniform tariff at 10% (percentage change in household real income)

Household Types	Total	Pdr	wht	osd	Pfb	v_f	c_b	lea	gro	ofd	tex	livestock	fsh	Frs
Rural small farmer (Quantile 1)	0.07	0.00	0.00	0.17	0.17	0.29	0.00	-0.53	0.00	-0.04	-0.05	0.05	0.00	0.00
Rural Small farmer (Quantile 234)	-0.04	0.00	0.00	0.15	0.16	0.27	0.00	-0.59	0.00	-0.03	-0.04	0.05	0.00	0.00
Rural medium farmer (Quantile 1)	0.67	0.00	0.00	0.37	0.56	0.14	0.00	-0.28	0.00	-0.04	-0.11	0.03	0.00	0.01
Rural medium farmer (Quantile 234)	0.43	0.00	0.00	0.34	0.45	0.10	0.00	-0.38	0.00	-0.04	-0.09	0.03	0.00	0.01
Rural landless farmer (Quantile 1)	0.53	0.00	0.00	0.27	0.29	0.35	0.00	-0.29	0.01	-0.05	-0.08	0.03	0.00	0.01
Rural landless farmer (Quantile 234)	0.26	0.00	0.00	0.23	0.22	0.22	0.00	-0.34	0.01	-0.05	-0.07	0.03	0.00	0.01
Rural farm worker (Quantile 1)	-0.75	0.00	0.00	-0.04	-0.11	0.11	0.00	-0.72	0.00	-0.03	-0.03	0.06	0.00	0.00
Rural farm worker (Quantile 234)	-0.91	0.00	0.00	-0.07	-0.15	0.07	0.00	-0.78	0.00	-0.03	-0.02	0.06	0.00	0.00
Rural non-farm worker (Quantile 1)	-0.52	0.00	0.00	-0.03	-0.28	0.03	0.00	-0.12	0.00	-0.06	-0.08	0.01	0.00	0.00
Rural non- farm worker (Quantile 2)	-0.49	0.00	0.00	-0.02	-0.26	0.03	0.00	-0.12	0.00	-0.06	-0.07	0.01	0.00	0.00
Rural non- farm worker (Quantile 3)	-0.47	0.00	0.00	-0.02	-0.25	0.03	0.00	-0.12	0.00	-0.06	-0.06	0.01	0.00	0.00
Rural non- farm worker (Quantile 4)	-0.47	0.00	0.00	-0.02	-0.25	0.03	0.00	-0.12	0.00	-0.06	-0.07	0.01	0.00	0.00
Urban (Quantile 1)	-0.42	0.00	0.00	0.00	-0.23	0.06	0.00	-0.14	0.00	-0.06	-0.07	0.02	0.00	0.00
Urban (Quantile 2)	-0.47	0.00	0.00	-0.01	-0.25	0.04	0.00	-0.14	0.00	-0.06	-0.07	0.01	0.00	0.00
Urban (Quantile 3)	-0.48	0.00	0.00	-0.02	-0.24	0.04	0.00	-0.14	0.00	-0.06	-0.07	0.01	0.00	0.00
Urban (Quantile 4)	-0.47	0.00	0.00	-0.02	-0.24	0.04	0.00	-0.13	0.00	-0.07	-0.07	0.01	0.00	0.00
Total	**-3.53**	**0.00**	**0.01**	**1.29**	**-0.42**	**1.85**	**0.00**	**-4.93**	**0.03**	**-0.79**	**-1.04**	**0.46**	**0.00**	**0.02**

Note: Author's own simulations based on GTAP Data Base version 9.2.

Table C.18: Uniform tariff at 15% (percentage change in household real income)

Household Types	Total	Pdr	wht	osd	Pfb	v_f	c_b	lea	gro	ofd	tex	livestock	fsh	frs
Rural small farmer (Quantile 1)	0.94	0.02	0.02	0.26	0.25	0.48	0.00	-0.27	0.01	-0.02	0.05	0.11	0.00	0.01
Rural Small farmer (Quantile 234)	0.81	0.02	0.02	0.22	0.23	0.44	0.00	-0.30	0.01	-0.02	0.05	0.11	0.00	0.01
Rural medium farmer (Quantile 1)	1.75	0.04	0.04	0.56	0.82	0.25	0.00	-0.14	0.00	-0.02	0.12	0.06	0.00	0.02
Rural medium farmer (Quantile 234)	1.42	0.04	0.04	0.52	0.67	0.17	0.00	-0.19	0.01	-0.02	0.09	0.07	0.00	0.02
Rural landless farmer (Quantile 1)	1.49	0.03	0.03	0.41	0.43	0.58	0.00	-0.15	0.01	-0.02	0.09	0.06	0.00	0.02
Rural landless farmer (Quantile 234)	1.08	0.03	0.03	0.35	0.32	0.36	0.00	-0.17	0.01	-0.02	0.08	0.07	0.00	0.02
Rural farm worker (Quantile 1)	-0.23	0.01	0.01	-0.05	-0.16	0.18	0.00	-0.36	0.00	-0.01	0.03	0.14	0.00	-0.01
Rural farm worker (Quantile 234)	-0.45	0.00	0.00	-0.11	-0.22	0.12	0.00	-0.39	0.00	-0.01	0.02	0.14	0.00	-0.01
Rural non-farm worker (Quantile 1)	-0.39	0.00	0.00	-0.04	-0.41	0.04	0.00	-0.06	0.00	-0.02	0.09	0.03	0.00	0.00
Rural non- farm worker (Quantile 2)	-0.36	0.00	0.00	-0.04	-0.39	0.04	0.00	-0.06	0.00	-0.02	0.08	0.03	0.00	0.00
Rural non- farm worker (Quantile 3)	-0.35	0.00	0.00	-0.04	-0.37	0.05	0.00	-0.05	0.00	-0.02	0.07	0.03	0.00	0.00
Rural non- farm worker (Quantile 4)	-0.35	0.00	0.00	-0.04	-0.36	0.05	0.00	-0.05	0.00	-0.03	0.07	0.03	0.00	0.00
Urban (Quantile 1)	-0.22	0.00	0.00	0.00	-0.34	0.09	0.00	-0.06	0.00	-0.02	0.08	0.03	0.00	0.00
Urban (Quantile 2)	-0.30	0.00	0.00	-0.02	-0.36	0.07	0.00	-0.06	0.00	-0.02	0.08	0.03	0.00	0.00
Urban (Quantile 3)	-0.31	0.00	0.00	-0.03	-0.35	0.06	0.00	-0.07	0.00	-0.03	0.08	0.03	0.00	0.00
Urban (Quantile 4)	-0.31	0.00	0.00	-0.03	-0.35	0.05	0.00	-0.06	0.00	-0.03	0.08	0.03	0.00	0.00
Total	**4.21**	**0.18**	**0.17**	**1.93**	**-0.58**	**3.04**	**0.00**	**-2.45**	**0.05**	**-0.34**	**1.16**	**1.00**	**0.00**	**0.06**

Note: Author's own simulations based on GTAP Data Base version 9.2

Appendix D

Simulated Results of Pakistan Agriculture Trade Negotiations based on Export Potential

Table D.1: Change in Real Factor Wages (in percentage)

Real Factors	PAK-BANGLADESH		PAK-CHINA		PAK-EU25		PAK-KOREA		PAK-TURKEY		PAK-USA	
	Pakistan	Bangladesh	Pak	China	Pak	EU25	Pak	Korea	Pak	Turkey	Pak	USA
Labour-small farmer	0.05	0.02	0.07	0.00	0.73	0.00	0.02	0.00	0.06	0.00	0.22	0.00
Labour-medium farmer	0.05	0.02	0.10	0.00	0.75	0.00	0.02	0.00	0.09	0.00	0.28	0.00
Labour-farm worker	0.05	0.02	0.07	0.00	0.71	0.00	0.02	0.00	0.06	0.00	0.23	0.00
Labour- non-farm low skilled	0.01	0.02	0.06	0.00	0.23	0.00	0.01	0.00	0.03	0.00	0.12	0.00
Labour- non-farm high skilled	0.07	0.01	0.09	0.00	0.32	0.00	0.02	0.00	0.04	0.00	0.18	0.00
Land – small	0.07	-0.04	0.13	0.00	1.05	0.03	0.02	0.00	0.11	0.01	0.35	0.02
Land – medium	0.11	-0.04	0.20	0.00	1.46	0.03	0.04	0.00	0.17	0.01	0.55	0.02
Land – large	0.05	-0.04	0.08	0.00	1.01	0.03	0.01	0.00	0.11	0.01	0.27	0.02
Livestock	0.03	0.04	0.05	0.00	0.38	0.00	0.01	0.00	0.05	0.00	0.14	0.00
Capital – agriculture	0.06	0.04	0.11	0.00	1.82	0.00	0.02	0.00	0.10	0.00	0.30	0.00
Capital – formal	0.01	0.04	0.03	0.00	0.19	0.00	0.00	0.00	0.02	0.00	0.07	0.00
Capital – informal	0.01	0.04	0.01	0.00	0.09	0.00	0.00	0.00	0.02	0.00	0.03	0.00
Total	**0.57**	**0.13**	**1.00**	**0.00**	**8.79**	**0.09**	**0.2**	**0.00**	**0.86**	**0.03**	**2.75**	**0.06**

Note: This table presents the percentage change in real factor wages in response to Pakistan trade deals on the bases of export potential of Pakistan textile sector. Whereas, results are author's own simulation based upon GTAP DATABASE 9.2.

Table D.2: Change in Household Real Income (in percentage)

Household Types	PAK-BAN		PAK-CHINA		PAK-EU25		PAK-KOREA		PAK-TURKEY		PAK-USA	
	Pak	Ban	Pak	China	Pak	EU	Pak	Korea	Pak	Turkey	Pak	USA
Rural small farmer (Quantile 1)	0.10	0.05	0.19	0.00	1.41	0.00	0.04	0.00	0.18	0.00	0.59	0.00
Rural Small farmer (Quantile 234)	0.10	0.05	0.19	0.00	1.41	0.00	0.04	0.00	0.18	0.00	0.55	0.00
Rural medium farmer (Quantile 1)	0.12	0.05	0.24	0.00	1.71	0.00	0.04	0.00	0.20	0.00	0.64	0.00
Rural medium farmer (Quantile 234)	0.12	0.05	0.24	0.00	1.71	0.00	0.04	0.00	0.20	0.00	0.64	0.00
Rural landless farmer (Quantile 1)	0.10	0.05	0.18	0.00	1.31	0.00	0.03	0.00	0.17	0.00	0.53	0.00
Rural landless farmer (Quantile 234)	0.10	0.05	0.18	0.00	1.31	0.00	0.03	0.00	0.17	0.00	0.53	0.00
Rural farm worker (Quantile 1)	0.09	0.05	0.17	0.00	1.18	0.00	0.03	0.00	0.14	0.00	0.44	0.00
Rural farm worker (Quantile 234)	0.09	0.05	0.17	0.00	1.18	0.00	0.03	0.00	0.14	0.00	0.44	0.00
Rural non-farm worker (Quantile 1)	0.07	0.05	0.14	0.00	0.99	0.00	0.02	0.00	0.14	0.00	0.44	0.00
Rural non- farm worker (Quantile 2)	0.07	0.05	0.14	0.00	0.99	0.00	0.02	0.00	0.14	0.00	0.44	0.00
Rural non- farm worker (Quantile 3)	0.07	0.05	0.14	0.00	0.99	0.00	0.02	0.00	0.14	0.00	0.44	0.00
Rural non- farm worker (Quantile 4)	0.07	0.05	0.14	0.00	0.99	0.00	0.02	0.00	0.14	0.00	0.44	0.00
Urban (Quantile 1)	0.07	0.05	0.14	0.00	1.01	0.00	0.02	0.00	0.12	0.00	0.38	0.00
Urban (Quantile 2)	0.07	0.05	0.14	0.00	1.01	0.00	0.02	0.00	0.12	0.00	0.38	0.00
Urban (Quantile 3)	0.07	0.05	0.14	0.00	1.01	0.00	0.02	0.00	0.14	0.00	0.38	0.00
Urban (Quantile 4)	0.07	0.05	0.14	0.00	1.01	0.00	0.02	0.00	0.14	0.00	0.38	0.00
Total	**1.38**	**0.80**	**2.68**	**0.00**	**19.22**	**0.00**	**0.44**	**0.00**	**2.46**	**0.00**	**7.64**	**0.00**

Note: This table presents the percentage change in household real income in response to Pakistan trade deals on the bases of export potential of Pakistan textile sector. Whereas, results are author's own simulation based upon GTAP DATABASE 9.2.

Table D.3: Change in Real Factor Wages (in percentage)

Real Factors	PAK-CHINA		PAK-EU25		PAK-INDONESIA		PAK-TURKEY		PAK-USA		PAK-VIETNAM	
	Pak	China	Pak	EU	Pak	Indo	Pak	Turk	Pak	USA	Pak	Viet
Labour-small farmer	0.06	0	0.07	0	0	0	0.01	0	0.01	0	0.01	0
Labour-medium farmer	0.07	0	0.08	0	0	0	0.01	0	0.01	0	0.02	0
Labour-farm worker	0.09	0	0.1	0	0	0	0.01	0	0.02	0	0.02	0
Labour- non-farm low skilled	-0.02	0	-0.03	0	0	0	-0.01	0	-0.01	0	-0.01	0
Labour- non-farm high skilled	-0.03	0	-0.03	0	0	0	-0.01	0	-0.01	0	-0.01	0
Land – small	-0.11	0	-0.12	0	0	0	-0.01	0	-0.02	0	-0.02	0
Land – medium	-0.12	0	-0.13	0	0	0	-0.01	0	-0.02	0	-0.03	0
Land – large	-0.08	0	-0.09	0	0	0	-0.01	0	-0.02	0	-0.02	0
Livestock	0.37	0	0.41	0	0	0	0.05	0	0.07	0	0.08	0
Capital – agriculture	-0.1	0	-0.12	0	0	0	-0.01	0	-0.01	0	-0.02	0
Capital – formal	-0.03	0	-0.03	0	0	0	-0.01	0	-0.01	0	-0.01	0
Capital – informal	-0.03	0	-0.03	0	0	0	-0.01	0	-0.01	0	-0.01	0
Total	**0.07**	**0**	**0.08**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Note: This table presents the percentage change in real factor wages in response to Pakistan trade deals on the bases of export potential of Pakistan leather sector. Whereas, results are author's own simulation based upon GTAP DATABASE 9.2.

Table D.4: Change in Household Real Income (in percentage)

Household Types	PAK-CHINA		PAK-EU25		PAK-INDONESIA		PAK-TURKEY		PAK-USA		PAK-VIETNAM	
	Pak	China	Pak	EU	Pak	Indo	Pak	Turk	Pak	USA	Pak	Viet
Rural small farmer (Quantile 1)	0.18	0	0.2	0	0	0	0.02	0	0.03	0	0.04	0
Rural Small farmer (Quantile 234)	0.21	0	0.23	0	0	0	0.02	0	0.04	0	0.04	0
Rural medium farmer (Quantile 1)	0.1	0	0.11	0	0	0	0.01	0	0.02	0	0.02	0
Rural medium farmer (Quantile 234)	0.13	0	0.15	0	0	0	0.01	0	0.02	0	0.03	0
Rural landless farmer (Quantile 1)	0.1	0	0.12	0	0	0	0.01	0	0.02	0	0.02	0
Rural landless farmer (Quantile 234)	0.12	0	0.13	0	0	0	0.01	0	0.02	0	0.03	0
Rural farm worker (Quantile 1)	0.25	0	0.27	0	0	0	0.02	0	0.04	0	0.05	0
Rural farm worker (Quantile 234)	0.26	0	0.29	0	0	0	0.02	0	0.05	0	0.06	0
Rural non-farm worker (Quantile 1)	0.04	0	0.05	0	0	0	0	0	0.01	0	0.01	0
Rural non- farm worker (Quantile 2)	0.04	0	0.04	0	0	0	0	0	0.01	0	0.01	0
Rural non- farm worker (Quantile 3)	0.04	0	0.04	0	0	0	0	0	0.01	0	0.01	0
Rural non- farm worker (Quantile 4)	0.04	0	0.04	0	0	0	0	0	0.01	0	0.01	0
Urban (Quantile 1)	0.05	0	0.05	0	0	0	0	0	0.01	0	0.01	0
Urban (Quantile 2)	0.05	0	0.05	0	0	0	0	0	0.01	0	0.01	0
Urban (Quantile 3)	0.05	0	0.05	0	0	0	0	0	0.01	0	0.01	0
Urban (Quantile 4)	0.04	0	0.05	0	0	0	0	0	0.01	0	0.01	0
Total	**1.7**	**0**	**1.87**	**0**	**0**	**0**	**0.12**	**0**	**0.32**	**0**	**0.37**	**0**

Note: This table presents the percentage change in household real income in response to Pakistan trade deals on the bases of export potential of Pakistan leather sector. Whereas, results are author's own simulation based upon GTAP DATABASE 9.2.