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# An Analysis of Interaction Effects of China–South Korea and China–Australia FTAs and the Expanding TPP

**Sun Yuhong**

Dongbei University of Finance & Economics, College of International Economics & Trade, China  
syh04@163.com

**Mu Yifei**

Dongbei University of Finance & Economics, College of International Economics & Trade, China  
yifei\_m@sina.com

**Jun Yang**

University of International Business and Economics, China  
jydy.ccap@igsnrr.ac.cn

## Abstract

On 5 October 2015, the Trans-Pacific Partnership Agreement (TPP) led by the U.S. was signed. Already, 12 countries<sup>1</sup> have joined the agreement, but China has not. Thus, lots of research has focused on the negative effect of the TPP on China's foreign trade. On the other hand, China is moving forward in its own efforts to establish bilateral free trade agreements (FTAs) and free trade zones. In June 2015, China–South Korea and China–Australia signed bilateral FTAs which went into effect in December 2015. Several questions were raised: Since South Korea and Australia are the major trade partners in the Pacific area and the bilateral FTAs will be effective before the TPP, will these FTAs' positive effects on China's foreign trade offset some of the negative effects of the TPP? If China and the U.S. adopted a competitive trade policy, which countries would benefit? If China and the U.S. adopted a cooperative trade policy, how would the trade value and economic welfare change? This paper simulates and analyses the mutual effects of China–South Korea and China–Australia FTAs and the enlarging TPP using the computable general equilibrium model. The major conclusions drawn suggest that China–South Korea and China–Australia FTAs will significantly offset the TPP's negative effect on China's foreign trade. If China is not included, the U.S. economic benefit from the TPP will be limited. The economic welfare for a country like Australia, which joined both the bilateral FTA and the TPP, will be increased the most. In the long run, China joining the TPP would be the most beneficial decision for its national interest. However, if the TPP cannot be approved by the US congress, the U.S.'s economic indicators and export would be decreasing sharply. China's economy and export will benefit from FTAs.

**Key words:** China–South Korea FTA, China–Australia FTA, TPP, interaction effects

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<sup>1</sup> The 12 countries are New Zealand, Singapore, Chile, Brunei, the U.S., Australia, Malaysia, Peru, Vietnam, Mexico, Canada, and Japan.

## Introduction

Since 2009, when the U.S. initiated discussions regarding the Trans-Pacific Partnership Agreement (TPP), 12 countries have agreed to participate in the TPP, with the final agreement being reached on 5 October 2015. Much attention has been focused on the TPP's negative effects on China's foreign trade, because China is not a TPP member despite being one of the most important economies in the trans-Pacific area. On the other hand, two of the most significant achievements for China's free trade policy in 2015 were two bilateral free trade agreements (FTAs): the China–South Korea FTA and the China–Australia FTA. Both FTAs were signed in June 2015 and went into effect on 20 December 2015. Both South Korea and Australia are major trade partners with China in the trans-Pacific area, and the two FTAs came into effect before the TPP. People are interested in knowing if the FTAs' positive trade effect will offset the negative effect of the TPP for China. If both China and the U.S. were to adopt a competitive trade policy, which countries would benefit most? If a cooperative trade policy between the two were adopted, how would the economic welfare change?

Focusing on these questions, this paper simulates the mutual economic effects of the TPP and China's FTAs to evaluate the effectiveness of each trade policy. Measuring and simulating the mutual effects of multiple trade agreements are relatively novel and complicated research objectives. To design the scenarios of simulation, this paper simulates the different scenarios of the China–South Korea and China–Australia FTAs as well as the dynamic expansion of TPP. Likewise, analysis is made of the change of economic welfare and export value for different time frames of the FTAs and the TPP and the potential mutual economic impact. As the TPP's dynamic expansion is mainly reflected in the interests of the game between China and the U.S., in order to clarify the policy interaction between the two countries, this paper also analyses the scenarios if China were to join the TPP or not in the future; the results should have strong policy implications for governments' policy adoption.

## Literature Review

By using the computable general equilibrium (CGE) model, it is possible to simulate and analyse the economic effect of trade agreement. The Global Trade Project (GTAP) model, developed in 1992 at Purdue University in the U.S., is a standard CGE model based on the neoclassical theory of firm and household behaviour assuming perfect competition as well as rational and utility-optimizing behaviour. Many researchers use the GTAP model to analyse the effect of

China's FTAs and TPP. Wei (2010) and Wei (2009) used the GTAP6 model to analyse the expectation of the macro-economic impact of the China–South Korea FTA. They suggested that the establishment of the China–South Korea FTA may improve both countries' GDP, economic welfare, terms of trade, and total trade value. Huang and Wang (2010) simulated two scenarios of the China–South Korea FTA by using GTAP7 and made suggestions on the FTA negotiation strategy. Wang and Zheng (2013) simulated three scenarios of the tariff-cutting process by using GTAP7 to analyse the impact on both countries' agriculture industry. Zhao (2008) pointed out that, on some tariff-cutting processes, there will be a win-win situation for both China and South Korea. He also analysed the FTA's impact of both countries' domestic production. Wang (2013) also simulated the economic effect of the China–South Korea FTA by using GTAP 7. There is also research focusing on the China–Australia FTA. Zhou, Wu, Hu, and Cui (2006) analysed the economic effect of the China–Australia FTA and suggested that the FTA will increase the trade value between the two countries and create a trade diversion effect, thereby decreasing the welfare of the nearby countries. All these researches are focused on one single FTA. Most adopted the GTAP 6 or GTAP 7. However, far less research adopting the GTAP9 is focused on the mutual effect of these two FTAs.

The U.S. announced its participation in the TPP negotiations in 2009. Since then, many researchers have focused on the negotiation and economic effect of the TPP. Some of the research adopted GTAP to make quantitative simulations and analyses. Wan (2011) simulated three scenarios of the TPP using GTAP 6. She focused on the economic effect of Japan's participation in the TPP. According to the findings, there will be a positive effect on the U.S. economy and a negative effect on China's economy if Japan were to join the TPP. J. Zhao (2012) suggested that there will be a significant negative impact on China's economy and trade if both South Korea and Japan were to join the TPP. Lu(2013) simulated the effect of the TPP on China's textile industry. His research suggested that there will be a negative effect on China's textile export. Y. Zhao (2014) simulated the economic welfare change of trans-Pacific countries, suggesting that the majority of the economic indicators of the countries will be improved if the trans-Pacific countries, including China, were to join the TPP. A. Todsadee et al.(2012) used GTAP 7 to analyse the economic effect of the countries that have joined the TPP, suggesting that there will be an improvement of the countries' GDP, welfare, and trade if China, Japan, and South Korea were all to join the TPP. However, according to their findings, there will be a negative effect for countries outside of the TPP. Todsadee, Kameyama, & Lutes (2012) analysed the effect of the TPP on the stock farming industry. Compared to previous studies, this paper varies the simulation scenarios' setting and research objective.

Some research has also focused on the mutual effect of the TPP and other free trade policies. Petri, Plummer, and Zhai (2011) adjusted the tariff setting of the TPP and previous tariff cutting between regional comprehensive economic partnership (RCEP) countries to simulate the tariff-cutting and service-liberalization effect on the U.S. economy welfare when the TPP membership expands. Yang and Lu (2013) used GTAP 8 to analyse the TPP and China's, Japan's, and South Korea's FTA using five different scenarios. Liu (2014) analysed the mutual effect of the TPP and China–South Korea FTA, suggesting that the China–South Korea FTA is the best choice for China regardless of the TPP's negotiation outcome. Aslan, Mavus, and Oduncu (2014) suggested that there will be a larger negative effect on China's trade if both the TTIP and TPP are established. However, there would be a positive effect if China joined the TPP. Cheong and Tongzon (2013) analysed the mutual effect of the TPP and RCEP. All mentioned studies focused on the mutual effect of the TPP and one FTA, such as RCEP, TTIP, China–South Korea FTA, or China–South Korea–Japan FTA. In order to be closer to reality, this paper focuses on the mutual effect of TPP and the two FTAs—both the China–South Korea FTA and China–Australia FTA—at the same time.

## Methodology and Simulation Scenarios Designation

### Methodology

Based on the trade creation and trade diversion theory, free trade policy will improve trade partners' welfare due to the trade creation effect.<sup>2</sup> However, the welfare level will not be increased due to the trade diversion and may even cause a decline for certain members and the countries not involved in the policy. In addition, if many countries adopt the FTA strategy and continuously strengthen the self-centred networks of trade agreement or regional block at the same time, the increasing overlapping FTAs are in a dynamic process, which will affect not only members' trade relations and welfare level, but also those of countries outside the FTAs. Thus, we will estimate how the expanding TPP, China–South Korea FTA, and China–Australia FTA will all have their own trade creation effect and trade diversion effect. Different timeframes and overlapping participants between these agreements will make the analysis more demanding.

This paper adopted the CGE model to analyse the economic impact of these trade agreements. The objective of this paper

is to simulate and analyse China's bilateral FTAs' effect based on the background establishment of the TPP. The GTAP model is a multiregional, applied general equilibrium model, with perfect competition and constant returns to scale, which built up a framework of production, trade, and consumption through a series of behaviour equations and parameters. The total supply and demand determines the numerical value of endogenous variables while the product market and factor market clear the equilibrium at the same time and the inputs into production are a nested structure. The GTAP model is designed to work with bilateral trade flows among all regions and linkages between economies and between sectors within economies. Each region has a single representative household. The share of aggregate government expenditures in each region's income is held at a fixed level. There is a global banking sector that intermediates between global savings, and bilateral trade is handled via the Armington assumption. Primary factors (land, unskilled labour, skilled labour, capital, and natural resources) are substitutable, but as a composite are used in a fixed proportion to intermediate inputs (Hertel, 1997). The GTAP Agg program is used to prepare databases for the GTAP economic model. The full GTAP Version 9 database is the latest version and covers approximately 57 commodities and 140 regions.<sup>3</sup> To get the best results, we separated the regions into 10 groups: China; South Korea; Australia; Japan; Hong Kong; Taiwan; the U.S.; other TPP partners<sup>4</sup>; the European Union; and other countries and regions. We also separated the different industry sectors into 10 industry sectors: grains and crops; livestock and meat products; mining and extraction; processed food; textile and clothing; light manufacturing; heavy manufacturing; utilities and construction; transport and communication; and other services. As the major characteristic of trade agreement is tariff cutting, this paper uses tariffs as the target of the analysis.

### Simulation scenario designation

South Korea and Australia joined both FTAs with China and the TPP, and all these trade agreements will cause different economic effects. To clarify the effectiveness of China's FTA and trade policy in the future, the scenarios' designation will include two parts. One is making a quantitative simulation analysis on the mutual effect of the China–South Korea China–Australia FTAs as well as the TPP. Another is China and U.S. future trade policies' impact on bilateral trade and economic welfare, based on the background

<sup>2</sup> Viner, J. (1950). *The customs union issue*. New York: Carnegie Endowment for International Peace.

<sup>3</sup> <https://www.gtap.agecon.purdue.edu/databases/v9/default.asp>

<sup>4</sup> Not including Brunei as there are no data in the GTAP database for Brunei.

of the China–South Korea and China–Australia FTAs. We designed five simulation scenarios:

- (1) No FTA for China or the TPP (including 12 countries) come into effect.<sup>5</sup>
- (2) China–South Korea and China–Australia FTAs come into effect and the TPP was established but did not come into effect.
- (3) China–South Korea and China–Australia FTAs as well as the TPP come into effect.
- (4) China–South Korea and China–Australia FTAs come into effect and the TPP is expanded into 13 countries, with South Korea joining it.<sup>6</sup>
- (5) China–South Korea and China–Australia FTAs come into effect and China joins the TPP<sup>7</sup> (see Table 1).

**Table 1.** Five Simulation Schemes

Scenarios	China–South Korea/ China–Australia FTAs	TPP
1	Not in effect	In effect for 12 countries
2	In effect	Agreed on, but not in effect
3	In effect	In effect
4	In effect	In effect plus South Korea
5	In effect	In effect plus South Korea and China

Note: The authors designed the schemes by combining the research purpose with reality.

## Analysis of Mutual Economic Effect of China–South Korea and China–Australia FTAs and the TPP

### Impact on countries' and districts' economic welfare<sup>8</sup>

The economic welfare impacts on major countries and districts are listed in Table 2. The first column shows relatively large improvements for the welfare of the U.S., Japan, and Australia. Other TPP partners' welfare would also increase. Welfare would decline for China, South Korea, European

Union, Hong Kong, and Taiwan. The welfare decline for China would be the largest. This shows that the TPP would generate a positive effect for TPP partners. However, there is no China–South Korea FTA in scenario one; thus, both China's and South Korea's welfare would decrease. Australia's welfare would increase even though there is no China–Australia FTA as Australia is a TPP partner. Other non-TPP partners' welfare would also decrease.

The second column of Table 2 shows an improvement for China's, South Korea's, and Australia's economic welfare in scenario two. The U.S.'s and Japan's welfare would decline. Other TPP partners' welfare would also decline. China, South Korea, and Australia would benefit from the FTA, and other countries would be worse off. The U.S.'s and Japan's welfare decline would be relatively larger compared to that of other countries.

In the third column of Table 2, South Korea's, Australia's, and Japan's economic welfare would increase relatively more than that of other countries. Especially for Australia, the welfare is tripled compared to scenario two. Even if China were not to join the TPP, China's welfare would still be increased due to the FTAs with South Korea and Australia. The positive effect of the China–South Korea and China–Australia FTAs offsets the negative effect of China not being a TPP partner. The impact on the U.S.'s welfare would still be positive, although it would significantly less compared to scenario one. This result demonstrates that the mutual effect of the FTAs and the TPP would limit the increase in welfare for both China and the U.S. when some countries join both trade agreements.

Scenario four suggests relatively large improvements for South Korea and Japan. Especially for South Korea, the welfare would be triple that in scenario three. There would also be a large increase for the U.S.'s welfare. China's welfare would decrease significantly. However, compared to scenario one, the decline would still be smaller. South Korea's trade policy decision would not just impact its own economic welfare, but also impact the other countries at a much larger economic scale.

The fifth scenario in Table 2 shows a large improvement for China's welfare. Compared to the fourth scenario, the impact would not only change China's welfare from negative to positive, but also make China the largest beneficiary. Japan's welfare would also double compared to scenario four. However, other TPP partners' welfare would decline compared to scenario four. The countries and districts that did not join FTAs or the TPP would suffer a relatively large loss. The economic welfare of the U.S. and China would not be balanced if China were to join the TPP. Thus, trade policy adoption would be different for the two countries.

<sup>5</sup> This scenario will reflect the negative impact for China from the TPP, even against the fact that China's FTAs have already come into effect.

<sup>6</sup> South Korea applied to join the TPP in 2013. It is listed as a primary candidate for the TPP's expansion.

<sup>7</sup> China has not applied to join the TPP yet. There are controversies about China joining the TPP. However, it is not impossible for China to join.

<sup>8</sup> Equation 67 in *Structure of GTAP* written by Thomas W. Hertel and Marinos E. Tsigas (n.d.); see <https://www.gtap.agecon.purdue.edu/resources/download/86.pdf>

**Table 2.** Impacts on Countries' and Districts' Economic Welfare<sup>10</sup> (in millions of U.S. dollars)

	S1	S2	S3	S4	S5
CHN	-4513.89	5320.16	806.27	-2551.9	26504.17
KOR	-1037.72	9179.56	8141.84	25150.73	22072.35
AUS	2102.74	1013.34	3116.09	3683.57	2850.5
JPN	11488.04	-1681.01	9807.02	13184.74	26095
HKG	-131.89	-139.72	-271.61	-328.79	-883.27
TWN	-492.7	-552.87	-1045.56	-1393.02	-3147.97
USA	4083.87	-2210.98	1872.89	4226.36	3979.45
otherTPP	1620.38	-1043.42	576.96	615.43	-166.01
EU	-2641.72	-1331.57	-3973.29	-5633.59	-11290.5
RestofWorld	-4918.52	-2755.38	-7673.9	-12415.3	-20736.1

Source: GTAP 9 Model Simulation

**Table 3.** Impacts on Countries' and Districts' Export Values (in percentages)

	S1	S2	S3	S4	S5
CHN	-0.01	1.02	1.01	0.93	3.91
KOR	0.08	1.38	1.46	1.79	1.73
AUS	0.5	0.52	1.02	1.26	1.45
JPN	0.25	0.15	0.4	0.54	0.72
HKG	0.04	-0.07	-0.03	-0.02	-0.15
TWN	-0.04	-0.14	-0.17	-0.23	-0.5
USA	0.4	0.07	0.46	0.65	2.05
otherTPP	0.73	-0.01	0.72	0.92	1.42
EU	0.09	0.01	0.1	0.16	0.27
RestofWorld	0.06	-0.02	0.04	0.09	0.11

Source: GTAP 9 Model Simulation

### Impact on countries' and districts' export value<sup>10</sup>

The impacts on export value for major countries and districts are listed in Table 3. All the TPP partners would experience relatively large increases in export value in scenario one. China and Taiwan's export value would decrease due to the trade diversion effect of the TPP.

The second scenario shows improvements for China's, South Korea's, and Australia's exports due to the trade

creation effect. The U.S.'s, Japan's, and the European Union's exports would not benefit much. Exports from the other countries and districts group would decline due to trade diversion effects from the China–South Korea and China–Australia FTAs.

In scenario three, exports from China, South Korea, Australia, the U.S., Japan, and other TPP partners would increase whereas those from other countries and districts would decrease. Thus, when both China's FTAs and the TPP come into effect, all the agreement partners' export values would increase. However, the improvements would not be even across each country. Exports from China, Australia, and South Korea would increase more than those from Japan and the U.S.

Compared to scenario three, there would be no change in the signs in scenario four. Due to South Korea joining the TPP, there would be a relatively large increase in South Korea's

<sup>9</sup> This welfare is the equivalent variation (EV) in GTAP, which refers to the Cobb-Douglas super-utility function for region  $r$ . It is computed using Equation 67 in *Structure of GTAP* (Hertel & Tsigas, n.d.). See <https://www.gtap.agecon.purdue.edu/resources/download/86.pdf>

<sup>10</sup> Equation 91 in *Structure of GTAP* (Hertel & Tsigas, n.d.). See <https://www.gtap.agecon.purdue.edu/resources/download/86.pdf>

export. China's exports would increase less compared to scenario three due to the trade diversion effect. Exports from Australia, Japan, the U.S., and other TPP partners would also increase compared to the third column. Taiwan's and Hong Kong's exports would decline.

Compared to the fourth column, there would be a large increase in exports from both China and the U.S. if China were to join the TPP. China's exports would quadruple compared to scenario four, and the U.S.'s exports would triple. All other TPP partners' export values would also increase. However, exports from Taiwan and Hong Kong would decline even more.

Among all these five scenarios, both China's and the U.S.'s exports would benefit most if China were to join the TPP. Exports' improvements would be significantly higher compared to other scenarios—not only for China, but also for the U.S. This would lead to a win–win situation for both countries. Therefore, trade policy adoption would be the same for the two countries if measured by export value.

## **Analysis of Mutual Economic Effects of China–South Korea and China–Australia FTAs and the TPP**

### **China–South Korea and China–Australia FTAs and the TPP's impact on China–U.S. bilateral trade**

#### **Impacts on China's exports<sup>11</sup> to the U.S.**

The quantitative and structural changes of China's exports to the U.S. are listed in Table 4. No China–South Korea or China–Australia FTAs and no TPP serves as the baseline. China's exports to the U.S. are focused on manufacturing industries. The top three industries are the textile and clothing industry, light manufacturing industry, and heavy manufacturing industry. Agriculture, mining, and construction industries' exports are relatively lower.

No significant change occurred in scenario one compared to the baseline scenario; thus, the TPP's trade diversion would not have a large effect on China's exports to the U.S.

In scenario two, China's exports to the U.S. would be reduced for all industries, which would lead to a decline in total value. This shows that China–South Korea and

China–Australia FTAs would create a trade diversion effect if the TPP were not to come into effect. China's exports would be redirected towards South Korea and Australia.

In scenario three, China's exports to the U.S. would decline due to the trade diversion effect from both China's FTAs and the TPP, because no trade agreement exists between China and the U.S. However, no significant difference would emerge compared to scenario two. China–South Korea and China–Australia FTAs' trade diversion effects would dominate the trade diversion effect from the TPP. Because there would be no significant change between scenario one and the baseline scenario, the major impact would come from China's FTAs.

Compared to the baseline scenario, the grains and crops industry and the livestock and meat products industry's exports would increase while the light manufacturing industry's export would decrease in scenario four. A change would occur in the structure of China's exports to the U.S. South Korea's light manufacturing goods would compete with China's products in the U.S. market when South Korea joins the TPP. The U.S. food industry would export more to the South Korean market and would benefit China's food industry export to the U.S.

In scenario five, almost all the industries' exports to the U.S. would increase for China except the transport communication and services industries. Especially the textile industry and manufacturing industry's exports would increase significantly and lead to a raise in China's total export value to the U.S. This reveals that China's comparative advantage in the textile industry and manufacturing industry would increase if China joined the TPP, and China's exports in these industries would also increase. The U.S. comparative advantage in the transport and services industries would also increase, and China's exports in these industries would decline. Overall, China's exports to the U.S. would increase if China joined the TPP.

#### **Impacts on the U.S.'s exports<sup>12</sup> to China**

Quantitative and structural changes in the U.S.'s exports to China are listed in Table 5. We still use the no China–South Korea or China–Australia FTAs and no TPP as the baseline. The U.S. exports to China are focused on the grain and crops industry and the manufacturing industries.

Compared to the baseline scenario, all industries' exports to China would decline except in the mining industry. This reveals that the trade diversion effect from the TPP would decrease the U.S.'s exports to China.

<sup>11</sup> Equation 29 in *Structure of GTAP* (Hertel & Tsigas, n.d.). See <https://www.gtap.agecon.purdue.edu/resources/download/86.pdf>

<sup>12</sup> Equation 29 in *Structure of GTAP* (Hertel & Tsigas, n.d.). See <https://www.gtap.agecon.purdue.edu/resources/download/86.pdf>

**Table 4.** Impacts on China's Exports to the U.S. (in millions of U.S. dollars)

	Base	S1	S2	S3	S4	S5
GrainsCrops	795.88	821.79	778.03	803.94	823.72	842
MeatLstk	555.9	558.87	549.64	552.62	565.5	555.24
Extraction	601.49	598.82	596.22	593.55	592.54	607.05
ProcFood	5756.2	5734.65	5697.01	5675.46	5702.38	6190.63
TextWapp	28397.28	27410.91	28206.66	27220.29	27217.85	40476.14
LightMnfc	104197	104380.7	103558.7	103742.5	104339.9	125151.9
HeavyMnfc	246415	247126.1	245112.7	245823.8	246853.8	255887.3
Util_Con	413.55	417.54	410.56	414.55	417.4	403.85
TransComm	6242.42	6284.4	6190.71	6232.69	6264.49	6030.05
OthServices	7986.89	8044.06	7920.18	7977.35	8026.63	7709.3
Total	401361.5	401377.8	399020.4	399036.7	400804.2	443853.5

Source: GTAP 9 Model Simulation

**Table 5.** Impacts on U.S. Exports to China (in millions of U.S. dollars)

	Base	S1	S2	S3	S4	S5
GrainsCrops	16989.27	16304.9	17162.72	16478.34	15808.9	18171.51
MeatLstk	2712.86	2638.96	1953.62	1879.72	1809.82	3268.99
Extraction	3565.63	3570.82	3569	3574.2	3563.2	3716.21
ProcFood	3245.17	3198.15	3210.49	3163.47	3099.44	4141.77
TextWapp	1274.72	1265.84	1240.84	1231.96	1221.25	1862.69
LightMnfc	24337.75	24162.19	23966.89	23791.32	23734.08	34243.75
HeavyMnfc	68015.73	67682.27	66479.34	66145.88	66165.66	83408.18
Util_Con	140.2	139.12	141.7	140.62	140.46	144.17
TransComm	3410.05	3382.49	3430.79	3403.23	3387.32	3449.71
OthServices	7366.1	7301.15	7417.36	7352.41	7318.34	7459.48
Total	131057.5	129645.9	128572.8	127161.2	126248.5	159866.5

Source: GTAP 9 Model Simulation

Scenario two would see an even greater decline in the U.S.'s exports to China compared to scenario one. China–South Korea and China–Australia FTAs would create an even larger trade diversion effect and decrease the U.S.'s exports to China even more.

Scenario three would decline more than scenario two. The trade diversion effects from both of China's FTAs and the TPP would decrease the U.S.'s exports to China as no trade agreement exists between China and the U.S.

Scenario four would decline even more than scenario three. The trade diversion effect would be larger if South Korea joined the TPP. The U.S.'s exports to China would be realigned towards other TPP partners.

The U.S. would experience an improvement in its exports to China if China joined the TPP. All industries' exports would increase. Total export value would increase by 22%, which would have a positive impact on the U.S. economy.

### **China–South Korea and China–Australia FTAs and the TPP's impact on macroeconomic indicators of China and the U.S.**

We analyse the impacts of China's FTAs and the TPP on consumption, investment, government spending, exports, imports, and GDP for China and the U.S. The baseline scenario is no China–South Korea or China–Australia FTAs and no TPP.

**Table 6.** Impacts on China’s Macroeconomic Indicators (in millions of U.S. dollars)

	Consumption	Investment	Gov. Spd.	Export	Import	GDP
Base	2658237	3375387	988370.1	1951878	-1651997	7321875
S1	2652023	3365412	986061.6	1948612	-1646463	7305646
S2	2662622	3385039	990129.0	1972993	-1677621	7333163
S3	2656408	3375065	987820.5	1969728	-1672087	7316934
S4	2651251	3367299	985973.1	1965796	-1666515	7303804
S5	2676021	3406529	995911.2	2032150	-1741993	7368618

Source: GTAP 9 Model Simulation

**Table 7.** Impact on the U.S. Macroeconomic Indicators (in millions of U.S. dollars)

	Consumption	Investment	Gov. Spd.	Export	Import	GDP
Base	10887626	2874598	2567570	1880767	-2676776	15533785
S1	10900094	2880156	2570469	1890051	-2690646	15550123
S2	10875822	2868550	2564797	1880345	-2671935	15517578
S3	10888288	2874108	2567696	1889628	-2685805	15533914
S4	10893874	2874147	2568948	1893942	-2689903	15541008
S5	10868465	2868939	2563015	1916843	-2712454	15504808

Source: GTAP 9 Model Simulation

### Impacts on China’s macroeconomic indicators<sup>13</sup>

Compared with the baseline scenario, all macroeconomic indicators for China would decline (see Table 6) in scenario one. The TPP would have a negative impact on China’s economy if China doesn’t sign any FTA.

In scenario two, all the indicators would increase. A slight decrease in trade surplus would occur. The China–South Korea and China–Australia FTAs would have a positive impact on China’s economy.

In scenario three, China’s exports and imports would increase. However, China’s consumption, investment, government spending, and GDP would drop. The decline would not be as large as in scenario one. For China, the positive impact from China–South Korea and China–Australia FTAs and the negative impact from the TPP would be neutralized.

Scenario four’s performance would be similar to scenario three, but the decline would be expanded. Consumption and government spending would be even less compared to scenario one. There would be a relatively large negative impact if South Korea joined the TPP.

In scenario five, there would be large improvements for all indicators. China’s economy would benefit more than in other scenarios if China joined the TPP. Thus, joining the TPP would be China’s best choice in the future.

### Impact on the U.S.’s macroeconomic indicators<sup>14</sup>

All the macroeconomic indicators would increase for the U.S. in scenario one compared with the baseline. The U.S. would benefit from the TPP when it comes into effect.

In scenario two, all the indicators would decrease for the U.S. China–South Korea and China–Australia FTAs would have a negative impact on the U.S. economy.

In scenario three, a slight drop in consumption, investment, government spending, exports, and imports would occur while the GDP would slightly increase. On average, no notable differences are evident between scenario three and the baseline scenario. For the U.S. economy, the negative impact from China–South Korea and China–Australia FTAs and the positive impact from the TPP would be neutralized.

Compared to scenario three, all the indicators would increase if South Korea joined the TPP. There would be a positive

<sup>13</sup> Equation 72 in *Structure of GTAP* (Hertel & Tsigas, n.d.). See <https://www.gtap.agecon.purdue.edu/resources/download/86.pdf>

<sup>14</sup> Equation 72 in *Structure of GTAP* (Hertel & Tsigas, n.d.). See <https://www.gtap.agecon.purdue.edu/resources/download/86.pdf>



impact on the U.S. economy, especially in consumption, exports, and imports.

In scenario five, the U.S.'s export and import values would increase. However, consumption, investments, and government spending would decrease. Thus, it would not necessarily be the best situation for the U.S. if China joined the TPP.

## Conclusions and Policy Implications

This paper analysed the mutual effect of China–South Korea and China–Australia FTAs as well as the TPP. We simulated the impacts on welfare and export value for different countries and districts. Furthermore, this paper simulated the impacts on bilateral trade between China and the U.S. We also analysed the trade agreements' impact on macroeconomic indicators for China and the U.S.

China's welfare and total export value would decline if the TPP came into effect without either the China–South Korea or China–Australia FTAs. TPP partners' welfare and total export value would increase. The trade diversion effect due to the TPP is limited to China's exports to the U.S. However, the trade diversion effect would decrease the U.S.'s exports to China. There would be a negative impact on China's economy and a positive impact on the U.S. economy.

In the scenario where China–South Korea and China–Australia FTAs came into effect but the TPP did not, welfare and total export values would increase for China, South Korea, and Australia. Welfare for TPP partners would decline. Both China's exports to the U.S. and the U.S.'s exports to China would decrease due to the trade diversion effect caused by China's FTAs. China's economy would benefit from the FTAs. However, the U.S.'s economic indicators would drop.

If China–South Korea and China–Australia FTAs and the TPP were all in effect, changes in welfare for both China and the U.S. would be relatively small due to the neutralization of the FTAs and the TPP. China's exports to the U.S. would be almost the same as in scenario two. The trade diversion effect from China–South Korea and China–Australia FTAs would dominate the change of China's exports to the U.S. As for the U.S.'s exports to China, the trade diversion effect from both of China's FTAs and the TPP would have negative impacts. Effects from the FTAs and the TPP would offset each other in terms of both countries' macroeconomic indicators.

China's welfare would decline if South Korea joined the TPP. However, the drop would still be smaller compared to the case in scenario one. The U.S.'s welfare would improve in scenario four. South Korea's welfare and total export

value would benefit most compared to other countries. There would be a structural change for China's exports to the U.S. The manufacturing sector's exports to the U.S. would shrink due to competition with South Korea's products in the U.S. market. The U.S. food sector products would export more to South Korea. Hence, China's food sector's exports to the U.S. would expand because of less competition with local products. The U.S.'s exports to China in almost all industries would decline due to trade redirection toward South Korea. There would be a negative impact on China's economy and a positive impact on the U.S. economy if South Korea joined the TPP.

In scenario five, welfare for China and Japan would increase significantly. However, the improvements in welfare for the U.S., South Korea, and Australia would not as notable as the cases in scenario four. China would benefit most. The total export value for both China and the U.S. would increase if China joined the TPP. Industries in which China has a more comparative advantage would benefit more in terms of exports to the U.S. Almost all of the U.S. industries' exports to China would benefit. All the macroeconomic indicators for China would increase. However, only export and import value would increase for the U.S.

From the results in scenario one, the TPP would bring a negative impact to China's trade and overall economy. However, the results in scenario two and three suggest that China–South Korea and China–Australia FTAs would positively impact China's trade and economy and neutralize the negative impact from the TPP. As seen from the results in scenarios three and four, the U.S.'s benefits would be limited if China were excluded from the TPP. In particular, the U.S.'s benefits from trade would be limited. The countries that participate in both China's FTAs and the TPP would enjoy the most benefit. As the China–South Korea and China–Australia FTAs have already come into effect, participating in the TPP is the best choice for China, whether measured by welfare or by trade. Letting China join the TPP is the best choice for improving the U.S.'s trade and the second best choice for improving its welfare. This may result in trade policy diversion for the U.S. and China if measured by welfare. However, it will be a win–win situation if measured by trade. A more liberalized trade policy reform and further efforts to participate in the TPP are ultimately a good option for China.

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## Authors

**Sun Yuhong** is an associate professor of economics and research fellow in the Faculty of International Economics and Trade at Dongbei University of Finance and Economics (DUFEE). She earned her Ph.D. in economics in 2007 from DUFEE, majoring in international economics and regional economic integration. She has published 4 academic books and more than 20 academic papers as well as conducted various research projects supported by the Ministry of Education and Liaoning Province.

**Mu Yifei** is a Clemson University graduate who earned his Ph.D. in economics. He is a lecturer, master's tutor, and research director for trade theory and empirical study, enterprise heterogeneity, and open macro. He majored in senior international trade theory.

**Jun Yang** is a professor at the School of International Economics and Trade at the University of International Business and Economics. He earned his international Ph.D. at the Center for Agricultural Policy Research, Chinese Academy of Sciences, in 2005 and served as a postdoctoral fellow at the Asia Pacific Institute of Economics, Australian National University, in 2007. He majored in international economics, international trade, and micro-economics. He has published 50 papers in English (SSCI Article 22) and more than 70 domestic papers.

## Analiza interakcijskih učinkov sporazuma o prosti trgovini med Kitajsko in Južno Korejo ter Kitajsko in Avstralijo ter razširjenega transpacifiškega sporazuma o partnerstvu

### Izvleček

Transpacifiškemu sporazumu o partnerstvu, ki je bil sklenjen 5. oktobra 2015, se je že pridružilo 12 držav. Ker Kitajska k sporazumu ni pristopila, je bilo veliko raziskav osredotočenih na negativne učinke na kitajsko zunanjo trgovino po sklenitvi tega sporazuma. Po drugi strani si Kitajska prizadeva, da bi omogočila svoj razvoj z bilateralnim sporazumom o prosti trgovini in z območji proste trgovine. Junija 2015 je Kitajska podpisala bilateralna sporazuma z Južno Korejo in Avstralijo; veljati sta začela decembra 2015. Pojavila so se številna vprašanja: Ker sta Južna Koreja in Avstralija glavni trgovinski partnerici na pacifiškem območju in ker bosta bilateralna sporazuma o prosti trgovini učinkovita še pred transpacifiškim sporazumom o partnerstvu, ali bodo pozitivni učinki sporazumov o prostem trgovanju nadomestili nekatere negativne učinke transpacifiškega sporazuma o partnerstvu? Katere države bodo imele korist od tega, da bi Kitajska in Združene države Amerike privzele tekmovalno trgovinsko politiko? Kako bi se spremenili tržna vrednost in ekonomska blaginja, če bi Kitajska in ZDA privzele sodelovalno trgovinsko politiko? V prispevku simuliramo in analiziramo vzajemne učinke sporazumov o prosti trgovini med Kitajsko in Južno Korejo ter Kitajsko in Avstralijo ter razširjenega transpacifiškega sporazuma o partnerstvu z uporabo izračunljivega modela splošnega ravnovesja. Glavne ugotovitve so: sporazuma o prosti trgovini med Kitajsko in Južno Korejo ter Kitajsko in Avstralijo bosta značilno nadomestila negativne učinke transpacifiškega sporazuma o partnerstvu na kitajsko zunanjo trgovino. Če Kitajska ne bo vključena, bo ekonomska korist transpacifiškega sporazuma o partnerstvu za ZDA omejena. Ekonomska blaginja za državo, kot je Avstralija, se bo s pridružitvijo tako bilateralnemu sporazumu o prosti trgovini kot transpacifiškemu sporazumu o partnerstvu najbolj povečala. Na dolgi rok bo odločitev Kitajske, da se pridruži transpacifiškemu sporazumu o partnerstvu, za njene nacionalne interese prinesla največ koristi.

**Ključne besede:** sporazum o prosti trgovini med Kitajsko in Južno Korejo, sporazum o prosti trgovini med Kitajsko in Avstralijo, transpacifiški sporazum o partnerstvu, interakcijski učinki