




## The Economics of Conflict and Cooperation in the Asia-Pacific: RCEP, CPTPP and the US-China Trade War\*

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The Regional Comprehensive Economic Partnership (RCEP) agreement, signed in November 2020, comes shortly after the Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP) entered into force and the US-China Trade War escalated. We use a computable general equilibrium model to assess the long-term effects of these three developments on income, trade, economic structure, factor returns and employment across the world, and especially in Asia-Pacific countries. The results suggest that RCEP could generate income gains that will be almost twice as large as those of the CPTPP, and that the two agreements together will largely offset the substantial negative effects of the US-China Trade War for the world as a whole. All three policy developments, but especially RCEP, will deepen East Asian production networks and will raise productivity and increase wages and employment in much of East Asia. At the sectoral level, regional trade in non-durable and durable manufactures will experience the most growth.

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## I. Introduction

The 15 negotiating parties of the Regional Comprehensive Economic Partnership (RCEP) made history on 15 November 2020 by signing the largest free-trade area (FTA) ever in size (\$26 trillion in GDP) and population (2.3 billion). It is the second “megaregional” trade agreement in Asia and the Pacific, following the Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP) that became effective in December 2018. The two agreements have the potential to mold regional trade and investment patterns well into the future and to influence the direction of global economic cooperation at a challenging time. At the same time, the Asia-Pacific region is experiencing its first major trade conflict between the United States and China. Tariffs escalated sharply after the arrival of the Trump Administration in 2017 before stabilizing with the Phase I agreement between the two countries in January 2020. They remain in place under the Biden Administration and are unlikely to diminish in the foreseeable future.

This study will examine the economic effects of the major policy innovations on Asia-Pacific countries. It uses a computable general equilibrium (CGE) approach to explore implications for income, economic structure, factor returns, and employment in individual countries, and for trade and other economic relations among them. As one of the first studies of RCEP based on the agreement’s final text, it will also contribute new detail on the implications of RCEP as well as identify priorities for studies that further advance our understanding of its potential scope and membership.

The path to RCEP was difficult: it took nearly a decade of work, 30 rounds of negotiations, and four summits to reach agreement. Negotiations were launched in November 2012, after two decades of preliminary discussions. Conducted under ASEAN leadership, they eventually included the 10 Association of Southeast Asian Nations (ASEAN) and their six “dialogue partners”: the Northeast Asian economies of China, Japan, and Korea; the Oceanic countries of Australia and New Zealand; and the South Asian country of India. Thus, the negotiations spanned some of the world’s most and least developed economies, constraining the ambition of any ultimate outcome. But diversity was also RCEP’s biggest draw: it enables a more efficient division of labor and offers potential for deepening existing supply chains and building profitable new ones.

If RCEP delivers on its promise, it will become a model for managing the diverging interests and sensitivities of developing and developed economies with implications for wider multilateral cooperation. Even so, India withdrew from the process in its final stages in November 2019. The loss of India was a blow, but the agreement underscores that India would be welcomed back even before others are admitted.<sup>1</sup>

Understanding the value added of RCEP is complicated by the region's multiple existing FTAs. For example, ASEAN economies already have FTAs with each other, as well as an ambitious economic integration program, the ASEAN Economic Community, which went into effect in December 2015 and continues to deepen. One would not expect, *a priori*, RCEP to significantly lower intra-ASEAN barriers to trade and investment. The same would be true of barriers between Australia and New Zealand, whose Closer Economic Relations agreement is one of the most advanced FTAs in the world. Further, all non-ASEAN RCEP members already have FTAs with ASEAN (a condition to join negotiations), and many have FTAs with each other. However, while China and Korea have a limited FTA, there was no regional FTA binding China, Japan, and Korea together. RCEP will change that.

Importantly, RCEP will add a comprehensive template even to existing FTAs, helping to bind the “noodle bowl” of bilateral agreements together with common rules. A single, cumulative rules-of-origin system will bolster integration and enhance the impact of tariff reductions on regional productivity. Consolidated rules, streamlined regulatory procedures and expanded market access should steadily reduce nontariff barriers in this large region, with commensurate benefits for trade, investment and economic growth.

Our results will show that RCEP is likely to make significant contributions to the region and the world economy. By 2030, we estimate that it will increase members' incomes by 0.6 percent, adding \$245 billion annually to regional income and 2.8 million jobs to regional employment. These benefits will be more than twice those projected for the CPTPP mainly due to RCEP's economic size, the high degree of its prior integration, and new FTA partnerships, especially in Northeast Asia. Every RCEP member will gain. The largest percentage increases will be realized by the region's most trade-oriented economies, such as Malaysia and Vietnam; by Northeast Asian economies with no prior trade agreements with each other, such as China, Japan

<sup>1</sup> Chapter 20 of RCEP agreement notes that all other applicants must wait at least 18 months after entry into force of the agreement (Table 1).

and Korea; and by poorer countries throughout the region that can join new regional supply chains, including Cambodia, Lao PDR and Myanmar.

The results suggest especially strong gains in trade and production links and thus productivity. Increases in trade will be approximately 2-3 times as large as increases in income, reflecting substantial trade in intermediate goods. New trade will mostly affect manufacturing industries and their supply chains, but gains are also projected for primary goods and service flows.

Finally, the results underline the importance of liberalizing measures beyond tariff reductions. Liberalization of nontariff barriers in goods and services will be the most important source of projected benefits, accounting for approximately two-thirds of the total effects of RCEP on income. This will require coordinated changes in domestic policies, partly managed by the agreement's built-in consultation mechanisms. Full and transparent implementation of scheduled tariff cuts and rules-of-origin reforms will be essential.

The paper is organized as follows. Section II reviews the contents of the RCEP agreement. Section III reviews the modeling approach, and Section IV summarizes estimates of the impact of the three policy developments and especially RCEP. Section V concludes. Appendix A summarizes the details of our CGE model.

## II. The New RCEP Agreement

RCEP is one of several major regional agreements that have taken over the work of modernizing the global trading system given the stalemate in the World Trade Organization (WTO) (Pomfret, 2021). It includes 20 chapters covering most aspects of contemporary trade relations, many of which follow the chapters of the CPTPP, an even more ambitious agreement.<sup>2</sup> In discussing the key features of RCEP, we therefore use the CPTPP as a benchmark and include it in our policy simulations.<sup>3</sup> While RCEP is not as wide-ranging as the CPTPP—for example, it does not include provisions on labor and environmental standards or state-owned enterprises—it is reasonably comprehensive, covering trade in goods and services; cumulative and

<sup>2</sup> For a copy of all chapters of the agreement see <https://dfat.gov.au/trade/agreements/negotiations/rcep/Pages/regional-comprehensive-economic-partnership.aspx> (accessed August 20, 2021)

<sup>3</sup> For economic estimates of CPTPP expansion scenarios, including the potential accession of China and five other East Asian economies which have expressed interest in joining, see Petri and Plummer (2019).

trade-friendly rules of origin; customs procedures and trade facilitation; sanitary and phytosanitary measures; standards, technical regulations, and conformity assessment procedures; and trade remedies. The memberships of the agreements overlap: 7 of 11 CPTPP members also signed RCEP.

Table 1 compares the main features of the CPTPP and RCEP, recognizing that a truly comprehensive mapping of the legal provisions would require far more technical analysis. RCEP is long—at over 6,000 pages—because it includes detailed schedules that record how individual members exercised the flexibilities offered by the agreement. In part, these flexibilities address the needs of the region’s least developed countries, Cambodia, Lao PDR, and Myanmar. But they are not limited to these countries—positive lists are used for services liberalization in five other RCEP economies, including China and New Zealand.

On the whole, liberalization measures included in RCEP are less rigorous than in the CPTPP. While the CPTPP will eliminate tariffs on 99% of products that enter intraregional trade,<sup>4</sup> RCEP is estimated to cover approximately 90% of goods and, even for these, tariffs will not be fully eliminated in the transition period.<sup>5</sup> Yet its broad coverage bodes well for deepening its provisions in the future, as is typical of ASEAN-centric agreements. For instance, the ASEAN Free Trade Area began in 1992 as an arrangement that only included 10 manufacturing sectors and defined free trade as tariffs between 0%–5%.<sup>6</sup> Subsequently, it expanded to include all goods, with a relatively small exclusion list, and reduced tariffs to zero. In the meantime, the region launched the ASEAN Economic Community (AEC) initiative in 2003 with the ambitious goal of creating a region in which goods, services, skilled labor, and foreign direct investment would flow freely.<sup>7</sup> The AEC went into effect on 31

<sup>4</sup> Congressional Research Service, “TPP Countries Sign New CPTPP Agreement without U.S. Participation,” March 9, 2018. <<https://crsreports.congress.gov/product/pdf/IN/IN10822>> (accessed August 20, 2021)

<sup>5</sup> Congressional Research Service, “The Regional Comprehensive Economic Partnership: Status and Recent Developments,” November 19, 2020. <<https://crsreports.congress.gov/product/pdf/IN/IN11200>> (accessed August 20, 2021). See also Sawada (2020) and Tan et al. (2020)

<sup>6</sup> Agreement on the Common Effective Preferential Tariff for the ASEAN Free-Trade Area, Singapore, 28 January 1992, <[https://asean.org/?static\\_post=agreement-on-the-common-effective-preferential-tariff-cept-scheme-for-the-asean-free-trade-area-singapore-28-january-1992](https://asean.org/?static_post=agreement-on-the-common-effective-preferential-tariff-cept-scheme-for-the-asean-free-trade-area-singapore-28-january-1992)> (accessed August 20, 2021)

<sup>7</sup> Declaration of Bali Concord II, 9th ASEAN Summit, 7 October, 2003. <[https://asean.org/?static\\_post=declaration-of-asean-concord-ii-bali-concord-ii](https://asean.org/?static_post=declaration-of-asean-concord-ii-bali-concord-ii)> (accessed August 20, 2021)

December 2015, even though arguably much remains to be done in completing its single market and production base.

RCEP too has an extensive structure of scheduled meetings and a built-in work plan for future improvements. For example, it does not include an investor-state dispute settlement mechanism but stipulates that discussions begin on setting one up two years after the agreement enters into force. The services chapter allows for both positive and negative-list approaches to increasing market access, but all countries are committed to adopt a negative-list approach within 6 years. Moreover, applications from potential new members can be submitted 18 months after the agreement enters into force, except for India, which can apply at any time.

The RCEP agreement falls short of the CPTPP especially in areas of special concern to advanced economies. Its intellectual property provisions add little to those that most members have already accepted in the WTO or other agreements. RCEP does not have chapters on labor, the environment, or state-owned enterprises. It does include a chapter on electronic commerce and its provisions stipulate that parties will sustain a moratorium on duties on electronic transmissions, but the treatment of electronic commerce does not appear to go beyond commitments under the WTO (Article 12.11). Impediments to cross-border data transfers and data localization requirements are prohibited, but these provisions are subject to loosely defined exceptions that could be widely used—parties may apply restrictions in the case of “legitimate public policy objectives” or to protect security interests (Article 12.14 and Article 12.15). Provisions on investor-state dispute settlement are not included but will be negotiated no later than two years after entry into force of the agreement (Article 10.18). And while ambitious general dispute settlement procedures are defined in the agreement, they will not apply to many of the agreement’s most important chapters, with discussions scheduled to expand their coverage two years from now.

In sum, RCEP has shortcomings in comparison with the more advanced CPTPP agreement, but it will be the world’s largest regional trade agreement with meaningful coverage and effects. Significantly, it will offer cumulative, favorable rules of origin (ROO) for manufacturers participating in regional supply chains. It will improve on ASEAN’s prior agreements by providing consolidated rules and establish a first FTA among Northeast Asia’s large economies. Its market access provisions will set common terms of reference for regulatory policies and extend national and most favored nation treatment to new sectors. Its customs procedures and trade facilitation chapter will

enhance harmonization, regional cooperation, and transparency. And the agreement sets the stage for future improvements and incorporates an open enlargement policy.

Table 1. Provisions of the CPTPP and RCEP Agreements

Major Issues	CPTPP Chapter	RCEP Chapter	CPTPP Content	Expected RCEP Differences
National treatment and market access for trade in goods	2	2	Provisions regarding the administration of tariffs, including application of national and most favored nation treatment, transparent tariffs.	Same (standard WTO).
Rules of origin	3, 4	3 (Annexes 3a on product specific rules, and 3b on info requirements)	Favorable definitions and costing methods for cumulation. <i>De minimis</i> treatment of non-originating materials. Special provisions for textiles and apparel.	Regional value added requirement generally a liberal 40%.
Customs administration and trade facilitation	5	4 (Annex 4a on timing of implementation)	Enhanced customs cooperation, trade facilitation, express shipments, administration of customs penalties.	Same goals and focus on consistency, transparency, efficiency.
Trade remedies	6	7 (Annex 7a on anti-dumping and countervailing duties)	Rules for safeguards, temporary protection, antidumping and countervailing duties.	Same coverage.
Sanitary and phytosanitary measures	7	5	Rules for sanitary and phytosanitary measures, equivalence recognition, science and risk analysis, audits, certification and transparency.	Same in general, World Trade Organization (WTO+); includes capacity building; Far less ambitious in terms of disciplines. May be covered by dispute settlement in the future.
Technical barriers to trade	8	6	Enhanced cooperation on standards for technical regulations, conformity assessment.	Standards, technical regulations, and conformity assessment procedures. May be covered by dispute settlement in the future.

Table 1. Continued

Major Issues	CPTPP Chapter	RCEP Chapter	CPTPP Content	Expected RCEP Differences
Investment	9	10 (Annex 10A customary international law; Annex 10B expropriation)	National treatment, most favored nation treatment, compensation for expropriation, rules for financial transfers, bar performance requirements, investor-state dispute settlement with improved safeguards for public welfare regulations. Phasing out equity limits in some countries.	Similar structure but permits positive lists for exceptions. Investor-state dispute settlement not yet included but part of work program, with discussions to begin two years after entry into force.
Cross-border trade in services	10, 11, 13	8 (Annex A financial services; Annex B telecommunications services; Annex C Professional services)	Disciplines on market restrictions, local presence requirements, regulations, criteria for service providers. Special provisions for financial services for offering new products and restricting regulations, for educational services in enhancing offerings, and for telecommunications services on interconnection, roaming.	Includes negative lists for seven countries and positive lists for eight; national treatment; special and differential treatment for least developed countries. Lists offered by members are extensive (over 1,000 pages). All should transition to negative-list approach within 6 years of entry into force.
Temporary entry for business persons	12	9	Disciplines on regulating temporary entry of business persons. Country-specific concessions for additional professional services and longer periods of stay.	Takes essentially same approach, focus on transparency, cooperation to further facilitate movement.
Electronic commerce	14	12	Prohibits customs duties on electronic transmissions, discriminatory treatment of digital products. Sets legal framework for e-commerce. Limits restrictions on cross-border transmission of data and location of computing facilities.	Trade facilitation; maintains moratorium on customs duties on electronic transmissions; prohibits impediments to cross-border data flows and data localization requirements, but permits exceptions for broadly defined public policy objectives; not subject to dispute settlement.



Table 1. Continued

Major Issues	CPTPP Chapter	RCEP Chapter	CPTPP Content	Expected RCEP Differences
Government procurement	15	16	National treatment and non-discrimination, governance of procurement, expanded range of organizations covered.	Focuses on transparency and cooperation, no obligations for least developed countries; not subject to dispute settlement.
Competition and regulatory policy	16, 25, 26	13 (Annexes on measures against anti-competitive by country groups)	Ensures fairness in competition law, enables private right of action. Enhanced regulatory coherence, transparency, anti-corruption measures.	Measures against anti-competition behavior; technical cooperation and capacity building; consumer protection; not subject to dispute settlement.
State-owned enterprises and designated Monopolies	17	Not applicable.	Defines state-owned enterprises and designated monopolies and limits non-commercial assistance to state-owned enterprises.	Not covered.
Intellectual property	18	11 (11A Party-specific transition periods; 11B list of technical assistance requests)	Commitments to ratify international agreements on intellectual property. US-promoted provisions for expanded intellectual property protections under Trans-Pacific Partnership are suspended.	Same commitments on international agreements, improves enforcement, WTO+ but more limited coverage.
Labor	19	Not applicable.	Commitments to implement laws and regulations supporting International Labor Organization Declaration on Labor Rights. Institutions for review and a Labor Council for monitoring.	Not covered.
Environment	20	Not applicable.	Recognition of multilateral environmental agreements. Provisions on ship pollution, biodiversity, invasive species, marine fisheries, conservation.	Not covered.

Table 1. Continued

Major Issues	CPTPP Chapter	RCEP Chapter	CPTPP Content	Expected RCEP Differences
Cooperation and capacity building	21, 22, 23, 24	14 (small and medium-sized enterprises), 15 (economic and technical cooperation)	Institutions for cooperation and capacity building, including especially small and medium-sized enterprises.	Same general coverage, resources applied are voluntary, special considerations for ASEAN least developed countries.
Dispute resolution	28	19	Extensive coverage of provisions under dispute settlement procedure; defined process and panel for unresolved disputes.	Process for adjudicating disputes, creates dispute panel whose decisions are final and binding, special and differential treatment for least developed countries. However, it does not cover numerous important chapters of the agreement.
Definitions, administration, and institutions	1, 27, 29, 30	1, 17, 18, 20	Establish the Trans-Pacific Partnership Commission, security related exceptions, safeguard measures, taxation. Conditions for changes including enlargement.	Entry into force after ratified by six ASEAN countries and three others; enlargement possible after 18 months from entry into force, with exception of India, which can return at will.

CPTPP = Comprehensive and Progressive Agreement for Trans-Pacific Partnership, RCEP = Regional Comprehensive Economic Partnership.

Source: Authors.

### III. Modeling the Effects of RCEP, the CPTPP and the Trade War

CGE models remain the workhorse of *ex-ante* trade policy modelling due to their ability to provide quantitative insight into macro-economic effects in multiple regions as well as micro-economic trade and production projections for many sectors. Appendix A summarizes the present model's structure, reviews its parameters (including the specification of tariffs, utilization of preferences, nontariff barriers, rules of origin, and FDI), and describes the treatment of factor markets and macro closures. Even so, space constraints preclude a full coverage of the model's details, which are available in Zhai (2008), Petri et al. (2012), and Petri and Plummer (2016). Our model differs from many of its type by assuming firm heterogeneity in production, and by its

extensive treatment of the effects of tariff and nontariff barriers. The model includes data on some 80 relevant regional FTAs and simulates how firms operate transactions that could be covered by multiple trade agreements (and in effect choose the most advantageous option). The model has 29 regions and 19 economic sectors and dynamically projects annual results from a 2015 base year to 2030.

We have used this model in earlier studies of trade policy over the past decade, first to assess the implications of the Trans-Pacific Partnership (TPP) and later to examine the CPTPP and emerging RCEP agreements, including variants based on future enlargement scenarios.<sup>8</sup> Unlike those studies, this paper employs a model specification with endogenous labor markets, that is, incorporates positive labor supply responses to real wage changes. This mechanism is used in light of the relative flexibility of labor markets in RCEP's lower income countries, where rising real wages are likely to attract workers into the formal labor force. In contrast to previous results, the present results include projections of employment changes in addition to income changes. This mechanism amplifies the scale of policy effects, since scenarios that yield positive (negative) productivity changes also yield an expansion (contraction) in labor supplies, which in turn reinforce changes in economic activity.<sup>9</sup> The amplification factor turns out to be as large as 40 percent, depending on the economy and the simulated policy package.

We build up the analysis of the RCEP agreement from three scenarios that specify changes in the global trade environment. These changes are not viewed as alternatives, but are sequentially added to the model's baseline. The baseline is a "business as usual" projection of world economic growth under pre-2015 trade policies. The first scenario adds the US-China trade war that rapidly intensified between 2018 to 2020. This new baseline then serves as the backdrop to US-Asia economic relations for the indefinite future. The second scenario adds the CPTPP agreement and its steady implementation after it came into force in 2018. The third scenario adds the RCEP agreement, which will ramp up gradually over the coming decade. Comparing these three solutions enables us to decompose the cumulative change in the global trading environment into the incremental effects of the trade war, the CPTPP, and RCEP.

<sup>8</sup> For more details of the CGE model employed see Petri et al. (2012) and Petri and Plummer (2016).

<sup>9</sup> The model does not account for corresponding changes in leisure or non-market activity.

The scenarios are quantified using assumptions and parameters to specify changes in trade and investment barriers (see Table 2). These are the parameters that drive changes in trade flows and then enter indirectly in virtually all other endogenous variables of the model. They are set as follows:

- The parameters of the US-China trade war assume that high bilateral trade barriers, reached when the US-China Phase I Agreement was concluded in January 2020, will persist indefinitely.
- The parameters of the CPTPP agreement assume that the tariff and non-tariff schedules agreed by signatory countries will be fully implemented (although only a subset of these countries have ratified the agreements at this writing).
- The parameters of the RCEP agreement assume that the tariff and non-tariff schedules agreed by the signatories, as estimated by the authors in May 2021, will be fully implemented (although the RCEP agreement has not yet come into force at this writing).

These assumptions and hence our results are of course subject to error. All scenario parameters depend on future actions by governments and are specified with varying degrees of precision. The results are best viewed as “what if” simulations of the effects of policy commitments as we now understand them. For example, although the volatility of the US-China trade war has recently diminished, the policies behind it remain unpredictable and the assumption that they will be sustained is uncertain. By contrast, the provisions of the CPTPP are reasonably well understood, and the CPTPP’s tariff and non-tariff provisions have been widely analyzed. RCEP is newer, so its implications have been less thoroughly studied by the research community; our estimates rely on a greater measure of judgement. With both agreements, uncertainties remain on how fully signatories will implement their commitments and use the new consultative mechanisms that become available.

The tariff parameters used in the baseline projections reflect bilateral rates included in the GTAP database.<sup>10</sup> These rates are then projected into the future by the model using scheduled agreements (other than those simulated in this paper) that have been concluded but are not yet fully implemented. Tariffs scheduled under the US-China trade war are based on Li (2018). The CPTPP tariff schedule is now widely available,

<sup>10</sup> <https://www.gtap.agecon.purdue.edu/databases/v9/default.asp> (accessed August 20, 2021)

Table 2. Specifications for Simulating Asia-Pacific Policies

	US-China Trade War	CPTPP	RCEP
Countries involved	China, United States	Australia, Brunei Darussalam, Canada, Chile, Japan, Malaysia, Mexico, New Zealand, Peru, Singapore, and Viet Nam	Australia, Brunei Darussalam, Cambodia, China, Indonesia, Japan, Korea, the Lao People's Democratic Republic, Malaysia, Myanmar, New Zealand, the Philippines, Singapore, Thailand, and Viet Nam
Launch date	2019	2018	2020
Tariff liberalization	Detailed bilateral schedule negotiated by US and China in the Phase I agreement of January 2020	Detailed schedule negotiated in the TPP agreement	90% elimination of most-favored-nation tariffs
Nontariff barrier liberalization	<ul style="list-style-type: none"> <li>• China increases nontariff barriers on US imports by 10%</li> <li>• US increases nontariff barriers on Chinese technology imports by 50%</li> <li>• US increases nontariff barriers on other Chinese imports by 10%</li> </ul>	Tariff equivalents representing the provisions of the TPP agreement, except for suspended provisions	Tariff equivalents representing the provisions of recent ASEAN+1 agreements
Foreign direct investment liberalization	US increases barriers on Chinese investments by 100%	As negotiated for TPP agreement except for suspended provisions	Average of estimated nontariff barriers in recent ASEAN+1 agreements
Share of nontariff barriers applied on an MFN basis	None	10%	10%

ASEAN = Association of Southeast Asian Nations, CPTPP = Comprehensive and Progressive Agreement for Trans-Pacific Partnership, NTB = Nontariff barrier, RCEP = Regional Comprehensive Economic Partnership, US = United States.

Source: Authors.

including through the World Trade Organization's (WTO) RTA Database,<sup>11</sup> but was obtained for this study shortly after the conclusion of the TPP agreement from Sarah Oliver of the Peterson Institute for International Economics, using data then provided by negotiators. The detailed RCEP schedule was not available when this empirical work was completed, so baseline bilateral tariffs were reduced across the board to correspond to the 90% average tariff reduction outcome cited by several reliable sources as the estimated outcome of the negotiations.<sup>12</sup>

The non-tariff parameters for goods used in the baseline projections, expressed as tariff equivalents, are based on work by Kee et al. (2009), including subsequent updates made available by the authors. These are now also available on the World Bank's nontariff measures website.<sup>13</sup> Baseline non-tariff barriers for service sectors are based on work by Fontagné et al. (2011). Increases in nontariff barriers due to the US-China trade war reflect judgments based on a list of policy actions by the two countries against each other, including limits on government procurement, sanctions on individual firms and products, heightened regulatory actions, subsidies for import-competing domestic products, and pressures on firms and consumers to avoid bilateral purchases. As is well known, these measures have been especially aggressively deployed in high technology sectors. Changes in nontariff barriers under the CPTPP reflect judgements about provisions in the agreement's text, and indexes of the similarity of those agreements with other agreements, like the Korea-US Free Trade Agreement and the North American Free Trade Agreement, whose effects have been earlier estimated. Changes in nontariff barriers under RCEP reflect judgements based on the published agreement and comparisons with the CPTPP, as outlined in Table 1.

Investment barriers are specified similarly. In the case of the US-China trade war, we assume new barriers facing Chinese investments in the United States, to reflect a wide range of interventions permitted by the 2018 Foreign Investment Risk Review Modernization Act (FIRRMA). These policies have already depressed Chinese investment in the United States from \$45 billion at its peak in 2016 to \$7 billion in

<sup>11</sup> <http://rtais.wto.org/UI/PublicSearchByMemberResult.aspx?membercode=392> (accessed August 20, 2021)

<sup>12</sup> This introduces differences in the composition (if not average levels) of tariff reductions used in the simulations and those in the negotiated schedule, and hence may give rise to errors in some results.

<sup>13</sup> <https://datacatalog.worldbank.org/search/dataset/0040437> (accessed August 20, 2021)

2020 (Hanemann et al., 2021). US investments in China have declined less, but at this writing new restrictions are being implemented also on the Chinese side.

The last line of Table 2 shows parameters quantifying the direct benefits that the CPTPP and RCEP will offer to non-participating economies. Even when nontariff barriers are reduced at the behest of partners, they sometimes cannot be implemented preferentially and thus offer spillover benefits for non-members. For example, improvements agreed in an FTA about regulatory transparency, competition policy, and trade facilitation usually cannot be confined to FTA partners and thus benefit nonmembers too. These effects are difficult to estimate; some studies have used high values to gauge and agreement's effects. Estimates for the European Single Market, for instance, assumed that more than half of the benefits of intra-European liberalization would also accrue to nonmembers (Cecchini et al., 1988). Kawasaki (2018) assumed a 50 percent spill-over effect for Asia-Pacific FTAs to nonmembers. Since the CPTPP and RCEP are likely to take more modest steps on such liberalizing measures, we conservatively assume that only 10% of nontariff barrier reductions will accrue to nonmembers.

The products of these assumptions—the actual tariff and nontariff barriers applied in the model—are summarized in Tables 5 and 6 (located in Section IV below). These show the *unweighted average* barriers applied to RCEP exports by RCEP partners on the baseline, and then the reductions that the CPTPP and RCEP impose on those barriers. Somewhat counterintuitively, the cuts are often deeper under RCEP than under the CPTPP, even though the CPTPP generally offers more ambitious reductions. This is because RCEP exports benefit from all RCEP barrier reductions, while only the exports of the seven RCEP countries that are also members of the CPTPP benefit from CPTPP barrier reductions. Note that levels and reductions in average protection are relatively small under both agreements, and especially so for goods. This is because tariffs have already fallen significantly in recent years due to multilateral trade agreements and numerous intra-RCEP trade agreements. Barriers for services start and remain high relative to goods, mainly due to natural barriers reflecting the difficulty of trading services across distance and differences in language, customs, and commercial requirements.

## IV. Estimates of the Effects of RCEP and Other Policies

As explained above, our simulations assess the effects of successively and cumulatively adding the US-China trade war, the CPTPP and RCEP to a baseline growth path.<sup>14</sup> We estimate the global growth path at each step in this approach. Comparing the baseline and three other estimated paths enables us to assess how each policy contributes to total changes in the policy environment—say, to what extent increases in East Asian interdependence can be attributed to China-US tensions, trade liberalization under the CPTPP, and trade liberalization under RCEP.

### *1. Aggregate Income and Trade Effects of Major Policy Changes*

The economic impact of the three policy scenarios is summarized in Table 3 for real national incomes and in Table 4 for exports. These tables show effects in incremental terms, i.e., the amount that each scenario adds to (or subtracts from) previous policies. The first column of Table 3 shows baseline incomes levels. The second column shows how the trade war will change those incomes relative to the baseline in 2030. The third column shows (assuming the trade war remains in place) how the CPTPP will change incomes. Finally, the fourth column shows the additional effects that will be caused by the RCEP agreement.

With respect to global income effects (World sum in Table 3), the trade war is the most significant of the three scenarios, *reducing* global incomes by \$514 billion, or 0.38%. The CPTPP then adds \$188 billion back to world incomes, and RCEP adds a further \$263 billion. Thus, RCEP has greater impact than the CPTPP, especially for RCEP member countries. The two agreements together come close to offsetting the negative effects of the Trade War on global incomes.

There are several reasons why RCEP generates larger results than the CPTPP, despite the fact that the latter is a more ambitious agreement. First, while most RCEP member-economies already had FTAs in place, this was not true for Northeast Asia, which includes the largest economies in the RCEP region; the exports of China, Japan and Korea constitute almost two-thirds of the RCEP total, one-half more than total

<sup>14</sup> Using a similar model, but without endogenous labor effects and with a different template for RCEP, we also estimate (Petri and Plummer, 2020) a scenario in which China-US trade policies revert to the status quo prior to the Trade War. That outcome appears increasingly unlikely today.



Table 3. Income Effects of Asia and Pacific Policies

	2030 Income	Incremental Income (\$ billion)			Percent Income Change (%)		
		US-China Trade War	CPTPP	RCEP	US-China Trade War	CPTPP	RCEP
<b>Americas</b>	<b>39,569</b>	<b>6</b>	<b>60</b>	<b>3</b>	<b>0.01</b>	<b>0.15</b>	<b>0.01</b>
Canada	2,717	6	26	1	0.23	0.96	0.02
Chile	463	-1	4	0	-0.18	0.82	0.03
Colombia	684	1	0	0	0.12	0.00	0.03
Mexico	2,169	29	21	1	1.33	0.98	0.03
Peru	442	1	12	0	0.16	2.64	0.00
United States	25,754	-41	-4	0	-0.16	-0.01	0.00
Latin America nie	7,341	11	1	1	0.14	0.01	0.01
<b>Asia</b>	<b>50,659</b>	<b>-490</b>	<b>91</b>	<b>234</b>	<b>-0.97</b>	<b>0.18</b>	<b>0.46</b>
Brunei Darussalam	31	0	1	0	-1.28	3.01	0.53
China	27,839	-515	-14	127	-1.85	-0.05	0.46
Hong Kong	461	-25	2	2	-5.42	0.38	0.42
India	5,487	17	-5	-7	0.31	-0.09	-0.13
Indonesia	2,192	3	-2	4	0.15	-0.09	0.18
Japan	4,924	7	57	60	0.13	1.17	1.22
Korea	2,243	7	-4	28	0.31	-0.16	1.27
Malaysia	675	4	29	7	0.60	4.36	1.03
Philippines	680	3	0	3	0.43	-0.05	0.39
Singapore	485	-3	15	0	-0.70	3.14	0.05
Taiwan	776	0	0	-4	-0.04	-0.02	-0.47
Thailand	812	6	-5	7	0.68	-0.67	0.88
Viet Nam	497	5	17	5	1.01	3.38	0.97
ASEAN nie	283	1	0	2	0.29	-0.06	0.56
Asia nie	3,272	2	0	0	0.07	0.00	0.01
<b>Oceania</b>	<b>2,854</b>	<b>-2</b>	<b>19</b>	<b>2</b>	<b>-0.07</b>	<b>0.65</b>	<b>0.08</b>
Australia	2,590	-2	15	2	-0.09	0.58	0.06
New Zealand	264	0	4	1	0.06	1.38	0.28
<b>Rest of the World</b>	<b>40,720</b>	<b>-28</b>	<b>19</b>	<b>24</b>	<b>-0.07</b>	<b>0.05</b>	<b>0.06</b>
Africa (Sub-Sahara)	4,068	4	0	1	0.09	0.00	0.01
Europe	23,189	-12	14	14	-0.05	0.06	0.06
EMENA	10,001	-17	4	7	-0.17	0.04	0.07
Russian Federation	3,371	-3	1	2	-0.09	0.02	0.04
Others	90	0	0	0	0.52	0.12	0.11
<b>WORLD</b>	<b>133,801</b>	<b>-514</b>	<b>188</b>	<b>263</b>	<b>-0.38</b>	<b>0.14</b>	<b>0.20</b>
<i>Memorandum</i>							
RCEP15 members	43,516	-486	113	245	-1.1	0.3	0.6

ASEAN = Association of Southeast Asian Nations, CPTPP = Comprehensive and Progressive Agreement for Trans-Pacific Partnership, EMENA = Europe, Middle East, and North Africa, nie = not included elsewhere, RCEP = Regional Comprehensive Economic Partnership, US = United States.

Source: Authors' simulations.

Table 4. Export Effects of Asia and Pacific Policies

	2030 Exports	Incremental Exports (\$ billion)			Percent Export Change (%)		
		US-China Trade War	CPTPP	RCEP	US-China Trade War	CPTPP	RCEP
<b>Americas</b>	<b>7,068</b>	<b>-379</b>	<b>78</b>	<b>-4</b>	<b>-5.4</b>	<b>1.1</b>	<b>-0.1</b>
Canada	835	8	40	-1	1.0	4.8	-0.1
Chile	147	-2	6	-1	-1.2	4.4	-0.4
Colombia	120	-1	0	0	-0.5	0.1	0.0
Mexico	670	32	25	-1	4.8	3.8	-0.2
Peru	135	-1	12	0	-0.6	9.2	-0.2
United States	3,906	-411	-8	-2	-10.5	-0.2	-0.1
Latin America nie	1,255	-6	2	1	-0.4	0.1	0.1
<b>Asia</b>	<b>12,905</b>	<b>-522</b>	<b>187</b>	<b>496</b>	<b>-4.0</b>	<b>1.4</b>	<b>3.8</b>
Brunei Darussalam	16	0	1	0	-1.6	3.6	0.6
China	4,976	-506	-6	234	-10.2	-0.1	4.7
Hong Kong	357	-11	1	-1	-3.0	0.3	-0.4
India	1,360	0	-3	-5	0.0	-0.2	-0.4
Indonesia	446	-2	-3	13	-0.5	-0.6	2.8
Japan	1,190	0	100	133	0.0	8.4	11.2
Korea	1,089	0	-6	65	0.0	-0.5	6.0
Malaysia	491	3	45	12	0.7	9.3	2.5
Philippines	184	1	0	7	0.7	-0.1	3.7
Singapore	470	-2	30	-2	-0.4	6.4	-0.5
Taiwan	506	-4	0	-8	-0.8	0.0	-1.5
Thailand	561	3	-7	28	0.6	-1.2	4.9
Viet Nam	357	2	35	16	0.4	9.7	4.4
Other ASEAN	93	0	0	4	-0.1	-0.5	4.5
Asia nie	810	-7	1	1	-0.9	0.1	0.1
<b>Oceania</b>	<b>673</b>	<b>-10</b>	<b>29</b>	<b>4</b>	<b>-1.4</b>	<b>4.3</b>	<b>0.6</b>
Australia	589	-9	24	3	-1.5	4.0	0.6
New Zealand	84	-1	5	1	-0.9	5.9	1.2
<b>Rest of the World</b>	<b>15,503</b>	<b>-143</b>	<b>19</b>	<b>0</b>	<b>-0.9</b>	<b>0.1</b>	<b>0.0</b>
Africa (Sub-Saharan)	883	-6	1	1	-0.7	0.1	0.1
Europe	9,706	-76	10	-6	-0.8	0.1	-0.1
EMENA	4,021	-52	6	4	-1.3	0.1	0.1
Russian Federation	851	-9	1	1	-1.0	0.1	0.1
Others	43	0	0	0	-0.7	0.4	-0.1
<b>WORLD</b>	<b>36,149</b>	<b>-1,053</b>	<b>312</b>	<b>496</b>	<b>-2.9</b>	<b>0.9</b>	<b>1.4</b>
<i>Memorandum</i>							
RCEP15 members	10,545	-510	217	514	-4.8	2.1	4.9

ASEAN = Association of Southeast Asian Nations; CPTPP = Comprehensive and Progressive Agreement for Trans-Pacific Partnership; EMENA = Europe, Middle East, and North Africa; nie = not included elsewhere; Other ASEAN = Cambodia, the Lao People's Democratic Republic, and Myanmar; RCEP = Regional Comprehensive Economic Partnership; US = United States.

Source: Authors' simulations.

CPTPP exports. Second, the share of intra-regional trade in RCEP is higher than it is in CPTPP, leading to larger effects even if CPTPP barrier cuts were generally higher. Third, initial protection levels in RCEP are higher on average than they are for the CPTPP economies.

Income effects vary substantially across countries (Table 3). The losses from the trade war are most severely felt by China (−\$515 billion) and the United States (−\$41 billion), and neither the CPTPP nor RCEP offset these losses for either country.<sup>15</sup> The largest gains from the CPTPP flow mainly to Japan, Malaysia, Vietnam and Singapore, and some North American countries, while those from RCEP flow to China, Japan, Korea and, in percentage terms, to several Southeast Asian economies. For China, the gains from RCEP (\$127 billion) cover only about one-quarter of the losses imposed by the trade war. Most other East Asian countries, however, are in the end well ahead from results projected under the baseline scenario.

Trade effects follow similar patterns with interesting differences (Table 4). Again China and the United States suffer the most significant losses from the trade war, which reduces US trade (−\$411 billion) nearly as much as China's trade (−\$506 billion). However, China will recapture almost half of these losses through RCEP, while the United States will suffer trade diversion from both new agreements (it is neither a member of the CPTPP nor RCEP). Malaysia, Thailand and Vietnam, will gain marginally from the trade war and substantially from the CPTPP and RCEP.

These results are broadly similar to those of other recent studies of the CPTPP and RCEP agreements, although comparisons are complicated by differences in assumptions. Ferrantino et al. (2020) use the World Bank's LINKAGE model and report aggregate income gains for the CPTPP as 0.4% of members' incomes, and for RCEP (including India) as 1.5% of members' incomes. Using a GTAP-based model, the Monetary Authority of Singapore (2021) reports gains based only on tariff reductions from RCEP (excluding India) at 0.4% of the members' GDP after 10 years but notes that RCEP's rules of origin would add substantial additional value. In this study, the income effects of the CPTPP are projected to be 1.1% of the incomes of members, and of RCEP excluding India to be 0.6% of the incomes of members (Table 3). The Institute of Developing Economies (IDE) employs its Economic Geography Simulation Model (IDE-GEM) to estimate the effects of RCEP on Northeast Asian

<sup>15</sup> Chinese exports to the US are much larger than US exports to China, hence more Chinese trade faces rising US barriers than vice versa.

economies and calculates income increases of 0.66%, 0.24% and 0.13% for Japan, Korea and China, respectively. These are less than the estimates in Table 3, but the IDE study examines only the effects of tariff liberalization (Kumagai and Hayakawa, 2021). An earlier study by Itakura and Lee (2019) uses a GTAP-based model to estimate the economic effects of the CPTPP, RCEP, and other configurations with a focus on supply chains. While that study is not directly comparable to ours, the magnitude of effects on individual countries are similar to results in Table 3. Finally, Kawasaki (2018) uses a GTAP based model to estimate the effects of various Asia-Pacific policy innovations, including several TPP scenarios and RCEP (with India), with somewhat larger effects than the results in Table 3 due to the assumption of much higher non-preferential nontariff barrier spillover effects, as noted above.

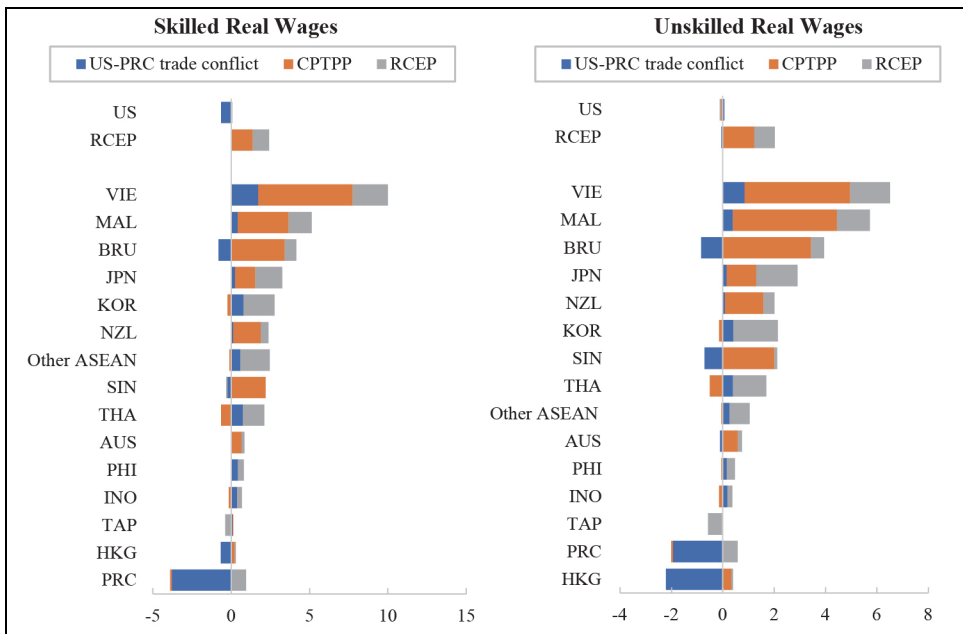
## *2. Labor Market Implications of Trade Policy Developments*

Popular discussions of trade policy often emphasize a job creation objective, even though economic models seldom attribute long-run employment effects to trade policies. Regardless of trade policy, an economy should be able to achieve normal employment of labor endowments, in the long run, through market forces and/or macroeconomic policies (Krugman, 1993). The benefits of trade policy instead reflect *shifts* in employment from low-productivity to high-productivity jobs. However, as this happens, trade agreements can raise real wages and, in some cases, especially low-income countries, such wage increases will induce workers to enter the formal labor markets and thus expand labor endowments. Given the potential relevance of this mechanism to RCEP, this study endogenizes skilled and unskilled labor supplies by relating changes in their levels to projected changes in real wages (see Appendix A).

To examine the results of this mechanism, projected values of real wage changes are summarized in Figure 1. Real wage changes generally correspond to changes in incomes reported in Table 3 but are typically larger. The trade war scenario (first bar in Figure 1) depresses wages, especially for China, the US, and their close trade partners. It raises wages in a few countries, such as Viet Nam, that benefit because they compete with China or the US. The CPTPP (second bar) and RCEP (third bar) scenarios increase the average skilled wages of RCEP members by 1.3% and 1.1%, respectively. These effects are especially high for trade-dependent economies like Viet Nam, increasing its skilled wages by 6.0% and 2.3%, respectively. Unskilled wage changes are distributed similarly across countries but are smaller in magnitude.

The employment effects of the scenarios are reported in Figure 2. The trade war (first bar) by itself will affect global employment negatively (-3 million jobs) but will be offset by increases of 1.5 million and 2.6 million jobs created by the CPTPP (second bar) and RCEP (third bar), respectively. China will be especially hard hit by the trade war (-4.8 million jobs) and to a lesser extent by the CPTPP (-159,000), but it will gain 1.4 million jobs due to RCEP. India will gain jobs (678,000) due to the trade war but lose nearly all of these (438,000) as a result of the CPTPP and RCEP. Viet Nam will achieve the largest percentage increases from the three scenarios combined (1.8 million jobs), reflecting its competitive position relative to China and its membership in both the CPTPP and RCEP agreements. Malaysia, Japan and New Zealand will have smaller, but also positive gains from the combined policy changes.

Figure 1. Real Returns to Labor under Asia and Pacific Policies (% Changes in 2030)



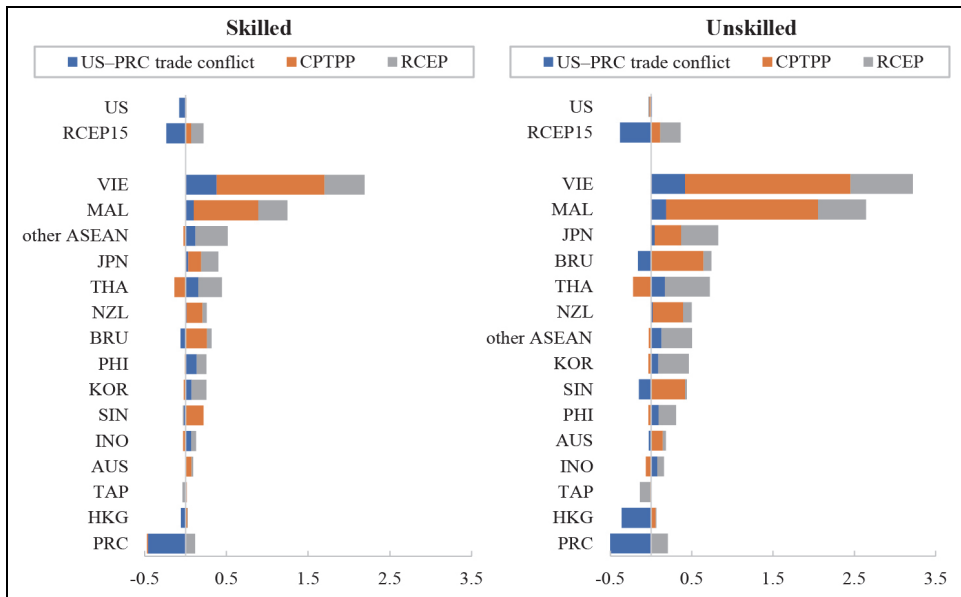
ASEAN = Association of Southeast Asian Nations; AUS = Australia; BRU = Brunei Darussalam; PRC = People’s Republic of China; CPTPP = Comprehensive and Progressive Agreement for Trans-Pacific Partnership; HKG = Hong Kong; INO = Indonesia; JPN = Japan; KOR = Republic of Korea; MAL = Malaysia; NZL = New Zealand; Other ASEAN = Cambodia, the Lao People’s Democratic Republic, and Myanmar; PHI = Philippines; RCEP15 = Regional Comprehensive Economic Partnership (15 members); SIN = Singapore; TAP = Taiwan; THA = Thailand; VIE = Viet Nam; US = United States.

Source: Authors’ calculations.

### 3. Sources of Income and Trade Gains

The results in this paper—including those already reported above—ultimately depend on the changes in trade barriers operating in the model. These are derived from the trade policy provisions outlined in Tables 1 and 2, translated into quantitative tariff and nontariff barriers (expressed in terms of ad valorem tariff equivalents) in the model. With simulations of different subsets of changes, it is also possible to pinpoint the source of aggregate effects—that is, how individual policy changes that account for overall income and trade gains.

Figure 2. Employment Effects under Asia and Pacific Policies  
(% of 2030 Baseline Employment)



ASEAN = Association of Southeast Asian Nations; AUS = Australia; BRU = Brunei Darussalam; PRC = People’s Republic of China; CPTPP = Comprehensive and Progressive Agreement for Trans-Pacific Partnership; HKG = Hong Kong; INO = Indonesia; JPN = Japan; KOR = Republic of Korea; MAL = Malaysia; NZL = New Zealand; Other ASEAN = Cambodia, the Lao People’s Democratic Republic, and Myanmar; PHI = Philippines; RCEP15 = Regional Comprehensive Economic Partnership (15 members); SIN = Singapore; TAP = Taiwan; THA = Thailand; VIE = Viet Nam; US = United States.

Notes: Estimated employment based on global employment data sources. Division into skilled and unskilled employment based on CGE model. Skilled and unskilled employment increases based on RCEP model simulation. Other ASEAN includes Cambodia, Lao People’s Democratic Republic, and Myanmar.

Source: Authors’ calculations.

We begin by examining how barriers that apply to *intra-RCEP* trade will change under the three policy scenarios in Table 5. (Table 6 reports similar barrier changes but disaggregated by export sector.) This table shows the barriers that RCEP members apply to goods imported from other RCEP partners. Baseline values—what these barriers would be in 2030 without policy changes—are in the initial columns of the sections of Table 5 that show tariff, nontariff, and total barriers. The next two columns in these sections show how barriers will be changed by the CPTPP (policy actions by those RCEP members that are also members in the CPTPP) and by RCEP. There is no column for changes due to the trade war, since the policy changes in the scenario only apply to China-US trade, which is not *intra-RCEP* trade. Of course, those changes too will ultimately affect significantly global trade, including trade among RCEP members.

Table 5. Barriers Applied to RCEP Exports in Intra-RCEP Trade, by Exporter  
(Unweighted Percentage Points in 2030)

Exporter	Tariffs			NonTariff Barriers			Total Barriers		
	Baseline	$\Delta$ CPTPP	$\Delta$ RCEP	Baseline	$\Delta$ CPTPP	$\Delta$ RCEP	Baseline	$\Delta$ CPTPP	$\Delta$ RCEP
China	3.0	0.0	-1.0	8.8	-0.1	-0.7	11.8	-0.1	-1.7
Japan	3.2	-0.6	-1.3	10.5	-0.8	-1.3	13.7	-1.3	-2.6
Korea	2.3	0.0	-1.0	10.3	-0.1	-1.0	12.7	-0.1	-2.0
Brunei	0.4	-0.1	-0.1	15.2	-1.0	-0.4	15.6	-1.0	-0.5
Indonesia	3.4	0.0	-1.5	10.4	0.0	-0.3	13.8	0.0	-1.7
Malaysia	1.0	-0.2	-0.3	10.3	-0.4	-0.3	11.3	-0.6	-0.5
Philippines	1.6	0.0	-0.6	10.4	0.0	-0.3	11.9	0.0	-0.9
Singapore	2.1	-0.3	-0.6	9.1	-0.3	0.0	11.2	-0.6	-0.6
Thailand	3.1	0.0	-1.3	10.3	0.0	-0.3	13.4	0.0	-1.6
Vietnam	2.5	-0.2	-0.9	10.2	-0.5	-0.3	12.7	-0.7	-1.2
Other ASEAN	2.7	0.0	0.0	15.0	-0.3	-0.2	17.7	-0.3	-0.2
Australia	2.9	-0.7	-0.8	9.1	-0.3	0.0	12.0	-1.0	-0.8
New Zealand	6.8	-0.6	-3.2	12.0	-1.3	-0.8	18.8	-1.9	-4.0
RCEP Average	3.1	-0.3	-1.2	10.2	-0.4	-0.7	13.3	-0.7	-2.0

Note: The trade war scenario only affects barriers between China and the US and is not included among *intra-RCEP* barriers.

Source: Authors' simulations.

As the last line of Table 5 indicates, the average tariffs applied to *intra-RCEP* trade would be 3.1 percent in 2030 on the baseline and would fall by 0.3 percent and 1.2 under the CPTPP and RCEP, or by a total 1.5 percent. NTBs would be 10.2 percent

on the baseline and would fall by a total of 1.1 percent. Thus, total barriers (the sum of tariffs and NTBs) would be 13.3 percent and fall by a total of 2.7 percent. Note that tariff reductions are larger than NTB reductions overall even though initial NTBs are higher than tariffs; NTBs are notoriously hard to cut and negotiations in a diverse context often make more progress on tariffs than on nontariff issues.

The barriers applied to Northeast Asia's three large economies—China, Japan, and Korea—are among those that decline the most, since RCEP will be the first trade agreement that fully spans these countries (Table 5). In fact, given the large volume of trade among them, weighted average reductions, unlike the unweighted averages calculated in Table 5, would show even greater declines. By contrast, intra-RCEP barriers against the exports of ASEAN economies are generally smaller on the baseline and fall relatively little, since these reflect relatively deep prior reductions through existing trade agreements.

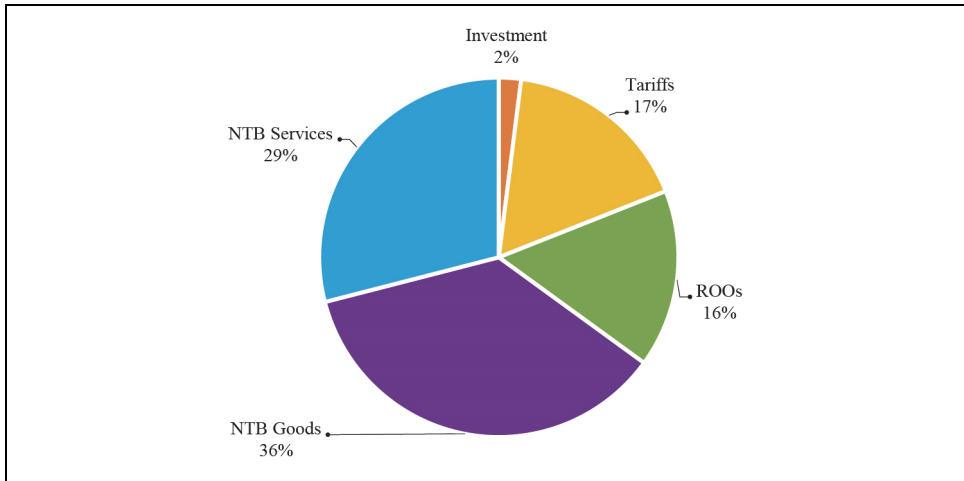
What parts of the policies simulated are most responsible for their overall impact? We can look “inside” each scenario by simulating the effects of different liberalization instruments as if they were applied individually. For example, Figure 3 decomposes the global income effects of RCEP by instrument—changes in tariffs, changes in nontariff barriers in goods and in services, changes in rules-of-origin, and changes in investment barriers.

The striking implication of Figure 3 is that reductions in nontariff barriers drive the ultimate value added of the RCEP agreement, accounting for about two-thirds of total effects. The roles of tariffs and rules-of-origin at 17% and 16% are more modest, and investment is only projected to contribute marginally (2%). This finding is consistent with the long history of trade policy changes that have sharply reduced tariff barriers in recent decades but also created new layers of behind-the-border measures—including product standards, marketing and manufacturing regulations, and other administrative requirements—now associated with trade.

In contrast to global income, trade effects are dominated by changes in tariffs and rules of origin (Figure 4). The difference lies in the still-dominant role of goods in world trade, and particularly goods that have relatively low NTBs. This effect is amplified by the extensive double-counting of intermediate goods involved in supply-chain trade. The outsized effect of tariffs on generating goods trade may also explain why tariffs and rules of origin receive so much attention from trade negotiators.



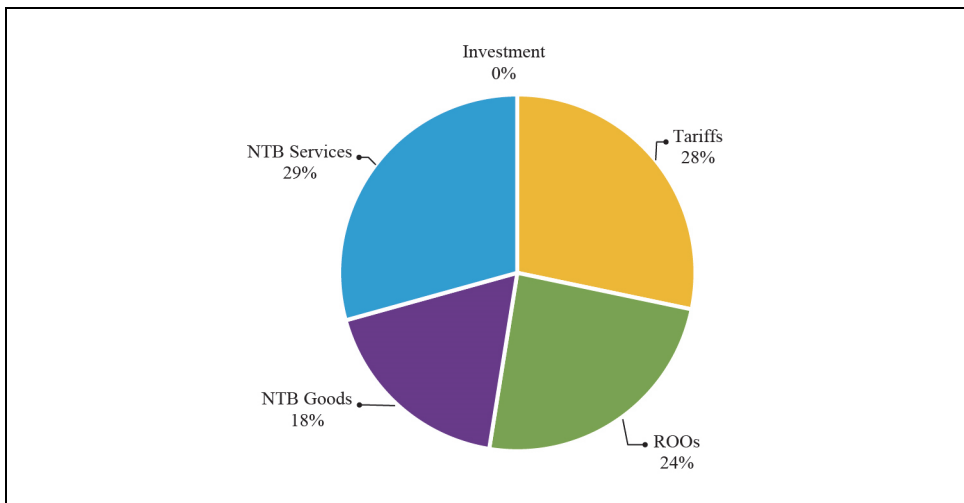
Figure 3. Composition of Global Income Effects of RCEP, by Liberalization Instrument



NTB = Nontariff Barrier, RCEP = Regional Comprehensive Economic Partnership, ROOs = Rules of Origins.

Source: Authors' calculations.

Figure 4. Composition of the Global Trade Effects of RCEP, by Liberalization Instrument



NTB = Nontariff Barrier, RCEP = Regional Comprehensive Economic Partnership, ROOs = Rules of Origins.

Source: Authors' calculations.

Since there is little double-counting in services trade (these consists mostly of value added), the contribution of NTBs on services is approximately the same in both income and trade accounts (Figures 3 and 4). In addition, services liberalization contributes to income even without trade, by stimulating productivity gains by domestic service providers.

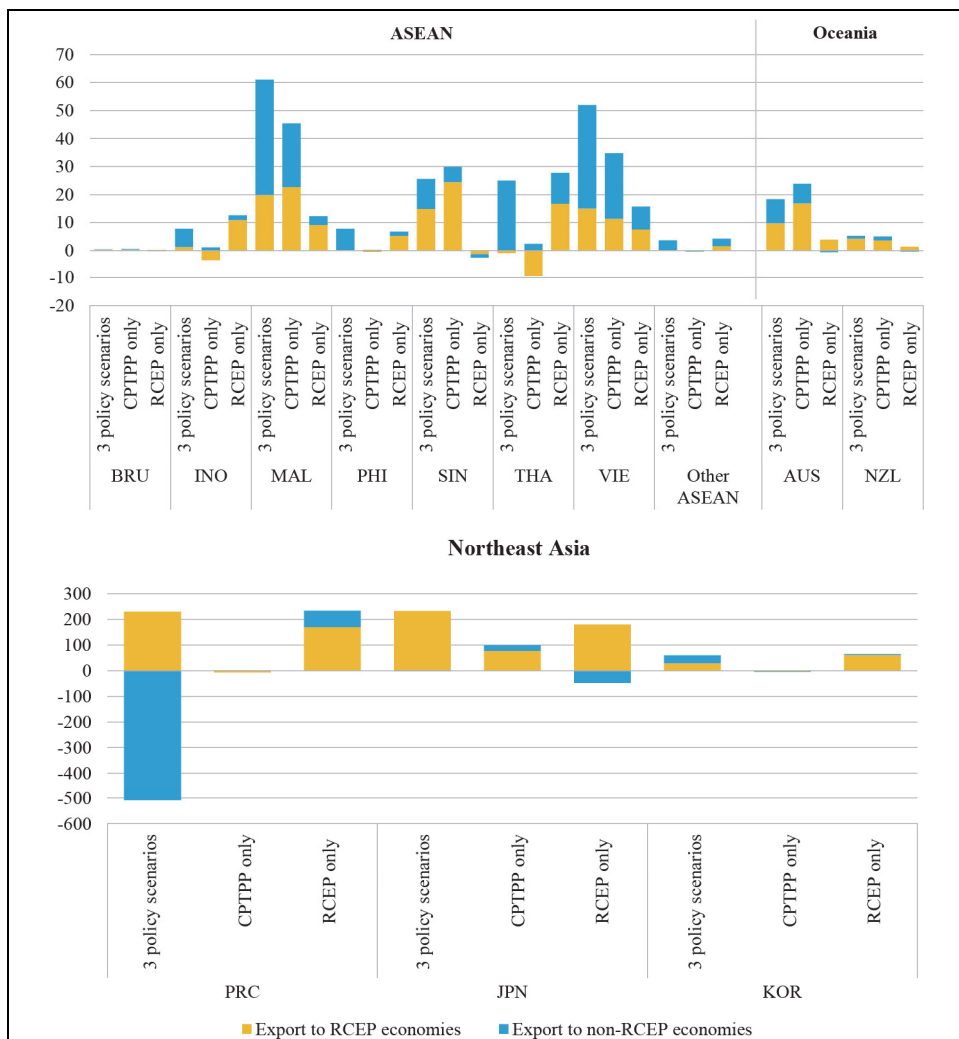
Figures 3 and 4 demonstrate that the RCEP agreement's full benefits will require sustained efforts to implement reductions in nontariff barriers to trade. Unlike tariff cuts, reductions in these barriers are hard to monitor. New approaches are required to control behind-the-border nontariff restrictions, including regional cooperation on trade facilitation, the alignment of standards, the acceptance of foreign certification, and so on. To drive these changes, the RCEP agreement created regular ministerial meetings and five joint committees. Using this mechanism will be critical to RCEP's success and will likely depend on leadership provided by the group's large Northeast Asian members. Their reforms and policies will set expectations for implementation throughout the region.

#### *4. How Policy Changes will Affect Trade Patterns*

The CPTPP and RCEP agreements will shift trade from other partners toward members; taken together, the three policy scenarios accelerate East Asian economic integration. Figure 5 summarizes the effects of the three policy changes on overall trade by country, grouped by RCEP subregions.

The largest effects are visible for the Northeast Asian economies, especially China and Japan (note that the scale of the figure is ten times as large as for other subregions). Chinese exports to non-RCEP economies will decline especially sharply (-\$508 billion), mainly due to the trade war with the United States. China also shows a substantial increase in trade with RCEP economies (\$231 billion). Chinese, Japanese and Korean exports to RCEP partners will increase especially as a result of RCEP. For ASEAN and Oceania, export increases to non-RCEP countries are relatively large, due to capturing some of China's trade. The CPTPP stimulates integration among RCEP members, including especially Japan, Malaysia and Viet Nam. It also results in modest trade diversion for non-CPTPP countries, including Indonesia and Thailand.

Figure 5. Export Changes under Asia and Pacific Policies  
(Changes in RCEP Members' Exports in 2030, by Destination, \$ billion)



ASEAN = Association of Southeast Asian Nations; AUS = Australia; BRU = Brunei Darussalam; PRC = People's Republic of China; CPTPP = Comprehensive and Progressive Agreement for Trans-Pacific Partnership; HKG = Hong Kong; INO = Indonesia; JPN = Japan; KOR = Republic of Korea; MAL = Malaysia; NZL = New Zealand; Other ASEAN = Cambodia, the Lao People's Democratic Republic, and Myanmar; PHI = Philippines; RCEP = Regional Comprehensive Economic Partnership; SIN = Singapore; THA = Thailand; VIE = Viet Nam; US = United States.

Note: The three policy scenarios refer to combined impact of US-China trade conflict, CPTPP, and RCEP on exports.

Source: Authors' calculations.

### 5. Sectoral Effects of Trade Policies

The sectoral results offer further evidence on integration across East Asia, in part focused on regional supply chains. Table 6 shows how tariffs and nontariff barriers will change on intra-RCEP trade, now disaggregated by products. (There is no column for the trade war since that scenario will not change intra-RCEP barriers.) The CPTPP and RCEP will reduce barriers by approximately 1/3 for manufacturing sectors, with larger cuts attributable to RCEP than to the CPTPP. Barriers are highest on food-related production and services in the baseline and fall most on primary products.

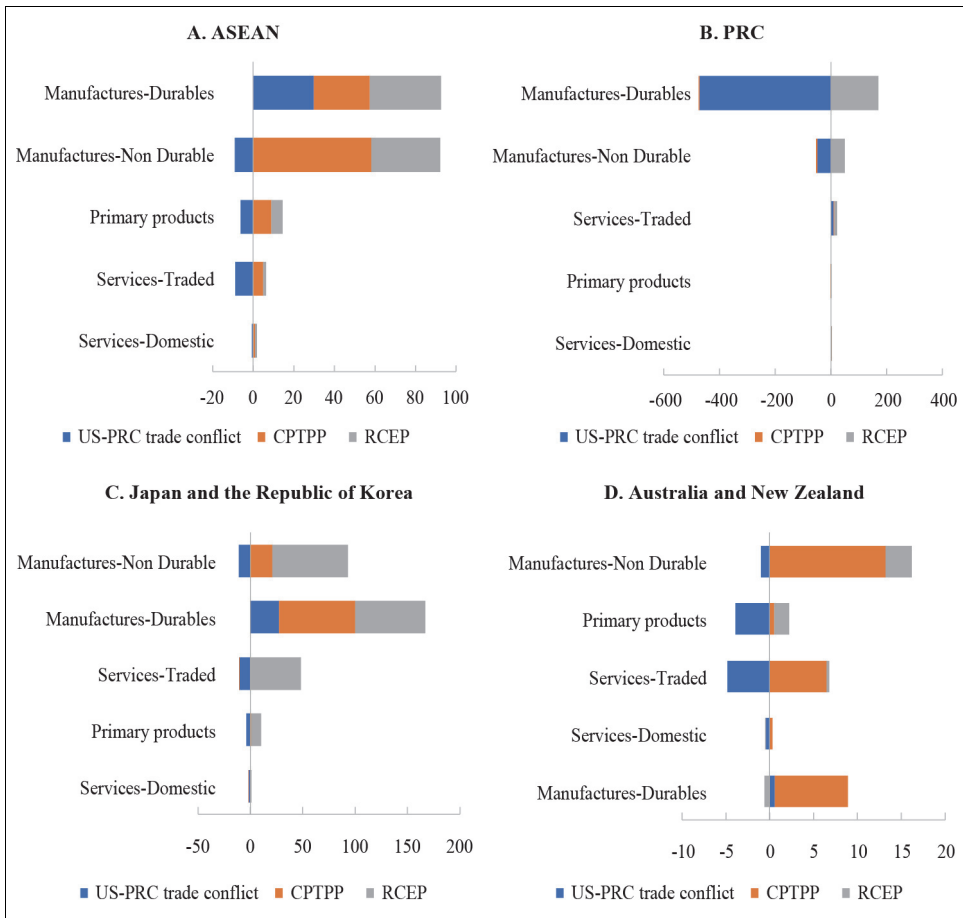
Table 6. Barriers Applied to RCEP Exports in Intra-RCEP Trade, by Sector  
(Unweighted Averages in 2030, Percentage Points)

Exporting Sector	Tariffs			Non-Tariff Barriers			Total Protection		
	Baseline	ΔCPTPP	ΔRCEP	Baseline	ΔCPTPP	ΔRCEP	Baseline	ΔCPTPP	ΔRCEP
Grains	22.7	-0.1	-11.3	14.0	-0.5	-1.3	36.7	-0.5	-12.6
Other Agriculture	13.7	-0.1	-5.6	7.2	-0.3	-0.5	20.9	-0.4	-6.0
Mining	1.1	-0.1	-0.4	1.8	-0.1	-0.1	2.9	-0.2	-0.5
Food Processing	9.1	-0.6	-3.0	13.5	-0.6	-1.0	22.6	-1.3	-4.0
Textiles	3.1	-0.2	-1.0	3.4	-0.3	-0.2	6.5	-0.5	-1.2
Apparel	5.4	-0.8	-1.6	1.5	-0.1	-0.1	6.8	-0.9	-1.7
Chemicals	2.0	-0.2	-0.6	4.1	-0.3	-0.2	6.1	-0.5	-0.8
Metals	1.1	-0.1	-0.3	3.9	-0.1	-0.3	5.0	-0.2	-0.6
Vehicles	4.1	-0.4	-1.2	1.8	-0.1	-0.1	5.9	-0.5	-1.3
Electrical Equipment	0.9	0.0	-0.3	3.3	-0.1	-0.1	4.2	-0.1	-0.4
Machinery	2.0	-0.2	-0.6	6.2	-0.2	-0.2	8.1	-0.4	-0.8
Other Manufacturing	2.4	-0.2	-0.6	3.1	-0.1	-0.2	5.4	-0.3	-0.9
Utilities	0.0	0.0	0.0	0.8	0.0	0.0	0.8	0.0	0.0
Construction	0.0	0.0	0.0	32.9	-0.3	-1.3	32.9	-0.3	-1.3
General Services	0.0	0.0	0.0	20.4	-0.4	-1.5	20.4	-0.4	-1.5
Communications	0.0	0.0	0.0	20.7	-0.9	-0.8	20.7	-0.9	-0.8
Finance	0.0	0.0	0.0	26.4	-1.1	-0.9	26.4	-1.1	-0.9
Private Services	0.0	0.0	0.0	25.3	-0.9	-0.7	25.3	-0.9	-0.7
Social Services	0.0	0.0	0.0	24.0	-0.9	-0.6	24.0	-0.9	-0.6
EXPORT GROUPS									
Primary goods	11.7	-0.2	-5.1	9.1	-0.4	-0.7	20.8	-0.6	-5.8
Light Manufactures	3.6	-0.4	-1.1	2.6	-0.1	-0.2	6.2	-0.5	-1.3
Advanced									
Manufactures	2.0	-0.2	-0.6	3.9	-0.2	-0.2	5.9	-0.4	-0.8
Traded Services	0.0	0.0	0.0	23.2	-0.8	-1.0	23.2	-0.8	-1.0
Other Services	0.0	0.0	0.0	19.5	-0.4	-0.8	19.5	-0.4	-0.8

Source: Authors' calculations

Tariffs and nontariff barriers on manufactured goods are relatively low on the baseline, but still fall significantly for manufactured goods like textiles, apparel and vehicles. Both the CPTPP and RCEP lower intra-RCEP barriers in virtually all sectors, with RCEP having greater impact on primary goods and services due to its wider reach across the region.

Figure 6. Sectoral and Regional Export Effects of Asia and Pacific Policies (Export Changes in 2030, \$ billion)



Source: Authors' calculations

Export effects in broad sectors and major country groupings are summarized in Figure 6. The clear outlier among the scenarios is the trade war, which has major negative effects on durable manufacturing in China, accounting for the lion's share of China's trade losses. However, the trade war shifts exports to China's competitors in RCEP, with ASEAN, Japan and Korea all benefiting. It also reduces exports of non-durable manufactures for all groupings, reflecting contracting import demand from China. For similar reasons, services trade is also negatively affected.

In addition, Figure 6 shows that the CPTPP and RCEP more than offset the effects of the trade war for RCEP members save China. The CPTPP raises exports of manufactures in every subgrouping of the RCEP region, including especially for Japan. RCEP produces similarly positive effects for all subgroups, with manufactures representing a high share of exports by ASEAN, Japan and Korea. China experiences slight trade diversion in manufactures due to the CPTPP, but this is dwarfed by the positive effects experienced by RCEP. Exports of traded services are significant mainly for Australia and New Zealand, mostly due to liberalization associated with the CPTPP. Primary products also play a modest role, benefiting Australia, New Zealand and ASEAN.

The dominant role of manufacturing underlines the importance of new regional value chains created by recent policy changes. The trade war shifts manufacturing value chains toward Asian partners, and a large share of the trade created by the CPTPP and RCEP focuses on manufactured products. This reflects, in part, the focus on goods-related barriers and ROO provisions in RCEP. In a region well known for multiple zones of manufacturing excellence, RCEP provides a new policy framework for competition, specialization, and globally competitive manufacturing. If the agreement is effectively implemented, this framework will not only benefit the manufacturing powerhouses of Northeast Asia but also energize globally competitive production centers elsewhere in the region.

## V. Conclusion

The goals of the RCEP agreement are stipulated in the Agreement's first chapter:

- (a) *establish a modern, comprehensive, high-quality, and mutually beneficial economic partnership framework to facilitate the expansion of regional trade and investment and contribute to global economic growth and development,*

- taking into account the stage of development and economic needs of the Parties especially of Least Developed Country Parties;*
- (b) progressively liberalise and facilitate trade in goods among the Parties through, inter alia, progressive elimination of tariff and nontariff barriers on substantially all trade in goods among the Parties;*
  - (c) progressively liberalise trade in services among the Parties with substantial sectoral coverage to achieve substantial elimination of restrictions and discriminatory measures with respect to trade in services among the Parties; and*
  - (d) create a liberal, facilitative, and competitive investment environment in the region, that will enhance investment opportunities and the promotion, protection, facilitation, and liberalisation of investment among the Parties.*

In short, the RCEP agreement is designed to enhance regional integration *progressively*, underscoring that the current accord is work in progress. As noted above, ASEAN-centric agreements tend to improve over time, as reflected in several provisions of the RCEP agreement. RCEP is also outward-oriented and inclusive; any economy could potentially enter negotiations soon after it takes effect.

This study shows that the benefits of the RCEP agreement could be substantial, particularly for Northeast Asia. While less comprehensive than the CPTPP, RCEP will generate global income gains that are almost twice as great, due to its scale. Indeed, Japan, a member of both the CPTPP and RCEP, will gain as much from the latter as the former. Trade diversion will be minimal, with the most-affected economies of Taiwan and India together losing \$11 billion, or only 4% of estimated global gains. At the sectoral level, exports and imports of non-durable and durable manufactures will experience the most growth and the new agreements will strengthen the region's manufacturing supply chains, raise productivity, and increase wages and employment. RCEP will make East Asia a more formidable global competitor.

Moreover, RCEP is intended as a stepping-stone toward more comprehensive integration in Asia and the Pacific, much as the CPTPP served to stimulate RCEP itself. RCEP deliberately left room for improvements. While it exempted members at early stages of development from some provisions through flexibility clauses, it expects all members to begin adopting RCEP's framework once the agreement enters into force and, in time, to pursue its full integration mandate.

This stepping-stone approach reflects the priorities outlined by Asia-Pacific Economic Cooperation (APEC) countries at the APEC Summit in November 2010 in Yokohama, Japan. In charting a way toward a region of open trade and investment and a Free-Trade Area of the Asia-Pacific, APEC leaders envisioned two tracks: an Asia-Pacific track through the TPP, which had started negotiations at that time, and an Asian track, which would take less ambitious steps toward the same endpoint, a high-quality Free-Trade Area of the Asia-Pacific. This Asian track eventually became RCEP. Much has changed since the 2010 Summit and the goal of starting negotiations on the Free-Trade Area of the Asia-Pacific has grown more remote, but the Asian track of the “Yokohama Vision” is well underway.

## REFERENCES

- Cecchini, P., Catinat, M. and A. Jacquemin. 1988. *The European Challenge 1992: The Benefits of a Single Market*. Aldershot, UK: Wildwood House.
- Evers, M., de Mooij, R. and D. van Vuuren. 2008. “The Wage Elasticity of Labor Supply: A Synthesis of Empirical Estimates,” *De Economist*, vol. 156, pp. 25-43.
- Ferrantino, M. J., Maliszewska, M. and S. Taran. 2020. Actual and Potential Trade Agreements in the Asia-Pacific: Estimated Effects. WB Policy Research Working Papers, no. 9496. World Bank. <<http://hdl.handle.net/10986/34940>> (accessed August 20, 2021)
- Findlay, C. and S. Urata. eds. 2010. *Free Trade Agreements in the Asia Pacific*. New Jersey: World Scientific Publisher.
- Fontagné, L., Guillin, A. and C. Mitaritonna. 2011. Estimations of Tariff Equivalents for the Services Sector. CEPII Working Paper, no. 2011-24. Centre d’Études Prospectives et d’Informations Internationales.
- Hanemann, T., Rosen, D. H., Witzke, M., Bennion, S. and E. Smith. 2021. Two-Way Street: US-China Investment Trends- 2021 Update. Rhodium Group. <<https://rhg.com/research/twowaystreet-2021/>> (accessed August 20, 2021)
- Itakura, K. and H. Lee. 2019. “Estimating the Effects of the CPTPP and RCEP in a General Equilibrium Framework with Global Value Chains.” Report presented at the 22<sup>nd</sup> Annual Conference on Global Economic Analysis. GTAP Resource, no. 5712. Center for Global Trade Analysis.
- Kawasaki, K. 2018. Economic Impact of EPAs beyond TPP11. Policy Analysis Focus, no. 18-2. National Graduate Institute for Policy Studies. <<https://www.grips.ac.jp/cms/wp-content/uploads/2018/07/PAF18-2-Economic-Impact-of-EPAs-beyond-TPP11.pdf>> (accessed August 20, 2021)



- Kawai, M. and G. Wignaraja. 2011. *Asia's Free Trade Agreements: How is Business Responding?* Cheltenham: Edward Elgar.
- Keane, M. P. and N. Wasi. 2016. "Labour Supply: The Roles of Human Capital and the Extensive Margin," *Economic Journal*, vol. 126, no. 592, pp. 578-617.
- Kee, H. L., Nicita, A. and M. Olarreaga. 2009. "Estimating Trade Restrictiveness Indices," *Economic Journal*, vol. 119, no. 534, pp. 172-99. <<https://onlinelibrary.wiley.com/doi/full/10.1111/j.1468-0297.2008.02209.x>> (accessed August 20, 2021)
- Krugman, P. R. 1993. "What Do Undergrads Need to Know about Trade?" *American Economic Review*, vol. 83, no. 2, pp. 23-26.
- Kumagai, S. and K. Hayakawa. 2021. Economic Impacts of the Regional Comprehensive Partnership: Analysis Using IDE-GSM. IDE Policy Brief, no. 147. IDE-JETRO. <<https://www.ide.go.jp/library/Japanese/Publish/Reports/AjikenPolicyBrief/pdf/147.pdf>> (accessed August 20, 2021)
- Li, M. 2018. CARD Trade War Tariffs Database (updated January 24, 2020). <<https://www.card.iastate.edu/china/trade-war-data/>> (accessed August 20, 2021)
- McClelland, R. and S. Mok. 2012. A Review of Recent Research on Labor Supply Elasticities. CBO Working Paper, no. 2012-12. Congressional Budget Office.
- McClelland, R., Mok, S. and K. Pierce. 2014. Labor Force Participation Elasticities of Women and Secondary Earners within Married Couples. CBO Working Paper, no. 2014-06. Congressional Budget Office.
- Melitz, M. J. 2003. "The Impact of Trade on Inter-Industry Reallocations and Aggregate Industry Productivity," *Econometrica*, vol. 71, no. 6, pp. 1695-1725.
- Monetary Authority of Singapore (MAS). 2021. "Box A: RCEP's Impact on Trade and Growth in the Asia Pacific," *Macroeconomic Review*, vol. 20, no. 1, pp. 25-34.
- Park, C. 2020. "Consumption, Reservation Wages, and Aggregate Labor Supply," *Review of Economic Dynamics*, vol. 37, pp. 54-80.
- Petri, P. A. and M. G. Plummer. 2016. The Economic Effects of the Trans-Pacific Partnership: New Estimates. PIIE Working Paper, no. 16-2. Peterson Institute for International Economics. <<https://www.piie.com/publications/wp/wp16-2.pdf>> (accessed August 20, 2021)
- Petri, P. A. and M. G. Plummer. 2019. China Should Join the New Trans-Pacific Partnership. PIIE Policy Brief, no. 19-1. Peterson Institute for International Economics.
- Petri, P. A. and M. G. Plummer. 2020. East Asia Decouples from the United States: Trade War, COVID-19, and East Asia's New Trade Blocs. PIIE Working Paper, no. 20-9. Peterson Institute for International Economics. <<https://www.piie.com/publications/working-papers/east-asia-decouples-united-states-trade-war-covid-19-and-east-asias-new>> (accessed August 20, 2021)

- Petri, P. A., Plummer, M. G. and F. Zhai. 2012. *The Trans-Pacific Partnership and Asia-Pacific Integration: A Quantitative Assessment*. Policy Analyses in International Economics 98. Washington D.C.: Peterson Institute for International Economics.
- Pomfret, R. 2021. “‘Regionalism’ and the Global Trading System,” *The World Economy*, vol. 44, no. 9, pp. 2496-2514.
- Sawada, Y. 2020. RCEP: What’s in It for the Asia-Pacific? Asian Development Bank. <<https://www.adb.org/news/op-ed/rcep-what-s-it-asia-and-pacific-yasuyuki-sawada>> (accessed August 20, 2021)
- Serajuddin, U. and N. Hamadeh. 2020. New World Bank Country Classifications by Income Level: 2020–2021. World Bank Data Blog. <<https://blogs.worldbank.org/opendata/new-world-bank-country-classifications-income-level-2020-2021>> (accessed August 20, 2021)
- Tan, I., Hong, K., Chiang, C. Y., Di, W., Pan, J. and W. K. Kok. 2020. Understanding the Regional Comprehensive Economic Partnership Agreement (RCEP). Baker McKenzie. <[https://www.bakermckenzie.com/-/media/files/insight/publications/2020/12/bakermckenzie\\_understandingrcep\\_dec2020.pdf?la=en](https://www.bakermckenzie.com/-/media/files/insight/publications/2020/12/bakermckenzie_understandingrcep_dec2020.pdf?la=en)> (accessed August 20, 2021)
- Todo, Y. 2013. Estimating the TPP’s Expected Growth Effects. Research Institute of Economy, Trade and Industry. <<https://www.rieti.go.jp/en/special/policy-update/048.html>> (accessed August 20, 2021)
- van der Mensbrugge, D. 2005. *Linkage Technical Reference Document*, Version 6.0. Washington D.C.: World Bank.
- Zhai, F. 2008. “Armington Meets Melitz: Introducing Firm Heterogeneity in a Global CGE Model of Trade,” *Journal of Economic Integration*, vol. 23, no. 3, pp. 575-604.

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## APPENDIX A: DESCRIPTION OF CGE MODEL EMPLOYED

### *Overview of Model and System Parameters*

The simulations in this study use a 19-sector, 29-region computable general equilibrium (CGE) model of the world economy with a long track record.<sup>16</sup> The model was initially developed by Zhai (2008) based on an early version of the World Bank's LINKAGE system (van der Mensbrugghe, 2005). It incorporates state-of-the-art production theory and allows for monopolistic competition in some goods and services with firms operating with heterogeneous productivity levels within each such sector. The model has been adapted to the analysis of free trade agreements and applied to Asia-Pacific economic integration in a variety of contexts (especially Petri et al., 2012 and Petri and Plummer, 2016). Data are derived from the GTAP dataset and other information sources through 2015. Extensive additional data have been included in a sub-model that covers the structure of protection under nearly all trade agreements concluded in the Asia-Pacific region, including the CPTPP and RCEP, as already noted in the text.<sup>17</sup>

### *Trade Policy*

Trade agreements are represented by five sets of parameters describing the structure of protection. These are the parameters varied in trade policy simulations:

- Tariffs
- Utilization rates of tariff preferences
- Nontariff barriers
- Costs associated with meeting rules of origin
- Barriers to Foreign Direct Investment

<sup>16</sup> Research using this model can be found at: [www.asiapacifictrade.org](http://www.asiapacifictrade.org).

<sup>17</sup> The RCEP text has been available since November 2020 but the actual tariff demobilization details only became available in machine-readable form very recently. The model will be updated in future using the actual tariff agreements, but it is unlikely that the results will differ much from the parameters assumed in these simulations.

The tariff reductions applied to trade flows are the product of the first two parameters, the reduction in preferential tariffs and the utilization rate of preferences.<sup>18</sup> Nontariff barriers are introduced as tariff equivalents that result in higher costs for domestic goods and services. These are modeled in part as iceberg costs, that is, reductions in productivity, and in part as rents that are shared between domestic producers and the producers of exports. We also associate productivity losses with preferential trade agreements if an agreement's strict rules of origin induce the substitution of less efficient domestic inputs for more efficient imports from partners.

Each sector-specific bilateral trade flow may be covered by multiple FTAs. In such cases, the protection level applied to the flow is the lowest available among applicable agreements.

The utilization rate of an agreement is modeled with reference to three aspects of agreements:

- Preference margin of tariffs (utilization depends positively on large margins)
- Restrictiveness of the rules of origin (ROO),<sup>19</sup> (utilization inversely with restrictiveness)
- Size of the agreement (utilization varies positively with agreement size)

The utilization rate is restricted to the range 16% - 80%.

As this discussion suggests, a score measuring the restrictiveness of ROOs of the agreement is one of the factors that determines the utilization of preferential tariffs. Stricter ROO provisions prevent more intermediate goods imports from entering under regional tariff concessions and reduce the agreement's utilization rate. This linkage provides a lever for estimating how ROOs affect trade and welfare. To assess the benefits generated by the ROO provisions of an FTA, we compare results with these provisions in place to a counterfactual that assumes that regional intermediate imports enter without benefiting from the FTAs preferential tariffs (and hence fewer and more expensive intermediate goods are imported).

On the export side, firms may also take on extra costs to meet ROOs to benefit from preferential tariffs. These include the administrative burden of meeting ROO certification and buying relatively expensive regional inputs. These costs are represented

<sup>18</sup> Data suggest that utilization rates are well below unity (Kawai and Wignaraja, 2011).

<sup>19</sup> This approach is similar to one used by Findlay and Urata (2010).

as iceberg costs added to the bilateral intermediate exports within an FTA. The size of this productivity penalty is a fraction of the export's tariff preference.

Reductions in NTBs are calculated as a product of three factors: (i) scores of each agreement in various issue areas,<sup>20</sup> (ii) policy coefficients that translate scores into reductions in different NTBs, and (iii) maximum reduction rates for each type of NTB.

Since modelling trade flows in a heterogeneous firms setting is already more complex than in a typical CGE approach, we elected to use a simple and mostly exogenous approach to represent FDI effects. The approach is based on a gravity specification to project baseline FDI stocks and uses econometric estimates to gauge how reductions in barriers due to trade scenarios affect FDI stocks. Benefits are based on the estimated FDI changes.<sup>21</sup>

### *Production and Trade*

Agriculture, mining and government services sectors are assumed to exhibit perfect competition. In these sectors a representative firm operates under constant returns to scale technology and trade is modeled using the Armington assumption for import demand. Manufacturing and private services are characterized by monopolistic competition and their structures of production and trade follow Melitz (2003). Sectors with monopolistic competition consist of continuum of firms that are differentiated by the varieties they produce and their productivity. Firms face fixed production costs, resulting in increasing returns to scale. There are also fixed costs and variable costs associated with exporting activities.

On the demand side, agents have Dixit-Stiglitz preferences over the continuum of varieties. Since each firm is a monopolist for the variety it produces, it sets the price of its product at a constant markup over marginal cost. A firm enters domestic or export markets if the net profit generated from such sales is sufficient to cover fixed cost. This zero-profit condition defines the productivity thresholds for firm's entering domestic and exports markets, and in turn determines the equilibrium distribution of non-exporting firms and exporting firms and their average productivities. Fixed export costs and variable (iceberg) export costs are set to ensure that the productivity threshold

<sup>20</sup> Based list of issues was constructed based on various issues reported in the CPTPP and RCEP agreements.

<sup>21</sup> For details on the FDI specification, see Petri et al. (2012), Appendix E.

for exporting is higher than the production threshold for domestic sales, so that only a fraction of firms with high productivity export. These firms supply both domestic and export markets. In contrast to some other applications of the Melitz model, the number of firms in each monopolistic sector is assumed to be fixed at any given time, though its sales in various markets vary.

There are five types of factors of production: capital, skilled and unskilled labor, agricultural land, and some other industry-specific natural resources. Except for natural resources, the factors are fully mobile across sectors. Production is modeled with multilevel production functions. At the top level, output is produced as a fixed combination of aggregate intermediate demand and value added. At the second level, aggregate intermediate demand is split into commodities according to Leontief technology. Value added is produced by a constant-elasticity-of-substitution (CES) capital-land bundle and aggregate labor. Finally, at the third level, aggregate labor is decomposed using a CES function into unskilled and skill labor, and the capital-land bundle is decomposed into capital and land (for the agriculture sector) or natural resources (for the mining sector).

### *Factor Markets*

Capital is treated as an exogenously-specified endowment in every year, based on the accumulation of capital through investments in previous years. After an initial year with fixed incoming capital endowments, the model determines subsequent capital endowments by adding current capital investments to the current capital stocks less depreciation. While labor is also often treated as an exogenous endowment, in the present application supplies of labor are determined endogenously as simple functions of also endogenously computed wage rates.

Demands for skilled and unskilled labor ( $D^s$ ,  $D^{us}$ ) in each region are generated through the production mechanism of the model, represented as equations that set labor demand levels as complicated functions of also endogenously determined real wages ( $W^s$ ,  $W^{us}$ ):

$$D^s = f(W^s) \quad \text{and} \quad D^{us} = f(W^{us}) \quad (A1)$$

Supplies of skilled and unskilled labor ( $S^s$ ,  $S^{us}$ ) are given by baseline projections of labor endowments ( $S^s_o$ ,  $S^{us}_o$ ) multiplied by the ratio of endogenously-determined real

wages relative to exogenous baseline real wages ( $W^s_o/W^s_o$ ,  $W^{us}_o/W^{us}_o$ ), raised to powers that represent uncompensated labor supply elasticities with respect to real wages ( $\epsilon_s$ ,  $\epsilon_{us}$ ):

$$S^s = S^s_o(W^s/W^s_o)^{\epsilon_s} \quad \text{and} \quad S^{us} = S^{us}_o(W^{us}/W^{us}_o)^{\epsilon_{us}} \quad (A2)$$

The model is completed with the usual market clearing equations for labor:

$$D^s = S^s \quad \text{and} \quad D^{us} = S^{us} \quad (A3)$$

Together, these equations determine equilibrium labor demands, labor supplies, and real wages. The specification does require a prior equilibrium baseline solution (one in which labor supplies, demands and wages satisfy an initial equilibrium path of the model). We obtain the baseline path by solving the model “backward,” that is, calculating productivity levels that achieve exogenously projected (mainly by the World Bank and the International Monetary Fund(IMF)) growth paths for GDP and factor endowments. This backward solution assures that the baseline, including the World Bank and IMF projections that gave rise to it, would be reproduced if model were operated in conventional “forward” projection mode with exogenous capital stocks and unchanged parameters.

However, changes in conditions, such as productivity shocks or trade policy shocks, lead to new equilibrium values for labor demands, labor supplies and wages. Trade policy shocks that would have caused real wages to rise sharply under fixed labor endowments would now also lead to greater labor supplies and somewhat diminished increases in real wages.

The labor supply elasticities used in the model are based on a meta-analysis of time- and country-specific estimates. The values were not derived with a formulaic aggregations of the underlying data, but were rather constructed by rounding parameters to produce smooth variations across income levels, types of labor, variable definitions, and estimation methods. Country classifications are obtained from Serajuddin and Hamadeh (2020).

Table A1. Labor Supply Elasticities  $\epsilon$ 

Country Income Class	2020 Per Capita Income	Skilled Workers	Unskilled Workers
High Income	> \$12,535	0.15	0.35
Upper Middle Income	\$4,046 - \$12,535	0.40	0.80
Lower Middle Income	\$1,036 - \$4,045	0.80	1.00
Low Income	< \$1,036	1.20	1.50

Source: meta-analysis as explained in the text.

These estimates are based on studies at the US Congressional Budget Office by McClelland and Mok (2012) and by McClelland et al. (2014), and academic papers including Evers et al. (2008). Other factor supplies such as capital and land are exogenously specified.

### *Incomes, Welfare and Closure*

Factor incomes and taxes generated from production flow to a single representative household in each region. The household maximizes utility using an Extended Linear Expenditure System (ELES). The consumption/savings decision is static. Savings enter the utility function as a good, with a price set to the average price of consumer goods. The government's consumption level is related to household welfare and is financed by income taxes on households. Government deficits or surpluses can be set exogenously. Investment demand and government consumption are specified with fixed compositions. In each sector, consumption and intermediate goods demands are defined in terms of composite goods, which are then allocated to domestic and imported varieties with Dixit-Stiglitz functions.

The welfare effects of scenarios are measured using "equivalent variations," which identifies the income required, at fixed prices, to match deviations in real expenditures from the baseline due to a scenario. These welfare effects are reported as annual dollar gains and are in some cases expressed as percentages of baseline GDP. Changes in real expenditures are normally due to changes in real output (productivity), the terms of trade (the relative value of output at international prices), and the range of product varieties available.

The model is closed by exogenously setting the net investment balances of all but one region (outflows on the capital account). The price index of US GDP serves as the numéraire.