The Regional Comprehensive Economic Partnership and its Implications for Global Trade

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Abstract

The Regional Comprehensive Economic Partnership (RCEP) free trade agreement was signed in 2020 between 15 Asia-Pacific countries and contains many of the world's largest economies, including China, Japan, South Korea, Vietnam, and others. The massive size of the agreement promises to significantly reshape the patterns of trade both regionally and globally, and quantifying the anticipated impacts of this nascent trade agreement is critical to establishing an understanding of how global trade dynamics are likely to evolve in coming decades. We explore this important and trade policy issue by quantifying the potential trade effects of RCEP, predicting counterfactual bilateral trade flows across 24 sectors for 160 trading countries using a structural gravity framework. Our findings show that the RCEP agreement yields substantial trade benefits, generating $501.5 billion in expanded trade among RCEP members, with impacts varying considerably across sectors and countries.

Keywords: Regional Comprehensive Economic Partnership; Gravity
JEL Codes: F13; F14; F17; O24

1. Introduction

Amidst the recent turmoil of international trade disputes, the COVID-19 pandemic, and other global trade disruptions which have illustrated the fragility of global supply chains, the Regional Comprehensive Economic Partnership (RCEP) free trade agreement (FTA) was signed in 2020 between 15 Asia-Pacific countries and entered into force in January 2022.[1] The RCEP is the largest free-trade area in history in terms of both economic scale, with a combined GDP of $26 trillion, and population, encompassing 2.3 billion people. Notably, RCEP is the first trade agreement that unites China, Japan, and South Korea. The agreement aims to eliminate over 90% of tariffs among member countries over the next 20 years and endeavors to deepen supply chains and production networks in Asia. The substantial size and scope of RCEP are poised to influence regional trade and investment patterns for years to come, marking a significant milestone in the evolution of the global trading system, particularly in the post-pandemic era. This paper seeks to evaluate the potential trade effects of RCEP by employing a structural gravity model framework to predict counterfactual bilateral trade flows across multiple sectors. In light of the agreement's scope and the participating countries' economic diversity, understanding the impacts of RCEP on trade dynamics is crucial for policymakers, businesses, and scholars alike. The paper aims to quantify the trade creation and reallocation effects induced by RCEP, analyzing these impacts from both sectoral and country-specific perspectives.

A limited body of work that investigates RCEP's potential impacts on its member states as well as its broader impacts on third countries has begun to take shape, though the existing evidence on the comprehensive impacts of the agreement remains limited. Most of this existing literature employs simulation techniques, such as computable general equilibrium (CGE) modeling (Itakura, 2022), to project the agreement's likely impacts. For instance, Petri and Plummer (2020) use a CGE approach to investigate the agreement's likely impacts on the United States and the European Union. Park et al. (2021) adopt a CGE model to determine that the RCEP agreement will generate income gains for member countries, with the nondurable and durable manufacturing sectors growing the most in terms of exports and imports. Zhu and Huang (2023) employ a dynamic CGE model to estimate the effects of tariff concessions under the RCEP agreement. While CGE frameworks can provide useful insights on the broad counterfactual impacts of trade policy changes such as RCEP, such approaches

[1]The agreement brings together 15 Asia-Pacific countries including China, Japan, Australia, South Korea, New Zealand, Indonesia, Laos, Malaysia, Myanmar, the Philippines, Singapore, Thailand, Vietnam, Brunei, and Cambodia. Several of these countries maintained FTAs prior to the formation of the RCEP; notably, the Association of Southeast Asian Nations (ASEAN) and the Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP).

(i) are typically constrained by their use of years-old data, thus giving an inaccurate picture of the current global market situation, and (ii) frequently rely on externally obtained values of key model parameters that can contribute to biased estimates of counterfactual trade impacts. Both of these shortcomings diminish the capacity of existing work on RCEP to accurately assess the agreement's anticipated impacts.

Our study explores this important development in the global trade environment by quantifying the potential trade effects of RCEP. To do this, we implement a structural gravity model framework for 160 trading partners to estimate counterfactual differences bilateral trade flows due to tariff concessions offered under RCEP across 13 broad manufacturing and agricultural sectors. Our empirical approach consists of two main components. First, we implement a theory-consistent structural gravity model of sector-level bilateral trade, with which we obtain estimates of the tariff elasticity of trade. Second, and based on the estimates of the gravity equation obtained in the first step, we undertake a counterfactual simulation exercise based on the approach developed by Anderson et al. (2018). This approach allows us to quantify both the direct (bilateral) impacts of trade liberalization under RCEP, as well as the indirect (multilateral) effects of RCEP on the trade flows of countries outside the agreement.

The econometric estimates in the first stage illustrate pronounced variability in the sensitivity of different sectors to changes in tariff rates, reflecting their differing capacities to adjust to changing trade costs. We obtain estimates of the tariff elasticity ranging from –3.027 in the chemicals to –0.965 in cereal grains, estimates which correspond to values for the elasticity of 4.027 and 1.965, respectively. In the second step, we compute counterfactual values of bilateral trade reflecting bilateral tariff liberalization enacted between RCEP members. Through this approach, we analyze both the trade creation and trade reallocation effects that take place at the country and sector levels. The former effect (trade creation) reflects increases in trade between RCEP members caused by the formation of the agreement, while the latter effect (trade reallocation) refers to the shifts in bilateral trade flows between RCEP member countries and non-members following the implementation of the RCEP.[2]

Our findings indicate that the RCEP agreement yields substantial trade benefits, generating $501.5 billion in expanded annual trade among RCEP partners. At the sectoral level,

[2]While we acknowledge the trade diversion effect in the trade literature—traditionally associated with the negative impacts of reallocating imports from more efficient non-member countries to less efficient member countries—we frame our analysis in terms of trade reallocation. This approach is adopted because our findings indicate both negative and positive impacts on trade with non-agreement members, thus extending beyond the conventional scope of trade diversion.

both the trade creation and trade reallocation effects of the RCEP agreement are positive across most sectors, although the trade creation effect is approximately 1.6 times larger on average than the trade reallocation effect. The chemicals sector emerges as the primary beneficiary, with an increase of $210.8 billion in trade creation among RCEP trading partners, representing a 45.2% increase relative to existing trade volumes, while bilateral trade with non-RCEP countries increases by $126.5 billion, equating to 132.5% of the initial level. The growth of the chemicals sector can be attributed to its sensitivity to tariff reductions and its substantial trade volume. Other key sectors benefiting from RCEP include metals, wood and paper, food, and textiles. Among agricultural sectors, the fruit and nuts sector exhibits the most significant increase in trade.

At the country level, China, Japan, and South Korea are the top three beneficiaries from RCEP. China stands to gain the most, given its substantial trade volume. Exports from Japan to RCEP members are projected to increase by $96.9 billion (a 42.7% increase relative to its existing exports to RCEP countries), while imports are expected to rise by $78.6 billion (a 34.8% increase). This is particularly significant for Japan, as its initial applied tariff rates with other RCEP members were relatively high. South Korea, which maintains some of the highest average tariff rates of RCEP member countries, is projected to see its exports and imports increase by approximately 43%, amounting to $81.6 billion and $72.1 billion, respectively. The middle-tier countries, including Thailand, Indonesia, Malaysia, Australia, Vietnam, Singapore, the Philippines, and New Zealand, are estimated to experience increases in both exports and imports ranging from $10 to $50 billion, with the increases in percentage terms around 40%. The Philippines is projected to increase its exports by 55.5%. In contrast, a small group of countries—Laos, Cambodia, Myanmar, and Brunei—are not expected to see significant increases in trade. These countries generally have smaller trade sizes or already have near-zero initial tariff rates, limiting the potential for substantial trade gains under the RCEP. Many of these countries are also party to existing free-trade frameworks (e.g., ASEAN) with other RCEP countries, which further limits the amount of trade creation that we estimate to take place.

Besides adding to the nascent body of literature examining the trade impacts of the RCEP, our study contributes to two other distinct strands of the literature. First, our study is in line with the large body of existing work analyzing impacts from the establishment of FTAs and other forms of regional economic agreements. Our work most closely relates to recent studies in this vein that use the gravity model to analyze these impacts, for instance, Baier et al. (2014), Bergstrand et al. (2015), Anderson and Yotov (2016), Mattoo et al. (2022), and many others. Second, our work adds to the growing literature that employs recent advances in the estimation of structural gravity to analyze trade policy counterfactuals. Prominent recent examples include Brakman et al. (2018), who employ a structural gravity method to analyze the counterfactual impacts of Brexit, and Herman and Oliver (2023), who use structural gravity to analyze the trade impacts of both internet connectivity and digital trade provisions in trade agreements. Pertaining to trade in agricultural products, Ridley et al. (2022) and Ridley and Devadoss (2023) implement a structural gravity framework to analyze trade policy dynamics in the global markets for wine and cotton, respectively. Our work extends both of these strands of the literature by leveraging the latest quantitative approaches in the literature to analyze the impacts from the establishment of the world's largest preferential trading bloc.

The remainder of the paper is organized as follows. Section 2 outlines our empirical approach, starting with the derivation of the empirical gravity equation from the structural gravity model. This section is divided into two parts: (i) the econometric approach with which we obtain sector-specific estimates of the tariff elasticity of trade and other key parameters, and (ii) the structural gravity simulation method based on a conditional general equilibrium framework. Section 3 details our data sources and provides summary statistics for our sample. In section 4, we present the findings of the empirical analysis, illustrating the effects of RCEP on trade at both sector and country levels. Finally, section 5 concludes by summarizing our findings and reflecting on the broader trade and policy implications of our results.

2. Empirical Approach

2.1 Econometric Model

We base our analysis on the canonical CES-Armington gravity framework developed by Anderson and van Wincoop (2003).[3] The structural gravity equation is given by

$$x_{ijkt} = \frac{y_{ikt} e_{jkt}}{y_{kt}^{W}} \left(\frac{t_{ijkt}}{\Pi_{ikt} P_{jkt}} \right)^{1-\sigma_k}. \tag{1}$$

x_{ijkt} is the monetary value of exports from country i to country j of product k in year t, which is a function of factors relating to the economic size of the two trading partners and trade cost terms. Note that x_{ijkt} includes both international trade flows (bilateral trade for $i \neq j$) and intra-national domestic sales (within-country trade for $i = j$). The size terms

[3] We provide additional description of the theoretical structure underlying the CES-Armington gravity framework in the Appendix.

include $y_{ikt} = \sum_j x_{ijkt}$, the value of production in country j, and $e_{jkt} = \sum_i x_{ijkt}$, the value of consumption in country j, which are scaled relative to world production/consumption $y_{kt}^W = \sum_i y_{ikt} = \sum_j e_{jkt}$. The trade barriers consist of (i) bilateral trade costs between country i and j (t_{ijkt}); (ii) the outward multilateral resistance term (MRT) Π_{ikt}, indicating the consumption-weighted incidence of trade costs faced by country i across all possible export destinations j; and (iii) the inward MRT P_{jkt}, representing the production-share-weighted incidence of trade costs faced by country j across all possible import sources i. The expressions for the outward MRT and inward MRT are given by

$$\Pi_{ikt}^{1-\sigma_k} = P_{ikt}^{1-\sigma_k} = \sum_j \left(\frac{t_{ijkt}}{P_{jkt}}\right)^{1-\sigma_k} \frac{e_{jkt}}{y_{kt}} \quad \text{and} \quad P_{jkt}^{1-\sigma_k} = \sum_i \left(\frac{t_{ijkt}}{\Pi_{ikt}}\right)^{1-\sigma_k} \frac{y_{jkt}}{y_{kt}}. \tag{2}$$

Finally, $\sigma_k > 1$ is the elasticity of substitution between varieties of product k obtained from different sources.

Equation (1) implies that trade between country i and j is influenced by three distinct factors. The driving force is the market size including the country i's own production capability y_{ikt} and country i's purchasing power e_{jkt} relative to the global output y_{kt}^W. Both outward and inward MRT are weighted by expenditure/production proportion, implying that the MRT varies with country's consumption/production capability. The concept of multilateral resistance posits that the bilateral trade between countries i and j is influenced not solely by the "remoteness" or distance between them but also by their respective "remoteness" from other trading partners. Outward multilateral resistance refers to the aggregate trade costs faced by the exporting country i from all its trading partners, excluding country j. Similarly, inward multilateral resistance encompasses the trade costs incurred by the importing country j from all its exporting partners, with the exception of country i. The MRT terms emphasize that bilateral trade dynamics extend beyond direct interactions between two countries to include their interactions with the broader international trading network.

For estimation, we follow the standard approach in the literature (as in, for example, Anderson and Yotov, 2016) and parameterize the bilateral trade component t_{ijkt} as a function of observable, time-varying policies and fixed effects:

$$t_{ijkt} = \exp\left\{\log\left(1 + \tau_{ijkt}\right) + \alpha_{1k}\text{FTA}_{ijt} + \lambda_{ijk}\right\}, \tag{3}$$

where τ_{ijkt} is the ad valorem tariff rate, and FTA_{ijt} is a binary variable capturing the joint membership of country i and j in a free trade agreement (FTA) equal to one f two trading partners are active members of the same FTA, and zero otherwise. Other factors such as geographic variables that remain constant through time are captured by the fixed effect λ_{ijk}. Inserting the empirical form of bilateral trade cost in Equation (3) into Equation (1) and introducing a random error term ϵ_{ijkt}, we our estimating equation is given by

$$x_{ijkt} = \exp\left\{\beta_{0kt} + \beta_{1k} \log\left(1 + \tau_{ijkt}\right) + \beta_{2k}\text{FTA}_{ijt} + \gamma_{ikt} + \delta_{jkt} + \eta_{ijk}\right\} + \epsilon_{ijkt} \tag{4}$$

where $\beta_{0kt} = -\log(y_{kt}^{W})$, $\beta_{1k} = (1 - \sigma_k)$, and $\beta_{2k} = (1 - \sigma_k)\alpha_{1k}$. The coefficients on the two trade policy variables correspond respectively to the elasticity of bilateral trade with respect to tariff rates and the average effect of FTA membership on bilateral trade flows. The coefficient of main interest here is β_{1k} given that tariff concessions will be the principal margin of trade policy through which we analyze the impacts of RCEP. As previously noted, the multilateral resistance terms cannot be directly observed, presenting a well-known challenge in estimating the empirical gravity equation. In Equation (4), we thus incorporate exporter/importer-time fixed effects to account for the MRTs as well as the exporter and importer size terms, that is, $\gamma_{ikt} = \log y_{ikt} - (1 - \sigma_k) \log \Pi_{ikt}$ and $\delta_{jkt} = \log e_{jkt} - (1 - \sigma_k) \log P_{ikt}$. In addition to accounting for these factors, γ_{ikt} and δ_{jkt} other time-varying domestic policy, technology, income, exchange rate, and unilateral and non-discriminatory trade policies at the country level. Critically, the country-pair-sector fixed effect $\eta_{ijk} = (1 - \sigma_k)\, \lambda_{ijk}$ controls for all time-invariant elements of bilateral trade costs (e.g., distance, colonial histories, contiguous border, etc.), and in doing so, help control for omitted variables that might correlate with both trade volumes and trade policy (e.g., historical trading relationships; Baier and Bergstrand, 2007).

As previously mentioned, we estimate Equation (4) using both intra-national and international trade data, further detail for which we provide below. Incorporating intra-national data has been increasingly highlighted as a critical feature of accurate identification of trade policy parameters in gravity estimation, and additionally, ensures that estimation is consistent with the underlying theory (Yotov, 2022). Following Santos Silva and Tenreyro (2006; 2011), we estimate the empirical gravity model using the Poisson pseudo-maximum likelihood (PPML) estimator, which addresses the well-known issues associated with zero-trade flows and heteroskedasticity in the error term. Second, we cluster at the country-pair level to account for within-pair correlation in the error term.

2.2 Simulation

In this section, we describe the conditional general equilibrium analysis based on Anderson et al. (2018) that we implement to simulate counterfactual bilateral trade flows under the RCEP using the empirical gravity equation established in the preceding section. The core of this simulation exercise is to estimate trade costs within a counterfactual scenario, subsequently integrating these estimates into the original model to compute counterfactual values of bilateral trade under alternative trade policy regimes (i.e., trade flows with and without tariff concessions enacted under RCEP). This simulation is a conditional equilibrium approach, wherein total supply (y_{ikt}) and demand (e_{jkt}) are held fixed to analyze how adjustments in trade costs reshape bilateral trade patterns in responses to changes in bilateral trade policies, all else equal. This approach entails a comprehensive consideration of changes in trade originating from both direct bilateral trade costs (t_{ijkt}) and indirect trade costs—namely, those mediated by adjustments in the inward and outward MRTs (P_{ijkt} and Π_{ijkt}). We base this counterfactual analysis on the year 2018 (the most recent year in our data); consequently, we omit time subscripts from the description that follows.

In our simulation, the counterfactual scenario considers the elimination of tariffs among the 15 countries that have ratified the RCEP agreement (i.e., setting τ_{ijk} to zero for trade between RCEP member countries), contrasting with the baseline scenario that reflects the pre-RCEP real-world tariff system. The simulation is executed in sequential steps as follows. First, based on estimates of trade policy parameters (β_{1k} and β_{2k}) and the bilateral fixed effects (η_{ijk}), we estimate the auxiliary gravity equation

$$x_{ijk} = \exp\left\{\hat{\beta}_{1k}\log(1+\tau^B_{ijk}) + \hat{\beta}_{2k}\text{FTA}_{ij} + \gamma_{ik} + \delta_{jk} + \hat{\eta}_{ijk}\right\} + \epsilon_{ijk} \tag{5}$$

for each sector k holding the bilateral elements of trade costs ($\hat{\beta}_{1k}\log(1+\tau^B_{ijk})$, $\hat{\beta}_{2k}\text{FTA}_{ij}$, and $\hat{\eta}_{ijk}$) constant, where superscript B represents values under the baseline scenario (i.e., under real-world applicable bilateral tariff rates).[4] Estimating Equation (5) allows us to obtain values of γ_{ik} and δ_{jk} which, as shown by Fally (2015), are exactly proportional to the (unobserved) outward and inward MRTs under the baseline regime of trade costs. Having estimated Equation (5), we forecast baseline bilateral trade flows as

$$x^B_{ijk} = \exp\left\{\hat{\beta}_{1k}\log(1+\tau^B_{ijk}) + \hat{\beta}_{2k}\text{FTA}_{ij} + \hat{\gamma}^B_{ik} + \hat{\delta}^B_{jk} + \hat{\eta}_{ijk}\right\}. \tag{6}$$

$\hat{\gamma}^B_{ik}$ and $\hat{\delta}^B_{jk}$ denote the estimates of the exporter and importer fixed effects, respectively. By definition, these fixed effects are proportional to the outward and inward MRTs, respectively, and thereby capture all indirect (multilateral) elements of trade costs.

In the counterfactual scenario, we set $\tau_{ijk} = 0$ for RCEP members, prioritizing the elimination

[4] Note that the general intercept β_{0k} from Equation (4) is subsumed by the exporter and importer fixed effects.

of sector-specific tariff barriers over adjustments to the country-year specific FTA policy variable. This focus is justified because the FTA variable essentially captures the residual impacts of FTA formation once tariff rates and country-pair fixed effects are controlled for. Changes in bilateral trade costs are directly linked to the changes in tariff rates and subsequently influence both bilateral (direct) trade costs via $\hat{\beta}_{1k}\log(1+\tau_{ijk})$ as well as multilateral (indirect) trade costs through the (MRTs) channeled through changes in the exporter and importer fixed effects ($\hat{\gamma}_{ik}$ and $\hat{\delta}_{jk}$). The estimation process for obtaining counterfactual trade flows is analogous to the one previously described. First, we re-estimate an auxiliary version of Equation (4) given by

$$x_{ijk} = \exp\left\{\hat{\beta}_{1k}\log(1+\tau^C_{ijk}) + \hat{\beta}_{2k}\text{FTA}_{ij} + \gamma_{ik} + \delta_{jk} + \hat{\eta}_{ijk}\right\} + \epsilon_{ijk}, \tag{7}$$

where τ^C_{ijk} reflect the counterfactual tariff rates and superscript C corresponds to values under the counterfactual scenario. Estimation of Equation (7) yields estimates of the counterfactual exporter and importer fixed effects ($\hat{\gamma}^C_{ik}$ and $\hat{\delta}^C_{jk}$), which are exactly proportional to the values of the MRTs under the counterfactual scenario. Counterfactual bilateral trade, denoted by x^C_{ijk}, is thus calculated as

$$x^C_{ijk} = \exp\left\{\hat{\beta}_{1k}\log(1+\tau^C_{ijk}) + \hat{\beta}_{2k}\text{FTA}_{ij} + \hat{\gamma}^C_{ik} + \hat{\delta}^C_{jk} + \hat{\eta}_{ijk}\right\}. \tag{8}$$

The key metric of interest is the difference between the counterfactual and baseline bilateral trade, represented as $\left(x^C_{ijk} - x^B_{ijk}\right)$. To establish a range for the estimates of RCEP's trade impacts that account for parameter uncertainty, we replicate the aforementioned procedures using the upper and lower 95% confidence interval values of the tariff elasticity β_{1k}.

3. Data

We use a balanced sample comprising 160 exporting and importing countries across 13 sectors for the years 2000 to 2018. Our sample includes international trade data from two sources: information on manufacturing sectors from CEPII's Trade and Production (TradeProd; Mayer et al., 2023) database and data for agricultural sectors from CEPII's BACI database (Gaulier and Zignago, 2010). Our sample spans a variety of sectors from both the manufacturing and agricultural categories. The manufacturing data, sourced from the TradeProd database, is classified according to the 2-digit International Standard Industrial Classification (ISIC) and includes nine sectors: food, textiles, wood and paper, chemicals, minerals, metals, machinery, vehicles, and other miscellaneous manufacturing sectors not elsewhere classified (the "other" sector). The agricultural component of our sample com-

Table 1: Sample Summary Statistics

Variable	Mean	Std. dev.	Max
International trade flows (X_{ijkt} for $i \neq j$)	21.111	499.013	213,742.9
Intra-national trade flows (X_{ijt} for $i = j$)	10,023.37	82,597.49	3,198,207
Tariff rates (τ_{ijt})	11.143	27.817	853.839
Free trade agreements (FTA_{ijt})	0.119	0.324	1

Notes: Calculations are based on the sample data from 2000 to 2018. Trade flows are measured in current million USD, tariffs are reported as percentages, and FTA_{ijt} is represented by dichotomous variables indicating mutual membership between countries in FTAs. The minimum value recorded for all variables is zero.

prises four sectors from the BACI database, categorized under broad 2-digit Harmonized System (HS) product categories. These sectors are animal feed, cereals, fruits and nuts, and vegetables and animal oils. In Table 1, we present the summary statistics for four key variables across the 13 sectors in our sample. As might be expected, intra-national trade constitutes a significant portion of total trade volume. The average tariff rates across the 13 sectors stand at 11.143, accompanied by a substantial standard deviation of 27.817, indicating considerable variability in applied tariffs. Additionally, within our sample, 11.9% of the observations of bilateral trade are between countries in an FTA with each other.

The TradeProd data set incorporates embedded intra-national trade information for manufacturing sectors. However, for agricultural sectors, we calculate intra-national trade data using country-industry-specific farm-gate prices. This calculation involves multiplying these prices by the difference between a country's total agricultural output and its exports, according to data sourced from CEPII and the Food and Agriculture Organization (FAO). The data set also encompasses records of zero trade. Our tariff data, encompassing both non-discriminatory Most Favored Nation (MFN) tariff rates and applicable preferential tariff rates, are obtained from the World Integrated Trade Solution (WITS) Database and UNCTAD TRAINS database (UNCTAD, 2022). Information on bilateral membership in FTA agreements is obtained from the US International Trade Commission (USITC) gravity data set (Gurevich and Herman, 2018).

Table 2 presents information on the key variables in our analysis; namely, the volume of trade for each sector along with preference margins, defined as the average difference between nondiscriminatory Most Favored Nation (MFN) tariff rates and preferential tariff rates, for both the aggregate sample and specifically for RCEP countries. In the context of the RCEP countries, the sectors with the highest average trade within-RCEP bilateral trade volumes are machines ($4.456 billion); chemicals ($3.665 billion) metals ($2.949 billion), and

Table 2: Summary Statistics on Trade Flows and Applied Tariffs

Sector	Trade Value (billion USD)			Applied Tariffs		
	Total	RCEP countries	RCEP country share of total (%)	Total mean (%)	RCEP countries (%)	RCEP/total ratio
Manufacturing	**41.972**	**18.353**	**43.727**	**7.375**	**1.217**	**16.502**
Chemicals	9.272	3.665	39.524	4.220	0.538	12.740
Food	5.713	2.295	40.165	13.976	3.597	25.739
Machines	8.905	4.456	50.039	4.639	0.724	15.605
Metals	5.836	2.949	50.522	5.765	0.551	9.565
Minerals	1.583	0.903	57.053	7.566	0.927	12.250
Other	1.177	0.348	29.591	9.275	0.831	8.964
Textiles	1.842	0.85	46.159	8.804	1.209	13.729
Vehicles	5.723	2.209	38.596	6.083	1.680	27.623
Wood and Paper	1.921	0.679	35.326	6.048	0.895	14.806
Agriculture	**2.243**	**0.719**	**32.055**	**11.236**	**7.011**	**62.401**
Animal Feed	0.203	0.021	10.545	10.176	2.798	27.492
Cereals	0.849	0.391	46.07	13.324	20.076	150.677
Fruits and Nuts	0.485	0.149	30.809	14.644	4.629	31.609
Vegetable and Animal Oils	0.221	0.008	3.414	6.799	0.542	7.977

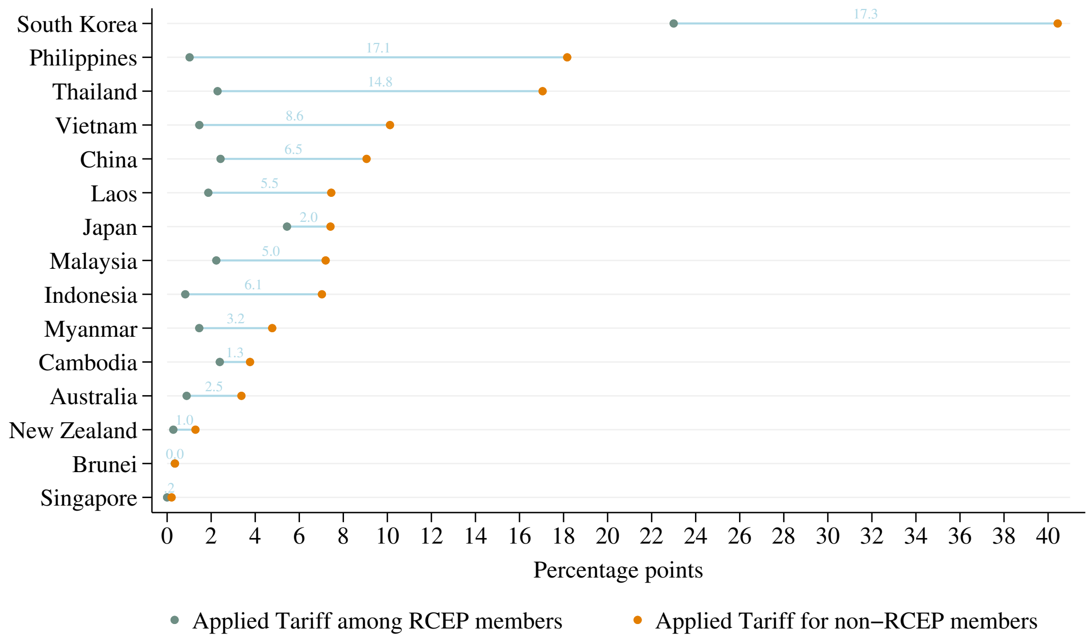
Notes: This statistic summary is based on the sample data for the year 2018. The applied tariff rates are equivalent to preferential tariff rates if they exist. If no preferential tariff rates are available, the applied tariffs default to the Most Favored Nation (MFN) tariff rates.

food ($2.295 billion). Trade flows from RCEP countries account for 43.727% of global manufacturing trade, amounting to $18.353 billion, and 32.055% of global agricultural trade, totaling $0.719 billion, with a pronounced focus on manufacturing sectors such as minerals (57.053%), metals (50.522%), machines (50.093%), textiles (46.159%), and food (40.165%). Conversely, the preference margins are generally higher for agricultural sectors than for manufacturing sectors, both globally and within RCEP member states. The agricultural sector typically faces higher trade barriers than other sectors (in keeping with well-documented patterns on higher levels of protectionism in agricultural trade; see, e.g., Anderson, 2022), with an average applied tariff of 7.011% for RCEP countries compared with an average of 1.217% applied tariff for manufacturing sector, also noted in Table 2. The agriculture sector is thus expected to benefit from significant reductions in trade barriers under the RCEP agreement.[5] Overall, RCEP members encounter larger preference margins compared to the global average, suggesting that they may derive greater benefits from reductions in regional trade costs. The vegetable and animal oils sector is an exception, facing a lower preference margin than the global average. Other sectors experience preference margins ranging from 1.051 times the global average in the food sector to 1.828 times in the fruits and nuts sector. Notably, the sectors with the largest trade volumes—chemicals ($9.272 billion), machinery ($8.905 billion), metals ($5.836 billion), and vehicles ($5.732 billion)—tend to face relatively low preference margins.

Figure 1 visually depicts average applied tariff rates across industries set by the 15 RCEP countries for their trading partners, both within and outside the RCEP agreement. The applied tariff rate is equal to the preferential tariff rate when such a rate exists; otherwise, it defaults to the MFN tariff rate. The green dots represent the applied tariff rates set for RCEP members, which are generally lower than those for non-RCEP trading partners, represented by the orange dots. The industries are ranked by the average applied tariff for non-RCEP countries. The difference between the two groups' tariff rates is noted by the labels at the midpoint of each line. The most notable case in Figure Figure 1, is South Korea, which imposes an average tariff of 23% on its RCEP members and an average tariff of 40.4% on its other trading partners. South Korea has the highest tariff levels and significant differences between within and outside RCEP members. Therefore, the implementation of RCEP is likely to greatly benefit South Korea. Some countries, such as Singapore, New

[5] We exclude the services sector from our analysis because the RCEP agreement adopts a hybrid approach for it. Specifically, some countries such as Cambodia, China, Laos, Myanmar, New Zealand, Philippines, Thailand, and Vietnam have adopted a positive list approach, while others including Australia, Brunei, Indonesia, Japan, Korea, Malaysia, and Singapore follow a negative list approach. Besides, the barriers in the services sector are primarily non-tariff barriers (NTB) rather than tariff barriers. The hybrid nature of the agreement makes it challenging to measure the effects accurately under this agenda.

Figure 1: Applied Tariff Rates within RCEP Members and from Outsiders (2018)



Notes: Figure illustrates the applied tariffs imposed by the 15 RCEP countries on their export partners, both within the agreement and outside, across 13 sectors for the year 2018. Numeric labels on the figure highlight the differences between tariffs on intra-RCEP trade and tariffs on trade with external partners.

Zealand, Brunei, and Indonesia, already have relatively low tariff rates for RCEP members, with average applied rates under 1%. Consequently, the RCEP is not expected to have pronounced effects on these countries. Countries like the Philippines and Thailand have tariff differences between RCEP and non-RCEP members exceeding 14% on average. This suggests that these countries have relied more on trade relationships with RCEP members from the outset; consequently, the implementation of RCEP is unlikely to significantly alter these countries' trade situation. In contrast, countries such as Japan, which maintains an average tariff rate of 5.4% for RCEP members and 7.4% for non-RCEP members, stand to benefit relatively more from the implementation of the RCEP agreement.

4. Results

4.1 Econometric Estimates

We first present the results of estimation of empirical gravity equation of Equation 4 in Table 3, with a particular emphasis on the coefficients for the trade policy variables. In Figure 2, we further provide a detailed examination of the tariff coefficient at a 95% confidence level to give a clearer picture of how the estimates of the tariff elasticity vary across sectors. The first nine rows in Table 3 show the estimates for the nine manufacturing sectors from TradeProd data and the remaining four rows show results for the four agricultural sectors that we analyze. In general, the findings indicate that tariffs generally have a more pronounced effect on shaping bilateral trade patterns compared to FTAs in our sample, suggesting that the trade impacts of FTAs primarily stem from tariff reductions. Notably, tariffs are found to significantly decrease bilateral trade volumes in 9 out of 13 sectors, with coefficients ranging from –3.027 in the chemicals sector to –0.725 in the minerals sector. This implies elasticities of substitution spanning from 1.725 to 4.027, based on the relation $\sigma_k = 1 - \beta_{1k}$. The tariff coefficients are notably larger in magnitude for manufacturing sectors such as chemicals, metals, textiles, wood and paper, and other sectors, with respective elasticities of substitution at 4.027, 3.800, 3.617, 3.463, and 3.494. This indicates that reductions in trade costs serve as a significant incentive for enhancing bilateral trade flows, particularly in these manufacturing sectors. Trade in food products demonstrates a lower sensitivity to tariffs on average, with a coefficient of –1.471 and an elasticity of substitution of 2.471. Further analysis of the agricultural sector reveals differences among specific categories. The fruits and nuts sector, with a coefficient of –3.016 and an elasticity of substitution of 4.016, and the vegetable and animal oils sector, with a coefficient of –1.791 and an elasticity of substitution of 2.791, exhibit higher sensitivities to tariffs compared to the animal feed and cereals sectors, which have coefficients of –0.880 and –0.965, and elasticities of substitution of 1.880 and 1.965, respectively.

The coefficients associated with FTAs are predominantly found to be statistically insignificant, indicating that, when accounting for tariffs and country-pair fixed effects, coefficients of FTAs only reflect residual impacts on bilateral trade flows. The magnitudes of the FTA coefficients are noticeably modest, and counter to expectations, the signs of the coefficients for certain sectors, including machinery, minerals, textiles, and wood and paper, are estimated to be negative. This suggests that, beyond the immediate effects of tariff reductions, the presence of an FTA does not significantly affect trade volumes between countries, and in some instances, the expected positive impact of FTAs on trade flows in specific sectors may not materialize as anticipated.[6]

In Figure 2, it becomes more evident that four sectors—machines, vehicles, minerals, and animal feed—yield "misbehaved" estimates, i.e., theoretically infeasible and/or statistically

[6]While these results are perhaps surprising, our findings on the effects of FTA membership are consistent with the broader survey of the literature provided in the meta-analysis of Cipollina and Salvatici (2010) based on 1,827 point estimates of FTA impacts from 85 papers in the literature. Their findings reveal that 693 of these estimates are statistically insignificant, while 778 exhibit non-positive effects.

Table 3: Estimates of Gravity Equation, by Sector

	Policy Variables					
	log $(1+\tau)$		FTA			Pseudo
Sector	Estimate	Std. err.	Estimate	Std. err.	Obs.	R^2
Manufacturing						
Chemicals	–3.027***	(0.508)	0.095**	(0.036)	198,753	0.998
Food	–1.471***	(0.275)	0.092**	(0.030)	215,623	0.998
Machines	2.145*	(0.931)	–0.071	(0.056)	168,542	0.996
Metals	–2.800***	(0.600)	0.108*	(0.059)	197,056	0.997
Minerals	–0.725	(0.546)	0.001	(0.072)	149,777	0.998
Other	–2.561***	(0.623)	–0.023	(0.075)	160,098	0.993
Textiles	–2.617***	(0.597)	0.010	(0.058)	177,728	0.992
Vehicles	0.524	(0.854)	0.026	(0.051)	131,608	0.996
Wood and Paper	–2.384***	(0.568)	–0.003	(0.039)	171,199	0.997
Agriculture						
Animal Feed	–0.880*	(0.524)	0.015	(0.116)	126,077	0.987
Cereals	–0.965***	(0.230)	0.031	(0.078)	172,373	0.994
Fruits and Nuts	–3.016***	(0.632)	0.015	(0.056)	191,712	0.994
Vegetable and Animal Oils	–1.791***	(0.406)	0.084	(0.089)	100,137	0.987

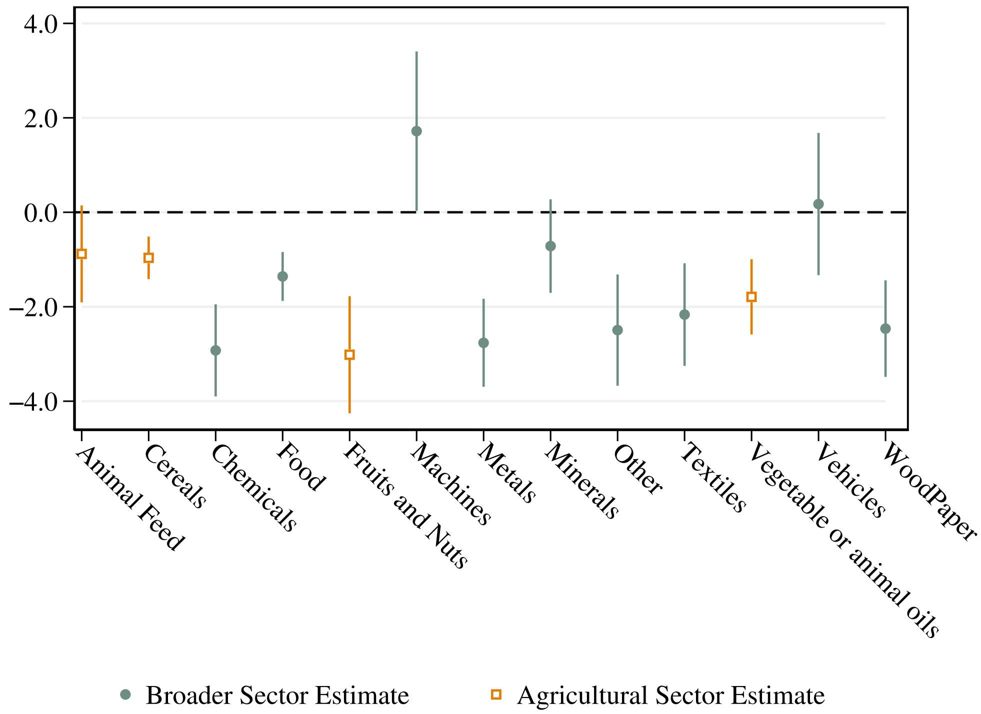
Notes: Table shows the results from the gravity equation estimation for each of the 13 sectors from 2000 to 2018. Dependent variable is the country-pair-year bilateral trade. Robust standard errors clustered at country-pair level are reported in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

insignificant parameter estimates. To preserve the validity of our counterfactual analysis, we refine our sample to the nine sectors that exhibit theory-consistent and statistically significant responses to tariff rates.

4.2 Simulation Results

To portray the results of our simulation on the trade impacts of RCEP, we show the difference between counterfactual and baseline trade flows following the implementation of RCEP based on the simulation methods elaborated above. We detail the precise changes in trade volumes based on the benchmark point estimates of the tariff elasticity along with the upper and lower bounds of these trade effects, demarcated by blue bars in the figures, which reflect estimates based on the upper and lower 95% confidence interval values of the tariff elasticity. This approach offers a comprehensive view of the potential range of outcomes, allowing for a clearer understanding of the variability and uncertainty surrounding our estimates. Our analysis is bifurcated into two distinct dimensions, separately for exports versus imports: first, the trade creation benefits that accrue to RCEP member countries as a result of RCEP's enactment, and second, the trade reallocation effects relating to changes in trade between

Figure 2: Estimates of Tariff Elasticity, by Sector



Notes: Figure displays the tariff coefficients for each sector. Error bands represent the 95% confidence intervals. Standard errors are clustered at the country-pair level.

RCEP member countries and non-RCEP countries induced by the implementation of this trade agreement. We pay particular attention to the heterogeneity that arises in our findings relating to impacts across specific sectors and countries.

Panel a of Figure 3 depicts that the total trade gains for within-RCEP trade range across sectors from \$210.8 billion for the chemicals sector to a modest \$0.9 billion in the animal feed sector. Along the x-axis, percentile changes are annotated next to each sector's name, indicating the scale of trade expansion due to the implementation of RCEP. Strikingly, the chemicals sector is estimated to see its original trade flow among RCEP members nearly double. The significant gains observed for trade in chemicals can be attributed to its high sensitivity to tariff rates and the substantial volume of trade that occurs in this sector, both globally and within the RCEP member countries. Besides the four agricultural sectors and the "other" sector, the smallest (yet still significant) increase is observed in the textiles sector, with a \$35.7 billion (26.7%) increase in within-RCEP trade. While for the agricultural sectors the absolute level of increase may not appear to be substantial in absolute terms, the percentage growth is noteworthy, especially in the fruits and nuts sector, which sees a \$3.4

billion (26.7%) increase in trade. The least increase, yet still sizable, arises in the cereals sector, with $1.3 billion (13.8%) in expanded trade.

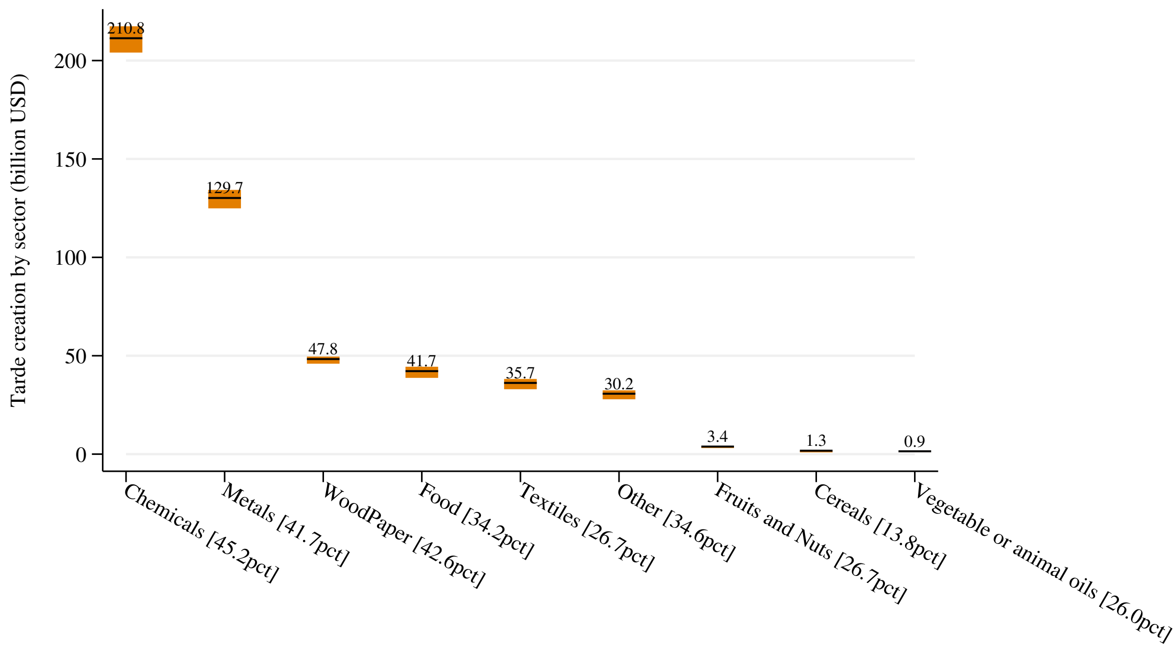
Panel b of Figure 3 depicts the changes in trade flows resulting from RCEP, from member countries to those outside the partnership. The positive trade reallocation effect suggests that RCEP facilitates an increase in trade among its members without diminishing the bilateral exchanges with non-member countries. In fact, all sectors experience a rise in trade reallocation, albeit to a lesser extent than the trade creation effects. The chemicals sector leads with a significant increase of $126.5 billion, marking a 32.5% rise from its baseline trade volume. Following closely are the metals sector, with a $63.4 billion increase (28.9%), the wood and paper sector, enhancing by $26.5 billion (34.4%), and the food sector, with a $24.1 billion uplift (31.6%). Similarly, the agricultural sectors exhibit a pattern in which RCEP does not lead to a shift in trade from non-member to member countries, though the extent of trade reallocation growth is smaller compared to the figures for trade creation.

To further unpack our findings on trade creation and reallocation, we detail the top 40 most-impacted bilateral trade linkages derived from our counterfactual estimations in Table 4, organized by the magnitude of trade volume changes. Notably, the five most significant trade linkages originate from the chemicals sector, with the first and second highest bilateral trade occurring between countries not in the RCEP program. This finding suggests that existing trade relationships between RCEP member and non-member countries remain robust under the implementation of RCEP. The most substantial increase in bilateral trade is between South Korea and China, amounting to $20.07 billion, while the fourth largest surge is observed between Japan and China, totaling $17.44 billion.

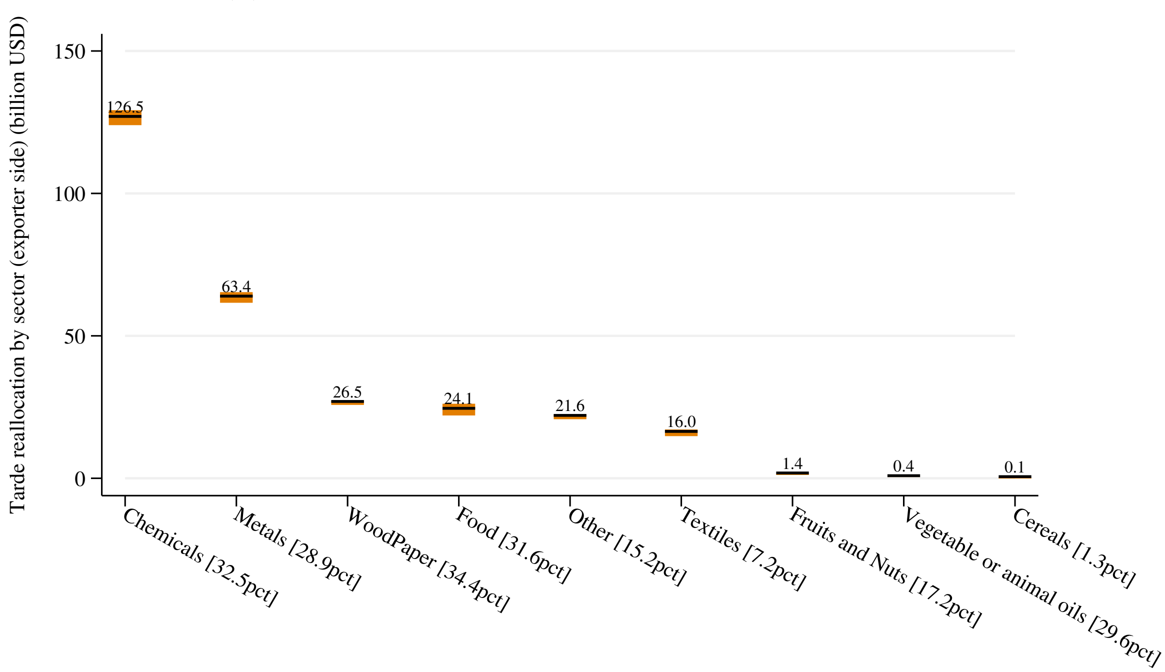
In Figure 4, we examine the trade creation effects relating to within-RCEP trade for the 15 RCEP member countries, with countries as importers illustrated on the left panel and exporters on the right. Among the 15 member nations, the top six beneficiaries from the RCEP agreement maintain a relative consistency, comprising China, Japan, South Korea, Thailand, Indonesia, and Malaysia, with the first three countries experiencing substantial trade creation impacts. China emerges as the foremost beneficiary, registering an increase of $123.0 billion in imports and $99.8 billion in exports. This substantial growth in trade can be attributed, in part, to the high preferential tariff rate that China encounters. Japan sees a significant boost with an uplift of $78.6 billion in imports and $96.9 billion in exports, while South Korea witnesses a surge of $72.1 billion in imports and $81.6 billion in exports. The middle tier, consisting of seven countries, witnesses moderate growth in trade post-RCEP, with increases ranging approximately from $10 billion to $50 billion. Conversely, the last

Figure 3: Counterfactual Impacts on Trade Flows among RCEP Partners, by Sector

(a) Trade Creation within RCEP Members



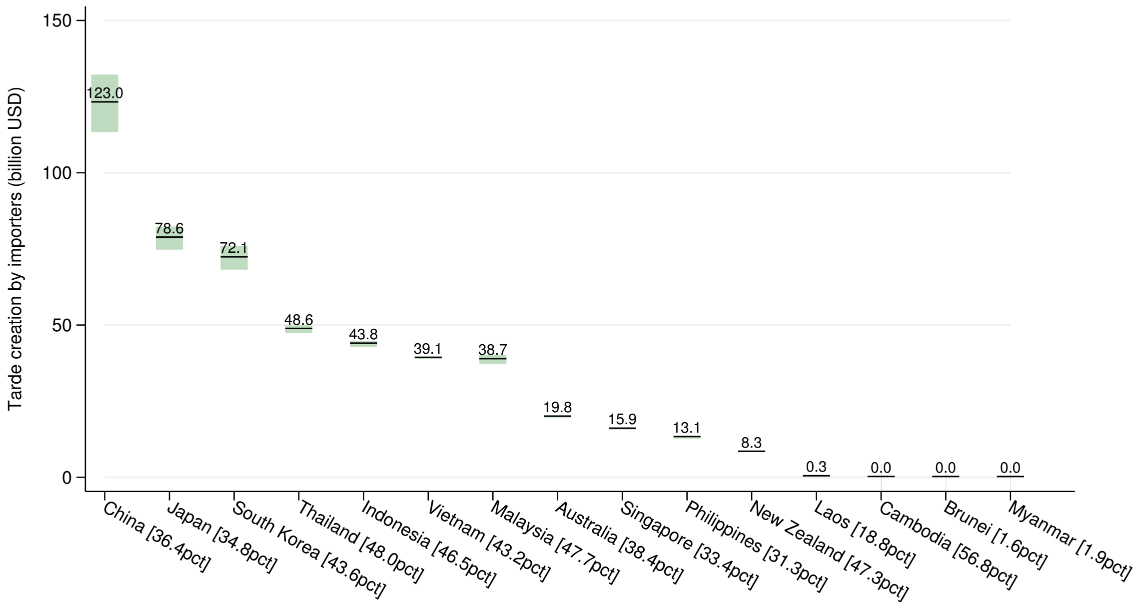
(b) Trade Flows between RCEP Members and Non-Members



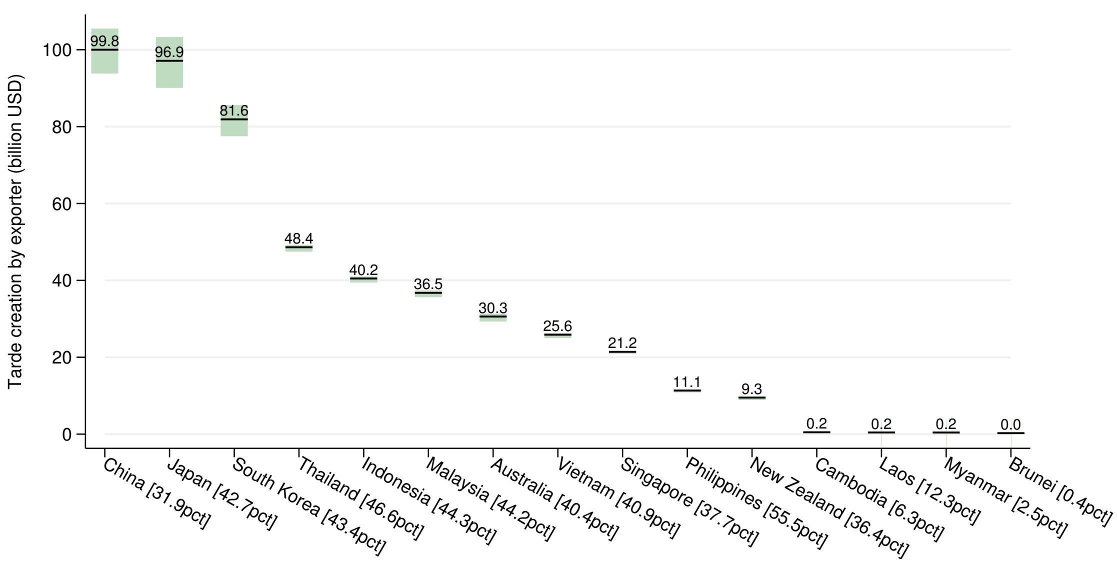
Notes: Sector-level trade creation effects are calculated as $\Delta x_k = \sum_{i \neq j}(x^C_{ijk} - x^B_{ijk})$. Error bands denote the 95% confidence interval for these differences. Point estimates are marked in billion USD. Corresponding percentage growth rates are indicated in brackets along the x-axis.

Figure 4: Trade Creation within RCEP Members, by Country

(a) Trade Creation within RCEP Members, by Importer



(b) Trade Creation within RCEP Members, by Exporter



Note: Country-level trade creation effects are calculated as $\Delta x_i = \sum_k \sum_{j \neq i} (x^C_{ijk} - x^B_{ijk})$ for exporters and $\Delta x_j = \sum_k \sum_{i \neq j} (x^C_{ijk} - x^B_{ijk})$ for importers. Error bands denote the 95% confidence interval for these differences. Point estimates are marked in current billion USD. Corresponding percentage growth rates are indicated in brackets along the x-axis.

four countries—Laos, Cambodia, Brunei, and Myanmar—show minimal growth following the implementation of RCEP. This lack of significant growth is likely attributable to these countries' initially low preferential tariff rates and existing preferential trading relationships with other RCEP members.

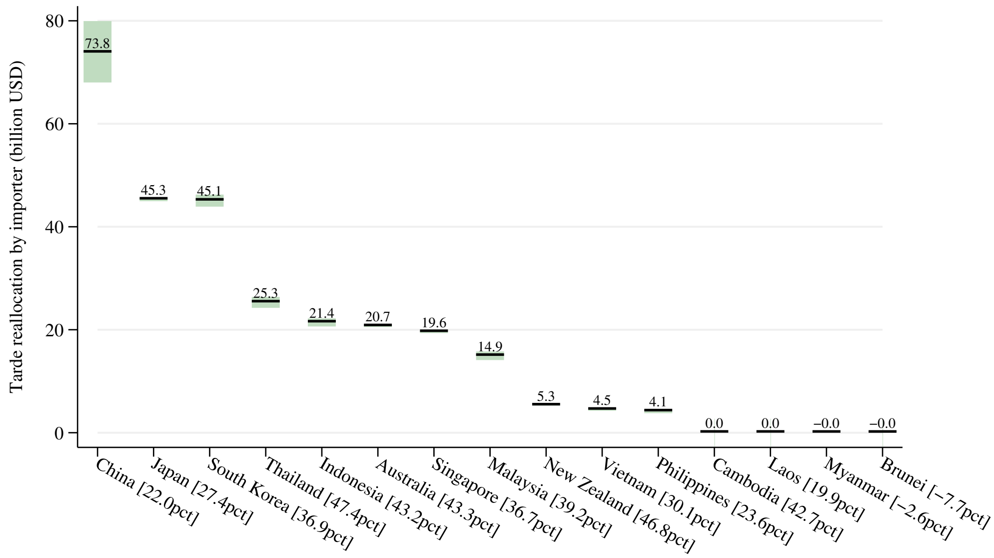
The country-specific impacts in terms of trade reallocation are illustrated in Figure 5, with the roles of countries as importers and exporters delineated in the left and right panels, respectively. Upon comparing these visuals with those presented in Figure 4, it is apparent that the magnitude of trade reallocation is less pronounced than those for trade creation. This suggests that RCEP's primary impact is derived from trade creation rather than significant adjustments to existing trade relationships with countries outside of the RCEP.

Notably, China stands out in the context of trade reallocation, demonstrating a substantial increase in its trade with non-RCEP countries. As an importer, China experiences a growth of $73.8 billion, overshadowing Japan—the country with the second-highest increase at $45.3 billion. On the export side, China's trade reallocation escalates to $97.1 billion, more than double that of South Korea, which undergoes a $35.6 billion increase as the second-largest beneficiary. South Korea, Japan, and Thailand also exhibit significant trade interactions with non-RCEP nations, indicating their pivotal roles within the broader trade reallocation narrative. This (perhaps surprising) result on increased trade with countries outside of the RCEP is a direct result from the expanded within-RCEP trade. Specifically, in facing lower tariff barriers in importing markets within the RCEP, China (and other RCEP members that experience increased trade with countries outside of the RCEP) sees its exports to these markets increase. Because country-level expenditures within sectors are held fixed in our counterfactual analysis, these increases in exports (and the resulting diminished availability of domestic supply of the good) are met with increases in imports from both within-RCEP and outside-RCEP sources, thus yielding positive changes in external trade in several instances.

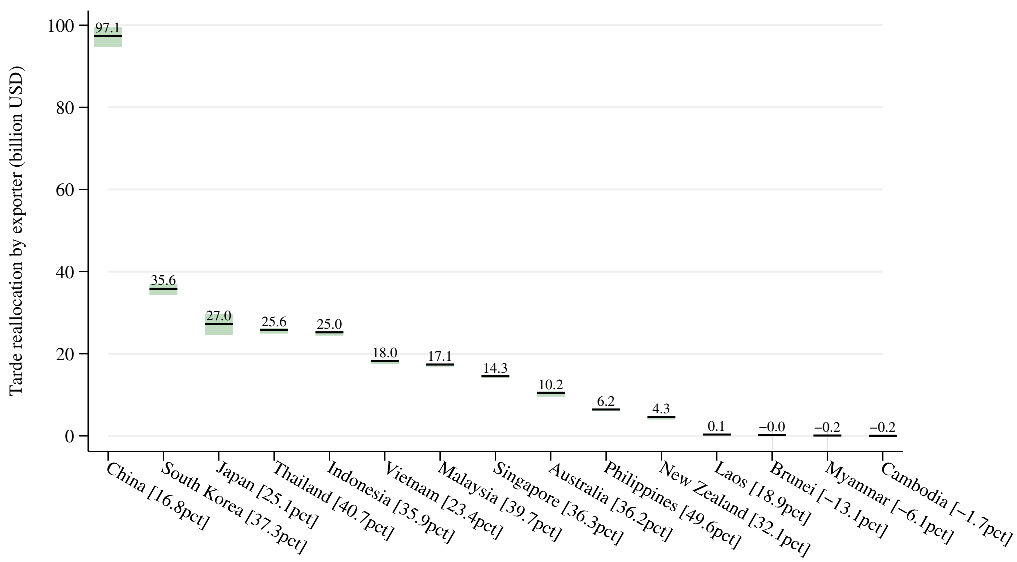
Table 4 sheds further light on the aggregate results discussed earlier. In particular, the findings on particular bilateral linkages reveal that the sectors deriving the most significant trade benefits from the establishment of the RCEP include, in order, the chemical, metal, wood and paper, and food sectors. These sectors align with the top four industries identified in Figure 3 as experiencing substantial trade gains under RCEP. A remarkable observation from Table 4 is that 30 of the top 40 most-impacted trade linkages involve bilateral trade between non-RCEP member countries. This indicates that the robust trade creation effect attributed to RCEP is accompanied by substantial reallocations in trade patterns for a

Figure 5: Trade Flow between RCEP Members and Non-Members, by Country

(a) Trade Flow between RCEP Members and Non-Members, by Importer



(b) Trade Flow between RCEP Members and Non-Members, by Exporter



Note: Country-level trade reallocation effects are calculated as $\Delta x_i = \sum_j \sum_{i \neq j} (x^C_{ijk} - x^B_{ijk})$ for exporters and $\Delta x_j = \sum_i \sum_{i \neq j} (x^C_{ijk} - x^B_{ijk})$ for importers. Error bands denote the 95% confidence intervals for these differences. Point estimates are marked in current billion USD. Corresponding percentage growth rates are indicated in brackets along the x-axis.

Table 4: Bilateral Trade Linkages with the 40 Largest Estimated Trade Impacts

Exporter	Importer	Sector	Δx_{ijk}	$\%\Delta x_{ijk}$	$\Delta x_{ijk}^{95\%CI}$
Canada	United States	Chemicals	28.54	77.39	(28.35,28.71)
United States	Canada	Chemicals	21.58	62.45	(21.48,21.67)
South Korea	China	Chemicals	20.07	55.04	(18.42,21.66)
Japan	China	Chemicals	17.44	67.99	(15.44,19.36)
Mexico	United States	Chemicals	17.02	130.91	(17.01,17.04)
Mexico	United States	Metals	15.41	119.62	(15.28,15.53)
Canada	United States	Metals	15.08	56.99	(14.98,15.18)
United States	Canada	Metals	14.25	78.76	(14.16,14.34)
United States	Mexico	Chemicals	13.96	50.01	(13.82,14.09)
United States	Mexico	Metals	13.17	69.13	(13.00,13.34)
Japan	South Korea	Chemicals	9.94	96.94	(9.37,10.50)
South Korea	China	Metals	9.15	60.86	(8.45,9.83)
Japan	China	Metals	9.13	52.05	(7.99,10.22)
China	South Korea	Metals	8.69	57.45	(8.31,9.06)
China	Japan	Chemicals	8.67	50.45	(8.27,9.06)
Germany	Belgium	Chemicals	8.52	58.64	(8.42,8.61)
United States	Canada	Wood and Paper	8.44	69.96	(8.40,8.47)
Canada	United States	Food	8.36	56.22	(8.51,8.22)
Netherlands	Germany	Chemicals	8.14	56.84	(8.05,8.23)
Italy	Germany	Chemicals	7.81	80.89	(7.74,7.88)
Germany	France	Chemicals	7.65	55.86	(7.56,7.73)
Germany	Italy	Chemicals	7.60	70.60	(7.53,7.66)
United Kingdom	Germany	Chemicals	7.49	92.07	(7.41,7.57)
Germany	United Kingdom	Chemicals	7.48	56.63	(7.39,7.56)
Japan	South Korea	Metals	7.47	93.71	(7.20,7.74)
Belgium	Germany	Chemicals	7.36	63.45	(7.29,7.41)
United States	Germany	Chemicals	7.35	62.36	(7.60,7.11)
United States	Canada	Food	7.27	67.06	(7.41,7.13)
Canada	United States	Wood and Paper	7.24	42.47	(7.19,7.30)
France	Germany	Chemicals	6.76	64.80	(6.69,6.84)
China	Japan	Textiles	6.73	27.11	(5.76,7.65)
Germany	Netherlands	Food	6.62	84.89	(6.50,6.72)
Germany	Netherlands	Chemicals	6.43	47.00	(6.33,6.54)
Poland	Germany	Chemicals	6.41	119.94	(6.38,6.43)
China	South Korea	Chemicals	6.23	55.01	(5.86,6.60)
Netherlands	Germany	Food	6.00	68.13	(5.89,6.11)
Poland	Germany	Metals	6.00	101.51	(5.96,6.04)
Belgium	Netherlands	Food	5.97	105.65	(5.86,6.07)
Netherlands	Belgium	Food	5.89	109.28	(5.82,5.97)
Netherlands	Belgium	Chemicals	5.87	53.39	(5.81,5.93)

Notes: Calculations in the table are give by $\Delta x_{ijk} = x_{ijk}^C - x_{ijk}^B$ (in current billion USD) denoting the bilateral trade difference between counterfatcual and baseline scenarios, $\%\Delta x_{ijk} = (\Delta x_{ijk}/x_{ijk}^B) \times 100\%$ indicating the growth of bilateral trade relative to the baseline trade volume. $\Delta x_{ijk}^{\%95CI}$ provides the lower and upper bounds of the estimated trade growth effects based on the 95% confidence interval values of β_{1k}, measured in current billion USD.

significant number of trading relationships between countries outside of the agreement.

An additional finding highlights that within the top 40 trade linkages, those that involve RCEP member countries exclusively feature bilateral trade between China, Japan, and Korea. This insight speaks to these countries' major contribution to the overall trade benefits observed from the RCEP agreement. The concentration of significant trade linkages among these three countries within the RCEP membership underscores the pivotal role they play in regional trade dynamics. This pattern not only reflects the economic stature and interconnectedness of China, Japan, and Korea within the Asia-Pacific region but also suggests that the strength of their trade relations is a critical factor in realizing the potential trade enhancements offered by RCEP.

5. Concluding Discussion

With the proliferation of regionalism as the driving force behind the current global trade policy situation as a backdrop, the RCEP has recently been established as the world's largest free trade bloc. The RCEP is set to reshape not only Asia-Pacific economic integration but also the broader architecture of global trade dynamics, particularly in the context of ongoing US-China trade tensions and the economic recovery phase following the global pandemic and recent supply chain disruptions.

In this study, we investigate the implications of reduced trade barriers among RCEP countries on bilateral trade patterns, both within the member countries and with external trading partners. To do this, we implement a structural gravity approach that makes use of econometric and simulation approaches to offer a comprehensive assessment of the agreement's anticipated impacts on trade. We first develop a structural gravity model that serves as the basis of our analysis. Based on estimates of key trade policy parameters, we then simulate baseline and counterfactual trade flows under a conditional general equilibrium framework. This simulation enables us to quantify the changes in trade for RCEP countries, detailing the effects on trade with fellow RCEP members as well as with non-member countries, across sectors and countries.

Our analysis reveals significant trade benefits resulting from RCEP, with total trade increases amounting to $501.5 billion among RCEP partners. This results are driven in large part by sector-specific variability in the trade elasticity, estimates for which range from –3.03 to –0.73. The chemical sector, highly sensitive to tariff changes, is estimated to undergo the largest trade impacts from the implementation of the RCEP, showing trade increases of $210.8 billion for within-RCEP trade and $134.2 billion for trade with non-RCEP partners.

Other sectors also experienced notable growth from their original trade volumes. We categorized RCEP countries into three tiers based on trade gains. The first tier, including China, Japan, and South Korea, displayed significant trade creation, with import increases ranging from \$72.1 billion to \$123.0 billion and export growth from \$81.6 billion to \$99.8 billion. Notably, China maintained robust trade levels with non-RCEP countries, recording imports and exports at \$73.8 billion and \$97.1 billion, respectively, while Japan and South Korea saw increases of around \$45 billion in imports and approximately \$30 billion in exports from external trading partners. The second tier, comprising Thailand, Indonesia, Malaysia, Australia, Singapore, New Zealand, and Vietnam, observed more modest trade creation, ranging from \$8.3 billion to \$48.6 billion, and trade reallocation from \$4.1 billion to \$25.6 billion. The last tier, consisting of Cambodia, Laos, Myanmar, and Brunei, started with low trade costs with RCEP partners and witnessed minimal gains from RCEP's implementation.

Our findings underscores the pivotal role of tariff reductions in amplifying bilateral trade volumes under the RCEP. This decrease in trade costs is poised to significantly bolster regional trade, thereby facilitating deeper economic ties and fostering increased commerce across the Asia-Pacific region. Given the implications of these developments both regionally and globally, our estimates of these impacts provide valuable insights on this important development in the global trade arena.

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Appendix

The microfoundations of the CES-Armington version of the structural gravity model were first derived by Anderson (1979) based on a constant elasticity of substitution (CES) expenditure function. Anderson and van Wincoop (2003) famously expanded on this structure by establishing that the gravity relationship depends fundamentally on three factors: the economic size terms, bilateral trade frictions between trading partners, and the outward and inward multilateral resistance terms (MRTs) that describe the average barriers to trade with the rest of the world faced by exporters and importers, respectively. Here, we briefly describe the steps used to obtain the structural gravity equation used in our analysis.

Assuming CES preferences, the quantity demanded by consumers in country j of varieties of product k sourced from country i in year t are given by

$$x_{ijkt} = \left(\frac{\beta_{ikt} p_{ikt} t_{ijkt}}{P_{jkt}} \right)^{(1-\sigma_k)} e_{jkt}, \tag{9}$$

where P_{jkt} is the CES price index, $\beta_i > 0$ is a preference parameter, and $\sigma > 1$ is the elasticity of substitution between varieties of product k obtained from different sources. Define $p_{ijkt} = p_{ikt} t_{ijkt}$ where p_{ikt} is the factory-gate price in country i; p_{ijkt} is thus the received price of goods from exporter i in importer j inclusive of bilateral trade costs (i.e., the CIF price). The source of trade costs can be transportation cost, regulatory barriers, financial barriers, information costs, or any other factors that impede or encourage bilateral trade. Here, we assume exporters are responsible for trade costs and pass $t_{ij} - 1$ for each unit of the product that is shipped on to importers. The above demand function implies that the bilateral trade between country i and j depends on three parts: (i) a preference factor that is common for all the importers (β_{ikt}), (ii) price effects accounting for trade costs that negatively affect trade demand $\left(\frac{p_{ikt} t_{ijkt}}{P_{jkt}} \right)$, and (iii) market size/size of demand in the destination country j (x_{ijkt}). The CES price index is given by

$$P_{jkt} = \left[\sum_i \left(\beta_{ikt} p_{ikt} t_{ijkt} \right)^{(1-\sigma_k)} \right]^{1/(1-\sigma_k)},$$

a term that also reflects the inward multilateral resistance faced by an importing market j, i.e., the average trade barriers faced by j across all potential export sources i. The market clearing condition is the last building block of this multi-country trade model, implying that the income of exporter i is equal to all the expenditures from its trading partners including intra-national trade in the domestic market, given by $y_{ikt} = \sum_j x_{ijkt}$. By the same logic, the total expenditure at destination j is equal to all its imports from its trading partners and itself, $e_{jkt} = \sum_i x_{ijkt}$. Dividing the demand function by world market size y_{kt}^W, where $y_{kt}^W = \sum_i y_{ikt} = \sum_j e_{jkt}$, and rearranging terms yields the gravity equation

$$x_{ijkt} = \frac{y_{ikt} e_{jkt}}{y_{kt}^W} \left(\frac{t_{ijkt}}{\Pi_{ikt} P_{jkt}} \right)^{1-\sigma_k}.$$