A Computable General Equilibrium Analysis of Transatlantic Trade and Investment Partnership and Trans-Pacific Partnership on Chinese Economy

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A Computable General Equilibrium Analysis of Transatlantic Trade and Investment Partnership and Trans-Pacific Partnership on Chinese Economy*

Buhara Aslan  Merve Mavuş Kütük  Arif Oduncu

Abstract

As a result of deadlocked multilateral trade negotiations, many countries have commenced to establish bilateral and regional trade agreements. Among those agreements the Transatlantic Trade and Investment Partnership (TTIP) and Trans-Pacific Partnership (TPP) are agreements with members from across the Atlantic and the Pacific respectively. This study focuses on the impacts of these agreements on Chinese economy under three scenarios by using the Global Trade Analysis Project database and a computable general equilibrium model. The results suggest that when only the TTIP is realized, Chinese economic variables are negatively affected. When both the TTIP and TPP are realized and China is excluded, the combined damage in Chinese economy is higher than the damage of the TTIP alone. On the other hand, inclusion of China in the TPP results in positively affected economic variables. In other words, positive impacts of participation of China in the TPP compensate for the negative impacts of the TTIP.

Keywords: Free trade agreements, Transatlantic Trade and Investment Partnership, Trans-Pacific Partnership, China.

JEL Classification: F13, F14, F15

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1. Introduction

In the second half of the 1980s, an unprecedented increase in foreign direct investment and a revolution in information and communication technology initiated a new phase of interdependence called globalization (Ostry, 1998). Along with these developments that eased global economic and trade relations, countries seek to reduce the obstacles to international trade and hence ensure their market power. In this context, the General Agreement on Tariffs and Trade (GATT) and its successor organization the World Trade Organization (WTO) paved the way to create a strong, opulent and liberal international trading system, and thus contributed to global economic growth. Nevertheless, these developments are deadlocked with the Doha Round of WTO negotiations for multilateral trade, and hence a need for bilateral and regional trade negotiations arose to promote trade liberalization. Accordingly, this need has led to the establishment of bilateral and regional trade agreements such as Free Trade Agreements (FTAs). In general, FTAs eliminate tariffs, quotas, and non-tariff barriers between the member countries so that members could gain trading advantages and preserve their economic interests.

For the US, apart from the deadlocked multilateral trade negotiations, a reason for signing FTAs is that Asia’s and particularly China’s rise in world trade caused a loss in the US competitiveness and it seeks remedies to strengthen its competitive position. A significant number of FTAs by Association of Southeast Asian Nations (ASEAN)¹ and China exclude the US which could reduce its share in global trade and investment. In return, the Transatlantic Trade and Investment Partnership (TTIP) and the Trans-Pacific Partnership (TPP), both dominated by the US, are initiatives that would bypass China. The US aims strengthening its competitive position in the international trade arena by these agreements which may redefine global trading rules.

¹ ASEAN countries: Brunei, Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, Philippines, Singapore, Thailand, Vietnam.
In February 2013, the US and the European Union (EU) announced their intention to launch negotiations on the TTIP. They cooperate to sign the TTIP with the aim to establish a comprehensive trade and investment partnership as each other’s most influential trade and investment partner. Since the tariffs in the US and the EU are already low, the TTIP will focus on the reducing non-tariff barriers of the US and the EU which differ from each other significantly. The TTIP, whose negotiations started in July 2013, would be a comprehensive agreement addressing non-tariff issues and contributing to the development of global trade and investment rules. Serving to the TTIP negotiations, the EU-US High Level Working Group on Jobs and Growth identifies policies and measures that will eventually support mutually beneficial job creation, economic growth, andcompetitiveness across the Atlantic (European Commission, 2013).

The US is also negotiating an Asia-Pacific trade agreement, the TPP, with eleven other countries. The negotiations of the TPP have started in 2002. The US declared its intent to participate in the negotiations in 2008 and affirmed its engagement in 2009. TPP countries altogether comprise the largest export market for the US. With the TPP, the US will further develop trade and investment relations with Asia-Pacific. Similar to the TTIP, the TPP would also contribute to the development of global trade and investment rules. The agreement aims to support trade and investment among the TPP member countries, promote innovation, economic growth and development, and support the creation and retention of jobs.

The TTIP and TPP are large FTAs in terms of their size, comprising a significant share of global population, 11.4 percent and 11.2 percent respectively, and a significant share of GDP based on PPP, 33.3 percent and 27.5 percent respectively as of 2014. Given the substantial share of their member countries in the world trade, the TTIP and TPP would affect the economies of non-member countries as well as member countries, and could represent comprehensive FTAs across the Atlantic and the Pacific respectively. China could

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2 TPP countries: Australia, Brunei Darussalam, Canada, Chile, Japan, Malaysia, Mexico, New Zealand, Peru, Singapore, Vietnam, and the US.
3 Source: Bloomberg, IMF
not take part in the TTIP, and despite being a big country in the Asia-Pacific she has not participated in the TPP yet. Thus, along with these agreements’ effects on member countries which comprise the two largest trading partners of China, the effects on China should be analyzed since it is expected to be heavily affected from both agreements.

Although there are studies examining the effects of the TPP on Chinese economy, literature examining the effects of the TTIP on Chinese economy does not exist. To the best of our knowledge, we are the first to analytically analyze the economic impacts of the TTIP on Chinese economy. Our results provides solid foundations for policy implications since i) the TTIP has a strong possibility of realization, ii) the TTIP and TPP are two large FTAs, iii) the results of quantitative analysis are consistent with expected effects.

This study analyzes the possible quantitative effects of the TTIP and TPP on Chinese economy under three different scenarios. In all of the scenarios, the TTIP is realized and China never becomes a member. In the first scenario, the TPP is not realized. In the second scenario, the TPP is realized and China is excluded from it. In the last scenario, the TPP is realized and China is included in the initiative. Global Trade Analysis Project (GTAP) Data Base and its general equilibrium model are used in order to analyze the effects of each scenario on Chinese GDP, export and import. The GTAP which is a global network of researchers and policy makers conducting quantitative analysis of international policy issues (Walmsley, et al., 2012) is commonly used to assess the effects of FTAs on member and non-member countries.

The results are that when the TTIP is realized, Chinese economic variables are negatively affected. When both the TTIP and TPP are realized and China is excluded, the combined damage in Chinese economy is higher than the damage of the TTIP alone. Nevertheless, inclusion of China in the TPP affects its economic variables positively despite the negative effects of the TTIP. In other words, positive impacts of participation of China in the TPP compensate for the negative impacts of the TTIP.
The rest of the paper's structure is as follows. In Section 2, China’s trade status, existing and possible FTAs and the quantitative results of published literature which focus on these FTAs are summarized. In Section 3, we analyze the empirical results of each scenario where China is affected by the realization or non-realization of the TTIP and TPP, and China’s participation or non-participation to them. Section 4 provides further discussion on services and other possible FTAs of China. Section 5 concludes possible policy implications.

2. China’s Trade Status and Literature

As for constituting a basis for our quantitative analysis, the framework in the work of Viner (1950) on customs unions from trade creation and diversion point of view is employed. Keeping in mind that there are various degrees of economic integration and taking the customs union as an analogy to any degree of economic integration, the evaluation of Viner (1950) on customs union could be implemented when evaluating any form of trade agreement.

Viner identifies welfare improving and welfare deteriorating trade agreements. He argues that a trade agreement is favorable if it creates trade whereas it is unfavorable if it diverts trade. The welfare improving effect trade creation results from replacing high-cost domestic products with less costly imports from FTA member countries. The welfare deteriorating effect trade diversion could result from replacing less costly imports from non-member countries with high-cost imports from member countries. In this paper, apart from the trade diversion resulting from becoming a member of an FTA, the trade diversion resulting from being excluded from an FTA should also be considered. That is to say, another unfavorable effect from the non-member country's point of view could also result from replacing the export of this non-member country with the less costly imports of member countries.

In order to evaluate the welfare effects of inclusion or exclusion from an FTA, Robson (2006) suggests assessing various static factors. These factors are pre-integration trade
relationships, substitutability between products of members and products of nonmembers, size of the free trade area, levels of economic development, geographical proximity, complementarity of economic structures, and tariff structures. Of these factors, pre-integration trade relationships and substitutability between products are the most solid relevant factors for evaluating trade creation and diversion.

a. Pre-integration Trade Relationships

Pre-integration trade relationships between countries are an important factor in forming an FTA. Countries with strong pre-integration trade relationships are more likely to profit from an FTA. Since the US, the EU, and other members of the TPP combined are important trade partners for China, both the TTIP and TPP could affect Chinese economy significantly.

**Figure 1: Top Trade Partners of China**

(2013, 2014)

![Trade Partners Chart](chart)

Source: Bloomberg

TPP-11\(^4\), the EU and the US are China's three largest trading partners consecutively, in 2013 and 2014 (Figure 1). The trade with the members of the TTIP and TPP combined comprise 46 percent of the total trade of China in 2014. The largest trading partners are the

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\(^4\) All the members of TPP excluding the US are aggregated and TPP-11 group is formed.
largest export markets as well. The exports to the markets of the TTIP and TPP members comprise 49 percent of the total exports of China in 2014 (Figure 2).

**Figure 2: Largest Export Markets for China**
*(2013, 2014)*

![Figure 2: Largest Export Markets for China](image)

Apart from being largest trading partners and export markets, the US and EU provide positive trade balances for China, while TPP-11 is the net exporter to China (Figure 3).

**Figure 3: Trade Balance of China**
*(Million Dollar, Monthly, 12-Month Sum)*

![Figure 3: Trade Balance of China](image)
Hence, the realization of the TTIP and TPP, and China's being included in the TPP creates an opportunity to benefit from expanding TPP-11 and the US markets for Chinese exports and having a higher positive trade balance as a result of trade creation. On the other hand, China's being excluded from these agreements creates the risks of contracting TPP-11, the EU and the US markets for Chinese exports and having a lower positive trade balance as a result of trade diversion.

**b. Substitutability Between Products**

The realization of the TTIP and TPP could divert trade from China to member countries. As for the TTIP, Chinese exports to the US (EU) could be replaced by EU (US) exports to the US (EU) as a result of lower tariffs and non-tariff barriers among member countries when compared to those between the non-member country China and the member countries, the US and the EU. Likewise, with the TPP, Chinese exports to the US (TPP-11) could be replaced by TPP-11 (US) exports to the US (TPP-11).

To assess the competition between Chinese and the EU exports to the US markets, Chinese and the US exports to the EU markets; Chinese and TPP-11 exports to the US markets, Chinese and the US exports to the TPP-11 markets, an export similarity index (ESI) of Finger and Kreinin (1979) is used. It is defined as:

$$ESI (j, k) = \sum \min (X_{ij}, X_{ik})$$

where $X_{ij}$ and $X_{ik}$ are *industry* $i$'s export shares in *country* $j$'s and *country* $k$'s exports to the relevant export market. The index is bounded by zero and one, where an index value of zero means that *country* $j$ and $k$ have no export industries in common destined to the relevant market while an index value of one means the exports of *country* $j$ and $k$ are identical across industries. In other words, lower index values indicate lower competition and an index value of one indicates full competition between Chinese and US/EU/TPP-11 exports. In addition to China's ESI with competing countries, the contribution of each industry
to ESIs is also reported. The GTAP sectors are aggregated into seven industries to have a broader perception as Park et al. (2009) suggested (Table 1).

### Table 1: Sectoral Aggregation

<table>
<thead>
<tr>
<th>Industry</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agricultural products (AP)</td>
<td>paddy rice; wheat; cereal grains nec; vegetables, fruit, nuts; oil seeds; sugar cane, sugar beet; plant-based fibers; crops nec; bovine cattle, sheep and goats, horses; animal products nec; raw milk; wool, silk-worm cocoons; bovine meat products</td>
</tr>
<tr>
<td>Food products (FP)</td>
<td>meat products nec; vegetable oils and fats; dairy products; processed rice; sugar; food products nec; beverages and tobacco products</td>
</tr>
<tr>
<td>Extractive industry (EI)</td>
<td>forestry; fishing; coal; oil; gas; minerals nec; petroleum, coal products</td>
</tr>
<tr>
<td>Light manufacturing (LM)</td>
<td>textiles; wearing apparel; leather products; wood products</td>
</tr>
<tr>
<td>Heavy manufacturing (HM)</td>
<td>paper products, publishing; chemical, rubber, plastic products; mineral products nec; ferrous metals; metals nec</td>
</tr>
<tr>
<td>Technology-intensive manufacturing (TIM)</td>
<td>metal products; motor vehicles and parts; transport equipment nec; electronic equipment; machinery and equipment nec; manufactures nec</td>
</tr>
<tr>
<td>Services (SER)</td>
<td>electricity; gas manufacture, distribution; water; construction; trade; transport nec; water transport; air transport; communication; financial services nec; insurance; business services nec; recreational and other services; public administration, defense, education, health; dwellings</td>
</tr>
</tbody>
</table>

Source: Park et al. (2009)

According to the ESIs, which encompass all the industries but service industry\(^5\), China has a higher competition with the TPP members than TTIP members (Figure 4). This roughly suggests that the trade diversion impact of the TPP on the Chinese economy could be higher than that of the TTIP. Regarding the TPP, China has a higher competition with the US in the TPP-11 market than the one with the TPP-11 in the US market. As for the TTIP, China has a higher competition with the US in the EU market than the one with the EU in the US market.

### Figure 4: Export Similarity Indices (ESI) of the Competing Countries in the Relevant Export Markets

Source: International Trade Center, Authors' calculations

\(^{5}\) The service industry as the seventh industry is not reported due to lack of concordance data of HS2 to GTAP product codes. The concordance data is taken from the World Bank website: [http://wits.worldbank.org/product_concordance.html](http://wits.worldbank.org/product_concordance.html)
With respect to the contribution of each industry to ESIs, technology-intensive manufacturing and heavy manufacturing industries combined constitute a large portion - between 79 percent and 93 percent - of competition for all competing country pairs (Figure 5).

**Figure 5: Contribution of Industries’ to ESIs* (Percentage)**

*The sum of the contributions of the industries in each competing country pair equals to 100%.

Source: International Trade Center, Authors’ calculation.

c. China’s FTAs and Literature

Besides trade statistics, analyzing China’s existing and potential FTAs and the quantitative results of the published literature on these agreements are also of importance. Since the multilateral trade negotiations are deadlocked with the Doha round of WTO, many countries have been working to form FTAs over the last decade. Likewise, China has been pursuing to form bilateral and regional FTA with various partners.

China is currently working on 17 FTAs of which 11 agreements were signed (Table 2). Apart from the signed ones, the agreements under negotiation are China-Gulf Cooperation Council (GCC)\(^6\), China-Australia and China-Norway FTAs. The agreements under consideration are China-India, China-Korea, and China-Japan-Korea FTAs.

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\(^6\) GCC countries: Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the United Arab Emirates.
Table 2: China's FTA Partners and the Dates of Contracts

<table>
<thead>
<tr>
<th>FTA partner</th>
<th>Date</th>
<th>FTA signed in</th>
<th>FTA entered into force in</th>
<th>Agreement on Trade in Goods signed in</th>
<th>Agreement on Trade in Services signed in</th>
<th>Agreement on Investment signed in</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pakistan</td>
<td>2006</td>
<td>2007</td>
<td>-</td>
<td>2009</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Chile</td>
<td>2005</td>
<td>2006</td>
<td>-</td>
<td>2008</td>
<td>Being negotiated</td>
<td></td>
</tr>
<tr>
<td>Singapore</td>
<td>2008</td>
<td>2009</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Peru</td>
<td>2009</td>
<td>2010</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Hong Kong CEPA</td>
<td>2003</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Macau CEPA</td>
<td>2003</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Costa Rica</td>
<td>2010</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Iceland</td>
<td>2013</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Switzerland</td>
<td>2013</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Source: China FTA Network

The TPP, neither under negotiation nor consideration, has the potential to fall under these categories. Among the studies which use the GTAP model, Petri et al. (2011) finds that the TPP would increase the US GDP by 0.07 percent while China loses 0.09 percent of its GDP by 2025. The simulation results of Li and Whalley (2012) show that China will be hurt by the TPP initiative if she is excluded from the TPP. On the other hand, they find that when China joins the TPP, China’s welfare and trade will increase by about 1.1 percent and 10 percent respectively under complete trade costs removal.

According to Zhang and Shen (2012), China and ASEAN countries need to cooperate in designing the architecture to provide regional and global freer trade and investment. The China-ASEAN FTA is signed in 2002 as the first FTA of China, and entered into force in 2005. Agreements on trade in goods, services and investment were signed in 2004, 2007, 2009 respectively. Estrada et al. (2012) estimated that China and ASEAN gains a 0.57 percent and 0.65 percent increase in output, 0.13 percent and 0.31 percent in welfare respectively, under ASEAN-China FTA. Kawasaki (2003) computes the effect of the FTA of ASEAN with Japan and China as a 3.7 percent increase in Chinese output. A study by the

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7 CEPA stands for Closer Economic and Partnership Arrangement.
8 Source: China FTA Network.
Joint Expert Group for Feasibility Study on East Asia Free Trade Area (2006) estimated the increase in China’s income from joining the ASEAN+3 FTA as approximately 1.7 percent. In terms of welfare impacts, the estimates of Lee et al. (2004), based on a dynamic computable general equilibrium (CGE) model, show that welfare changes for China are more favorable under the ASEAN+3 FTA (4 percent) than under ASEAN-China FTA (1.4 percent).

An FTA with New Zealand was signed in 2008 and entered into force by then. Agreements on trade in goods, services and investment were also all signed in the same year. According to Sandrey and Jensen (2008), China and New Zealand gains a 0.01 percent and 0.30 percent increase in output, 0.00 percent and 0.53 percent increase in trade respectively, from an FTA between them.

An FTA with Switzerland was signed in 2013 but hasn’t been entered into force yet. Swiss Chinese Joint Study Group (2010) finds that China and Switzerland gain a 0.0 and 0.2 percent increase in output, 0.1 and 0.7 percent increase in exports respectively.

China-Japan-Korea FTA is among the agreements under consideration. Yoon et al. (2009) show increments in the GDP of Korea, China and Japan by 2.5 percent, 0.6 percent and 1.0 percent, respectively, through the China-Japan-Korea FTA. In the same study, authors find that exports and imports of China rise by 6.0 percent and 8.6 percent as a result of the same FTA.

China-Australia FTA is among the agreements under negotiation and it hasn’t been signed yet. The study of Siriwardana and Yang (2007) indicates that China gains increases in real GDP by 0.2 percent, in export volume by 0.7 percent and in import volume by 1.1 percent after Australia-China FTA.

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9 ASEAN+3 is a forum of ASEAN, China, Japan, and Korea.
3. **Methodology and Empirical Results**

In order to analyze ex-ante impacts of the TTIP and TPP on China, a computable general equilibrium model is employed in line with the literature. The GTAP network and Standard GTAP General Equilibrium Model set under the assumptions of perfect competition and constant returns to scale have been used in order to measure effects of these two important free trade agreements on Chinese economy.

As explained in Brockmeier (2001), two main equation types are employed in the model. In the first type, income and expenditures are balanced for each agent where the second type covers behavioral equations of optimizing agents. Each region defined in the GTAP model includes a regional household that collects all income created within the economy. The collected income is used in different forms of final demand: private household expenditures, government expenditures and savings. Since the GTAP is a multi-region open economy model, agents have economic interaction with the rest of the world. Therefore, private household and government consume both domestic goods and services from domestic producers and foreign goods and services from the rest of the world. Savings and investments, which are other elements of final demand, are calculated on a global scale. In the model, global savings and global investment are equal to each other. Moreover, all markets clear and all producers obtain zero profit under perfect competition assumption.

Producers earn income by selling consumption goods to private households (Private Household’s Domestic Consumption) and to the government (Government’s Domestic Consumption). They also sell intermediate inputs to other producers (Firms’ Domestic Consumption) and investment goods to the global savings sector (Net Investment). Regarding the multi-region open economy model, producers export their final goods and services to the rest of the world and import intermediate inputs. Therefore, receipts of producers are net investment, domestic consumption of private households, government and firms, and export to the rest of the world. Under zero profit assumption, total revenue of the
producers should be equals to total expenditures which are sum of taxes, firms’ domestic and foreign consumption to intermediate inputs, and value of endowments paid by the producers to the regional household for the use of endowment commodities which are non-tradable goods including agricultural land, labor and capital.

In addition, GTAP model incorporates government via taxes and subsidies. The private household and the government use their revenues not only for expenditure but also for transferring tax to the regional households. Producers transfer tax to the regional household, where taxes are considered in terms of net value due to the subsidies. Regional household’s income is comprised of tax revenues both from domestic agents and rest of the world and flows from producers due to consumption of endowments. Finally, private households, government and producers consume not only domestic products but also imported products and thus, both the regional household has an export and import tax revenues from the rest of the world.

The transmission mechanism summarized above is reflected only from one-country one-sector perspective. Different transmission mechanisms and parameters are available for each region and sector. In this study, the parameters are obtained from the standard GTAP general equilibrium model and shocks are applied on import tax and international trade costs among countries.

The dataset for the general equilibrium model is obtained from GTAP-8 Data Base covering 134 regions and 57 sectors and also related bilateral trade information, transport and protection linkages with reference year of 2007. The sectoral and regional aggregations are provided in Table 1 and Table 3, respectively.
### Table 3: Regional Aggregation*

<table>
<thead>
<tr>
<th>Region</th>
<th>The United States of America</th>
<th>Canada</th>
<th>Malaysia</th>
<th>Peru</th>
</tr>
</thead>
<tbody>
<tr>
<td>European Union</td>
<td>Chile</td>
<td>Mexico</td>
<td>Singapore</td>
<td></td>
</tr>
<tr>
<td>Australia</td>
<td>China</td>
<td>New Zealand</td>
<td>Vietnam</td>
<td></td>
</tr>
<tr>
<td>Rest of the world</td>
<td>Japan</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Although Brunei is a member of the TPP, she could not be taken in regional aggregation since the GTAP Data Base does not include her.

In order to measure quantitative economic effects of the TTIP and TPP, three different scenarios are applied:

i) Only the TTIP is realized,

ii) Both the TTIP and TPP are realized

iii) Both the TTIP and TPP are realized and China participates in the TPP.

In each scenario, the scopes of the agreement have been deepened by differentiating simulations using particular shocks (Table 4). Due to the fact that FTAs mainly covers merchandise trade, trade liberalization shocks are not applied to the services sector. The discussion on inclusion of services in liberalization is provided in the next section. In the first scenario, custom tariffs including tariff equivalents and quotas in all sectors except services between member countries are reduced. 90 percent of the tariff barriers are eliminated in agricultural and food products; however, tariff barriers are fully removed in the other sectors. The reason behind this limited reduction in agricultural and food products is the exclusion of socio-economically sensitive agricultural products in the FTAs.

Since it is widely accepted that these two important FTAs will cover not only removal of custom tariffs but also reduction in non-tariff barriers among member states, quantitative effects of comprehensive agreements are also calculated using reduction in non-tariff barriers among member states together with elimination of tariff barriers. Similar to the first scenario, reduction in non-tariff barriers are applied at a lower rate in sensitive sectors compared to the extractive and manufacturing sectors. Finally, in the third simulation, non-tariff barriers in the exports of third countries to the FTA partners have been reduced according to the approach of direct spill-over effect of Francois et al. (2013) which introduces
a cost reduction in exports of third countries to the FTA members as a result of harmonization of regulations.

Table 4: Applied Shocks in Simulations

<table>
<thead>
<tr>
<th>Agreements</th>
<th>Applied shocks</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Reduction in tariff barriers</td>
<td>All custom tariffs including tariff equivalents and quotas have been removed in extractive industry, light manufacturing, heavy manufacturing and technology-intensive manufacturing. However, 90 percent of custom tariffs including tariff equivalents and quotas in agricultural and food products have been removed.</td>
</tr>
<tr>
<td>(2) Reduction in both tariff and non-tariff barriers</td>
<td>In addition to previous shocks applied in (1), reduction in non-tariff barriers through decline in international trade costs is applied. Lower reduction in non-tariff barriers in agricultural and food products is applied compared to extractive industry, light manufacturing, heavy manufacturing and technology-intensive manufacturing.</td>
</tr>
<tr>
<td>(3) Reduction in both tariff and non-tariff barriers with spill-over effects</td>
<td>In addition to shocks applied in (1) and (2), limited non-tariff barrier reduction in export from non-member countries to FTA members is applied due to spill-over effects through decline in international trade costs.</td>
</tr>
</tbody>
</table>

i) Only the TTIP is realized

In the first scenario, quantitative impacts of finalization of the TTIP are analyzed using the CGE model. The impacts of the TTIP on GDP and trade flows of China are displayed in Figure 6. If the TTIP becomes a restricted agreement in a sense that it only covers only reduction in tariff barriers among member states, the loss on Chinese GDP and trade flows would be lower compared to the situation of comprehensive agreement. The loss in these variables decreases in the third case including spill-over effects owing to the fact that China benefits from harmonization of regulations, procedures and other types of technical requirements among the US and the EU which would be a cost-reducing item in the export of China to the US and the EU. The results suggest that the loss in Chinese GDP could increase up to 0.51 percent and similarly the loss in export and import could rise up to 0.51 percent and 0.73 percent, respectively.
In sectoral analysis of Chinese exports, extractive industry becomes the most negatively affected sector by the realization of the TTIP (Figure 7). The decline in the export of extractive industry increases up to 1.7 percent as a result of both tariff and non-tariff barriers reduction with spill-over effects. The spill-over effects causes both positive and negative consequences in export of goods. For instance, spill-over effects worsen export in agricultural and food products and extractive industry whereas export in light, heavy and technology intensive manufacturing increases by means of spill-over effects.
The results of the CGE analysis suggest that sign of deviation on imports due to the TTIP does not change according to the depth of the agreement and is always negative (Figure 8). The highest contraction in import is observed in agricultural products. The other sectors which are also sensitive to the TTIP are technology-intensive manufacturing and heavy manufacturing consecutively.
ii) Both the TTIP and TPP are realized

In this case, the effects of both the TTIP and TPP agreements are simulated. Since China is not a member of neither of the two agreements, the loss in output and trade flows raises compared to the initial case where only impacts of the TTIP agreement is investigated. The decline in the GDP of China varies in the range of 0.34 percent and 1.77 percent according to the depth of the agreements (Figure 9). Also, export and import could decline up to 2.15 percent and 2.84 percent, respectively. Similar to the previous case, spill-over effects softens the damage that Chinese economy faces due to trade diversion arising from realization of two important trade agreements.

![Figure 9: Impacts of the TTIP and TPP on China](image)

In sectoral details in export of China, extractive and food products industry become the most vulnerable sectors followed by agricultural products industry. The decline in the export of food products and extractive industry could increase up to 6.4 and 5.6 percent, respectively (Figure 10). Furthermore, spill-over effects is not strong enough to alter the sign of export deviations in any sectors. Similar to the impacts observed in exports, agriculture and food products are among most negatively affected sectors in terms of import losses (Figure 11).
Figure 10: Impacts of the TTIP and TPP on Chinese Merchandise Export in Selected Sectors
(Percentage Change, Base Year Deviations)

Source: Authors’ calculations

Figure 11: Impacts of the TTIP and TPP on Chinese Merchandise Import in Selected Sectors
(Percentage Change, Base Year Deviations)

Source: Authors’ calculations
ii) Both the TTIP and TPP are realized and China participates in the TPP

Since the TPP is not finalized, there is still room for China to participate in the agreement. Therefore, in this last scenario, economic impacts of inclusion of China in the TPP are investigated. According to the results suggested by the model, the negative impacts arising from the TTIP are offset by the inclusion of China in the TPP. Figure 12 depicts the impacts on Chinese GDP, export and import. Chinese GDP could increase up to 1.71 percent. In foreign trade side, exports can rise in range of 3.78 percent and 6.98 percent and similarly, import of China could jump up to 7.88 percent.

![Figure 12: Impacts of the TTIP and TPP including on China](Percentage Change, Base Year Deviations)

Although benefits from participation of China in the TPP is strong enough to create positive effects in export and import in overall, the export of agricultural products declines also in the last scenario (Figure 13). In contrast to agricultural products, other sectors, especially light manufacturing, increases after the inclusion of China. Opposite to the previous scenario in which China is not a member of the TPP, the change in imports of the all sectors are positive (Figure 14). Even in the extractive industry in which relatively lower jumps in the imports are observed, imports can increase up to 1.24 percent.
Figure 13: Impacts of the TTIP and TPP including China on Chinese Merchandise Export in Selected Sectors
(Percentage Change, Base Year Deviations)

Source: Authors’ calculations

Figure 14: Impacts of the TTIP and TPP including China on Chinese Merchandise Import in Selected Sectors
(Percentage Change, Base Year Deviations)

Source: Authors’ calculations
4. Further Discussion

a. Services Trade

It is expected that both the TTIP and TPP would focus on liberalization of service trade. In line with these expectations, impacts of services liberalizations are tried to be measured. However, the GTAP data base does not cover so many detailed sectors in services as in the case of the merchandise trade. Moreover, the reduction in non-tariff barriers in the trade in services may not be achieved by the elimination of trade costs like in the case of trade in goods due to different trade structures and barriers in trade in services as compared to trade in goods. Therefore, the results may not reflect the real impact of liberalization of services on Chinese economy.

Even so, simulations are applied in the covered services sectors in order to get a general idea about the impacts of the further liberalization in services. Due to the fact that there are not any custom tariffs or tariff equivalents in services, directly non-tariff barriers in services are reduced to capture easing effects of the TTIP and TPP in terms of services trade. Those shocks are applied together with reduction in both tariff and non-tariff barriers in merchandise trade. In other words, simulation results shown in Figure 15 are obtained as a result of reduction in tariff and non-tariff barriers in trade in goods and reduction in non-tariff barriers in trade in services.

Results indicate that the easing in trade in services increases the damage on Chinese economy slightly. For instance, in the case where only the TTIP is realized, it is observed that GDP loss in China increases from 0.51 percent to 0.55. Similarly, Chinese GDP declines 1.84 percent which is 0.07 percent higher than the merchandise trade liberalization in the case of both Agreements are realized. Finally, gain in Chinese GDP as a result of participation of China in the TPP declines to 1.69 percent from 1.71.
b. Possible FTAs of China

Even though China may not be included in the TPP, there are many alternative FTAs that China continue to negotiate. In this section, it is aimed to measure whether alternative possible FTAs of China is strong enough to offset negative impacts of the TTIP and TPP. Same shocks described in Table 4 are applied to China’s FTA negotiation partners. One of the possible FTAs of China is the one with the Regional Comprehensive Economic Partnership (RCEP). The RCEP, an FTA aimed to be concluded in 2015, comprises ten ASEAN countries and six other FTA partners of ASEAN countries\(^\text{10}\). The RCEP includes China while the TPP includes the US. These FTAs could be regarded as tools to establish dominance in the region. The competition between China and the US could also cause decomposition among members of ASEAN, because some of them may focus on the RCEP while others may focus on the TPP. The impacts of the China-RCEP FTA together with the TTIP and TPP are shown in Figure 16. It is observed that the China-RCEP FTA could

\(^{10}\) Member countries of the RCEP are ASEAN countries and Australia, China, India, Japan, South Korea, New Zealand.
increase Chinese GDP up to 1.31 percent. If this partnership and the TTIP are achieved at the same time, the net effect of these two important FTAs is still positive on Chinese GDP but the gain decreases to 0.92 percent. Similarly, if the China-RCEP FTA end in success and the TTIP and TPP are completed, the net effect on Chinese GDP would still to be positive. In this case, Chinese GDP can increase up to 0.78 percent. Although China can eliminate negative impacts of the TTIP and TTP by signing the China-RCEP FTA, these positive effects are smaller than the ones in the case China participates in the TPP. Therefore, it is recommended that China should consider being part of the TPP instead of RCEP since the TPP would outpace RCEP as being a more favorable FTA.

**Figure 16: Impacts of the RCEP on China**

(Percentage Change, Base Year Deviations)

![Bar chart showing impacts of different trade agreements on Chinese GDP](chart)

Source: Authors’ calculations

In addition to China-RCEP FTA negotiations, China has FTA negotiations either under negotiation or consideration with the GCC, Australia, Norway, India, Korea, and Japan-Korea. Therefore, China can use those agreements to eliminate or reduce negative impacts of the TTIP and TPP. The simulation results for these possible FTAs are shown in
Figure 17 to 20\footnote{The simulation results for FTAs with Australia and Japan-Korea are excluded since the results are reviewed in the existing literature part.}. The results indicate that the China-India and the China-Korea FTA could create significant gains in Chinese economy. For instance, the China-India FTA can create 0.33 percent GDP gains and the one with Korea can bring additional 0.40 percent gain. However, none of these agreements seem to be strong enough to eliminate negative impacts of the TTIP and TPP fully on Chinese GDP. Therefore, the China-RCEP FTA seems to be the unique FTA which is able to cope with the negative impacts of the TTIP and TPP.

**Figure 17: Impacts of the China-GCC FTA on China**

(Percentage Change, Base Year Deviations)

![Graph showing impacts of China-GCC FTA on China](image)

Source: Authors' calculations

**Figure 18: Impacts of the China-Norway FTA on China**

(Percentage Change, Base Year Deviations)

![Graph showing impacts of China-Norway FTA on China](image)

Source: Authors' calculations

\footnote{The simulation results for FTAs with Australia and Japan-Korea are excluded since the results are reviewed in the existing literature part.}
Figure 19: Impacts of the China-India FTA on China
(Percentage Change, Base Year Deviations)

Source: Authors’ calculations

Figure 20: Impacts of the China-Korea FTA on China
(Percentage Change, Base Year Deviations)

Source: Authors’ calculations
5. Conclusion

Globalization and rise in international trade as a result of technological developments and reduction in trade barriers have been promoting economic growth. To ensure the continuance of liberalizing the international trading system, alternatives to the multilateral trade are in progress. Among those arrangements, the TTIP and TPP may redefine global trading rules and have significant effects on global economies.

It is highly likely that these initiatives will cause considerable impacts on Chinese economy since both agreements are dominated by the US and bypass China. This study focuses on the impacts of the TTIP and TPP on Chinese economy under three scenarios. In all of the scenarios the TTIP is realized and China never becomes a member. In the first scenario the TTIP is realized alone. In the second scenario both the TTIP and TPP are realized and China is excluded from both of them. In the last scenario both the TTIP and TPP are realized and China is included in the TPP. Different scenarios with respect to the realization of the agreements are studied as they are in progress and have not been finalized yet.

It is found that Chinese economy is negatively affected when only the TTIP is realized; the decrease in Chinese GDP could be up to 0.5 percent. When both the TTIP and TPP are realized and China is excluded, the combined damage in Chinese economy is higher than the damage of the TTIP alone and the decrease in Chinese GDP could go up to 1.8 percent. Nonetheless, inclusion of China in the TPP while being excluded from the TTIP results in up to a 1.7 percent increase of Chinese GDP suggesting that positive impacts of participation of China in the TPP compensate for the negative impacts of the TTIP.

In sum, Chinese government should reconsider its decision about being excluded from the TPP according to these estimations. Although signing regional FTA negotiations such as China-RCEP, China-GCC, China-Norway, China-India and China-Korea, has positive effects on Chinese economy, being part of the TPP would outpace these FTAs since it may result in
the highest GDP and trade increase in Chinese economy. Therefore, it is recommended that
China should consider being part of the TPP in order to offset negative impacts of the TTIP.
References


Ando, Mitsuyo and Shujiro Urata, 2006, “The Impacts of East Asia FTA: A CGE Simulation Study” in JSPS (Kyoto University)-NRCT (Thammasat University) Core University Program Conference, Kyoto.


Brockmeier, Martina, 2001, “Graphical Exposition of the GTAP Model”, GTAP Technical Paper No. 8, Center for Global Trade Analysis, Purdue University.


Joint Expert Group for Feasibility Study on East Asia Free Trade Area, 2006, “Towards an East Asia FTA: Modality and Road Map”, report submitted by the Association of Southeast Asian Nations, Jakarta.


Lee, Hiro, David Roland-Holst and Dominique van der Mensbrugghe, 2004, “China’s Emergence and the Implications of Prospective Free Trade Agreements in East Asia”, Mimeo, Kobe University, Kobe.


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