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COMPARING ALTERNATIVE CHINA AND US ARRANGEMENTS WITH CPTPP

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ABSTRACT

This paper builds a 29-country numerical general equilibrium model with inside money and trade cost to simulate and compare the effects of China and the US taking part in the Comprehensive and Progressive Trans-Pacific Partnership (CPTPP), which is a high standard mega regional trade agreement. Comparison results show that China will benefit CPTPP member countries more than the US on trade, GDP, and manufacturing employment. China's entering the CPTPP can also benefit most non-member countries on GDP and manufacturing employment. By joining, the US will benefit the whole world more, as the US economic scale is larger than that of China. Our simulation results reveal that China will be more welcomed to the CPTPP by member countries.

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Abstract: This paper builds a 29-country numerical general equilibrium model with inside money and trade cost to simulate and compare the effects of China and the US taking part in the Comprehensive and Progressive Trans-Pacific Partnership (CPTPP), which is a high standard mega regional trade agreement. Comparison results show that China will benefit CPTPP member countries more than the US on trade, GDP, and manufacturing employment. China's entering the CPTPP can also benefit most non-member countries on GDP and manufacturing employment. By joining, the US will benefit the whole world more, as the US economic scale is larger than that of China.

Keywords: Comprehensive and Progressive Agreement for Trans-Pacific Partnership; Numerical General Equilibrium; China; United States

JEL Code: F53, C68, F47

1. Introduction

In the context of anti-globalization trends such as populism and protectionism, promoting regional economic integration has become an important way for countries to seek international cooperation. On 8 March 2018, 11 economies (following the US exit) signed the Comprehensive and Progressive Trans-Pacific Partnership Agreement (CPTPP), which came into effect on 30 December 2018. As the first mega-free trade agreement in the Asia-Pacific region, the CPTPP represents the standard of high-level FTAs, and it is also a new paradigm for regulatory cooperation in regional trade agreements. Compared to previous trade agreements, the CPTPP has new features, such as a wide range of terms, wide geographical coverage, and high standards. The birth of the CPTPP has profound impacts on Asian trade patterns and global trade rules. In addition, the CPTPP's conditions of entry into force are relatively loose, and the entry barriers are low, so it has good prospects for capacity expansion. On 19 January 2019, Tokyo hosted the first ministerial meeting of member states after the CPTPP took effect. The meeting specifically discussed the member expansion rules and some prospective countries to join the CPTPP in the future, these countries include Colombia, Indonesia, South Korea, Thailand, UK, etc.

In recent years, China is trying to expand "friend group", for instance, actively promoting the development of the "Belt and Road" initiative and accelerating the signing of the Regional Comprehensive Economic Partnership (RCEP). China is not a CPTPP member, but has an open mind about participating multilateral and regional trade cooperation, and China should seize the chance for CPTPP expansion. Moreover, given that the CPTPP rules are less stringent than the TPP rules and the controversial terms have been put on hold or suspended, it is easier for China to join.

Many CPTPP countries have expressed willingness for China's accession. In the meantime, it is highly probably that the US will return to the CPTPP; the Trump administration has not ruled out the possibility of rejoining. The possible reasons for the US return to CPTPP are as follows: First, joining the CPTPP can get liberalization benefits. Second, the US tries to regain core discourse right in multilateral trade, investment, finance, intellectual property, and other areas in the Asia-Pacific region. Third, the US will consider making use of existing CPTPP multilateral rules to regain rule dominance in the Asia Pacific. The above reasons have led the US government to re-examine the value of the CPTPP.

In the context of China-US trade frictions and the expansion of the CPTPP, if China and the US come into the CPTPP, the economic impact on member states will receive widespread attention. With the backdrop, this paper constructs a global general equilibrium (GE) numerical model to simulate different scenarios for the US and China's participation in the CPTPP and quantifies the economic effects of member states to measure which is more favored by CPTPP members. The economic effects are mainly divided into the following aspects: GDP effect, welfare effect, employment effect, and trade effect. In addition, we analyze the economic effects of the expansion of the CPTPP to 16 member countries. The results show that in terms of GDP effect, employment effect and trade effect, China's accession to the CPTPP can bring more economic benefits to members than the US. On the contrary, if only welfare effect is taken into consideration, the benefits of US membership in the CPTPP will be greater than China's. The contributions of this paper include three points: First, it uses inside money to endogenously determine the trade imbalance structure, which can increase the stability of the model and help to reflect the individual country's preference for trade surplus. Second, introducing trade costs, including tariffs and non-tariff barriers, into theoretical models can quantify the impact of rule and standard liberalization in CPTPP. Third, it comprehensively quantifies and compares the impact of separately China and the US on membership after entry into the CPTPP.

The rest of the paper is organized as follows: Section 2 provides a literature review; section 3 describes the GE model, data, and parameter calibration; section 4 illustrates the results of the quantitative analysis, which mainly compares the economic effects of China and the US after joining the CPTPP on existing members and the expanded members; section 5 draws conclusions and identifies policy implications.

2. Literature Review

2.1 Theoretical Review

Since 1995, the number of FTA negotiations involving major economies such as the US, EU, China, and India, as well as small and medium-sized economies, have grown rapidly (Aggarwal and Evenett, 2013). With the rise of bilateral or regional trade agreements, countries have developed a set of complex and unmanageable accords, and each agreement has its own rules and procedures. Various exceptions and limitations often make it difficult for companies to manage their global supply chains, so these agreements may actually undermine rather than promote open trade. Agreements with differing provisions and exclusions may cause the "noodle bowl" effect. In this context, the establishment of so-called mega-FTAs can be viewed positively (Aggarwal, 2016).

Scholars hold different views on the compatibility of mega-FTAs with the WTO trade system. [Stoler \(2014\)](#) considers that mega-FTAs have a competitive relationship with the WTO, and if all mega-FTAs are successfully completed, the most important international goods, services, and investment transactions of the participants would be comprehensively covered by preferential free trade agreements, and most behind-the-border questions would be addressed through so-called “WTO-plus” commitments. Inconsistent with this view, [Urata \(2016\)](#) argues that mega-FTAs and the WTO can be complementary, as mega-FTAs can facilitate negotiations with fewer negotiating members. Urata emphasizes the importance of extending mega-FTAs to a global level by accepting new members and merging with other mega-FTAs. Although the existing research is rich in theoretical evidence, most articles focus on the impact of mega-FTAs such as TPP, TTIP, and RCEP ([Capling and Ravengill, 2011](#); [Wilson, 2015](#); [Das, 2015](#); [Capaldo and Izurieta, 2018](#); [Lin et al., 2018](#); [Steiner, 2018](#); [Lee, 2019](#)), and the available literature pays insufficient attention to the CPTPP. [Ji and Rana \(2019\)](#) examine the role of the US in the rise and fall of the TPP, and they lay out informed conjecture about the future of the CPTPP. [Corr et al. \(2019\)](#) discuss the potential impact of CPTPP’s entry into force on global trade, arguing that this includes not only country-specific implications for select parties, but also trade development implications for non-member countries. However, these articles only include qualitative analysis and lack quantitative evaluation.

2.2 Empirical Review

The numerical GE methodology is one of the most widely used techniques for evaluating the potential economic implications of trade agreements; it is employed for the analysis of regional trade agreement effects using real economic data ([Shoven and Whalley, 1992](#); [Gilbert and Scollay, 2000](#); [Zhai, 2008](#); [Areerat et al., 2012](#); [Jean et al., 2014](#)). This kind of quantitative research on the economic impact of trade agreements occupies a dominant position in the existing literature, and mega-FTAs are the focus of attention. [Peter et al. \(2016\)](#) estimates the effects of the TPP, suggesting that the TPP will yield substantial gains for Japan, Malaysia, and Vietnam, while the US will be the largest beneficiary of the agreement. [Gilbert et al. \(2016\)](#) examines the TPP in comparison to two other major mega-FTAs: the RCEP and the FTAAP. They also consider the implications of a possible expansion of the TPP to include countries that have indicated an interest in joining in future. [Li et al. \(2016\)](#) explores the potential impacts on both China and other major countries of possible mega trade deals. Their simulation results reveal that the RCEP and the China-TPP will generate the highest welfare outcomes for China. [Khan et al. \(2018\)](#) evaluates the likely impacts of the CPTPP on the trade flows and other macroeconomic aggregates of Pakistan, and the results show that Pakistan’s proposed entry to the CPTPP will not only yield a wide gain but will reduce the gap between poor and rich.

Nevertheless, these articles rarely explore and compare the effects of alternative China and the US joining the CPTPP. At the same time, few studies have considered the model of trade cost and the endogenous structure of trade imbalance. Based on related research, and according to the latest results of the CPTPP negotiations, this article evaluates the economic impact of China and the US’ accession to the CPTPP by constructing a global GE model. It also analyzes which countries will benefit more from the participation of either China or the US in different scenarios.

3. GE Model and Data

3.1 GE Model

We build a global GE model and add a monetary structure using inside money following [Whalley et al. \(2011\)](#) to endogenously determine the trade imbalance. In our global GE model with monetary structure, we allow inter-commodity trade to coexist within the period along with trade in debt in the form of inside money. We use a single period model where either claim on future consumption (money holding) or future consumption liabilities (money issuance) enter the utility function as incremental future consumption from current period savings. This is the formulation of inside money that [Archibald and Lipsey \(1960\)](#) uses.

On the production side of the model, we assume a CES technology for production of each good in each country. On the consumption side, we use the Armington assumption of product heterogeneity across countries and assume claims on future consumption enter preferences and are traded between countries. Each country can thus either issue or buy claims on future consumption using current period income. We use a nested CES utility function to capture consumption: the first layer structure is goods selection between different products, including tradable goods, non-tradable goods, and inside money; the second layer structure is goods selection between products produced in different countries (see Figure 1).

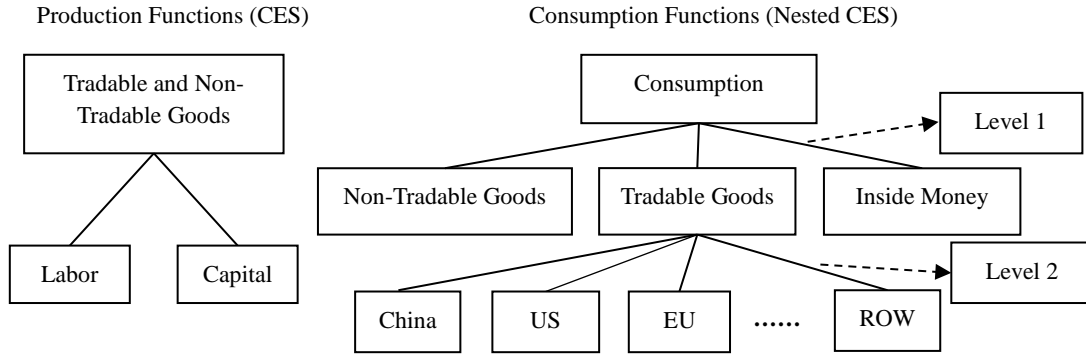


Figure 1: Nesting Structure in Production and Consumption Functions

Source: Compiled by authors.

We introduce trade costs into the model. Trade costs include not only import tariffs but also other non-tariff barriers such as transportation costs, language barriers, and institutional barriers. We divide trade costs into two parts in our model: import tariffs and non-tariff trade costs. Tariffs collect revenue and increase government income. Non-tariff barriers are different from import tariffs: they cannot collect revenue, and importers need to use actual resources to cover the costs involved. In the numerical model, we assume that the resource costs involved in overcoming all other non-tariff barriers are denominated in terms of domestic non-tradable goods. We incorporate this resource using feature through the use of non-tradable goods equal in value terms to the cost of the barrier. We thus assume reduced non-tariff trade costs (including transportation costs) will thus occur under trade liberalization as an increase in non-tradable goods consumption by the representative consumer in importing countries.

For trade imbalance modelling, we introduce the internal currency imbalance structure of inside money. The principle is to allow the trade of products and the trade of debt expressed in internal currency to exist simultaneously. The utility function includes the claim of future

consumption (holding currency). The debt of consumption (issuing currency) represents the increase in future consumption caused by current savings. At the same time, the internal currency enters the utility function and sets the internal currency as equal to the level of the trade imbalance. Specifically, Y_i represents both inside money (debt) held by country i and country i 's trade imbalance. $Y_i > 0$ implies a trade surplus (or positive claims on future consumption); $Y_i < 0$ implies a trade deficit or future consumption liabilities (effectively money issuance), and $Y_i = 0$ implies a trade balance. For trade deficit countries, utility will decrease in inside money since they are issuers. To capture this, given that $Y_i < 0$ for these countries, we use an upper bound Y^0 in the utility function in a term $[Y^0 + Y_i]$ and assume that Y^0 is large enough to ensure that $Y^0 + Y_i > 0$. We use the transformation $y_i = Y^0 + Y_i$ to solve the optimization problem.

The model equilibrium conditions include the factor market clearing, product market clearing, global trade clearing, and zero-profit conditions in a perfectly competitive market. All markets clearing at the same time determine the equilibrium of the model.

3.2 Data and Parameters Calibration

We use 2013 as our base year in building a benchmark numerical GE dataset for use in calibration and simulation. We include 29 countries/regions in our numerical model, which are Australia, Bahrain, Brazil, Brunei, Canada, Chile, China, the European Union, India, Indonesia, Japan, Korea, Kuwait, Malaysia, Mexico, New Zealand, Oman, Papua New Guinea, Peru, the Philippines, Qatar, Russia, Saudi Arabia, Singapore, Thailand, the United Arab Emirates, the US, Vietnam, and ROW (rest of world). Production factors in our numerical models include capital (K) and labor (L). We include only two goods in our model structures, which are tradable goods and non-tradable goods.

Factor input and production data for all countries are calculated from the World Bank's WDI database. We use agriculture and service share of GDP data and GDP data to yield production data for tradable and non-tradable goods, and we use capital/GDP ratios to yield capital and labor inputs in production. We set the upper bound in our monetary structure as equal to 1,000 billion dollars for all countries. We use world values minus all individual countries to generate ROW values. For the two goods, we assume that secondary industries (manufacturing) reflect tradable goods, and primary and tertiary industries (agriculture, extractive industries, and services) yield non-tradable goods. For the two factor inputs, we use total labor income (wages) to denote labor values for inputs by sector. We adjust some of the data values for mutual consistency for calibration purposes.

Trade data between each pair of countries are from the UN Comtrade database. We use total export and import values for individual countries to indirectly yield exports to and imports from the ROW. Using production and trade data, we can then calculate each country's consumption values. We calculate trade costs following the approaches in [Novy \(2013\)](#), and we obtain each country's

import tariff data from the WTO Statistics Database. We cannot obtain the ROW import tariff directly, so we use the world average tariff rate to denote its value. We calculate non-tariff barriers using trade costs minus import tariffs.

There are no available estimates of elasticities for individual countries on the demand and production sides of the model. Many of the estimates of domestic and import goods substitution elasticity are around 2, so we set all these elasticities in our model to 2 (Whalley and Wang, 2010). We change these elasticities in our sensitivity analysis to check their influence on simulation results.

Using the real data listed above, we calibrate the parameters in the model by setting the parameters in the model as variables. Assuming the variables as parameters, we use the real data to solve the model's equilibrium and then the inverse calculation to determine the model's parameter values. After the numerical general equilibrium model system is established, it is also necessary to test its validity. We use the numerical model system to simulate real economic variables and compare model simulation values with real data to check the reliability of the numerical model. Our test reveals that the numerical model is reliable.

4. Simulation Results

We report simulation results to check which country, China or the US, will benefit CPTPP member countries more. We simulate the participation of China and the US separately and compare the effects. Additionally, we compare effects after the CPTPP member expansion to 16 countries. Finally, we perform a sensitivity analysis on elasticities and non-tariff barriers. In each scenario, we explore both the trade cost elimination effects and the border tariff elimination effects. The trade cost elimination simulations are our main results, and the border tariff elimination results act as a reference. As it is difficult to accurately evaluate the non-tariff barriers elimination level by the CPTPP, we assume the non-tariff barriers can decrease by 40% according to CPTPP rules and standards. In order to reduce the randomness of the non-tariff barrier reduction level, we perform a sensitivity analysis for non-tariff barriers. The results of the above simulations are analyzed in the following sections.

4.1 GDP Effect Comparison with China or US in CPTPP

Table 1 illustrates the impact of China or the US' accession on GDP. Overall, China's entry into the CPTPP will yield more benefits to member countries. From the comparison of members, the countries that benefit most from China's accession are Australia, Malaysia, New Zealand, Singapore, Peru, and Chile. Their gains are 1.764%, 3.119%, 0.896%, 0.815%, 1.002%, and 2.115% respectively under trade cost eliminations condition. A possible reason for such benefits is that China has a large bilateral trade volume with these countries, which in turn makes these countries more dependent on China's market. Compared to non-members, China's accession to the CPTPP can reduce their GDP loss and even benefit some countries. China is an important economy in the Asia-Pacific region, and it can play a role in promoting economic growth with trade agreements.

However, the benefit brought by US's accession to the whole world is significantly larger than that of China. As the US economic scale is larger than that of China, therefore the US taking part

in CPTPP and further opening up the market can benefit the world more than China. Additionally, the simulation results of border tariff elimination conditions are basically consistent with the conclusions drawn from the results under trade cost eliminations conditions.

Table 1: GDP Effect Comparison of Either China or US in CPTPP

Country	China In	US In	China > US	China In	US In	China > US
	<u>Trade Cost Elimination</u>			<u>Border Tariff Elimination</u>		
CPTPP Member Countries						
Japan	0.882	0.931	NO	0.771	0.125	YES
Australia	1.764	-0.632	YES	0.992	-0.750	YES
Canada	0.232	25.518	NO	0.285	24.840	NO
Mexico	0.439	3.978	NO	0.241	3.442	NO
Malaysia	3.119	1.379	YES	2.108	-0.513	YES
New Zealand	0.896	-2.949	YES	-0.449	-4.026	YES
Singapore	0.815	-0.387	YES	0.836	-0.457	YES
Vietnam	2.984	3.054	NO	1.921	-0.220	YES
Peru	1.002	0.604	YES	-0.417	-1.507	YES
Brunei	-1.926	-36.957	YES	-7.791	-40.836	YES
Chile	2.115	-0.285	YES	0.504	-1.730	YES
Potential Member Countries						
China	0.735	0.241	YES	0.452	0.221	YES
US	0.200	4.111	NO	0.194	3.641	NO
Non-Member Countries						
EU	0.146	-0.158	YES	0.123	-0.154	YES
India	-0.021	-1.532	YES	-0.032	-1.418	YES
Brazil	-0.038	-1.328	YES	-0.057	-1.235	YES
Russia	0.022	-1.000	YES	0.009	-0.933	YES
Korea	0.135	-2.252	YES	0.116	-2.090	YES
Thailand	-0.033	-6.628	YES	-0.045	-6.116	YES
Indonesia	-0.099	-2.299	YES	-0.119	-2.178	YES
Philippine	-0.606	-9.111	YES	-0.662	-8.465	YES
ROW	0.074	0.066	YES	0.073	0.066	YES
World	0.313	1.275	NO	0.224	1.082	NO

Note: "China>US" means China can benefit other countries more than the US.

Source: by authors.

4.2 Welfare Effect Comparison with China or US in CPTPP

We use the Hicks equivalent variation (EV) as a percent share of GDP, and the Hicks compensation variation (CV) as a percent share of GDP to indicate the welfare effect. The definitions of EV and CV are

$$\begin{cases} EV = e(p^0, v(p^1, m^1)) - e(p^0, v(p^0, m^0)) = e(p^0, v(p^1, m^1)) - m^0 \\ CV = e(p^1, v(p^1, m^1)) - e(p^1, v(p^0, m^0)) = m^1 - e(p^1, v(p^0, m^0)) \end{cases} \quad (1)$$

Table 2 and Table 3 report the impact of China or the US accessing the CPTPP on welfare. In

general, the US will benefit more member countries than China to join the CPTPP. In terms of members, except for Canada, Mexico, and Vietnam, the US joining CPTPP will benefit them more. In terms of non-members, including the world, welfare effect of US participation in CPTPP is significantly better than that of China. We take New Zealand as an example to compare effects, when China or the US joins the CPTPP, EV as a share of GDP will separately increase 7.982% and 2.465% under trade cost elimination condition. It is obvious that the US in CPTPP will generate more welfare gains than China in to New Zealand.

Table 2: EV as a Share of GDP Effect Comparison of Either China or US in CPTPP

Country	China In	US In	China > US	China In	US In	China > US
	<u>Trade Cost Elimination</u>			<u>Border Tariff Elimination</u>		
CPTPP Member Countries						
Japan	0.909	0.709	NO	0.004	0.381	NO
Australia	2.185	0.644	NO	-0.373	0.865	NO
Canada	-2.173	0.974	YES	-0.038	-3.564	YES
Mexico	0.805	1.383	YES	0.113	-0.617	YES
Malaysia	5.786	5.138	NO	2.527	3.49	NO
New Zealand	7.982	2.465	NO	0.644	5.975	NO
Singapore	1.691	0.657	NO	-0.434	0.667	NO
Vietnam	7.191	10.024	YES	7.288	5.756	YES
Peru	3.277	2.623	NO	0.652	1.539	NO
Brunei	49.019	11.25	NO	10.515	55.719	NO
Chile	3.653	1.548	NO	0.188	1.848	NO
Potential Member Countries						
China	0.143	0.646	YES	0.143	0.186	NO
US	0.315	-0.053	NO	-0.03	0.021	NO
Non-Member Countries						
EU	-0.050	-0.044	YES	-0.027	-0.028	YES
India	0.889	-0.096	NO	-0.044	0.881	NO
Brazil	0.408	-0.055	NO	-0.022	0.405	NO
Russia	0.346	-0.093	NO	-0.064	0.343	NO
Korea	1.221	-0.297	NO	-0.165	1.339	NO
Thailand	3.157	-0.622	NO	-0.423	3.263	NO
Indonesia	1.784	-0.236	NO	-0.124	1.843	NO
Philippine	11.73	0.29	NO	0.464	10.923	NO
ROW	0.221	-0.135	NO	-0.085	0.222	NO

Note: "China>US" means China can benefit other countries more than the US.

Source: by authors.

Table 3: CV as a Share of GDP Effect Comparison of Either China or US in CPTPP

Country	China In	US In	China > US	China In	US In	China > US
	<u>Trade Cost Elimination</u>			<u>Border Tariff Elimination</u>		
	CPTPP Member Countries					
Japan	0.516	0.629	NO	0.019	0.24	NO
Australia	0.355	1.72	NO	-0.394	0.621	NO
Canada	0.761	-5.345	YES	-0.048	-6.223	YES

Mexico	1.004	0.282	YES	0.082	-0.832	YES
Malaysia	4.598	5.019	NO	2.352	3.051	NO
New Zealand	1.989	6.999	NO	0.634	5.41	NO
Singapore	0.588	1.515	NO	-0.442	0.537	NO
Vietnam	8.848	5.923	YES	6.63	4.892	YES
Peru	1.959	2.688	NO	0.644	1.459	NO
Brunei	8.833	32.581	NO	8.994	34.744	NO
Chile	0.948	3.18	NO	0.152	1.772	NO
Potential Member Countries						
China	0.425	0.058	YES	0.077	0.107	NO
US	-0.054	0.07	NO	-0.031	0.135	NO
Non-Member Countries						
EU	-0.046	-0.107	YES	-0.028	-0.079	YES
India	-0.1	0.749	NO	-0.047	0.748	NO
Brazil	-0.056	0.355	NO	-0.023	0.358	NO
Russia	-0.094	0.322	NO	-0.065	0.322	NO
Korea	-0.305	0.931	NO	-0.172	1.042	NO
Thailand	-0.638	2.566	NO	-0.434	2.731	NO
Indonesia	-0.243	1.579	NO	-0.13	1.635	NO
Philippine	0.275	10.337	NO	0.45	9.71	NO
ROW	-0.138	0.067	NO	-0.088	0.088	NO

Note: "China>US" means China can benefit other countries more than the US.

Source: by authors.

4.3 Employment Effect Comparison with China or US in CPTPP

Table 4 reports the impact of China or the US in CPTPP on manufacturing employment. In general, China's participation in CPTPP will bring more benefits to both member and non-member countries. We take the trade cost elimination condition as an example, China will benefit more member countries of Australia, Malaysia, New Zealand, Singapore, Peru, Brunei and Chile. For non-member countries, most of them will lose with CPTPP, but their losses will decrease when China in CPTPP. Simulation results under border tariff elimination conditions are nearly the same.

In terms of world as a whole, the US' entry can increase the overall manufacturing employment more than China in the agreement. Under trade cost elimination condition, China's in CPTPP will increase world manufacturing employment by 0.313%, and the US in will increase by 1.275%. Comparing the simulation results under the scenario of border tariff elimination, world manufacturing employment with China and US in will increase separately 0.224% and 1.082%.

Table 4: Manufacturing Employment Effect Comparison of Either China or US in CPTPP

Country	China In	US In	China > US	China In	US In	China > US
	<u>Trade Cost Elimination</u>			<u>Border Tariff Elimination</u>		
CPTPP Member Countries						
Japan	0.882	0.931	NO	0.771	0.125	YES
Australia	1.764	-0.632	YES	0.992	-0.75	YES
Canada	0.232	25.518	NO	0.285	24.84	NO

Mexico	0.439	3.978	NO	0.241	3.442	NO
Malaysia	3.119	1.379	YES	2.108	-0.513	YES
New Zealand	0.896	-2.949	YES	-0.449	-4.026	YES
Singapore	0.815	-0.387	YES	0.836	-0.457	YES
Vietnam	2.984	3.054	NO	1.921	-0.22	YES
Peru	1.002	0.604	YES	-0.417	-1.507	YES
Brunei	-1.926	-36.957	YES	-7.791	-40.836	YES
Chile	2.115	-0.285	YES	0.504	-1.73	YES
Potential Member Countries						
China	0.735	0.241	YES	0.452	0.221	YES
US	0.2	4.111	NO	0.194	3.641	NO
Non-Member Countries						
EU	0.146	-0.158	YES	0.123	-0.154	YES
India	-0.021	-1.532	YES	-0.032	-1.418	YES
Brazil	-0.038	-1.328	YES	-0.057	-1.235	YES
Russia	0.022	-1.000	YES	0.009	-0.933	YES
Korea	0.135	-2.252	YES	0.116	-2.09	YES
Thailand	-0.033	-6.628	YES	-0.045	-6.116	YES
Indonesia	-0.099	-2.299	YES	-0.119	-2.178	YES
Philippine	-0.606	-9.111	YES	-0.662	-8.465	YES
ROW	0.074	0.066	YES	0.073	0.066	YES
World	0.313	1.275	NO	0.224	1.082	NO

Note: "China>US" means China can benefit other countries more than the US.

Source: by authors.

4.4 Trade Effect Comparison with China or US in CPTPP

Trade effect comparison with China or US in CPTPP shows that a little more member countries will gain more if China in CPTPP, but most non-member countries will gain more if the US in CPTPP. For member countries, China's in will benefit Japan, Australia, Malaysia, New Zealand, Vietnam and Chile more on trade. For non-member countries, China's in only can benefit Brazil more than the US in. For the world as a whole, the US in also will benefit it significantly more than China in. Simulation results under trade cost elimination condition and border tariff elimination condition are nearly the same. We take the trade effect of Canada and Mexico under border tariff elimination condition as examples, Canada's trade with China in and the US in are separately increasing by 1.162% and 9.951%, and Mexico's trade with China in and the US in are separately increasing by 1.178% and 8.945%. The reason may be that the US is main trade partner of Canada and Mexico (see [Table 5](#)).

Table 5: Trade Effect Comparison of Either China or US in CPTPP

Country	China In	US In	China > US	China In	US In	China > US
	<u>Trade Cost Elimination</u>			<u>Border Tariff Elimination</u>		
	CPTPP Member Countries					
Japan	9.01	8.588	YES	3.622	2.704	YES
Australia	14.437	9.116	YES	4.447	1.76	YES
Canada	4.3	14.59	NO	1.162	9.951	NO

Mexico	4.57	14.472	NO	1.178	8.945	NO
Malaysia	7.481	7.361	YES	3.892	3.333	YES
New Zealand	16.003	15.654	YES	3.105	3.931	NO
Singapore	3.708	3.75	NO	1.439	1.313	YES
Vietnam	9.383	8.333	YES	6.016	4.69	YES
Peru	14.824	17.123	NO	2.619	3.406	NO
Brunei	28.144	69.909	NO	16.304	56.891	NO
Chile	12.996	12.503	YES	3.639	3.059	YES
Potential Member Countries						
China	5.254	0.928	YES	2.325	0.883	YES
US	-0.069	9.717	NO	0.035	5.831	NO
Non-Member Countries						
EU	0.028	0.472	NO	0.053	0.471	NO
India	-0.033	0.38	NO	0.009	0.395	NO
Brazil	-0.06	-0.019	YES	-0.03	0.011	NO
Russia	0.065	0.325	NO	0.071	0.283	NO
Korea	-0.095	1.077	NO	-0.037	1.054	NO
Thailand	-0.124	2.596	NO	-0.055	2.452	NO
Indonesia	-0.196	0.642	NO	-0.085	0.676	NO
Philippine	-0.03	3.384	NO	0.091	3.204	NO
ROW	0.016	0.426	NO	0.032	0.381	NO
World	2.15	3.736	NO	0.876	2.198	NO

Note: "China>US" means China can benefit other countries more than the US.

Source: by authors.

4.5 Effects Comparison with More Countries Entering CPTPP

The CPTPP was designed to be an open and inclusive agreement. Other countries, including Colombia, Indonesia, Thailand, the Philippines, South Korea, and Sri Lanka, have expressed interest in joining the agreement. The UK stated that it would consider joining the CPTPP after Brexit, and the EU also announced that it would maintain a long-term cooperative and mutually beneficial relationship with CPTPP. At present, the countries that have formally proposed joining the CPTPP are Colombia, Indonesia, Thailand, the Philippines, and South Korea. If these countries sign the agreement, a 16-country CPTPP will be formed. Few studies have discussed the expansion of the CPTPP.

Based on the development prospects of the CPTPP, we additionally compares the economic impacts of China and the US' entry into a 16-country agreement, as displayed in [Table 6](#) and [Table 7](#). For member countries, simulation results under the trade cost elimination and under border tariff elimination consistently show that China's accession can bring more benefits to member countries on GDP effect and manufacturing employment effect, while the US' accession has more advantages to member countries on the welfare and trade effects. Similarly, non-member countries and the whole world will gain more from the welfare and trade effects if the US rejoins the CPTPP. The simulation results under border tariff elimination condition show same effects, which prove the reliability of our findings.

Table 6: Effect Comparison of Either China or US in 16-Country CPTPP under Trade Cost Elimination

Country	China In	US In	China > US	China In	US In	China > US	China In	US In	China > US	China In	US In	China > US
	<u>GDP Effect Comparison</u>			<u>EV/GDP Effect Comparison</u>			<u>Employment Effect Comparison</u>			<u>Trade Effect Comparison</u>		
Japan	1.484	1.259	YES	0.822	1.489	NO	6.275	5.768	YES	12.515	12.763	NO
Australia	2.189	-1.101	YES	0.653	2.914	NO	8.117	1.741	YES	17.439	12.258	YES
Canada	0.319	39.299	NO	1.051	-2.157	YES	3.536	62.253	NO	4.985	19.471	NO
Mexico	0.415	4.972	NO	1.707	0.547	YES	3.002	12.034	NO	5.438	16.408	NO
Malaysia	4.737	1.168	YES	5.723	7.558	NO	2.482	1.372	YES	9.985	10.932	NO
New Zealand	1.481	-6.465	YES	2.25	14.788	NO	8.336	-19.615	YES	18.796	21.138	NO
Singapore	1.555	-0.447	YES	0.326	2.065	NO	4.465	1.658	YES	5.228	5.566	NO
Vietnam	4.363	1.801	YES	12.166	10.803	YES	1.766	0.77	YES	12.481	12.605	NO
Peru	1.425	-1.02	YES	2.717	5.508	NO	3.168	0.651	YES	16.962	20.887	NO
Brunei	3.197	-53.566	YES	10.855	140.004	NO	1.111	-63.327	YES	33.71	137.696	NO
Chile	2.615	-2.193	YES	1.481	5.749	NO	7.972	-2.209	YES	14.79	15.369	NO
Korea	2.588	0.328	YES	2.353	4.72	NO	6.518	3.918	YES	11.181	9.483	YES
Thailand	3.353	0.182	YES	4.469	6.854	NO	4.65	1.676	YES	9.942	10.005	NO
Indonesia	1.847	-0.236	YES	2.841	4.094	NO	3.416	1.447	YES	20.023	17.547	YES
Philippine	1.817	-3.476	YES	5.004	11.45	NO	6.816	-3.624	YES	24.216	23.636	YES
China	0.908	-0.173	YES	0.789	0.12	YES	2.941	-0.09	YES	7.815	0.975	YES
US	0.276	5.462	NO	-0.094	0.501	NO	-0.108	4.917	NO	-0.146	12.447	NO
EU	0.201	-0.683	YES	-0.08	-0.056	NO	-0.023	-0.422	YES	-0.015	0.451	NO
India	0.02	-3.02	YES	-0.235	1.792	NO	-0.145	-6.418	YES	-0.124	0.391	NO
Brazil	-0.006	-2.8	YES	-0.123	1.059	NO	-0.101	-5.747	YES	-0.163	-0.254	YES
Russia	0.056	-2.088	YES	-0.168	0.822	NO	0.021	-2.413	YES	0.047	0.31	NO
ROW	0.078	0.06	YES	-0.238	0.592	NO	-0.179	0.351	NO	-0.056	0.439	NO
World	0.533	1.663	NO	/	/	/	1.441	2.155	NO	3.789	5.616	NO

Note: (1) "China>US" means China can benefit other countries more than the US. (2) "Employment effect" denotes manufacturing employment effect.

Source: by authors.

Table 7: Effect Comparison of Either China or US in 16-Country CPTPP under Border Tariff Elimination

Country	China In	US In	China > US	China In	US In	China > US	China In	US In	China > US	China In	US In	China > US
	<u>GDP Effect Comparison</u>			<u>EV/GDP Effect Comparison</u>			<u>Employment Effect Comparison</u>			<u>Trade Effect Comparison</u>		
Japan	1.430	0.511	YES	-0.080	0.719	NO	2.719	1.955	YES	5.767	5.437	YES
Australia	1.368	-1.235	YES	-0.629	1.295	NO	2.858	-2.094	YES	5.649	3.048	YES
Canada	0.376	38.418	NO	-0.111	-3.876	YES	0.946	57.101	NO	1.361	13.907	NO
Mexico	0.307	4.567	NO	0.084	-1.314	YES	0.573	8.018	NO	1.462	10.327	NO
Malaysia	3.512	-0.834	YES	2.765	4.960	NO	0.859	-0.459	YES	5.645	6.092	NO
New Zealand	-0.091	-7.45	YES	0.08	12.048	NO	-0.43	-27.519	YES	3.591	6.567	NO
Singapore	1.543	-0.511	YES	-0.895	0.908	NO	2.232	-0.636	YES	2.445	2.588	NO
Vietnam	2.918	-1.827	YES	9.122	9.681	NO	0.337	-0.669	YES	8.309	8.425	NO
Peru	-0.125	-3.391	YES	0.29	3.642	NO	-0.344	-4.496	YES	3.046	5.225	NO
Brunei	-4.473	-57.299	YES	10.133	174.061	NO	-3.17	-79.331	YES	18.835	114.8	NO
Chile	0.861	-3.697	YES	-0.113	3.757	NO	1.596	-9.041	YES	4.372	4.697	NO
Korea	1.878	-0.527	YES	1.969	4.165	NO	4.818	1.657	YES	8.761	6.305	YES
Thailand	2.068	-1.166	YES	4.243	7.01	NO	2.783	-0.32	YES	7.472	7.415	YES
Indonesia	0.818	-1.662	YES	0.27	2.75	NO	0.478	-1.127	YES	6.561	5.927	YES
Philippine	0.604	-4.564	YES	0.542	7.294	NO	0.512	-9.759	YES	6.362	7.294	NO
China	0.613	-0.14	YES	0.149	0.208	NO	1.452	-0.015	YES	4.101	1.047	YES
US	0.268	5.211	NO	-0.063	0.115	NO	-0.039	2.75	NO	-0.007	7.861	NO
EU	0.169	-0.606	YES	-0.055	-0.027	NO	-0.006	-0.354	YES	0.027	0.529	NO
India	-0.0002	-2.771	YES	-0.147	1.759	NO	-0.125	-5.789	YES	-0.052	0.481	NO
Brazil	-0.028	-2.551	YES	-0.077	0.98	NO	-0.119	-5.212	YES	-0.104	-0.162	YES
Russia	0.038	-1.909	YES	-0.125	0.772	NO	0.01	-2.197	YES	0.062	0.303	NO
ROW	0.076	0.059	YES	-0.173	0.592	NO	-0.125	0.366	NO	-0.022	0.45	NO
World	0.405	1.506	NO	/	/	/	0.584	1.079	NO	1.867	3.458	NO

Note: (1) "China>US" means China can benefit other countries more than the US. (2) "Employment effect" denotes manufacturing employment effect.

Source: by authors.

4.6 Sensitivity Analysis to Elasticities and Non-Tariff Barriers

In the numerical simulation of GE models, owing to the uncertainty of the values of some parameters, it is usually necessary to analyze the sensitivity of the simulation results with respect to parameter settings. If the simulation results are not very sensitive, or if they are insensitive, to parameter changes, it means that the simulation results are reliable. Moreover, the level of reduction of non-tariff barriers is also an important issue to be determined by simulation analysis. However, the reduction of non-tariff barriers is a difficult problem to quantify in trade agreements, and even if there are specific negotiation goals, it cannot be measured. Since the level of reduction of non-tariff barriers is assumed to be random, we also need to perform a sensitivity analysis on the relevant results.

We perform sensitivity analysis to both elasticities and non-tariff barriers in this part. As the elasticities of substitution in production function and demand function is set to 2 according other references, we change the elasticities of substitution from 1.5 to 4.5. Meanwhile, we change the level of non-tariff barriers reduction in the model to 20% and 60%. For simplicity, we just report the sensitivity analysis results on GDP effect under trade cost elimination scenarios. Results are shown in [Table 8](#).

The results of the elasticity sensitivity analysis show that although the number of countries benefiting from China's accession to the CPTPP decreased with the increase in the value of elasticity, China's accession still has certain advantages as a whole, so the elasticity sensitivity test is reliable. Additionally, the non-tariff barrier sensitivity analysis results show that when the non-tariff barrier elimination takes different values, the change in GDP effect is not obvious, which means that the simulation results and conclusions are reliable. To sum up, both the elastic sensitivity analysis and the non-tariff barrier sensitivity analysis prove the credibility of all of the numerical simulation results in the paper.

Table 8: Sensitivity Analysis on GDP Effect Comparison of Trade Cost Elimination to Elasticities and Non-tariff Barriers

Country	China In	US In	China > US	China In	US In	China > US	China In	US In	China > US	China In	US In	China > US
	<u>Elasticities = 1.5</u>			<u>Elasticities = 4.5</u>			<u>Non-tariff Barrier Elimination = 20%</u>			<u>Non-tariff Barrier Elimination = 60%</u>		
Japan	0.787	0.767	YES	1.192	1.385	NO	0.828	0.483	YES	0.932	1.386	NO
Australia	1.58	0.529	YES	2.347	2.385	NO	1.367	0.606	YES	2.179	1.686	YES
Canada	0.101	32.297	NO	0.558	13.138	NO	0.264	25.106	NO	0.185	25.758	NO
Mexico	0.297	3.786	NO	0.812	3.634	NO	0.339	3.675	NO	0.541	4.236	NO
Malaysia	2.714	-0.337	YES	4.109	3.879	YES	2.592	0.321	YES	3.698	2.366	YES
New Zealand	0.492	-6.181	YES	2.327	1.544	YES	0.18	-3.713	YES	1.72	-2.536	YES
Singapore	0.698	-0.993	YES	1.075	0.527	YES	0.828	-0.418	YES	0.795	-0.346	YES
Vietnam	2.441	0.052	YES	4.313	7.019	NO	2.416	1.207	YES	3.643	4.838	NO
Peru	0.606	-2.905	YES	2.445	5.418	NO	0.236	-0.738	YES	1.911	1.686	YES
Brunei	-2.787	-55.716	YES	-0.115	-13.716	YES	-5.102	-39.897	YES	1.875	-35.611	YES
Chile	1.725	-2.598	YES	3.411	3.025	YES	1.254	-1.201	YES	3.113	0.441	YES
China	0.677	0.076	YES	0.898	0.037	YES	0.584	0.036	YES	0.909	-0.136	YES
US	0.176	4.877	NO	0.269	2.726	NO	0.198	3.851	NO	0.201	4.32	NO
EU	0.15	-0.022	YES	0.139	-0.148	YES	0.134	-0.164	YES	0.158	-0.181	YES
India	-0.006	-1.715	YES	-0.036	-0.987	YES	-0.026	-1.475	YES	-0.014	-1.607	YES
Brazil	-0.043	-1.574	YES	0.008	-0.799	YES	-0.048	-1.312	YES	-0.027	-1.446	YES
Russia	0.025	-1.203	YES	0.017	-0.611	YES	0.015	-0.981	YES	0.03	-1.072	YES
Korea	0.104	-2.291	YES	0.207	-1.532	YES	0.125	-2.218	YES	0.148	-2.44	YES
Thailand	-0.077	-6.749	YES	0.088	-4.531	YES	-0.039	-6.379	YES	-0.025	-6.966	YES
Indonesia	-0.127	-2.846	YES	0.067	-1.223	YES	-0.109	-2.289	YES	-0.086	-2.474	YES
Philippine	-0.66	-9.862	YES	-0.158	-6.145	YES	-0.636	-8.922	YES	-0.569	-9.777	YES
ROW	0.128	0.121	YES	-0.068	-0.077	YES	0.074	0.066	YES	0.075	0.066	YES
World	0.283	1.528	NO	0.405	0.922	NO	0.267	1.162	NO	0.364	1.35	NO

Note: "China>US" means China can benefit other countries more than the US.

Source: by authors.

5. Conclusions

This paper builds a large numerical GE model with endogenous trade imbalance and trade cost that can be divided into tariff and non-tariff barriers. We calibrate and estimate model parameters with real-world economic data. Then we use the counterfactual simulation methodology to explore and compare the related economic effects of either China or the US joining the CPTPP.

The simulation results reveal that: (1) As far as member countries are concerned, China's entry into the CPTPP can benefit more countries in terms of GDP effects, manufacturing employment effects, and trade effects; (2) For non-member states and potential member states, China's accession can benefit more countries in the GDP effect and employment effect; (3) For the world as a whole, the returns of the US in CPTPP are larger in all specific effects, including GDP, welfare, manufacturing employment and trade. In general, our simulation results show that China's accession to the CPTPP will be more welcomed by member states.

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Appendix

A. Some Simulation Results

- (1) CPTPP with China in and US out
- (2) CPTPP with US in and China out
- (3) 16-Country CPTPP with China in and US out
- (4) 16-Country CPTPP with US in and China out

Table A1: Effects of CPTPP with China (Unit: % Change)

Country	EV/GDP	GDP	Employment ⁽¹⁾	Export	Import	EV/GDP	GDP	Employment ⁽¹⁾	Export	Import
	<u>Trade Costs Elimination</u>					<u>Border Tariffs Elimination</u>				
Japan	0.709	0.882	4.338	9.658	7.947	0.004	0.771	1.594	4.116	2.921
Australia	0.644	1.764	6.565	15.908	12.183	-0.373	0.992	2.117	5.945	2.478
Canada	0.974	0.232	2.862	3.605	4.695	-0.038	0.285	0.690	1.122	1.039
Mexico	1.383	0.439	2.476	3.84	5.081	0.113	0.241	0.414	0.932	1.300
Malaysia	5.138	3.119	1.808	6.141	8.86	2.527	2.108	0.458	3.008	4.822
New Zealand	2.465	0.896	10.387	17.374	13.007	0.644	-0.449	1.273	4.345	1.016
Singapore	0.657	0.815	3.107	3.741	3.442	-0.434	0.836	1.291	2.150	0.518
Vietnam	10.024	2.984	1.301	5.525	13.307	7.288	1.921	0.135	2.459	9.647
Peru	2.623	1.002	3.89	16.541	12.068	0.652	-0.417	0.258	3.533	1.135
Brunei	11.25	-1.926	3.82	9.403	36.271	10.515	-7.791	-1.093	4.142	24.677
Chile	1.548	2.115	7.755	15.183	10.208	0.188	0.504	1.609	4.523	2.396
China	0.646	0.735	1.722	4.690	5.339	0.143	0.452	0.698	1.723	2.692
US	-0.053	0.2	-0.115	-0.199	-0.229	-0.03	0.194	-0.032	-0.070	-0.032
EU	-0.044	0.146	-0.035	-0.086	-0.139	-0.027	0.123	-0.007	-0.018	-0.029
India	-0.096	-0.021	0.036	-0.126	-0.103	-0.044	-0.032	-0.014	0.015	-0.072
Brazil	-0.055	-0.038	0.052	-0.301	-0.062	-0.022	-0.057	-0.051	-0.095	-0.109
Russia	-0.093	0.022	0.015	-0.116	-0.016	-0.064	0.009	-0.001	0.016	-0.051
Korea	-0.297	0.135	-0.195	-0.279	-0.364	-0.165	0.116	-0.082	-0.161	-0.182
Thailand	-0.622	-0.033	0.012	-0.216	-0.305	-0.423	-0.045	-0.035	-0.017	-0.243
Indonesia	-0.236	-0.099	0.082	-0.259	-0.366	-0.124	-0.119	-0.006	0.040	-0.338
Philippine	0.29	-0.606	0.819	-0.685	-0.222	0.464	-0.662	-0.174	0.063	-0.285
ROW	-0.135	0.074	-0.137	-0.171	-0.218	-0.085	0.073	-0.059	-0.096	-0.084
World	/	0.313	0.847	2.15	2.15	/	0.224	0.265	0.876	0.876

Note: (1) Employment here is percent changes of total employment in manufacturing sectors.

Source: by authors.

Table A2: Effects of CPTPP with US (Unit: % Change)

Country	EV/GDP	GDP	Employment ⁽¹⁾	Export	Import	EV/GDP	GDP	Employment ⁽¹⁾	Export	Import
	<u>Trade Costs Elimination</u>					<u>Border Tariffs Elimination</u>				
Japan	0.909	0.931	4.03	10.059	7.323	0.381	0.125	0.969	3.258	2.228
Australia	2.185	-0.632	1.929	8.602	9.664	0.865	-0.75	-1.178	2.314	1.169
Canada	-2.173	25.518	45.975	-10.353	39.206	-3.564	24.841	41.227	-11.386	31.008
Mexico	0.805	3.978	10.343	13.977	14.964	-0.617	3.442	6.595	8.963	8.927
Malaysia	5.786	1.379	1.201	7.488	7.219	3.49	-0.513	-0.322	3.297	3.374
New Zealand	7.982	-2.949	-7.176	18.95	12.483	5.975	-4.026	-14.215	6.949	1.029
Singapore	1.691	-0.387	1.337	4.355	3.078	0.667	-0.457	-0.569	2.277	0.243
Vietnam	7.191	3.054	0.948	9.099	7.566	5.756	-0.22	-0.279	4.446	4.935
Peru	3.277	0.604	2.405	21.307	13.342	1.539	-1.507	-2.025	6.952	0.203
Brunei	49.019	-36.957	-27.326	87.468	23.593	55.719	-40.836	-34.139	72.744	15.075
Chile	3.653	-0.285	1.895	15.131	10.005	1.848	-1.73	-4.276	5.116	1.104
China	0.143	0.241	0.158	1.258	0.551	0.186	0.221	0.179	1.096	0.639
US	0.315	4.111	3.888	10.654	9.076	0.021	3.641	2.129	5.913	5.775
EU	-0.05	-0.158	-0.172	1.529	-0.626	-0.028	-0.154	-0.14	1.409	-0.504
India	0.889	-1.532	-3.181	2.338	-1.038	0.881	-1.418	-2.892	2.129	-0.86
Brazil	0.408	-1.328	-2.741	2.396	-2.416	0.405	-1.235	-2.53	2.179	-2.142
Russia	0.346	-1	-1.151	1.266	-1.236	0.343	-0.933	-1.069	1.116	-1.099
Korea	1.221	-2.252	-2.694	3.319	-1.379	1.339	-2.09	-2.441	3.006	-1.085
Thailand	3.157	-6.628	-6.998	7.968	-2.348	3.263	-6.116	-6.383	7.219	-1.934
Indonesia	1.784	-2.299	-1.523	2.797	-1.402	1.843	-2.178	-1.447	2.506	-1.06
Philippine	11.73	-9.111	-19.086	11.372	-2.862	10.923	-8.465	-17.615	10.374	-2.401
ROW	0.221	0.066	0.166	0.589	0.261	0.222	0.066	0.182	0.478	0.282
World	/	1.275	1.579	3.736	3.736	/	1.082	0.805	2.198	2.198

Note: (1) Employment here is percent changes of total employment in manufacturing sectors.

Source: by authors.

Table A3: Effects of 16-Country CPTPP with China (Unit: % Change)

Country	EV/GDP	GDP	Employment ⁽¹⁾	Export	Import	EV/GDP	GDP	Employment ⁽¹⁾	Export	Import
	<u>Trade Costs Elimination</u>					<u>Border Tariffs Elimination</u>				
Japan	0.822	1.484	6.275	14.144	11.115	-0.08	1.43	2.719	7.147	4.581
Australia	0.653	2.189	8.117	20.019	14.686	-0.629	1.368	2.858	8.186	2.941
Canada	1.051	0.319	3.536	4.654	5.311	-0.111	0.376	0.946	1.612	1.113
Mexico	1.707	0.415	3.002	4.767	6.102	0.084	0.307	0.573	1.381	1.541
Malaysia	5.723	4.737	2.482	9.041	11.039	2.765	3.512	0.859	5.095	6.258
New Zealand	2.25	1.481	8.336	23.068	14.689	0.08	-0.091	-0.43	6.579	0.718
Singapore	0.326	1.555	4.465	6.229	4.119	-0.895	1.543	2.232	4.05	0.665
Vietnam	12.166	4.363	1.766	7.815	17.16	9.122	2.918	0.337	3.737	12.893
Peru	2.717	1.425	3.168	20.921	13.386	0.29	-0.125	-0.344	5.394	0.925
Brunei	10.855	3.197	1.111	30.508	42.115	10.133	-4.473	-3.17	14.917	29.129
Chile	1.481	2.615	7.972	18.672	11.099	-0.113	0.861	1.596	6.357	2.486
China	0.789	0.908	2.941	6.52	9.299	0.149	0.613	1.452	3.026	5.333
US	-0.094	0.276	-0.108	-0.243	-0.079	-0.063	0.268	-0.039	-0.085	0.046
EU	-0.08	0.201	-0.023	0.064	-0.096	-0.055	0.169	-0.006	0.077	-0.026
India	-0.235	0.02	-0.145	0.239	-0.387	-0.147	-1.51E-04	-0.125	0.242	-0.264
Brazil	-0.123	-0.006	-0.101	0.208	-0.53	-0.077	-0.028	-0.119	0.203	-0.408
Russia	-0.168	0.056	0.021	0.294	-0.364	-0.125	0.038	0.01	0.268	-0.28
Korea	2.353	2.588	6.518	10.023	12.45	1.969	1.878	4.818	7.312	10.348
Thailand	4.469	3.353	4.65	8.873	10.925	4.243	2.068	2.783	5.484	9.301
Indonesia	2.841	1.847	3.416	20.222	19.835	0.27	0.818	0.478	6.586	6.538
Philippine	5.004	1.817	6.816	26.362	22.539	0.542	0.604	0.512	7.973	5.102
ROW	-0.238	0.078	-0.179	0.132	-0.247	-0.173	0.076	-0.125	0.12	-0.165
World	/	0.533	1.441	3.789	3.789	/	0.405	0.584	1.867	1.867

Note: (1) Employment here is percent changes of total employment in manufacturing sectors.

Source: by authors.

Table A4: Effects of 16-Country CPTPP with US (Unit: % Change)

Country	EV/GDP	GDP	Employment ⁽¹⁾	Export	Import	EV/GDP	GDP	Employment ⁽¹⁾	Export	Import
	<u>Trade Costs Elimination</u>					<u>Border Tariffs Elimination</u>				
Japan	1.489	1.259	5.768	15.217	10.655	0.719	0.511	1.955	6.995	4.099
Australia	2.914	-1.101	1.741	12.993	11.473	1.295	-1.235	-2.094	4.9	1.071
Canada	-2.157	39.299	62.253	-17.458	55.914	-3.876	38.418	57.101	-18.297	45.688
Mexico	0.547	4.972	12.034	16.319	16.496	-1.314	4.567	8.018	11.156	9.505
Malaysia	7.558	1.168	1.372	12.354	9.346	4.96	-0.834	-0.459	7.284	4.764
New Zealand	14.788	-6.465	-19.615	27.969	14.572	12.048	-7.45	-27.519	12.409	0.95
Singapore	2.065	-0.447	1.658	7.255	3.691	0.908	-0.511	-0.636	4.631	0.321
Vietnam	10.803	1.801	0.77	14.456	10.75	9.681	-1.827	-0.669	8.869	7.98
Peru	5.508	-1.02	0.651	27.971	14.487	3.642	-3.391	-4.496	11.49	-0.435
Brunei	140.004	-53.566	-63.327	178.583	29.888	174.061	-57.299	-79.331	150.877	19.675
Chile	5.749	-2.193	-2.209	20.718	10.283	3.757	-3.697	-9.041	9.122	0.491
China	0.12	-0.173	-0.09	2.025	-0.228	0.208	-0.14	-0.015	1.926	0.039
US	0.501	5.462	4.917	13.512	11.719	0.115	5.211	2.75	7.953	7.798
EU	-0.056	-0.683	-0.422	2.362	-1.534	-0.027	-0.606	-0.354	2.273	-1.282
India	1.792	-3.02	-6.418	3.901	-2.15	1.759	-2.771	-5.789	3.634	-1.801
Brazil	1.059	-2.8	-5.747	3.964	-4.442	0.98	-2.551	-5.212	3.674	-3.971
Russia	0.822	-2.088	-2.413	1.928	-2.373	0.772	-1.909	-2.197	1.756	-2.106
Korea	4.72	0.328	3.918	8.512	10.547	4.165	-0.527	1.657	4.966	7.772
Thailand	6.854	0.182	1.676	10.824	9.251	7.01	-1.166	-0.32	7.008	7.789
Indonesia	4.094	-0.236	1.447	20.563	14.686	2.75	-1.662	-1.127	7.072	4.842
Philippine	11.45	-3.476	-3.624	28.681	19.692	7.294	-4.564	-9.759	11.55	3.967
ROW	0.592	0.06	0.351	0.329	0.551	0.592	0.059	0.366	0.334	0.567
World	/	1.663	2.155	5.616	5.616	/	1.506	1.079	3.458	3.458

Note: (1) Employment here is percent changes of total employment in manufacturing sectors.

Source: by authors.