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Quantitative Assessment of Pakistan and China Free Trade Agreement

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Abstract

The purpose of this paper is to assess the economic impact of tariff eliminations under free trade agreement (FTA) of Pakistan and China on various macroeconomic and trade variables. The objective is to scrutinize the pre and post effect of Pakistan and China FTA on macroeconomic factors like real gross domestic product (GDP), trade balance, output and trade in different sectors, welfare in context of Pakistan. In this regard, the computable general equilibrium (CGE) modeling structure of the global trade analysis project (GTAP) model and database is use to analyze the aggregate effect as well as sectorial implications. The GTAP database version 9 has data of 140 countries. Nevertheless, 2 main countries such as Pakistan and China are aggregated separately. Moreover, the database also embedded with data of 57 sectors, which have been aggregated into 43 sectors. The simulation results reveal that under tariff eliminations of Pakistan and China FTA, Pakistan faces negative impact on its economy whereas China gets benefit from the same. China gains in terms of welfare, real GDP and trade balances, while Pakistan losses in terms of welfare, real GDP and trade balances. However, the results identify the potential exports sectors of Pakistan such as textile, wearing apparel, leather products, plant-based fibers, chemical products, vegetable oil and fats, and metal products. Therefore, Pakistan can exploit this opportunity by increasing exports from these sectors to China. This study is useful for policy makers to design appropriate trade policy of Pakistan.

Keywords: Free trade agreement (FTA), Pakistan, China, global trade analysis project (GTAP), computable general equilibrium (CGE).

1. Introduction

Free Trade Agreements are one of the outcomes of global interactions between member countries to develop their economies. Nevertheless, free trade agreements (FTAs), which are preferential trading agreements, have both favorable and non-favorable impact on the partner economies. The significance of FTAs is growing among emerging countries due to their role in economic prosperity and growth. This issue has immense importance from both theoretical and empirical aspects. The number of researchers contributed in this

discussion and highlights the role of FTA in the economic development like Rose (2004), Plummer (2006), Karmakar (2005), Kawai and Wignaraj (2007) and Mai et al. (2010). However, the discussion on current FTAs' implication is an ongoing process.

Pakistan and China both countries are member of World Trade Organization (WTO) since 1January 1995 and 11 December 2001 respectively. Pakistan and China have strong economic and trade relationship as well as both are political and strategic ally in the region. In the consequence, the private and government sectors of both nations are engaged in numerous agreements and investments projects. The Free Trade Agreement (FTA) of Pakistan and China is significant on several levels. Primarily, it establishes the long lasting trade association among Pakistan and China. From the last decades, both countries have been significant trade partners for each other. For instance, Pakistan is a main exporter of plant-based fiber, textile, wearing apparel, vegetable oil and fats, metal, leather and chemical products to China. While, China is a leading exporter of textile, wood products, petroleum and coal products, chemical products, metal products, auto parts, machinery and equipment, paddy rice, and other crops. China and Pakistan have a major role in world economic affairs due to assertive growth rates and friendly associations. Exclusively, China has achieved remarkable development in international trade and investment. Currently, China is one of the world's major exporting economies, whereas Pakistan exports have increased significantly from 2000 to 2014.

Specifically in Asia, both nations have been involved in different FTAs with other economies. Nevertheless, no improvement has been made to attain the maximum benefit from Pakistan-China FTA. The local industry of Pakistan has raised concerns on various occasions regarding Pakistan-China FTA. In this scenario, it is important to scrutinize the possible impact of Pakistan-China FTA on the economy and identify the sectors wherein, an elimination of trade tariff might result in mutual benefit and maximization of return from this FTA. This study is an attempt to examine the pre and post impact of Pakistan-China FTA on macroeconomic factors of Pakistan is especially lacking in the existing literature. Therefore, the study significantly contributes to the body of knowledge related to the impact of Pakistan-China FTA on macroeconomic factors. Furthermore, practically this study is also significant for the policy makers to establish an appropriate trade policy.

In fact, Pakistan is developing economy and facing enormous economic challenges. Nevertheless, it has significant strategic geographical location in the world. Pakistan can improve its economic condition through Free Trade Agreements (FTAs) because FTA facilitate the free flow of trade and investment and bring about closer economic integration between the binding parties by eliminating tariff restrictions on each other's commodities. Nevertheless, the problem arises that whether Pakistan is getting gains or not from the Pakistan-China FTA.

That is why; the aim is to investigate the pre and post impact of Bilateral Trade Agreement BTA of Pakistan and China on macroeconomic factors like real Gross Domestic Product (GDP), trade balance, output and trade in different sectors, welfare in context of Pakistan. Moreover, this study is considered research question of what is the pre and post impact of Pakistan-China FTA on macroeconomic factors.

The remaining manuscript is organized in the following order. The section 2 is related with the overview of trade agreement of Pakistan and China. Moreover, in section 3 literature

review and hypothesis are discussed followed by methodology in section 4. Section 5 elaborates the results discussion. The last chapter is about the conclusion.

In the global economy, China has become a major player and views FTAs as a significant part of its international trading strategy. The Chinese industrial sectors rely on Foreign Direct Investment (FDI) inflows and export of raw material and intermediate commodities. In fact, its export industries are embedded in current regional and global production networks (Zhang 2010). Similarly, according to Qi et.al (2014), China has become the world's largest trading economy in commodities, ending the United States' post-war international trade dominance.

During last three decades, it has been observed that China's GDP is soaring at a swift rate. The GDP was $9,240,270 million in 2013 and the same has been enhancing by over one trillion dollar from 2012 i.e. $8,229,490 million. China's trade share a huge portion of the world economy, and it is the second largest economy in the world. China's surplus trade balance was $260,587 million (Pakistan Business Council 2015).

Keeping in view of above global importance of China, Pakistan signed a FTA with China on 24th November 2006, which came into effect in 2007. The agreement was consist of two phases. In phase-I, China abolished tariffs on 6418 product lines and similarly Pakistan also eliminate/decrease tariffs on 6711 product lines within 5 years. The phase-I ended in December 2012. Pakistan provide market entry to China mostly on machinery, organic, and inorganic chemicals, fruits & vegetables, medicaments and other raw materials for various industries including engineering sector, intermediary goods for engineering sectors, etc. While China abolished tariff on industrial alcohol, cotton fabrics, bed linen and other home textiles, marble and other tiles, leather articles, sports goods, mangoes, citrus fruit and other fruits and vegetables, iron and steel products and engineering goods. China also eliminated 50% tariff on products such as fish, dairy sectors; frozen orange juice, plastic products, rubber products, leather products, knitwear, woven garments etc. (MoC, 2016).

Since July 2013, phase-II negotiations are ongoing between both countries. The initial objective of the FTA is to abolish tariff on at least 90% of all products (both in terms of tariff lines and trade volume). At this point in time, it's significant for Pakistan to exploit this opportunity for enhancing Pakistan's market access to the Chinese's markets. The objective of phase-II agreement is that to improve the bilateral trade up to $15 billion beside with to enhance economic relations between the two countries through trade. The bilateral trade reached to approximately $9,278 million at the end of 2013 as compared to $3,421.96 million in 2006 prior to the FTA being executed (Pakistan Business Council 2015).

Pakistan and China are close friends and they have excellent strategic link for many decades with each other. China always takes keen interest in development of Pakistan's industrialization, defense, technology and infrastructure. Pakistan China – FTA is golden opportunity for Pakistan towards enhancing its overall trade development.

In Pakistan's imports, China had been sharing importantly, even before the FTA was signed and after the FTA execution in 2007, it has significantly enhanced its ranking. In 2012, it was sharing 15% of Pakistan's overall imports from the world as contrast to 9.8% in 2006. Nevertheless, Pakistan's share to China's imports from world did not observe any considerable rises in this time period, it was raised from 0.06% to a simply 0.18%. China's shares to Pakistan's imports were even higher, if petroleum and petroleum commodities

are excluded from the imports. The share enhances from 13% to 24% (nearly 1/4th of total) during 2006 to 2012 an evidence of China's swift rising contribution in Pakistan's imports (UNCT, 2016).

2. Literature Review

Shaikh (2009) and Shaikh et al. (2012) analyzed the South Asian Free Trade Agreement (SAFTA) by using GTAP model and found that the Pakistan's economy will get net export benefits from this FTA. Similarly, the researchers like Krueger et.al (2004) and Bandara and Yu (2003) take a largely pessimistic view of the South Asian Free Trade Agreement (SAFTA). However Khan (2010) investigated that currently very limited intra-industry trade exists between Pakistan, India, Bangladesh and Sri Lanka. Moreover, Kemal (2005) highlighted the obstacles such as limited capacity to generate exportable surpluses, restrictive trade policies, and political problems have also inhibited the growth of intra-regional trade among South Asian countries. Taneja et al. (2013) clearly argued that economic integration in South Asia is governed by India's relations with the other economies of the region. So they highlighted the significance of the India in the region and India and Pakistan political relation is main issue in the implementation of SAFTA. On the same line, Coulibaly (2007) build up an argument that Asia (SAPTA's) negative impact on its members' intra-trade is probably an implicit effect of the India-Pakistan tensions. Furthermore et al. (2011) argued that intra-SAARC trade is carried on small scale when is compared to regional blocks of the rest of the world. In view of above discussion, most of the researchers highlight the negative impact of SAFTA which was practically observed due to political conflict between Pakistan and India. That is why, after failure of SAFTA Pakistan involved in different Bilateral Trade Agreements (BTAs) and among these FTAs one of the BTAs is Pakistan-China FTA, which is analyzed in this study.

According to Irshad et al. (2014), China should enhance the collaboration with the different nations and regions according to their resource characteristics, economic structure and technological intensity. Sudsawasd and Mongsawad (2007) examined the trade potential and the economic impact of bilateral free trade agreements between the ASEAN-5 member countries (Indonesia, Malaysia, the Philippines, Singapore and Thailand). They showed that ASEAN-5 would gain greater benefits from the FTAs if they fully liberalized trade among themselves. This would be due in part to less trade diversion, better resource allocation and terms-of-trade effect improvement. Kawai and Wignaraja (2007) used a CGE model to examine the economic impact of forming various types of FTAs in East Asia among such groups as ASEAN+1 (ASEAN + China, ASEAN + Japan, ASEAN + Republic of Korea and ASEAN + India) mainly in the form of free trade agreements (FTAs) or comprehensive economic partnership agreements, ASEAN+3 (ASEAN, China, Japan and the Republic of Korea), ASEAN+6 (ASEAN+3, Australia, New Zealand and India). They concluded that of the plausible regional trade arrangements, consolidation at the ASEAN+6 levels would yield the largest welfare gains for East Asia. Boumellassa et al. (2006) had a point of view after conducted the simulations, the ASEAN countries will improve their GDP up to more than 2% up till 2020. The significant impact of FTA on trade balance of a country had been analyzed by Kawasaki (2003). His results reveal that the Japanese import volumes were more than its export volumes. Cheong (2010) argued that after the simulation of ASEAN FTA it had been observed that Vietnamese's sectoral output and trade changed. The output of all primary and secondary sectors reduced excluding the Grains and Crops sector. The export price and volume of Grains and Crops

sector increased as compare to other sectors. The above mentioned discussion is related to those variables which are analyzed in this study.

Sindu et al. (2016) investigated the effect of trade liberalization on poverty in Ethiopia by using a computable general equilibrium model and found that after complete tariff elimination trade liberalization has a negative short-run impact on the country. There are also various studies using Computable General Equilibrium (CGE) modeling, such as Oduncu et al. (2014), Xin (2014), Narayanan and Sharma (2014) and Petri et al. (2011) to assess the impact of Trans-Pacific Partnership (TPP) on different regions. Study by Hiro and Itakura (2014) used Global Trade Analysis Project (GTAP) dynamic model to investigate welfare impact of Regional Comprehensive Economic Partnership (RCEP) and TPP on various regions. Nevertheless, the above said literature uses the CGE model but does not consider the Pakistan-China FTA for the investigation which motivates the author to examine. In view of above mentioned literature the following hypotheses have been developed:

- **H_1:** Pakistan- China FTA has significant impact on real GDP of a country.
- **H_2:** Pakistan- China FTA has significant impact on country's trade balance.
- **H_3:** Pakistan- China FTA effect on trade and output in different sectors within the country.
- **H_4:** Pakistan- China FTA has significant effect on country's welfare.

3. Methodology

Numerous researchers use the computable general equilibrium (CGE) modeling structure of the Global Trade Analysis Project (GTAP) to assess the economic impact of a free trade agreement such as Faruqui et al. (2015), Hiro and Itakura (2014), Cheong (2013), Rahman and Cheong (2014). Hertel (1997) documented the general equilibrium model and the GTAP database in detail. In fact the GTAP model is a multi-region CGE model and it has structure to handle with comparative static examination of the trade policy reforms. Therefore for this study, the latest version 9 is used for the analysis of pre and post impact of Pakistan-China FTA from 2004 to 2014.

Basically, the CGE model is a contemporary version of Walras' model of competitive economy. The exclusive attribute of general equilibrium modeling is derived from Walrasian general economic equilibrium theory, which believes economy as a set of agents. These agents act together in numerous markets for the same number of goods under a specified set of preliminary endowments and income distribution. Each agent explains its supply or demand behavior by optimizing its particular goals. The decision of agents generates a set of surplus supply functions which obey the conditions of Walras law and that are the global identity of income and expenditures. The same was verified by Arrow and Debreu (1954) under some general circumstances, there are set of prices that carry supply and demand into equilibrium.

Nevertheless, few modelers expand CGE model ahead of the actual Walrasian model to capture the effect of market imperfections. Few of the modelers used the term general equilibrium programming (Zalai, 1982) or generalized equilibrium modeling (Nesbitt, 1984) and explain the flexibility of the CGE model.

The GTAP database structure is consist of households, governments, industrial sectors and global sectors across different economies. In the global economy, the countries and regions

are connected with each other through trade. Concurrently, the prices and quantities are measured in both factor and good markets. Skilled and unskilled labor, capital, natural resources and land are the major factor of production.

The firms produce under stable returns to scale, while the technology is defined by the Leontief and CES functions. The intermediate inputs and primary factors of productions are segregated as inputs. In the GTAP model (Hertel 1997), the firms minimize costs of inputs at certain level of output and fixed technology. Firstly, firms utilize the combination of intermediate inputs and primary factors at fixed proportion subsequent to a Leontief production function. Secondly, at next stage of production, the intermediate input are taken by the combination of imported and local goods of the same input-output group. The prices of traded commodities relative to locally produced commodities can be affected due to change in trade policy. Subsequently, the most significant relationship for scrutiny of model is the degree of substitution between imported and local commodities. This significant relationship is known as Armington elasticity. The Armington structure assumed that locally produced commodities and imported commodities are imperfectly exchangeable, which is used in the GTAP model.

An aggregate utility function is used to measure the behavior of the households, in the model. Moreover, a Cobb-Douglas production function with stable expenditure shares is embedded along with aggregate utility. This utility function is consisted of savings, private consumption and government consumption. The government consumption merges into the regional household utility function and treats as proxy for government provision provided to general public commodities and services. The stable difference elasticity expenditure function is defined the private households' consumption.

The trade policy and local support are presented in the model as ad valorem. In the model, these trade barriers have effect on the consumption as well as production sectors. All the firms earn no profit, the households face budget limitation and world savings are equal to world investment in equilibrium. The model is capable enough to evaluate the impact from a country's or regions' actual equilibrium position to a new equilibrium position, if the parameters are changed in the model.

The simulation shows the changes in any economy can be occurred, if there is a shift in trade policy or distress. The impact of the shift in trade policy is observed through the difference in the values of the endogenous variables from the base year and the simulation. After running the simulation, the results reported in this paper are considered as 'long run' time period of 10 years in a go which is needed to attain the equilibrium. This time period for achieving the equilibrium is widely acceptable by economist. Hence the model has ability to predict the impact on real GDP, trade and production patterns, if there was shift in trade policy. Moreover, the policy maker would be capable to give their opinion regarding whether the economy get the welfare benefits from the shift in policy or not. Theoretically, the structure of the GTAP is strong because it has ability to show direct and indirect interaction between all sectors of an economy and generate accurate comprehensive quantitative results.

3.1 Data and the Aggregation Scheme in GTAP Version-9

Currently, the new version of the GTAP model was released in May 2015. In this study, this latest version is used for the analysis of pre and post impact of Pakistan-China FTA from 2004 to 2014. This database is different from the previous versions of the database

because it has more than one reference years: 2004, 2007 and 2011 with 140 regions and 57 sectors. The number of countries in the standard GTAP has been increased from 226 to 244 countries aggregated into 140 regions.

The data for a CGE analysis is usually aggregated by regions, sectors and factors. In this study, the data on the 140 countries given in the GTAP database version-9 are aggregated into 10 regions: 2 main countries such as Pakistan and China are aggregated separately because the main focus of bilateral trade analysis is on these two countries. The remaining countries are aggregated into eight regions name as Sri Lanka, Malaysia, ASEAN, Rest of SAARC, Rest of America, European Union, Rest of West Asia and the last region is Rest of World. The GTAP database has data on 57 sectors, which have been aggregated into 43 sectors according to the nature of outputs.

In the GTAP database, the five factors are included such as land, natural resources, unskilled labor, skilled labor and capital. These are left disaggregated in this analysis. Land and natural resources are presumed to be perfectly immobile between sectors. Nevertheless, unskilled labor, skilled labor, and capital are perfectly mobile. The benchmark year for this CGE scrutiny is 2011 as the data from the GTAP database is from version-9 which is from the same year.

The mapping of Harmonized System (HS) codes has been done with GTAP codes and tariffs are considered as zero for the purpose of simulation analysis. The Pakistan China FTA's mapping of major exports commodities of GTAP codes with HS 6 codes. The exports which are US $ 10 million are equal to and above from 2004 to 2014 are considered as major Pakistani exports to China. Moreover, the mapping of major imports commodities of GTAP codes with HS 6 codes. The imports which are US $ 10 million are equal to and above from 2004 to 2014 are considered as major Pakistani imports from China.

4. Results of GTAP Simulation Effects of Pakistan China Free Trade Agreement

The GTAP simulation has been performed on Pakistan China FTA. In this simulation, the ad valorem tariffs on imports from Pakistan into China and imports from China into Pakistan are all reduced to zero. For the purpose of this simulation, the closure (i.e., the treatment of equilibrium in the model) used is the standard GTAP multiregional general equilibrium closure. The solution algorithm used is the Gragg 4 8 12 method with automatic correctness to obtain a high level of accuracy in the results. The following is the simulation results of Pakistan-China FTA:

4.1 Simulated Aggregate Effects

The simulated aggregate impact of the Pakistan China FTA in terms of real GDP is depicted in table 1. The post FTA impact result shows that there is negative change of $-95.86 million for Pakistan and positive change of $217 million for China. These figures clearly indicate that the Chinese's real GDP is expanded while Pakistan's real GDP is contracted. So these results are similar with the finding of Boumellassa et al. (2006) and satisfied the H_1.

Table 1: Real GDP

Real GDP	Business As Usual $ Million	Post-FTA $ Million	Change $ Million
Pakistan	213,686.2	213,590.34	-95.86
China	7,321,874.5	7,322,091.5	217
Notes: The GTAP Variables Used Are: (I) Qgdp For Real GDP			

Source: Author's results from a GTAP simulation.

Table 2 shows the simulated aggregate trade effects of Pakistan China FTA, which presents that Pakistan's trade growth is more than China, and both countries experience enhance in export values. Moreover, Pakistan faces trade deficit because its imports are more than exports. In the base year pre-simulation, Pakistan was in trade deficit with China and remains in deficit after running the simulation. Whereas, China was in trade surplus in the base year before simulation and maintains its trade surplus after simulation. Nevertheless, the exports of China are more than Pakistan as shown in table # 2 and China attains the trade surplus. In context of terms of trade, the result depicts that there is enhancement for China, however, a worsening for Pakistan. Hence, the trade balance results are align with Kawasaki (2003) and H_2.

Table 2: Simulated Aggregate Trade Effects

Aggregate Effects	Change in Export Value ($ Million)	Change in Import Value ($ Million)	Change in Trade Bal. value ($ Million)	Change in Terms of Trade (%)
Pakistan	546.0855	6053.6967	-5507.6112	-1.0060
China	5638.494	588.7774	5049.7166	0.029

Notes: The GTAP variables used are: (i) VXWD for export value, (ii) VIWS for import value, (iii) VXWD for the initial level of exports and VIWS for the initial level of imports and (iv) tot for the terms of trade.

Source: Author's results from a GTAP simulation.

4.1 Simulated Sectoral Effects

Table 3 depicts the Pakistan China FTA effects on Pakistani sectors. Plant-based fiber has the largest relative output expansion 2.91% because of increase in export volume at $25.79 million from base year. Textile sector has output expansion of 2.82% due to largest increase in export volume at $359.27 million from base year. Wearing apparel has the output expansion of 1.6% because of enhancement in export volume at $8.95 million from base year. Vegetable oil and fats has relative output expansion of 2.02% due to increase in export volume at $1.60 million from base year. The other important export sectors are Metals products whose export volume percentage change is increased due to increase in export volume at $20.50 million from base year. Leather product sector, whose export volume percentage change is enhanced because of the second largest relative increase in export volume at $72.65 million from base year. Furthermore, chemical products sectors' export volume percentage change is increased due to increase in export volume at $32.79 million from base year. The results present in table # 3 shows that the sectors have absolute

percentage changes of less than 1.96% for export prices and less than 20.61% for export volume. The largest drop in output is observed in auto parts sector and decrease in import price of -4.8% due to an increase in import volume of 12.46% and at $887.64 million from base year. Moreover, there is largest drop in import price and largest increase import volume percentage change in leather products with an increase in import volume at $311.57 million from base year, which substitute for and reduce the domestic supply of leather products and auto parts products in Pakistan's local market.

Since increase in import volume of textile at $1096.12 million, machinery and equipment at $1043.05 million, auto parts at $887.64million, metal products at $1148.12 million, chemical products at $729.77 million, leather products at $311.57 million, wood products at $285.09 million, manufactures at $171.50 million and wearing apparel at $144.49 million from base year are the prominent sectors in reduction in Pakistan's real GDP. The general increase in import volumes can be characteristics to tariff elimination and decrease in import prices in all of these above mentioned sectors.

Table 3: Simulated Sectoral Effects of the Pakistan China FTA on Pakistan (% Change)

Gtap Code	Pakistan –Sectors	Domestic Output (Qo)	Export Prices (Pxw)	Exports (Qxw)	Import Prices (Pim)	Imports (Qiw)
Pdr	Paddy Rice	0.13	-0.96	7.67	-4.93	17.48
Gro	Cereal Grains Nec	0.58	-1.02	2.62	-0.01	-0.54
V_F	Vegetables, Fruit, Nuts	0.25	-0.85	2.75	-0.07	-1.55
Osd	Oil Seeds	0.15	-0.85	9.08	-0.01	-0.65
Pfb	Palnt-Based Fibers	2.91	-0.27	8.71	-0.01	2.24
Ocr	Other Crops	-0.11	-0.64	3.99	-1.34	0.49
Frs	Forestry	-0.5	-1.68	7.75	-0.13	-3.07
Fsh	Fishing	-0.16	-1.7	14.06	0	-2.29
Pcr	Processed Rice	0.08	-1.36	5.64	-0.03	-3.74
Ofd	Food Products Nec, Process Food	-0.36	-1.27	5.51	-4.93	8.56
Tex	Textiles	2.82	-1.1	10.6	-8.86	23.91
Wap	Wearing Apparel	1.6	-1.85	14.12	-15.29	67.46
Lea	Leather Products	-1.18	-1.26	20.61	-15.78	77.17
Wood	Wood Product,Paper Product,Publishing	-1.59	-1.42	8.85	-4.81	10.74
Vol	Vegetable Oil & Fats	2.02	-1.96	10.98	-0.05	-4.31
Mineral	Minerals Nec	-0.08	-1.44	2.07	-0.08	-1.3
Crp	Chemical,Rubber,Plastis Prods	0.62	-1.47	12.91	-1.66	0.88
Ome	Machinary & Equip Nec	-1.9	-1.35	11.56	-3.45	6.57
Omf	Manufactures Nec	0.8	-1.4	10.69	-6.35	15.33
Auto	Autoparts-Otn-Mvh	-3.22	-1.38	9.08	-4.8	12.46
P_C	Petroleum,Coal Products	-0.01	-0.2	1.28	-0.22	-0.08
Metal	Metals	-2.65	-1.27	8.26	-5.63	10.2

Notes: The GTAP variables used to calculate percentage changes are (i) qo for domestic output, (ii) pxw for export price (equal to pm, i.e., output price, in this simulation)(iii) pim for import price; and (iv) qxw for aggregate exports of i from region r, FOB weights, qiw for aggregate imports of i into region s, CIF weights and DQXS for the volume change in exports and imports in terms of $ millions.

Source: Author's results from a GTAP simulation.

The change in China's sectoral output and trade are mentioned in table 4 because of the simulated Pakistan China FTA. There is increased in output of textile, wood products, petroleum and coal products, chemical products, metal products, auto parts, leather products, paddy rice, and other crops and remaining sectors face reduction in output. The export prices of all sectors are increased. Furthermore, the sectors which contribute in

improvement in China's real GDP are textile , wood products, petroleum and coal products, chemical products, metal products, auto parts, machinery and equipment, paddy rice, other crops due to increase in export volume percentage change.

Table 4: Simulated Sectoral Effects of the Pakistan China FTA on China (% Change)

GTAP Code	China- Sectors	Domestic Output (qo)	Export Prices (pxw)	Exports (qxw)	Import prices (pim)	Imports (qiw)
pdr	Paddy rice	0.02	0.06	5.18	-0.03	0.46
gro	Cereal grains nec	0	0.05	-0.14	-0.01	0.07
v_f	Vegetables, fruit, nuts	0	0.05	-0.18	-0.03	0.13
osd	Oil seeds	-0.07	0.04	-0.21	-0.01	0.03
pfb	Palnt-based fibers	-0.01	0.05	-0.36	-0.07	0.21
ocr	Other crops	0.34	0.12	0.63	-0.01	0.11
frs	Forestry	-0.01	0.05	-0.11	0	0.11
fsh	Fishing	0	0.05	-0.09	-0.15	0.26
pcr	Processed rice	-0.01	0.05	-0.47	-0.06	0.28
ofd	Food Products nec, Process food	0	0.05	0.02	-0.03	0.15
tex	Textile	0.08	0.03	0.44	-0.21	0.96
wap	Wearing apparel	-0.06	0.03	-0.17	-0.02	0.19
lea	Leather products	0.05	0.04	0.16	-0.17	0.9
wood	Wood product,Paper product,publishing	0.01	0.04	0.13	0	0.13
vol	Vegetable oil & fats	-0.03	0.04	-0.28	-0.03	0.2
mineral	Minerals nec	0	0.04	-0.05	0	0.03
crp	Chemical,rubber,plastis prods	0.01	0.04	0.17	0	0.13
ome	Machinary & Equip nec	-0.01	0.04	0	0	0.14
omf	Manufactures nec	-0.02	0.05	-0.11	0	0.19
auto	Autoparts-otn-mvh	0.09	0.04	0.8	0	0.16
p_c	Petroleum,coal products	0.02	0.01	0.18	0	0.03
metal	Metals	0.02	0.04	0.35	0	0.14

Notes: The GTAP variables used to calculate percentage changes are (i) qo for domestic output, (ii) pxw for export price (equal to pm, i.e., output price, in this simulation)(iii) pim for import price; and (iv) qxw for aggregate exports of i from region r, FOB weights, qiw for aggregate imports of i into region s, CIF weights and DQXS for the volume change in exports and imports in terms of $ millions.

The largest relative increase in output is 0.34% of other crops sector and second largest relative increase in output is 0.09% of auto parts sector, which is due to increase in export volume of about 0.63% and 0.80% respectively. The largest relative decrease in import

price of textile sector because of largest relative increased in import volume of the same sector among other sectors. The trade and output sectors of Pakistan and China results are consistent with the study of Cheong (2010) and H_3.

4.2 Simulated Welfare Effects of the Pakistan China FTA

Table 5 presents the simulated welfare effects of Pakistan China FTA. China experience a positive total welfare change from this FTA, while Pakistan experience negative total welfare change. The import prices of 9 sectors of China show no change but remaining sectors has low import prices. Due to the elimination of tariffs with Pakistan, China's export prices of all sectors are increased. Consequently, China's terms of trade enhance because it receives higher price for its exports in contrast of Pakistani export prices which are reduced after the simulation. Pakistan is the loser in net welfare with negative change in allocative efficiency. However, China achieves the net welfare gain with positive change in allocative efficiency. The Chinese positive allocative efficiency proves the shift of resources from inefficient sectors to more efficient sectors. Nonetheless, Pakistan face negative change in allocative efficiency because it does not shift its resources from inefficient sectors to efficient sectors. In context of Pakistan's allocative efficiency, the worst performing sectors are auto parts, petroleum and coal products, vegetable oil and fats, machinery and equipment, other crops and chemical products. The net simulated welfare effect on China is net welfare gain of $719.7296 million, but Pakistan has net welfare loss of $-417.9981 million. Pakistan faces net welfare loss mainly due to the negative terms of trade effects. The results of welfare effect are similar with the investigation of Sudsawasd and Mongsawad (2007) and satisfy the H_4.

Table 5: Simulated Welfare Effects of Pakistan China FTA and Decomposition ($ Millions)

Welfare	Allocative Efficiency	Terms of Trade Effects	Total
Pakistan	-91.1583	-326.8398	-417.998
China	156.4868	563.2428	719.7296

Note: The Global Trade Analysis Project (GTAP) variable containing the decomposed numbers above is welfare.

Source: Author's results from a GTAP simulation.

5. Conclusion and Discussion

Pakistan-China FTA, on which this study presents the extensive analysis. The analysis is focused on real GDP, trade and sector wise output and trade variables and welfare condition of China and Pakistan. It is assumed that the ad valorem tariffs imports from Pakistan into China and imports from China into Pakistan are all reduced to zero. The effect of the FTA as précis from the simulation results is mentioned as follows:

The change in China's real GDP is $217 million due to improvement in exports of textile, wood product, petroleum and coal products, chemical products, metal products, auto parts, machinery and equipment, other crops and paddy rice. Nonetheless, the negative change of $-95.86 million in real GDP of Pakistan because of increase in imports of textile, machinery and equipment, auto parts, metal products, chemical products, leather products,

wood products, manufactures NEC and wearing apparel. These finding are consistent with previous work of Boumellassa et al. (2006).

The change in exports value of Pakistan and China are increased significantly. However, Pakistan has a large increase in imports than in exports due to which it has trade deficit of $-5507.6112 million. In contrast, China has large increase in exports than in imports and has trade surplus of $5049.7166 million. According to Kawasaki (2003) the FTA has significant impact on the trade balances which is highlighted as above.

Pakistan terms of trade are reduced due to export prices are decreased in all sectors. Furthermore, Pakistan's net welfare is in loss $-417.998 million with negative change in allocative efficiency. Nevertheless, China is the gainer in net welfare of $719.7296 million because of its positive terms of trade and allocative efficiency. This welfare scenario of China enhances because of its export prices are increased in all sectors and import prices are lower in main sectors in connection of terms of trade gain. These results are in accordance with the evaluation of Sudsawasd and Mongsawad (2007).

The results of the analysis are clearly indicated that Pakistan is in trade deficit which is in favor of China. This is all happen because of China's size of the economy, its production base, and the differences in overall competitiveness. In future it is foreseeable that China will remain have a positive trade balance with Pakistan.

5.1 Contribution and Recommendations

On the basis of this simulation results the exports potential sectors of Pakistan such as textile, wearing apparel, leather products, plant-based fibers, chemical products, vegetable oil and fats, and metal products are identified. Therefore, it is recommended that Pakistan should improve trade with China by increasing production or diverting exports to China in terms of these high potential exports sectors. By doing so, Pakistan will be in a position to improve its trade balance, welfare and GDP growth. It is also recommended that imports which have swelled sharply after the FTA should also be watchfully monitored and items may be added to Pakistan's protection list if local industries are suffering as a result. These above highlighted recommendations may be considered by Pakistan Government as Phase –II negotiations of the Pakistan China FTA are currently underway.

5.2 Limitation and Future Research

The limitation of this study is that it does not consider the increasing returns to scale and imperfect competition. Therefore, the CGE model can be extended to incorporate increasing returns to scale and imperfect competition for future research. The contemporary topic for future research is China Pakistan Economic Corridor (CPEC) because the impact of CPEC on Pakistan economy will be marvelous. The CPEC create new job opportunities, reduce poverty, development of transportation, development in energy sector, information technology, tourism, education, agricultural development, and public health and ultimately open new horizon for researchers to explore CPEC research projects by using CGE model.

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