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Regional Trade and Economic Development: Options for Pakistan[1]

Muhammad Aamir Khan[2]

ABSTRACT

Pakistan shares its northern border with China, while it shares part of its northern, eastern and southern border with India: the second and seventh largest economies in the world respectively.[3] Pakistan should therefore be ideally positioned to gain from liberalization of trade. The Pakistan-China Free Trade Agreement (FTA) signed in 2006 came with expectations of exclusive concessions and advantages towards Pakistan, but the benefits from Pakistan-China FTA are considerably less than first anticipated. Pakistan's domestic producers suffered a huge blow as they could not compete with cheaper imports, particularly from the ASEAN economies who subsequently received more concessions from China as part of the ASEAN-China FTA. This research also quantifies the Potential Pakistan-India Trade Normalization. Proponents of Pakistan granting India NDMA status maintain that both countries stand to gain increased access to one another's vibrant markets after years of restrictive policies and disproportionately low trade relative to their trade with other countries.

Given this new backdrop we analyze the impact of the Pakistan-China FTA and the possibility of trade normalization with India and consider what changes could be made to these agreements to improve the outcome for Pakistan. A global economic trade model is adapted to include more detailed information on Pakistan, India and China's labor and household groups into the latest GTAP database using MyGTAP approach (Walmsley and Minor, 2013). This is the first model of its kind to incorporate 3 comprehensive SAM's in GTAP framework. This allows for a more detailed analysis of the impact of the different regional integration scenarios at the household level. The current Pakistan-China FTA shows a negative impact on Pakistan economy, however when the preferences are increased in line with the ASEAN-China FTA the overall impact on Pakistan is positive, at both the macro and micro level. Normalizing trading relations with India, through granting India NDMA status with better trade facilitation and full implementation of South-Asian Free Trade Agreement (SAFTA), shows modest positive gains on the Pakistan economy, while also raising real GDP in India, thereby offering a win-win solution for both parties. The report

[1] This Research was funded by World Bank.

[2] Assistant Professor, Department of Economics, COMSATS University, Islamabad.

[3] According to IMF data (http://www.investopedia.com/articles/investing/022415/worlds-top-10-economies.asp), Jan 10, 2019.

concludes that the gains to Pakistan from normalizing relations with India with better trade facilitation are much larger than those from the FTA with China.

1 Introduction

Regional connectivity is an important element of the recently unveiled Vision 2025 of the Government of Pakistan. Pakistan considers regional trade an important component for economic growth. However, despite the revival of interest in the regional trade or regionalism, intra-regional trade accounts for only 5 percent of the total trade of Pakistan (Ahmad, 2014). In 1988, the government of Pakistan implemented the maiden International Monetary Fund's (IMF) Structural Adjustment Program (SAP) which led to a reduction in tariffs. In 1995, trade liberalization received a further boost with Pakistan's accession to the WTO and its associated agreements, resulting in further steps to reduce import duties and eliminate various subsidies. When the WTO negotiations failed to resolve, each issue regarding international trade, free trade agreements surged in popularity around the world. As a developing country, Pakistan also started signing bilateral and regional trade agreements, as a potential means of continuing to liberalize trade. The objectives of Pakistan in negotiating these preferential/free trade agreements has been to: a) strengthen its own economic development by further increasing and promoting trade and investment; b) bring about economic co-operation with trading parties; and c) maintain a high comparative export value or market share.

Pakistan actively participates in many regional trading agreements such as South Asian Free Trade Agreement (SAFTA). Pakistan has also signed Free Trade Agreements (FTA) with China, Malaysia, Sri Lanka and other regional economies but none of these have been able to significantly improve the outcome for Pakistan. Pakistan still follows somewhat restrictive trade policies compared to its regional counterpart economies like India, Sri Lanka and Bangladesh. Talk of India receiving Most Favored Nation (MFN)4 status or Non-Discriminatory Market Access (NDMA)5 from Pakistan has dominated the discourse on Pakistan-India trade for several years. While India granted Pakistan MFN status in 1996, and both countries have been subject to the SAFTA since 2006, Pakistan is yet to grant India MFN/NDMA status after a series of false starts and delays. Many believe that this decisive move towards a normalized trading regime will help realize the massive potential for trade between the two countries that so far lies largely dormant.

In the present era of globalization and the successive participation of economies in international trade and world trade relations, most of the developing countries are still trying to identify the determinants of economic growth. The evidence that trade liberalization can be a catalyst to higher economic growth is compelling (Winters, McCulloch et al. 2004), and has caused large numbers of developing countries to

4 "Most Favoured Nation" (MFN) status is a level of treatment accorded by one state to another in international trade.
5 Non-Discriminatory Market Access (NDMA) is another name for Most Favoured Nation status used in recent years by both sides.

adopt liberalization policies in the hope of increasing economic growth. However, developing countries are not well prepared to face the competition brought about by the liberalization of trade and hence special conditions should be implemented for such countries; thereby allowing the trading rules to differ depending on the stage of development (Freres & Mold, 2004).

Multilateral Trade Liberalization and the welfare of households living in developing countries like Pakistan are the two prominent issues in global trade negotiations. A common question that arises is whether the liberalization of world trade benefits people who live in poverty? This question has motivated many policy debates, especially since the launch of the Doha Development Agenda (DDA) in 2001 (Corong, 2014). Trade liberalization is generally believed to increase the employment elasticity of economic growth relative to import substitution or a closed economy, thereby reducing poverty. However, the impact of trade liberalization on poverty and income inequality is less clear (Winters, McCulloch et al. 2004). Nevertheless, steadfast critics of Trade liberalization are of the view that benefits of trade induced economic growth have little chance of being evenly distributed, and thus, the distribution impacts of trade liberalization are expected to adversely affect the poor.

With this backdrop in mind, this study investigates the impact of several alternative trading agreements available to Pakistan to improve its trading relations with China and India, the two economic giants in Asia. The analysis includes an examination of the impact of these agreements on the Pakistan, Chinese and Indian economies, including trade and production, as well as on poverty and households within Pakistan and India. Several agreements are considered including the current Pakistan-China FTA and a possible extension, the normalization of trade between Pakistan and India via an MFN/NDMA scenario, and the full implementation of SAFTA.

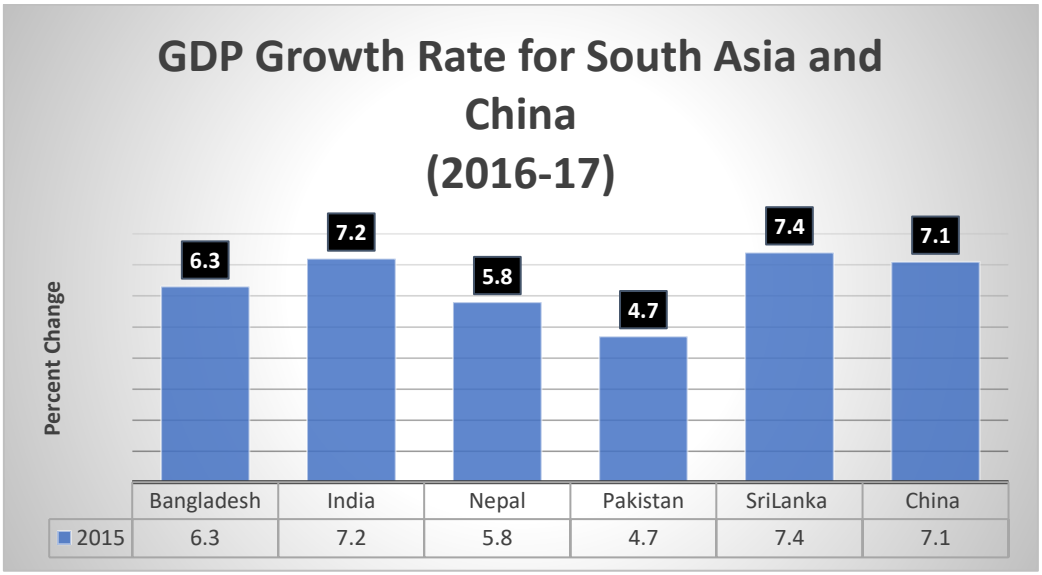
The rest of the study is organized as follows. First, we present an overview of Pakistan economy and the various Pakistan trade agreements. This is followed by a section on the Pakistan-China Free Trade Agreement (FTA) and an overview of Pakistan-India trade, followed by an examination of some of the issues hampering normalization of trade between Pakistan and India. Section 3 presents the methodological framework, data sets and measures of inequality used in this study. Results are then discussed in Section 4, sensitivity analysis are presented in Section 5, followed by concluding remarks in Section 6.

2. Overview of Pakistan Economy

Pakistan has a growing semi-industrialized economy that relies on manufacturing, agriculture and remittances. Pakistan's economy remains vulnerable to high inflation, energy shortages and declining foreign exchange reserves; as well as to political instability and a variable security environment.

Amidst the chaos, the real GDP growth has seen a slight increase in fiscal year 2016-17 to 4.7 as compared to 4 percent last year (IMF,2018). Despite this modest increase Pakistan's growth rate is still the lowest in South Asia as demonstrated in figure 1 Figure 2 shows Pakistan's Real GDP growth over the last decade. Pakistan's Real GDP growth clearly deteriorated after the signing of FTA with China in 2006, although the decline in growth is also likely to have also been affected by a severe energy crisis and worsening security that occurred in Pakistan during this time. The negative impact of the global financial crisis on Pakistan can also be seen in 2009. Overall average real GDP growth in Pakistan for the post-FTA period (2007 to 2014) was 3.3 percent per year, compared to an average annual growth rate of 5.07 percent, in the preceding period leading up to the FTA (1999 to 2006).

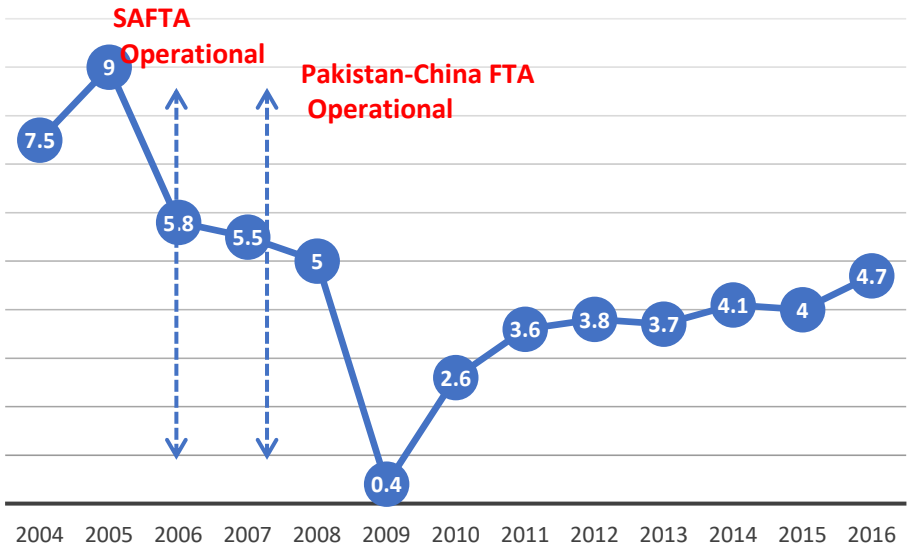
Figure 1: GDP Growth rate for South Asia and China



Source: International Monetary Fund, World Economic Outlook

South Asia's current economic performance across all macroeconomics indicator has been impressive. The average aggregated growth in South Asia rose to 6.8 % in 2016 (IMF, 2017). China's growth has also been impressive with growth rates in excess of 10 percent over the last decade, although it has declined in recent years and is expected to continue to be lower. With such high growth rates across the region, Pakistan is likely to gain significantly from increased trading relations with its neighbors.

Figure 2: Pakistan Real GDP Growth Rate



Source: International Monetary Fund

Since independence, Pakistan has never observed surplus in its trade balance except during 1950's. Since then, Pakistan has persistently faced deficit in its trade accounts. Table 1 explains the behavior of Pakistan's balance of trade which indicates that except 1950, Pakistan has been facing deficit in its trade accounts. This is due to increasing number of imports and declining export sectors. The trade deficit reached its all-time maximum of US$ 26680 million in 2017-18.

Table 1: Historical overview of Pakistan Balance of Trade (US Million $)

Years	Exports	Imports	Balance of Trade
1950	406	353	53
1955	156	203	-47
1960	114	457	-343
1965	253	605	-352
1970	420	757	-337
1975	1137	2067	-930
1980	2958	5409	-2451
1985	3070	5634	-2564
1990	6131	7619	-1488
1995	8707	11805	-3098
2000	9202	10729	-1527
2005	16388	24647	-8259
2010	25,356	35,872	-10,427
2015	24,089	41,280	-17,191
2016	21972	41255	-19283
2017	22003	48683	-26680

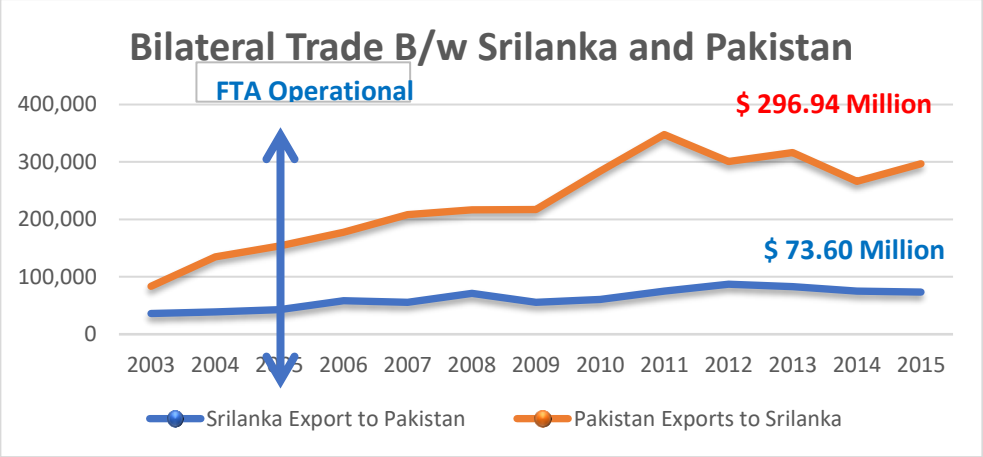
Source: Pakistan Economic Survey ,2018

2.1 Pakistan Trade Agreements

Pakistan actively participated in many regional trading agreements. Pakistan has FTA's with China, Sri Lanka and Malaysia. In this section we discuss the Pakistan-Sri Lanka and Pakistan-Malaysia FTAs. The Pakistan-China FTA and is discussed in section 2.1.1.

Pakistan-Sri Lanka FTA has been operational since 2005. At the beginning, the FTA coverage was sufficiently broad that covered some major export items. However, trade volumes between the two partners has not been meaningful. This is evident from the negligible share in each other import market. Pakistan exports to Sri Lanka in 2015 is US $ 296 million and imports from Sri Lanka is US $ 73.60 million (figure 3) percent (2014). The reason behind low utilization of this FTA is lack of interest in trade with each other and lack of coordination between government of Pakistan and business community.

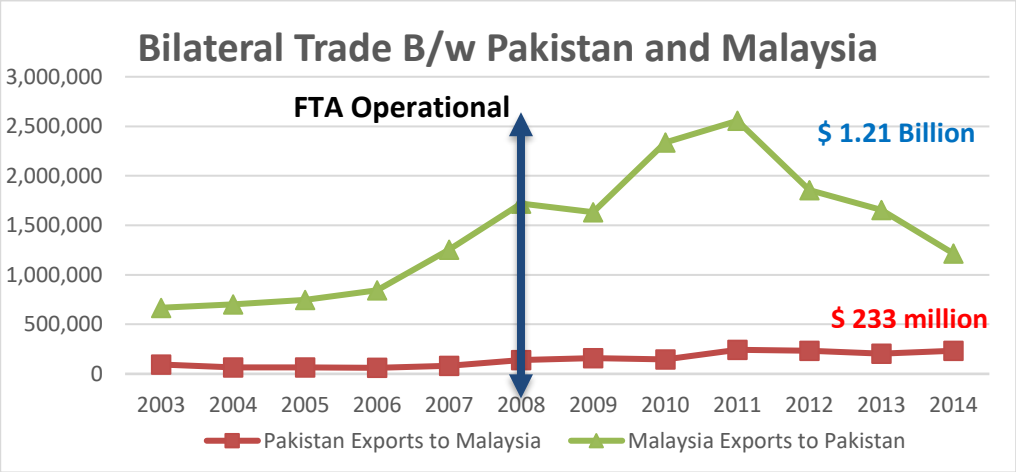
Figure 3: Bilateral Trade b/w Pakistan and Sri Lanka



Source: Trademap, United Nation Commodity Trade Statistics Database

Pakistan and Malaysia are important economic forces of their respective regions. Both economies agreed upon to closer economic integration and signed a Free Trade Agreement in 2006, which became operational in 2008. The FTA covers trade in goods and service, investment and other issues, such as economic cooperation and intellectually property rights. Under the FTA negotiation, Malaysia provided market access to Pakistani goods by offering the Tariff Rate Quota (TRQ), while Pakistan provided market access to Malaysia by offering the 'margin of preference (MOP)' status for 138 tariff lines. Pakistan's trade deficit with Malaysia has further widened indicating a low scope of gains to Pakistan from FTA with Malaysia.

Figure 4:Bilateral Trade b/w Pakistan and Malaysia

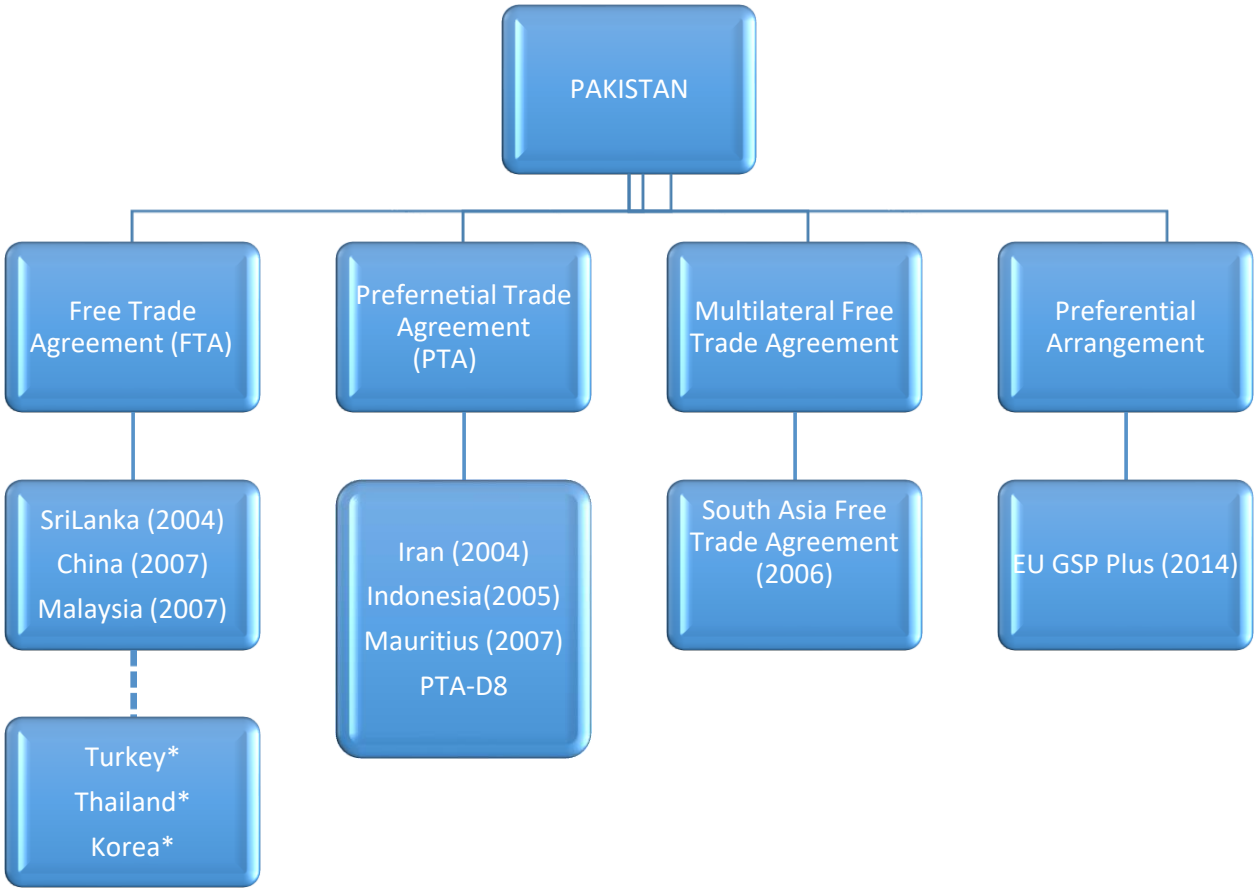


Source: Trademap, United Nation Commodity Trade Statistics Database

Pakistan Trade agreements are illustrated in Figure 5. As discussed earlier, Pakistan has signed Free Trade Agreements with China, Sri Lanka and Malaysia. Pakistan's preferential trade Agreements is with Iran, Indonesia, Mauritius and PTA-D8 (Developing 8[6]). Pakistan has also one preferential arrangement, the European GSP Plus, which was granted by European Union in December,2013. The preferential arrangement is unlike preferential agreement as it is not on reciprocal basis. This status is usually granted by the developed nation to developing country to improve their balance of trade deficit.

[6] The 8 African and Asian developing countries include Pakistan, Egypt, Nigeria, Bangladesh, Turkey, Malaysia, Iran, Indonesia.

Figure 5: Pakistan Trade Agreements



Source: Author's own design

* shows Pakistan Potential Free Trade Agreements (Source: Ministry of Commerce, 2018)

2.1.1 Overview of Pakistan-China Free Trade Agreement (FTA)

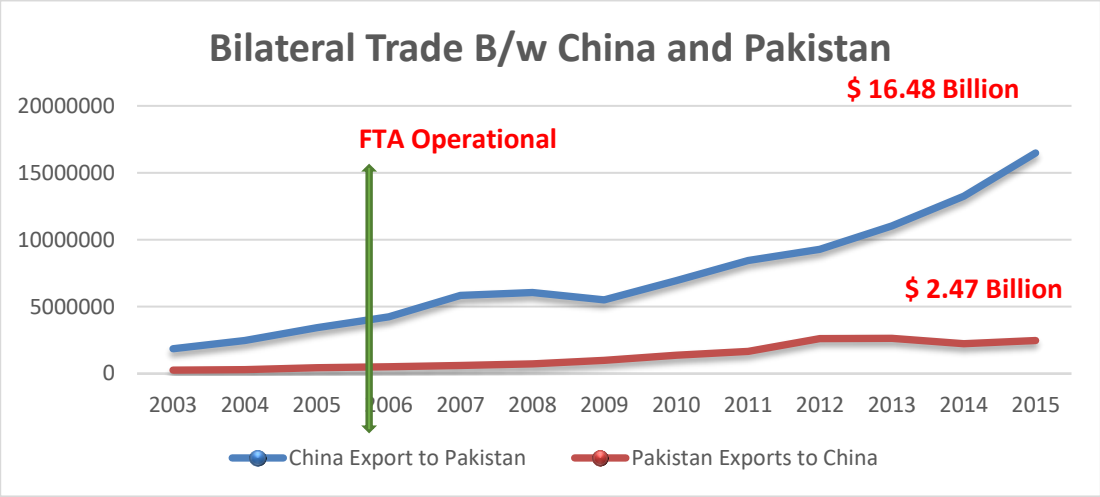
The early Harvest Program (EHP) between Pakistan and China was initiated and operationalized in January 2006. The Pak-China FTA became operational in November 2006. As part of the agreement Pakistan gave market access to China in 11 sectors and 107 subsectors and China offered access to 11 sectors and 133 subsectors. Pakistan received tariff concessions of zero duty for fabric, cotton and bedding; other home-linen, marble and certain other types of tiles, leather goods, sports equipment & merchandise, iron & steel products and engineering goods, as well as industrial alcohol imported by China. China, on the other hand, will enjoy market access on industrial machinery, chemicals both organic & inorganic, and light and heavy manufacturing sector (Pakistan Business Council, 2013 (henceforth PBC, 2013)). The free trade agreement between Pakistan with China is therefore of great significance to Pakistan as it provides access to the large

Chinese market, while also reducing the price of intermediate inputs, such as organic chemicals and machinery to Pakistani producers.

Pakistan Business Council (2017) have argued that Pakistan is losing competitiveness in its own market due to cheap Chinese imports having low production cost and tariff concessions, which in turn has hindered potential investment in local industries. The recent signing of an agreement between China and the ASEAN countries has also dampened Pakistan's enthusiasm for the Pakistan-China FTA. The PBC (2017) have also argued that in nearly all cases China has awarded higher or equal reductions in tariffs to ASEAN countries as part of an ASEAN-China FTA. Under the ASEAN-China FTA tariffs were abolished on over 90% of traded products, many of which directly compete with Pakistani products. While many of the top exports to China are included in China's no concession/protected list in both the Pakistan-China FTA and ASEAN-China FTA, there are a number of additional tariffs reductions and discounts offered to the ASEAN countries that were not given to Pakistan. Given the similarities in export structures between Pakistan and the ASEAN countries this means that many of the gains from the Pakistan-China agreement are likely to be eroded by this new agreement between ASEAN and China due to more aggressive competition in the Chinese market.

China has always been an important trading partner for Pakistan, contributing considerably to its imports even before the free trade agreement between the two countries was signed. Figure 6 depicts the rise in trade between China and Pakistan over time. The rapid increase in Pakistan imports from China appears to have commenced in 2001/2, with the share of Pakistan's imports from China growing from 5 percent to 10 percent in 2006, well before the FTA was signed. Pakistan's exports to China only started growing after the implementation of the FTA, with China's share in Pakistan's exports fluctuating around 2.5 percent between 2001 and 2006. As a result, imports from China have generally exceeded exports to China (Figure 3) and today Pakistan has a large trade deficit with China. The trade deficit also reflects the fact that China has increased investment in Pakistan because of the FTA, in order to take advantage of Pakistan's cheap and hardworking labor force.

Figure 6: Pakistan China Bilateral Trade



Source: Trademap, United Nation Commodity Trade Statistics Database

After the Pakistan-China FTA entered into force in 2007, there was a substantial increase in the share of Pakistan's imports coming from China. By the end of 2012, the year in which the first phase of the FTA was completed, Chinese imports to Pakistan had expanded to 15% percent of the Pakistan's global imports, up from 10 percent in 2006. In 2015, this share had risen to an astonishing 45.1 percent (Trademap.org). Although it is difficult to ascertain how much of this increase was due to the implementation of the FTA and how much to the general increase in imports from China that had been occurring since 2001, the increase is nevertheless substantial. The impact of the FTA on Pakistan's exports to China, on the other hand, have been less dramatic, with the share rising from 2.5 percent in 2006 to just over 10 percent in 2012. Table 2 provides a list of the top products imported by Pakistan and the share of those imports coming from China in 2006 and 2012, the year the first phase of the FTA was completed. Pakistan primarily imports chemicals, rubbers and plastics; iron and steel; machinery and equipment for local manufacturing, from China and the rest of the world. With the exception of textiles, Pakistan does not produce many of these goods itself, relying solely on imports. Table 2 shows a substantial increase in imports of electric and electronic tools; machines; chemicals; fertilizers and textiles from China as a result of the FTA.

Table 2: Pakistan's top imports from China compared to Pakistan's imports from world (in million dollars)

		2006		2012	
GTAP code	Product	Imports from world ($US Millions)	Share of imports from China (%)	Imports from world ($US Millions)	Share of imports from China (%)

ELE	Electrical, electronic equipment	3,081	18	2,752	63
OME	Machinery, nuclear reactors, boilers, etc	3,344	21	3,060	28
CRP	Organic chemicals	1,178	11	2,038	18
TEX	Manmade filaments	313	44	530	70
I_S	Iron and steel	1,393	9	1,848	19
CRP	Fertilizers	452	0	908	37
CRP	Plastics and articles thereof	1,129	8	1,501	14
I_S	Articles of iron or steel	428	18	409	44
OTN	Vehicles other than railway, tramway	1,733	5	1,596	11
TEX	Man-made staple fibres	285	7	539	33
CRP	Rubber and articles thereof	312	26	464	34
CRP	Miscellaneous chemical products	374	19	549	21
OTN	Railway, tramway locomotives, rolling stock, equipment	37	80	110	95
CRP	Inorganic chemicals, precious metal compound, isotopes	238	25	498	22

Source: Pakistan Business Council (2013); United Nations Trade Center Database

There is considerable potential for Pakistan to export more of these commodities to China if tariffs were removed. Table 3 reports Pakistan's current exports to China and Chinese tariff for both Pakistan and ASEAN (base year 2007, when FTA got operational) on those commodities which Pakistan considers have greater potential for enhancing trade between Pakistan and China. Table 4 shows the same for base year 2011 on those aggregated sectors / commodities after first phase was about to complete.

Table 2:Chinese Tariff for Pakistan and ASEAN in 2007 When FTA got Operational

Sector Detail	Pak X to World (US Million $)	Pak X to China (US Million $)	Chinese M from W (US Million $)	Tariff for Pakistan	Tariff for ASEAN
Grain Crops	1321.95	4.296	15246.23	22.61	2.94
Veg n Fruit	214.88	2.160	1429.796	7.56	0.39
Meat Lvstk	81.49	0.408	5677.646	11.36	6.00
Extraction	146.33	77.175	137843.9	0.52	0.93
Processed Food	734.35	31.597	15347.98	4.68	8.96
Leather	504.53	69.532	4686.143	6.95	8.02
Wap	2644.82	2.305	3820.496	12.76	11.72
Textile	8362.82	698.784	16697.57	3.11	6.70
Light Manufacturing	731.38	4.850	69936.55	6.98	3.75

Heavy Manufacturing	2046.58	143.433	571907.4	3.29	2.98

Source: GTAP Data base 8a (Base year 2007)

Table 3: Chinese Tariff for Pakistan and ASEAN (2011)

Sector Detail	Pak X to World (US Million $)	Pak X to China (US Million $)	Chinese M from W (US Million $)	Tariff for Pakistan	Tariff for ASEAN
Grain Crops	3580.09	104.16	54059.65	4.57	2.03
Veg n Fruit	657.3	9.36	5737.6	5.17	0
Meat Lvstk	182.87	0.52	13340.64	5.22	0.81
Extraction	346.65	229.26	413206.25	0.47	0
Processed Food	1391.39	75.11	38008.97	2.29	6.99
Leather	631.66	100.66	5764.38	5.87	0.22
Wap	3678.59	6.91	6500.26	10.17	0.1
Textile	10759.88	1128.77	25964.84	2.94	0.51
Light Manufacturing	1320.95	6.24	173104.25	4.6	1.79
Heavy Manufacturing	3326.3	302.82	851380.5	1.52	1.91

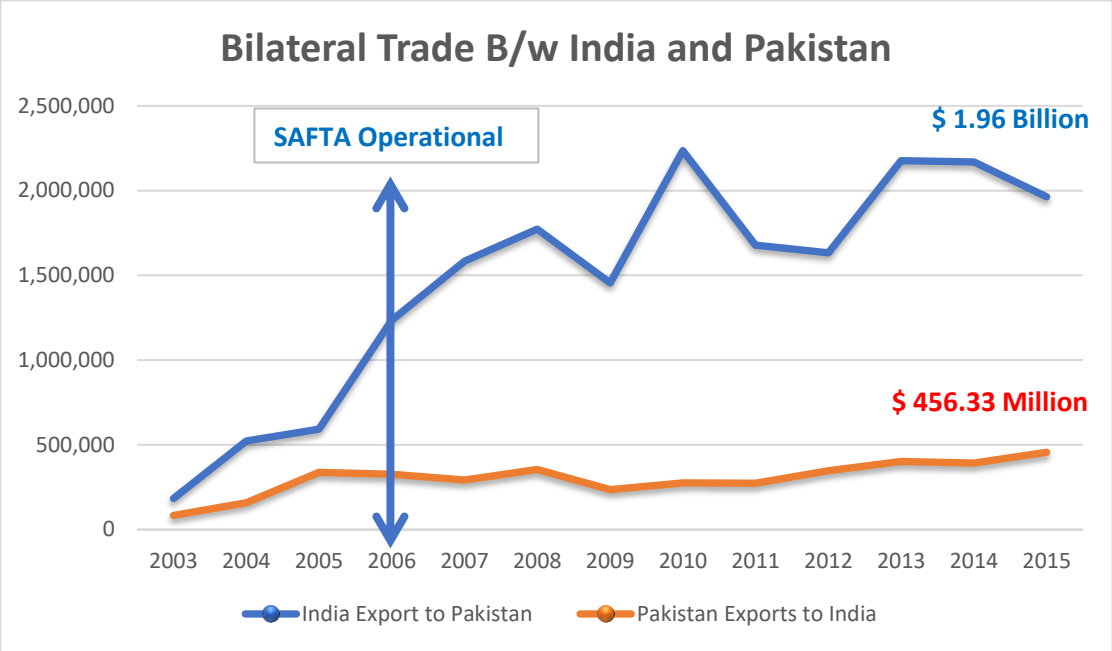
Source: GTAP Data base 9a (Base year 2011)

This study first investigates the impact of the tariff reductions agreed to in the Pakistan-China FTA. Considering the recent ASEAN-China FTA, the study also examines the potential impact on the Pakistan economy of the ASEAN-China FTA and of an extended Pakistan-China FTA in which Pakistan can receive the same tariff concession awarded to ASEAN countries under ASEAN-China FTA. In addition to the general economic gains from the FTA, we also explore how this agreement impacts income inequality in Pakistan.

2.1.2 Overview of Pakistan-India Trade

South Asia is the least integrated regions in the world. This is primarily due to the fact that the two South Asian giants Pakistan and India hardly trade with each other. They together constitute almost 85 percent of South Asia's GDP, 80 percent of South Asia's total population, and about 75 percent of South Asia's area. And yet, the percentage of Indo-Pak trade is a mere 16 percent of the regional trade (Raihan & De, 2014). Pakistan is in the process of Trade normalization with India. Pakistan's Ministry of Commerce intends to grant India the Non-Discriminatory Market Access (NDMA) as India has already granted MFN status to Pakistan in 1996, due to the implementation of SAFTA in 2006 of which both countries are members, this intention is now seen more as a reality. This decision to normalize the trading regime between Pakistan and India is seen to have massive potential for trade between the two countries that so far lies largely dormant.

Figure 7: Bilateral Trade b/w India and Pakistan



Source: Trademap, United Nation Commodity Trade Statistics Database

Pakistan's delay in granting India NDMA status has frequently been noted as the main obstacle to realizing this potential trade that would likely result in a corresponding increase in consumer welfare on both sides of the border. However, if previous trade agreements are taken into account, Pakistan has not always benefitted from this process. For instance, Pakistan's main FTA with China, an economic giant, does not appear to have improved the situation for Pakistan's domestic producers. A major issue in Pak-Indo trade is the high level of protection in the form of both tariff and non-tariff barriers. I will discuss few issues, along with others, in the next section.

2.2 Issues in Pak-India Trade Normalization

India's standards regime, which is unique to India and in certain cases does not recognize the standards developed and enforced by developed countries. India has complex and rigid requirements for labelling and packaging, quarantine, certification etc. for many high potential Pakistani export products.

The mutually agreed and implemented visa regime remains relatively illiberal despite some notable improvement in its terms. Multiple entry visas are now available, but individuals must have a minimum annual income to qualify. Police reporting on arrival and departure is still required. A business visa holder from Pakistan cannot remain in India for more than 30 continuous days on any one visit and still faces a limit on the number of cities he or she can visit. These are not featuring of India's visa policies for other

countries such as China and Sri Lanka. The shortcomings of the visa regime on both sides seriously hamper interaction between the two countries' business communities (PBC, 2013).

India imposes high para-tariffs on imports, with para-tariffs reaching up to 23% on imported goods, compared to a 12% duty on local producers (PBC, 2015). On the other hand, Pakistani General Sales Tax (GST), which is 17%, is exempt for imports of food, raw materials and capital goods, and therefore while some Pakistani products have a 5% advantage over imports (given a basic customs duty of 5%) others may have none. On the other hand, local producers in India have an advantage over exporters by a margin of at least 10%. These are not import tariff rates kept on other SAFTA countries like Bangladesh and Sri Lanka (PBC, 2015).

India highly subsidizes its local industries; its 2015 budget earmarked USD 37 billion for major subsidies. In its budget for fiscal year 2014-2015 India allocated USD 18.4 billion (0.95% of GDP) for direct food subsidies. On the other hand, Pakistan's total food subsidies in its 2014-2015 federal budget amounted to USD 161 million (0.06% of GDP) when added up. Pakistan allocated USD 147 million for subsidies to farms in the same year, none of which was disbursed since agriculture became a subject of the provinces and a mechanism to spend the subsidy could not be devised.

One of the main reasons for Pakistan granting India NDMA status is India's promise to immediately reduce its Sensitive List for Pakistan to 100 items. The Indian side has repeatedly hinted that most of the items to be removed from the Sensitive List comprise of products within which Pakistan enjoys export competitiveness, although these items are yet to be stated. But a reduction in tariffs may not necessarily translate into increased exports from Pakistan, if Indian consumers avoid products from Pakistan on account of their history.

According to an Authoritative report by PBC (2015), If SAFTA is taken under consideration, Bangladesh faces the Least Developed Countries sensitive list which consists of a mere 25 items as compared to the Non-Least Developed countries sensitive list faced by Pakistan, which runs to 614 items. This is an important issue, since unless India offers Pakistan terms similar to those offered to Pakistan's regional competitors (i.e. Bangladesh, Sri Lanka etc) the actual impact of a reduction in the Sensitive List may bring little substantial gain for Pakistan.

3. Methodological Framework

The methodological framework used in this paper for examining the economy wide impact of regional integration in South Asia is based on neo-classical theory. The paper uses an extended version of the GTAP

model (Hertel and Tsigas, 1997). The GTAP model uses the only available common global dataset for the economy wide analysis, the GTAP database 9a (Aguiar et.al 2016). The GTAP model assumes perfectly competitive markets, with all production and trade activities exhibiting constant returns to scale, firms and household display profit and utility maximizing behavior respectively. The model is solved using the software GEMPACK (Harrison and Pearson, 1996).

The MyGTAP model extensions to the GTAP model include several new characteristics that are helpful in examining the behavior of multiple households (Walmsley and Minor 2013a). First, it allows more flexibility in the treatment of government savings and spending by removing the regional household of the standard GTAP model and replacing it with a separate government and private households. Second, the model allows for additional factors of production and multiple private households; and third, the model also includes transfers between government and households and among household groups, as well as foreign remittances and capital income. These additions allow for the assessment of policy impacts on different household groups. While many of these additional features are standard in the MyGTAP framework, the inclusion of multiple households and additional factors requires additional data to be supplied from a social accounting matrix (SAM) or household survey. These data are then incorporated into the augmented MyGTAP framework using a facility developed by (Walmsley and Minor 2013a). Table 2 illustrate the difference between standard GTAP model and MyGTAP model.

Table 4: Difference b/w Standard GTAP and MyGTAP model

Standard GTAP model	MyGTAP Model
Single Regional Household	Multiple and differentiated household's types. Link Governemnt income and expenditure to tax revenue.
Less detailed income-expenditure system; Income Sources are taxes and factor incomes. Further distributes in three components: Government expenditure, private household expenditure and saving-investment expenditure.	More detailed accounting system increasing understanding of the relationships. Factor incomes, Remittances, taxes and Aid are transferred by household and government transfers to multiple households and government. The income is spent/save by different Households expenditure and savings, and Government expenditure and savings.
Income of households and income from factors of production cannot be linked thus limiting deep analysis.	The household and factor income is linked by connecting each household income with factor of production shares of that household.
Constant difference of elasticity (CDE) function in household consumption, thus limits analysis of subsistence consumption in poor economies.	CDE function + Availability of Linear expenditure function (LES) for multiple household private consumption.
No transfer b/s household and Government	Transfers between household and government and also foreign Aid and remittances.

Standard 5 factors of production (Land, skilled labor,unskilled labor, capital and natural resource)	Flexible factors categories (e.g. Urban and Labor, multiple types of land and capital)

Source: www.mygtap.org

In this section we outline the additional data included in the MyGTAP model to disaggregate households and factor types in Pakistan, India and China and some additions made to the MyGTAP model to measure income inequality.

3.1 Incorporating Multiple Household and Factors

To study the economy wide impact of the regional integration in South Asia, four different types of datasets were used: the latest released GTAP Database 9a (Aguiar et.al 2016), latest available comprehensive Pakistani SAM 2010-11 (IFPRI,2016), India SAM 2007-08 (Pradhan et.al 2013) and China SAM 2007-08 (IFPRI,2013). The GTAP database 9a represents the world economy for three reference years, 2004,2007 and 2011. We used the latest base year, 2011. The database is composed of 140 regions, 119 countries and 21 aggregated regions and 57 sectors for every region. Keeping in view the direction of Pakistan imports and exports and also to facilitate computation, the number of regions has been aggregated to 30 regions (Table 6) and the number of commodities/sectors to 15. The sectorial aggregation used in this study is shown in Table 7.

Table 5: Regional Aggregation used in this study

Region	Description
Pakistan	Pakistan
China	China
India	India
USA	USA
Bangladesh	Bangladesh
Sri Lanka	Sri Lanka
Indonesia	Indonesia
Malaysia	Malaysia
Singapore	Singapore
Thailand	Thailand
Turkey	Turkey
Australia	Australia
New Zealand	New Zealand
Japan	Japan
Korea	Korea
Chile	Chile
Canada	Canada
Peru	Peru
Iran	Iran
Brunei	Brunei
S.Arab	S.Arab
UAE	United Arab Emirates
Vietnam	Vietnam
Mexico	Mexico
Egypt	Egypt
Rest of S.Asian	Rest of South Asia
Other OECD	Australia, New Zealand, Japan, Korea, Canada, Mexico, Chile
Europe 27	Austria, Belgium, Cyprus, Czech Rep, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Norway, Rest of EFTA, Turkey, Albania, Bulgaria, Belarus, Croatia, Romania, Ukraine, Rest of Eastern Europe, Rest of Europe
Rest of Asia	Hong Kong, Taiwan, Rest of East Asia, Cambodia, Lao People's Democratic Republic, Philippines, Rest of Southeast Asia
Rest of World	Morocco, Tunisia, Bahrain, Argentina ,Colombia, Ecuador, Paraguay, , Uruguay, Venezuela, Rest of South America, Cost Rica, Guatemala, Nicaragua, Panama, Rest of Central America, Caribbean, Israel, Kuwait, Oman, Qatar, Rest of North Africa, Cameroon, Cote d'Ivore, Ghana, Nigeria, Senegal, Rest of Western Africa, Central Africa, South Central Africa, Ethiopia, Kenya, Madagascar, Malawi, Mauritius, Mozambique, Tanzania, Uganda, Zambia, Zimbabwe, Rest of Eastern Africa, Botswana, Namibia, South Africa, Rest of South Africa Customs Union , Rest of North America, Rest of the World

Source: Author's own aggregation using GTAP 9a Data Base

Table 6: Sectoral Aggregation used in this study

Code	Comprising GTAP sectors (code)
GrainCrops	Pdr,wht,gro,osd,c_b,pfb,ocr,pcr
VegFruit	V_f
MeatLvtk	Ctl, oap, rmk, wol, cmt, omt
Extraction	Frs,fsh,coa,oil,gas,omn
Processed Food	Vol,mil,sgr,ofd,b_t
leather	Lea
Wap	Wap
Textile	Tex
LightMnfc	Lum,ppp,fmp,mvh,otn,omf
HeavyMnfc	P_c, crp, nmm, i_s, nfm, ele, ome
Util_Cons	Ely, gdt, w
TransComm	Trd, otp, wtp, atp, cmn
FinServices	ofi, isr
BusServices	Obs
OthServices	Ros, osg, dwe

Source: Author's own aggregation using GTAP 9a Data Base

The latest available Indian Social Accounting Matrix (SAM) 2007-08 (Pradhan et.al 2013) comprises of 78 sectors/commodities with 9 household types based on occupation and location (i.e. Rural and urban). It is an extension of the region SAM 2003-04 for India. The gross value added has been divided into three factors of production, i.e. labour, capital, and land. Further, labour has been divided into three types, i.e. unskilled, semi-skilled, and skilled while non-wage income has been divided into income from capital and land. The institutions are classified into households, private corporations, and government sectors. Households have been disintegrated into nine groups (i.e. five for rural and four for urban). The households have been classified into different occupational groups, by their principal source of income, for rural as well as urban areas. The government sector has been further categorized into public enterprises, government and indirect taxes. The extensive data sources used in the construction of this SAM are Central Statistical Organization's (CSO) I-O table 2007-08, NSSO's 66th round survey on consumer expenditure, and NCAER's Income-Expenditure Survey 2004-05 (Pradhan et.al 2013)

The latest Chinese Social Accounting Matrix (SAM) is a square matrix of 61 activites/ commodity sectors, 4 types of factors (low skilled labor, skilled labor, capital, and land), and 2 representative household (rural and urban) groups. The data sources including an existing input-output table, national accounts, government

budgets, balance of payments, commodity exports and imports, labor employment and wage statistics, household expenditure surveys and agricultural production statistics (IPFRI,2013).

The latest available GTAP 9a database (Aguiar et.al 2016) is modified by breaking down the regional household into multiple households using the MyGTAP data tool, documented in Minor and Walmsley (2013). Households' categorization is crucial because conclusions concerning welfare and inequality of households may depend on how the population is subdivided. The population may be divided on the basis of sources or size of income. The Pakistani SAM 2011 contains income and expenditure flows of 16 Representative Households classified by geographical zones, and rural and urban categories.

Table 7: Pakistan Household types in SAM 2010-11 and used in this study

	Household Types	HH Code	Population (million)	Income (billion)
1	Rural small farmer (quartile 1)	hhd-rs1	4,193	275.6327
2	Rural small farmer (quartile 234)	hhd-rs234	15,565	2232.853
3	Rural medium+ farmer (quartile 1)	hhd-rm1	208	14.13264
4	Rural medium+ farmer (quartile 234)	hhd-rm234	2,914	853.3687
5	Rural landless farmer (quartile 1)	hhd-rl1	3,348	194.3888
6	Rural landless farmer (quartile 234)	hhd-rl234	7,292	947.8456
7	Rural farm worker (quartile 1)	hhd-rw1	6,333	238.9349
8	Rural farm worker (quartile 234)	hhd-rw234	8,305	722.2187
9	Rural non-farm (quartile 1)	hhd-rn1	12,595	481.5706
10	Rural non-farm (quartile 2)	hhd-rn2	10,888	645.3767
11	Rural non-farm (quartile 3)	hhd-rn3	9,088	849.5021
12	Rural non-farm (quartile 4)	hhd-rn4	6,316	1388.453
13	Urban (quartile 1)	hhd-u1	5,930	271.7564
14	Urban (quartile 2)	hhd-u2	8,820	657.4251
15	Urban (quartile 3)	hhd-u3	11,506	1366.653
16	Urban (quartile 4)	hhd-u4	17,080	6979.068
All households				

Source: Pakistan SAM 2010-11,

Similarly, the regional household of India in standard GTAP database is broken down into 9 types of household based on occupation and location (i.e. Rural and urban) as illustrated in Table 9.

Table 8: Indian Household Types in SAM 2007-08

	Household Types	Household population	HH Income (INR)
RH1	Rural Non-agricultural Self-Employed	121698281	3488163785422
RH2	Rural Agricultural Labour	176731708	2895364083410
RH3	Rural Non-agricultural Labour	110177819	2105645255109
RH4	Rural Agricultural Self-Employed	263549886	7582114981483
RH5	Rural Other Households	69580342	4516676873823
UH1	Urban Self -Employed	113202688	7564320714939
UH2	Urban Salaried Class	107428060	9663878620726
UH3	Urban Casual labour	39751700	1032666373139
UH4	Urban Other households	18393099	2223170513235
	Total Household		

Source: Indian SAM 2007-08

On the income side, information on the 12 factors of production from the Pakistan SAM is mapped with the standard 8 GTAP production factors. The mapping of land, labor and capital types in SAM also required defining not only the ownership of these labor types by households, but also their use in the production of each of the 57 GTAP commodities. So, I first take the shares of GTAP and then mapped those with SAM and disaggregates the labor and capital as shown in Table 10.

Table 9: Factors types used in this Study

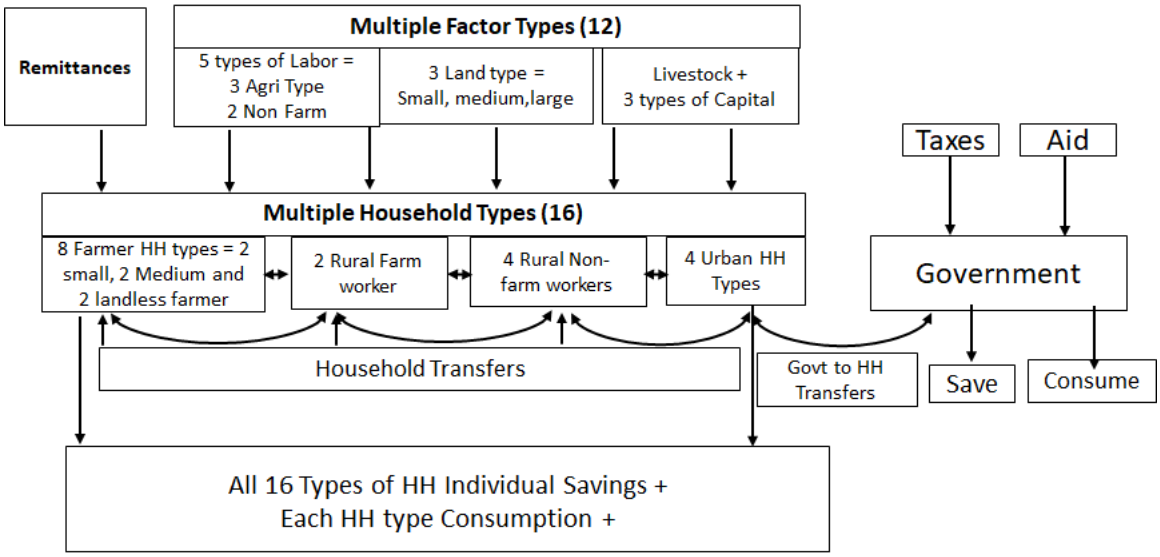
Pakistan SAM		Indian SAM		China SAM	
Code	*Description*	*Code*	*Description*	*Code*	*Description*
flab-s	Labor - small farmer	fcap	Capital	Flabusk	Unskilled Labor
flab-m	Labor - medium+ farmer	flnd	Land	Flabsk	Skilled Labor
flab-w	Labor - farm worker	Unskilled	Unskilled Labor		
flab-l	Labor - non-farm low skilled	Semi skill	Semi-skilled labor		
flab-h	Labor - non-farm high skilled	Skilled lab	Skilled Labor		
flnd-s	Land - large				
flnd-m	Land - medium				
flnd-l	Land - small				
fliv	Livestock				
fcap-a	Capital - agriculture				
fcap-f	Capital - formal				
fcap-i	Capital - informal				

Source: Pakistan SAM 2010-11, Indian SAM 2007-08, China SAM 2007-08

This research made many modifications into the standard GTAP data base by incorporating factor income by each Pakistan/Indian/Chinese household type, factor use by each sector, household consumption by each commodity, remittances by each household, transfers among the household and b/w household and government, and the saving rates for Pakistan. These modifications are made in such a way that the total returns to factors and consumption are consistent with the original GTAP database. Figure 8a and 8b shows modification made to the GTAP Data base and Model for Pakistan and India Respectively.

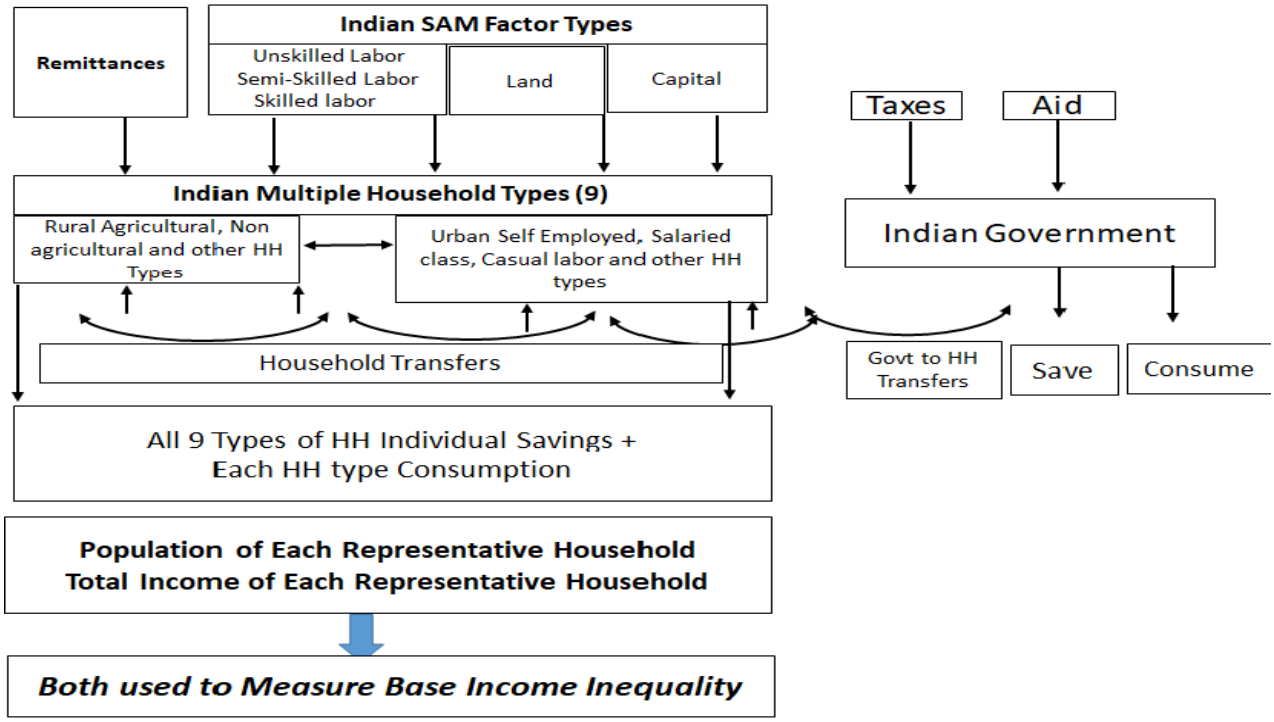
Figure 8a: Mapping of 4 Extensive Datasets using MyGTAP Approach in case of Pakistan and India

Figure 8a: Overview of the Pakistani data in the GTAP Database and model after the modifications



Source: Author's own design based on MyGTAP model (Minor and Walmsley (2013)

Figure 8b: Overview of the Indian data in the GTAP Database and model after the modifications



Source: Author's own design based on MyGTAP model (Minor and Walmsley (2013)

3.2 Income Inequality Estimation

This study used different inequality measures to see the impact of policy scenarios developed on household income inequality. Inequality is related to a number of mathematical concepts, including dispersion, skewness, and variance. Therefore, there are several ways to measure inequality, which itself arises from various social and physical phenomena. While this research will not discuss all of them exhaustively, however we will briefly discuss some of the most popular inequality measures used in this study.

3.2.1 Gini coefficient of inequality

Gini coefficient is widely used method of income inequality. The base of Gini is a Lorenz curve - that compares the distribution of a specific variable (e.g. income, expenditure, etc.) with the uniform distribution that represents equality. The coefficient value ranges between 0 and 1. In mathematics, we can state the Gini Coefficient as:

$$Gini = \frac{2}{n^2 \bar{y}} \sum_{i=0}^{n} i\,(y_i - \bar{y}) \qquad (1)$$

Observations are ranked from lowest to highest on the income to plot Lorenz curve, with cumulative proportion of the population on the horizontal axis and the cumulative proportion of income on the vertical axis. This cumulative frequency and size curve are compared by Gini coefficient to the uniform distribution that represents equality.

Litchfield (1999) discussed in detail the criteria of a good measure of income equality. Accordingly, any measure of equality will be considered good if it satisfies the following conditions:

Table 10: Criteria of Good measure of Income Inequality

	Statistical Condition	Explanation
A	Mean Independence	If income doubled, measure would not be changed.
B	Population size independence	Population change will not alter the inequality measure. That is, if population and each household doubled then inequality would not change?
C	Symmetry	If individuals exchange their income still no change in the inequality measure
D	Pigou-Dalton Transfer sensitivity	If Income transferred from Rich to poor (or vice versa) would reduce (raise) Income inequality.
E	Decomposability	If means the inequality could be broken down on the basis of population groups or income sources or in other proportions.

3.2.2 Generalized Entropy (GE) measures

The criteria of good measures of inequality, as explained above, are satisfied by various inequality measures. Theil indexes and the mean log deviation measure are the most widely used measures of inequality. Both the indexes belong to the family of generalized entropy inequality measures. The values of generalized entropy measures vary between 0 and ∞, with zero representing an equal distribution and a higher value representing a higher level of inequality. The most common values used for α are 0, 1 and 2. Theil's T index is GE(1) and it can be written as:

$$GE(1) = \frac{1}{N}\sum_{h=1}^{N}\frac{YH_h}{\overline{YH}}\ln\left(\frac{YH_h}{\overline{YH}}\right) \qquad (2)$$

GE(0) is Theil's L index, and sometimes it is referred as the mean log deviation measure. It can be written as:

$$GE(0) = \frac{1}{N}\sum_{h=1}^{N}\ln\left(\frac{\overline{YH}}{YH_h}\right) \qquad (3)$$

There is one inherent problem in the Theil Index as it has no close scale between 0 to 1, which is not there, in the case of Gini. This drawback is even acknowledged by Amartya Sen (1996) that Theil's index is not the measure which is overflowing with intuitive sense, exactly. To overcome this problem we can normalize Theil index (Juana Domínguez-Domínguez, José Javier Núñez-Velázquez, 2005).

3.2.3 Hoover's inequality measure

The Hoover index, another widely used measure of inequality, characterises the maximum vertical distance from the Lorenz curve to the 45° line of equality (Kawachi and Kennedy, 1997). The Hoover framework does not include a sensitivity parameter like the Atkinson and GE indexes. The mathematical form is :

$$HI = \frac{1}{2}\sum_{h}\left|\frac{YH_h}{\sum_{h} YH_h} - \frac{N_h}{\sum_{h} N_h}\right| \qquad \textbf{(4)}$$

3.2.4 Decomposition of income inequality

Generally in static decomposition, the determinants of household income are household and personal characteristics, such as gender, education, skilled and unskilled, urban and rural, and regional location. In such a situation, at least part of the value of any given inequality measure must reflect the fact that people have different level of educational, gender, occupations, and regions. This inequality is a "between-group" component. But for any such population division which is based on properties such as, gender, education, skilled and unskilled, urban and rural, and regional location, some inequalities exist among those people within the same subgroup. This phenomenon is called "within-group" component.

Due to the limitation of the data, we only calculated the inequality between groups before and after shocking global CGE model developed and used in this study. Mathematically, Theil-T index between groups is as follows:

$$TT = \sum_{h}\frac{YH_h}{\sum_{h} YH_h}\ln\left(\frac{YH_h / \sum_{h} YH_h}{N_h / \sum_{h} N_h}\right) \qquad (5)$$

we can rewrite Theil-T as:

$$TT = \ln\left(\frac{\sum_h N_h}{\sum_h YH_h}\right) - \frac{\sum_h YH_h \ln\left(\frac{N_h}{YH_h}\right)}{\sum_h YH_h} \quad (6)$$

Theil-L index between groups can be explain as:

$$TL = \sum_h \frac{N_h}{\sum_h N_h} \ln\left(\frac{N_h / \sum_h N_h}{YH_h / \sum_h YH_h}\right), \quad (7)$$

we can rewrite Theil-L as:

$$TL = \ln\left(\frac{\sum_h YH_h}{\sum_h N_h}\right) - \frac{\sum_h N_h \ln\left(\frac{YH_h}{N_h}\right)}{\sum_h N_h} . \quad (8)$$

We can calculate the "symmetrized" Theil index as:

$$TS = \frac{1}{2}[TT - TL]. \quad (9)$$

3.3 Policy Experiment / Simulation:

In this study we investigated the economy wide impacts of regional integration in South Asia and Pakistan Free Trade agreement with China on both aggregate as well as household level in Pakistan. Six different simulation were undertaken to study the impact of the regional integration in South Asia:

1) Current Pakistan-China FTA **(P-C FTA):** Pak-China FTA with 2007 Tariff when FTA got operational.[7]
2) Extended Pakistan-China FTA **(P-C Ext):** Pakistan to receive additional concessions reflecting the additional concessions awarded to ASEAN in ASEAN-China FTA (products listed in Table 4)[8].
3) Potential Pak-India MFN-NDMA **(NDMA-TR):** MFN/NDMA with bilateral trade liberalization.
4) Potential Pak-India MFN/NDMA **(NDMA-TF):** MFN/NDMA with bilateral trade facilitation[9]
5) Extended Pakistan-India FTA **(NDMAExt):** Pakistan to receive same tariff concessions as awarded to Sri Lanka, Nepal, Bhutan under SAFTA agreement and India the same tariff concession as awarded to China.

[7] This is done by using Tariffs of 2007 (Table 3).

[8] This is done by using Tariffs of 2011 (Table 4).

[9] In Pak-India bilateral trade facilitation scenario, the transaction costs in the bilateral trade between India and Pakistan is reduced by 30 percent.

6) South Asian Free Trade Agreement **(SAFTA)**: Full implementation of South Asian Free Trade Agreement (SAFTA) by removing all bilateral tariff and subsidies.

In the next section we examine the impact of these agreements on Pakistan economy.

4. Results and Discussion

4.1 Impact on Macro Economic Variable (Constant 2011 prices)

Table 12,13 and 14 illustrates the impact of Regional integration in South Asia on macroeconomic variables like real GDP, terms of trade, real investment and regional exports and imports. Tariff Reduction usually lowers the price of imported commodities, thereby reducing the cost of intermediate goods for domestic producers. This coupled with increased export demand, induces an increase in the country's production. Unfortunately, in this case the current Pakistan-China agreement (Sim-I) has an adverse effect on Pakistan's Real GDP by -0.0027 percent. Only when the preferences are increased in line with the ASEAN-China FTA (Simulation II) does Pakistan's real GDP increase, by 0.02 percent (50 Million US dollars). Due to current Pak-China FTA, Pakistan is losing its own competitiveness due to cheap Chinese imports to Pakistan which in turn has hindered domestic industry and so overall production. For China, the impact on real GDP too is modest but negative for both simulations which indicates that Pak-China FTA renegotiation in line with the ASEAN-China FTA will still have a positive impact on China's real GDP, hence renegotiation will be a win-win situation for both economies.

Table 11: Pakistan key Macroeconomic variables (% Changes, Constant 2011 Prices)

	Sim-I	Sim-II	Sim-III	Sim-IV	Sim-V	Sim-VI
	P-C FTA	P-C Ext	NDMA-TR	NDMA-TF	NDMA Ext	SAFTA
Real GDP (qgdp)	-0.0027	0.02	-0.0175	1.43	0.44	0.04
Real Exports (qxwreg)	-0.0077	0.12	1.1018	9.53	4.98	2.05
Real Imports (qiwreg)	-0.1156	0.38	0.4431	8.05	3.47	2.55
Terms of Trade (tot)	-0.073	0.019	-0.0491	0.29	0.03	1.02

Source: Authors' simulations

Table 12: Chinese key Macroeconomic variables (% changes, Constant 2011 Prices)

	Sim-I	Sim-II	Sim-III	Sim-IV	Sim-V	Sim-VI
	P-C FTA	P-C Ext	NDMA-TR	NDMA-TF	NDMA Ext	SAFTA
Real GDP (qgdp)	0.00021	0.00018	-0.0001	-0.0003	-0.0002	-0.0009
Real Exports (qxwreg)	0.002015	0.011	-0.0009	-0.003	-0.003	0.026
Real Imports (qiwreg)	-0.003074	0.010	-0.0022	-0.032	-0.014	-0.028

Terms of Trade (tot)	0.000238	-0.001	-0.001	-0.01	-0.005	-0.019

Source: Authors' simulations

Table 13: Indian key Macroeconomic variables (% changes, Constant 2011 Prices)

	Sim-I	Sim-II	Sim-III	Sim-IV	Sim-V	Sim-VI
	P-C FTA	P-C Ext	NDMA-TR	NDMA-TF	NDMA Ext	SAFTA
Real GDP (qgdp)	0.00001	-0.00009	0.0036	0.091	0.034	0.045
Real Exports (qxwreg)	-0.00048	0.0015	0.0684	0.716	0.40	0.43
Real Imports (qiwreg)	-0.00005	0.00034	0.0828	1.060	0.51	0.74
Terms of Trade (tot)	-0.00019	0.00042	0.0286	0.484	0.206	0.38

Source: Authors' simulations

Pak-India Trade normalization with bilateral tariff removal under NDMA-TR will have a negative impact on Pakistan economy. The results suggest that tariff-liberalization with India has a negative impact on Pakistan's Real GDP (-0.017%) but a positive impact on India's real GDP (0.003%). The impact from bilateral trade liberalization is very modest for both countries. However, Trade facilitation via reduction in transaction costs in the Indo-Pak bilateral trade have an overall positive impact on Pakistan real GDP and it provides one of the best real GDP outcomes for Pakistan, as it will increase by 1.43 percent from baseline. Thus, if Indo-Pak Trade normalization is not accompanied with Trade facilitation, it will not improve the outcome for Pakistan. In monetary terms this positive change via Trade facilitation for Pakistan is equal to US $ 3052 Million. This will also improve outcome for India, as Indian real GDP will increase by 0.09 percent which is equivalent to US $ 1724 million. This trade normalization with bilateral trade facilitation b/w two neighboring countries will have a modest but a negative impact on China's GDP by US $ 24 Million. There will also be some welfare loss for other countries due to possible trade diversion and will negatively affect USA real GDP by US $ 17 million, UAE by $ 14.97 million, Brazil by US $ 17.75 Million, Sri lanka by US $ 5.27 Million, Bangladesh by US $ 5.03 million, Iran by US $ 17.06 million and Vietnam by US $ 7.8 million. The results of NDMA-Ext show that if Pakistan and India get the same tariff concession as awarded to other trade partners like Pakistan to China, Malaysia and Sri Lanka under FTA while India to Bangladesh, Sri Lanka and other South Asia countries then it will improve the outcome for both India and Pakistan. The real GDP of Pakistan will increase by 0.44 percent from baseline while that of India is 0.034 percent.

In simulation 6, with full implementation of South Asian Free Trade Agreement (SAFTA) by removing bilateral tariffs and subsidies. SAFTA was signed with a pledge to allow free trade among member countries by eliminating trade barriers and scale down their tariffs in two phases to 0-5 percent that will come in force on January 1, 2006 and was supposed to be fully implemented by December 31, 2015. The results show a win-win scenario for all SAFTA countries except Sri Lanka. In monetary terms. The Indian real GDP will

increase by US $ 855 million, Pakistan by US $ 83 million, Bangladesh by US $ 11 million while there will be a decrease in real GDP of Sri Lanka by US $ 118 million. In a nutshell, only removal of tariff will not do good and to realize the potential, all the SAFTA countries should remove non-tariff barriers by showing strong commitment and political will to reduce trade costs by improving trade facilitation both 'at and behind the border'.

The impact on Pakistan's real imports and exports results shows that beside Pak-China FTA, all other experiments show the positive results. An extended Pakistan-China FTA in line with ASEAN-China FTA will boost up the trade sector of the Pakistan, with imports increase more than the real exports. The 3rd 4th and 5th scenarios with enhanced Tariff liberalization, trade facilitation, and extended FTA b/w Pakistan and India show a higher increase in exports than imports, thereby depicting a trade surplus. The Full implementation of SAFTA in the last experiment would also result in rise in Pakistan's overall imports and exports. Though magnitudes are lower, similar results are observed as far as the impacts of different scenarios on India's imports and exports are concerned. The excess demand for exports coupled with decline in Pakistan's tariff leading to lower costs of production and it will facilitate more investment in those exports oriented sectors whose demand will increase and hence real investment will increase in all scenarios except simulation 1.

The terms-of-trade, is generally defined as the ratio of prices a country receives for its exports and pays for its imports. It is an important idea in comprehending the effect of price changes on general welfare of a certain country. In case of Pak-China FTA, both simulation results show a significant decline in Pakistan's terms-of-trade primarily through a decline in its export prices relative to the prices it pays for imports. The current Pakistan-China FTA (P_C FTA) result shows that Pakistan's terms of trade deteriorate while in the revised agreement (P_C Ext) when Pakistan receives higher tariff concessions from China in products they hold a comparative advantage. This boosts exports compared to baseline and hence there is an overall positive impact on Pakistan terms of trade with China. Pak-India tariff liberalization will also not do goods for Pakistan in terms of its terms of trade but improved bilateral trade facilitation have a positive impact on both Pakistan and India. One can conclude from the results that excessive concessions granted to China in its free trade agreement with Pakistan and the resistance to opening trade with India may have resulted in inefficient trade, i.e., imports from a less competitive partner and exports to a less lucrative market. Thus, a better South-South trade will improve the outcome for Pakistan as well as for other South Asian countries.

4.2 Changes in Export

The abolition of tariffs usually leads to decline in the imported price to domestic good (and other imported goods) and hence triggers substitution towards cheap imports and away from other imports and domestically

produced goods. On the other hand, the reduction in tariffs and subsequently lower prices of imports purchased for intermediate use will also cause a decline in domestic prices by reducing production costs, thereby causing exports to rise. The impact on local production therefore depends on the extent to which the increase in exports outweighs or is outweighed by the fall in domestic sales due to substitution towards Chinese imports. Table 16,17 and 18 reports the impact on Pakistan, China and Indian sectorial exports. The impact of the all six scenarios on the sectorial exports is different across the group of commodities in terms of magnitude. For instance, under P_C Ext (Sim II), leather, wearing and apparel and textile which is the main exports item of Pakistan increases by 6.08 percent from baseline, wearing apparel by 0.92 percent, extraction by 2.5 percent and textile by 1.08 percent. The impact of the NDMA with tariff liberalization on Pakistan's total sectoral exports would boost Pakistan export-oriented sectors like fruits n vegetable. Textile, leather and heavy manufacturing. NDMA with Trade facilitation (Sim-IV) and full implementation of SAFTA (Sim-VI) would cause some marginal fall in Pakistan exports to its major export destinations such as United States and European Union. This suggests that the NDMA scenario would lead Pakistan to redirect some of its exports to the South Asian region, although overall exports rise.

Table 14: Changes in Pakistan Export

	Sim-I	Sim-II	Sim-III	Sim-IV	Sim-V	Sim-VI
	P-C FTA	P-C Ext	NDMA-TR	NDMA-TF	NDMAExt	SAFTA
Grain Crops	-0.724	-0.65	-0.9159	11.47	3.25	-4.88
VegFruit	0.286	-0.34	12.0345	24.79	31.44	27.54
MeatLstk	0.949	-2.83	-1.2238	9.30	1.38	-10.01
Extraction	0.327	2.50	2.9517	33.71	18.50	3.12
ProcFood	-0.269	-0.40	0.9188	-2.84	0.64	11.60
leather	-0.438	6.08	0.5176	10.20	5.39	0.52
Wap	0.209	0.92	1.1547	-1.75	0.11	-2.37
Textile	0.348	1.08	0.8549	5.98	3.51	6.24
LightMnfc	0.142	-0.99	1.2756	-6.80	-0.49	-2.51
HeavyMnfc	-0.836	-0.40	2.6571	50.14	19.93	4.31
Util_Cons	0.122	-0.67	0.7468	-0.04	1.01	-2.72
TransComm	0.115	-0.63	0.5398	-3.42	-0.41	-2.72
FinServices	0.135	-0.76	0.6545	-5.85	-1.12	-3.37
BusServices	0.128	-0.72	0.6692	-2.70	0.21	-3.06
OthServices	0.120	-0.68	0.6336	-5.64	-1.21	-2.91

Source: Authors' simulations

Table 15: Changes in Chinese Export

	Sim-I	Sim-II	Sim-III	Sim-IV	Sim-V	Sim-VI

	P-C FTA	P-C Ext	NDMA-TR	NDMA-TF	NDMAExt	SAFTA
Grain Crops	-0.0384	0.042	0.0054	-0.599	-0.29	0.25
VegFruit	-0.0140	0.016	-0.0078	-0.324	-0.19	-0.23
MeatLstk	-0.0084	0.007	0.0105	0.081	0.03	0.17
Extraction	0.0003	0.002	0.0011	-0.12	-0.04	-0.002
ProcFood	-0.009	0.008	-0.0022	0.05	0.02	0.07
Leather	-0.0070	0.027	0.0058	0.06	0.03	0.16
Wap	-0.0072	0.048	-0.0009	0.17	0.05	-0.017
Textile	0.0206	0.056	-0.0276	-0.3	-0.11	-0.34
LightMnfc	0.00043	0.005	0.0056	0.10	0.04	0.047
HeavyMnfc	0.00048	0.004	-0.0011	-0.03	-0.017	0.042
Util_Cons	0.00096	0.002	0.0023	0.019	0.007	0.102
TransComm	0.00035	0.002	0.0057	0.086	0.03	0.11
FinServices	0.0012	0.001	0.0059	0.09	0.037	0.12
BusServices	0.00099	0.003	0.0084	0.13	0.051	0.15
OthServices	0.00129	0.004	0.0003	0.064	0.02	0.10

Source: Authors' simulations

Table 16: Changes in Indian Export

	Sim-I	Sim-II	Sim-III	Sim-IV	Sim-V	Sim-VI
	P-C FTA	P-C Ext	NDMA-TR	NDMA-TF	NDMAExt	SAFTA
Grain Crops	-0.0152	0.043	0.27	4.34	2.82	0.72
VegFruit	-0.0175	0.029	0.16	4.94	2.90	6.69
MeatLstk	-0.0003	0.008	-0.11	-1.39	-0.44	-1.59
Extraction	0.00001	-0.0009	0.034	1.70	1.14	0.27
ProcFood	-0.0005	0.0068	0.79	1.78	0.67	1.98
leather	0.00532	-0.027	-0.23	-3.32	-1.45	-2.70
Wap	0.00010	-0.006	-0.20	-3.33	-1.45	-2.24
Textile	-0.0068	-0.007	0.089	1.34	0.049	3.64
LightMnfc	0.00079	0.0007	-0.12	-1.6	-0.83	0.91
HeavyMnfc	0.0007	0.0007	0.23	3.27	1.64	1.30
Util_Cons	0.00116	-0.0019	-0.14	-2.2	-0.95	-1.91
TransComm	0.00068	-0.0003	-0.09	-1.38	-0.58	-1.22
FinServices	0.000695	-0.0014	-0.15	-2.29	-0.96	-1.97
BusServices	0.000450	-0.0002	-0.12	-1.58	-0.65	-1.69
OthServices	0.000156	0.001	-0.14	-2.147	-0.90	-1.93

Source: Authors' simulations

4.3 Changes in Import

Table 18, 19 and 20 presents the impact on Pakistan, China and India's sectoral import. The concessions given by Pakistan to China during the first phase of the FTA predominantly contained raw materials and intermediary goods. In return, China eliminated tariff on finished goods. This was primarily due to the fact that Pakistan government wants to envisage an economic integration model where Pakistan would import

raw materials, components and intermediaries to boost domestic manufacturing and subsequently export these goods to China under the FTA at preferential tariffs. The impact of Pak-China FTA on Pakistan's import is modest but positive under both the simulations. The 3rd, 4th and 5th simulation shows that Pakistan imports from India will increase and hence it will then compete with Chinese imports in Pakistani market so imports from China, USA, European Union and rest of the world would decline by some margins. Indian imports of grain crops, leather, wearing apparel and textile will increase. The rise in Pakistan imports from India would happen due to India's unit cost advantage compared to Pakistan's other trading partners.

It is pertinent to mention here that Pakistan's NDMA to India would generate larger benefits if it is supported by improved connectivity and trade facilitation. The overall macro impacts of the reduction in trade barriers under SAFTA are positive but the magnitude is small. With improved trade facilitation and removal of non-tariff barriers (NTBs), the benefits to Pakistan, India, and the entire South Asian region are likely to be larger, as others have found when NTBs are included (Hertel, Walmsley and Itakura, 2001). With Pakistan's NDMA status to India in place, the full implementation of SAFTA becomes much more likely.

Table 17: Changes in Pakistan Import

	Sim-I	Sim-II	Sim-III	Sim-IV	Sim-V	Sim-VI
	P-C FTA	P-C Ext	NDMA-TR	NDMA-TF	NDMAExt	SAFTA
Grain Crops	-0.4724	0.95	2.36	22.72	13.43	7.68
VegFruit	-0.2326	0.41	1.25	8.19	5.39	5.57
MeatLstk	-0.4337	1.37	1.77	26.09	12.75	6.41
Extraction	-0.1320	0.13	0.18	2.14	1.34	0.87
ProcFood	-0.1490	0.44	1.80	9.52	3.51	4.28
leather	-0.3746	1.15	0.24	7.94	2.82	5.49
Wap	-0.1255	0.60	0.44	5.97	1.79	5.64
Textile	-0.1807	0.46	0.86	11.52	3.42	3.52
LightMnfc	-0.1156	0.54	-0.14	10.02	2.79	2.80
HeavyMnfc	-0.0745	0.33	0.37	7.72	3.60	2.24
Util_Cons	-0.0725	0.48	-0.22	4.17	1.25	2.23
TransComm	-0.0768	0.37	-0.25	5.37	1.61	1.75
FinServices	-0.0430	0.26	-0.21	3.96	1.12	1.17
BusServices	0.05	0.21	-0.16	4.96	1.65	0.97
OthServices	0.08	0.42	-0.90	5.09	0.38	1.06

Source: Authors' simulations

Table 18: Changes in Chinese Import

	Sim-I	Sim-II	Sim-III	Sim-IV	Sim-V	Sim-VI
	P-C FTA	P-C Ext	NDMA-TR	NDMA-TF	NDMAExt	SAFTA
Grain Crops	-0.0380	0.009	-0.012	-0.106	-0.05	-0.139

VegFruit	-0.0012	0.012	-0.003	0.0002	0.003	-0.043
MeatLstk	0.0005	-0.005	-0.005	-0.014	-0.005	-0.066
Extraction	0.0002	0.001	-0.0016	-0.017	-0.010	-0.01
ProcFood	-0.0072	0.0036	0.0011	-0.039	-0.016	-0.053
leather	-0.0616	0.5	-0.008	-0.132	-0.059	0.316
Wap	-0.0047	0.034	-0.002	-0.06	-0.02	-0.002
Textile	-0.0220	0.51	0.002	-0.07	-0.007	0.203
LightMnfc	-0.0009	-0.0003	-0.002	-0.03	-0.012	-0.036
HeavyMnfc	-0.0021	0.001	-0.001	-0.02	-0.011	-0.026
Util_Cons	-0.0009	-0.0006	-0.001	-0.02	-0.010	-0.061
TransComm	-0.0005	0.0002	-0.003	-0.05	-0.021	-0.0589
FinServices	-0.0010	-0.0004	-0.006	-0.104	-0.043	-0.102
BusServices	-0.0008	-0.0012	-0.008	-0.14	-0.058	-0.1405
OthServices	-0.0009	-0.0029	-0.002	-0.03	-0.013	-0.062

Source: Authors' simulations

Table 19: Changes in Indian Import

	Sim-I	Sim-II	Sim-III	Sim-IV	Sim-V	Sim-VI
	P-C FTA	P-C Ext	NDMA-TR	NDMA-TF	NDMAExt	SAFTA
Grain Crops	0.00578	0.005	0.81	5.54	3.97	13.2
VegFruit	0.0021	-0.001	1.32	3.12	3.48	3.13
MeatLstk	0.0005	-0.004	0.20	4.4	1.84	1.84
Extraction	0.0002	-0.0001	0.05	0.66	0.36	0.34
ProcFood	-0.0006	0.0012	0.13	1.63	0.77	1.27
leather	0.0003	-0.002	0.21	3.06	1.66	0.85
Wap	-0.0003	0.006	0.52	4.70	3.21	8.21
Textile	-0.0023	0.009	0.44	5.44	2.39	2.57
LightMnfc	-0.0004	0.0011	0.08	1.32	0.57	1.18
HeavyMnfc	-0.0001	0.0005	0.07	1.12	0.49	0.78
Util_Cons	-0.0005	0.0004	0.07	1.29	0.52	1.04
TransComm	-0.0005	0.0008	0.07	1.37	0.57	1.01
FinServices	-0.0003	0.0006	0.07	1.26	0.52	1.03
BusServices	0.000010	-0.0002	0.03	0.62	0.2525	0.45
OthServices	-0.00002	-0.0004	0.05	0.97	0.40	0.73

Source: Authors' simulations

4.4 Impact on sectoral output

Table 21 depicts the impacts of six simulations on the sectorial output of Pakistan. The results reveal that the extended Pakistan-China FTA will boost processed food, leather, wearing apparel and textile sector while with Pakistan-India trade normalization under NDMA scenario and SAFTA will positively impact output of vegetable and fruit, meat and livestock, processed food, leather, wearing apparel and textile sector and will decrease the output of grain crops, light and heavy manufacturing sector. The output results of Pakistan main export oriented sectors are positive but the magnitude is very small.This is because Pakistan

textile and leather industrial sector has been facing a tremendous shortage of gas supply and electricity shutdowns for the last 5 years. To make things even worse floods every year are primarily hitting the Punjab, where thousands of cattle are dying.

Table 20: Changes in Pakistan Sectoral Output

	Sim-I	Sim-II	Sim-III	Sim-IV	Sim-V	Sim-VI
	P-C FTA	P-C Ext	NDMA-TR	NDMA-TF	NDMAExt	SAFTA
Grain Crops	-0.014	0.0001	-0.107	-0.350	-0.308	-0.200
VegFruit	0.078	-0.070	1.345	1.000	2.646	2.840
MeatLstk	0.012	0.080	-0.014	1.060	0.371	-0.040
Extraction	0.017	-0.090	0.092	0.260	0.045	-0.570
ProcFood	-0.014	0.040	-0.006	0.510	0.269	0.300
leather	-0.013	0.220	0.025	1.710	0.670	0.110
Wap	-0.012	0.120	0.230	0.630	0.515	-0.500
Textile	0.249	0.550	0.462	1.230	1.557	3.140
LightMnfc	-0.001	-0.120	0.157	-1.520	-0.201	-0.390
HeavyMnfc	-0.051	-0.150	0.081	-2.340	-0.826	-0.430
Util_Cons	-0.045	0.090	0.045	1.940	0.733	0.530
TransComm	-0.002	-0.010	0.038	0.010	0.061	0.020
FinServices	0.004	-0.010	0.017	-0.220	-0.059	-0.040
BusServices	0.016	-0.160	0.186	-1.600	-0.368	-0.630

Source: Authors' simulations

4.5 Impact on sectoral Prices

The instantaneous outcome succeeding trade liberalization is the impact on commodity prices. It is expected that the all simulation with broad aim of liberalizing trade will directly affect prices of imports. Thus, this will affect all other prices due to inter-connection that exist in the domestic economy. The sectoral prices for all the sectors fall only under first scenario. The cheap imports from China will decrease the sectoral prices but on the other hand, those sectors that are being substituted by imports are expected to reduce production, thereby adversely impacting the factors that these sectors use intensively, and their owners. In scenarios, second, fourth and fifth, the effect on sectoral price has been positive for all sector though the rise in prices of agriculture related sectors is more reflective in both later scenarios. While in case of NDMA with Trade Facilitation (Sim-IV), the duty-free import through Wagha border — the closest possible point to the Indian agriculture production base and Pakistan's most populated areas — will have an impact on local agriculture market and hence the price in the domestic market will fall. The sectors focused on domestic market have greater incentive to employ more factors therefore encourage production of these sectors.

Table 21: Changes in Pakistan Sectoral Prices

	Sim-I	Sim-II	Sim-III	Sim-IV	Sim-V	Sim-VI
	P-C FTA	P-C Ext	NDMA-TR	NDMA-TF	NDMAExt	SAFTA
Grain Crops	-0.21	0.26	0.25	-0.87	0.5	1.9
VegFruit	-0.15	0.23	0.64	-0.59	0.88	2.67
MeatLstk	-0.15	0.43	0.24	-0.06	0.66	1.85
Extraction	-0.03	0.12	0.0002	0.15	0.14	0.49
ProcFood	-0.06	0.2	-0.08	0.12	0.22	1.07
leather	-0.1	0.3	0.055	0.02	0.4	1.37
Wap	-0.03	0.15	-0.15	0.07	0.12	0.68
Textile	-0.07	0.19	-0.07	-0.29	0.19	0.98
LightMnfc	-0.03	0.18	-0.15	0.35	0.14	0.8
HeavyMnfc	-0.02	0.14	-0.13	0.2	0.1	0.6
Util_Cons	-0.02	0.14	-0.16	0.13	0.08	0.58
TransComm	-0.03	0.18	-0.15	0.39	0.14	0.81
FinServices	-0.03	0.2	-0.17	0.53	0.16	0.89
BusServices	-0.03	0.18	-0.17	0.45	0.14	0.81

4.6 Welfare Analysis

To analyze the welfare effect of trade liberalization, the mostly widely used measurement is the Equivalent Variation (EV) which can be decomposed into various compositions that include 'allocative efficiency', 'terms of trade' and 'change in capital stock'. Allocative efficiency' implies an optimal domestic production, i.e. when the production represents the consumer choices. In other words, when the marginal costs of production are equal to the marginal utility of that output, this is called allocative efficiency. Improvements in the terms of trade (TOT) also leads to increase in overall welfare as it leads to avail higher prices of exports as compared to what is paid for imports. Trade liberalization may also lead to increase in capital stock that in turn enhances the domestic productive capacity and so overall welfare.

Results illustrated in Table 23 show that Pakistan receive a meaningful decrease in overall welfare, i.e. by 45 Million US dollars under P_C FTA. Pakistan faces loss in all the components of welfare with the highest decrease in the terms of trade. The welfare impact of Pakistan-China FTA with 2007 tariffs is modest but positive for China. The welfare impact of the second scenario (Pakistan-China FTA with additional tariff concessions) is positive for Pakistan with improvement in all components of welfare (EV). China and India both on the other hand, receive decrease in overall welfare in the second scenario. The overall welfare impact of Pakistan-India NDMA-TR (Sim-III) is negative for Pakistan with loss in all the components of EV (compositions of welfare). However, India show a meaningful increase in overall welfare along with

improvement in all welfare compositions. The welfare impact of Pakistan-India NDMA under trade liberalization and facilitation is negative for China. A better trade relation between India and Pakistan would directly hurt the welfare of China. Moreover, the implementation of SAFTA would reduce China's welfare by $600 million which is largely because of the deteriorating terms of trade.

For Pakistan, 2nd 4th and 6th experiments are the favorable scenario where an extended FTA with China would improve its welfare by $52 million. An equal treatment to Pakistani exporters as ASEAN exporters by China would increase the ability of Pakistani exports to compete in the international market. By giving the NDMA to India with trade facilitation, the welfare with improve by $7million. The Full implementation of SAFTA, however, would be useful for Pakistan.For India, all scenarios are favorable beside the FTA between China and Pakistan. It would gain largely under extended FTA with Pakistan. If Pakistan provide India equal tariff concessions as it gives to China, her overall welfare will increase by $1402 million. Also SAFTA proves to be really good for her, as it enhanced her total welfare by $2710 million.

Table 22: Decomposition of estimated equivalent variation on Pakistan/China and India under various scenarios (US$ million)

	Allocative efficiency effect	Change in terms of trade	Change in capital stock	Total
	Pakistan			
Scenario 1	-8.49	-28.2	-9.27	-45.96
Scenario 2	14.9	20.3	17	52.2
Scenario 3	-37.4	-15.2	-32	-84.6
Scenario 4	22	-28.9	14.5	7.6
Scenario 5	-75.4	8.99	-22.4	-88.81
Scenario 6	82.7	315	106	503.7
	China			
Scenario 1	2.2	8.98	5.08	16.62
Scenario 2	19.2	-20.8	-5.31	-6.91
Scenario 3	-5.33	-21.9	1.91	-25.32
Scenario 4	-5.59	-62.2	-33.8	-101.59
Scenario 5	-15.1	-129	-45.6	-189.7
Scenario 6	-68.7	-418	-114	-600.7
	India			
Scenario 1	0.77	-3.08	1.06	-1.25
Scenario 2	-0.172	2.49	-1.73	0.588
Scenario 3	66.9	109	31.7	207.6
Scenario 4	200	457	115	772
Scenario 5	407	791	204	1402
Scenario 6	856	1454	400	2710

4.7 Effects on Real Returns to factors

Results in table 24 below, reflect the impact on the real factors' reward in Pakistan. The impact of the P_C FTA (Sim-I) on the reward of most types of labor is negative except for capital and non-farm skilled and unskilled labors. The impact on the reward of most types of labor is positive under the P_C Ext (Sim-II). The reason is that the extended Pak-China FTA will encourage exports of textiles and wearing apparel and so will motivate domestic production, which will in turn lead to increase in the factor rewards. Results of 2^{nd},3^{rd},4^{th},5^{th}, and 6^{th} simulation shows that better demand for labor, which mainly sprouts from cotton lint/yarn, textile, and leather sectors, because of the improvement in output in these areas, results in better wages for labor workers involved in production of these goods. The results oppose the popular theory that trade liberalization could reduce the wages of unskilled labour even in a labour-abundant country, thereby increasing poverty. See for instance, Stiglitz (1970), Davis (1996), Feenstra and Hanson (1997), Cunat and Maffezzoli (2001), Kremer and Maskin (2003), Banerjee and Newman (2004), Topalova (2007), Harrison (2007).

Table 24: Percent Changes in Real Factor Wages in Pakistan

Factor codes	Factor description	Sim-I	Sim-II	Sim-III	Sim-IV	Sim-V	Sim-VI
		P-C FTA	P-C Ext	NDMA-TR	NDMA-TF	NDMAExt	SAFTA
flab-s	Labor - small farmer	-0.234	0.240	1.06	1.80	0.752	2.680
flab-m	Labor - medium+ farmer	-0.254	0.280	0.67	-2.040	0.152	1.990
flab-w	Labor - farm worker	-0.184	0.180	0.95	-0.810	0.941	1.910
flab-l	Labor - non-farm low skilled	0.048	0.040	-0.09	2.590	0.791	0.070
flab-h	Labor - non-farm high skilled	0.042	-0.010	-0.17	2.260	0.512	0.270
flnd-s	Land - large	-0.267	0.120	1.33	-3.920	0.561	3.520
flnd-m	Land - medium	-0.301	0.140	0.87	-4.430	-0.420	2.530
flnd-l	Land - small	-0.338	0.170	0.36	-5.000	-1.490	1.460
fliv	Livestock	-0.094	0.670	0.54	5.530	2.778	1.480
fcap-a	Capital - agriculture	-0.332	0.160	0.40	-4.890	-1.390	1.510
fcap-f	Capital - formal	0.036	0.030	-0.10	2.580	0.798	0.070
fcap-i	Capital - informal	0.039	0.000	-0.118	2.400	0.685	-0.100

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4.8 Changes in Household Income

A unique feature of the MyGTAP model used in this study is the capability to disaggregate the regional household into both private and government entities. We disaggregated the regional household in Standard GTAP model to 16 types of Pakistan household's, 9 types of Indian household's and 2 types of Chinese

household (urban and rural). This enables to conduct a detailed analysis of the effects to household income distribution and expenditures. This disaggregated analysis stands in contrast to a typical "national welfare analysis" often cited in CGE analysis in that we do not suppose that all stakeholders will be impacted equally - the assumption is that trade policy will have distributional impacts and that the impacts on poor households should be given special consideration when making trade policy (Minor and Mureverwi, 2013).

The changes in relative wages lead to changes in the household incomes. Household incomes are primarily composed of factor income, such that the changes in the wages shape the changes in household incomes. The results in table 25 show the impact on real incomes under all scenarios. The results indicate that income of all the households decrease under the first simulation (P_C FTA) with largest decrease is shown by the 'rural medium farmer (hhd-rm234) by 0.35 percent. One of the main reasons of the reduction in the income of all types of household is the China's successful utilization of the current FTA that has led to increase in Pak imports from China. This in turn discourages the farm production and so reduces domestic household income. This finding is consistent with the earlier empirical findings according to which China has been successful in utilizing the current Pak-China FTA, i.e. China is receiving higher gains from the FTA as Pakistan tariff preferences are consistent with its export's potentials. The impact of the extended Pak-China FTA stands in sharp contrast to the first simulation (P_C FTA) in that income of all types of households show increase with the highest increase in income of 'Rural medium formers from Punjab followed by rural farm workers. While Sim-3 under Indo-Pak NDMA with tariff liberalization those household which derive their income from agriculture seen an increase in their income while rural non-farm and urban workers from all 4 provinces of Pakistan seen a decline in their income.

These differentiated effects on household wages are in turn the effects of the reallocation of production that favors cotton lint/yarn, textile, and wearing apparel and leather sectors. Adding to that, under current Pak-China FTA, Pakistan even losing competitiveness in its own market due to cheap Chinese imports having low production cost combined with tariff concessions has overall negative impact on household income in Pakistan.

Table 26 Illustrates the impact on Indian households and it can be clearly seen that Trade normalization with Pakistan via NDMA scenario as well as with fully implementation of SAFTA will have a positive impact on all 9 household types. Thus, more integrated South Asian market is a way forward for all countries especially 2 Big Asian giants, India and Pakistan.

Table 25: Percent Changes in Pakistan real household Income

		Sim-I	Sim-II	Sim-III	Sim-IV	Sim-V	Sim-VI

		P-C FTA	P-C Ext	NDMA-TR	NDMA-TF	NDMAExt	SAFTA
hhd-rs1	Rural small farmer (quartile 1)	-0.26	0.35	0.645	-1.190	0.432	2.80
hhd-rs234	Rural small farmer (quartile 234)	-0.28	0.39	0.647	-1.430	0.385	3.0
hhd-rm1	Rural medium+ farmer (quartile 1)	-0.21	0.10	0.612	-0.670	0.090	0.91
hhd-rm234	Rural medium+ farmer (quartile 234)	-0.35	0.40	0.540	-3.130	-0.476	2.82
hhd-rl1	Rural landless farmer (quartile 1)	-0.28	0.32	0.634	-1.850	0.155	2.77
hhd-rl234	Rural landless farmer (quartile 234)	-0.27	0.35	0.489	-1.650	0.045	2.62
hhd-rw1	Rural farm worker (quartile 1)	-0.11	0.30	0.321	1.990	1.078	1.60
hhd-rw234	Rural farm worker (quartile 234)	-0.09	0.33	0.171	2.520	1.111	1.49
hhd-rn1	Rural non-farm (quartile 1)	-0.029	0.20	-0.140	2.770	0.782	0.89
hhd-rn2	Rural non-farm (quartile 2)	-0.032	0.20	-0.153	2.800	0.780	0.90
hhd-rn3	Rural non-farm (quartile 3)	-0.03	0.20	-0.16	2.830	0.785	0.91
hhd-rn4	Rural non-farm (quartile 4)	-0.04	0.21	-0.159	2.950	0.847	0.99
hhd-u1	Urban (quartile 1)	-0.05	0.20	-0.061	2.440	0.759	1.02
hhd-u2	Urban (quartile 2)	-0.04	0.21	-0.118	2.630	0.769	0.98
hhd-u3	Urban (quartile 3)	-0.04	0.21	-0.141	2.730	0.785	0.98
Hhd-u4	Urabn (quantile 4)	-0.05	0.222	-0.151	2.882	0.841	1.052

Source: Author(s)'s simulation

Table 26: Percent Changes in Indian real household income

Factor Codes	Factor Description	Sim-I	Sim-II	Sim-III	Sim-IV	Sim-V	Sim-VI
		P-C FTA	P-C Ext	NDMA-TR	NDMA-TF	NDMAExt	SAFTA
RH1	Rural Non-agricultural Self-Employed	0.000032	-0.0004	0.040	0.68	0.28	0.53
RH2	Rural Agricultural Labour	-0.00019	0.00004	0.047	0.75	0.31	0.6
RH3	Rural Non-agricultural Labour	-0.00016	-0.00002	0.046	0.74	0.31	0.59
RH4	Rural Agricultural Self-Employed	-0.00072	0.0013	0.048	0.90	0.38	0.63
RH5	Rural Other Households	0.00015	-0.0006	0.036	0.64	0.26	0.49
UH1	Urban Self -Employed	0.00006	-0.0004	0.039	0.67	0.27	0.52
UH2	Urban Salaried Class	-0.00016	-0.00002	0.046	0.74	0.31	0.58
UH3	Urban Casual labour	-0.00012	-0.00009	0.045	0.73	0.30	0.57
UH4	Urban Other households	0.00015	-0.0006	0.036	0.64	0.26	0.49

Source: Author(s)'s simulation

4.9 Effect on Overall Income Inequality:

The base Gini Coefficient of 0.4159 in Table 27 confirms the fact that income is still unequally distributed amongst the population in Pakistan. We calculated these base values using the total income and population of all 16 types of household from Social Accounting Matrix (SAM) 2011. The simulation results show that the Sim I (P_C FTA) would result in slightest increase in income inequality in Pakistan, however, if China awards Pakistan the same tariff concession as given to ASEAN under China-ASEAN FTA (P_C Ext), there is a modest but positive impact on income inequality in Pakistan. Results of Trade normalization with India in Simulation 3 with tariff liberalization will reduce income inequality in Pakistan. However, Simulation 4 and 5 show an overall increase in income inequality in Pakistan. This primarily is due to the fact that Indian agriculture in highly subsidized so opening and facilitating trade with India will have a negative impact on income of poor farmers in Pakistan which is already affected by higher cost of inputs, floods and timely availability of water to crops. The complete implementation of SAFTA will have a positive impact on income Inequality in Pakistan. The Theil-L, Theil-T, Theil-S and Hoover index in the base were 0.2945, 0.2905, 0.2925 and 0.3109. The results imply that out of 6 simulation used in this study only Sim 2,3 and 6 will reduce the inequality between households.

In case of an overall Income Inequality in India as illustrates in Table 28. In case of India, the low base Gini index shows less inequality as compared to Pakistan. In all scenarios of India-Pak tariff liberalization and trade facilitation, the ratio of income inequality decreases. The impact of India-Pak trade normalization on income inequality in India stand in complete contrast to the impact on index of Pakistan where income inequality increases in all scenarios. This confirms that under current economic and policy situation in both countries, trade normalization with India will hurt the poor more in Pakistan as compared to India. Even full implementation of SAFTA agreement will have an overall positive impact on income inequality in India. The result concludes that South-South trade will have a positive impact at macro as well as at household level in India.

Table 27: Effect on Overall Inequality Effect in Pakistan

	Gini Coefficient	Hoover	Theil-T	Theil-L	Theil-S
Base Index	0.4159	0.3109	0.2945	0.2905	0.2925
Sim-1	0.4162	0.3109	0.2949	0.2910	0.2930
Sim-2	0.41572	0.3108	0.2944	0.2902	0.2923
Sim-3	0.41574	0.3109	0.2940	0.2902	0.2921
Sim-4	0.4212	0.3140	0.3016	0.3000	0.3008
Sim-5	0.4166	0.3113	0.2955	0.2917	0.2936
Sim-6	0.4140	0.3098	0.2922	0.2872	0.2897

Source: Author(s)'own simulation

Table 28: Effect on Overall Inequality Effect in India

	Gini Coefficient	Theil-T	Theil-L	Hoover	Theil-S

Base Index	0.28537	0.19136	0.18696	0.28116	0.18916
Sim-1	0.28537	0.19137	0.18697	0.28116	0.18917
Sim-2	0.28537	0.19136	0.18696	0.28116	0.18916
Sim-3	0.28536	0.19135	0.18695	0.28114	0.18915
Sim-4	0.28527	0.19111	0.18673	0.28090	0.18892
Sim-5	0.28532	0.19125	0.18686	0.28104	0.18905
Sim-6	0.28531	0.19121	0.18681	0.28102	0.18901

Source: Author(s)'own simulation

5. Sensitivity analysis

In this section we conduct a sensitivity analysis to test some of the important modeling assumptions to see its impact on overall results. The results presented in this paper are based on assumption of full employment. However, with a high unemployment rate in Pakistan, we test the assumption of unemployment of unskilled labor and review changes in the assumption regarding the trade balance. Finally, we review the results of systematic sensitivity analysis by testing the assumption of unemployment to determine if the results are sensitive to changes in the closure.

5.1 Unemployment

As discussed in closure and reported above, the results presented in this report are based on an assumption of full employment, i.e., that labor inputs cannot easily be increased in response to increased demand. The unemployment rate in Pakistan, while improving, was reported to be 6 percent in 2011-10 (Economic Survey of Pakistan, 2015). The unemployment rate as reported call into question the validity of the full employment assumption. In this section we examine the extent to which this assumption impacts the results.

Table 23: Macro Economic Results for Sensitivity Analysis in Pakistan (Percent Change in US $ Million

	Real GDP		Real Investment		Terms of Trade	
	Full Employment	Unemployment of Unskilled Labor	Full Employment	Unemployment of Unskilled Labor	Full Employment	Unemployment of Unskilled Labor
Sim-I	-0.0027	-0.0014	-0.1047	-0.15	-0.073	-0.09
Sim-II	0.01	0.02	0.25	0.26	0.019	0.19
Sim-III	-0.0175	-0.026	0.127	0.104	-0.049	-0.05
Sim-IV	1.43	1.66	4.23	4.82	0.29	0.32
Sim-V	0.44	0.51	1.69	1.88	0.03	0.04
Sim-VI	0.04	0.04	1.43	1.45	1.02	1.02

[10] Reference year for both data sets for the world economy and SAM used here is for 2011.

Table 24 reports Pakistan' change in real GDP, real investment and terms of trade for all Six scenarios assuming low skilled labor is unemployed. The impacts on real GDP increase from 0.01 percent of real GDP to 0.02 percent in P_C Ext (Sim-II), 1.43 percent to 1.66 percent in NDMA-TF (Sim-IV), 0.44 percent to 0.51 percent in NDMA-Ext (Sim-V) , if unemployment is assumed for non-farm low skilled labor. Similar trend was found in Pakistan real investment and terms of trade results. However, with only Tariff liberalization b/w Pakistan and India, unemployment is assumed for only low skilled non-farm workers, real GDP declines slightly due to the importance of these low skilled workers in declining sectors, e.g., agriculture.

Since unemployment is assumed in this scenario estimates of employment changes can be estimated. Table 25 illustrates estimated changes in real factor wages in Pakistan under the alternative assumption on unemployment of non-farm low skilled labor. In most cases real factor wage of non-farm high skilled labor, small and medium farmers, farm worker increases.

Table 24: Impact on Real Factor wages under Unemployment of low skilled labor[11]

Factor codes	Factor description	Sim-I	Sim-II	Sim-III	Sim-IV	Sim-V	Sim-VI
		P-C FTA	P-C Ext	NDMA-TR	NDMA-TF	NDMAExt	SAFTA
flab-s	Labor - small farmer	-0.2	0.25	0.983	-1.34	0.93	2.7
flab-m	Labor - medium+ farmer	-0.23	0.29	0.653	-1.46	0.34	2.01
flab-w	Labor - farm worker	-0.12	0.19	0.928	-0.12	1.16	1.93
flab-l	Labor - non-farm low skilled	0	0	0	0	0	0
flab-h	Labor - non-farm high skilled	0.03	-0.01	-0.182	2.36	0.54	-0.27
flnd-s	Land - large	-0.2	0.13	1.315	-3.43	0.72	3.54
flnd-m	Land - medium	-0.25	0.15	0.851	-3.93	-0.26	2.55
flnd-l	Land - small	-0.3	0.17	0.344	-4.47	-1.32	1.48
fliv	Livestock	-0.14	0.68	0.521	6.29	3.01	1.5
fcap-a	Capital - agriculture	-0.29	0.17	0.385	-4.36	-1.21	1.52
fcap-f	Capital - formal	0	0.03	-0.104	2.63	0.81	0.07
fcap-i	Capital - informal	0.02	0.01	-0.122	2.5	0.71	-0.09

[11] swap empl("flab-l ",Pakistan) = pfactreal("flab-l ",Pakistan) ;

5.2 Fixing the trade balance

In our core scenario presented earlier we assume that the trade balance is fully flexible and ultimately a function of domestic savings and investment (and any changes in foreign income flows). This means that the trade balance is driven by our model assumptions that savings is a constant share of income and investment (including foreign investment) is driven by rates of return. In developing countries like Pakistan, foreign investment usually has a fixed percentage of GDP and hence the trade balance should be fixed as a share of the country's GDP or income. We test this scenario of a fixed trade balance on the results and found no material change in the results.

5.3 Level of Shocks

Sensitivity analysis is usually based on the size of shocks and can be undertaken in a number of ways. One can alter the particular shocks to reflect alternative views about the size of the shock or another method of systematic sensitivity analysis (SSA) can be employed. In systematic sensitivity analysis (SSA) number of simulations are carried out with a sampling distribution of the shocks employed in the model. The goal is to identify any critical points in which the shocks values may result in significantly different results.

We first examine the impact of doubling and halving the shocks. We find that doubling the shocks, more than doubles the gains to real GDP. The results of our SSA on the key shock variables showed similar results.

6. Conclusion and Policy Recommendation

International trade remains a key factor of International Corporation and sustainable growth. In case of Pak-China FTA the study results suggest that the gap between the poor and the rich households has increased post FTA. However, if Pakistan renegotiate FTA and gets the same tariff concession as awarded to ASEAN then there is an overall positive impact on Pakistan Economy. Adding to that those sectors in which Pakistan holds comparative advantage should be added to the protection list of Pakistan in the 2nd phase so the local industries have some time to build up scale and competencies to compete with cheap Chinese products.

SAFTA has been the most significant move towards trade liberalization in the region. India and Pakistan were expected to be the main drivers of trade once SAFTA came into effect, though Pakistan's trade with India remains disproportionate with the huge potential for trade that is thought to exist between the two countries. By granting NDMA status to India and reducing tariff, Pakistani products could barely integrate the Indian market due to Indian para-tariffs, other non-trade barriers, and more favorable tariffs available

to other countries in the region. However, with Trade facilitation, both the countries can benefit remarkably only when India's concessions to Pakistan is such that Pakistan's products receive fair access to India's market harmonized with the more favorable terms faced by other SAFTA countries such as Bangladesh and Sri Lanka. Cooperation among the south regions will lead to substantial trade flows and is one of the best ways to avoid trade plummet. Moreover, countries in the south will continue to have higher trade with south- south region such as India and Pakistan from South Asia with the responsibility of stirring this momentum. Pak India trade liberalization with better Trade facilitation would strengthen the economic relationship and promote growth through regional integration. Pakistan should consider the endogenous factors working against sustained growth in the country's trade. Growth for many local industries has been stagnant because of the energy crisis. Lack of government's commitment to invest, limited technological development and skilled labor are also factors that have hindered any substantial growth in production capacity/ utilization.

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