

Impact of UK – Japan Comprehensive Economic Partnership Agreement (CEPA): Options for UK and Japan

Muhammad Omer Khan¹, Muhammad Aamir Khan²

ABSTRACT

The policy of trade liberalization has been implemented by number of countries in form of various agreements. It is accepted that implementation of free trade policy consequently raises the economic growth in the engaging countries.

UK has already implemented 38 trade agreements with 97 countries. The paper reveals that UK-Japan CEPA operates (with similar tariff rates as of EU-Japan EPA) to replace EU-Japan EPA after Brexit. It intends to tailor mesmerizing growth in Britain's economy which would be impossible during EU-Japan EPA. This research concentrates on effects of UK – Japan CEPA; and scenario of bilateral 5% trade facilitation with FTA using CGE model. The potential trade facilitation scenario aids to reduce the trade cost established by NTBs. In GTAP model, the constrains and barriers are determined by ad-valorem equivalents (AVEs) and added into GTAP by AMS tools, which works to enhance the trade facilitation. The shock pretending 5% trade facilitation works in reducing the trade cost and constrains by the specific amount calculated as of AVEs.

The outcome of UK-Japan CEPA and UK-Japan FTA with trade facilitation would have significant and luminous impact on both economies however, there exist disparity across some of the variables. The real GDP for both countries have a higher expectancy by implementation of UK- Japan CEPA + trade facilitation (UK grows by \$1411M while Japan elevates by \$924.5M). Similarly, the term of trade is also higher to ToT from UK – Japan CEPA. However, the real returns from factors reduced for both countries (in total) by UK – Japan CEPA + trade facilitation. Briefly, the fact behind the decrease in return is the excessive presence of factors like land and natural resources. In other words, diversion of productivity from land intensive to labour and limited land.

The results reveals that if both countries step forwards to extend CEPA towards trade facilitation agreement then it would result in win-win scenario for both. Keeping the same tariff concession as proposed by the paper would result in a very luminous and bright outcome.

Keywords

Free Trade Agreement, Computable General Equilibrium, United Kingdom, CEPA

¹ Research Associate, Department of Economics, COMSATS University, Islamabad

² Assistant Professor, Department of Economics, COMSATS University, Islamabad

Corresponding Author email address: m.aamir.khan@comsats.edu.pk

1. Introduction

International trade has been taken as a buttress and mainstay to stanchion economic growth and development. Trade treaty plays a significant role in the provision of resources from other regions or countries: where it is in an abundant to assist in fulfilling the deficiency in the home country. In the case of social and societal welfare; trade creation takes place by the implementation of RTAs (Freund & Ornelas, 2010). Elimination of trade barriers like tariffs and non-tariff measures are essential aspects of trade liberalization. In today's era, every country is stepping towards liberalized trade policies due to its major benefits like trade openness, trade creation, economy of scale and dropping of domestic prices (Freund & Ornelas, 2010; Iqbal et al., 2018; Mukhopadhyay & Thomassin, 2010). Additionally, free trade agreement (FTA) or trade liberalization policies are stated to have positive implication on regional economy as it boosts the bilateral trade volume which eventually escalates the economic indicators of country and achieving higher standard of living with in the country (Baltagi et al., 2008; Friel et al., 2013; Mahmood et al., 2010). Both developed and developing economies have triggered a rapid integration of world goods market by reducing trade barriers. Economies are implementing free trade policies, multilateralism, regional trade agreements as well as unilateral efforts to achieve macroeconomic goal. Moreover, the income of poor household are also directly benefited from the free trade policy (Cammatt & Bhagwati, 2005). The economic implication of free trade policies depends upon the status of the economy, whether developed or lacking in factor profusion. Moreover, the labour- intensive countries show subsistence gains to household than a capitalist economy. This results in elevated yields to laborers as compared to capitalists; like the US and China (Mah, 2013). In developing countries, RTAs in form of liberalized trade is an alarming phase for income disparity notably, trading with developing countries (Acharya et al., 2012; Meschi & Vivarelli, 2009).

Pragmatic evidence signifies that trade liberalization and economic growth moves hand-in-hand (positive linkage) (Balassa, 1978; Ben-david, 1993; Dollar, 1992; Greenaway et al., 2002; Harrison & Topalova, 2013; Jenkins, 1996; Khan & Khan, 2021; Levine & Renelt, 2016; Sachs et al., 1995; Shafaeddin, 1995; Zakaria & Ahmed, 2013). On contrary side, some studies highlighted undesirable relationship of liberalized trade policies with economic growth (Grossman & Helpman, 1990, 1991; Romer, 1995).

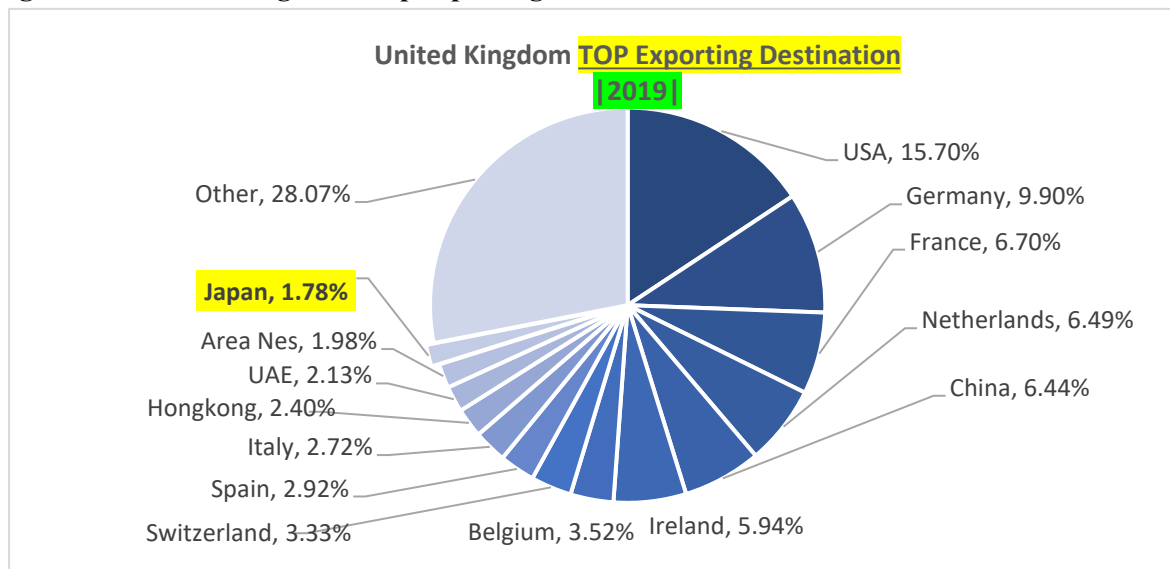
2. United Kingdom – Japan Trade: Emphasizing Free Trade Policy

After the happening of Brexit, the UK government stepped towards free trade agreement in from of Comprehensive Economic Partnership Agreement (CEPA) as a replacement of EU – Japan Economic Partnership Agreement (EPA). This deal would boost the overall economy of both developed countries with primary implication on economy after the exposure of pandemic (COVID-19). This free trade agreement would give wide based opportunities to household in form of employment, real income and also prices. The major influential growth would be achieved by the UK's market including railway rolling, stocks and automobile commodities. Free trade agreement with Japan (third largest economy) would create a smooth path for sectors like agrarian, industrial and services in form of expansion in supply chain among the countries. United Kingdom has potential to reduce domestic prices, raise wage rate and also boost the rate of employment after the implementation of the free trade policy. Additionally, removal of tariff and non-tariff barriers would favourably expand the outcome of firms trading within Japanese market. Textile and agricultural sectors are said to get highest gains from the trade liberalization policy (Gov.uk). At the same time, the British government has also intended to join the Asia Pacific trade pact (Khan & Khan, 2021). Against this milieu, the successful bilateral free trade agreement between Japan and UK would also assist Britains to join the

mega regional trade agreement (CPTPP) as Japan is the largest trading partner among the eleven countries.

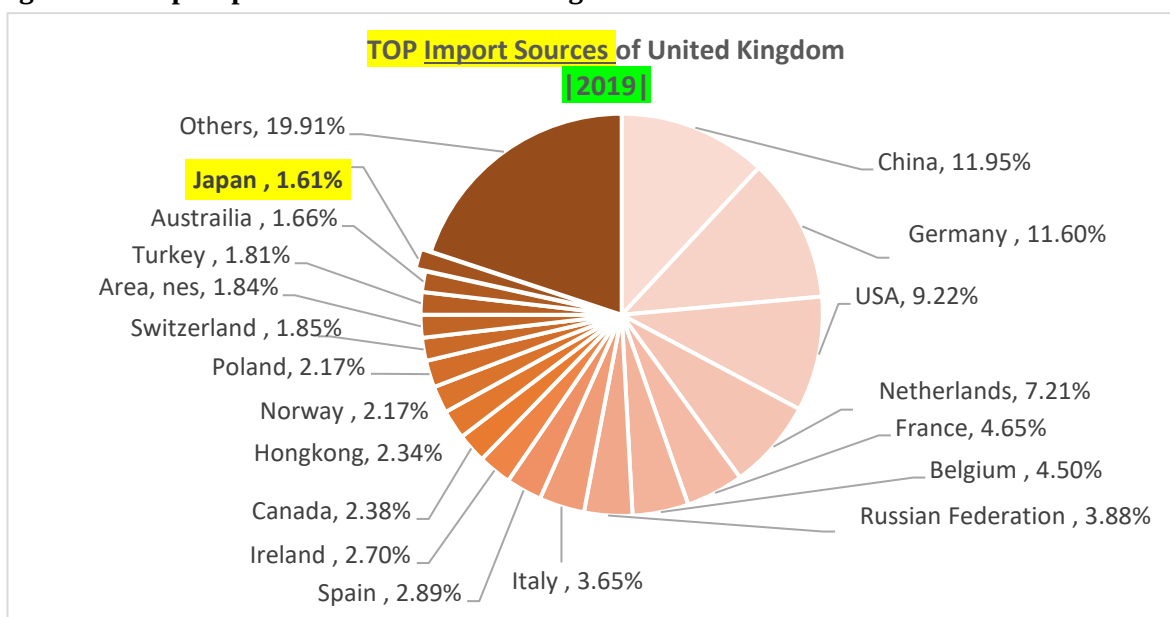
United Kingdom is constitutently comprised of various states i.e., England, Ireland, Wales, and Scotland, which is also renowned as state of parliamentary democracy and industrial revolution. The country was member of European Union (EU) since 1973 however, EU referendum took place in 2016 and thus in 2021: Great Britain (GB) was withdrawn from the EU. On economic basis, British economy was marked among the top six economies of the world. After the referendum, the economy of UK slowed down. Also, the economy worsens at the pandemic. The country possess trade with the world: among which United States is the top exporting destination while Germany, Netherland, France etc. comes afterward. Japan is marked as thirteenth export destination of UK. In 2019, about 1.78% of total exports were made to Japan and 1.61% of commodities were imported from Japan (UNCOMTRADE,2021). Figure 1.1 and Figure 1.2 represents UK trade with the world highlighting the position of Japan.

Figure 1.1: United Kingdom's top exporting destination in 2019.



Source: UNCOMTRADE, 2021 with Authors Illustration

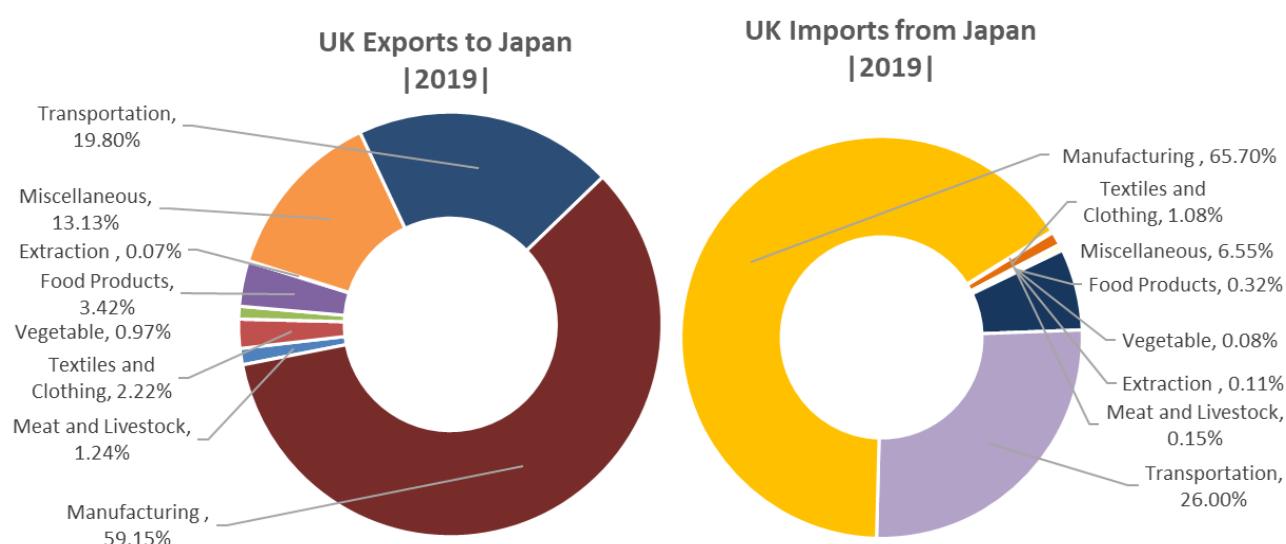
Figure 1.2: Top Import Sources of United Kingdom in 2019.



Source: UNCOMTRADE, 2021 with Authors Illustration

UK and Japan enjoy plentiful relationship from day one. Both the countries trade for various commodities belonging to different stages of production i.e., Capital good, Consumer good, intermediate goods and raw material. About 8,408 British industries exports to Japan; among which 89% belong to SMEs. In 2018, Consumer goods were exported in highest proportion to Japan whereas, capital good, intermediate, and raw material were transported in lower proportion. About 42.96% of Consumer goods, 40.7% of capital goods, intermediate goods – 13.80% and raw materials – 0.96% were exported to Japan (europa.eu). Similarly, United Kingdom did not only focus on imported commodities belonging to single phase but all the four production stages. The highest and largest share of commodities belonged to capital good whereas consumer good, intermediate goods and raw material falls below. In 2018, Capital good – 49.70%, Consumer goods – 28.90% and Intermediate good, raw materials were imported by the Britain government with share of 18.92% and 1.94% respectively. Besides the stages of products, the figure 1.3 illustrates the share of UK's trading commodities with Japan in 2019 based.

Figure 1.3: Illustration representing tradable commodities between United Kingdom and Japan.

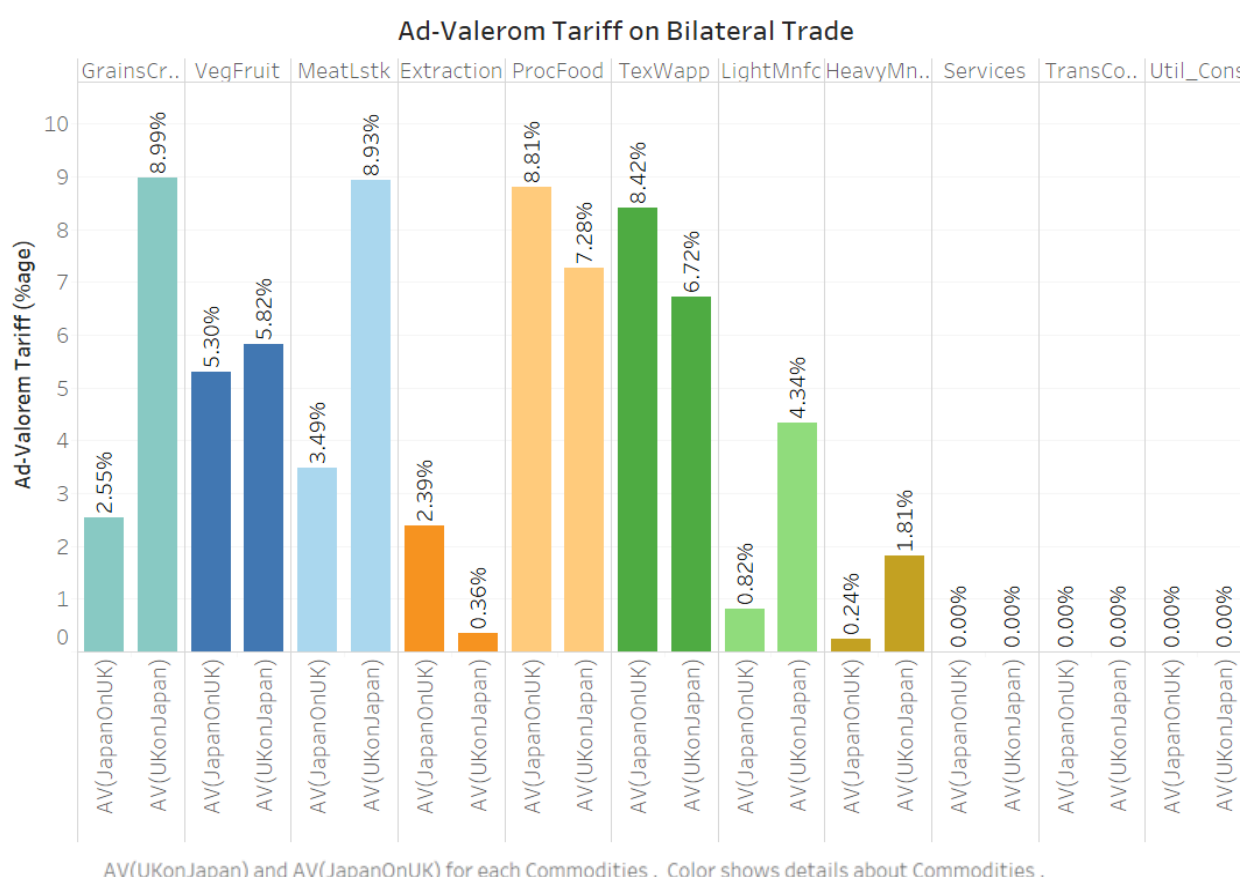


Source: WITS, 2021 with Authors Illustration (Aggregation added in Appendix)

Around the globe, countries impose tariff and non-tariff measures to protect their domestic industry and collect revenue for governmental expenditure. Similarly, the HMRC in UK is responsible to collect custom duty on imported goods in spite free trade policy. Likewise, Japan Customs are liable to charge custom duty on their imports. As discussed, UK- Japan enjoys trade in plethora amount, all the tradable commodities are levied by ad-valorem tariff. Figure 1.4 signifies the bilateral tariff imposed on tradable commodities. The figure shows that UK customs has levied higher tariff on grains crops, vegetables & fruits, and meat livestock comparative to Japan customs. Whereas, the Japan has only levied higher tariff on extraction (minerals etc), processed food, textile and wearing apparels.

The above discussion concludes that United Kingdom (UK) enjoys trade with Japan with superabundance and implementation of bilateral free trade policy would consequently boost the macroeconomic indicator as well as real household income of United Kingdom.

Figure 1.4: Tariff rates on bilateral trade between United Kingdom and Japan



Abbreviation: AV – Ad-Valorem Tariff

Source: GTAP Database 10a with Author's Own Visualization

(Aggregation of sectors mentioned in appendix)

This study identifies the economic implication of United Kingdom – Japan (UK-Japan) Free Trade Agreement using MyGTAP model accompanied with GTAP Database 10a. The economy wide impact of UK- Japan FTA is crucial to comprehend the consequences of free trade policy on macroeconomic indicators, sectoral productivity, regional trade with the world, factors return as well as bilateral trade volume of both countries along with the implication on other countries highly affected from the liberalized trade policy. No study has been found on UK-JAPAN liberalized trade policy by reviewing various studies between 1996 to 2021. This substantiates the necessity for analysing economic implication of UK-JAPAN free trade policy on both countries.

This paper is organized as follow: section 3 represents the methodology employed over the paper while section 4 shows the results from the simulation. Last, the conclusion is represented by section 5 while, appendix is added at the end.

3. Review of Studies

Numbers of studies has been conducted to assess the economic implication of trade liberalization. Scholars like Dao, (2015); Harrison, (1996); Iqbal et al., (2018); Khan et al., (2018); Manni & Afzal, (2012); Mkubwa et al., (2014) concluded positive relationship of trade liberalization with economic growth. According to our research, no study has been leaded using CGE approach to assess the economy wide impact of UK-JAPAN FTA The review of literature shows that liberalized policy of trade in form of bilateral trade or multilateral trade shows positive outcome country's macroeconomic indicators. Reduction and elimination of tariff resultantly boosts the macroeconomic indicators especially the GDP and trade volume of the country and also real factors return (Dao, 2015; Khan,

2019; Manni & Afzal, 2012; Suvankulov & Ali, 2012). Moreover, there exists blended outcome from trade liberalization and inequality of income (Chaudhry & Fatima, 2013; Yasmine & Chahir, 2018). The review of previous studies clearly indicates that there is need for countries to sign free trade agreement to realize economic goal and enhance the development in the country.

4. Methodological Framework

This research uses Computable General Equilibrium (CGE) framework to investigate the outcome on UK – JAPAN Free trade agreement on the economies of both countries. The analysis used extended version of GTAP model i.e., MyGTAP due to its multiple features. The description regarding the methodological framework is mentioned as follow.

4.1. CGE Approach

The Computable General Equilibrium approach is a global model which assesses economic results based upon outcome of simulation on global world. The model is primarily endorsed to analyse impact of various governmental policies, scenarios, environmental issues etc on economy of countries including all macroeconomic and microeconomic results (real household income, income inequality as well as real return of factor). The model indulge household maximizing agents while it considers firms as cost efficient and minimizing agent. Additionally, the CGE approach is marked to be suitable method to evaluate the welfare after imposition of respective scenario with in the country (Savard, 2003). The general equilibrium approach is stationed and established through linkage of various equations through assorted and diversified software's like GEMPACK, GEMS, MATLAB (Bandara (1991). Moreover, researcher like (Shaikh et al. 2012) expresses that Computable General Equilibrium and Applied General Equilibrium model is associated internally and are competent in evaluating inter-linkage among all sectors.

Moreover, the approach decision making is based upon the prices established by the supplier and demand by the people. Analysing the income inequality and welfare by the CGE model. The model is based upon system of hundreds of equations linking the variant number of sectors, commodities. The specific software to solve the equation under GTAP software package is the GEMPACK³.

4.2. Standard Global Trade Analysis Project

The model conceals data of various countries for implication of policy scenario globally (Adam et al., 2000). The Global Trade Analysis Project (GTAP) considers single regional household and an aggregate utility function. This model expresses regional expenditure in form of private expenditure, government expenditure and investments. Assumption is made under selling of endowment commodities along with intermediate goods to manufacturing industries to make final goods. In return, household are provided with income. Those finalized manufacturing commodities are purchased by all households i.e., private and government. Additionally, the model also encompasses global banks, trade accounts along with transportation. The drawback of standard GTAP is assumption of single household due to which further modification was made resulting MyGTAP Model.

³ GEMPACK – tool to enables policy makes and model designers to solve abundant system of equation especially the algebra type (Harrison and Pearson, 1996).

Table 1.1: Review of literature on Trade Liberalization.

Review on Trade Liberalization Using CGE Approach			
Author	Relativity	Technique	Observation
(Iqbal et al., 2018)	Pakistan trade agreements with EU, SAARC, China, and India	MyGTAP Model GTAP 8.1 with Pakistan's SAM 2007-08	Gain in economic growth and household income was detected in Pakistan by implementation of trade liberalization scenarios across countries.
(Khan & Khan, 2021)	UK and CPTPP	MyGTAP Model GTAP Database 10	Enormous growth in real economic indicators like GDP, exports & imports were obtained. Moreover, expansion in sectoral productivity and trade also took place in UK.
(Khan & UrRahman, 2020)	China – Pakistan	GTAP Model Database 9	Both countries are highly benefited from the free trade agreements; growth in macroeconomic indicators i.e., real GDP, regional exports and imports were highlighted. Real factors of Pakistan were stated to improve by the FTA.
Khan et al. (2018)	CPTPP (11) and Pakistan	CGE Approach with MyGTAP Model Version 9a + Pakistan SAM (2010-11)	Successful inclusion of Pakistan in CPTPP would consequently reduce the gap between poor and rich along with expansion in real factor return.
(Shaikh et al., 2012)	Pakistan and India	GTAP database 4	Bilateral trade boosts the trade indicators of both countries.
(Ali, 2017)	Pakistan – Turkey	CGE Approach: GTAP (Database 7)	Pakistan and Turkish economies are at pace of benefiting from trade agreement in terms of GDP, Welfare, terms of trade, efficiency, and exports with implementation of 85% Liberalized trade.
(Islam et al., 2015)	South Asia	GTAP Model Database 8.1	Under the imposition of dynamic model, India would be adversely affected whereas, standard model describes India as winner.
(Khan et al., 2018)	Pakistan Malaysia	MyGTAP Model Database 9a with Pakistan SAM 2010-11	Bilateral free trade agreement eventually resulted in win-win scenarios for both countries. In other words, the growth of macroeconomic indicators and real household income was highlighted. However, the inequality of income has declined.

Empirical Research on Trade Liberalization			
Author	Relativity	Technique	Observations
(Manni & Afzal, 2012)	Bangladesh and Developing Countries	Ordinary Least Square (OLS) Method	persistent growth was estimated by trade liberalization in GDP, trade indicators and other macroeconomic indicators.
(Mkubwa et al., 2014)	Tanzania	Ordinary Least Square (OLS) Method	Positive outcome in economy of Tanzania from trade liberalization.
(Harrison, 1996)	India	Heckscher Ohlin Model	Enhancement in mobile labour would resultantly minimize the cost to trade openness.
(Dao, 2015)	71 Countries (1980-2010)	Panel data technique/ pool OLS regression	Strong and sizable outcomes from trade liberalization from liberalized trade. Direct relationship between trade and growth indicators.
(Ando & Urata, 2015)	Malaysia, Thailand, and Indonesia	Gravity Model	No significant growth in Japanese trade volume after successful implementation of liberalization scenario.
(Daumal, 2013)	Brazil	Time Series Regression	Gap between poor and rich show contraction by implementation of trade openness.
(Green et al., 2001)	Brazil	Stolper Samuelson Theorem	Policy of liberalized trade shows insignificant result for relativity with real household income.
(Chaudhry & Fatima, 2013)	Pakistan	Autoregressive Distributed Lag Models (ARDL)	In long run, successive liberalization of trade shows significant impact on income inequality.
(Lin & Fu, 2016)	Democratic and Autocratic countries	Stolper–Samuelson theorem Trade Cost variable	Democratic countries forced with liberalized trade enhances the unequal distribution of income whereas, countries with absolutism and being autocratic consequently contracts the income inequality.
(Rojas-Vallejos & Turnovsky, 2017)	37 countries (1984-2010)	Fixed Effect Model	Study concludes that reduction of bilateral tariff creates larger gap between rich and poor in short run whereas, no significant outcome was discovered for long run.
(Goldberg & Pavcnik, 2007)			Variegated relativity of free trade policy with gap between rich and poor.
(Shah & Samdani, 2015)	D – 8 Countries	Random Effect Panel Estimation technique	Trade Openness play's role of evidence by expansion of inflow of FDI.
(Acar et al., 2009)	Indonesia, Bangladesh, and Malaysia	CGE Approach with GTAP (database - version 6)	Indonesia and Malaysia do not highlight adverse or negative implication from FTA however, Bangladesh suffered negative consequences from the trilateral trade agreement.

4.3. MyGTAP Model

Using the CGE approach, the model has adopted MyGTAP model (Walmsley & Minor, 2013). MyGTAP⁴ Model is the extended version of standard Global Trade Analysis Project (GTAP). Model is incorporated with global datasets which assists in implication of policy variation. The model comprises of I-O table, trade data and other macroeconomic data. The model is known for its special feature of dividing expenditure into private, government expenditure and investment saving. By incorporating social accounting matrix, the model also exhibits the outcome on real household income. MyGTAP model also overlook the remittances and foreign aid. Additionally, the MyGTAP also takes foreign remittances and capital income into account. In this extended version, the CDC⁵ and LES⁶ are direction for expenditure of income of private household.

4.4. Database

The global trade analysis project of database 10a has been incorporated in the MyGTAP model to analyse the outcome of UK-JAPAN Free trade agreement. GTAP database 10a (Aguilar et al., 2019) comprises of global data of 2004, 2007, 2011 and 2014. Among these four years, 2018 has been chosen as reference year. The respective dataset highlights data for 121 countries without region (regions – 20). Data related to energy sector and emissions are also inclusive along with expansion in manufacturing as well as services of around the globe. Figure 1.5 expresses the countries comprehended into the GTAP model.

Figure 1.5: Geographic illustration of countries included into the GTAP database 10.



Source: GTAP database 10

⁴ *MyGTAP* – Extended version of standard GTAP (Hertel and Tsigas, 1997).

⁵ CDC – Constant Different Expenditure

⁶ *LES – Linear Expenditure Service*

4.5. Closure

Standard version of MyGTAP closure is carried at the beginning. Assumption of perfect competition is made in all products of all sectors. Factors of production like capital and labour are taken as totally mobile among sectors while land and natural resources are marked to be sluggish. Moreover, flow of foreign income is presumed to increase or decrease with price of factors. Lastly, expected rate of return acts as driving force for investment while sum of private household and budget deficits results in sum of domestic savings. Resultantly, trade balance acts as endogenous variable in closure.

4.6. Research Scenario

To evaluate the economic implication of UK-Japan free trade policy; this research has taken two scenarios:

- a) **UK – Japan Free Trade Policy:** Elimination of overall bilateral tariff on tradable commodities.
- b) **UK- Japan Free Trade Agreement with Bilateral Trade Facilitation of 5%:** Using the AMS tool of MyGTAP, the model implicates 5% trade facilitation for both Japan and UK along with removal of bilateral tariff. This would result in facilitation and provision of goods and services at quiet lower prices and expedition of commute. In other words, incorporation of AMS tool would make adaptation in the import's prices (Fugazza and Maur, 2006). Raise in AMS indicator would resultantly decrease the price of goods imported from region "r" into region "s".

5.0. Results and Discussion

This section exploits the economic consequences of trade liberalization and trade facilitation between United Kingdom and Japan. Against the background of instigation of the scenarios; this section expresses the implication of the agreement on both countries.

5.1. Impact of Scenario on Macroeconomic Indicators

Table 1.2 articulates the impact of UK -Japan Comprehensive Economic Partnership Agreement using the CGE approach. Using the global model, the table identifies the variation in macroeconomic indicators like real GDP, real exports and imports, terms of trade along with government income of United Kingdom, Japan and countries which are adversely affected by the bilateral trade agreement. The implementation of free trade policy boosts the productivity and trade volume in a country which eventually leads to growth in GDP. In the same way, both UK and Japan enjoy marvellous trade; over here the simulation removed overall bilateral tariff on the tradable commodities and services. The impact of removal of overall tariff on tradable commodities between UK and Japan shows significant potential outcome for real GDP, real exports, and imports from the world and also terms of trade. The real GDP shows variant gain of \$130 million for UK and \$51 million for Japan. The expansion in real GDP of UK and Japan exists due to the growth in private expenditure on tradable commodities along with investment in various investments in respective regions equivalent to capital goods sector. Moreover, the exports of UK and Japan plays major role in expansion of real GDP in the country after the imposition of UK – Japan CEPA. Nonetheless, the dominancy and excessive growth of annual productivity of UK than Japan came into existence because of higher expenditure of household on tradable commodities, regional investments, and exports. The success of CEPA between UK and Japan adds up adverse outcome on real GDP of countries like India, United States, China etc. The

Table 1.2: Implication on Simulation I (UK -JAPAN Free trade agreement) on Macroeconomic Indicators

SIM -1 (UK – JAPAN FTA _ Elimination of Overall Bilateral Tariff)				
Countries	Real GDP	Real Exports to the World	Real Imports from World	Terms of Trade
UK	0.00% (\$130M)	0.02% (\$161.06M)	0.12% (\$983.5M)	0.0134
Japan	0.00% (\$51M)	0.02% (\$228.56M)	0.10% (\$947.81M)	0.0443
India	-0.00% (\$-0.5M)	0.00% (\$11.47M)	-0.00% (\$-20.19M)	-0.0018
Korea	-0.00% (\$-6.88M)	0.00% (\$10.75M)	-0.00% (\$-17.63M)	-0.0014
United States	-0.00% (\$-6M)	0.01% (\$136.63M)	-0.01% (\$-221.25M)	-0.0033
Brazil	-0.00% (\$-4.75M)	0.01% (\$16.66M)	-0.01% (\$-19.63M)	-0.0023
China	-0.00% (\$-58M)	0.00% (\$31.25M)	-0.01% (\$-252.75M)	-0.0047
Canada	-0.00% (\$-3.13M)	0.00% (\$23.28M)	-0.00% (\$-20.75M)	-0.0017
Indonesia	-0.00% (\$-3.5M)	0.00% (\$4.25M)	-0.01% (\$-14.92M)	-0.0040
Australia	-0.00% (\$-6.13M)	0.00% (\$13.78M)	-0.01% (\$-18.69M)	-0.0038
EU_27	-0.00% (\$-54M)	-0.00% (\$-28M)	-0.01% (\$-442M)	-0.0027
Pakistan	-0.00% (\$-1.2M)	0.00% (\$1.05M)	-0.01% (\$-3.16M)	-0.0033
Vietnam	-0.00% (\$-1.67M)	0.00% (\$4.13M)	-0.01% (\$-12.59M)	-0.0041
Rest of World	-0.00% (\$-30.15M)	0.04% (\$106.92M)	-0.06% (\$-166.21M)	-0.0358

Source: Authors Own Calculation using GTAP Database 10

Table 1.3: Impact of Simulation II (Free trade agreement and Trade Facilitation between UK and Japan) on Macroeconomic Indicators

SIM – 2 (SIM – 1 PLUS Bilateral Trade Facilitation of 5%)				
Countries	Real GDP	Real Exports to the World	Real Imports from World	Terms of Trade
UK	0.05% (\$1411M)	-0.04% (\$-310.94M)	0.42% (\$3550.63M)	0.1243
Japan	0.02% (\$924.5M)	0.11% (\$968.81M)	0.36% (\$3380.56M)	0.1239
India	-0.00% (\$-5.63M)	0.01% (\$43.13M)	-0.01% (\$-68.97M)	-0.0044
Korea	-0.00% (\$-22.63M)	0.01% (\$39.69M)	-0.01% (\$-87.94M)	-0.0062
United States	-0.00% (\$-26M)	0.03% (\$512.63M)	-0.04% (\$-916.25M)	-0.0135
Brazil	-0.00% (\$-18.5M)	0.02% (\$64.34M)	-0.03% (\$-84.66M)	-0.0102
China	-0.00% (\$-214M)	0.01% (170M)	-0.04% (\$-913.88M)	-0.0161
Canada	-0.00% (\$-12.75M)	0.02% (\$89.66M)	-0.02% (\$-104.44M)	-0.0090
Indonesia	-0.00% (\$-11.06M)	0.01% (\$20.2M)	-0.03% (\$-55.03M)	-0.0142
Australia	-0.00% (\$-22.13M)	0.02% (\$51.25M)	-0.03% (\$-83.66M)	-0.0158
EU_27	-0.00% (\$-193M)	0% (\$78.5M)	-0.03% (\$-1684M)	-0.0105
Pakistan	-0.00% (\$-3.28M)	0.01% (\$4.15M)	-0.01% (\$-8.62M)	-0.0074
Vietnam	-0.00% (\$-4.63M)	0.01% (\$12.14M)	-0.02% (\$-38.86M)	-0.0121
Rest of World	-0.01% (\$-101.20M)	0.15% (\$338.64M)	-0.25% (\$-801.66M)	-0.1340

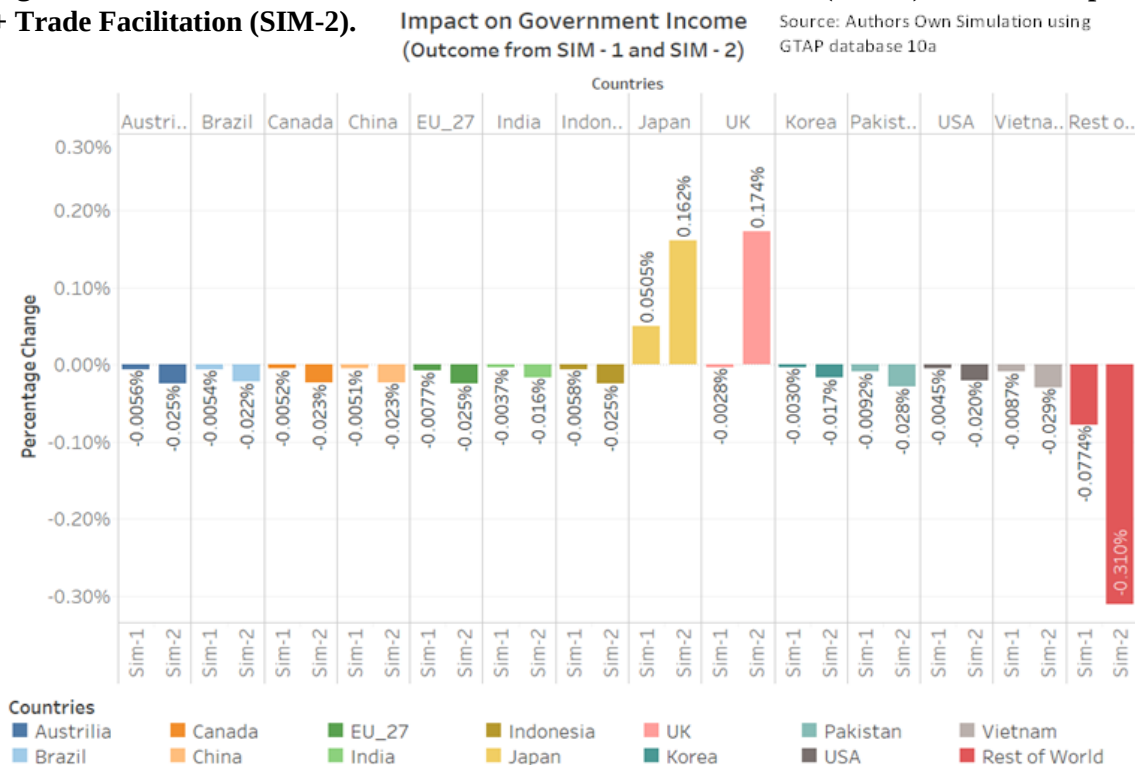
Source: Authors Own Calculation using GTAP Database 10a

largest monetary loss is expected to be reflected by China equivalent to \$-58 million while the lowest monetary loss is expected to be observed by India.

The global model also exhibits the outcomes of real trade indicators i.e., real imports and exports from (to) the world. The successful implementation of UK – JAPAN bilateral free trade agreement reveals growth of real exports by \$161.06 million and \$228.56 million for United Kingdom (UK) and Japan respectively. At the same pace, countries like India, Korea, United States, Brazil, China, Canada, Indonesia, Australia, and Pakistan shows maximum gain except EU-27 in real exports to the world and adverse implication on its real imports from the world. Contrastingly, UK and Japan indicate growth in their terms of trade indicator, which reveals the ratio of monetary value of exports to imports of a country. Variation in price of tradable commodities are the major rationale for the alteration of terms of trade value (Iqbal et al., 2018). The scenario of UK – JAPAN free trade agreement shows minor depreciation in terms of trade value due to variation in prices of tradable commodities. Moreover, the simulation related to UK – JAPAN free trade agreement exploits negative outcomes on government revenue of for UK while growth was shown in Japanese economy. Additionally, opposing effect has been identified on other countries like India, Pakistan, Vietnam, China etc.

Besides simulation – I i.e., UK – JAPAN Free trade agreement, the table 1.3 shows the macroeconomic outcome like real GDP, real trade values by a scenario of UK – Japan bilateral FTA and trade facilitation by 5%. Trade facilitation agreement is marked to be an essential agreement to create ease for trader otherwise the traders are subject to delays resulting in costly products for traders (Beverelli et al., 2015). In other words, trade facilitation would assist in simplification of required paperwork, custom duties and even slash the time consumption along with cost. It is pertained to say that it is censorious as trade cost because of estimation represents 134% AVE (in developed countries) and 219% (developing countries) – according to World Trade Report 2015. The results escapade that real GDP of UK and Japan has potential to grow by \$1411 million (0.05%) and \$924.5 million (0.02%) respectively. This is specifically due to the implementation trade facilitation agreement (TFA) between UK and Japan, enhancing the productivity adjusted by inflation. By sighting the outcome on the global world, the analysis predicts compression in the real GDP of all countries like India, Korea,

Figure 1.6: Effect on Government Income from UK -JAPAN FTA (SIM-1) and UK – Japan FTA + Trade Facilitation (SIM-2).



United States, China, Brazil, Canada, Indonesia, Australia, European Union (27), Pakistan, Vietnam, and Rest of World. Additionally, the real trade volume has also enhanced for Japan while for UK only real imports has grown. This shows UK's demand for international product has boosted up which consequently reached up in higher growth in imports rather than exports. The manifest justification to cover up the depreciation in exports and growth in imports can be the inflated products of UK which diverted the public to international commodities which consequently up streamed the real imports of UK. At the same time, UK exports have dropped due to its higher prices. Variation in trade policy has implication on government income. Figure 1.6 represents the influence of free trade policy (FTA) and FTA + 5% trade facilitation on government income of UK, Japan, China, Indonesia, EU – 27 and other global countries. The analysis assess that the government income of Japan successively enhances by 0.0505% while UK, Australia, China, EU – 27 etc. government income would abate by successive implementation of UK's free trade agreement with Japanese government. Alternately, the implementation of bilateral trade facilitation and Free trade agreement would be a worth for both countries. The government income shows augmentation and strength for both countries i.e., United Kingdom and Japan. The UK government revenue is predicted to intensify by 0.1736% while Japanese economy has potential to escalate the government revenue by 0.1619%. As the primary source of government revenue are direct and indirect taxes; in the same way: the implementation of successive bilateral FTA along with 5% trade facilitation would raise the FDI, employment, PPP and wage rate consequently leading to elevation in income tax, value added taxes etc. and thus government income of UK and Japan.

5.2. Economic Impact on Components of GDP (Using Expenditure Approach)

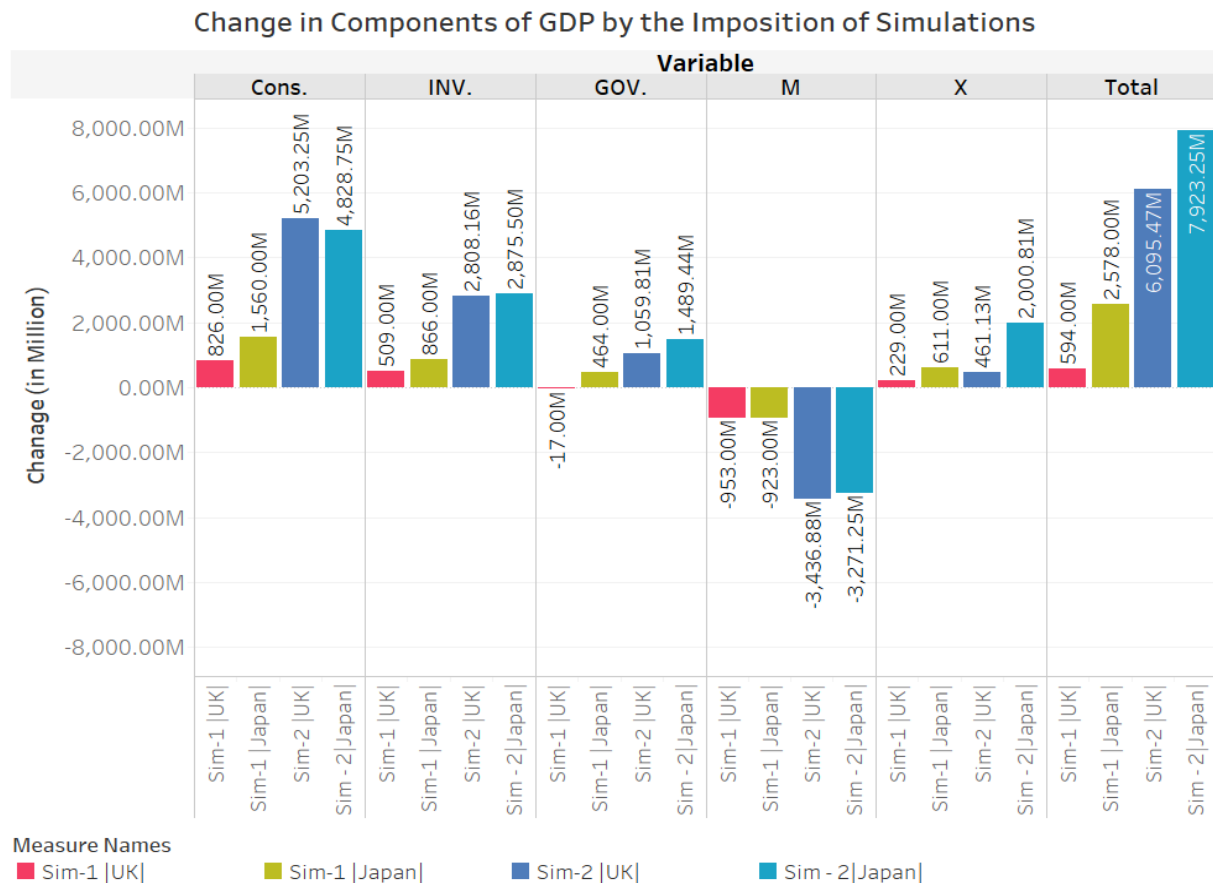
Figure 1.7 illustrates the influence of distinctive scenarios on the component of GDP i.e., consumption, investment, government revenue, imports, and exports. Estimation of the GDP through expenditure approach is used commonly to identify the outlook of country's economy. The expenditure method of GDP is used to evaluate the total expenses made on productivity of commodities. Against this backdrop, the components of GDP would result in major adaptation. Comparative analysis of overall variation on the GDP shows that the simulation – II would have a better outcome for both countries i.e., UK and Japan relative to simulation – I (UK – Japan FTA). The fragmented version of GDP (expenditure approach) depicts that household consumption, investment in various fields and areas by firms, expenditure made by government and exports are relatively higher of simulation II as relative to simulation I for both United Kingdom and Japan. By successful implementation of UK – Japan FTA plus trade facilitation, the overall GDP of UK and Japan would boost up. The consumption made by household would enhance by \$5,203.25 million and \$4,828.75 million for UK and Japan respectively. By the successful implementation of UK – Japan trade facilitation along FTA agreement, the tradable commodities would be available with lower cost and expedition of commute. This would motivate the public to purchase the Britain products (by Japanese public) and Japanese products (by Britain's) rather than products of other countries. Additionally, the implementation of trade facilitation and FTA simultaneously, resulted in massive and excessive growth in net exports of both UK and Japan. Figure 1.7 illustrates the visualized outcome of scenario based upon CGE approach.

5.3. Impact on UK and Japan Productivity

The variation in trade policy also impacts the industrial productivity of countries: UK and Japan industrial outcomes has also been affected as shown by figure 1.8 and figure 1.9. Assessment between UK – JAPAN FTA (simulation I) and simulation II (trade facilitation and liberalization) identifies that the successful implementation of trade facilitation along with liberalization is beneficial for both countries. Comparative analysis depicts blended outcomes in all major sectors in both simulations. The massive gain is identified in capital good commodities from implementation of trade facilitation and liberalization as compared to bilateral liberalized trade policy. The outcome of UK industrial productivity at simulation II is higher by \$1212.97 million than UK – Japan bilateral trade liberalization (simulation I) whereas Japanese domestic

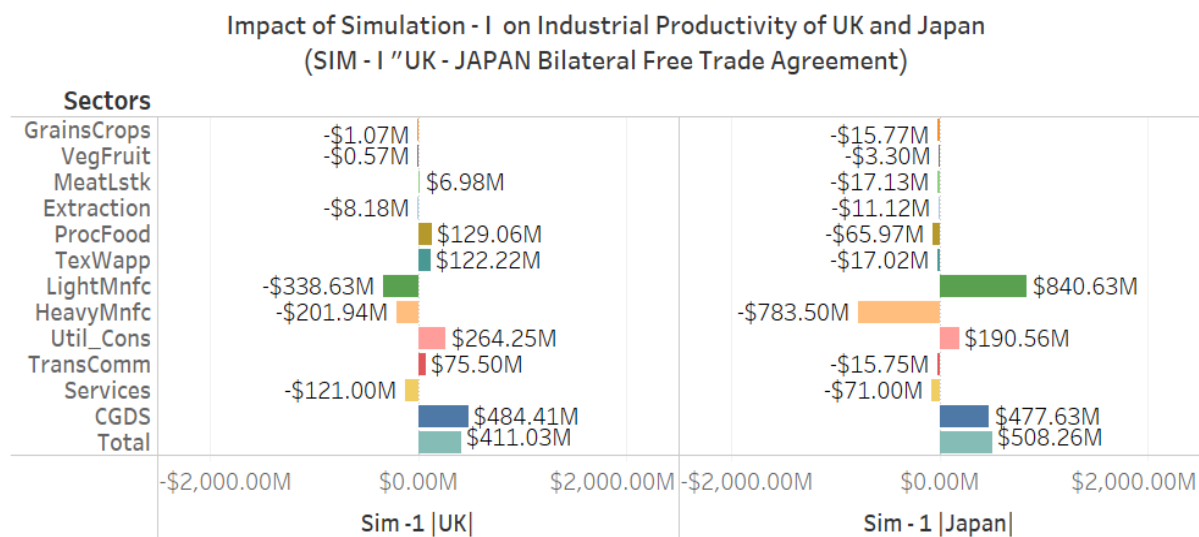
productivity would have a vital difference \$887.54 million between outcome of simulation II and simulation I (FTA). Figure 1.8 and figure 1.9 highlights the outcomes of respective simulations based upon the industrial productivity in United Kingdom and Japan.

Figure 1.7: Influence on Components of GDP by Implementation Simulation



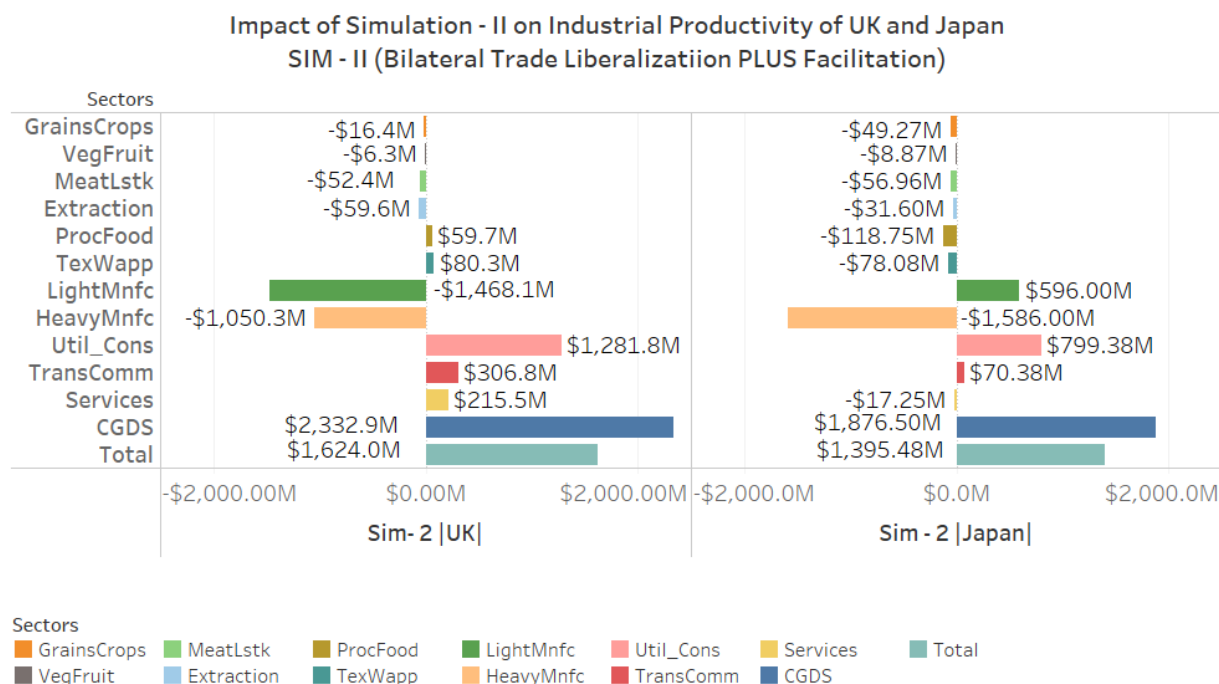
Source: Authors Own Illustration and Simulation using GTAP database 10a

Figure 1.8: Illustration representing the Implication of Bilateral Trade Liberalization on Sectoral productivity of UK and Japan.



Source: Authors Own Illustration and Simulation

Figure 1.9: Illustration representing the Implication of Simulation II Sectoral productivity of UK and Japan.



Source: Authors Own Illustration and Simulation

5.4. Implication of Simulation on Real Factor Returns

The analysis reflects major changes in real returns from factors after implementation of both scenarios. Comparative and relative evaluation exhibits that implementation of UK – Japan trade liberalization would ensue gain of 21.67% in UK's economy while Japanese income from real factors would contract by -81.80%. Similarly, the simulation related to trade facilitation along with liberalization (Simulation – II) would results in overall contraction in total for both countries. However, the contraction from simulation II (FTA + trade facilitation) would be lower as compared shrinkage and decline from simulation I (UK – JAPAN FTA).

The enhancement of trade and productivity in both countries influence all the factors. The simulation regarding bilateral trade liberalization influences the real factor returns. At first place, the enhancement in UK's productivity sectors like processed food, textile & wearing apparels, utility consumption and capital goods commodities would lead to amalgamation and growth of land, labour and capital being the foremost factors. As the productivity enhances, the expansion of industries, firms, mills etc. would expands which consequently would raise the return from land and related factors especially agrarian factors. However, the contraction of UK's extraction and machinery sectors may possibly be the reason to shrink the natural resources.

On contrary side, the bilateral liberalized policy of UK - JAPAN would consequently boost Japanese factors like labours, livestock, and capital. The growth of light manufacturing and utility consumption along with capital good commodities might possibly be the reason behind growing factors; among them most of the factors provide services while other are consumed entirely in production process. Nevertheless, the justification and reason behind the contraction of Japanese land and both natural resources are the shrinkage of productivity of grain crops, vegetables & fruits, meat & livestock, extraction, textile & wearing apparels, heavy manufacturing, transportation, and services sectors.

Additionally, the simulation regarding trade facilitation along with liberalization resulted in lower return as compared to returns from simulation – I. Over here, UK and Japanese factors like land (small, medium, and large) and natural resources shows negative consequences. However, labour

and capitals were estimated with positive consequences with particulates of massive demands of United Kingdom's and Japanese productivity (e.g., processed food, textile & wearing apparels, utility consumption and capital commodities in UK and light machinery, utility consumption and capital commodity sector of Japan).

Table 1.4 indicates the real factor returns on UK and Japanese factors. Comparative analysis reveals that UK – JAPAN FTA is beneficial for United Kingdom returns of factor. While Japanese factor returns gains better outcome, if simulation – II (UK – JAPAN FTA Plus Trade facilitation) is implemented.

Table 1.4: Tabular version of variation in real factor return in UK and Japan

Factors	SIM – 1 (Bilateral FTA)		SIM- 2 (SIM – 1 + Trade Facilitation)	
Description	UK	Japan	UK	Japan
Land	3.05%	-11.03%	-0.27%	-0.33%
Unskilled Labor	2.48%	1.60%	0.11%	0.06%
Skilled Labor	2.16%	1.36%	0.10%	0.05%
Capital	2.37%	1.28%	0.12%	0.05%
Natural Resources	-9.55%	-27.40%	-0.75%	-0.76%
Natural Resources ²	-9.55%	-27.40%	-0.75%	-0.76%
Labor - small farmer	2.48%	1.60%	0.11%	0.06%
Labor - medium+ farmer	2.48%	1.60%	0.11%	0.06%
Labor - farm worker	2.48%	1.60%	0.11%	0.06%
Labor - non-farm low skilled	2.48%	1.60%	0.11%	0.06%
Labor - non-farm high skilled	2.16%	1.36%	0.10%	0.05%
Land - large	3.05%	-11.03%	-0.27%	-0.33%
Land - medium	3.05%	-11.03%	-0.27%	-0.33%
Land - small	3.05%	-11.03%	-0.27%	-0.33%
Livestock	2.37%	1.28%	0.12%	0.05%
Capital - agriculture	2.37%	1.28%	0.12%	0.05%
Capital - formal	2.37%	1.28%	0.12%	0.05%
Capital - informal	2.37%	1.28%	0.12%	0.05%
Total	21.67%	-81.80%	-1.23%	-2.19%

Source: Authors Own Simulations Using GTAP Database 10a

6.0. Conclusion

The paper adopts global trade model (GTAP) in order to assesses the implication of the Comprehensive Economic Partnership Agreement (CEPA) after the elimination of UK from European Union. United Kingdom initiated their trade policy planning and agreements with numbers of countries prior to BREXIT thus, as the separation of UK from BREXIT came into existence; the UK began with free trade and reduced tariff agreement with various countries. It is disclosed that BREXIT would worsen UK's economy in long run due to the existence of pandemic (COVID – 19). Keeping the trending bilateral agreement; this paper also reflects a scenario of imposition of both free trade policy along 5% trade facilitation. This would elongate the trade of both countries. This study favours trade facilitation with association of liberalization due to its highest potential in the GDP of both countries. As the study adopts global model; due this fact: it focuses on the implication on the global countries like India, Korea, United States, Brazil, China, Canada, Indonesia, Australia, EU (27), Pakistan, Vietnam, and Rest of the world. The analysis also reflects maximal potential in government revenue (in long-run) by the implementation of trade facilitation along with removal of tariff rather than imposition of free

trade agreement. The government revenue escalades due to positive gains in components of GDP of both countries, which results in growth in revenue of both governments.

The study highlights the outcome of currently signed UK – JAPAN free trade agreement along with additional scenario focusing on bilateral trade liberalization along with facilitation. Computable General Equilibrium approach has been involved to estimate the outcomes of the free trade agreement and also a scenario of FTA along with trade facilitation. Extended version GTAP model i.e., MyGTAP model has been encompassed into the model. The model incorporates GTAP dataset 10a with 2014 marked as base year to assess the economic outcomes on macroeconomic indicators (real GDP, terms of trade, real import & exports, and government revenue), industrial productivity, bilateral trade indicators and real factors return. The study uses global model which reflects the implication of bilateral free trade policy on other countries.

First, it can be concluded that the implementation of simulation II (UK - JAPAN FTA plus Trade facilitation) would result in enormous growth in real GDP, real import, government income, terms of trade of UK and Japan. The real export of Japan shows positive and enormous growth while UK shows contraction in real exports. The real GDP of UK shows immersive growth of \$1411 million from simulation II (trade liberalization plus facilitation) while growth of \$130 million would be evaluated by implementation of UK – JAPAN Free trade agreement. Additionally, the components of GDP i.e., consumption, investment, net exports, and government income also represents prodigious and massive growth from enactment of scenario of FTA along with trade facilitation.

Second, the productivity sector of UK and Japan reveals blended outcomes in each sector even though, the sum of industrial productivity in simulation II (FTA + trade facilitating) is higher than productivity of UK and Japan in case of liberalized trade. Additionally, there exist massive gain in bilateral trade volume by implementation of simulation II (FTA + trade facilitation) relative to trade liberalization. This concludes that the expansion in trade volume would have positive implication on the economic indicator of countries i.e., UK and Japan.

Last, the expansion in tradable sectors and growth in industrial productivity would strengthen and augment the real factors return. The model estimates decline in factors by implementation of both policy scenarios for both countries except UK – Simulation I. It can be terminated in a way, the real return of factors from both scenarios would consequently contract the real factor return; among which bilateral trade liberalization had major losses relative to simulation – II (FTA + trade facilitation). In the light of this situation, the analysis would suggest the implementation of UK – JAPAN bilateral trade liberalization with execution of five percent facilitation.

To conclude the research, the termination suggests that there exists win – win outcomes for both economy for implementation of UK – JAPAN trade liberalization along with trade facilitation in all cases. The returns from real factors contracts in both case; still the outcomes of simulation – II (FTA + trade facilitation) would exhibit less variation as compared to returns from simulation – I (bilateral free trade agreement). Thus, this study recommends and counsels the Minister of State for Trade and Investment, United Kingdom and Ministry of Economy, Trade and Industry, Japan to negotiate bilaterally to implement trade liberalization along with at least 5% trade facilitation.

References

- Adams, P. D., Horridge, M., Parmenter, B. R., & Zhang, X. G. (2000). Long-run effects on China of APEC trade liberalization. *Pacific Economic Review*, 5(1), 15-47.
- Acar, M., Alpay, S., Bakimli, E., & Koc, Z. Z. (2009). South - East Asian Integration in the Context of OIC: Implications of Free Trade among Malaysia, Indonesia and Bangladesh. *Journal of Economic Integration*, 24(1), 1–18. <https://doi.org/10.11130/jei.2009.24.1.1>
- Acharya, S., Hölscher, J., & Perugini, C. (2012). Trade liberalisation and inequalities in Nepal: A CGE analysis. *Economic Modelling*, 29(6), 2543–2557. <https://doi.org/10.1016/j.econmod.2012.08.008>
- Ali, A. (2017). A CGE Analysis of Pakistan-Turkey Free Trade Agreement. *Economic Policy*, 2116, 0–33. <https://doi.org/10.1227/01.NEU.0000349921.14519.2A>
- Ando, M., & Urata, S. (2015). Impacts of Japan's FTAs on Trade: The cases of FTAs with Malaysia, Thailand, and Indonesia. *RIETI Discussion Paper Series*.
- Balassa, B. (1978). Exports and economic growth. Further evidence. *Journal of Development Economics*, 5(2), 181–189. [https://doi.org/10.1016/0304-3878\(78\)90006-8](https://doi.org/10.1016/0304-3878(78)90006-8)
- Baltagi, B. H., Egger, P., & Pfaffermayr, M. (2008). Estimating regional trade agreement effects on FDI in an interdependent world. *Journal of Econometrics*, 145(1–2), 194–208. <https://doi.org/10.1016/j.jeconom.2008.05.017>
- Ben-david, D. A. N. (1993). *EQUALIZING EXCHANGE : TRADE LIBERALIZATION AND INCOME CONVERGENCE* * In 1969 Arghiri Emmanuel wrote about the "unequal exchange " that he believed was brought about by the "imperialism of trade ." This paper provides evidence that movement toward free tr. August.
- Beverelli, C., Neumueller, S., & Teh, R. (2015). Export Diversification Effects of the WTO Trade Facilitation Agreement. *World Development*, 76, 293–310. <https://doi.org/10.1016/j.worlddev.2015.07.009>
- Cammett, M., & Bhagwati, J. (2005). In Defense of Globalization. *International Journal*, 60(2), 592. <https://doi.org/10.2307/40204318>
- Chaudhry, I. S., & Fatima, I. (2013). Does trade liberalization reduce poverty and inequality? Empirical evidence from Pakistan. *Pakistan Journal of Commerce and Social Sciences (PJCSS)*.
- Dao, A. T. (2015). Trade Openness and Economic Growth. *The Park Place Economist*, 23(1). <https://www.iwu.edu/economics/PPE13/houser.pdf>
- Daumal, M. (2013). The Impact of Trade Openness on Regional Inequality: The Cases of India and Brazil. *International Trade Journal*, 27(3), 243–280. <https://doi.org/10.1080/08853908.2013.796839>
- Dollar, D. (1992). Outward-oriented developing economies really do grow more rapidly: evidence from 95 LDCs, 1976-1985. *Economic Development & Cultural Change*, 40(3), 523–544. <https://doi.org/10.1086/451959>
- Freund, C., & Ornelas, E. (2010). Regional trade agreements. *Annual Review of Economics*, 2, 139–166. <https://doi.org/10.1146/annurev.economics.102308.124455>
- Friel, S., Hattersley, L., Snowdon, W., Thow, A. M., Lobstein, T., Sanders, D., Barquera, S., Mohan, S., Hawkes, C., Kelly, B., Kumanyika, S., L'Abbe, M., Lee, A., Ma, J., Macmullan, J., Monteiro, C., Neal, B., Rayner, M., Sacks, G., ... Walker, C. (2013). Monitoring the impacts of trade agreements on food environments. *Obesity Reviews*, 14(S1), 120–134.

<https://doi.org/10.1111/obr.12081>

- Goldberg, P. K., & Pavcnik, N. (2007). The Effects of the Colombian Trade Liberalization on Urban Poverty. In *Globalization and Poverty: Vol. ISBN* (Issue March). University of Chicago Press Volume. <http://www.nber.org/chapters/c0106>
- Gov.uk. (2021). *UK-Japan free trade agreement: the UK's strategic approach*.
- Green, F., Dickerson, A., & Arbache, J. S. (2001). A picture of wage inequality and the allocation of labor through a period of trade liberalization: The case of Brazil. *World Development*, 29(11), 1923–1939. [https://doi.org/10.1016/S0305-750X\(01\)00071-7](https://doi.org/10.1016/S0305-750X(01)00071-7)
- Greenaway, D., Morgan, W., & Wright, P. (2002). Trade liberalisation and growth in developing countries. *Journal of Development Economics*, 67(1), 229–244. [https://doi.org/10.1016/S0304-3878\(01\)00185-7](https://doi.org/10.1016/S0304-3878(01)00185-7)
- Grossman, G. M., & Helpman, E. (1990). Trade, Innovation, and Growth. *The American Economic Review*, 80(2), 86–91.
- Grossman, G. M., & Helpman, E. (1991). Trade, knowledge spillovers, and growth. *European Economic Review*, 35(2–3), 517–526. [https://doi.org/10.1016/0014-2921\(91\)90153-A](https://doi.org/10.1016/0014-2921(91)90153-A)
- Harrison, A. (1996). Openness and growth: A time-series, cross-country analysis for developing countries. *Journal of Development Economics*, 48(2), 419–447. [https://doi.org/10.1016/0304-3878\(95\)00042-9](https://doi.org/10.1016/0304-3878(95)00042-9)
- Harrison, A., & Topalova, P. (2013). Trade Liberalization, Poverty, and Inequality. In *Globalization and Poverty* (Issue March). <https://doi.org/10.7208/chicago/9780226318004.003.0008>
- Iqbal, M. S., Anwar, S., Khan, M. A., & Iftikhar, M. (2018). Potential economic and household income gains from trade liberalization by using MyGTAP model. *European Online Journal of Natural and Social Sciences*, 7(2), 444–459.
- Islam, A., Salim, R., & Harry, S. (2015). Welfare Impacts of Preferential Trade Liberalization in South Asia. *The Journal of Developing Areas*, 49(5), 285–292. <https://doi.org/10.1353/jda.2015.0070>
- Jenkins, R. (1996). Trade liberalization and export performance in Bolivia. *Development and Change*, 27(4), 693–716. <https://doi.org/10.1111/j.1467-7660.1996.tb00608.x>
- Khan, A., & UrRahman, A. (2020). Computational Analysis of China-Pakistan FTA in a GTAP Modeling Framework: A Disaggregated Approach. *Journal of Management Sciences*, 14.
- Khan, M. A. (2019). *Potential Pakistan-South Korea Free Trade Agreement – Options for Pakistan*. 9(11), 1–9.
- Khan, M. A., Mehmood, Q., Zakaria, M., & Husnain, M. I. ul. (2018). A Household Level Analysis of the Pakistan–Malaysia Free Trade Agreement. *Journal of Asian and African Studies*, 53(7), 1062–1085. <https://doi.org/10.1177/0021909618762568>
- Khan, M. A., Zada, N., & Mukhopadhyay, K. (2018). Economic implications of the Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP) on Pakistan: a CGE approach. *Journal of Economic Structures*, 7(1). <https://doi.org/10.1186/s40008-017-0103-x>
- Khan, M. O., & Khan, M. A. (2021). Economic impact of UK joining Asia Pacific Trade pact CPTPP : A Global CGE Approach. *SSRN Electronic Journal*, 1–22. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3790232
- Levine, B. R., & Renelt, D. (2016). American Economic Association A Sensitivity Analysis of Cross-Country Growth Regressions Author (s): Ross Levine and David Renelt Source : The American

Economic Review , Vol . 82 , No . 4 (Sep ., 1992), pp . 942-963 Published by : American Economic As. *The American Economic Review*, 82(4), 942–963.

- Lin, F., & Fu, D. (2016). Trade, Institution Quality and Income Inequality. *World Development*, 77(9144034), 129–142. <https://doi.org/10.1016/j.worlddev.2015.08.017>
- Mah, J. S. (2013). Globalization, decentralization and income inequality: The case of China. *Economic Modelling*, 31(1), 653–658. <https://doi.org/10.1016/j.econmod.2012.09.054>
- Mahmood, M. A., Sheikh, A. D., & Akmal, N. (2010). IMPACT OF TRADE LIBERALIZATION ON AGRICULTURE IN PAKISTAN: A REVIEW. *Journal of Agricultural Research*, 48(1), 121–131. <http://ovidsp.ovid.com/ovidweb.cgi?T=JS&CSC=Y&NEWS=N&PAGE=fulltext&D=caba6&AN=20103304717%5Cnhttp://www.saarcagri.net/>
- Manni, U. H., & Afzal, M. N. I. (2012). Effect of trade liberalization on economic growth of developing countries: A case of Bangladesh economy. *Journal of Business, Economics*, 1(2), 37–44.
- Meschi, E., & Vivarelli, M. (2009). Trade and Income Inequality in Developing Countries. *World Development*, 37(2), 287–302. <https://doi.org/10.1016/j.worlddev.2008.06.002>
- Mkubwa, H. M., Mtengwa, B. A., & Babiker, S. A. (2014). The Impact of Trade Liberalization on Economic Growth in Tanzania. *International Journal of Academic Research in Business and Social Sciences*, 4(5), 514–532. <https://doi.org/10.6007/ijarbss/v4-i5/879>
- Mukhopadhyay, K., & Thomassin, P. J. (2010). Impact of regional economic integration in East Asia. *International Economic Journal*, 24(2), 125–153. <https://doi.org/10.1080/10168731003657746>
- Rojas-Vallejos, J., & Turnovsky, S. J. (2017). Tariff Reduction and Income Inequality: Some Empirical Evidence. *Open Economies Review*, 28(4), 603–631. <https://doi.org/10.1007/s11079-017-9439-y>
- Romer, P. M. (1995). Two Strategies for Economic Development: Using Ideas and Producing Ideas. In *Proceedings of the World Bank annual conference on development economics, 1994*.
- Sachs, J. D., Warner, A., Aslund, A., & Fischer, S. (1995). Economic Reform and the Process of Global Integration. *Brookings Papers on Economic Activity*, 1995(1), 1. <https://doi.org/10.2307/2534573>
- Savard, L. (2003). Poverty and Income Distribution in a CGE-Household Micro-Simulation Model: Top-Down/Bottom Up Approach. *SSRN Electronic Journal*, October 2003. <https://doi.org/10.2139/ssrn.485665>
- Shafaeddin, M. (1995). The Impact of Trade Liberalization on Export and GDP Growth in Least Developed Countries. *UNCTAD Review*. https://doi.org/10.1057/9781137462053_4
- Shah, M. H., & Samdani, S. (2015). *Impact of Trade Liberalization on FDI Inflows to D-8 Countries Mumtaz Hussain Shah 1 and Saima Samdani 2*. 5(1), 30–37.
- Shaikh, F. M., Syed, G., A. A. S., Shah, H., & Shah, A. A. (2012). Observing Impact of SAFTA on Pakistan ' s Economy by Using CGE Model. *Pak. J. Commer. Soc. Sci.*, 6(2), 185–209.
- Suvankulov, F., & Ali, W. (2012). Recent Trends and Prospects of Bilateral Trade between Pakistan and Turkey: A Gravity Model Approach. *Journal of International and Global Economic Studies*, 5(1), 57–72. http://search.proquest.com/docview/1265879460?accountid=13042%5Cnhttp://oxfordsfx.hos ted.exlibrisgroup.com/oxford?url_ver=Z39.88-2004&rft_val_fmt=info:ofi/fmt:kev:mtx:journal&genre=article&sid=ProQ:ProQ:econlitshell&ati tle=Recent+Trends+and+Prospects+of+B

- Walmsley, T., & Minor, P. (2013). *MyGTAP Model : A Model for Employing Data from the MyGTAP Data Application — Multiple Households , Split Factors , Remittances , Foreign Aid and Transfers By and*. 78, 1–31.
- Yasmine, K., & Chahir, Z. (2018). *How Do Technical Barriers to Trade Affect Exports? Evidence from Egyptian Firm-Level Data*. 33(4).
- Zakaria, M., & Ahmed, E. (2013). *OPENNESS – GROWTH NEXUS IN PAKISTAN : A MACRO – ECONOMETRIC ANALYSIS*. 1(1).

Appendix

Model Aggregation

Sectoral Aggregation (GTAP Database 10)		
GTAP Sector	Abbreviation	Description
Grains Crops	Grain Crops	Paddy rice, Wheat, Cereal grain nec, Oil seeds, Sugar cane, sugar beet, Plant based fibers, processed rice and Crops nec
VegFruit	Vegetables and Fruits	Vegetables, fruit, nuts
MeatLstk	Meat and Livestock	Bovine cattle, sheep and goats, horses, Animal products nec, Raw milk, Wool, silk-worm cocoons, Bovin meat products and Meat products nec.
Extraction	Extractions	Forestry, Fishing, Coal, Oil, Gas and Other Extraction like mineral etc.
ProcFood	Processed Food/ Other Food	Vegetable oils and fats, Dairy products, Sugar, Food products nec, Beverages and tobacco products.
TexWapp	Textile and Wearing Apparels	Textiles and Wearing apparel
LightMnfc	Light Manufactures	Leather products, Wood products, Paper products publishing, Petroleum, coal products, Basic Pharmacetuical products, Rubber and Plastic products, Metal products, motor vehicles and parts, Transport equipment nec. and manufactures nec.
HeavyMnfc	Heavy Manufactures	Petroleum, coal products, Metals nec, Ferrous metals, Metal products, Motor vehicles and parts, electronic equipment, Machinery, and equipment nec & manufactures nec.
Util_Cons	Utility Consumption	Electricity, Gas manufacture, distribution, Water, Construction
TransComm	Transport and Communication	Trade, Transport nec, Water transport, Air transport, Communication
Services	Services	Accommodation, Food, and service activities, Warehousing, and support activities, financial services, Insurance (formally isr), Real estate services, Business service nec, Recreational and other services, public administration and defence, Education, Human health and social work activities and Dwellings.

Sectors Abbreviation

Code	Abbreviation
GrainsCrops	Grain Crops
VegFruit	Vegetable and Fruits
MeatLstk	Meat & Livestock
Extraction	Extraction
ProcFood	Processed Food
TexWapp	Textile & Wearing Apparal
LightMnfc	Light Manufacturing
HeavyMnfc	Heavy Manufacturing
Util_Cons	Utility Consumption
TransComm	Transport and Communication
Services	Services Sector

Aggregation of figure 1.3

Sectors	Commodities
Meat and Livestock	Animal
	Hides and Skins
Textiles and Clothing	Textiles and Clothing
	Footwear
Vegetable	Vegetable
Food Products	Processed Food
Extraction	Minerals
Miscellaneous	Miscellaneous
Transportation	Transportation
Manufacturing	Chemicals
	Fuels
	Machinery and Electronics
	Metals
	Plastic or Rubber
	Stone and Glass
	Wood