Should the United States Rejoin the Trans-Pacific Trade Deal?

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Abstract

Before the Trans-Pacific Partnership (TPP) entered into force, the United States withdrew from the trade accord. Eleven other TPP signatories decided to revive the agreement, which led to the implementation of the Comprehensive and Progressive Agreement for TPP (CPTPP). The objectives of this paper are to estimate economic welfare effects under alternative scenarios of TPP/CPTPP, to evaluate the extent of losses to the US from its withdrawal from TPP and expected gains from rejoining the Trans-Pacific trade accord, and to examine whether the US economy would have to undergo extensive sectoral adjustments from its participation. We employ a dynamic computable general equilibrium (CGE) model to examine these issues. The results suggest that the US loses an opportunity to gain 0.4 percent in its economic welfare by withdrawing from TPP, but it would be able to recover most of its projected welfare gains by reengaging with CPTPP. Since sectoral output adjustments in the US are small, its adjustment costs from participation in CPTPP would be limited. In addition, there exist political incentives for the US to become a member of this trade accord.

Keywords: TPP, CPTPP, US, GTAP, CGE model

JEL Classification: F13, F14, F15, F17

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1. Introduction

After more than five years of negotiations, twelve nations reached a final agreement on the Trans-Pacific Partnership (TPP) trade accord in October 2015. However, the United States withdrew from TPP in January 2017 before it went into effect. Eleven other TPP signatories decided to revive the agreement, which led to signing of the Comprehensive and Progressive Agreement for TPP (CPTPP) in March 2018. This agreement specified that its provisions enter into effect 60 days after ratification by at least six signatories. CPTPP came into force for Australia, Canada, Japan, Mexico, New Zealand and Singapore on 30 December 2018, and for Vietnam on 14 January 2019. The trade agreement will go into effect in Brunei, Chile, Malaysia and Peru 60 days after they complete their ratification processes.

The objectives of this paper are to estimate economic welfare effects under alternative scenarios of TPP/CPTPP, to evaluate the extent of losses to the US from its withdrawal from TPP and expected gains from rejoining CPTPP, and to examine whether the US economy would have to undergo considerable sectoral adjustments from its return to the Trans-Pacific trade deal. We employ a dynamic computable general equilibrium (CGE) model to examine three alternative scenarios of TPP/CPTPP. The first is the implementation of CPTPP by seven of the 11 members from 2019, followed by the four other members and the United Kingdom joining in 2022, and a further enlargement taking place in 2025. Under this scenario, the US never reengages with the Trans-Pacific trade accord. In the second scenario, the US is assumed to join CPTPP in 2025 while other assumptions are retained. The third is a hypothetical scenario in which TPP including the US is implemented from 2018, followed by enlargements. This scenario is included to compare the US welfare and sectoral output results with the first two scenarios.

A number of studies have quantified the effects of TPP/CPTPP using a CGE model (e.g., Ferrantino et al. 2020; Gilbert et al., 2018; Lee and Itakura, 2018; Li and Whalley, 2021; Petri et al., 2012; Petri and Plummer, 2016; USITC, 2016; World Bank, 2016). Petri et al.'s (2012) study is the first to compare the Trans-Pacific (or TPP) track and Asian track free trade agreements (FTAs). They find that by far Vietnam is the largest beneficiary under both tracks. Several countries' welfare gains are found to be larger under the TPP

track than under the Asian track. Using more recent data and estimates on nontariff barriers (NTBs), Petri and Plummer (2016) updates Petri et al.'s (2012) study. Economic welfare of the 12 TPP members, expressed as percent change from the baseline in 2030, ranges from 0.5% in the United States to 8.1% in Vietnam. The results obtained by Ferrantino et al. (2020), Gilbert et al. (2018) and World Bank (2016) are comparatively similar, as smaller and more open member countries would attain relatively large welfare gains. Most studies estimate US welfare gains from TPP/CPTPP to be only 0.1-0.5 percent of its real income, casting doubt on the possibility of its rejoining the Trans-Pacific trade agreement.

While economic incentives for the US to engage in CPTPP might be small, political motivations for participating in trade agreements can be more important. Using a dataset covering 116 countries over 1960-2007, Liu and Ornelas (2014) find that deeper engagement in FTAs increases the durability of democracies and that political instability induces FTA participation. Hinz (2017) suggests that geopolitical considerations play a significant role in the choice of partner countries and the depth of economic integration. Eichengreen et al. (2021) indicate that both economic variables and geopolitical factors are important for bilateral trade accords. Notably, defense treaties significantly increase the probability of implementing a bilateral trade agreement.

The US has defense pacts with Australia and New Zealand, Japan, the UK and other NATO countries. After the UK becomes a member of CPTPP, political motives for the US to rejoin the Trans-Pacific trade deal are likely to become stronger. The current political and economic tensions between the US and China might also attract the former into this mega-regional trade agreement since its dependency on imported intermediate products may shift away from China and towards the CPTPP member countries.[1] While China has expressed an interest in joining CPTPP, it is years away from being able to meet the high standards concerning such issues as trade in services, investment, state-owned enterprises, labor protection and the environment.

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[1] For economic security reasons the US intends to reduce its dependency on Chinese intermediate products, including semiconductors, large-capacity batteries, critical minerals and pharmaceuticals. Laget et al. (2020) find that the depth of trade agreements increases value-added trade in intermediate goods and services among participating countries. CPTPP is considered to be one of the deepest trade accords.

An overview of the model and data is given in the next section, followed by descriptions of the baseline and policy scenarios in Section 3. In Section 4 assessments of welfare and sectoral output adjustment effects are offered, and changes in US real GDP are illustrated as reference. Concluding remarks are provided in the final section.

2. Analytical Framework and Data

2.1 Overview of the Dynamic GTAP Model

The numerical simulations undertaken for this study are derived from the dynamic GTAP model, described in detail by Ianchovichina and McDougall (2012). This model extends the comparative static framework of the standard GTAP model developed by Hertel (1997) to the dynamic framework by incorporating international capital mobility and capital accumulation. The dynamic GTAP model allows international capital mobility and capital accumulation, while it preserves all the features of the standard GTAP, such as constant returns to production technology, perfectly competitive markets, and product differentiation by countries of origin known as the Armington assumption, where a nested-CES specification is used to incorporate imperfect substitution of imported goods with respect to domestically produced goods. Aggregate domestic absorption by sector is allocated between domestic goods and a single composite import good. The latter is then allocated across region of origin to determine the bilateral trade flows on a sectoral basis. The model enhances the investment theory by incorporating international capital mobility and ownership. In this way it captures important trade agreement effects on investment and wealth that are missed by a static model.

In the dynamic GTAP model, each of the regions is endowed with fixed physical capital stock owned by domestic firms. The physical capital is accumulated over time with new investment. These dynamics are driven by net investment, which is sourced from regional household savings. The savings in one region are invested directly in domestic firms and indirectly in foreign firms, which are in turn reinvested in all regions. The dynamics arising from positive savings in one region are related to the dynamics from the net investment in other regions. Overall, at the global level, it must hold that all the savings across regions are completely invested in home and overseas markets.

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In the short run, an equalization of the rates of return seems unrealistic, and there exist well-known empirical observations for "home bias" in savings and investment. These observations suggest that capital is not perfectly mobile, causing some divergence in the rates of return across regions. The dynamic GTAP model allows inter-regional differences in the rates of return in the short run, which will be eventually equalized in the very long run. It is assumed that differences in the rates of return are attributed to the errors in investors' expectations about the future rates of return. During the process, these errors are gradually adjusted to the actual rate of return as time elapses, and eventually they are eliminated and a unified rate of return across regions can be attained. Income accruing from the ownership of the foreign and domestic assets can then be appropriately incorporated into total regional income.

Participating in a trade agreement could lead to more investment from abroad. Preferential trade liberalization often makes prices of goods in a participating country lower owing to removal of tariffs, creating an increase in demand for the goods. Responding to the increased demand, production of the goods expands in the member country. The expansion of production is attained by using more intermediate inputs, labor, capital and other primary factor inputs. These increased demands for production inputs raise the corresponding prices, wage rates and rental rates. Higher rental rates are translated into higher rates of return, attracting more investment from both home and foreign countries.

2.2 Data, aggregation and initial tariffs

In this study we employ the GTAP database version 10, which has a 2014 base year and distinguishes 141 countries/regions and 65 sectors (Aguiar et al., 2019). For the purposes of the present study, the data has been aggregated to 19 countries/regions and 15 sectors, as shown in Table 1. Foreign income data are obtained from the International Monetary Fund's *Balance of Payments Statistics*, which are used to track international capital mobility and foreign wealth. The values of key parameters, such as demand, supply and CES substitution elasticities, are based upon previous empirical estimates. The model calibration primarily consists of calculating share and shift parameters to fit the model

specifications to the observed data, so as to be able to reproduce a solution for the base year.

The sectoral tariff rates on 12 commodities and tariff equivalents of nontariff barriers (NTBs) on three services sectors are summarized in Table 2. There are striking differences in the tariff structures across the countries/regions. Singapore is duty free with the exception of alcohol and tobacco. U.S. tariff rates are low, except on textiles and apparel. The tariff rates on textiles and apparel are also relatively high in a number of other countries/regions, including Japan, Taiwan, Vietnam, Australia, India, Canada/Mexico and the rest of the world. In Japan and Korea, tariff rates on agricultural and food products are substantially higher than other products. The tariff rate on motor vehicles exceeds 10% in China, Taiwan, Thailand, Vietnam, the rest of ASEAN, Australia and India.

Ad valorem tariff equivalents of NTBs in services sectors are computed as unweighted averages of the gravity-model estimates of Wang et al. (2009) and the values employed by the Michigan Model of World Production and Trade (Deardorff and Stern, 2011). There are even greater variations in tariff equivalents of NTBs in services than in commodities. They are particularly high in China, Indonesia/Philippines, Thailand, Vietnam and India.

3. The Baseline and Policy Scenarios

3.1 The Baseline Scenario

In order to evaluate the effects of TPP/CPTPP, the baseline scenario is first established, showing the path of 19 economies/regions over the period 2014-2035. The baseline projections contain information on macroeconomic variables and expected policy changes. The macroeconomic variables in the baseline include projections for real GDP, gross investment, capital stocks, population and total labor force. Real GDP projections and gross investment were obtained from International Monetary Fund (2021). Projections for population are taken from the United Nations (2019), while those for labor force are based on the working-age population (15-64 years old).

The projections for population, investment and labor force obtained for over 150 countries are aggregated to 19 countries/regions, and the growth rates are calculated to

obtain the macroeconomic shocks describing the baseline. Changes in the capital stocks are not imposed exogenously, but are determined endogenously as the accumulation of projected investment. Any changes in real GDP not explained by the changes in endowments are attributed to technological change.

In addition, policy projections are also introduced into the baseline scenario. Trade accords included in the baseline are those which have already entered into force among the member countries, including all ASEAN+1 FTAs, EU-Korea, Korea-US, China-Korea, EU-Japan and US-Japan trade agreements. It is assumed that tariffs are cut by 80% among the member countries of the FTAs that are currently being implemented. Productivity is assumed to increase by 1 percent per year in every sector in all countries/regions.

3.2 Policy Scenarios

Welfare and sectoral output effects of TPP/CPTPP and their economic implications for the United States are to be examined in the next section. We consider the following three scenarios.

Scenario 1: Implementations of CPTPP7 over the period 2019-2035, CPTPP12 from 2022 and CPTPP16 from 2025.[2]

Scenario 2: CPTPP7 over the period 2019-2035, CPTPP12 from 2022 and CPTPP17 from 2025.[3]

Scenario 3: TPP8 over the period 2018-2035, TPP13 from 2022 and TPP17 from 2025.[4]

In Scenario 1, we start with seven of the 11 CPTPP members that have entered the trade accord into effect. We then assume that the remaining four members and the United Kingdom, which formally applied to join CPTPP in February 2021, will start

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[2] CPTPP7: Australia, Canada, Japan, Mexico, New Zealand, Singapore and Vietnam. CPTPP12: CPTPP7 plus Brunei, Chile, Malaysia, Peru and the UK. CPTPP16: CPTPP12 plus Indonesia, the Philippines, Thailand and Taiwan.

[3] CPTPP17: CPTPP16 plus the US.

[4] TPP8: Australia, Canada, Japan, Mexico, New Zealand, Singapore, the US and Vietnam. TPP13: TPP8 plus Brunei, Chile, Malaysia, Peru and the UK. TPP17: TPP13 plus Indonesia, the Philippines, Thailand and Taiwan.

implementing the agreement in 2022. This is followed by accessions to CPTPP in 2025 by four additional economies previously expressed an interested in joining TPP/CPTPP – Indonesia, the Philippines, Thailand and Taiwan.

Scenario 2 is the same as Scenario 1, except that the United States is assumed to rejoin the Trans-Pacific trade accord in 2025. Scenario 3 is a hypothetical scenario in which eight of the 12 TPP signatories including the US implement TPP starting in 2018, followed by four other members and the UK joining in 2022 and an enlargement to 17 member economies in 2025. The third scenario is added to compare the differences in the effects between the US participation from the beginning of TPP implementation and not participating in CPTPP, as well as those under this scenario and a delay in the US participation.

In all three scenarios, tariff reductions are based on the *actual* TPP tariff commitment schedules for each commodity in member countries compiled by the International Trade Centre (2016). The tariff reduction timeline *differs significantly across commodities*. While tariffs are reduced to zero for most commodities within 10 years, for several commodities some tariffs will remain after 2035. Tariff equivalents of NTBs in services are assumed to fall linearly by 25 percent over 10 years, starting from the first year of implementation. In addition to reductions in tariffs and NTBs, the time cost of trade – such as shipping delays arising from regulatory procedures and inadequate infrastructure – is to decrease by 25 percent between the member economies.[5]

We also assume that productivity in agricultural and manufacturing sectors will increase gradually from 1 percent a year (baseline) to 1.1 percent a year over a 10-year period after a member starts implementing TPP/CPTPP. As shown by Trefler (2004), import liberalization results in an increase in productivity through greater competition in liberalized sectors, larger imports of technology-intensive intermediate and capital goods, and increasing the quality and variety of intermediate inputs available to domestic producers. Using a model with firm heterogeneity, Chen et al. (2009) show that trade openness exerts a positive effect on productivity and a negative effect on markups in the short run. Halpern et al. (2015) find that imports have a significant and large effect on firm

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[5] For a detailed analysis of the time cost of trade, see Hummels and Schaur (2013) and Minor (2013).

productivity and that one-quarter of the productivity growth in Hungary during 1993-2002 was caused by imported inputs. Ahn et al. (2019) suggest that removal of remaining tariffs could increase aggregate productivity of developed countries by around 1 percent on average. While an increase in productivity of 0.1 percentage point is rather small, TPP/CPTPP is only one of many FTAs. Thus, it would be reasonable to assume that a marginal increase in productivity resulting from TPP/CPTPP to be 0.1 percentage point, after taking into consideration all FTAs included in the baseline.

4. General Equilibrium Results

4.1 Welfare Effects

A representative household's utility is used as the welfare measure. Economic welfare is largely determined by four factors: allocative efficiency, the terms of trade, the contribution to equivalent variation (EV) of change in the price of capital investment goods, and the contribution to EV of change in equity owned by a region (Walmsley et al., 2012). The welfare results of the three policy scenarios for the years 2025, 2030 and 2035 are summarized in Table 3. Panel A of the table gives absolute changes relative to real income in billions of US dollars in 2014 constant prices, whereas panel B provides percent changes. Under Scenario 1, economic welfare of the CPTPP members increases during 2025-2035, whereas that of some nonmembers, such as the US, China and Korea incur small losses. The welfare gains for the CPTPP countries in 2035 range from $5.1 billion (Chile and Peru) to $52.7 billion (Japan) in absolute values. In terms of percent changes relative to real income, they range from 0.4% (Australia) to 3.6% (Thailand), wherein the latter is assumed to join CPTPP in 2025. While the terms of trade of countries with zero or low initial tariff rates (e.g. Singapore and New Zealand) improve, those of countries with high initial tariff rates (e.g. Thailand and Vietnam) deteriorate, causing the latter's welfare gains to be smaller than real GDP gains.

Under Scenario 2 in which the US returns to the Trans-Pacific trade agreement in 2025, the economic welfare of most of the CPTPP members increases by 2035. However, the US welfare gain from rejoining the trade accord is relatively small ($77.4 billion, or 0.4% relative to real income, in 2035) for two main reasons. First, countries with low imports to

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GDP ratios and low initial tariffs tend to realize only small welfare gains. Second, the US already has FTAs/trade agreements with seven of the CPTPP members – Australia, Canada and Mexico (USMCA), Chile, Japan, Peru and Singapore. Nevertheless, as CPTPP attracts more countries to join and increase the combined GDP of the member economies, US welfare gains are expected to increase in the future. If an enlargement of CPTPP leads to a Free Trade Area of the Asia-Pacific (FTAAP), gains might become sizable.

Scenario 3 is included mainly to compare the welfare results of the United States under the first two scenarios with this hypothetical scenario. Not surprisingly, US welfare gains become greater in this scenario than in Scenario 2. The difference in US welfare gains between the two scenarios is projected to be $48.4 billion and $6.4 billion (in 2014 constant dollars) in 2030 and 2035, respectively. Furthermore, compared with Scenario 1 that assumes the US never joins CPTPP, the difference in its welfare changes is estimated to become $91.0 billion (0.4%) in 2035.

4.2 Changes in US real GDP

While the effects on real GDP do not include the terms-of-trade effects, policymakers often prefer looking at real GDP effects to referring to welfare effects because the former is more familiar to them. US real GDP changes relative to the baseline projections over the 2019-2035 period (in billions of US dollars in 2014 prices) are plotted in Figure 1. When the US never joins CPTPP (Scenario 1), its real GDP is projected to be $41.1 billion (0.16%) lower relative to the baseline by 2035.[6] The small reduction is largely caused by contractions in US trade with the CPTPP countries. When the US rejoins the Trans-Pacific trade accord in 2025, its real GDP would be $84.5 billion (0.33%) higher than the baseline projection in 2035. Finally, had the US stayed in TPP (Scenario 3), real GDP would be $112.6-113.6 billion (0.44%) higher per year during 2031-35. Overall, the magnitudes of US real GDP gains are expected to be relatively small.

4.3 US Sectoral Output Adjustments

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[6] As the US terms of trade are projected to improve somewhat from around 2023, its welfare would be almost unchanged during 2019-2035.

Structural adjustments and resource reallocations result from trade agreements. The FTA groupings and differences in the initial tariff rates across sectors and member countries play a critical role in determining the direction of the adjustments in sectoral output.[7] Table 4 presents US sectoral output adjustments in 2035, expressed in percent changes relative to the baseline in that year. In Scenario 1, a lower volume of US trade with the CPTPP countries in almost all commodities relative to the baseline scenario causes output of a wide range of sectors to fall by small percentages. In Scenario 2, US exports to and imports from the CPTPP members increase during 2025-2035, and output of agriculture, mining, food products, and petroleum and chemical products increases slightly. Output of many manufacturing sectors decreases slightly.

Had the US not withdrawn from TPP (Scenario 3), only the textile and apparel sector would be projected to contract in 2035. Output of all other sectors would either expand slightly or stay at about the same level, compared with the baseline in 2035. Contrary to popular belief, a large contraction of output and employment in US manufacturing would not occur.[8] In particular, output of motor vehicles does not fall largely because the US tariffs on auto and light truck imports from Japan would not be eliminated for 25 and 30 years, respectively, following implementation of TPP. Small sectoral output adjustments in the US contrast with relatively large sectoral adjustments in small open economies such as Singapore, Malaysia and Vietnam (e.g., Lee and Itakura, 2018).

5. Conclusion

In this paper, we have used the dynamic GTAP model to investigate how TPP/CPTPP might affect economic welfare of the United States and other Asia-Pacific countries. Under the first scenario wherein CPTPP is first implemented in seven of the 11 CPTPP members from 2019, followed by the four other members and the UK from 2022 and four prospective members from 2025, the welfare gains for the CPTPP countries in 2035 range

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[7] Other factors that affect the magnitude and direction of sectoral output changes include the import-demand ratio, the export-output ratio, the share of each imported intermediate input in total costs, and the elasticity of substitution between domestic and imported products.

[8] Although not reported in the table, percent changes in sectoral employment are similar to those in sectoral output.

from 0.4% (Australia) to 3.6% (Thailand). In the second scenario in which the US is assumed to join CPTPP in 2025, all members' welfare gains become larger. The US welfare gain would be small partly because it already has FTAs with seven of the CPTPP members, including a trade agreement with Japan that entered into force in 2020. The third scenario is included to compare the welfare effects of TPP/CPTPP with and without US participation at the start of the trade accord. If the United States had never withdrawn from TPP, its welfare gains would be 0.4% relative to its real income by 2030.

If the US returns to the CPTPP in 2025, output of several manufacturing sectors is projected to decline by small percentages in 2035, which is more than offset by output expansion in the primary and tertiary sectors. Had the US stayed in TPP, output of all sectors except textiles and apparel would increase slightly. Since sectoral output adjustments in the US are small, its adjustment costs from participation in CPTPP would be limited.

Although not being examined in this paper, US reengagement with the Trans-Pacific trade deal might be desirable for two additional reasons. First, its return to CPTPP is likely to facilitate a reduction in US dependence on Chinese intermediate products and a greater diversification in its supply chains (Laget et al., 2020). Second, after the UK becomes a member of CPTPP, four member countries – Australia, New Zealand, Japan and the UK – will have defense pacts with the US, which might provide a political incentive for the US to rejoin the trade pact amid escalating tensions with China (Hinz, 2017; Eichengreen et al., 2021).[9] Both issues are beyond the scope of this paper and the reader is referred to the literature for further details.

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[9] The US has restarted the "Quad" with Australia, Japan and India, as a means to coordinate its strategic response to greater perceived threats from China to the region.

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Table 1. Regional and sectoral aggregation

A. Regional aggregation

	Country/region	Corresponding economies/regions in the GTAP 10 data base
1	United States	United States
2	Japan	Japan
3	China	China, Hong Kong
4	Korea	Korea
5	Taiwan	Taiwan
6	Singapore	Singapore
7	Brunei, Malaysia	Brunei Darussalam, Malaysia
8	Indonesia, Philippines	Indonesia, Philippines
9	Thailand	Thailand
10	Vietnam	Vietnam
11	Rest of ASEAN	Cambodia, Laos, rest of Southeast Asia
12	Australia	Australia
13	New Zealand	New Zealand
14	India	India
15	Canada, Mexico	Canada, Mexico
16	Chile, Peru	Chile, Peru
17	United Kingdom	United Kingdom
18	European Union	27 member states of the European Union
19	Rest of world	All the other economies/regions

B. Sectoral aggregation

	Sector	Corresponding commodities/sectors in the GTAP 10 data base
1	Agriculture	Agriculture; livestock; forestry; fishing; processed rice
2	Mining	Coal, oil, gas; other extraction
3	Food products	Food products; beverages and tobacco products
4	Textiles and apparel	Textiles; wearing apparel; leather products
5	Petro and chemical prod.	Petroleum, coal products; chemical; rubber and plastic products
6	Metals	Ferrous metals; metals nec; metal products
7	Electronic products	Computer, electronic and optical products
8	Electrical equipment	Electrical equipment
9	Machinery	Machinery and equipment nec
10	Motor vehicles	Motor vehicles and parts
11	Other transport equip.	Transport equipment nec
12	Other manufactures	Other manufactures
13	Construction and utilities	Construction; electricity; gas manufac, distribution; water
14	Trade and transport	Trade; sea transport; air transport; other transport; warehousing
15	Other services	Communication; financial services; other services

Table 2. Tariff rates on merchandise imports and tariff equivalents of nontariff barriers on services, 2014 (%)

	Sector	United States	Japan	China	Korea	Taiwan	Singapore	Brunei, Malaysia	Indonesia, Philippines	Thailand	Vietnam
1	Agriculture	0.2	13.1	2.6	109.7	4.3	0.0	2.6	4.9	20.3	4.5
2	Mining	0.0	0.0	0.0	2.1	0.0	0.0	0.9	0.4	0.0	0.7
3	Food products	1.7	14.5	6.2	21.0	10.7	4.3	7.9	4.9	17.7	8.4
4	Textiles and apparel	9.4	7.1	5.9	5.5	7.3	0.0	0.8	2.7	4.6	9.7
5	Petro and chemical prod.	1.1	0.8	4.0	3.5	2.0	0.0	1.3	1.9	2.4	3.7
6	Metals	0.7	0.4	2.0	1.1	0.7	0.0	2.2	2.3	1.7	1.9
7	Electronic products	0.3	0.0	1.9	1.1	0.4	0.0	0.1	0.4	0.5	0.7
8	Electrical equipment	1.0	0.0	4.5	3.8	3.1	0.0	1.4	1.7	3.4	3.9
9	Machinery	0.6	0.0	4.5	2.7	1.4	0.0	1.2	2.0	1.3	1.1
10	Motor vehicles	0.6	0.0	18.2	3.0	13.8	0.0	5.9	7.2	15.9	11.6
11	Other transport equip.	0.3	0.0	2.8	0.8	1.9	0.0	0.8	2.6	3.3	5.3
12	Other manufactures	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
13	Construction and utilities	2.3	5.0	25.2	13.0	10.8	0.0	19.3	56.3	44.9	53.7
14	Trade and transport	6.8	18.3	85.1	27.7	24.1	1.3	28.0	81.7	57.4	74.1
15	Other services	7.5	17.9	80.2	30.1	27.0	1.6	27.2	81.1	56.1	75.3

Table 2 (continued)

	Sector	Rest of ASEAN	Australia	New Zealand	India	Canada, Mexico	Chile, Peru	United Kingdom	European Union	Rest of world
1	Agriculture	3.6	0.1	0.1	18.6	0.7	1.0	1.5	0.9	6.9
2	Mining	0.5	0.0	0.0	1.9	0.0	0.4	0.0	0.0	0.5
3	Food products	3.8	1.0	1.0	48.8	1.4	0.5	3.4	1.9	10.7
4	Textiles and apparel	2.3	6.1	2.9	11.4	9.0	2.6	4.4	2.9	11.3
5	Petro and chemical prod.	2.5	1.0	0.8	7.0	0.5	0.5	0.7	0.6	3.8
6	Metals	1.6	2.2	1.0	8.3	0.4	0.5	0.4	0.3	3.6
7	Electronic products	4.3	0.5	0.3	2.7	0.3	0.4	0.5	0.4	3.3
8	Electrical equipment	2.4	2.7	1.7	8.0	0.7	0.9	0.9	0.6	6.3
9	Machinery	2.1	2.2	2.3	6.7	0.2	0.3	0.4	0.3	4.0
10	Motor vehicles	10.4	13.1	4.0	13.9	1.3	1.2	0.5	0.5	9.2
11	Other transport equip.	3.5	1.3	0.2	6.6	1.1	0.7	0.7	0.7	4.6
12	Other manufactures	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
13	Construction and utilities	20.6	4.3	1.0	109.7	14.1	26.6	5.6	5.6	30.9
14	Trade and transport	24.4	12.9	5.8	139.7	24.7	30.4	9.9	9.9	42.5
15	Other services	16.6	15.5	5.0	138.9	25.4	34.3	9.9	9.9	44.2

Sources: Sectors 1-12: GTAP data base, version 10. Sectors 13-15: unweighted averages of the gravity-model estimates of Wang et al. (2009) and the values employed by the Michigan Model of World Production and Trade.

Table 3. The welfare effects under Scenarios 1-3 (changes in utility relative to real income)

A. Absolute changes (US$ billion in 2014 prices)

	Scenario 1			Scenario 2			Scenario 3		
	2025	2030	2035	2025	2030	2035	2025	2030	2035
United States	-1.9	-5.6	-7.2	0.5	28.9	77.4	49.1	77.3	83.8
Japan	18.3	44.7	52.7	18.5	49.8	61.6	28.6	52.4	61.2
China	0.5	7.7	7.9	0.5	10.3	25.8	2.0	16.7	18.6
Korea	0.4	0.8	-1.4	0.4	1.4	0.5	1.2	2.8	0.4
Taiwan	0.7	6.0	13.1	0.8	6.9	15.1	1.4	7.7	15.4
Singapore	2.4	5.4	6.8	2.4	5.7	7.3	3.3	6.0	7.4
Brunei, Malaysia	1.6	7.3	14.2	1.6	7.6	14.2	1.5	7.2	14.0
Indones, Philippines	0.3	8.8	28.0	0.4	8.4	27.0	-0.7	8.3	28.9
Thailand	0.6	6.3	15.4	0.7	6.9	17.0	1.0	7.6	17.5
Vietnam	2.5	6.3	10.0	2.5	8.5	13.3	5.8	10.1	14.4
Rest of ASEAN	-0.1	-0.1	0.2	-0.1	-0.3	-0.1	-0.3	-0.4	-0.1
Australia	2.9	6.2	8.8	2.9	5.3	5.3	2.1	2.9	4.5
New Zealand	1.1	2.2	2.9	1.1	2.2	2.7	1.3	2.2	2.7
India	0.9	2.7	0.4	1.0	4.2	6.2	3.3	7.6	5.0
Canada, Mexico	8.9	18.2	20.9	9.8	22.2	27.4	17.2	25.4	27.8
Chile, Peru	0.6	3.0	5.1	0.7	3.2	5.0	0.4	2.9	5.0
United Kingdom	2.6	10.6	15.8	2.8	11.1	15.0	2.7	10.2	14.8
European Union	0.5	-1.1	-7.1	0.6	-2.2	-16.6	-1.4	-11.3	-24.4
Rest of world	-6.4	-16.8	-15.0	-7.0	-28.0	-45.8	-22.8	-46.1	-48.3

Definitions of scenarios:

Scenario 1: Implementations of CPTPP7 over the period 2019-2035, CPTPP12 from 2022 and CPTPP16 from 2025.

Scenario 2: CPTPP7 over the period 2019-2035, CPTPP12 from 2022 and CPTPP17 from 2025.

Scenario 3: TPP8 over the period 2018-2035, TPP13 from 2022 and TPP17 from 2025.

Table 3 (continued)

B. Percent changes

	Scenario 1			Scenario 2			Scenario 3		
	2025	2030	2035	2025	2030	2035	2025	2030	2035
United States	0.0	0.0	0.0	0.0	0.2	0.4	0.3	0.4	0.4
Japan	0.4	1.1	1.3	0.4	1.2	1.5	0.7	1.2	1.5
China	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.1	0.1
Korea	0.0	0.1	-0.1	0.0	0.1	0.0	0.1	0.2	0.0
Taiwan	0.1	1.0	2.2	0.1	1.2	2.6	0.2	1.3	2.6
Singapore	0.8	1.8	2.2	0.8	1.9	2.4	1.1	2.0	2.4
Brunei, Malaysia	0.3	1.2	1.7	0.3	1.2	1.8	0.3	1.1	1.7
Indones, Philippines	0.0	0.5	1.2	0.0	0.4	1.1	0.0	0.4	1.2
Thailand	0.2	1.6	3.6	0.2	1.7	4.0	0.3	1.9	4.1
Vietnam	1.0	2.0	2.4	1.0	2.7	3.3	2.4	3.2	3.5
Rest of ASEAN	-0.1	-0.1	0.1	-0.1	-0.2	0.0	-0.2	-0.2	0.0
Australia	0.2	0.3	0.4	0.2	0.3	0.2	0.1	0.2	0.2
New Zealand	0.5	1.1	1.3	0.5	1.1	1.2	0.7	1.1	1.2
India	0.0	0.1	0.0	0.0	0.1	0.2	0.1	0.2	0.1
Canada, Mexico	0.3	0.6	0.7	0.4	0.8	0.9	0.6	0.9	0.9
Chile, Peru	0.1	0.5	0.8	0.1	0.6	0.7	0.1	0.5	0.7
United Kingdom	0.1	0.4	0.7	0.1	0.5	0.6	0.1	0.4	0.6
European Union	0.0	0.0	0.0	0.0	0.0	-0.1	0.0	-0.1	-0.1
Rest of world	0.0	-0.1	-0.1	0.0	-0.2	-0.2	-0.1	-0.3	-0.2

Source: Model simulations.

Figure 1. US real GDP changes under Scenarios 1-3
(Absolute changes from the baseline, US$ billion in 2014 prices)
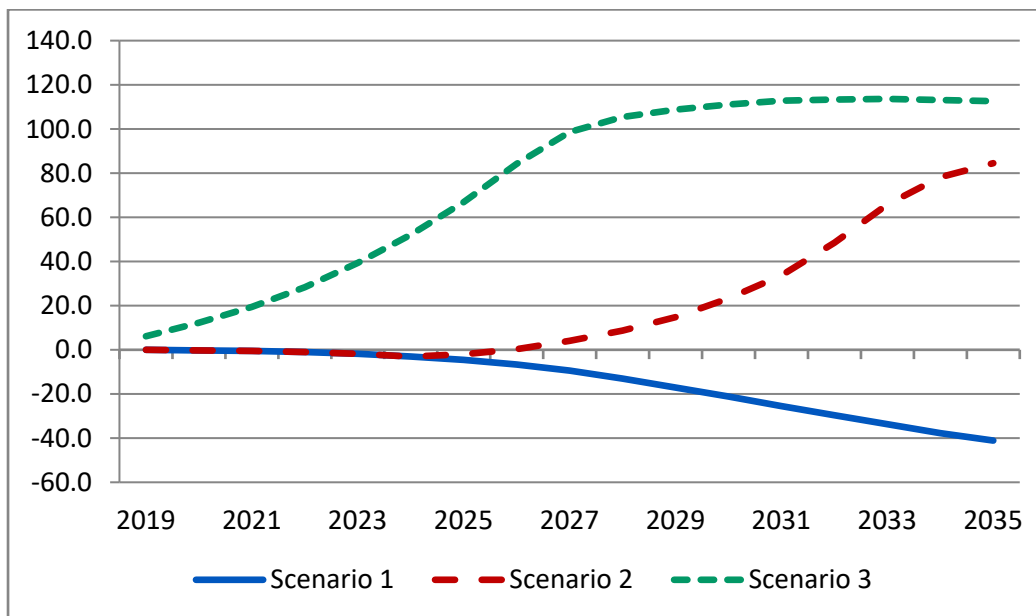
Source: Model simulations.

Table 4. US sectoral output adjustments
(percent changes relative to the baseline in 2035)

Sector	Scenario 1	Scenario 2	Scenario 3
Agriculture	0.0	0.5	0.6
Mining	0.0	0.5	0.5
Food products	-0.1	0.7	1.0
Textiles and apparel	-0.2	-2.6	-3.7
Petro and chemical prod.	-0.3	1.1	1.5
Metals	-0.4	-0.5	0.7
Electronic products	-0.1	-0.5	0.6
Electrical equipment	-0.3	-0.9	0.1
Machinery	-0.3	-0.1	0.5
Motor vehicles	-1.0	-0.2	0.1
Other transport equip.	0.1	-0.9	0.0
Other manufactures	-0.2	0.0	0.4
Construction and utilities	-0.6	0.7	0.4
Trade and transport	-0.1	0.2	0.3
Other services	0.0	0.0	0.2

Source: Model simulations.