Potential Economic and Household Income Gains from Trade Liberalization by Using MyGTAP Model

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Abstract

The current study attempted to calculate the potential gains/losses to the household income in Pakistan. The study has employed MyGTAP model which was initially developed by Minor & Walmsley (2012) and is extension of standard GTAP model. The standard GTAP model was linked with a representative household model by using the Social Accounting Matrix (SAM) to capture the effects of trade liberalization on economic growth and income distribution. The study used eight different simulations to calculate the impact of trade agreements with EU, SAARC, China and India and found a significant rise in economic growth. Regardless of some limitations, the model developed in this study produced significant results that may help to explain the current debate on trade liberalization. The results of the study conclude that it is manufacturing sector that may help to improve the income of all types of household and economic growth

**Keywords:** Trade, CGE model, SAM, Simulation, Growth.

Introduction

The importance of trade has been recognized since long time ago by developed and developing countries for sustainable economic growth. Knowing the importance of trade, economies have adopted export oriented policies aiming to gain internal and external stability and efficient use of economic resource (Berg & Krueger, 2003). Trade liberalization has been recognized as the only mean to modernize and develop the industry, to achieve economy of scale and economic growth.

Most recently, in the desire of economic growth expansion, many developing economies have espoused external economic liberalization policies. It is based on a common fabrication that countries with less trade restrictions have fast-paced economies and vice-versa. Trade liberalization has an inherent tendency to raise employment elasticity of economic growth thereby creating a better impact. However, critics of globalization find a chance to underline that growth benefits might possibly be unevenly spread; as a result, the impingements of distributions could also affect the poor adversely (Chaudry & Fatima, 2013).

Benefits of total factor productivity gained by the economies of scale alongside enhanced efficiency; have a powerful potential to be transformed in to an immense raise in potential output. In addition, due to the tendency of attracting Foreign Direct Investment (FDI) and larger access to regional markets, liberalized trade regime becomes a place of interest for foreign investment prospects. A higher value of Foreign Direct Investment (FDI) consequently, may also pave the way for a larger scale technology transfer as well as total factor productivity.

The trade liberalization in Pakistan started in 1988 by implementing the Structural Adjustment Program (SAP) of International Monitory Fund (IMF). The success of SAP convinced Pakistan to Join the World Trade Organization (WTO) in 1995. WTO and its associated programs convinced Pakistan to eliminate the import tariffs and subsidies gradually. The reduction and ultimately removal of trade berries promote the efficient use of economic resources and ultimately the economic growth. Similarly, reduction in trade barriers resulting from different trade agreements will help Pakistan to explore new export opportunities in South Asian Free Trade Agreement (SAFTA), China, European Union (EU) and India (Siddiqui et.al., 2006).

	Pakistan	India	Bangladesh	Afghanistan	Sri Lanka
Series1	3.2	5.9	6.1	6.5	6.7
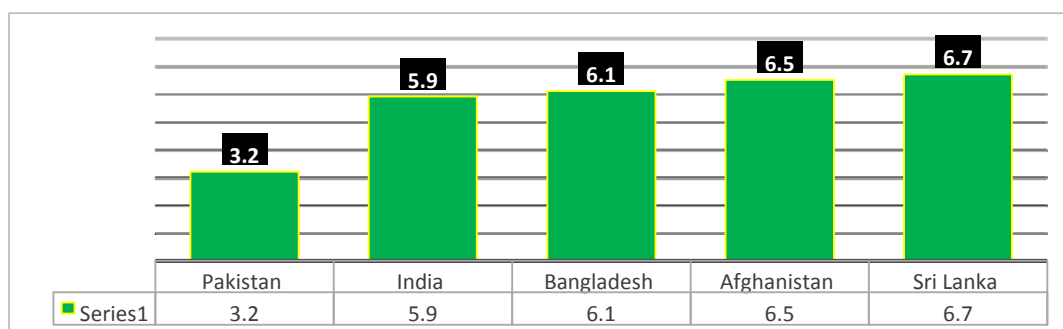
Figure 1: GDP Growth in Developing Economies of Asia (Percent)
Source: International Monetary Fund (2013)

Figure 1 show the situation of Pakistan among the developing economies of Asia. Pakistan is growing at least growth rate and need to excel its growth.

Pakistan's Exports

Pakistan's top 5 five export account for 46.6percent of all exports while if we step up to the top 10 this share is 60.9 percent of total exports. The sluggish behavior of the world trading activities in 2012 added with Weak global demand, energy dearth and a tapered export base underwrite Pakistan's high trade deficit.

Pakistan major export destination is USA, UAE and China with share of 17.49 percent, 9.09 percent and 10.29 percent in total exports during fiscal year 2012-13. Table 1 and 2 illustrates Pakistan Top 10 Exporting countries and Top 10 exported commodities and their contribution is Total exports during fiscal year 2012-13 in percentages.

Table 1: Top 10 Export Commodities (US Dollars)

Top 10 Export commodities	FY 2011	FY 2012	Percent change
Cotton Cloth	721,513	642,020	-11.02
Knitwear	716,141	501,421	-29.98
Cotton Yarn	597,527	487,937	-18.34
Bed Wear	572,948	458,594	-19.96
Garments	318,738	365,274	14.60
Rice - Basmati	329,821	268,710	-18.5
Rice - Non-Basmati	236,082	252,935	7.14
Towels	183,731	188,639	2.67
Cement	142,692	147,666	3.49
Plastic Materials	150,303	146,458	-2.56

Source: State Bank of Pakistan

Table 2: Top 10 Export Countries

Country	2011	2012	Change
USA	17.26	17.49	0.23
China	5.75	10.89	5.15
UAE	8.45	9.09	0.65
UK	5.49	5.83	0.34
Afghanistan	7.13	5.15	-1.97
Germany	5.55	4.08	-1.46
Bangladesh	2.73	2.59	-0.14
Hong Kong	2.41	2.41	-0.01
Italy	3.47	2.28	-1.19
Spain	2.46	2.17	-0.30
Other	39.3	38.01	1.30
Total	100.00	100.00	

Source: State Bank of Pakistan

Objectives of the Study:
• To develop a CGE model for Pakistan primarily focusing on inequality in perspective of trade liberalization.
• To evaluate the effects of different levels of reduction of import tariffs on poverty as well as income distribution in Pakistan.

Methodology
The study is employing the Computable General Equilibrium (CGE) model in its global version and the main idea is drawn from Khan, (2015). This section highlights the concept of CGE model. It further elaborate the Global Trade Analysis Project (GTAP) its structure.

Computable General Equilibrium Model (CGE)
The study utilize CGE model to highlights the economy wide impact of different free trade agreements. CGE model is a useful tool to describe the complex relation of various sector of the economy. It is helpful to interlink the diversify sectors of the economy through behavioral equations. It gives us numerical value which depicts the effects of a major policy reforms in the economy (Savarad, 2003).

(Winters et al., (2004) has concluded that economic theory is incapable to depict distributional effects on various sectors in case of any major policy reforms. The CGE model is based on the system of equation which links different sectors of the economy and these equations are solved through various computer programs, namely; GAMS and GEMPACK. Avitsland & Aasness, (2004) has concluded that CGE modeling is based on neo classical ideas in which the main purpose of the producer is to minimize cost and for the household is the optimization of resources.

Shaik et al., (2012) has discussed the wide application of CGE model and its ability to captures direct and indirect linkages among different sectors of the economy. The models are specifically designed to elaborate the impacts of trade-oriented-policy reforms in the economy and recommend a future path for the prescribed trade policy.

CGE models in its global version work through GTAP (Global Trade analysis Project) which provides a database and a frame work for CGE modeling. Therefore, in the following section we discuss GTAP briefly.

Global Trade Analysis Project (GTAP)

It comprised on country's input output data. It comprises economic linkages among regions and bilateral trade among different countries. The GTAP data base encompasses detail information about transportation and featuring protections data. GTAP model is multi-sectors and multi-regions analysis, and is specifically intended for comparative static analysis of the trade related policy reforms (Francois & McDonald, 1996). The database is publically available and upgrades annually and encouraged broad participation from the researchers. Hertel & Reimer (2005) showed that the GTAP model is multi sectors and multi-regional in nature and therefore can be applied for the general equilibrium analysis of changes in trade policy reforms.

The GTAP Analysis contains one regional household and aggregate utility function. It distributes the regional expenditure in three parts namely; government expenditure, expenditure by private sector, and savings. Regional households receive their income by selling its endowments to the domestic producers. The firms collect these endowments goods with some intermediates goods and produce final goods to meet the demands of the people. These goods are in turn purchased by the private and government household. The capital goods are purchased by the private household for saving. These transactions occur in a closed economy and it is the circular flow of goods and expenditure.

In an open economy two major sectors are included e.g. the global bank sector and transport. The global bank sector links global saving and regional investment which further take in to account trade and transport activities. There are two types of equation in GTAP. The first one deals with receipts-expenditure accounting relationship of every economic agent within the given economy, while the second type of equations deals with the behavior of the optimizing agent.

In this study, we plan to use the version of GTAP Database (2007), i.e. GTAP 8.1. The world economy is represented in the database with 109 countries, 129 regions and 20 aggregated regions, each region contains 57 sectors for the for two reference years 2004 and 2007. Considering the Pakistan's imports and export, and to ease computation, a number of regions/countries is aggregated into 12 regions, these are: Pakistan, US, India, China, ASEAN, Other SAARC (excluding Pakistan and India), Rest of Asia, European Union, Other OECD, Rest of West Asia, Latin America, Rest of World. While keeping in mind its importance, the number of sectors is aggregated to thirty seven (37). (For details, please see appendix)

MyGTAP Model

The MyGTAP model which is newly developed by Minor & Walmsley (2013) employed. The data about multiple households and labor types have been taken from the latest SAM (2007-08) of Pakistan,

MYGTAP is actually the extension of GTAP developed by Hertel, (1998).The purpose of this extension to incorporate regional household specification plus different inter regional transfer. MyGTAP, unlike the standard GTAP contains more options that help in context of multiregional. These features include:

1. It is more flexible while treating the government spending and savings by replacing the regional household with the private household and government in the standard GTAP model.
2. It includes the transfer payments between household and government and further between groups of household, foreign remittances and the incomes of foreign capital.
3. MyGTAP models allow to assess the impact of policy options on different groups of household and factors of production in any given economy as it contains the additional database of SAM (Minor & Walmsley, 2012).
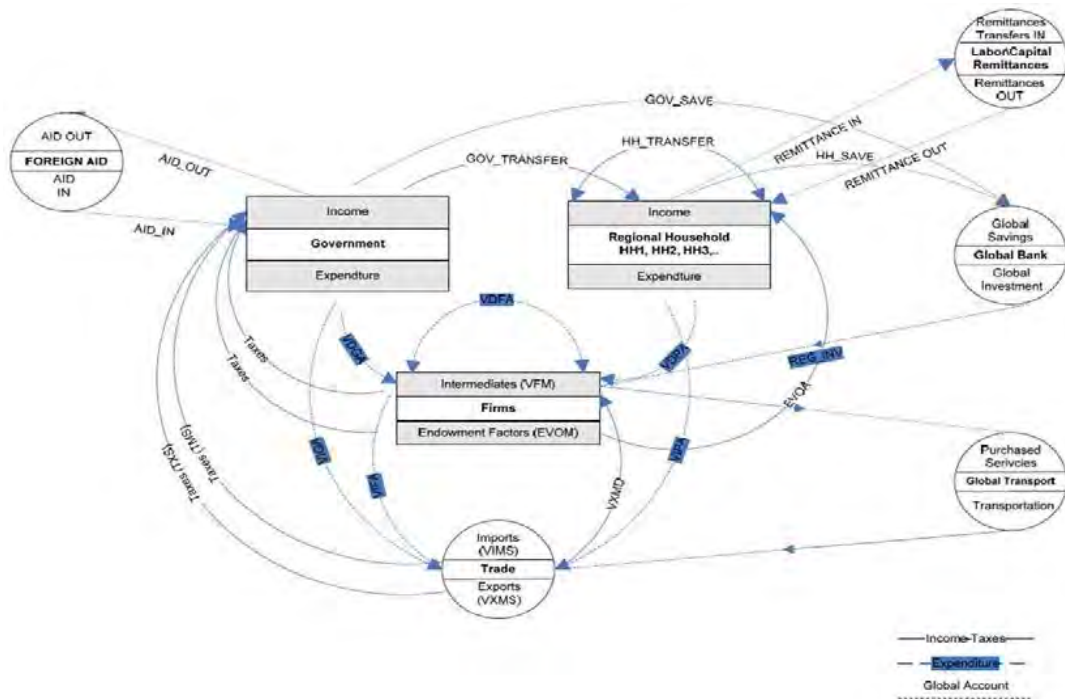
Figure 2: Income and Expenditure Flows in MyGTAP Model
Source: Walmsley & Minor 2013

Figures 2 and 3 represent the simple working of MyGTAP.
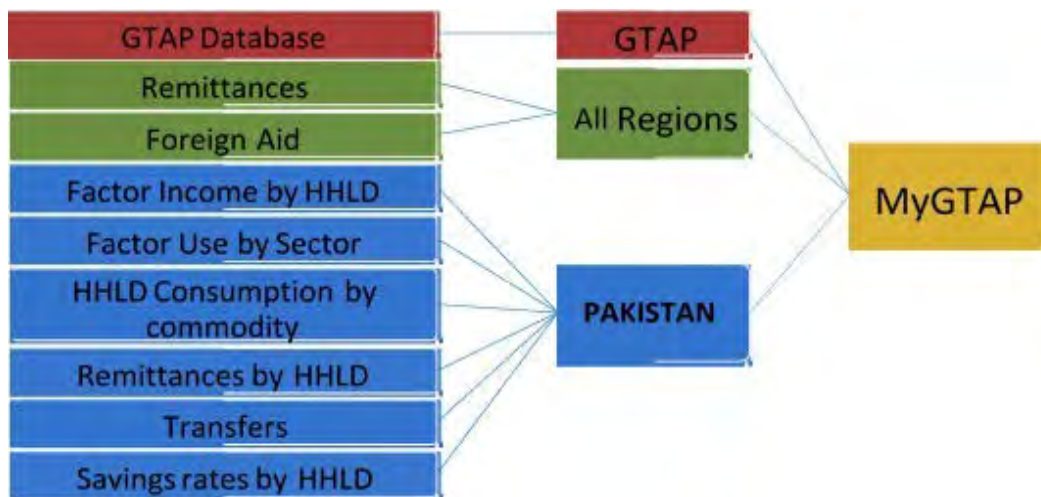
Figure 3: MYGTAP mapping by Walmsley and Minor 2013
Source: Khan, 2015

After the Commutable General Equilibrium model used in this study has been fully calibrated, then various policy experiments has been performed by varying the related parameters. Then we will discuss results of changes in household income, real factor wages, prices, outputs, government income and expenditures, terms or trade, imports as well as exports.

Income Inequality Estimation

The study used the Gini coefficient to measure the inequality. The value to coefficient rages from 0 to 1. The value 1 means complete inequality. It means that one person is getting maximum benefits and the other one is getting nothing. The zero value means complete equality in distribution of income. The below equation helps to calculate the value to Gini coefficient.

$$GGGGGGGG = \sum_{ii=0}^{nn} \frac{2}{GG_2 yyGG}(yy_{ii} - yy)$$

Overview of Pakistan-SAARC Trade

In 2004 at the occurrence of SAARC summit in Pakistan the South Asian Free Trade Agreement (SAFTA) was signed. But it was implemented on 1st January 2006 after the given ratification from the seven member governments (excluding Afghanistan), when the SAFTA was fully enforced.

South Asia is still considered as one of the least integrated regions in the world. The 2 big nations, India & Pakistan constitute almost 91 percent of South Asia's GDP, 84 percent of South Asia's total population, and about 80 percent of South Asia's area. And yet, the percentage of Indo-Pak trade is a mere 20 percent of the regional trade (Raihan & Ghani, 2013).

South Asia's two major economies hardly trade with each other. In broader perspective if we look this on a global stage nevertheless, Pakistan-India trade added a negligible amount to total trade of each country.

Bilateral trade between Pakistan and India was only $1.9 billion in 2012 which accounts only ten percent of the potential trade between these two neighboring countries i.e. 29 Billion. Pakistan trade with India is just 0.2 percent of its total world trade reported in year 2012 (Pakistan Business Council, 2013).

Overview of Pakistan European Union (EU) Trade

EU is one of the biggest importers of Pakistani product. About one third of total trade of Pakistan is with EU. Pakistan is enjoying the Generalized System of Preferences (GSP) since seventies and was granted the status of GSP plus in December 2013. The immediate outcome of GSP Plus status is a likely increase in accessing EU market through the duty free import of GSP-eligible goods. This improved status of GSP Plus has been effective since Jan 1, 2014. This status will substantially increase Pakistani exports to the EU especially Pakistani Textile, Wearing Apparel and leather sectors.

GSP Plus advantage is supposed to increase substantially for Pakistan. Although, it shall have to counter strong defensive action from within the EU; with competitors of the likes of Italy, Portugal & Greece in textile industry and Romania in garments. Also, the likelihood of an offensive action from non-EU competitors such as Bangladesh, India, Vietnam and China is not completely out of question (Khan, 2015).

Simulations Used in the Study

The following Simulations were used in the study.

S1: 50 percent reduction in import taxes and export subsidies in all regions and all tradable commodities (Multilateral)

S2: 100 percent reduction in all import taxes and export subsidies in all regions and all tradable commodities (Multilateral)

S3: Multilateral Trade Liberalization of Agriculture (no import tax or subsidy in all agriculture tradable commodities)

S4: Multilateral Trade Liberalization of Industry (no import tax or subsidy in all industrial tradable commodities)

S5: Pak China Free Trade Agreement (FTA)

S6: EU-27 GSP + Status to Pakistan. (import and duty free export of Pakistan Textile, wearing apparel and Leather sector to EU-27
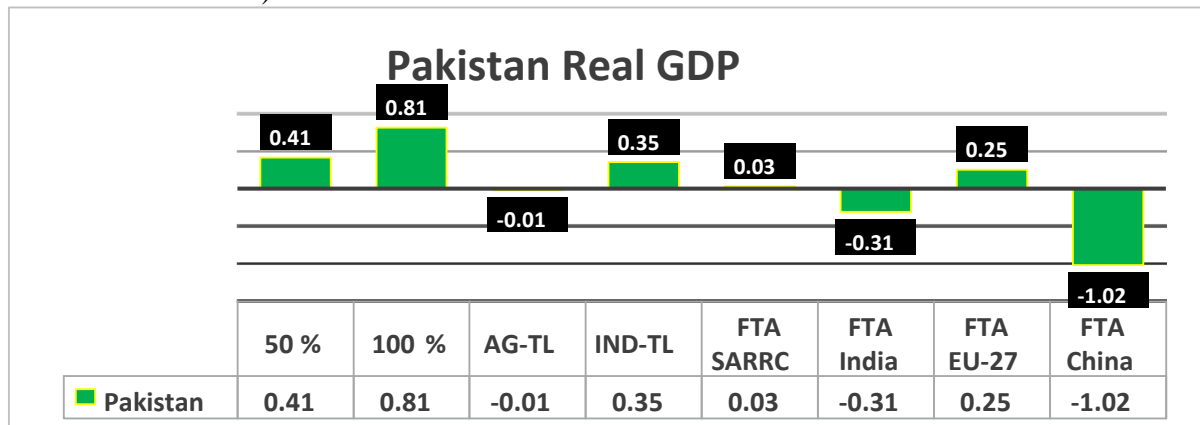
S7: Pakistan India Free Trade Agreement FTA

S8: Pak-SAARC Free Trade Agreement FTA

Results

GDP and Production

Figure 4 illustrates the impacts of all simulation on the real GDP of Pakistan. The change in GDP is shown from the base year (2007-08) value. The results of GDP of different trade liberalization scenarios is modest, ranging from positive 0.81 percent with complete removal of import tariff and export subsidies to -1.02 percent for Pakistan in the case of free trade agreement with china. A liberalized Pakistan-SAARC trade too will have a positive marginal impact on Pakistan's Real GDP as it will increase by 0.03 percent. In case of Potential Free trade agreement with India Pakistan real GDP will decrease by -0.31 percent from base line. The positive impact of recently granted GSP + status by EU-27 to Pakistan is (0.25 percent from base line) on real GDP is mainly due to increased exports of Textiles, wearing apparels and leather sector adding to those Pakistani sectors which are already under duty free access in European Union e.g. Rice, Sports equipment, surgical goods, meat products and fruits. Hence now after the recently granted GSP plus status to Pakistan almost 90 percent of our exports will lie under duty free category. Thus this will have an overall positive impact on Pakistan's real GDP. All other scenarios witnessed a reduction in real GDP and maximum deterioration was seen when Pakistan liberalize trade with China (-1.02 percent from base line).

	50 %	100 %	AG-TL	IND-TL	FTA SARRC	FTA India	FTA EU-27	FTA China
Pakistan	0.41	0.81	-0.01	0.35	0.03	-0.31	0.25	-1.02

Figure 4: Percent changes in Real GDP
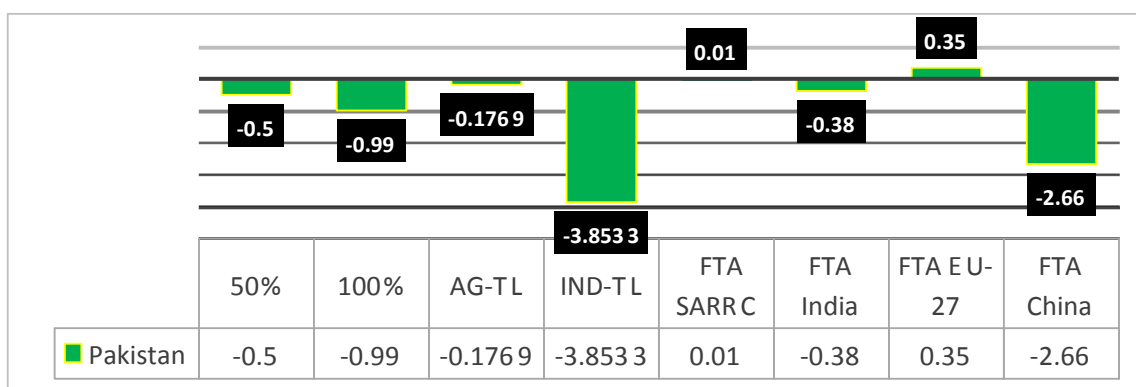**Source: Author simulation results using MyGTAP program**

Terms-of-trade Impact

The terms-of-trade (TOT), is the ratio of prices that a country receives for its exports to the prices of imports that a country pays. The changes in the value of TOT reflect the overall welfare of an economy due to change in price level. This study uses different reciprocal liberalization involved

in Free Trade Agreement (FTA) and usually this result in two counterbalancing effects. (i) Liberalization of Pakistan's imports would reduce production costs in Pakistan thus increasing the supply of its exports to global markets. This may be expected to lower prices received for exports for each unit. (ii) After an FTA partners cut their prices on Pakistani exports, their demands for Pakistani exports will rise, and subsequently it will increase Pakistani export prices. The net effect will be reliant on whichever of these two effects is higher.

Figure 5 demonstrates the effects of different simulation on the Pakistan's terms-of-trade. It implies that terms-of-trade of Pakistan deteriorate in most of the cases due to changes in prices. However with European Union Pakistan Terms of trade will appreciate as after the GSP plus status now almost 90 percent of Pakistan exports to Europe will be duty free. Pakistan terms-of-trade appreciate by 0.35 percent from base line because of changes in its prices for its exports to EU respect to prices of imports it pays for the EU. The highest deterioration is seen with FTA with China (-2.66 percent) and when Pakistani liberalizes its industrial sector worldwide the terms of trade decreases by 3.85 percent.

	50%	100%	AG-TL	IND-TL	FTA SARRC	FTA India	FTA EU-27	FTA China
■ Pakistan	-0.5	-0.99	-0.176 9	-3.853 3	0.01	-0.38	0.35	-2.66

Figure 5: Changes in Pakistan Terms of Trade (TOT)
Source: Author's Simulation

Changes in Household Income

The uniqueness of MYGTAP model lies in its feature which disaggregate the represented household of the standard household into regional household. We disaggregated the households into 18 categories for detailed analysis. The data was acquired from the latest available SAM (2007-08) for Pakistan.

The disaggregated analysis used in the study is different from the traditional "national welfare analysis "analysis of CGE studies. In MyGTAP, different types of households are affected in different way due to any policy change, so the poor household should be given more attention while designing the trade policy. Any change in wage leads to change in per capita income.

The results shown in table 3 are of mix nature where some household are beneficiary while others are worst off in terms of income. The major beneficiaries are large and medium sized household. In case of land income, the income of all household that own land increased (H-LF, H-MF, H-SF). Although small rural farmers of KPK and Sindh province witnessed decreases in their income during simulation (S1) and (S3). The household of rural non-farm showed a decrease in income with minimal value. In all urban household types the effects are unbiased to all households. All household obtain a positive increase in their capital income. Overall, factor income remains positive for almost all households. If there is no import tariff and export subsidy b/w Pakistan and

India, then income of every household type will increase but that increase is merely modest. Note withstanding with the reduction in import tariff but also the unit costs of imports if they are sourced from India would be lower than the imports unit costs if they are sourced from other countries. Thus it will reduce Pakistan import prices from India because now the potential of Pakistani imports from India will be improved due to the cheaper prices.

Table 3: Percent Changes in Household income of Pakistan

Household type	Pak- SAARC FTA	Pak-India FTA	Pak-China FTA	Pak-EU GSP Plus
HMF1	1.58	0.23	1.3	0.7
HMF2	1.03	0.19	1.14	1.88
HMF3	-1.73	-0.12	0.16	-0.53
HSF1	1.22	0.17	-0.06	1.77
HSF2	-0.51	0.26	-0.19	2.1
HSF3	-1.33	-0.52	-1.06	0.89
HOF1	2.43	0.22	-0.18	1.86
HOF2	1.28	0.39	-0.43	2.38
HOF3	1.87	-0.55	-1.16	1.22
HAGW1	2.63	-1.05	-1.06	2.88
HAGW2	-1.47	0.93	-1.15	3.6
HAGW3	1.23	-1.01	-1.03	2.6
HNFQ1	1.44	0.58	-1.02	2.8
HNFQ2	-0.62	-0.57	-1.08	1.78
HNFOTH	-0.58	-0.54	-1.47	2.74
HUQ1	0.48	0.52	1.37	2.69
HUQ2	0.54	0.51	1.39	1.68
HUOTH	0.51	0.56	0.14	1.93

Source: Author's Simulation

Changes in Government Income and Expenditure

In addition to the prime objective of the study i.e. to focus on household's income under different trade liberalizing scenarios, we now bring into focus the importance of trade policy on government expenditure and revenue. Any change in tariff policy will bring changes in the revenue of the government of Pakistan as these tariffs are major source of income at border while exporting or importing the goods. Not properly accounting for these revenue changes would potentially distort the analysis, since an overall positive impact on households might be countered by much lower government revenue, which will have to be made up, usually through taxes on the households. But at this point of time we are not in a position to describe which tax instrument Pakistani government should employ to recover revenues - would they be pro-poor tax and revenue replacements? Would the government replace the revenue or cut services, and if so, which services would be cut? In the processes of answering these questions, proper policies can be brought to light and can play a part in informed policy debate from at an earlier time.

The eight scenarios reviewed in Tables 4 and 5 show impact on government income and expenditure. There is major impact on the income of government due to reduction in tariff and

ultimately, there will be change in expenditures. However, the results show that some household will be beneficiary and hence the government has room to recover the revenue from these households. The maximum negative impact on Pakistan Government income is during Simulation 2 and 4. The government income will then be reduced by -24.43 percent and -25.06 percent. The Agricultural trade liberalization and the recently granted GSP plus status to Pakistan by EU would appear to offer some benefits and hence will increase the government income by 0.66 percent and 2.18 percent respectively.

Table 4: Changes in Government Income, Constant 2007 Prices (Percent and Millions US$)

gincome	50 %-TL	100-TL	AGRI-TL	IND TL	Pak-EU GSP	Pak-SAARC	Pak-china	Pak-India
Pakistan	-10.56	-24.43	0.66	-25.06	2.18	-1.9	-7.04	-2.9
China	-5.97	-13.84	-1.27	-12.7	-0.02	0	0.05	-0.01
India	-7.29	-14.65	-0.07	-19.56	-0.01	-0.05	-0.02	-0.08
USA	-0.53	-1.14	-0.03	-1.11	-0.01	0	0	0
Other OECD	-0.34	-0.92	-0.09	-0.84	-0.01	0	0	0
ASEAN	-5.41	-12.13	-0.48	-11.57	0	-0.01	-0.01	-0.02
Other SAARC	-4.29	-9.65	-0.04	-9.56	-0.01	-0.07	-0.02	-0.01
ROA	-0.68	-1.45	-0.18	-1.27	0	0	0	0
Latin America	-2.34	-5.02	-0.16	-4.85	-0.01	0	0	0
EU_27	-0.49	-1.18	-0.02	-1.16	-0.02	0	0	0
RestofWorld	-3.63	-7.84	-0.23	-7.6	-0.01	-0.01	-0.01	-0.02
RWAsia	-6.52	-14.88	-0.72	-14.16	0	0	-0.01	-0.03

Source: Author's simulation

Table 5: Changes in Government Expenditure, Constant 2007 Prices (Percent and Millions US$)

qgov	50%-TL	100-TL	AGRI-TL	IND TL	Pak-EU GSP	Pak-SAARC	Pak-China	Pak-India
Pakistan	-10.46	-23.97	0.04	-24.08	0.01	-2.44	-5.95	-2.34
China	-6.06	-13.9	-1.19	-12.81	-0.01	0	-0.01	-0.01
India	-6.79	-13.65	-0.07	-19.56	-0.01	-0.05	-0.02	-0.08
USA	-0.25	-0.53	-0.01	-0.53	0	0	0	-0.08
OtherOECD	-0.72	-1.71	-0.16	-1.55	0	0	0	0
ASEAN	-5.93	-13.2	-0.49	-12.62	0	0	0	0
OtherSAARC	-4.98	-11.17	0.06	-18.17	0	-0.08	-0.01	-0.02
ROA	-1.59	-3.3	-0.18	-3.11	0	0	0	-0.01
LatinAmer	-1.89	-4.33	-0.13	-4.18	0	0	0	0
EU_27	-0.17	-0.45	-0.01	-0.44	-0.01	0	0	0
RestofWorld	-2.85	-6.26	-0.25	-6.01	0	0	0	-0.03
RWAsia	-6.34	-14.47	-0.63	-13.83	0	0	0	-0.04

Source: Author's simulation
Impact on Overall Inequality (Percent change from Base)

Gini coefficient is used to calculate the income equality in the study. The value of base Gini coefficient 0.3812 in the table confirms the unequal distribution of income. The simulation results reported in table 6 show that inequality decreases slightly in all simulation except with current Pakistan China Free Trade Agreement and when Pakistan liberalizing only agricultural goods. The inequality increases 0.49 % during Pakistan Agricultural Trade Liberalization and 0.66% in case of Pak-China Free Trade agreement. Similar results were produced by Cicowiez et al., (2010) while studying the impact of trade reforms on the Argentine economy. The overall results show that poorer households have become relatively better off as increase in their income is more than the richer households.

The results in the table suggest that Pakistan failed to maximize the benefits from FTA between Pakistan and China. The results show an increase in inequality which might be due to the separation of business community from the negotiations (Pakistan Business Council, 2013). In addition to imbalance of benefits for both countries, the reduction in import duty for China cost Pakistan $ 0.21 billion in 2011 and $ 0.23 billion in 2012. On the other hand, the exports from Pakistan increased from $ 0.2 billion in 2011 to $ 0.8 billion in 2012. Pakistan may maximize the export benefits but cost of import duty is nullifying the impact of FTA for Pakistan (Pakistan Business Council, 2014).

Table 6: Inequality Effect (Percent change from Base)

Simulation	Base Index	Simulation Index	Percent Change from Base
50 Percent TL	0.3865	0.3842	-0.36
100 Percent TL	0.3865	0.3816	-0.76
AGRI-TL	0.3865	0.3884	0.49
IND-TL	0.3865	0.3865	-0.62
FTA SAARC	0.3865	0.3833	-0.50
FTA Pak-Ind	0.3865	0.3776	-1.38
EU-GSP + Pak	0.3865	0.3852	-0.20
FTA Pk-China	0.3865	0.3891	0.66

Source: Author's Simulation results

Conclusion

The study attempted to investigate the impact of trade liberalization at household and aggregate level. For this purpose, the study used the newly developed MyGTAP which utilized the latest available SAM (2007-08) for Pakistan.

The overall results show that trade liberalization, modeled via a series of multilateral, bilateral as well as sectoral scenarios between Pakistan, China, SAARC, European Union (EU) and the Rest of the World, will cause a significant increase in economic growth..

Despite some limitations, the Global CGE model developed in this study produces plausible results that would help to shed some light on the current debate about the trade liberalization effects on income inequality in Pakistan. The results of simulation – squeezing government expenditure to cover revenue losses due to trade liberalization – suggest that manufacturing industries tend to

increase the economic growth and to increase welfare across somewhat all household types. There are some positives like the recently granted European Union GSP Plus advantages supposed to increase substantially for Pakistan but it should counter strong defensive action from European competitors like Italy, Portugal and Greece in textiles and Romania in clothing; and offensive actions from non-EU competitors like Bangladesh, India, Vietnam and China.

Agricultural trade liberalization widen inequality and thus promote relative poverty. The liberalization policy should not be considered to reduce the inequality rather it should be used to ensure the sustainable economic growth.

Limitations of the Study

Like many empirical studies, this study was constrained by a variety of limitations. The first and the most important limitation is the database, similar to most other studies which adopt Global Commutable General Equilibrium models. This study used the GTAP data base v8.1 with base year 2007 and Social Accounting Matrix 2007-08 and the parameters related to trade elasticity used in the model are from MyGTAP model, which is an extension of Standard GTAP model..

Another limitation of the study was that the model could only be simulated for comparative static results rather than the dynamics ones. This could be used to understand the path that changes the income and expenditure of households over time. It would have been ideal to use a recursive dynamic model to track the policy implications, given the nature of the fundamental research problem. Construction of a recursive dynamic CGE of Pakistan model was severely constrained by relevant data such as capital stock at industry level and other time series forecasts for exogenous variables.

Regional disparities play a vital role in determining inequality in Pakistan. It can be seen from the nature of inequality in the country. Henceforward, when analyzing the inequality and poverty, it is important to take these regional disparities into account and look into the regional development aspects with respect to trade liberalization. It would have been ideal if we had evaluated the policy issues using a regional CGE model. However, lack of reliable and comprehensive data at regional level is a major constraint in constructing a regional CGE model for Pakistan.

Despite the above mentioned limitations, the Global CGE model used in this study, along with the most latest constructed SAM for Pakistan and the other database, generated plausible empirical results in analyzing the impact of trade liberalization on growth, household welfare and inequality within the Pakistan context.

Future Vision

The areas of further research are directly or indirectly associated with some of the above mentioned limitations of the current study. Some recommendations for further extension of the study are as followed:

a)   It would be useful to spend more time, effort and resources into developing an inclusive database for a more recent base year. Furthermore, the database should include some of the key features, for instance, regional level industry and macro data – regional Input-Out out (IO) tables, industry level capital stocks data and time series forecasts for different exogenous variables in the present model.

b)   It is ideal to enlarge the Pak-GTAP to include features, such as regional Extensions in tracking regional disparities, recursive dynamics in making conditional forecasts, and to include features of imperfect competition in some of the markets - in order to better capture the ground

realities in Pakistan markets. Introducing imperfection feature of markets will ensure more realistic simulation results with respect to trade liberalization, inequality and poverty linkage, predominantly in terms of implications in the long run within the Pakistan context.

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Appendix

Household Types used in this study

Household Types	HH Code	Population (million)	Income shares (percent)	Population shares (percent)
Large and medium farm sindh	H-MF1	0.8	1.5	0.6
Large and medium farm punjab	H-MF2	2.4	6.1	1.8
Large and medium farm other	H-MF3	0.6	0.8	0.4
Small farm Sindh	H-SF1	3.1	1.8	2.4
Small farm Punjab	H-SF2	16.0	11.5	12.2
Small farm otherpak	H-SF3	5.6	3.3	4.3
Landless farmers sindh	H-0F1	2.5	1.4	1.9
Landless farmers punjab	H-0F2	3.6	1.8	2.7
Landless farmers otherpak	H-0F3	1.7	0.7	1.3
Landless agri. Lab sindh	H-AGW1	3.0	1.5	2.3
Landless agri. Lab punjab	H-AGW2	3.3	1.4	2.5
Landless agri. Lab otherpak	H-AGW3	0.4	0.2	0.3
Rural non farm quantile	H-NFQ1	8.2	2.8	6.2
Rural non form quintile 2	H-NFQ2	8.9	3.3	6.8
Rural non farm quantile othe	H-NFOTH	27.7	17.3	21.2
Urban quantile 1	H-UQ1	8.6	2.6	6.6
Urban quantile 2	H-UQ2	8.6	3.4	6.6
Urban other	H-UOTH	25.7	38.7	19.7
Total households		130.6	100.0	100.00

Source : Pakistan SAM 2007-08

Factors types in Pak SAM 2007-08

LA-AGL	Labor - agric (own)-large
LA-MF1	Labor - agric (own)-med Sindh
LA-MF2	Labor - agric (own)-med Punjab
LA-MF3	Labor - agric (own)-med OPak
LA-SF1	Labor - agric (own)-sm Sindh
LA-SF2	Labor - agric (own)-sm Punjab
LA-SF3	Labor - agric (own)-sm OPak
LA-AGW	Labor - agric (wage)
LA-SKU	Labor - non-ag (unsk)
LA-SK	Labor - non-ag (skilled)
LN-LG1	Land - large- Sindh
LN-LG2	Land - large- Punjab

LN-LG3	Land - large - OthPak
LN-MD1	Land - irrigated - med Sindh
LN-MD2	Land - irrigated - med Punjab
LN-MD3	Land - irrigated - med OthPak
LN-SM1	Land - irrigated - sm Sindh
LN-SM2	Land - irrigated - sm Punjab
LN-SM3	Land - irrigated - sm OthPak
LN-DR1	Land non-irrig - sm/m Sindh
LN-DR2	Land non-irrig - sm/m Punjab
LN-DR3	Land non-irrig - sm/m OthPak
WATER	Water
K-LVST	Capital livestock
K-AGR	Capital other agric
KFORM	Capital formal
KINF	Capital informal

Source: Pakistan SAM 2007-08, HIES 2007-08

Mapping of SAM Sectors to GTAP Sectors

Pakistan SAM 2007-08		GTAP Sectors Version 8	
Code	*Description*	*Code*	*Description*
A-WHTI	Irrigated wheat	Wht	Wheat
A-WHTN	Non-irrigated wheat	Wht	Wheat
A-PADI	Rice IRRI (irr) 1/3	Pdr	Paddy Rice
A-PADB	Rice basmati (irr) 2/3	Pdr	Paddy Rice
A-COTT	Cotton (irr)	Pfb	Plant based fiber
A-CANE	Sugar cane (irr)	Crb	Cane and beet
A-OCRP	Other field crops	Gro	Other grains
A-HORT	Fruits/vegetables	v_f	Veg & Fruits
A-CATT	Livestock (cattle, milk)	ctl	Cattle
A-POUL	Livestock (poultry)	Oap	Other Animal Prod
A-FOR	Forestry	Frs	Forestry
A-FISH	Fishing	Fsh	Fishing
A-MINE	Mining	Minerals	Minerals
A-VEGO	Veg Oils	vol	Vegetable Oils
A-WHTF	Wheat Milling	Processed Food	Processed Food
A-RICI	Rice Milling (Irri)	Processed Food	Processed Food
A-RICB	Rice Milling (Bas)	Processed Food	Processed Food
A-SUG	Sugar	sgr	Sugar
A-OTHF	Other food	Processed Food	Processed Food
A-LINT	Cotton gin (lint)	tex	Textiles and man-made fibers

A-YARN	Cotton spin (yarn)	tex	Textiles and man-made fibers
A-CLTH	Cotton weave (cloth)	tex	Textiles and man-made fibers
A-KNIT	Knitwear	wap	Wearing Apparel
A-GARM	Garments	wap	Wearing Apparel
A-OTXT	Oth Textiles	tex	Textiles and man-made fibers
A-LEAT	Leather	lea	Leather
A-WOOD	Wood	Wood	Wood
A-CHEM	Chemicals	crp	Chemical rubber products
A-FERT	Fertilizer	crp	Chemical rubber products
A-CEM	Cement, bricks	nmm	Non-Metallic Minerals
A-PETR	Petroleum refining	p_c	Petroleum and Coke
A-MANF	Other Manufacturing	omf	Other Manufacturing
A-ENRG	Energy	utilities	Utilities
A-CONS	Construction	cns	Construction
A-TRADW	Trade-wholesale	trd	Trade
A-TRADR	Trade-retail	trd	Trade
A-TRADO	Trade-other (rest, hotel)	trd	Trade
A-RAIL	Transport-Rail	Transport	Transport
A-ROAD	Transport-Road	Transport	Transport
A-TRWAT	Transport-Water	Transport	Transport
A-TRAIR	Transport-Air	Transport	Transport
A-TROTH	Transport-Other (pipes)	Transport	Transport
A-HSNG	Housing	Utilities	Utilities
A-OWNH	Imputed Rent	Utilities	Utilities
A-BSERV	Business Services	Allservices	All services
A-HSERV	Health care	Allservices	All services
A-ESERV	Education	Allservices	All services
A-PERSV	Personal Services	Allservices	All services
A-OSERV	Other Priv Services	Allservices	All services
A-PUBS	Public Services	Allservices	All services
A-FIN	Finance and insurance	Allservices	All services

Source: Author's own mapping using GTAP 8.1 Data Base and Pak SAM 2007--08