

AN ANALYSIS OF TRANS-PACIFIC PARTNERSHIP (TPP): IMPLICATIONS FOR INDIAN ECONOMY¹



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An ANALYSIS OF TARIFF REDUCTIONS IN TRANS-PACIFIC PARTNERSHIP (TPP): IMPLICATIONS FOR THE INDIAN ECONOMY

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The objective of this study is to undertake comparative analysis of the likely impact of tariff reduction under Trans-Pacific Partnership on various macro and trade variables of Indian economy under different scenarios, by using the widely used standard GTAP model. Five different scenarios of complete integration in terms of tariff reduction between different regions are simulated using the GTAP model. Under each scenario, tariff among members of a group of regions is eliminated, but is unchanged for other regions. Higher welfare arising from allocative efficiency, come with the cost of relatively lower consumption of domestic products and investment, resulting in the loss in terms of GDP. Therefore, we conclude that there are mixed prospects and no strong reason for India to pursue being part of the TPP.

Key Words: GTAP, TPP, CGE, India

JEL Classification: F15, F17

Section 1: Introduction

The TPP negotiations are emerging amidst a lot of uncertainty about the global trading system as well as concern due to slow progress of multilateral system under WTO (Petri et.al, 2011). To promote economic growth and trade through regional integration, Brunei, Chile, New Zealand, and Singapore signed Trans-Pacific Strategic Economic Partnership Agreement (TPSEP or P4). Since 2010, negotiations for Trans-Pacific Partnership are progressing, to expand the scope of TPSEP in terms of membership as well as content by including various issues related to trade and investment. Twelve countries namely Brunei, Chile, New Zealand, Singapore, United States, Australia, Peru, Vietnam, Malaysia, Mexico, Canada and Japan are negotiating Trans-Pacific Partnership. In 2013, Taiwan and South Korea have also shown interest in joining the TPP. However, emerging economies like India and China are not part of TPP negotiations. The TPP agreement is proposed to have 29 chapters dealing with issues like IPR, Rules related to SPS & TBT, Market Access, investment, labour and environment etc. Study by Seshadri (2013) mentioned that with vast coverage of issues like trade and investment, TPP is bound to have influence on other free trade initiatives underway, as also on the Doha multilateral trade negotiations. TPP members include both large and small economies drawn from either side of the Pacific. This study also pointed out that US has taken a leadership role in the negotiations due to unwillingness to

make concession of market access and agriculture subsidies under Doha Round and has been looking for other trade liberalisation initiatives in which an asymmetric strategy will be successful where its contribution will be minimal and gains optimal.

Using Computable General Equilibrium (CGE) modelling, many studies like Lee and Itakura (2014), Cheong (2013), Arif et.al (2014), Xin (2014) and Petri et.al (2011) try quantifying the impact of TPP on different regions. Study by Lee and Itakura (2014) used GTAP dynamic model to examine welfare impact of Regional Comprehensive Economic Partnership (RCEP) and TPP on various regions. India will experience welfare gain in case of RCEP by 0.5 to 1.3 percentage point in comparison to baseline projection. As India is not member of TPP, trade liberalisation under TPP track will have a negative impact in comparison to baseline.

Cheong (2013) analyzes the progress on major issues regarding the current TPP negotiations which are being led by the United States, and draws implications for East Asian economic integration. The paper argues that the TPP should be promoted for its economic value, not for geopolitical purposes. It should be open to all Asia and Pacific countries, including the People's Republic of China. The impact of forming the TPP under three scenarios was estimated using the GDyn, a recursive dynamic computable general equilibrium (CGE) model developed by the Global Trade Analysis Project (GTAP). The three scenarios are TPP9 (nine TPP members), TPP12 (12 members), and TPP12+ China (13 members). As India is not a member of TPP in these three scenarios, its GDP declines by .01 to .38 percentage point in comparison to baseline projection.

Arif et.al (2014), examine the impacts of TPP on Turkish economy. By using Global Trade Analysis Project (GTAP) database and a general equilibrium model, the effects of various scenarios on GDP and exports are studied. Obtained results show that Turkey could face losses on GDP up to 1% if the TPP covers only current twelve countries. However, supposing that this FTA is widened by including other countries, Turkey's losses could reach to 2.4% of GDP. Exports may decline by 0.65 percent in first scenario and by up to 1.79 percent in second scenario.

Xin (2014) show that most of the macroeconomic indicators are positive like GDP, consumption, real export, import employment for China, US, Japan but for Vietnam, Singapore and Australia & New Zealand it is negative, if China becomes a member of TPP.

Petri et.al (2011) did a quantitative assessment of the Trans-Pacific Partnership and Asia-Pacific integration by using GTAP database. According to this study, TPP and an Asian Track could consolidate the "noodle bowl" of current smaller agreements and provide

pathways to a Free Trade Area of the Asia-Pacific (FTAAP). The effects on the world economy would be small initially, but by 2025 the annual welfare gain would rise to \$104 billion on the TPP track, \$303 billion on both tracks and \$862 billion with an FTAAP. The study also mentioned that strong economic incentives would emerge for the USA and China to consolidate the tracks into a region-wide agreement.

Above mentioned studies analyse and quantify the various aspects of TPP and its impact on different regions. However, not much research has been done to quantify the impact of TPP on Indian economy under different scenarios. It would be interesting to see the impact of TPP on Indian economy in two cases; (1) India is a member of TPP and (2) India is not a member of TPP. It will also be important to see the impact of TPP on various macro-economic and trade indicators of Indian economy when China also joins TPP. On the issue of joining the TPP, Seshadri (2013) pointed out that there is no immediate prospect of India joining such an agreement due to commitments such as in respect of supply chain management, regulatory coherence or TRIPS plus issues. If TPP comes into being, India may lose some market share in TPP markets as a result of trade diversion. Generally speaking, however, the negative fallout may not be very significant as India already has FTAs with some TPP participants. India's main loss on market access would, therefore, come from US market where Vietnam and Malaysia could be particular beneficiaries in products such as textiles, apparel, leather goods, etc., where US's MFN tariffs are relatively high, compared to other sectors.

With this background, the objective of this study is to make a comparative analysis of likely impact of tariff reduction under Trans-Pacific Partnership on various macro and trade variables of Indian economy under different scenarios by using GTAP static model. The unique contribution of this paper lies in the evaluation of scenarios wherein India may be involved in the TPP and also focusing on the impact on India from the different TPP scenarios. This has the potential to provide deep insights to the currently active policy debate on TPP in Asia.

Section 2: Methodology

Before delving into the methodology, we have a look at the total bilateral trade flows between the regions involved in this paper (see table A1 for details). The top sources of India's imports are EU27, China, USA, Japan and Australia, of which the last three are current TPP members. China mainly imports from EU27, Japan, US, Korea and Australia. India's top export destinations include EU27, USA, China, Japan and Korea. China exports chiefly to USA, EU27, Japan, Korea and India. Therefore, Korea, China and India are closely

related to the proposed TPP members and it is important to consider their involvement in this partnership.

This study is conducted with a multi country, multi sector general equilibrium model. WTO (2012)³ states that the purpose of the CGE simulations is to determine the effects of a change in trade policy on the endogenous variables of the model – prices, production, consumption, exports, imports and welfare. The simulation represents what the economy would look like if the policy change or shock had occurred. The difference in the values of the endogenous variables in the baseline and the simulation represents the effect of the policy change. All the policy simulations as well as results reported in the paper, as in other major models of this type, may be thought of as occurring in one-shot over a time-period that is needed for equilibrium to be achieved. This time-period is akin to what is widely thought of by economists as ‘medium run’, possibly 3-5 years in a go. So the model should be able to foretell the effect on trade and production patterns if the trade policy was changed. Furthermore, based on the change in welfare, the policy-maker would be able to judge whether the country benefited from the change in policy or not. Similarly, Gilbert (2013) mentions that the idea behind CGE is to program a large scale mathematical system representing the global economy and to combine that theoretical system with a benchmark set of real world data representing the status quo. The equilibrium is then perturbed to generate insights into the direction and magnitude of the economic effects of policy intervention and/or other changes in the economic system. The impact of regional integration on different regions is estimated by using Global Trade Analysis Project (GTAP) static model. The model assumes perfect competition, constant returns to scale and profit and utility maximising behaviour of firms and household respectively. Hertel (1997) provides detailed information about the structure and overview of GTAP model. The data used in this study is the version 8.1 (the most recent version available, documented in Narayanan, Aguiar and McDougall, 2012) of the GTAP database. The reference year for this database is 2007. GTAP 8.1 Data Base (134 regions) is better suited for this analysis compared to GTAP 8 Data Base, since the IO tables for China and few other countries were improved in this version and the tariff data issues were also addressed in it.

2.1 Aggregation Strategy

³WTO (2012), “A Practical Guide to Trade Policy Analysis”, published by United Nation and World Trade Organisation.

The GTAP database is compiled for 134 countries/regions across the world and for 57 tradable commodities of the world. In this study, 134 countries/regions given in GTAP data base are mapped to 16 regions (Table 1).The analysis is done for 18 sectors given in GTAP database. The 57 sectors of GTAP data base are mapped into 18 sectors (Table 2)

*******Table 1: Regional Aggregation*******

*******Table 2: Sector Aggregation*******

2.2 Experiment Design

Given the unstable economic environment, unemployment is a general phenomenon around the world. Therefore, to make this study more realistic, standard closure of GTAP is altered by changing the assumption of full employment for skilled and unskilled labour. This study begins with GTAP 8.1 Data Base (Narayanan, Aguiar and McDougall, 2012) with base year of 2007, aggregated to the set of regions and sectors specified in this paper. We then collected data on GDP, bilateral merchandise trade and tariffs for the year 2011 from the World Bank dataset, UN COMTRADES and ITC MacMAP, respectively, and then aggregated to these sectors and regions. ITC MacMAP dataset accounts for all the tariff preferences, FTAs and PTAs that were in effect in the year 2011, all over the world.

We then updated these data components in our dataset to the 2011 levels, by using Altermax closure and parameters (Malcolm, 1998). GDP is targeted by letting the sectoral outputs get updated; trade is targeted without affecting the tariffs, while tariffs are updated separately. GTAP model has the ‘technological change’ variables, which absorb these changes in the data during the Altermax simulation. These variables are exogenous typically for the policy simulations and act as the endogenous switch variables in the data updating simulations. These simulations are and have to be different from policy simulations, since their only purpose is to update the relevant components of the dataset and not to evaluate any policy impact. These assumptions ensure that the targeted components of the data base are updated, but other components of the data remain as undisturbed as possible.

The implication of reducing tariff across various sectors would vary between various regions, as these regions have comparative advantage in different commodities. Similarly the effect of regional integration on welfare and macroeconomic indicators would be varied due to different socio-economic conditions prevailing in these regions. Five different scenario of complete integration in terms of tariff reduction between different regions are simulated using the GTAP model. Under each scenario, tariff among member of regional integration (each

scenario of table 3) is removed but maintained for other regions. Tariff faced by India in different regions across all sectors is given in Table 4; barring a few specific sectors in specific countries, India faces reasonably low tariffs across the partners.

*******Table 3: Experiment Design*******

*******Table 4: Tariff Faced by India in Different Regions*******

Section 3: Result

In this section, we discuss the results of our analysis in the following sequence. Firstly, we look into the macro-economic and more aggregate sectoral results in section 3.1 and then we focus on India's bilateral exports, imports and trade balance in specific important sectors in section 3.2.

3.1 Aggregate Global Results

In the GTAP model, tariff elimination leads to reduction in the domestic market prices of imports. This results in increased demand for imports by firms for intermediate inputs, private households as well as government. Cheaper imported intermediate inputs for firms may also reduce the cost of production across the spectrum of commodities. Further, reduced demand for domestic production may result in an excess supply situation, which can be rectified by the reduction of market prices to reach the equilibrium. In bilateral terms, when an importer reduces tariffs on many or all of its partners, the degree of increase or decrease of imports from each of them would depend on two opposite effects– trade creation enabled by overall expansion in demand for cheaper imports and trade diversion created by the expansion of exports by partners facing higher tariff reduction at the cost of others, accomplished in terms of response to price differentials. This is similar to income and substitution effects in the standard microeconomic theory. This is the major mechanism that affects bilateral trade, which adds up to the sectoral consumption, which, in total, equals the output.

All these sector-specific results add up to the macroeconomic results. Table 8 shows the GDP and welfare results of several countries. In the GTAP model, welfare changes are measured in Equivalent Variations (EV). This is the amount of money the consumers in any region would pay instead of facing the changes in prices and quantities resulting from the simulations.

Table 5 shows that India loses in terms of GDP, in all scenarios including when it reduces tariffs, but gains in welfare when it reduces its tariffs. When China reduces its tariffs,

it enjoys increase in both GDP and welfare. Welfare gains may be traced back largely to the increased ability to allocate resources across the sectors, thereby raising the efficiency effects. Canada, USA, Chile, Japan, Malaysia, New Zealand, Singapore and Viet Nam gain in terms of welfare and GDP in all scenarios; Korea and Australia have similar results, but they are exceptions in that the former loses in terms of GDP and welfare and the latter loses in terms of GDP alone, in the first scenario. The World as a whole gains in terms of both GDP and welfare in all scenarios. Japan and USA emerge as the biggest winners in terms of both GDP and welfare in all scenarios (table 5).

*******Table 5: Changes in Gross Domestic Product and Welfare effects *******

*******Table 6: Welfare Decomposition for India (in US\$ Millions) *******

Table 6 further digs deeper into the welfare results for India. The first component is allocative efficiency, which is the measured change in the ability to efficiently allocate resources across sectors in the economy. Mathematically, this is just a collection of changes in the tax revenue of the regional household, which represents the government of a country in the real world. Given that India's imports fall in the first three scenarios, these revenues also fall, as the tariffs are unchanged, implying negative allocative efficiency effects. Endowment effect, the second component in this table, measures the increase in wage bill caused by changes in employment. Given a fall in employment in the scenarios that involve no tariff reduction by India, the numbers are negative in the first three scenarios, while they are positive in the last two. Terms of trade effects show that India loses a little in the first three scenarios, but a lot in the last two, owing to the cheaper import prices (than export prices) in India arising from tariff elimination. The difference between investment and savings in a country adjusts to equate the real trade balance. This explains the last component, namely, investment-savings effect, which is negative in all scenarios, more so in the last two scenarios, moving in line with the trade balance. In summary, despite the negative effects from loss in terms of trade, India gains in welfare due to tariff elimination, because of increased allocative efficiency.

Investigating the reasons for the decline in India's GDP in all scenarios, we learn from table 7 that it's predominantly due to decline in consumption and to an extent, investment, although there is an expansion of trade balance in all scenarios. The major driver for decline in local consumption of domestically produced commodities is the increase in both imports and exports in the scenarios where India cuts tariffs. In the scenarios that involve no tariff change by India, owing to relatively reduced global prices, output in India

goes down in many sectors slightly (as seen in table 12). This results in reduced consumption and investment as well.

*******Table 7: GDP components in India (in US\$ Millions)*******

We focus on these exports, imports and trade balance in tables 8 and 9. As expected, all countries including India witness flooding of imports when they eliminate tariffs. Due to the competitive prices offered by imports, production becomes cheaper in these countries, resulting in increased exports as well. India is no exception to both these effects in the last two scenarios that involve its tariff elimination. Further, while the aggregate trade balance for India has been positive in all scenarios, the situation is different for different sectors depending on the extent of tariff changes and economic structure, as we will discuss in section 3.2.

In value terms, changes in aggregate exports and imports are very similar, when all of the tariffs are eliminated, for a few, but not all, countries (e.g. Australia, Canada, Malaysia, Mexico). The explanation for this is as follows; cheaper imports mean increase in import demand and also cheaper imported inputs needed for production, reducing the prices in the importing country. This, in turn, enhances the competitiveness of exports, which also increase at an aggregate level. Given the steep fall in tariffs, the rise in exports and imports is high. The extent of rise in both exports and imports depends on relative changes in prices in different sectors driven by tariff reduction. This is why the aggregate exports and imports are similar for a few and different for others.

*******Table 8: Aggregate Exports and Imports: Changes in Millions of US\$*******

*******Table 9: Aggregate Trade Balance: Changes in Millions of US\$*******

3.2 India's sectoral results

Until now, we have analysed the overall and global results in macro-economic and specific sectors. Now, we turn our attention to India's results, particularly focusing on a few sectors. Further, so far, we looked at the results in changes in value of various variables, which include the total of price and quantity effects. A few of the next few tables show the percentage changes in quantities and prices. While the tariff changes affect directly the bilateral trade of specific sectors, overall effects on aggregate trade in all sectors in the economy is of interest to policy-makers.

Table 10 provides the results in this regard, in percent change terms for quantities and not in values, which means that the changes in prices are not taken into account herein. This also explains why these numbers suggest a story that is different from the other results in value terms. An overarching trend here is that the exports grow but not as much as the imports do, across the board. Notable exceptions to this trend include wheat, sugar, fisheries, extraction and auto industries. Table 11 provides a good reason for this trend; export prices do not fall, if at all they do, to the extent that import prices fall, again if they do. Therefore, exports are relatively more expensive and hence grow less than the imports do. For the exceptions, the price equation is reversed; export prices fall more than the import prices do, implying that exports are more competitive and hence grow more than imports do. The reason why such a possibility may occur is that intermediate imports have become quite cheap after tariff reduction (e.g. fertilizers among the light manufactures – cheaper by 3-5%, needed to produce wheat), reducing the production costs and hence the export price, despite no reduction in import tariffs (on wheat in this example – under 0.5%).

*******Table 10: Aggregate Exports and Imports for India*******

*******Table 11: Aggregate Export and Import Prices for India*******

For many agricultural products, India's trade balance improves with tariff reduction, except a few sectors, where it deteriorates steeply, as shown in table 12. Overall, India does gain in total trade balance, but less so when she reduces her own tariffs. Inclusion of Korea and China in TPP does raise India' trade balance, since global tariff reductions are much higher as a result, thereby reducing the import prices of many intermediate inputs leading to cheaper and consequently, expanding exports.

*******Table 12: Overall Trade Balance and Output for India*******

Mixed prospects in terms of output in many sectors are seen in table 12, when India eliminates her tariff. In a few sectors such as wheat, sugar, vegetables and processed food, output declines in all scenarios; the decline is steeper when India cuts tariffs. In contrast, in certain sectors such as dairy, fish, meat/livestock, textile products, leather, light and heavy manufacturing, the decline (or small increase) in output if India is excluded from TPP, gets replaced with significant increase when India joins TPP.

A word of caution is needed while interpreting these results. India may face challenges in terms of Sanitary and Phytosanitary Standards and other non-tariff barriers,

which can curb the expansion of exports and output of dairy, fish and meat/livestock, shown in this study, as we focus only on tariff barriers.

Further in this section, we have a closer look at the sector-specific results. Table 13 and 14 summarize the effects of tariff elimination on India's imports of few commodities from various countries. We chose these products for this analysis, for a couple of reasons. Firstly, among all the commodities considered in this study, these are the ones with substantial changes; secondly, sectors such as processed food products and textile products are vital in the Indian economy on account of employment.

*******Table 13: Changes in India's imports of food and textiles*******

*******Table 14: Changes in India's imports of other manufactured products*******

For all of these products, India imports less if it does not join TPP and imports more if it does. In the first three scenarios, India's imports from all countries except Korea and Malaysia change little and negatively, except those from Japan. In contrast, in the last two scenarios, which involve India's participation in TPP, the import changes are largely positive, except in regions like Rest of the world, which neither reduce tariffs nor face tariff reduction by India, due to the diversion of trade away from them to the TPP partners. In the following paragraph, we shall first attempt to explain this overarching result and then move on to these exceptions.

The general trend of small negative changes in India's imports when India does not participate in TPP, can be explained by the slightly negative changes to aggregate import demand in India; in other words trade creation (captured by the first square-bracketed term in equation 1) (page 13) in India is negative, albeit small. Since India does not reduce tariffs in these scenarios, the prices of imports in India's domestic market hardly change, resulting in small reduction in import demand. Trade diversion, captured in the second square-bracketed term in equation 1, has not much of a role in these scenarios since all tariffs are unchanged. When India eliminates her tariffs on imports from other TPP partners, however, there is a huge reduction in prices, resulting in the expansion of import demand from all partners.

For the first three scenarios for food products, India's imports from Malaysia and Japan increase despite the overall negative trend. These include vegetable oils, which is a major commodity exported from Malaysia to India. This is because the tariff reduction in

these countries is so high that their domestic market prices fall a lot⁴, resulting in the reduction in their export prices as well. Thus, in spite of not reducing the tariffs, India faces a reduction in the prices of these imports, whose pre-tariff prices decline due to fall in export prices. Imports from Korea follow the same suite in the third scenario which includes Korea in TPP. There is a trade diversion effect in favor of these countries (Malaysia, Japan and Korea), which also partly explains the small reduction in imports from other countries in these scenarios.

Initial trade and tariff structure can explain most of these results. Japan's processed food exports is about 6% of global processed food exports. So it is a significant global player in this sector. Among India's total imports of food products, however, Japanese contribute 0.3%, while Malaysia contributes 16%. Japan, Malaysia and Korea have high tariffs on agricultural sectors, therefore tariff elimination across the board means a much steeper tariff reduction in food sector than in others including textiles and other manufacturing, implying higher reduction in prices in the food sector, resulting in higher favorable trade diversion in food sector. This explains why they see reduced increase or even reduction in imports by India on most non-food sectors; exceptions to this rule are the sectors wherein the initial tariffs are higher than in the food sector, such as Malaysia's heavy manufacturing sector. Comparing the last two scenarios, we can infer that inclusion of China alongside India in the TPP may result in higher imports in India, since China would also grow more competitive due to tariff elimination.

Tables 15 and 16 summarize the results in terms of changes in exports from India. For all products, it is clear that India's joining the TPP can help raise India's exports to the world, while for food and textile products, India may even lose if she does not join the TPP. The reason for poorer export performance in the scenarios of India not being part of TPP is that the trade is diverted away from India owing to its higher relative export prices resulting from higher relative import prices of all commodities. In other words, no tariff reduction in India means that import prices and hence the market prices do not fall, resulting in same or higher export prices; while for the TPP partners, the prices fall due to tariff elimination and hence relatively the price reduction is much higher in these countries. Thus, all importers shift away from India and towards these TPP partners.

*******Table 15: Changes in India's exports of food and textiles*******

⁴ This is despite the fact that Malaysia does not import a lot of vegetable oil. One explanation here is that imported intermediate inputs used to produce these vegetable oils and other food products go down so much as a result of tariff reduction, as to reduce the output prices as well as export prices.

*******Table 16: Changes in India’s exports of other manufactured products*******

Inclusion of both India and China in the TPP enhances India’s exports further, as seen in the last scenario, in all sectors shown here, except textile products. Possibly, higher initial tariffs in India than in China, may lead to higher reduction of prices due to tariff elimination and hence a favorable trade diversion against China. In terms of trade balance, which is the result of changes in both exports and imports and discussed here, India may gain by joining TPP in textile products and other light manufacturing, while the losses in trade balance are much higher in food products and heavy manufacturing, as seen in tables 17 and 18.

*******Table 17: Changes in India’s trade balance of food and textiles *******

*******Table 18: Changes in India’s trade balance of manufactured products *******

Tables 19 and 20 illustrate the analysis for the changes in exports and imports in selected scenarios and partner countries, as a result of the tariff changes modelled. Textile exports of India to USA decreases when India does not cut her tariffs (TPP3), while it increases when India cuts her tariffs (TPP4). In both cases, there is trade created (term 1 in equation 1 below) in USA’s import market, less so in TPP4; however, since USA cuts tariffs on India’s exports in TPP4, there is a huge diversion of trade from other countries in favour of India. This phenomenon is shown in the equation below and illustrated in columns 4-8 of table 19:

$$qxs(i,r,s) = qim(i,s) [Trade Creation] - ESUBM(i) * [pms(i,r,s) - pim(i,s)] [Trade Diversion] (1)$$

where, $qxs(i,r,s)$ (column 4) and $pms(i,r,s)$ (column 8) are percentage changes in quantities and prices of bilateral imports of commodity ‘i’ from region r to region s and $qim(i,s)$ (column 5) and $pim(i,s)$ (column 7) are those in total quantities and prices of aggregate imports of commodity ‘i’ by region s, respectively; $ESUBM(i)$ is the (Armington) elasticity of substitution among imports from different sources for commodity ‘i’.

The first term, showing the change in imports in the destination (column 5) shows the extent of trade created overall due to a given tariff reduction, while the second term captures the substitution between different sources, in terms of the price differential between the exporter concerned and total imports; in other words this is the extent of trade diverted from other sources to the one of interest: India in our example. Another instance of trade diversion effect, away from India, overwhelming the trade creation effect is India’s processed food exports to Korea, despite getting a bit subdued when India cuts tariffs. For the exports of light and heavy manufactures, from USA and Japan, respectively, trade creation is complemented

by favorable trade diversion for India when it cuts tariffs; when it does not, trade diversion acts slightly against trade creation but still the latter wins. Trade diversion effect is driven by the differential between aggregate import prices in the destination and bilateral import prices of exports from India to the corresponding destination (columns 7 and 8).

Changes in bilateral import prices are driven by changes in tariffs as well as those in CIF prices of imports from the source country India (column 9), which are in turn, derived largely from changes in FOB prices (column 10) therein, given that the transportation prices do not change so much. This price linkage aspect is shown in equation (2), where $tms(i,r,s)$ and $pcif(i,r,s)$ are percentage changes in tariffs and CIF prices of bilateral imports of commodity 'i' from region 'r' to region 's':

$$pms(i,r,s) = tms(i,r,s) + pcif(i,r,s) \quad (2)$$

FOB prices are largely determined by the market prices, which is mostly the result of adjustment between output supply and demand to clear the market for all commodities. When India does not cut its tariffs, output goes down or remains constant in the illustrations in table 19 (column 12). When it cuts tariffs, output goes up in all examples except processed food. On the demand side, domestic demand decreases or doesn't change in all cases except in the case of textiles and apparel (column 13), wherein the firms demand more for catering to increased exports when India cuts tariff (column 16); on the other hand, exports decline a lot in textiles and processed food, while they remain stagnant in light and heavy manufactures when India remains out of TPP (column 16). In all cases, market prices in India fall, more so in the scenarios involving India's tariff reduction. Every scenario involves tariff reduction in some of India's trading partners and hence there is a situation of excess supply or reduced demand, resulting in a reduction of market prices to equilibrate.

Table 20 traces the story pertaining to imports by India. As expected, for all sectors, India's imports flood in when she cuts her tariffs on processed food, textile products, light and heavy manufacturing from Malaysia, China, Japan and USA, respectively, facilitated by both trade creation in India and trade diversion, stemming from reduction in prices as a result of tariff elimination. Import prices in India fall in all scenarios and sectors shown in the table, more so in the ones where India cuts tariffs. Market prices also go down in all scenarios, while output in India increases in all sectors except processed food. Most of the increase in output comes from export expansion; in the case of processed food, the reduction comes from domestic demand contraction.

Section 4: Conclusion

This study used the GTAP static model on 18 tradable commodities and 16 regions of the world to understand the likely impact of TPP on Indian economy. This study updates the GTAP database to the 2011 levels and analyses the likely impact on welfare, macro-economic variables, and output, employment and trade indicators. Five different scenarios of complete integration in terms of tariff reduction between different regions are simulated using the GTAP model. Under each scenario, tariff among member of regional is removed but maintained for other regions. Although it is unlikely that an agreement would result in the complete removal of tariffs on all products listed in national tariff lines, this experiment provides the maximalist situation of tariff liberalisation. However, eliminating tariffs on all products in each scenario cannot be a real situation as in almost all the FTAs, each partner has a sensitive or exclusion list covering products on which tariffs are not liberalised.

This study does not adequately capture the service trade reforms and thus the result may underestimate the potential effect of liberalisation where services sector is to be included. It is to be noted that GTAP model has both static and dynamic versions. However, in this paper, static GTAP model is used. Gilbert (2013) mentioned that the static model has disadvantages relative to dynamic techniques, of not describing the time path, i.e. attention in the analysis is concentrated on the end outcome rather than the transition. Data aggregation is an issue, since the result may be different if one does detailed sectoral and country-level analysis. For the model in general: market structure (perfect competition, uniformity of functions across sectors and regions, etc) is too simplistic in the standard GTAP model. Studies that do incorporate imperfect competition tend to generate welfare estimates that are roughly double those of competitive models (Gilbert, 2013). This study gives only conservative outcome as it only considered only merchandise trade liberalisation and also it ignores non-tariff barriers.

In this analysis, we have outlined the overall winners and losers of the various possible and hypothetical combinations of TPP. Countries like Japan, Korea and Malaysia have a win-win situation in all scenarios that include their tariff reduction. However, we also find that India has mixed fortunes at stake here. Tariff elimination by India results in lower GDP due to decline in consumption and to an extent investment In crucial sectors such as food products, wheat and sugar, India loses whether or not she joins the TPP, due to strong trade diversion effects arising from global price reduction facilitated by widespread tariff elimination. However, in certain sectors such as textiles and leather, the decline of output and

negative trade balance if India does not join TPP gets reversed under scenarios of India joining TPP. Adverse effects on agricultural sectors seen in this paper are likely to be more negative in reality if non-tariff measures are taken into consideration. Therefore, there is no strong reason for India to pursue being part of the TPP.

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Table 1: Regional Aggregation

No.	Region	No.	Region
1	Australia	9	Singapore
2	Canada	10	USA
3	Chile	11	Vietnam
4	Japan	12	India
5	Malaysia	13	China
6	Mexico	14	Korea
7	NewZealand	15	EU_27
8	Peru	16	RestofWorld

Source: GTAP 8 database

Table 2: Sector Aggregation

No.	New Code	Sector Description	Comprising old sectors
1	Paddy	Paddy rice	pdr pcr
2	Wheat	Wheat	wht
3	Plantfiber	Plantfiber	pfb
4	Oilseed	Oilseed	osd
5	Sugar	Sugar	c_b sgr
6	Vegetable	Vegetable	v_f
7	OtherGrains	Grains and Crops	gro ocr
8	Dairy	Milk and Dairy	rmk mil
9	ProcFood	Processed Food	vol ofd b_t
10	MeatLstk	Livestock and Meat Products	ctl oap wol cmt omt
11	Fish	Fish	fsh
12	Extraction	Mining and Extraction	frs coa oil gas omn
13	TextWapp	Textiles and Clothing	tex wap
14	Leather	Leather Products	lea
15	MotorVech	Motor Vehicle & Trans. Equip	mvh otn
16	LightMnfc	Light Manufacturing	Lum ppp fmp omf
17	HeavyMnfc	Heavy Manufacturing	p_c crp nmm i_s nfm ele ome
18	OthServices	Other Services	ely gdt wtr cns trd otp wtp atp cmn ofi isr obs ros osg dwe

Source: GTAP 8 database

Table 3: Experiment Design

Experiment	Regional Integration	Countries involve
TPP1	TPP	12
TPP2	TPP+Korea	13
TPP3	TPP+Korea+China	14
TPP4	TPP+Korea+ India	14
TPP5	TPP+Korea+ India+China	15

Source: Authors' experiment design

Table 4: Tariff Faced by India in Different Regions

Sector	Australia	Canada	Chile	Brunei	Japan	Malaysia	Mexico	NewZealand	Peru	Singapore	USA	Vietnam	China	Korea	EU_27	RestofWorld
Paddy	0	0	5.7	0	247.5	40	0	0	0	0	0.8	19.2	0	4.7	8.9	9.6
Wheat	0	0	0	0	0	0	0	0	0	0	1.6	1.8	0	0	9	7.2
Plantfiber	0	0	0	0	0	0	0.5	0	0	0	0	0	4.7	0	0	0.2
Oilseed	0	0	4.8	0	127	3.2	0	0	3	0	0	7.9	10.6	622.9	0	6.6
Sugar	0	1.8	0	0	24.7	0	0	0	0	0	12.5	25.7	49.4	2.5	18.3	11.1
Vegetable	0.1	0.4	6	0	0.3	0.2	19.5	0	0	0	0.1	13.5	3.7	7.3	1.9	9.2
OtherGrains	0	0.1	5.6	0.1	2.2	11.4	16	1	6	0	4.5	10.6	4.6	129.7	1.3	9.9
Dairy	2.4	24.8	2.2	0	12.7	0.4	5.5	0.4	0	0	0.5	8.5	1.9	20	7.5	7.1
ProcFood	0.7	2.5	5.5	0.1	1.4	10.7	11.8	1.8	2.5	0	0.8	7	7.1	10.6	4.9	13
MeatLstk	0.7	0	5.9	0	0.6	0	0	0.1	0	0	0.5	14.8	9	3	3.3	9.8
Fish	0	0	6	0	2.2	0.2	10.3	0	0	0	0	8.5	10.4	23.6	4.1	6.4
Extraction	0.2	0.1	5.4	0	0	0.8	6.4	0	3.1	0	0	8.3	0	0.6	0.1	3.3
TextWapp	6.4	13.5	5.4	0.6	0.2	9.8	21.3	5.4	7	0	8.9	7.7	5.4	8	7.9	10.9
Leather	4.8	8.2	5.2	1.8	12.3	1.5	19.8	6.3	10.7	0	6.1	8.2	7.2	4.3	2.7	9.1
MotorVech	30.4	1.7	5.9	19.1	0	9.6	25.5	7.1	5.2	0	0	33.5	7.7	1.7	3	13.9
LightMnfc	3.2	1.5	5.7	0.2	0.1	6.9	7.5	2.7	2	0	0.5	10.6	4.2	3.7	0.1	5
HeavyMnfc	2.4	0.3	5.4	11.4	0.6	3.1	4.7	1.4	1	0	0.7	3.5	3.2	3.4	0.3	5.2
OthServices	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Source: GTAP 8 Database

Table 5: Changes in Gross Domestic Product and Welfare effects (US\$ Millions)

Variables→	Gross Domestic Product (GDP)					Welfare in Equivalent Variations (EV)				
	TPP1	TPP2	TPP3	TPP4	TPP5	TPP1	TPP2	TPP3	TPP4	TPP5
Australia	-2275	7193	12585	13018	17459	3701	9221	14138	12006	16511
Canada	4640	3430	348	5053	1887	20665	20271	23434	21049	24181
Chile	1595	1514	197	1692	385	775	840	736	997	896
Brunei	-82	19	-6	13	-13	199	277	296	266	286
Japan	85091	109686	214442	117057	220558	77552	90991	136799	93002	138268
Malaysia	1847	1706	667	5650	4327	4154	4474	4531	6866	6782
Mexico	-1658	-1663	-3327	-1424	-3058	414	1125	2745	1324	2963
NewZealand	4219	4765	4484	5147	4801	2186	2588	2797	2725	2911
Peru	-208	-368	-1311	-439	-1361	120	146	203	161	231
Singapore	1581	1819	2443	2571	3000	1202	1440	2045	1810	2324
USA	53341	56712	67492	75001	82809	33352	36361	89074	48275	99099
Vietnam	8237	10541	6841	10847	7161	6649	9011	7072	9420	7507
India	-4208	-7678	-17378	-5959	-22429	-1041	-1968	-4253	13693	12852
China	-15909	-25755	41695	-34493	50624	-5243	-6504	56318	-11111	58881
Korea	-4099	81722	108207	85831	111414	-2978	113472	134339	116230	136438
EU_27	-32604	-54258	-119799	-63352	-131817	-10779	-18422	-34703	-20600	-37230
RoW	-26708	-38731	-111080	-54933	-132333	-7945	-7570	-28594	-13460	-35414
Total	72801	150656	206500	161281	213413	122983	255754	406974	282652	437485

Source: Authors' Simulation Results

Table 6: Welfare Decomposition for India (in US\$ Millions)

WELFARE	Allocative Efficiency	Endowment Effect	Terms of Trade	Investment-Savings	Total
TPP1	-121.8	-371.2	-383.8	-164.6	-1041.4
TPP2	-215	-699.6	-800.9	-252.2	-1967.7
TPP3	-526.1	-1715.8	-1635.7	-375.4	-4253.1
TPP4	3867.7	13400.4	-2637.4	-937.7	13693
TPP 5	4898.5	14570.8	-5054.4	-1563.2	12851.7

Source: Authors' Simulation Results

Table 7: Changes in GDP components in India (in US\$ Millions)

GDP Components	Consumption	Investment	Government	Exports	(-)Imports	Total
TPP1	-2659	-1699	-513	-177	840	-4208
TPP2	-4883	-2859	-932	-243	1238	-7678
TPP3	-10984	-5362	-2124	-2248	3340	-17378
TPP4	-4120	-2360	-307	22632	-21804	-5959
TPP 5	-14276	-6662	-2290	28814	-28015	-22429

Source: Authors' Simulation Results

Table 8: Aggregate Exports and Imports: Changes in Millions of US\$

Variables→	Changes in Aggregate Exports					Changes in Aggregate Imports				
	TPP1	TPP2	TPP3	TPP4	TPP 5	TPP1	TPP2	TPP3	TPP4	TPP 5
Australia	4086	7592	11160	9623	12830	4116	7260	10767	9056	12285
Canada	14822	14927	16619	15659	17147	14939	14710	16773	15427	17353
Chile	856	900	558	1045	699	618	633	413	740	523
Brunei	74	134	139	136	139	86	117	126	120	129
Japan	27767	36647	58066	38531	59232	35612	44959	73910	46660	75180
Malaysia	7591	8288	9101	11318	11878	7719	8463	9520	10580	11443
Mexico	2412	3660	5840	4033	6126	2222	3460	6252	3802	6556
NewZealand	1330	1558	1694	1711	1819	1402	1622	1815	1763	1935
Peru	355	432	657	500	711	329	392	671	453	722
Singapore	2025	2172	2770	3171	3489	1434	1461	1864	2232	2422
USA	19313	26293	50133	32022	54077	23705	28954	61614	36517	67593
Vietnam	12124	16312	16719	16800	17208	13216	17504	18118	18005	18621
India	-177	-243	-2248	22632	28814	-840	-1238	-3340	21804	28015
China	-4446	-6490	123285	-10975	129282	-3967	-6037	103208	-8979	108174
Korea	-843	54027	75384	56252	77051	-1482	62766	85746	64917	87397
EU_27	-5126	-7993	-33785	-10580	-38330	-13167	-20371	-46826	-24413	-51925
RoW	-6070	-7406	-35908	-13474	-44462	-9847	-13841	-40454	-20280	-48716
Total	76093	150812	300183	178404	337708	76094	150814	300177	178403	337707

Source: Authors' Simulation Results

Table 9: Aggregate Trade Balance: Changes in Millions of US\$

DTBAL	TPP1	TPP2	TPP3	TPP4	TPP 5
Australia	-30	332	393	567	544
Canada	-114	222	-150	236	-201
Chile	238	268	146	305	176
Brunei	-11	17	12	16	10
Japan	-7843	-8317	-15848	-8133	-15953
Malaysia	-126	-174	-419	738	436
Mexico	191	200	-413	232	-431
NewZealand	-71	-64	-121	-52	-117
Peru	26	41	-14	47	-11
Singapore	591	711	905	939	1067
USA	-4392	-2661	-11492	-4495	-13526
Vietnam	-1092	-1192	-1400	-1205	-1414
India	664	995	1092	828	799
China	-479	-454	20077	-1997	21109
Korea	639	-8737	-10352	-8661	-10341
EU_27	8036	12378	13038	13829	13594
RoW	3777	6437	4544	6808	4257

Source: Authors' Simulation Results

Table 10: Aggregate Exports and Imports for India

Variables→	% Changes in India's Exports					% Changes in India's Imports				
Sectors	TPP1	TPP2	TPP3	TPP4	TPP5	TPP1	TPP2	TPP3	TPP4	TPP5
Paddy	1.88	2.99	2.81	5.88	7	-0.56	-1.28	-1.66	41.32	39.19
Wheat	2.98	6.03	8.87	14.51	19.99	-0.84	-1.8	-2.56	-4.88	-6.53
Plantfiber	2.04	3.3	3.48	-1.21	11.8	-0.99	-1.55	-5.24	9.81	4.37
Oilseed	2.67	0.07	0.86	43.16	39.85	-0.38	7.15	7.06	19.24	19.7
Sugar	0.26	0.72	1.62	3.17	6.11	-0.26	-0.61	-1.06	1.14	0.12
Vegetable	0.6	1.05	2.11	4.1	5.96	-1.02	-1.43	-2.16	24.87	27.25
Other Grains	-4.52	-5.13	-4.92	2.79	4.19	-0.78	-1.18	-1.94	66.12	70.15
Dairy	-1.36	-1.11	0.65	5.26	9.32	-2.11	-3.1	-4.76	162.55	167.05
Proc. Food	-1.45	-5.1	-5.64	3.68	6.41	-0.01	0.06	-0.4	35.18	34.82
MeatLstk	-1.81	-2.28	-0.83	17.34	20.18	-0.88	-1.88	-4.97	9.26	8.15
Fish	2.17	2.02	2.14	6.08	8.78	-0.21	-0.43	-0.75	1.3	0.9
Extraction	0.62	1.63	2.67	2.58	4.45	-0.03	-0.12	-0.11	1.13	1.36
Textile Prod	-0.86	-1.12	-7.14	24.27	18.4	-0.28	-0.33	-1.74	9.06	39.25
Leather	-0.36	-1.02	-7.94	16.34	12.64	-0.26	-0.09	-2.47	6.27	18.64
Auto	-0.53	-0.78	0.3	13.76	19.09	-0.26	-0.37	-0.98	10.53	12.58
Light Mnfc	0.31	0.53	0.82	6.3	10.68	-0.23	-0.36	-0.95	7.66	12.16
Heavy Mnfc	0.2	0.31	0.46	7.16	12.36	-0.15	-0.25	-0.65	3.62	5.19
OthServices	0.57	1.11	2.15	2.27	4.51	-0.33	-0.56	-1.12	-0.14	-1.24

Source: Authors' Simulation Results

Table 11: Aggregate Export and Import Prices for India

Variables→	% Changes in India's Export Prices					% Changes in India's Import Prices				
Sectors	TPP1	TPP2	TPP3	TPP4	TPP5	TPP1	TPP2	TPP3	TPP4	TPP5
Paddy	-0.2	-0.36	-0.82	-0.73	-1.5	-0.05	-0.03	-0.39	-9.44	-9.78
Wheat	-0.24	-0.47	-0.95	-1.26	-1.99	-0.08	-0.14	-0.46	-0.53	-0.84
Plantfiber	-0.19	-0.36	-1.3	0.79	-0.04	0.1	0.11	-0.09	0.09	-0.19
Oilseed	-0.24	-0.57	-1.1	-0.6	-1.38	-0.11	-3.55	-4.05	-8.39	-9.19
Sugar	-0.21	-0.4	-0.85	-0.77	-1.52	-0.13	-0.22	-0.53	-1.26	-1.62
Vegetable	-0.26	-0.51	-1.07	-1.29	-2.07	0.33	0.29	0.15	-13.45	-15.1
Other Grains	-0.34	-0.58	-1.12	-0.88	-1.64	-0.01	-0.1	-0.4	-20.15	-21.64
Dairy	-0.24	-0.45	-0.96	-0.99	-1.78	0.34	0.41	0.35	-24.03	-25
Proc. Food	-0.21	-0.41	-0.85	-1.38	-2.15	-0.24	-0.52	-0.72	-18.67	-19.16
MeatLstk	-0.27	-0.49	-1	-0.96	-1.72	0.02	0.12	0.61	-3.56	-4.06
Fish	-0.21	-0.44	-0.98	-0.02	-0.81	-0.08	-0.16	-0.49	-0.89	-1.39
Extraction	0.01	0.16	0.05	0.13	-0.01	0.05	0.26	0.22	-0.11	-0.18
Textile Prod	-0.17	-0.3	-0.74	-0.57	-1.54	-0.11	-0.25	-0.45	-2.35	-10.25
Leather	-0.19	-0.35	-0.75	-1.02	-2.18	-0.14	-0.42	-0.57	-1.54	-6.75
Auto	-0.15	-0.25	-0.59	-0.93	-1.8	-0.08	-0.16	-0.26	-4.78	-6.29
Light Mnfc	-0.14	-0.23	-0.56	-0.86	-1.71	-0.07	-0.13	-0.26	-3.12	-5.26
Heavy Mnfc	-0.11	-0.16	-0.45	-0.74	-1.48	-0.06	-0.08	-0.2	-1.89	-3.21
OthServices	-0.18	-0.32	-0.73	-0.64	-1.4	-0.03	-0.06	-0.23	-0.05	-0.23

Source: Authors' Simulation Results

Table 12: Overall Trade Balance and Output for India

Variables→	Changes in India's Trade Balance in US\$ Millions					% Changes in India's Output				
Sectors	TPP1	TPP2	TPP3	TPP4	TPP5	TPP1	TPP2	TPP3	TPP4	TPP5
Paddy	68	107	80	205	217	0.09	0.13	0.07	0.62	0.69
Wheat	3	7	10	16	22	-0.14	-0.42	-0.45	-2.59	-2.35
Plantfiber	65	103	89	-46	384	0.23	0.43	-1.04	5.88	5.68
Oilseed	39	-11	-6	659	589	0.07	-0.3	-0.28	0.78	0.76
Sugar	1	7	16	40	81	-0.03	-0.09	-0.07	-0.14	0.12
Vegetable	31	54	100	-991	-1034	0.04	0.01	0.03	-1.34	-1.39
Other	-229	-268	-275	-433	-426	-0.31	-0.39	-0.43	-0.18	-0.13
Dairy	1	4	12	-522	-521	-0.02	-0.03	-0.09	0.07	0.02
Proc. Food	-153	-566	-601	-5359	-5072	-0.17	-0.54	-0.6	-3.69	-3.42
MeatLstk	-58	-74	-31	439	502	-0.12	-0.18	-0.26	1.74	1.77
Fish	4	4	4	9	14	-0.01	-0.05	-0.11	0.28	0.28
Extraction	71	110	282	-976	-895	0.22	0.55	0.91	0.66	1.34
Textile Prod	-312	-425	-2430	7121	3062	-0.31	-0.42	-2.46	8.17	4.09
Leather	-20	-56	-353	607	204	-0.17	-0.56	-3.75	7.95	3.76
Auto	-39	-59	139	-71	170	-0.12	-0.2	0.07	0.13	0.6
Light Mnfc	153	252	404	601	1152	0.07	0.1	0.23	1.16	1.73
Heavy Mnfc	546	859	1845	-1845	-820	0.04	0.05	0.18	0.75	1.11
OthServicese	491	947	1805	1377	3171	-0.03	-0.04	-0.09	0.92	1.04

Source: Authors' Simulation Results

Table 13: Changes in India's imports of food and textiles (Millions of US\$)

Sectors→	Processed Foods					Textile Products and Clothing				
Exporter	TPP1	TPP2	TPP3	TPP4	TPP5	TPP1	TPP2	TPP3	TPP4	TPP5
Australia	-0.3	-1.3	-2.2	112.6	107.4	0.4	-1.5	-0.4	34.1	3.1
Canada	0.2	0.1	0.1	18.3	17.8	0.1	0.1	0.3	5.7	3.1
Chile	-0.1	-0.2	-0.2	9.1	8.9	0	0	0.1	1	0.5
Brunei	0	0	0	0	0	0	0	0	0	0
Japan	2.3	1.8	0.6	11.4	9.2	-1.6	-3.7	1.7	198.4	96.9
Malaysia	28	28.9	-5.4	8978.9	8669.9	-0.3	-0.3	3.6	73.7	37.9
Mexico	0	-0.1	-0.1	23.1	22.5	0.1	0.1	0.3	3	1.7
NewZealand	-0.1	-0.1	-0.2	10.1	9.8	-4.9	-5.8	-4.4	15.1	-5.7
Peru	0	0	0	-0.2	-0.2	0	0	0.1	4.7	2
Singapore	-0.3	-0.5	-0.8	26	24.7	-0.3	-0.4	-0.7	18.4	7.3
USA	-3.7	-6.3	-7.9	164.3	156	-1.8	-3.2	0.1	208.1	99
Vietnam	-2.1	-3.1	-2.3	23.7	24.2	-2.8	0.3	13	76.5	56.4
China	-0.7	-1.7	-7.9	-85.6	258	-5.5	-12.5	-117.5	-226.4	2541
Korea	-0.7	61.2	61.3	134.8	132.5	-1	7.6	7.8	300.6	157.5
EU_27	-2.4	-5.7	-7.5	-171.3	-175.7	-1.8	-4.3	-10.3	-36.6	-182.9
RestofWorld	-53.4	-122.8	-150.8	-3642.6	-3729.2	-5.2	-11.9	-24.1	-91.7	-457.1
Total	-33.3	-49.9	-123.2	5612.6	5535.8	-24.4	-35.7	-130.8	584.5	2360.7

Source: Authors' Simulation Results

Table 14: Changes in India's imports of other manufactured products (Millions of US\$)

Sectors→	Light Manufacturing					Heavy Manufacturing				
	TPP1	TPP2	TPP3	TPP4	TPP5	TPP1	TPP2	TPP3	TPP4	TPP5
Australia	0.7	-1.5	-2.6	54.2	38.5	21.5	-76.7	-130.6	2832.5	2262.9
Canada	10.2	8	8.6	289.7	210.1	14.1	11.2	11.7	597.2	487.2
Chile	-1.3	-1.5	-1	9	3.7	-1.7	-2.1	-1.4	23.5	17.7
Brunei	0	0	0	0	0	0.2	0	0	1.8	1.3
Japan	-12.7	-21.4	-55.7	328.4	194.4	-209.6	-334.9	-881.2	4055.8	2386.5
Malaysia	-0.8	-1.9	2.5	312.8	244.5	64.7	75.8	102	1655.3	1302.5
Mexico	0.1	0	0.2	11.3	8.8	1.1	0.9	2.6	177.2	128.1
NewZealand	-6.2	-7.2	-7.2	47.8	34.5	-6.6	-7.6	-7.5	35.1	26.5
Peru	0	0	0	0.8	0.6	0	0	0.1	4	3.4
Singapore	-4.7	-6.4	-11	198.8	144.4	-112.9	-151.3	-252.6	2346	1568.3
USA	-47.4	-65.4	-66.1	2109.1	1588.9	-179.2	-238.3	-255.3	6686.6	5208.5
Vietnam	-6.3	-6.2	-1.6	53.5	46.4	-63.5	-62.8	-0.9	392.9	373
China	3.8	4.6	-115.8	-686	2390.7	53.7	133.8	-399.2	-4003.5	12738
Korea	-0.8	8.9	-30.4	630.8	423.6	-13.4	61.7	-251.9	4075.6	2748
EU_27	-0.2	-4.6	-2	-518.7	-859.7	23.5	43.1	127.5	-3210.8	-5405.8
RestofWorld	-5.2	-20.1	-1.1	-913.9	-1499	-44.6	-160.8	94.4	-7266.7	-12031.1
Total	-71.1	-114.9	-283.1	1927.6	2970.4	-452.8	-707.9	-1842.2	8402.6	11815.2

Source: Authors' Simulation Results

Table 15: Changes in India's exports of food and textiles (Millions of US\$)

Sectors→	Processed Foods					Textile Products and Clothing				
	TPP1	TPP2	TPP3	TPP4	TPP5	TPP1	TPP2	TPP3	TPP4	TPP5
Australia	1	2	3	8	10	-3	-1	-88	194	73
Canada	-25	-25	-25	-6	-4	-17	-20	-174	704	362
Chile	0	0	0	1	1	0	0	-22	65	40
Brunei	-2	-2	-2	-1	-1	0	0	0	0	0
Japan	-71	-168	-188	-84	-96	9	5	-127	18	-105
Malaysia	-7	-9	-9	93	95	5	1	-57	182	81
Mexico	-1	-1	-1	14	13	-27	-33	-98	625	397
NewZealand	1	-1	0	2	2	0	0	-14	24	5
Peru	0	0	0	0	0	-5	-7	-45	98	46
Singapore	1	0	1	3	4	2	2	1	4	7
USA	-10	-24	-18	112	138	-353	-416	-1760	5114	3002
Vietnam	-68	-219	-244	29	3	54	31	-35	170	65
China	-4	-26	-84	6	195	2	-2	-48	6	336
Korea	0	-103	-119	-38	-61	3	12	-66	272	150
EU_27	0	1	1	48	64	2	-4	35	138	548
RestofWorld	-2	-42	-40	68	101	-6	-29	-62	91	417
Total	-186	-616	-725	253	464	-336	-461	-2561	7705	5423

Source: Authors' Simulation Results

Table 16: Changes in India's exports of other manufactured products (Millions of US\$)

Sectors→	Light Manufacturing					Heavy Manufacturing				
	TPP1	TPP2	TPP3	TPP4	TPP5	TPP1	TPP2	TPP3	TPP4	TPP5
Australia	-2	3	-21	144	132	-7	-1	-11	212	230
Canada	2	3	-1	52	58	11	13	16	64	93
Chile	0	0	0	23	24	0	0	-1	96	102
Brunei	0	0	0	0	0	-4	-4	-4	10	10
Japan	7	11	29	32	67	53	72	181	290	492
Malaysia	-20	-22	-30	69	61	-115	-137	-151	324	361
Mexico	-1	-1	-5	44	40	-4	-11	-32	357	361
NewZealand	1	2	1	11	11	1	1	1	18	21
Peru	0	0	-1	2	2	-4	-4	-6	23	28
Singapore	14	16	25	46	76	17	21	49	101	186
USA	48	67	-18	806	1042	17	36	39	1425	1917
Vietnam	-3	-8	-14	37	26	-17	-26	-66	232	206
China	1	2	-22	18	161	24	34	-462	242	1460
Korea	0	4	3	56	61	11	-21	18	770	912
EU_27	-2	-1	9	214	425	4	6	30	689	1319
RestofWorld	35	63	167	977	1937	106	171	404	1705	3299
Total	82	138	121	2529	4123	93	151	3	6557	10995

Source: Authors' Simulation Results

Table 17: Changes in India's trade balance of food and textiles (Millions of US\$)

Sectors→	Processed Foods					Textile Products and Clothing				
Exporter	TPP1	TPP2	TPP3	TPP4	TPP5	TPP1	TPP2	TPP3	TPP4	TPP5
Australia	1.1	2.9	4.7	-104.7	-97.7	-3.5	0.1	-87.2	159.8	69.7
Canada	-25.4	-25.2	-24.8	-24.4	-22	-17.2	-19.9	-174.6	698.3	358.7
Chile	0.1	0.2	0.2	-7.8	-7.5	0.1	-0.3	-22.2	64.4	39.5
Brunei	-1.5	-1.5	-1.5	-1.4	-1.4	0	0	-0.1	0.1	0.1
Japan	-73.4	-169.8	-188.8	-95.3	-105.6	10.6	8.7	-129	-180.3	-201.6
Malaysia	-34.8	-38.2	-3.5	-8886.4	-8575.4	5.2	1.6	-60.1	108.4	42.8
Mexico	-0.9	-0.7	-1.3	-9.4	-9.3	-27.4	-32.6	-97.8	622.4	395.5
NewZealand	0.8	-0.4	-0.1	-8.2	-7.5	4.6	5.5	-9.9	8.7	10.6
Peru	0	0	0	0.5	0.5	-4.7	-6.6	-45.3	93.1	43.5
Singapore	1.3	0.9	1.8	-23.1	-20.7	2.1	2.4	1.3	-14.1	-0.7
USA	-6.3	-17.3	-9.9	-52.6	-17.7	-351.5	-413.1	-1760	4905.6	2903.4
Vietnam	-66.3	-215.9	-241.7	5.1	-20.9	56.6	30.4	-48.2	93.7	8.1
China	-3	-24.3	-75.7	91.4	-63.1	7.1	10.2	69.9	232	-2204.7
Korea	1	-164.4	-180.4	-172.8	-193.6	4.3	4.4	-74.1	-28.7	-7.9
EU_27	2.6	6.3	8.3	219.3	240.1	3.5	0.5	44.8	174.3	731.1
RestofWorld	51.7	81	111.3	3710.4	3829.8	-1.2	-16.6	-38.2	182.8	873.8
Total	-152.9	-566.5	-601.3	-5359.4	-5072.3	-311.5	-425	-2430	7120.6	3061.9

Source: Authors' Simulation Results

Table 18: Changes in India's trade balance of manufactured products (Millions US\$)

Sectors→	Light Manufacturing					Heavy Manufacturing				
Exporter	TPP1	TPP2	TPP3	TPP4	TPP5	TPP1	TPP2	TPP3	TPP4	TPP5
Australia	-2.5	4.5	-17.9	89.5	93	-28.3	75.4	119.8	-2620.7	-2032.7
Canada	-8.2	-5.2	-9.7	-238.1	-151.8	-2.7	2.2	4.6	-533.3	-394.1
Chile	1.5	1.6	0.6	13.6	20	1.7	2.1	0.4	72.4	84
Brunei	0	0	-0.1	0.1	0	-3.7	-3.5	-3.6	7.8	8.6
Japan	19.7	32.3	84.9	-296.2	-127.1	263	407	1062	-3765.4	-1894.7
Malaysia	-18.8	-20	-32.7	-244	-183.2	-179.5	-212.4	-253.4	-1331.4	-941.6
Mexico	-1	-1	-5.6	32.7	30.8	-5	-11.8	-34.7	180.2	232.5
NewZealand	7.3	8.7	7.7	-36.8	-23.3	7.1	8.8	8	-17.3	-6
Peru	-0.3	-0.3	-0.7	0.8	0.9	-3.9	-4.1	-6.5	19	25
Singapore	18.9	22.5	35.6	-152.7	-68.9	129.5	171.9	301.4	-2245.2	-1382.7
USA	95	131.9	48.6	-1303.4	-546.6	195.7	274.4	294.5	-5262	-3291.6
Vietnam	3.4	-1.7	-12.4	-17	-20.5	46.2	37.3	-65.5	-160.9	-166.9
China	-2.4	-2.3	93.8	704.3	-2229.3	-29.8	-100.1	-62.5	4245.6	-11278.4
Korea	1	-5	33.3	-575	-362.7	24.7	-82.3	269.4	-3305.6	-1836.3
EU_27	-1.6	3.4	11.1	732.6	1284.6	-19.6	-37	-97.7	3899.5	6724.7
RestofWorld	40.6	82.8	167.6	1890.6	3436	150.8	331.6	309.6	8972.1	15330
Total	152.9	252.6	404.2	601	1152.1	545.9	859.3	1845.5	-1845.5	-820.7

Source: Authors' Simulation Results

Table 19: Analysis of Changes in India's exports in %

Sectors	Scenario	Destination	Bilateral Exports of India	Trade Creation	Trade Diversion	Import Prices in destination	Market prices of bilateral imports	CIF prices of bilateral imports	FOB prices of bilateral imports	Market Prices of India	Output in India	Domestic Demand in India	Firm Demand	Household Demand	Exports	Imports	Import Prices in India
Textile	TPP3	USA	-25.2	14.2	40.9	-6.2	-0.7	-0.7	-0.7	-0.7	-2.5	-0.7	-0.6	-0.1	-7.1	-1.7	-0.5
Textile	TPP4	USA	75.8	5.6	-48.2	-2.3	-8.7	-0.5	-0.6	-0.6	8.2	2.0	1.9	0.1	24.3	9.1	-2.4
Proc. food	TPP3	Korea	-53.3	19.8	83.5	-21.3	-0.8	-0.8	-0.9	-0.9	-0.6	-0.1	0.0	-0.1	-7.1	-0.4	-0.7
Proc. food	TPP5	Korea	-26.0	20.0	40.4	-21.2	-11.3	-2.0	-2.1	-2.2	-3.4	-4.4	-1.3	-3.0	6.4	34.8	-19.2
LightMnfc	TPP1	USA	0.6	1.0	0.4	-0.2	-0.1	-0.1	-0.1	-0.1	0.1	0.0	0.0	0.0	0.3	-0.2	-0.1
LightMnfc	TPP5	USA	12.9	3.0	-9.0	-0.9	-2.2	-1.7	-1.7	-1.7	1.7	-1.0	-0.9	-0.1	10.7	12.2	-5.3
HeavyMnfc	TPP1	Japan	2.3	2.6	0.3	-0.1	-0.1	-0.1	-0.1	-0.1	0.0	0.0	0.0	0.0	0.2	-0.2	-0.1
HeavyMnfc	TPP5	Japan	21.6	7.6	-12.1	-0.4	-2.0	-1.4	-1.5	-1.5	1.1	-0.9	-0.8	0.0	12.4	5.2	-3.2

Source: Authors' Simulation Results

Table 20: Analysis of Changes in India's imports in %

Sectors	Scenarios	Source	Bilateral Imports of India	Trade Creation	Trade Diversion	Import Prices	Market prices of bilateral imports	CIF prices of bilateral imports	FOB prices of bilateral imports	Market Prices in India	Output in India	Domestic Demand in India	Firm demand	Household	India's total exports
Proc. Food	Tpp4	Malaysia	479.2	35.2	-99.5	-18.7	-43.1	2.1	2.4	-1.4	-3.7	-4.4	-1.4	-3.0	3.7
Proc. Food	TPP5	Malaysia	462.3	34.8	-97.4	-19.2	-43.0	2.2	2.5	-2.2	-3.4	-4.4	-1.3	-3.0	6.4
Textile	Tpp4	China	-6.3	9.1	15.0	-2.3	-0.3	-0.3	-0.3	-0.6	8.2	2.0	1.9	0.1	24.3
Textile	Tpp5	China	74.8	39.2	-20.1	-10.2	-12.9	-0.2	-0.2	-1.5	4.1	-1.4	0.1	-1.5	18.4
LightMnfc	Tpp3	Japan	-11.7	-1.0	11.5	-0.3	1.4	1.4	1.5	-0.6	0.2	0.0	0.1	0.0	0.8
LightMnfc	Tpp4	Japan	60.6	7.7	-37.7	-3.2	-8.5	0.6	0.6	-0.6	1.2	-0.4	-0.4	0.0	6.3
HeavyMnfc	Tpp3	USA	-1.7	-0.6	1.1	-0.2	-0.1	-0.1	-0.1	-0.5	0.2	0.1	0.2	0.0	0.5
HeavyMnfc	Tpp4	USA	45.7	3.6	-32.7	-1.9	-6.4	0.2	0.2	-0.7	0.8	-0.4	-0.4	0.0	7.2

Source: Authors' Simulation Results

Appendix: Details on Bilateral Trade Data

Table A1: Total Bilateral Trade Patterns

Importers→ Exporters↓	Australia	Canada	Chile	Brunei	Japan	Malaysia	Mexico	NewZealand	Peru	Singapore	USA	Vietnam	India	China	Korea	EU_27	RoW	Total
Australia	8	2168	494	55	36198	3843	867	6665	162	6278	14124	2118	9921	69744	19289	22477	46684	241094
Canada	2371	0	955	27	11436	1391	8067	521	637	1701	282722	449	3565	19489	4983	56962	44260	439536
Chile	1024	1655	0	3	9658	265	1976	56	1356	292	10366	370	2086	19783	4800	15423	17040	86152
Brunei	827	15	2	0	2299	47	4	270	1	135	201	28	874	324	1165	356	1023	7570
Japan	17514	10654	2675	197	0	19062	12033	2147	1196	18731	139082	9921	12903	178527	69546	112555	243817	850559
Malaysia	7097	2222	210	581	18515	0	2360	976	202	19780	28773	3509	8393	34982	7085	33052	61365	229101
Mexico	1386	14784	2282	10	3908	377	0	191	1259	514	250942	127	1536	7624	2078	24752	35419	347189
NewZealand	6426	751	68	12	3189	818	416	0	75	581	4215	405	712	5166	1600	8090	10855	43380
Peru	162	4066	1787	1	2112	28	327	30	0	62	5931	82	259	7572	1595	8432	13084	45530
Singapore	8180	2571	278	467	14439	27012	1028	1539	59	0	25766	4266	12317	26656	10975	42662	74388	252603
USA	34598	243215	13497	463	105426	20125	163858	4744	6611	32139	0	5603	28950	129846	61605	396878	424929	1672488
Vietnam	2220	1197	154	18	11381	2329	762	179	82	2873	19449	0	1559	8770	4864	19790	20071	95697
India	2830	3800	647	75	6781	3931	1815	432	664	4653	53329	3675	0	23871	4685	78943	123139	313269
China	38675	30832	11700	482	164333	29529	28611	4446	4907	21565	419385	28613	57838	0	91150	394919	534545	1861530
Korea	6870	5468	2622	618	38413	6847	9335	1150	1498	8293	63977	12970	12138	129002	0	66256	166165	531623
EU_27	53503	54018	14587	784	102008	26741	36196	8308	5195	35672	490371	10117	74156	217556	56786	3692546	1304419	6182963
RoW	42249	52738	18392	555	270232	48824	27545	6493	11320	65535	614662	27413	176157	502492	142268	1320998	1170513	4498386
Total	225941	430152	70350	4348	800327	191169	295198	38147	35224	218804	2423293	109668	403364	1381404	484473	6295092	4291716	17698669

Source: GTAP 8 Data Base