

An Economic analysis of UK joining in Asia-Pacific Trade pact with the CPTPP

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Abstract

The Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP) is one of the mega-regional trade agreements with the main objective of liberalized trade among the fastest-growing Asia-Pacific countries. The CPTPP (formerly TPP) members consist of eleven countries in wake of the secession of the United States (US). However, after the BREXIT, the United Kingdom (UK) is now seeking new trade agreements with potential non-EU countries. The UK recently applies to join the CPTPP. Against this backdrop, this research intends to understand the economic consequences of the UK joining the CPTPP by conducting a Computable General Equilibrium (CGE) analysis based on Global GTAP modelling. Results from this exercise show optimistic and encouraging growth outcome for the UK's economy. The impact on UK is more positive if China joins CPTPP. However, countries like EU-27, India, and Brazil are encountering some adverse implications. This research indicates that the UK membership in the CPTPP would not only boost the UK economy but also bring an expansion in real factor return of the UK resulting in higher investment and employment opportunities for the country.

Keywords: Trans-Pacific Partnership, Computable General Equilibrium, Trade Liberalization, United Kingdom, Trade Agreements

1. Introduction

The attainments of a few multi-regional free trade agreements (FTAs) built before the formation of the World Trade Organisation (WTO), namely the European Union (EU), North American Free Trade Agreement (NAFTA) and Association of South East Asian Nations (ASEAN), in terms of enhanced trade and investment flows, employment opportunities and sharp growth impetus encouraged more such regional economic integrations and assemblage in the post-WTO era. In this manifestation of regional economic multitude around the globe, the Trans-Pacific Partnership (TPP) is by far appeared as the most comprehensive trade and investment pact to eliminate a broad array of economic barriers and complications, some of which have been untouchable in the previous agreements and frame state-of-the-art anti-distortionary domestic policies to facilitate the free flow of tradable commodities and investable capital (Schott, 2016). The TPP agreement signed after many years of negotiations in February 2016 by the United States (US) and 11 other Pacific Rim countries.

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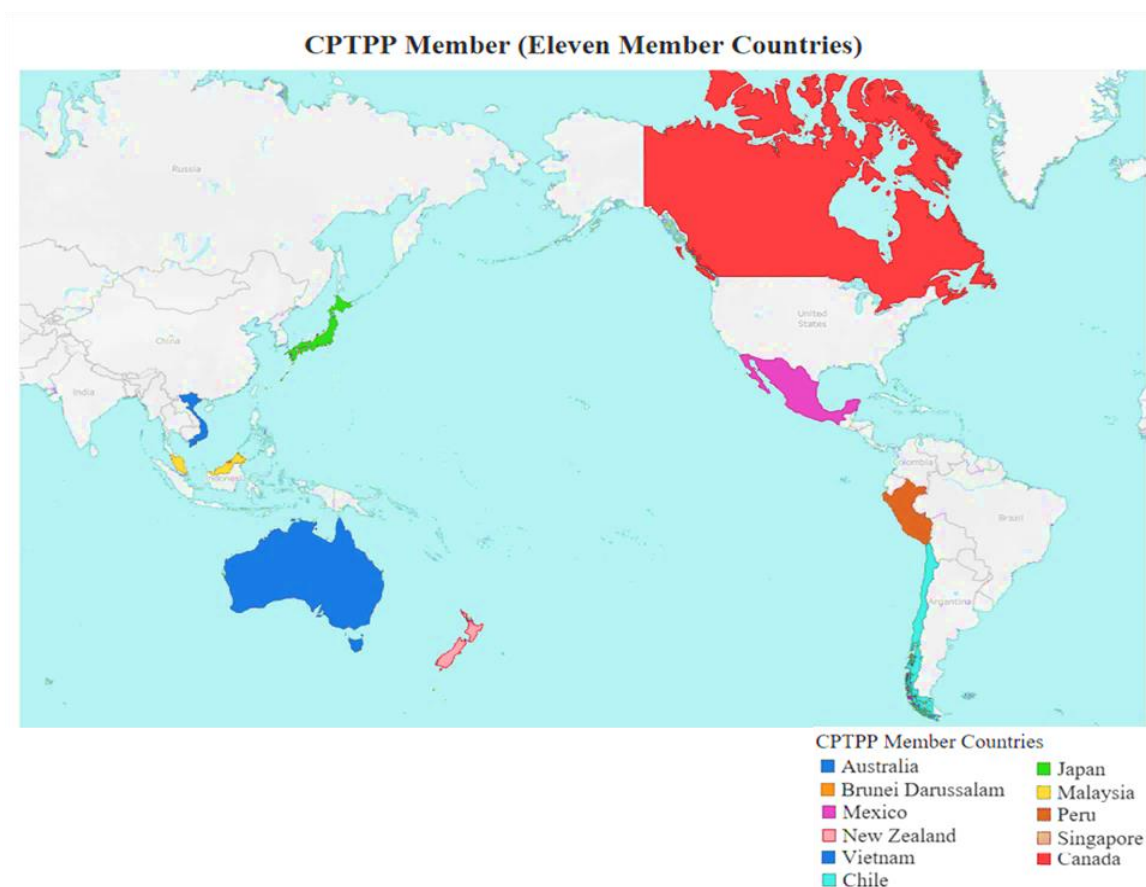
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The US initially gave high priority to this TPP pact amidst the collapse of the Doha Agreement in 2006 and extended phases of economic slowdowns from 2008 onwards (Petri et al., 2011)⁵. Applying a quantitative trade model, Petri and Plummer (2016) estimated that the engagement with the TPP would increase the annual real income for the US by 0.5% of their GDP, and annual exports by 9.1% of total US exports, over baseline projection for the year 2030, when the pact is fully implemented. Despite this enthusiasm and aspirations around the implementation of the TPP among a segment of the US trade practitioners and politicians, the Ex- President of the US, Mr Donald Trump considered the TPP trade deal as a threat to the US economy, employment and sovereignty and declared its pull-out from this agreement in January 2017 (Hufbauer et al., 2016; Noland, 2018). After the withdrawal of the US from the TPP, the remaining signatories are left to grapple with the consequences with more uncertainties about the future of this agreement due to the scepticism that without the US the trade deal is futile for it alone accounted for some 60% of the combined GDP of the rest of the eleven TPP members (Hseieh et al., 2017; Chaisse, 2019). However, these remaining two signatories in the South Pacific (Australia and New Zealand), four signatories in North and South America that border on the Pacific (Canada, Mexico, Peru and Chile) and five signatories in Asia (Japan, Vietnam, Singapore, Malaysia and Brunei Darussalam), as illustrated in Figure 1 below, moved forward to revive the trade deal and reach an agreement in January 2018 (Petri et al., 2017; Schott, 2018). During this course, many existing clauses are reviewed, revised and the outlook of the TPP is rebranded in the name of Comprehensive and Progressive Agreement for the Trans-Pacific Partnership (CPTPP) in March 2018 and came into force in December 2018 (Upreti, 2018; Gilbert et al., 2018; Khan et al., 2018 ; Chaisse, 2019; Wang, 2019).

⁵ According to Petri et al. (2011), the zest of the US in signing the TPP agreement was principally driven by four important expectations from the pact: Firstly, TPP would create a comprehensive alternative to a strong global agreement that would favour the US exports; secondly, it would promote powerful commercial diplomacy to benefit the US in superintending in this entire Asia-Pacific region; thirdly, it would evolve as a model for consolidating existing smaller regional bilateral and multilateral agreements and dismantling the overlapped rules to reduce costs of compliance and increase productivity; fourthly, it would defunct other operational FTAs by ASEAN, China and Japan that exclude the US and help level the playing field for the US trade competitiveness.

Figure 1: Geographic Identification of CPTPP members



Source: Authors Illustration with Ministry of Trade and Industry of Singapore, 2021

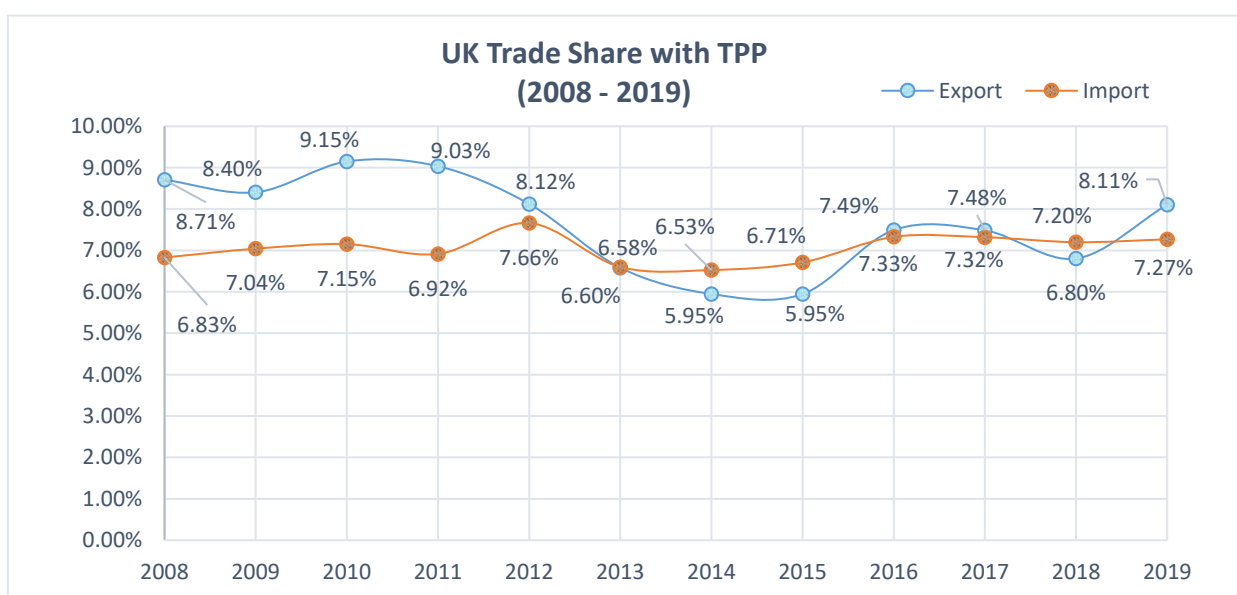
CPTPP brought deep economic integration by substantially opening up trade and investment opportunities, upgrading trade rules in key areas, e.g. intellectual property rights, bringing high-standard disciplines on competition policy, dispute settlement, and implementing an innovative mechanism to address more contemporary issues of e-commerce, environmental obligations, labour standards, designated monopolies by state-owned enterprises (SOEs), etc. (Fergusson et al., 2016; Petri & Plummer, 2018; MTI, 2021). However, once the trade agreement found its foot in reality and running successfully over some time, the next attention for the CPTPP was to expand the block and include some more like-minded member countries principally to complement the loss of economic size due to the withdrawal of the US (Wang, 2019; Rana and Ji, 2019). This aspect was formally discussed in the inaugural meeting of the CPTPP commission of ministers in Tokyo in January 2019 (Cutler et al., 2019). There is a long queue of countries already showed their interest to join in the CPTPP including Columbia, South Korea, Thailand, Indonesia, Philippines, etc. (Ji and Rana, 2019). The European Parliament also presented a strategic position for the EU based on their reviewed ever-changing trade policy environment under the implications of an expanded Trans-Pacific collaboration during a Workshop in Brussels in November 2017.

Interestingly, the UK stood wishful to join directly into the CPTPP trade pact even before formally extricating itself from the EU's common commercial policy. After the ceremonial BREXIT, the UK-EU relationship turned into mere bilateralism such that the regained distinction in trade policymaking capability drove the UK to put serious attention in Asia and other non-EU countries (Dhingra et al., 2017; Ijtsma et al., 2018; Banerjee, 2000a; 2000b). The

British government initiated their engagement with the CPTPP member countries in July 2018. Later, the British government applied on 1st February 2021 to be part of CPTPP which a positive aim of strengthening the supply chain to major and fast growth economies (like Malaysia, Mexico and Vietnam) for the welfare of the United Kingdom (Webb & Ward, 2021). Being the fifth-largest economy globally, the UK has six times higher trade with the existing CPTPP member countries than the other EU members. In 2019, the UK-CPTPP members' trade consists of 8.11% and 7.27% of the UK's total merchandise export and import respectively. Figure 2 represents the trend of bilateral trade between the UK and 11 TPP members during 2008-2019. For the UK, the manufacturing sector stands as the top export revenue generator while agricultural and services come afterward. The UK's total export to the CPTPP members were equivalent to \$353 billion in 2018 and \$340 billion in 2019 and total import from this block were \$456 billion in 2018 and \$561 billion in 2019. The pronounced trading commodities pertaining to the manufacturing sector include machinery, plastic or rubber, glass and related products, textile & wearing apparel, extraction, etc. Among the non-manufacturing commodities, the UK exports vegetable & fruit, meat, livestock and processed food products etc. To be precise, the share of manufacturing commodities in the UK's export and import in 2019 were equivalent to 59.75% and 71.10% respectively. Figure 3 shows a broad commodity-wise break-up of these shares in the UK's export and import with the CPTPP.

The joining of the UK in the CPTPP could be a tremendous benediction for the block both in terms of expanding economic activities and transactions and for enormously motivating other aspiring and prospective members for further proliferation of the partnership. However, this accession of the UK in the CPTPP would contrive wide-spread changes in the existing trading arrangement around the world (Khan et al., 2018). The presently operational bilateral negotiations between the 11 CPTPP members with the UK would be radically replaced by more favourable designs and mutually beneficial arrangement under the CPTPP agreement (Stephens, 2021). Besides, the countries outside this event of economic integration would also be affected for the disruptions in the existing network of international trade and investment.

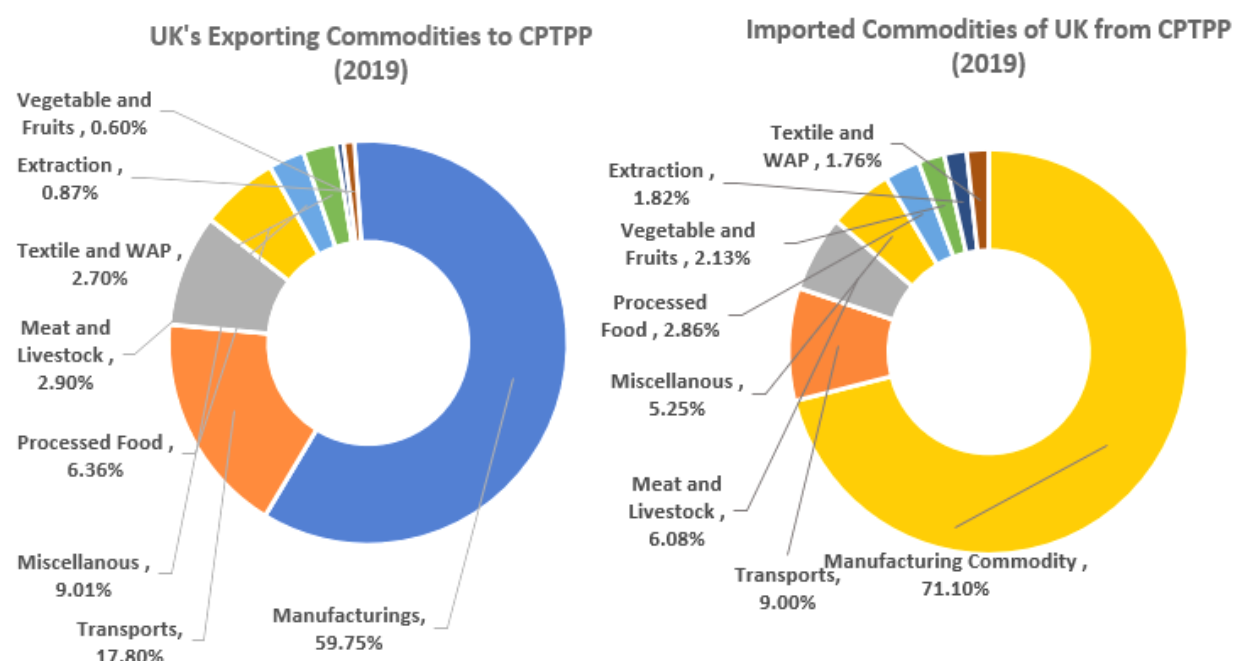
Figure 2: Trend in United Kingdom Trade with TPP (2008-2019)



Source: Authors Calculation using UN COMTRADE Statistics

This study intends to address these streams of impacts which may originate from this UK-CPTPP assemblage on the UK's economy and for the other parts of the world having a significant trade engagement with the UK and the CPTPP. To the best of literature reviewed, the paper is one of the first of its kind which conducts a global modelling of this contemporaneous event to examine the wide-ranging impacts in a comprehensive manner.

Figure 3: Share of UK Trade with CPTPP economies in 2019



Source: Source: Author's Visualization using WITS, 2021

The paper is structured as follows. Section 2 explains the relevant literature reviewed before conducting the study. Section 3 elaborates on the model and methodology adopted in the study. Section 4 discusses the results from the empirical exercise and their interpretations. Finally, section 5 concludes the paper.

2. Literature Review

The various dimensions of the wide-ranging impacts of the UK's recent interest in this collaboration with the CPTPP invites both new opportunities and challenges for the existing CPTPP members and other economies having significant trade relationship with both the UK and the CPTPP as a whole. Stephens (2021) expresses his concern for the future of the Trade Continuity Agreement (TCA) between the UK and the CPTPP member Canada which was framed by the two countries for reaching a new, permanent bilateral agreement by 2024 and replaced existing rules designed when the U.K. was still a member of the EU. However, if the U.K. joins the CPTPP, Canada cannot end up negotiating two trade agreements with the same country at the same time. Due to the clear divergences between the CPTPP members and the UK, notably over food standards, data and certain types of tariffs, there are enormous complexities in the mechanism of negotiations to frame the rules of the game of final economic alignment for a potential trade deal that would benefit the existing CPTPP members (Oxford Analytica, 2020). Wu (2020) argued that the UK has to fulfil its promise of Global Britain by delivering measurable progress in trade negotiations instead of renegotiating back what it has

already enjoyed under the EU-FTA. Reilly (2020) addressed the event of the UK-CPTPP partnership as an ‘intriguing possibility’, however, opined that the UK need to cast aside its old-fashioned stereotypes and patronising assumptions and instead seek to build relationships based on shared values, mutual understanding, willingness to learn and readiness to engage in patient negotiations, consensus-building and multilateral diplomacy. Additionally, the UK accession in CPTPP would diminish the trade barriers as well as it would mitigate the travel between the UK – CPTPP (DIT, 2021).

There is ample literature to discuss the impact of the CPTPP formation and expansion on the member and non-member countries. Most notably, for instance, Khan et al. (2018) studies the economic implications of the CPTPP on Pakistan applying a Computable General Equilibrium (CGE) analysis and found that Pakistan would suffer from the CPTPP agreement due to trade diversion of textile and apparels in favour of the CPTPP members, however, if Pakistan joins CPTPP, there is an overall positive impact on Pakistan’s economy. Rahman and Ara (2015) also found that for the South Asian economies joining the CPTPP would bring enormous gain in major economic variable like real GDP, terms of welfare and exports. Li & Whalley (2014) estimated the implication of the CPTPP granting membership to China and found that the inclusion of China would be mutually beneficial for the Chinese economy as well as for the other CPTPP members. Ganesh Kumar & Chatterjee (2016) also suggested that in the case of India, the country should aggressively pursue Preferential Trading Arrangements (PTAs) with key members of these mega PTAs to ensure that the country does not lose market share due to preference erosion. Table 1 below, showcases some more studies on the issue of the repercussions of the TPP on various national and regional economies. These studies found frequently adopting Computable General Equilibrium (CGE) approach due to the limitations of insufficient database to deal with an instantaneous issue and appropriateness to experiment under different possible scenarios.

From the reviewed literature on the implications of the CPTPP, the study found several considerable and significant impacts for both the members and non-members of the block. In general, the member countries found having positive economic impacts due to the effect of trade-creation under preferential arrangement, while the impact of the trade-diversion effect has been significant for the non-member economies. Based on these typical and well-established broad economic implications around any FTA, this research focuses on the event the UK’s joining in the mega-trade-pact of the CPTPP. The present study intends to fill up the lacuna in the literature that insufficiently addresses the interactions of trade-creation and trade-diversion aspect under the ambit of UK-CPTPP arena from a global macroeconomic perspective. The study also attempts to understand how far the inclusion of the UK in the CPTPP pact able to refit the loss of economic size due to the pull out of the US. Additionally, the study also reveals the consequences on UK as if USA along with UK joins the CPTPP and also the inclusion of UK and China in the Asian Pacific trade pact.

3. Model and Methodology

The study adopts a global Computable General Equilibrium (CGE) model-based analysis to empirically investigate the economic consequences of the UK’s inclusion in the CPTPP. The model is fundamentally based upon neo-classical economic theory. CGE modelling is frequently

employed for simulation-based analysis because it assists in the estimation of the impacts of different public policy changes, international occurrences, technological variation, environmental variation, etc. (Khan et al., 2021, Raihan et al., 2009; 2010; Khan 2020, De et al., 2012; Banerjee, 2020; Banerjee, 2021). The whole analysis bases on the real-world database arranged in the form of a Social Accounting Matrix (SAM)⁶. The Study applies the Global Trade Analysis Project (GTAP) model developed by Purdue University's Global Trade Center and follows the building blocks and parameters of the modified version of the MyGTAP model (Walmsley & Minor, 2013).

3.1. Standard GTAP and MyGTAP Model

The methodological framework (GTAP model) functions in a market where productivity and trade of goods arrogates and exists in form of competitiveness. The model is elucidated using GEMPACK software package (Harrison & Pearson, 1996). GTAP also called Multi-Country model and is habitually linear with utilization of real global dataset during the analysis. It takes utility maximization circumstance into existence for economic agents. Likewise, it is developed to analyse economic policies based upon various trade agreement like free trade policies, alteration in tariff, taxes, curtailment of non-tariff barriers and so forth.

MyGTAP is extended version of standard GTAP model, it differs from Standard GTAP model by distinguished types of households, association of government and expense.

⁶ A SAM is a comprehensive economy-wide data framework, consisting of production and consumption activities and interactions between different sectors, factors of production and institutions typically representing the economy of a nation (Lofgren et al., 2002).

Table 1: Evidence based on the study using CGE modelling.

Authors	Dataset/ Concentration	Methodology	Outcome
Khan et al. (2018)	GTAP Database 9a Pakistan SAM (2010-11) 30 regions x 15 sectors	CGE Approach with MyGTAP Model	Entry of Pakistan into CPTPP results in: • A mature growth in country's macroeconomic indicators along with trade balance (in long-run). • Growth in real household income is also observed with reduction in income inequality among poor and rich. • Exhibit in astounding real factors (e.g., labour, land & capital).
Rahman & Ara, (2015)	GTAP Database Version 8 17 region x 10 commodities	Standard GTAP Methodology	South Asia being part of TTIP would result in enormous gain in major economic variable like real GDP, terms of welfare, exports. Countries like: • Pakistan has potential gain in real GDP with 2.03%. • Bangladesh gains by 2.39% • Sri Lanka by 2.34% • Nepal by 5.1% • India 0.39%
Kikuchi et al. (2018)	Version 9 with reference year 2011. 27 regions x 24 sectors	Standard GTAP Model	Mega trade agreement in form of EVFTA, CPTPP, RCEP and FTAAP increased real GDP of Vietnam by 8.1% (\$11.0 billion), 6.5% (10 billion) and 9.2% (14 billion). Subsequently, middle income trap of Vietnam drops beneath the ample probable level.
Itakura & Lee, (2019)	GTAP Database Version 9 along with incorporation of I-O table	Incorporation of GVC structure with dynamic GTAP model	Output of textile and wearing apparels are estimated to have higher potential gain with CPTPP relative to RCEP. Mega Trade agreements like CPTPP and RECP has favourable effect on agrarian and textile sector along with services. Moreover, the employment of GVC structure shows insignificant results for overall welfare.
Maliszewska et al. (2020)	GTAP Database 9	CGE Model Global Income Distribution Dynamics (GGID)	A successful implementation of EVFTA and CPTPP was depicted to raise the Vietnamese economy by 2.4% (through EVFTA) and 0.8% via CPTPP. Expansion of trade volume between 12% to 14% (through EVFTA) and 16% to 19% via enactment of CPTPP and EVFTA.

Table 1: Evidence based on the study using CGE modelling.

Authors	Dataset/ Concentration	Methodology	Outcome
Li & Whalley, (2014)	Version 9 (2011) Aggregation into 11 countries UN COMTRADE Database	Armington type General Equilibrium Model Gravity Model	Chinese economy being marked as successive, if given the member of TPP. China was observed to achieve in economic gains after joining TTP whereas global FTA was suggested to benefit all countries on contrary side, China being part of TTP shows significant gain for other member of TTP indicators like welfare, production, and trade volume.
Oduncu et al., (2014)	GTAP v7 113 countries x 57 sectors	Standard GTAP Model	Turkey would be able to face loss by 1% of GDP, if TPP includes only twelve countries.
Areerat et al., (2015)	Version 7 (2004 – base) 12 regions x 15 sectors	GTAP Model focusing Agricultural Sector	Successive arrangement of Japan in TPP results in \$14 billion gains. Productivity of sectors like agricultural observes production shifts.
Cheong and Tongzon (2013)	Database v8 (2007) 18 regions x 5 commodities	Dynamic Version of GTAP Model	Significant growth was estimated through RCEP. Minor gains were assessed in the nominal GDP with omission of New Zealand and Malaysia while japan and china shows negative results in both scenarios.
Durongkaveroj et al. (2014)	GTAP Database 8 (2007 Reference year)	Standard GTAP Model	Minor growth in GDP of Thailand economy was assessed by joining the TPP however, adverse impact in agricultural sector is monitored in case Thailand is not taken into the partnership (TPP).
Li (2014)	Database Version 8 27 regions x 41 commodities	Recursive Dynamic along with Armington Model	Chinese economy and TPP region do not see any major growth in real GDP (except Vietnam).

TTIP: Transatlantic Trade and Investment Partnership; EVFTA: EU – Vietnam Free Trade Agreement; CPTPP: Comprehensive and Progressive Trans-Pacific Partnership; RCEP: Regional Comprehensive Economic Partnership; FTAAP: Free Trade Area of Asian Pacific; GVC: Global Value Chain; NTB: Non – Tariff Barrier and TPP: Trans-Pacific Partnership

MyGTAP model identifies the concatenation of remittances, taxes etc.(Walmsley & Minor, 2013) On contrary side, the standard GTAP model identifies limitation in households and factors income. Additionally, MyGTAP has a spotlight on transformation between household and government along with Aids and remittances. Moreover, the central point is that the extended version of global trade analysis project (GTAP) establishes categorized factors (i.e., types of land based upon size, variety of labour etc.) rather than conventional five factors like land, skilled and unskilled labour, capital and natural resources. Furthermore, the specific reason to discover and innovate MyGTAP model was that the initial model i.e., Standard GTAP model was not capable to incorporate latest data input. The prime intention was to manage household income, expenditure and transfer payments. The main highlighted feature of MyGTAP model is usage of linear expenditure system (LES). The LES in MyGTAP works in its best for analysing of consumption of developing countries while the Constant Demand Elasticity can be commenced by estimating and examining benefits in developed countries.

Table 2 Difference between Standard GTAP and MyGTAP model.

Difference b/w Standard GTAP and MyGTAP model

Standard GTAP model	MyGTAP Model
Single Regional Household	Multiple and differentiated household's types. Link Government income and expenditure to tax revenue.
Less detailed income-expenditure system; Income Sources are taxes and factor incomes. Further distributes in three components: Government expenditure, private household expenditure and saving-investment expenditure.	More detailed accounting system increasing understanding of the relationships. Factor incomes, Remittances, taxes and Aid are transferred by household and government transfers to multiple households and government. The income is spent/save by different Households expenditure and savings, and Government expenditure and savings.
Income of households and income from factors of production cannot be linked thus limiting deep analysis.	The household and factor income is linked by connecting each household income with factor of production shares of that household.
Constant difference of elasticity (CDE) function in household consumption, thus limits analysis of subsistence consumption in poor economies.	CDE function + Availability of Linear expenditure function (LES) for multiple household private consumption.
No transfer b/s household and Government	Transfers between household and government and also foreign Aid and remittances.
Standard 5 factors of production (Land, skilled labor, unskilled labor, capital and natural resource)	Flexible factors categories (e.g. Urban and Labor, multiple types of land and capital)

Source: Based on Khan (2020); www.mygtap.org

3.2. Dataset

The study uses the latest released GTAP 10 database (Aguiar et al. 2019a). The GTAP 10 database comprises a properly documented and fully transparent database on the world economy containing complete information on bilateral trade, transport and protection linkages based on four reference years, i.e., 2004, 2007: 2011 and 2014. Updated dataset is constructed

using a combination of national data with aggregated macroeconomic, microeconomic and energy data. This paper conducts the CGE analysis based on the recent data available for 2014 as the reference year. This dataset covers 121 countries aggregated into 20 regions. Moreover, it encompasses data for 65 relevant sectors with new version of sectoral concordances, extension of covered sectors. Figure 4 epitomize the covered regions in GTAP database.

Figure 4 exploiting the regions covered in GTAP database 10a.



Source: <https://www.gtap.agecon.purdue.edu>

3.3. Research Scenarios

The study conducts four scenario-based counterfactual analysis in the investigation to understand the consequences of the UK's joining in the CPTPP, principally on the United Kingdom economy. These simulation experiments are summarized in tabular form as shown in table 2 below. In these experiments, an assumption of tariff liberalization in bilateral trade is adopted without any alteration in the non-tariff measures

- 1) **SIM-I:** *Joining of the UK in the current CPTPP (11)* – United Kingdom trade with CPTPP members under the existing tariff.
- 2) **SIM-II:** *Joining of the UK in the current CPTPP (11)* – 50% reduction in bilateral tariff on the UK and CPTPP members' trade.
- 3) **SIM-III:** *Partnership of the UK and the USA with the CPTPP (11)* – 50% reduction in bilateral tariff of the UK, the USA and the CPTPP.
- 4) **SIM – IV:** *China and UK accession in CPTPP (11)* – Reduction of tariff by 50% on trilateral trade between UK, China and CPTPP (11).

Simulations	Description
SIM I <i>UK – CPTPP (11)</i>	UK excluded from CPTPP and trading under existing tariff

SIM II <i>UK + CPTPP (11)</i>	UK included in CPTPP; existence of fifty percent reduction in bilateral tariff
SIM III <i>UK+USA+CPTPP (11)</i>	Inclusion of UK and USA in CPTPP; existence of bilateral fifty percent tariff among UK, USA and CPTPP members.
SIM IV <i>UK+China+CPTPP(11)</i>	Reduction of tariff on trilateral trade by 50% between CPTPP (11), UK and China.

3.4. Model Closures

The study assumes perfect competition in all sectors. Both labour and capital are completely mobile across the sectors while the two other factors, namely natural resources and land are sluggish. Moreover, the model considers government expenditure as a flow of government income with the exemption of tax replacement. Furthermore, the flow of foreign income is marked to fluctuate with the fluctuation in factor prices in the country. The investment is powered by the same source as in standard GTAP i.e., expected rate of return and the sum of private household and government deficit results in total domestic savings. Thus, trade balance is endogenous.

4. Results and Discussions

4.1. Macroeconomic Impacts on the UK and other non-members of the CPTPP

The anticipated impact of the three scenarios on UK's economy and other (highly) effected global economies are mentioned below in table 3. The table shows the implication on various economic variables like real GDP, export, imports and terms of trade along with government income. Considering the first scenario, the impediments on UK's real GDP would be negative. Similarly, China, EU-27, Korea, Brazil, Thailand, Indonesia, India, Pakistan, and India would also have negative implication on its real GDP. Moreover, the real exports would elevate by \$143.19 million while the real imports would decline by \$-144.25 million. Similarly, the terms of trade and government income would face curtailment. On the other hand, other global economies would have blended consequences on its macroeconomic variables. The contraction in real GDP of UK occurs due to the shrinkage of government expenditure, private expenditure as well as the investment in the UK. Moreover, the slump in terms of trade resulted by the depreciation in the amount received for exports (amount received for good produced in UK) and appreciation in expenditure on imported commodities consumed in UK.

On contrary side, the inclusion of UK in Asia Pacific trade pact (CPTPP) with reduced bilateral tariff (Simulation – II – *CPTPP+UK*) would enhance the real GDP, real exports, real imports, terms of trade and government income of UK's economy. The consequences behind the enhancement and intensification is trade diversion. In this case, trade would divert to CPTPP member countries due to the fact of reduced ad-valorem tariff. Likewise, the consequences behind the amplification in terms of trade of UK would occur due to the strengthening of its currency and exports – higher amount of goods can be imported by a exporting a unit of good. Additionally, the growth in government income in UK's economy would also be identified because of hoisted collection of taxes from industrialists and SMEs. As the demand and productivity increases, the enhancement in direct and indirect taxes would also take place which as a result would escalate government revenue. The underlying cause of the growth in UK's real GDP is the massive gain in investments, expenditure of household in

UK as well as the regional exports. Likewise, the gains in terms of trade resulted because of the growth in both price paid for purchasing goods from foreign as well as price received by UK for exporting goods. Furthermore, the trade diversion would have a blended consequence on the macroeconomic variables; it can also be perceived from table 3.

The simulation III (*UK+USA+CPTPP*) was being taken into the analysis due to the questionable trend of US joining back the CPTPP. Against this backdrop, the simulation III reveals that UK will not just be beneficial from joining the largest trade pact, but USA would also notice upward trend in its economy. In this case, the UK might get potential gains of 0.03% in its real GDP, 0.16% in its real exports and 0.38% in its real imports. Moreover, the highest hit has been observed in its terms of trade and government income. The terms of trade and government income reveals growth of 0.08% and 0.05, respectively. However, the economy of other countries (China, EU-27, Korea, Brazil, Thailand, Indonesia & India) effected from inclusion of UK and USA into CPTPP contraction in its real GDP, real exports & imports, terms of trade. Despite that the other global economies would have negative consequences in all the macroeconomic variables mentioned. As the above discussion reveals the growth in real GDP of UK and USA; it can be concluded that gain in UK's economy would persist because of the amplification in the investments, household expenditure as well as regional exports (at world FOB prices) and the sale of commodities to international transport system which carries on the trade between countries.

Another pertinent point during the analysis was the application of China to join CPTPP. During the fourth simulation (*SIM-IV*), the potential economic implication of UK and China accession in CPTPP is highlighted. The analysis reveals that outcomes from the inclusion of China and UK into the trade pact would culminate to highest gains in real GDP, real exports, real imports, terms of trade and government income of both countries relative to the outcomes of preceding simulations. Table 3 exhibits that UK and China would have potential gain in their real GDP by 0.06% and 0.08%, respectively. Moreover, the real exports and imports of UK shows gain of 0.29% million and 1.11% while Chinese economy shows potential acquisition of 0.97% and 1.58% of their real exports and imports respectively. Moreover, the terms of trade also show appreciation for both countries however, the government income of Chinese economy might decline by -0.07. Likewise, the implication on other economies is blended; which are mentioned in table 3. The gains observed in the real GDP of UK and China is primarily associated with the growth in household expenditure on tradable goods, massive investments in both UK and China, enhanced regional exports and sale of goods to carriage sector. Moreover, the growth in terms of trade resulted by accumulation of higher amount for exports rather than the amount paid for imports.

Table 3: Impact of CPTPP on major Economic Indicators of UK and other effected non-member countries

Simulation - I (CPTPP)					
	Real GDP	Real Exports (qxwreg)	Real Imports (qiwreg)	Terms of Trade (tot)	Government Income (gincome)
China	-0.01% (\$-261M)	-0.00% (\$-36.75M)	-0.07% (\$ -1473M)	-0.03% (-0.0003)	-0.027888
EU_27	-0.00% (\$-49M)	0.00% (\$301.5M)	-0.01% (\$-643M)	-0.01% (-0.0001)	-0.015046
Korea	-0.01% (\$-41.88M)	0.01% (\$44.56M)	-0.04% (-218.25M)	-0.02% (-0.0002)	-0.032577
Brazil	-0.00% (\$-30.25M)	0.04% (\$106.84M)	-0.08% (\$-263.19M)	-0.04% (-0.0004)	-0.053134
Thailand	-0.01% (\$-25.78M)	0.03% (\$85M)	-0.10% (\$-260.53M)	-0.08% (-0.0008)	-0.113452
UK	-0.00% (\$-19.75M)	0.02% (\$143.19M)	-0.07% (\$-144.25M)	-0.01% (-0.0000)	-0.019046
Indonesia	-0.01% (\$-18.94M)	-0.01% (\$-21.77M)	-0.07% (\$-148.41M)	-0.03% (-0.0003)	-0.039567
India	-0.00% (\$-15.5M)	0.02% (\$71.91M)	-0.03% (\$-144.16M)	-0.02% (-0.0002)	-0.020685
Pakistan	-0.00% (\$-3.93M)	0.00% (\$0.24M)	-0.04% (\$21.00M)	-0.02% (-0.0002)	-0.046248
United States	-0.00% (\$-2M)	0.02% (\$340.12M)	-0.12% (\$-3036M)	-0.05% (-0.0005)	-0.039822

Simulation - II (CPTPP+UK)					
	Real GDP	Real Exports (qxwreg)	Real Imports (qiwreg)	Terms of Trade (tot)	Govt. Income
China	-0.00% (\$-343M)	0.00% (\$55.5M)	-0.09% (\$-1878.63M)	-0.04% (-0.0004)	-0.0378
EU_27	-0.00% (\$-51M)	0.01% (\$532M)	-0.02% (\$-1373.5M)	-0.01% (-0.0001)	-0.0249
Korea	-0.00% (\$-51.13M)	0.01% (\$66.75M)	-0.04% (\$-263.81M)	-0.03% (-0.0003)	-0.0406
Brazil	-0.00% (\$-39.5M)	0.05% (\$139.03M)	-0.10% (\$-316.38M)	-0.04% (-0.0004)	-0.0653
Thailand	-0.01% (\$-30.34M)	0.03% (\$97.06M)	-0.12% (\$-318.31M)	-0.09% (-0.0009)	-0.1363
UK	0.02% (\$696M)	0.09% (\$639.25M)	0.24% (\$2053.13M)	0.05% (0.0005)	0.0549
Indonesia	-0.00% (\$-23.5M)	-0.01% (\$-21.97M)	-0.09% (\$-189.67M)	-0.04% (-0.0004)	-0.0532
India	-0.00% (\$-18.63M)	0.02% (\$-89.5M)	-0.04% (\$185.44M)	-0.02% (-0.0002)	-0.0278
Pakistan	-0.00% (\$-4.70M)	0.00% (0.03M)	-0.05% (\$-27.61M)	-0.02% (-0.0002)	-0.0561
United States	-0.00% (\$-14M)	0.03% (\$511.5M)	-0.13% (\$-3470M)	-0.06% (-0.0006)	-0.0476

Source: Author's Own Simulation

Table 3: Impact of CPTPP on major Economic Indicators of UK and other effected non-member countries

Simulation - III (CPTPP+UK+USA)					
	Real GDP	Real Exports (qxwreg)	Real Imports (qiwreg)	Terms of Trade (tot)	Government Income (gincome)
China	-0.01% (\$-631M)	0.03% (\$656.25M)	-0.16% (\$-73.63M)	-0.07% (-0.0006)	-0.079039
EU_27	-0.00% (\$-238M)	0.02% (\$1436M)	-0.05% (\$-2975.5M)	-0.02% (-0.0002)	-0.05627
Korea	-0.01% (\$-76.38M)	0.02% (\$165.69M)	-0.07% (\$-444.06M)	-0.04% (-0.0004)	-0.062919
Brazil	-0.00% (\$-98.75M)	0.12% (\$315.41M)	-0.21% (\$-672.41M)	-0.09% (-0.0009)	-0.134219
Thailand	-0.01% (\$-42.97M)	0.06% (\$168.59M)	-0.18% (\$-472.47M)	-0.14% (-0.0014)	-0.207394
UK	0.03% (\$888.5M)	0.16% (\$1138.25M)	0.39% (\$3235.63M)	0.08% (0.0008)	0.0545%
Indonesia	-0.00% (\$-38.06M)	-0.01% (\$-18.88M)	-0.18% (\$-362.30M)	-0.07% (-0.0007)	-0.113381
India	-0.00% (\$-25.75M)	0.05% (\$228.63M)	-0.08% (\$-393.75M)	-0.04% (-0.0004)	-0.064342
Pakistan	-0.01% (\$-9.97M)	-0.01% (\$-4.32M)	-0.13% (\$-73.63M)	-0.08% (-0.0008)	-0.128413
United States	0.00% (\$314M)	0.25% (\$4930M)	0.27% (\$7119M)	0.03% (0.0003)	-0.021711

Simulation - IV (CPTPP+UK+China)					
	Real GDP	Real Exports (qxwreg)	Real Imports (qiwreg)	Terms of Trade (tot)	Govt. Income
China	0.08% (\$7585M)	0.97% (\$24362.75M)	1.58% (32765.5M)	0.07% (0.0007)	-0.0679
EU_27	-0.00% (\$-808M)	0.04% (\$2588.5M)	-0.08% (\$-5468M)	-0.04% (-0.0004)	-0.1213
Korea	-0.03% (\$-355.5M)	0.01% (\$42.81M)	-0.35% (\$-2183.75M)	-0.19% (-0.0019)	-0.3451
Brazil	-0.01% (\$-153.75M)	0.15% (\$399.81M)	-0.19% (\$586.97M)	-0.06% (-0.0006)	-0.1537
Thailand	0.02% (\$86.75M)	0.01% (\$37.25M)	-0.37% (\$-987.66M)	-0.19% (-0.0019)	-0.3
UK	0.06% (\$1849M)	0.29% (\$2009.75M)	1.11% (\$9411.69M)	0.33% (0.0033)	0.3073
Indonesia	-0.01% (\$-96.44M)	-0.04% (\$-81.17M)	-0.33% (\$-684.91M)	-0.12% (-0.0011)	-0.2493
India	-0.00% (\$-23.88M)	0.10% (\$413.81M)	-0.14% (\$-746.56M)	-0.09% (-0.0009)	-0.1188
Pakistan	-0.01% (\$-29.83M)	-0.10% (\$-29.63M)	-0.37% (\$-215.82M)	-0.23% (-0.0023)	-0.3036
United States	-0.00% (\$-198M)	0.14% (\$2697M)	-0.36% (\$9515.75M)	-0.15% (-0.0015)	-0.1889

Source: Authors Own Simulation

4.2. Sectoral Productivity of UK

Table 4 reveals the implication of current UK – CPTPP, UK inclusion in CPTPP and UK, USA inclusion in CPTPP on the macroeconomic variables incorporated into the CGE modelling. Trade of UK with CPTPP member through existing bilateral tariff would have negative inference on UK's economy. The British economy would face \$217.84 million loss in total in its sectoral productivity. Despite that the critical situation would fall on sectors like meat livestock, processed food, textile & wearing apparel, light manufacturing, utility consumption and goods and equipment for investment. However, productive sectors like grain crops, vegetable & crops, extraction, heavy manufacturing, and transport & communication shows positive gains due to the fact of producing world renown machineries (industrial and domestics). There exists comparative advantage phenomenon, which states the economic ability of a countries to import goods from other country where it is available at cheap cost. It can be expatiated in a way that trade diversion would take place which as result would reduce the national productivity in the respective sectors.

Additionally, the accession of UK in CPTPP would compensate the loss as well as would gain the regional productivity by \$868.59 million in total. The positivity in the sectoral productivity would result compensation in productivity in utility & consumption sector and would boosts the transport & communication, light machinery, vegetables & fruits, processed food and textile & wearing apparel as well as capital good sectors of GTAP. However, contraction in the remaining sectors would take place due to fact that UK's producers would import from the CPTPP member countries because of less producing / manufacturing cost. It is noted that the enhanced productive sectors like processed food, textile & wearing apparel, transport and communication along with manufacturing would result in boosting the returns from formal & informal capital, skilled & unskilled labour because higher production would require more employs and extended capital; thus, the returns would distant. Moreover, vegetable & fruits sectors would assist in enhancement of outcomes of labour belonging / working to (at) farms.

Over and above, the encompassment of UK and USA into CPTPP would positively influence the productivity of UK. During this assessment and scenario, the productivity growth would be \$335.94 million higher than the preceding scenario i.e., inclusion of only UK in the CPTPP. The inclusion of UK into CPTPP along with USA would drop the fruitfulness and productivity of UK in various sectors like grain crops, vegetable & crops, meat & livestock, extraction, heavy machinery and services. While the sectors like textile & wearing apparel, processed food, light manufacturing, utility consumption, transport & communication and productivity of goods (destined towards investments) would enhance. This enhancement would create widen progress in the returns of capital and labour because of their capital- and labour-intensive nature. The vital reason behind the negative consequences is that the member countries of CPTPP would shift their imports from UK to USA.

Another pertinent point reveals the trending contemporary trilateral agreement between UK, China and CPTPP. The analysis identifies that the inclusion of UK and China would create highest yield in UK's production as compared to the previous simulation i.e. *SIM-1*, *SIM-2* &

SIM-3; the regional production would raise by \$3,461.81 million. The accession of UK and China into CPTPP would result in blended outcomes in the sectors. Sectors like light manufacturing, utility consumption, transport& communication, and capital goods (capital intended for investments) would have massive gains. Despite that, the remaining sectors like grains crops, vegetables & fruits, Meat & livestock, extraction, processed food, textile & wearing apparel, heavy manufacturing, and services would exploit negative consequences. This winds up that the trade agreement would have gains and losses at some extend. The growing sectors are highly labour and capital intensive thus it would grow the returns of labour and capital. Whereas returns from livestock would also grow up due to its working share in light manufacturing sector. Table 4 shows the impact of number of scenarios on UK's sectoral productivity.

Table 4: Implication on UK's Sectoral Productivity by CPTPP

	SIM-1 (CPTPP -11)	SIM-2 (CPTPP+UK)	SIM-3 (CPTPP+UK+USA)	SIM – 4 (CPTPP+UK+China)
Grains Crops	0.01% (\$1.25M)	-0.21% (\$-18.40M)	-0.29% (\$-26.41M)	-0.65% (\$-58.08M)
VegFruit	0.03% (\$1.01M)	0.11% (\$3.44M)	-0.00% (\$-0.11M)	-0.45% (\$-13.53M)
MeatLstk	-0.01 (\$-3.68M)	-1.30% (\$-603.76M)	-1.40% (\$-651.30M)	-1.69% (\$-777.31M)
Extraction	0.01% (\$6.82M)	-0.04% (\$-20.34M)	-0.06% (\$-32.32M)	-0.24% (\$-123.41M)
ProcFood	-0.00% (\$-4.33M)	0.18% (\$250.27M)	0.13% (\$178.38M)	-0.10% (\$-149.62M)
TexWapp	-0.00% (\$-0.99M)	0.03% (\$9.29M)	0.14% (\$41.94M)	-2.81% (\$-867.56M)
LightMnfc	-0.02% (\$-94.13M)	0.08% (\$472.31M)	0.09% (\$520.56M)	1.10% (\$6169.13M)
HeavyMnfc	0.03 (\$118.31M)	-0.07% (\$-305.06M)	-0.05% (\$-199.72M)	-0.67% (\$-2792M)
Util_Cons	-0.02% (\$-109.69M)	0.07% (\$399.81M)	0.09% (\$537.13M)	0.29% (\$1795.38M)
TransComm	0.00% (\$18.75M)	0.01% (\$70.25M)	0.01% (\$126.63M)	0.01% (\$92.75M)
Services	0.00% (\$56.00M)	-0.00% (\$-109M)	-0.01% (\$-253.50M)	-0.08% (\$-1967.25M)
CGDS	-0.04% (\$-207.16M)	0.14% (\$719.78M)	0.18% (\$962.79M)	0.64% (\$3357.88M)
Total	\$-217.84M	\$868.59M	\$1204.53M	\$4666.34M

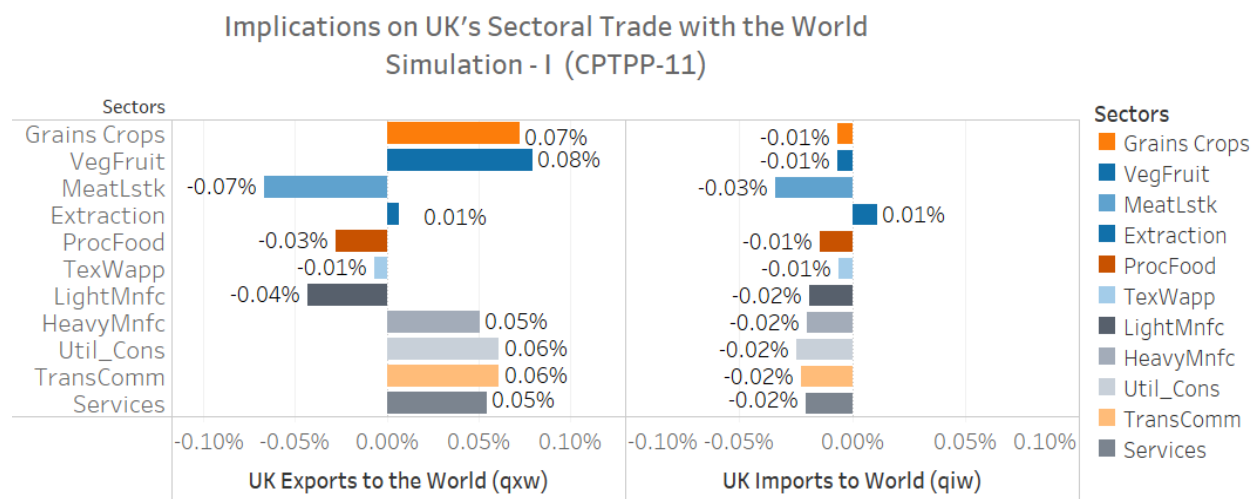
Source: Authors Own Simulation

4.3. UK's Sectoral Exports to World

Figure 6 expresses the outcomes of UK trading with CPTPP members under the existing tariff rates. Under the current scenario i.e. simulation I (UK trading with CPTPP through existing tariff), the exports of UK to the world would reduce for light manufacturing, meat livestock, processed food and textile and wearing apparel sectors because the trading countries would import from other trading partners where it would cost less than UK. Whereas, growth

would be observed in grain crops, vegetable & fruits, heavy manufacturing, utility consumption, transport & communication as well as services. The impetus behind the enhancement in edibles sectors (like grain crops and vegetable & fruits) may be due to the production of high quality, international standards and safety certified goods. Likewise, the demand of UK grain crops sectors especially wheat is at the peak due to the fact of producing free Karnal bunt wheat (Department for Environment Food and Rural Affairs, 2014). Similarly, the export of vegetable & fruit sectors also escalated due to its higher international demand because of their feature of passing the specific market standards (SMS), gradings, general marketing standards (GMS); and thus, they pass sanitary and phytosanitary measures without any hurdles. The export of goods belonging to sectors like meat livestock, processed food, textile & wearing apparel industry and light manufacturing would shrink by 0.07%, 0.03%, 0.01 and 0.04% respectively. The plummeted meat & livestock exports would drop the return of lower income household i.e., the labour which are directly or indirectly associated with farms thus resulting in lower returns of labour (linked with farm). On contrast, the imports of UK from the world declines except extraction. This may result due to burgeoned import cost (price of good + import duties); in response to this situation the household would divert to domestically produced goods.

Figure 6: Impact of CPTPP on UK trading sectors with the world using simulation I.

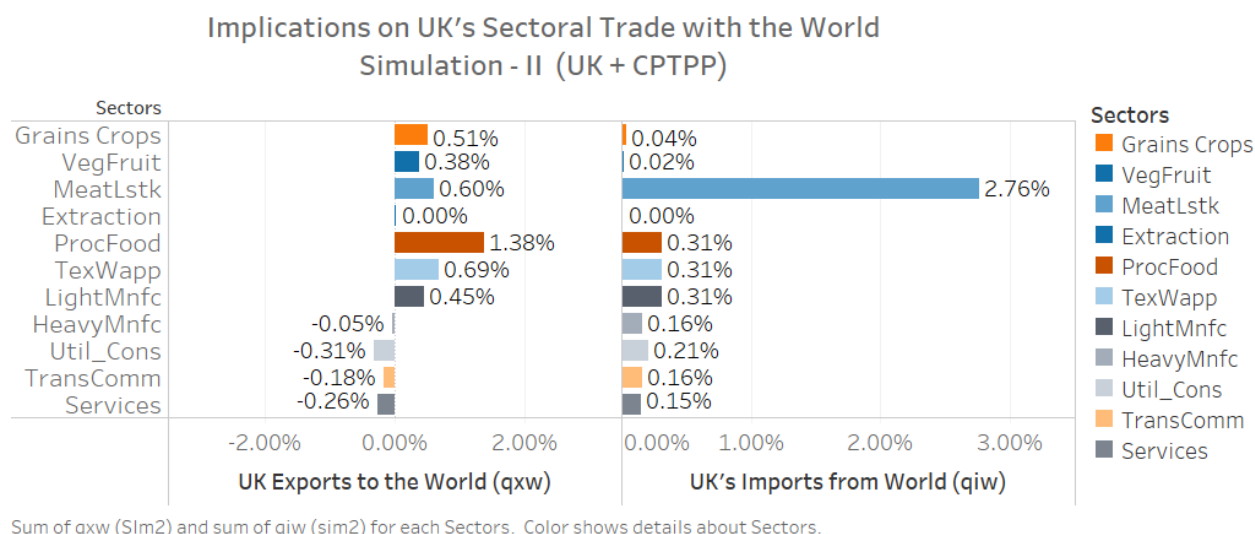


Source: Authors Own Illustration through Own Simulation

The accession of UK in CPTPP would reduce the bilateral tariff between UK and CPTPP member which would burgeon the economic trade among them. The real exports would have blended outcome like the heavy machinery, transport & communication, utility consumption and services sector would plummet; while the extraction, grain crops, light manufacturing, meat & livestock, processed food, textile & wearing apparel and vegetable and fruits sectors would expand. The analysis promulgates that the inclusion of UK in CPTPP would compensate the loss created by simulation I (trade between UK and CPTPP members through existing tariff). On the other hand, the sectoral imports of UK from the world would augment. In spite, the sectoral imports of UK would be extensive during this agreement between the UK and CPTPP. This would assist in availability of quality products produced in the UK. Additionally, the progressive sectors would assist in raising the employment opportunities and returns for all types of labour also well as the returns of capital. Figure 7

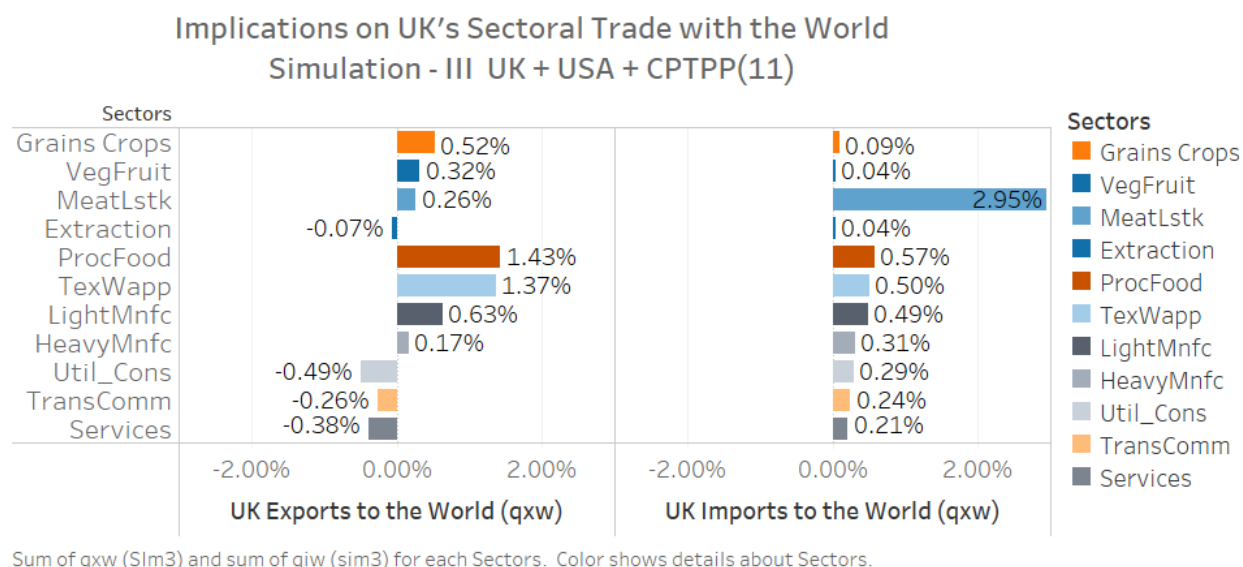
portrays the economic consequences on trade of UK with the world as the UK joins the CPTPP members.

Figure 7: Impact of CPTPP on UK trading sectors with the world using simulation II.



Source: Authors Own Illustration through Own Simulation

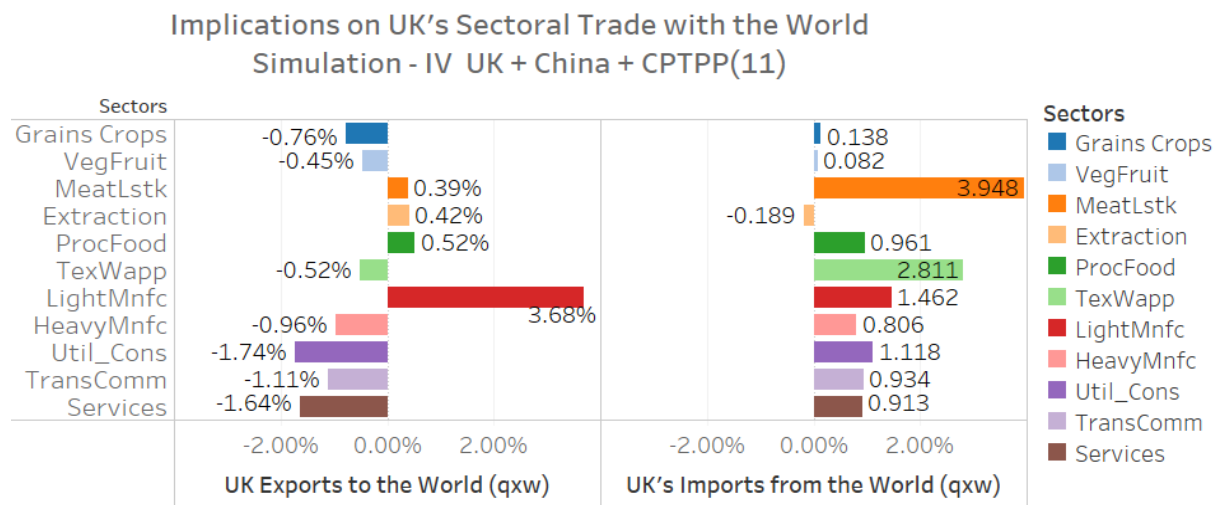
Figure 8: Impact of CPTPP on UK by inclusion UK and USA into CPTPP.



Source: Authors Own Illustration through Own Simulation

On stark contrast, the accession of UK and USA in CPTPP would assist the UK to export and import massive sectoral goods. This would result in higher exports and imports of UK to the world than the trade of UK with existing tariff and simulation related to inclusion of UK in CPTPP. Figure 8 symbolizes the consequences on sectoral trade of UK with the world after the inclusion and accession of UK and USA in CPTPP members. Figure 9 represents the potential outcomes on UK; after the accession of both UK and China into CPTPP.

Figure 9: Potential consequences of CPTPP on UK's trading sectors with the world by the inclusion of UK and China in CPTPP.



Source: Authors Own Illustration through Own Simulation

4.4. UK's Real Return Factors

The outcome from the four simulations are presented in tabular version below i.e. table 5. In a nutshell, the bilateral trade between UK and CPTPP members under the existing tariff rate would bring negative consequences on the returns from real factors especially, the labour, livestock and capital of all types except land and natural resources. Similarly, the accession of UK into CPTPP would lead to have negative outcomes of UK's returns from land and natural resources. while the positive outcomes would be anticipated on labour (unskilled, skilled, small farmer, medium farmer, non – farm worker [low & high skilled]), livestock and capital (formal and informal). Despite that the imposition of simulation-3 i.e. (CPTPP+UK+USA) would negatively influence the returns from factors like land and natural resources while the positive implication might be observed from labour, capital and livestock due to the fact of being the significant production factor of the escalating sectors. Furthermore, the contemporary simulation related to China and UK inclusion into CPTPP i.e. simulation 4 (UK+China+CPTPP) shows positive returns from all factors except land and natural resources.

Table 5.: Tabular version of variation in real factor return of UK due to CPTPP.

Description	SIM 1 (CPTPP-11)	SIM-2 CPTPP+UK	SIM-3 CPTPP+UK+USA	SIM – 4 CPTPP+UK+China
Land	0.01%	-1.9823%	-2.2112%	-2.8126%
Unskilled Labour	-0.0041%	0.0562%	0.08724%	0.2583%
Skilled Labour	-0.0032%	0.0598%	0.0897%	0.2480%
Capital	-0.0039%	0.0637%	0.0941%	0.2605%
Natural Resources	0.0955%	-0.2329%	-0.3764%	-1.5233%
Natural Resources2	0.0955%	-0.2329%	-0.3764%	-1.5233%
Labour small farmer	-0.0041%	0.0562%	0.0872%	0.2583%
Labour medium+ farmer	-0.0041%	0.0562%	0.0872%	0.2583%
Labour farm worker	-0.0041%	0.0562%	0.0872%	0.2583%
Labour non-farm low skilled	-0.0041%	0.0562%	0.0872%	0.2583%
Labour non-farm high skilled	-0.0032%	0.0598%	0.0897%	0.2480%
Land - large	0.0072%	-1.9823%	-2.2112%	-2.8635%
Land - medium	0.0072%	-1.9823%	-2.2112%	-2.8635%
Land - small	0.0072%	-1.9823%	-2.2112%	-2.8635%
Livestock	-0.0039%	0.0637%	0.0941%	0.2605%
Capital - agriculture	-0.0039%	0.0637%	0.0941%	0.2605%
Capital - formal	-0.0039%	0.0637%	0.0941%	0.2605%
Capital - informal	-0.0039%	0.0637%	0.0941%	0.2605%

Source: Author's Own Simulation

5. Conclusion and Policy Recommendation

Trans – Pacific Partnership (TPP) was considered as a comprehensive pact which would act as a catalyst in elimination of trade hurdles and complication which could not be eased by the previous trade agreements. USA along with other eleven countries initiated and ratified TPP in 2016 however, the US elected president Mr. Donald Trump appraised the trade pact as a threat the economy and thus US was withdrawn from TPP. After the severance of US from Trans – Pacific Partnership, the mega regional trade agreement was covered with a title of Comprehensive and Progressive Agreement for Trans – Pacific Partnership (CPTPP). CPTPP consists of eleven countries i.e. Australia, Brunei Darussalam, Mexico, New Zealand, Vietnam, Chile, Japan, Malaysia, Peru, Singapore and Canada.

Prior to Brexit, UK desired to join the CPTPP and as the UK – EU relationship metamorphosed into a bilateralism; the UK applied to join the CPTPP. CPTPP is marked to be top UK trading market. Accession of UK in CPTPP would harmonise enormous growth in economies of both blocks i.e. UK and CPTPP (11). To be precise, the UK would be born up with trade and investment opportunities along with strengthened supply chains. Moreover, the

accession of UK in CPTPP would establish widened signals to the global world stating that UK is prepared for implementation of free trade policy to annihilate and eradicate the eradication protectionism along with unnecessary trade barriers.

After the accession of UK into CPTPP; China also applied to join the Asian Pacific trade pact. Now, this would not just allow UK to trade freely with CPTPP but also with China. The analysis suggests that the incorporation of both UK and China in CPTPP would create enormous growth in the macroeconomic indicators of UK along with the return of factors. Moreover, it also urges that the trilateral agreement would cover all the losses created by UK trading through existing tariff with CPTPP member and the other assumed simulations.

This study primarily focuses on the implication of UK joining Comprehensive and Progressive Agreement for Trans – Pacific Partnership (CPTPP). Over here, an experimental technique i.e., MyGTAP model has been employed using GTAP database 10 with base year 2014. The dataset comprises of 65 sectors, which are aggregated into 12 sectors.

In summation, it can be stated that the UK trading with CPTPP member countries under the current tariff rates would have negative consequences. The leading cause behind it is modification in supply chain of CPTPP members and the trade diversion in sectors like textile & wearing apparels, light manufacturing, processed food and utility consumption. The pessimistic ramification would be held in UK's macroeconomic indicator (e.g., real GDP, real imports, terms of trade and government income). However, the UK admittance in CPTPP would reveal positive implication on the economic indicators of UK.

Fortunately, under the regional level, it is manifested that UK's productivity in sectors like vegetable & fruits, processed food, textile & wearing apparels, light manufacturing, utility consumption and transport communication would face enormous growth. Resultantly, it would enhance and foster the sectoral trade with the world as well as the factors return. The escalation in production would enhance the returns of labours along with capital and livestock. In addition to this, Higher demand of labour and capital would result in enhanced production resulting in better wages and return on capital. Thus, the employment, investment opportunities, foreign direct investment, tourism and living standard would be strengthened. Wherefore, the British government stepped on the right path, for the improvement of country's economy. Secondly, the inclusion of China into CPTPP would also bring enormous growth in the economy of UK. Thus, this research urges that if the China is approved by the commission of CPTPP then in that case, the UK's economy would get progressively more richer relative to the situation inclusion of only UK in CPTPP.

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