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The Effects of CPTPP on Philippine Employment and Earnings: A CGE Approach

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Abstract

The objective of the study is to determine the potential impact of Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP) on the Philippines using a CGE-microsimulation model. From the standard Global Trade Analysis Project (GTAP) Database, the paper first considers the impact of CPTPPP on the Gross Domestic Product, sectoral exports and imports and welfare in terms of incomes or consumption. After looking at the aggregate market- level reactions, the study then measures the adjustments at the worker level and determines how the exposure to trade with a particular region such as the CPTPP affected these adjustments. The results of the empirical analysis indicate benefits and costs from joining the CPTPP. The benefits are: (a) Shifts towards unskilled labor employment relative to other inputs; (b) Increases in employment, both skilled and unskilled; (c) Increases in returns for primary factors, particularly labor; and (d) Increased employment in NCR, Central Luzon, but also in Western Mindanao and BARMM. The costs however are: (a) Lower GDP (as higher value-added industries decline); (b) Greater trade deficits (due to accessibility of more imports); and (c) Lower consumption surplus given more countries in the bloc but higher surplus if bloc is limited to original members (trade diversion due to the participation). Participation in CPTPP is expected to result in losers and winners, which in this case are labor-intensive industries. The losses however can be mitigated through government support by moving these industries towards the favored ones. Apart from taking advantage of the abundant unskilled labor resources in the country and reducing wage inequality between skilled and unskilled workers, participation in CPTPP also indicates export diversification.

Keywords: Free Trade Agreements, Computable General Equilibrium, Trade, Employment, Factor Returns

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1. Introduction

The Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP) is a free trade agreement (FTA) between Australia, Brunei Darussalam, Canada, Chile, Japan, Malaysia, Mexico, Peru, New Zealand, Singapore, and Viet Nam signed in Santiago, Chile. CPTPP is in the league of the largest trade blocs in the world, with a combined population of about 500 million people and around 12 percent of global output in 2021, (Government of Canada, 2019; PIIE, 2022). Several economies, including the Philippines, have expressed interest to join CPTPP since the Agreement's entry into force in December 2018 (Philippine News Agency, 2021).

This study aims to assess the macroeconomic and welfare impacts of the Philippine accession to the CPTPP using the standard Global Trade Analysis Project (GTAP) model. More specifically, the study looks into the sectoral employment and wage impacts of the country's enhanced access to these CPTPP participating countries through different tariff elimination and non-tariff measures (NTMs) reduction scenarios The study makes use of the standard GTAP Database version 10 database released in 2019 covering the latest reference years 2004, 2007, 2011, and 2014 for global trade data.

Following the Hecksher-Ohlin (1991) and Stolper-Samuelson (1941) theory, the study first considers the aggregate impact of CPTPP on total output as measured by the gross domestic product (GDP), sectoral exports and imports, and welfare in terms of incomes or consumption. After which, the study focuses on analyzing the effects on labor market outcomes such as labor demand, and worker movements by skill, type of work, and age categories through a microsimulation model.

The rest of the study proceeds as follows: Section II provides a brief description of the CPTPP and its potential impact to the Philippines. Section III features a theoretical framework to indicate the expected results from the engagement with the FTA. Section IV discusses the empirical methodology. Section V presents the results of the empirical model. Section VI concludes the paper and offers policy recommendations.

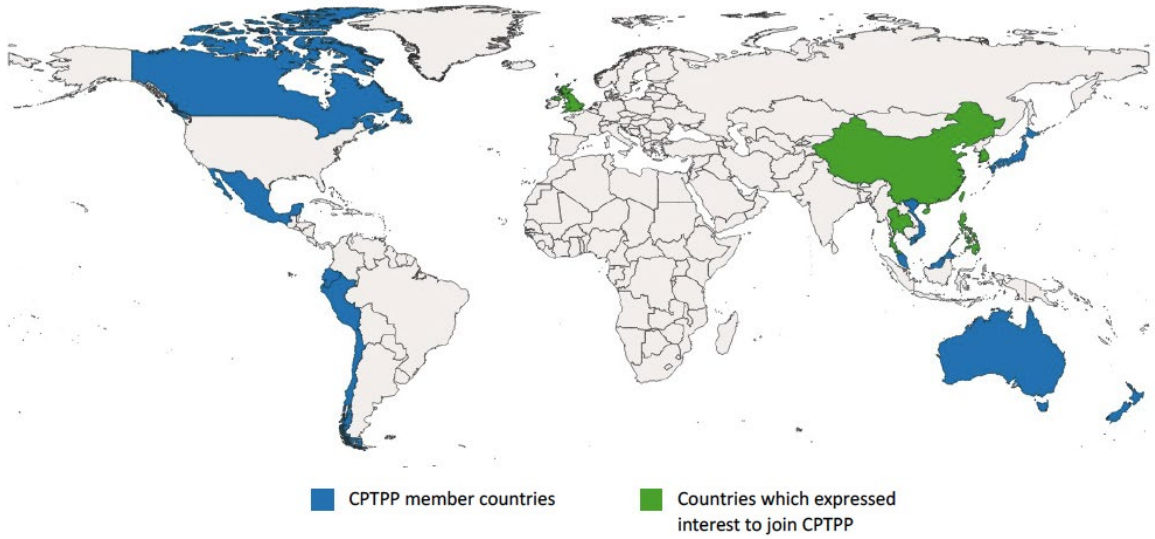
2. Significance of the CPTPP to the Philippines

The CPTPP was first conceived as a comprehensive trade agreement called the Trans-Pacific Strategic Economic Partnership Agreement (TPSEP), also known as Pacific-4 (P4) FTA, signed in 2005 among four countries, Brunei Darussalam, Chile, Indonesia, and New Zealand, with a view to, among others, reduce tariffs by up to 90 percent among its members. Building on the TPSEP, a broader agreement was discussed and negotiated with greater participating

countries[1] leading to the signing of the CPTPP in March 2018. Six countries, including Australia, Canada, Japan, Mexico, New Zealand, and Singapore ratified the pact within the year and the agreement went into force by 30 December 2018 (WTO, 2021).

At present, the eleven economies comprising the CPTPP have a combined GDP of USD 11.7 trillion, which is equivalent to 12.2 percent of the world's GDP in 2021. The CPTPP bloc also accounts for USD 3.9 trillion worth of exports (14.1 percent of global exports) and USD 3.8 trillion worth of imports (14.0 percent of global imports). The combined population of its member countries is 514 million (or 6.6 of the world's population), which makes it one of the largest FTAs in terms of consumption base (World Bank, 2022).

Figure 1. CPTPP member countries, and economies which expressed interest to join the Agreement as of 2021



Source: Authors' depiction using Quantum Geographic Information System

Several economies have formally expressed intent to join the partnership, including the United Kingdom (UK) on February 2021, People's Republic of China (PRC) and Taiwan on September 2021, and Ecuador on December 2021. In February 2021, the Philippines also inquired on the accession process, opening up discussions on the possibility of the country's inclusion in the trade agreement (Philippine News Agency, 2021). The Republic of Korea (ROK) and Thailand also signified interest to be part of CPTPP (Government of the United States Congressional Research Service, 2022; Scott, 2022). Interested participants will have to abide the Agreement's high-standard rules and elevated commitments, and will be subject to negotiations with the trade bloc's existing members.

If these seven economies become parties to the agreement, CPTPP is set to become an economic giant with a combined GDP of USD 36.2 trillion (37.7 percent of world GDP),

*Authors are members of Ateneo de Manila University Economics Department, International Trade Research Laboratory.
[1] Australia, Canada, Malaysia, Mexico, Japan, Peru, Viet Nam, and the United States before it formally withdrew

combined exports value of USD 10.0 trillion (35.9 percent of global exports), combined imports value of USD 9.3 trillion (34.6 percent of global imports), and market access to a total population of 2.3 billion (28.9 percent of the world's population) (World Bank, 2022).

At present, CPTPP is the market destination for 27.3 percent of goods and 22.5 percent of services exported by the Philippines. The bloc is also the source for 26.5 percent of goods and 23.9 percent of services imported by the country. As of 2021, 88.7 percent of the Philippines' net equity capital are also accounted for by the current members of the CPTPP, with Singapore already accounting for 70.9 percent of the country's net equity. In addition, four of its top trading partners are also signatories of the trade agreement, including Japan, Singapore, Malaysia, and Viet Nam.

The inclusion of other countries which expressed interest to join CPTPP is expected to further increase the economic significance of CPTPP in the perspective of the Philippines. Table 1 outlines the bilateral significance of the CPTPP membership in terms of trade in goods and services, and investment. Accession of the Philippines to the CPTPP also implies gaining trade agreement with economies where it has no existing trade partnership, such as Canada[2], Chile, Mexico, Peru, and possibly, Ecuador if it also accedes to CPTPP.

Table 1. Trade Significance of Comprehensive and Progressive Agreement for Trans-Pacific Partnership to the Philippines

	Existing members	Expanded members (with PRC)	Expanded members (without PRC)
Share to Philippines' total exports of goods (in percent)[3]	27.3	54.8	39.4
Share to Philippines' total exports of services (in percent)[4]	22.5	43.8	34.3
Share to Philippines' total imports of goods (in percent)[5]	26.5	68.1	45.4
Share to Philippines' total imports of services (in percent)[4]	23.9	42.7	35.8
Share to total net equity capital (in percent)[5]	88.7	90.9	90.4

[2] ASEAN and Canada are currently examining the potential benefits of establishing an ASEAN-Canada FTA, and a feasibility study jointly conducted by ERIA on behalf of ASEAN and Global Affairs Canada was completed in 2018 (ASEAN Secretariat 2022).

[3] Merchandise Trade data from UN ComTrade 2021. Other Asia, not included elsewhere included as it captures the bulk of trade statistics for Taiwan.

[4] OECD Balanced International Trade in Services as of 2019

[5] Bangko Sentral ng Pilipinas. Based on BPM6, direct investments can be in the form of equity capital, reinvestment of earnings and debt instruments. Net equity capital is broken down by country of origin. No industry and no country breakdown are available for reinvestment of earnings and debt instruments in the

Economies with current trade agreement with the Philippines	Japan, Malaysia, Singapore, Viet Nam	PRC, Japan, Malaysia, ROK, Singapore, Viet Nam, Taiwan, Thailand	Japan, Malaysia, ROK, Singapore, Viet Nam, Taiwan, Thailand
Economies without current trade agreement with the Philippines	Canada, Chile, Mexico, Peru		Canada, Chile, Ecuador, Mexico, Peru

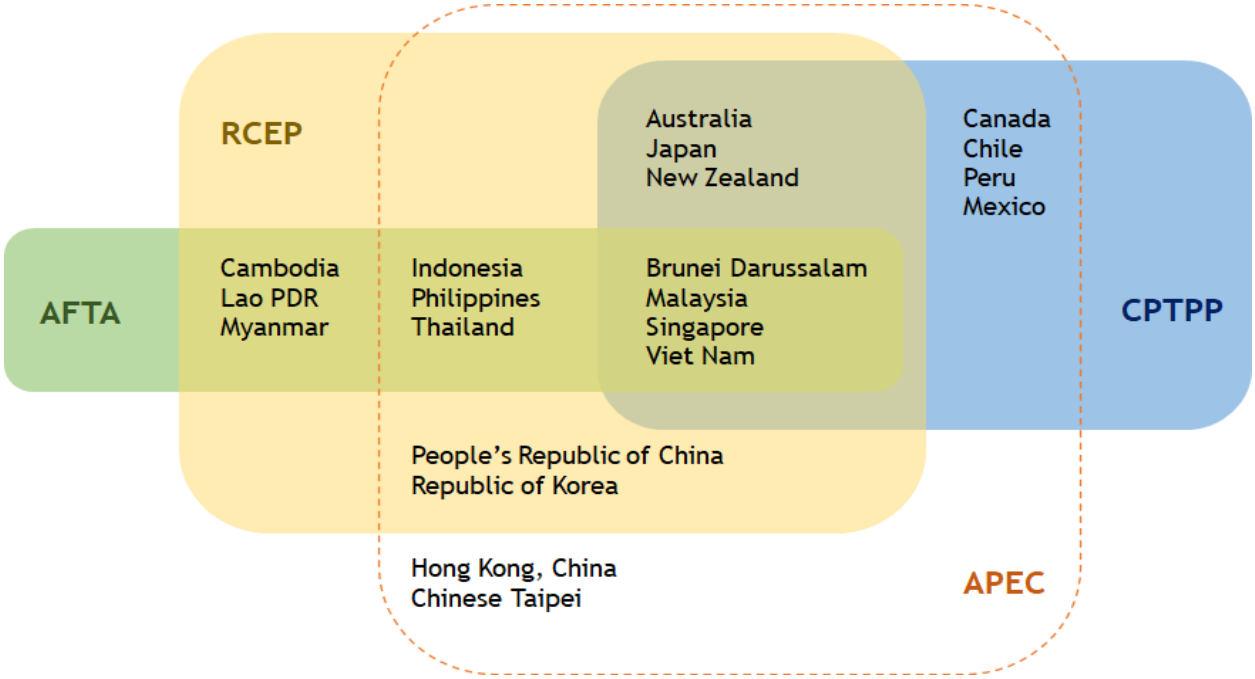
Source: Authors' calculations from UN ComTrade, OECD Balanced International Trade in Services, and Bangko Sentral ng Pilipinas data. Refer to footnotes 3 to 5.

Megaregional Agreements in the Asia and the Pacific: The Comprehensive and Progressive Agreement for Trans-Pacific Partnership and the Regional Comprehensive Partnership Agreement

The CPTPP is often compared to another megaregional trade agreement, the Regional Comprehensive Partnership Agreement (RCEP) led by the Association of Southeast Asian Nations (ASEAN). Signed in November 2020 by all 10 ASEAN Member States (AMS) and Dialogue Partners Australia, Japan, New Zelaand, PRC, and ROK, the RCEP Agreement is biggest trade pact to date, covering a market of 2.2 billion people with a combined size of USD 26.2 trillion or 30 percent of the world's GDP (ASEAN Secretariat, 2020). Trade experts envision CPTPP and RCEP as pathways towards greater economic cooperation and regional integration among economies in the Asia-Pacific region culminating in the realization of a Free Trade Area of the Asia-Pacific (FTAAP). Seven CPTPP member countries are also signatories of the RCEP, namely: Australia, Brunei Darussalam, Japan, Malaysia, New Zealand, Singapore, and Viet Nam (Figure 1).

absence of information. Singapore alone comprises 70.9 percent of the total equity as of 2021. https://www.bsp.gov.ph/statistics/external/tab10_fdc.aspx

Figure 2. Memberships to select Regional Trade Agreements in the Asia Pacific



Note: AFTA = ASEAN Free Trade Area; APEC = Asia Pacific Economic Cooperation; CPTPP = Comprehensive and Progressive Agreement for Trans-Pacific Partnership; Lao PDR = Lao People's Democratic Republic; RCEP = Regional Comprehensive Partnership Agreement
Source: Authors' Illustration.

Both the CPTPP and the RCEP aim to enhance cross-border trade, reduce trade and non-trade barriers, and deepen regional integration among its members, but the Agreements have considerable differences in scope and depth. reduce The CPTPP contains provisions on more 'beyond the border' disciplines such as environment, standards in labor, state-owned enterprises, regulatory coherence, and transparency and anti-corruption, among others (Table 2). On market access provisions, the RCEP is observed to be less rigorous in terms of trade liberalization compared to the CPTPP. Under the CPTPP, tariffs are to be eliminated in 96 percent of products traded within the bloc. In contrast, only 90 percent of goods are covered under the RCEP, and among these, import charges will not be completely removed in the transition period (Park et al., 2021).

Table 2. Chapters in the Comprehensive and Progressive Agreement for Trans-Pacific Partnership and the Regional Comprehensive Partnership Agreement

Provision	CPTPP Chapter	RCEP Chapter
Initial Provisions and General Definitions	Chapter 1	Chapter 1
Trade in Goods	Chapter 2: National Treatment and Market Access for Goods[a]	Chapter 2
Rules of Origin	Chapter 3: Rules of Origin and Origin Procedures[b]	Chapter 3[n]

	Chapter 4: Textiles and Apparel[c]	
Trade Facilitation	Chapter 5: Customs Administration and Trade Facilitation	Chapter 4: Customs Procedures and Trade Facilitation[o]
Trade Remedies	Chapter 6[d]	Chapter 7[p]
Sanitary and Phytosantary Measures	Chapter 7	Chapter 5
Technical Barriers to Trade	Chapter 8[e]	Chapter 6: Standards, Technical Regulations, and Conformity Assessment Procedures
Investment	Chapter 9[f]	Chapter 10[q]
Trade in Services	Chapter 10: Cross Border Trade in Services[g]	Chapter 8[r]
	Chapter 11: Financial Services[h]	Chapter 8 (Annex 8A) [r]
Movement of Persons	Chapter 12: Temporary Entry for Business Persons	Chapter 9: Temporary Movement of Natural Persons
	Chapter 13: Telecommunications[i]	
Electronic Commerce	Chapter 14	Chapter 12
Government Procurement	Chapter 15	Chapter 16[s]
Competition Policy	Chapter 16[j]	Chapter 13: Competition[t]
State-Owned Enterprises	Chapter 17: State-Owned Enterprises and Designated Monopolies[k]	
Intellectual Property	Chapter 18	Chapter 11[u]
Labour	Chapter 19	
Environment	Chapter 20[l]	
Cooperation and Capacity Building	Chapter 21	Chapter 15: Economic and Technical Cooperation
Competitiveness and Business Facilitation	Chapter 22	
Development	Chapter 23	
SMEs	Chapter 24: Small and Medium-Sized Enterprises	Chapter 14: Small and Medium Enterprises
Regulatory Coherence	Chapter 25	
Transparency and Anti-Corruption	Chapter 26[m]	
Administrative and Institutional Provisions	Chapter 27	Chapter 18: Institutional Provisions[v]
Dispute Settlement	Chapter 28	Chapter 19
General Provisions and Exceptions	Chapter 29	Chapter 17
Final Provisions	Chapter 30	Chapter 20

Notes:[a] The CPTPP includes Annexes on the following: National Treatment and Import and Export Restrictions (Annex 2-A); Remanufactured Goods (Annex 2-B); Export Duties, Taxes and Other Charges (Annex 2-C); and Tariff Commitment (Annex 2-D). Party-specific Annexes to the Chapter are also provided by the Members.

[b] The CPTPP includes Annexes on the following: Other Arrangements (Annex 3-A); Minimum Data Requirements (Annex 3-B); De Minimis Exceptions (Annex 3-C); Product Specific Rules of Origin (Annex 3-D); and Appendix on Provisions related to the Product-Specific Rules of Origin for certain vehicles and parts of vehicles.

[c] The CPTPP includes Annexes on Specific Rules of Origin of Textile Products (Annex 4-A); and Short Supply List of Products (Annex 4-B)

[d] The CPTPP includes an Annex on Practices Relating to Antidumping and Countervailing Duty Proceedings (Annex 6-A).

[e] The CPTPP includes product-specific Annexes on: Wine and Distilled Spirits (Annex 8-A); Information and Communications Technology Products (Annex 8-B); Pharmaceuticals (Annex 8-C); and Cosmetics (Annex 8-D); Medical Devices (Annex 8-E); Proprietary Formulas for Pre-packaged Foods and Food Additives (Annex 8-F); and Organic Products (Annex 8-G).

[f] The CPTPP includes Annexes on the following: Customary International Law (Annex 9-A); Expropriation (Annex 9-B); Expropriation Relating to Land (Annex 9-C); Service of Documents on a Party Under Section B (Investor State Dispute Settlement) (Annex 9-D); Transfers (Annex 9-E); Annex 9-F, which describes provisions on Chile's Decree Law 600; Public Debt (Annex 9-G); Annex 9-H, which describes some CPTPP Parties' foreign investment policy decisions; Non-Conforming Measures Ratchet Mechanism (Annex 9-I); Submission of a Claim to Arbitration (Annex 9-J); Submission of Certain Claims for Three Years After Entry into Force (Annex 9-K); and Investment Agreements (Annex 9-L),

[g] The CPTPP includes Annexes on the following: Professional Services (Annex 10-A); Express Delivery Services (Annex 10-B); and Non-Conforming Measures Ratchet Mechanism (Annex 10-C).

[h] The CPTPP includes Annexes on Cross-Border Trade (Annex 11-A); Specific Commitments (Annex 11-B); Non-Conforming Measures Ratchet Mechanism (Annex 11-C); Authorities Responsible for Financial Services (Annex 11-D); and Annex 11-E, which expresses some CPTPP Parties' policies on consent to arbitration.

[i] The CPTPP includes Annexes on Rural Telephone Supplies in United States (Annex 13-A) and Peru (Annex 13-B)

[j] The CPTPP includes an Annex on the Application of Article 16.2, Article 16.3 and Article 16.4 to Brunei Darussalam (Annex 16-A)k The CPTPP includes Annexes on the following: Threshold Calculation (Annex 17-A); Process for Developing Information Concerning State-Owned Enterprises and Designated Monopolies (Annex 17-B); Further Negotiations (Annex 17-C); Application to Sub-Central State-Owned Enterprises and Designated Monopolies (Annex 17-D); Singapore (Annex 17-E); and Malaysia (Annex 17-F).

[k] The CPTPP includes Annexes on the following: Annex to Article 18.7.2 (International Agreements) (Annex 18-A); Annex to Article 18.50 (Protection of Undisclosed Test or Other Data) and Article 18.52 (Biologics) (Annex 18-B); Annex to Article 18.50 (Protection of Undisclosed Test or Other Data) and Article 18.52 (Biologics) (Annex 18-C); Annex to Article 18.46 (Patent Term Adjustments for Patent Office Delays), Article 18.50 (Protection of Undisclosed Test or Other Data) and Article 18.52 (Biologics) (Annex 18-D); Annex to Section J (Internet Service Providers) (Annex 18-E); and Annex to Section J (Internet Service Providers) (Annex 18-F).

[l] The CPTPP includes Annexes on obligations under the Montreal Protocol (Annex 20-A); and obligations under The International Convention for the Prevention of Pollution from Ships (MARPOL) (Annex 20-B).

[m] The CPTPP includes an Annex on Transparency and Procedural Fairness for Pharmaceutical Products and Medical Devices (Annex 26-A), and an Appendix on Party-Specific Definitions.

[n] The RCEP includes Annexes on Product-Specific Rules (Annex 3A) and Minimum Information Requirements (Annex 3B).

[o] The RCEP includes an Annex on Period of Time to Implement the Commitments (Annex 4A).

[p] The RCEP includes an Annex on Practices Relating to Anti-Dumping and Countervailing Duty Proceedings (Annex 7A).

[q] The RCEP includes Annexes on Customary International Law (Annex 10A) and Expropriation (Annex 10B).

[r] The RCEP includes Annexes on the following: Financial Services (Annex 8A); Telecommunication Services (Annex 8B); and Professional Services (Annex 8C).

[s] The RCEP includes an Annex on Paper or Electronic Means Utilised by Parties for the Publication of Transparency Information (Annex 16A)

[t] The RCEP includes Annexes on the Application of Article 13.3 and 13.4 to Brunei Darussalam (Annex 13A), Cambodia (Annex 13B), Lao PDR (Annex 13C), and Myanmar (Annex 13D).

[u] The RCEP includes Annexes on Party-Specific Transition Periods (Annex 11A) and List of Technical Assistance Requests (Annex 11B).

[v] The RCEP includes an Annex on Functions of the Subsidiary Bodies of the RCEP Joint Committee (Annex 18A).

Source: Authors' compilation using the CPTPP and the RCEP legal texts.

3. Theoretical Framework

There have been several studies that have undertaken country level effects of the CPTPP deal, using a CGE model, including that of Khan and Khan (2021), in the case of the United Kingdom, and Itakura and Lee (2021), in the case of the United States. In the Philippines, Cororaton and Orden (2015) undertook a study to analyze the effects of tariff changes in the TPP and found that potential welfare gains can be made.

This work also contributes to the literature on the labor market consequences of globalization, much of which focuses on the consequences of international competition for wages and employment at the firm, industry, or region level. The major works here are Amiti and Davis (2012), Hummels et al. (2014), Artuc, et. al. (2010), Ebenstein et al. (2014), Chiquiar (2008), Topalova (2010), and Kovak (2013). Following Autor, et.al. (2014), this study shifts the focus from aggregate market- level reactions to adjustments at the worker level and measure exposure to trade with a particular region, like CPTPP.

According to the Hecksher-Ohlin (H-O) theory, countries will sell to the world market goods that use its more plentiful resource and will purchase internationally goods that use meager resources intensively. Trade thus raises the local demand for the country's abundant factors, because of the expansion of its export sectors, and reduces the demand for scarce resources because of the more diminished import-competing sectors. This will presumably lead to greater production, increased income and eventually higher welfare for the country (Hecksher and Ohlin, 1991).

In turn, factor prices will adjust, raising the prices of abundant factors and decreasing scarce resources in the local market. In developing countries, unskilled labor tends to be more abundant and skilled labor scarcer compared to the developed countries. A free trade agreement tends to increase the wages of unskilled workers and lower the skilled wages, thereby creating greater wage equality.

In contrast, non-participation in free trade agreements results in the maintenance of barriers (e.g., transport costs and tariffs) which lead in either limited trade or autarky. These barriers will then keep the same exports and production, while failing to develop its local resources. Even without participation in the free trade agreements, the country will experience lower outputs as members of the trading blocs will engage in greater trade among themselves, causing the country to lose its trade opportunities. Joining a trading bloc reduces these trade barriers, hence expanding trade because of the higher export prices and the lower import price in the less developed country.

The key hypothesis of the H–O model for the labor market is that international trade should increase labor demand in labor-abundant countries, and that real wages should tend to equalize between trading partners. Aleman-Castilla (2020, p.5) encapsulates the theory as follows:

> ""The essence of the H–O theory may be summarized in four theorems: (a) the Heckscher–Ohlin theorem, which postulates that countries export goods whose production is intensive in the use of those countries' abundant factors, and import goods whose production relies to a great extent on their scarce factors; (b) the factor-price equalization theorem, which postulates that trade tends to equalize

> the real prices of the factors of production between countries (and therefore regards trade as a substitute for international mobility of factors); (c) the Stolper–Samuelson theorem, which postulates that a rise in the relative price of a good generates an increase in the return to (or earnings of) the factor used most intensively in its production, and a fall in the return to the scarce factor; (d) and the Rybczynski theorem, which postulates that an increase in the endowment of one of the factors of production will increase the production of the good that uses that factor intensively and reduce the production of the other good..”

In a country with abundant unskilled labor, such a change in relative domestic producer prices would raise the wage of unskilled workers relative to that of skilled workers. This link, known as the Stolper-Samuelson theorem, exists because, as the H-O theory assumes, technology (that is, the relationship between inputs and outputs) is given. In other words, it assumes a fixed functional relationship between outputs of goods and inputs between the prices of goods and factors of production (Lanzona, 2021).

One consequence of trade under the H-O model is the increased propensity for export diversification emerging from the opening of new export lines that are already active in other countries. This is particularly true for developing countries copying existing products invented elsewhere and exporting those products as new export lines. Export diversification is a mechanism not only for raising export revenues but also a means to reduce uncertainties as a result of changing global demands for a product.

In the H-O model, however, the focus is not the diversification of exports per se, but the diversity of factor resources that can lead to additional products. In effect, apart from resource accumulation, there is no need for government to intervene in other policies to achieve export diversification. Given any product, as long as resources are available, the country is expected to produce new exports.

Many authors (e.g., Brainard and Cooper, 1968; de Rosa, 1992) nevertheless pointed out that there are limits to the export diversification that can be achieved. The transition to abundant resource-intensive production involves additional marginal costs. Resources which were being used in the production of goods before the decreased tariffs will need to be adjusted, and labor will have to be retrained to move to other sectors. Given the uncertainty involved in the process, the government may not be willing to invest in export diversification. In which case, private investments both domestic and foreign will be required for these shifts.

Related to the concept of export diversification is the issue regarding the difference between gross exports and value-added exports. In situations where exports are dependent on foreign products (imports), value-added from exports can be overestimated (Johnson, 2014). In contrast, for products that are dependent on local resources, the value-added accounts can be lower because its values are more accurately and correctly calculated. For most Asia and the Pacific economies, the gross exports approach underestimates export diversification compared to the value-added approach. Analysing these trends, Bajaj, et al. (2022) argue for the use of latter approach to complement the more traditional gross export approach. One general finding in their study is that divergence between diversification in exporting sectors and in sectors contributing to exports narrowed as income levels of economies increased.

This analysis has the important implications: First, if the H-O theory has any relevance to free trade agreements and the trade and income trends in low-wage countries, joining the CPTPP will result price i*n*creases in the country′s potentially competitive goods and price decreases in the more costly products. In effect, greater export diversification is expected. Based on the Stolper-Samuelson and the Factor Price Equalization theorems, these movement consequently lead to increased wages for unskilled labor which comprise most workers in the country. In other words, it is no longer the ratio if skilled and unskilled workers that matters, but the ratio of world prices that will determine the ratio of skilled and unskilled wages.

Second, the relevance of the ratio of factor supplies or the factor content in trade (FCT) used in many studies is found only in cases where there is an infinite number of goods being traded. For a small country trading under competitive conditions, such a condition may also be appropriate since prices will indicate the scarcity levels of such factors. This suggest that export diversification may eventually face boundaries However, in a setting where most fir*m*s trade based on scale economies, then the value of FCT as a tool of analysis may be limited. This means that the benefits from free trade may be limited unless government subsidies and private investments for product diversification are formed.

Third, the movement for export diversification can cause lower value-added exports if there is an overestimation of value added of exports before engagement in free trade agreements. This means that to take advantage of the opportunities from free trade, . Moreover, the response of the government may not be adequately captured in the data.

In summary, the benefits from participating in a trade bloc may be somehow hampered by the limits on the increased costs needed to engage in export diversification. Nevertheless, given the issues regarding value-added computations, the effects of additional trade on output values, such as GDP, may be of limited concern compared to the changes in the movements of labor and its corresponding returns. The returns from free trade then depends on how well the country can shift fully to the competitive sectors and raise their value-added.

4. Empirical Methodology

The empirical methodology consists of two parts: Multi-region Computable General Equilibrium (CGE) model and Employment microsimulation. What follows is simplified version of the methodology. An Appendix is provided for a more technical treatment of these two parts of the methodology.

4.1. CGE models as tools in ex ante assessment of trade

CGE models are standard tools in ex ante analysis of trade deals. With the structure of a CGE model, simulation of trade policy is straightforward. If one wishes to determine the impact of tariff adjustment, the net change in tariff rates can serve as the shock to the model. The solution of the model serves as the new equilibrium of the economy. The impact is measured simply as the difference between the baseline (no CPTPP) and the new equilibrium (with CPTPP). Since the Philippines is engaged in global trade, the emergence of the CPTPP will affect the world prices and the prices and output in the local economy whether the country engages in the agreement or not.

CGE models have been employed in the impact of trade on national economies (Nielsson, 2019; Piermartini and Teh, 2005). There are countless CGE models that have been developed to assess the impact of trade on economies. CGE models for trade analysis are often multi-regional models, which encompass several countries. These models incorporate multiple economies that interact with each other. Among the most popular CGE models used specifically for trade is the Global Trade analysis Project (GTAP) model, which is perhaps the biggest model in terms of regions covered.

4.2. GTAP model

The multi-region model that will be used in this analysis is the Standard Global Trade Analysis Project (GTAP) model which operationalizes a voluminous database that contains bilateral trade, transport and protection data linked with country input-output tables that outline the interrelationships for each region. The development of the GTAP model in the early 1990s was motivated by the desire for greater transparency in the quantitative analysis of global policy issues, specifically focused on trade (GTAP, 2007). Academics from the United States and Australia, who were initially dissatisfied with the difficulty of verifying the results of early CGE-based presentations in academic conferences, formed the workhorse of the GTAP.

The GTAP model is essentially a member of a family of computable general equilibrium using principles described in the so-called "1-2-3" model (de Melo and Robinson, 1989). The approach in the construction of this model is the development of archetype country model linked to other regions by their trading relationships, and the demand and supply of trade and transport services. Similar to other CGE models, the price systems in this model are linearly homogenous and the interest is in terms of relative, rather than absolute, changes in the macroeconomic values, following shocks and changes to the economy.

The labor microsimulation model will be developed along the lines suggested by Robillard, Bourguignon and Robinson (2008), where the values in the CGE model is utilized to generate a vector of prices, wages and employment variables and the household model generates changes in wage and self-employment incomes and employment status of households. This is based on an earlier work made by Alatas and Bourguignon (2005) that assessed the effects of a financial sector shock in Indonesia, with the following wage (w) and self-employment incomes (y) for specific households h, each with working members i.

Another alternative would be a household microsimulation using non-parametric models, as suggested by Ganuza, Barros and Vos (2002), which implies partly randomizing the movement of workers from different categories in the labor force. The household microsimulation data would be derived from the 2018 Family Income and Expenditure Survey and the quarterly roundsof the 2018 Labor Force Survey.

This paper utilizes the GTAP database version 10 (which has a 2014 reference year) through the RunGTAP application, which is based on the GTAP base model, a multi-region, multisector, computable general equilibrium model, with perfect competition and constant returns to scale as its economic behavioral assumptions to simulate the impact of CPTPP in the Philippines. The flow of values in the standard GTAP model is summarized in Figure 4. The red line shows the flow of incomes while the blue line shows the flow of expenditures.

Incomes accrue to the representative household for a particular region. This representative household spends its income on final demand as either private household consumption (privexp), savings (save), or government expenditures (govexp). The final demand is expressed

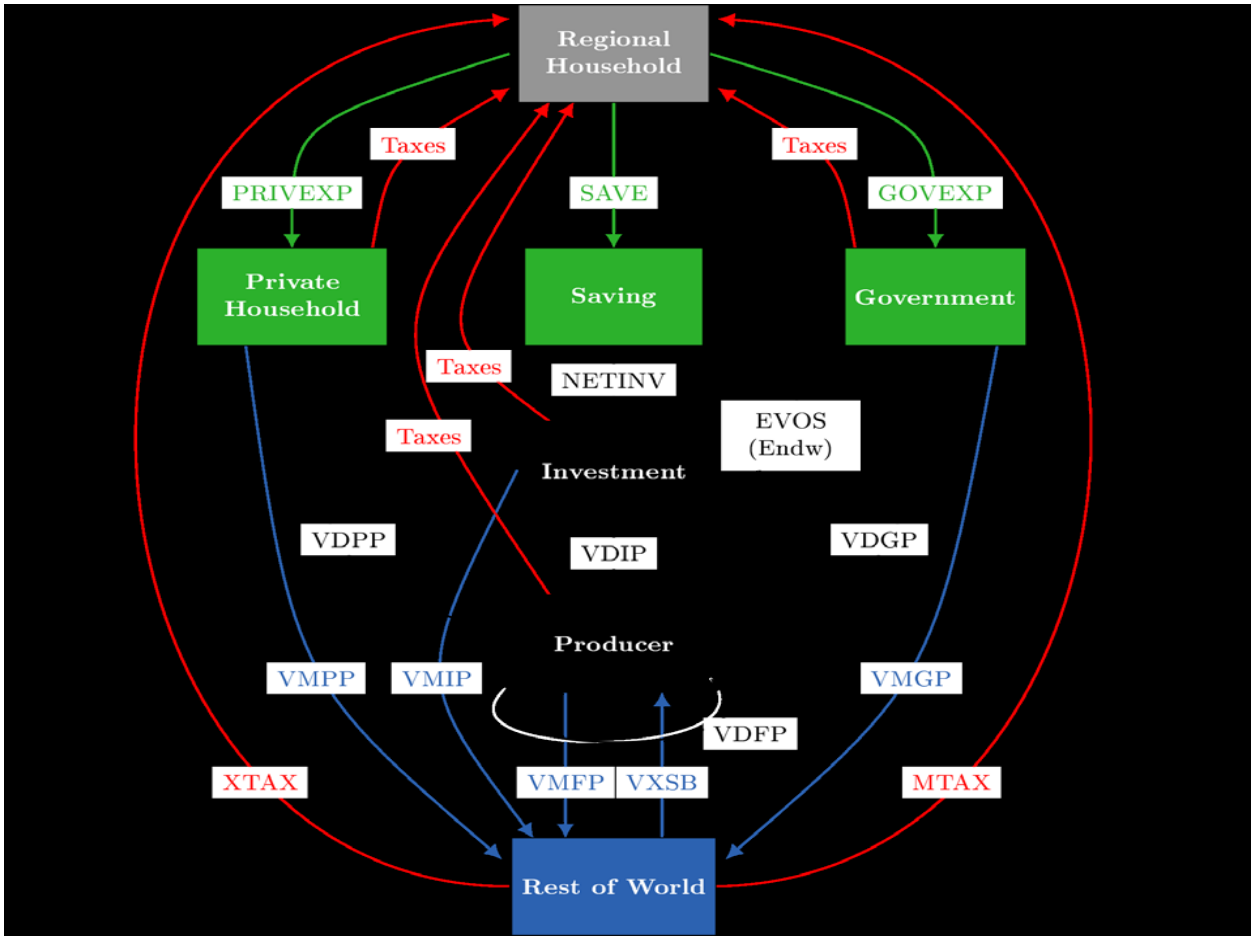
as a Cobb-Douglas utility function that combines these final demands. Government consumption behavior is modeled using a Cobb-Douglas utility function. Meanwhile, private household consumption is modeled using a constant difference of elasticity (CDE) implicit expenditure function. Brockmeier (2001) notes that although CDEs are less general compared to the more popular CES functions, it is more flexible and is easily calibrated and therefore suitable for the analysis of household behavior in a general equilibrium framework. In the model, all savings are transformed into investments and no surplus savings exist. In static models, investments do not play a role in productive capacities of sectors. The only way they affect production is through the demand for investment goods (Brockmeier, 2001).

Producers pay households for their use of primary factor endowments of households. Meanwhile, producers receive payments for their goods and services consumed by households and government, and other producers who use final goods as intermediate inputs. GTAP assumes zero profit so all revenues of producers are used in purchasing intermediate inputs and as payment to factors of production.

Single-country CGE models aggregate the transactions with other countries into a single account called rest of the world. In GTAP, the rest of the world represents other regions in the model.[6] In Figure 4, values also flow from, and to, the rest of the world. Producers earn revenue from supplying goods and services to the rest of the world; however, they also spend their revenues for intermediate inputs bought abroad. The regional representative household also transacts with the rest of the world. GTAP uses the Armington assumption, that is, goods that are sold in the domestic market are composite of both locally produced goods and imports, and that there is imperfect substitution between both of these goods.

[6] 'Regions' in this sense means either single countries or aggregated countries.

Figure 3. GTAP flow of values



Source: Adapted from Corong et al (2021) and Brockmeier (2001).

Data aggregation

The CGE model used in this study covers 65 sectors and 4 regions, which have been aggregated from a total list of 121 countries in the GTAP database. The 65 sectors covered in the model are presented in Table 3.

The regions highlighted in the model are Canada, Australia, Brunei, Chile, Japan, Malaysia, Mexico, New Zealand, Peru, Singapore, Vietnam. These regions are aggregated into a single region called CPTPP. The Philippines expressed its interest to join CPTPP and so it is also included as a separate region. The last region included in the model comprises countries that also expressed interest in joining CPTPP. These countries are China, Ecuador, Korea, Taiwan, Thailand, and United Kingdom. The rest of the world are aggregated in to a single region called ROW. The current regional aggregation assumes that apart from the Philippines and other countries identified above, there are no other countries that are willing to join CPTPP.

Table 3. GTAP sectors

Code	Description	Code	Description	Code	Description	Code	Description
Pdr	Paddy rice	**vol**	Vegetable oils and fats	**eeq**	Electrical equipment	**ros**	Recreational and other services
wht	Wheat	**mil**	Dairy products	**ome**	Machinery and equipment nec	**osg**	Public Administration and defense
Gro	Cereal grains nec	**pcr**	Processed rice	**mvh**	Motor vehicles and parts	**edu**	Education
v_f	Vegetables, fruit, nuts	**sgr**	Sugar	**otn**	Transport equipment nec	**hht**	Human health and social work activities
Osd	Oil seeds	**ofd**	Food products nec	**omf**	Manufactures nec	**dwe**	Dwellings
c_b	Sugar cane, sugar beet	**b_t**	Beverages and tobacco products	**ely**	Electricity		
Pfb	Plant-based fibers	**tex**	Textiles	**gdt**	Gas manufacture, distribution		
Ocr	Crops nec	**wap**	Wearing apparel	**wtr**	Water		
Ctl	Bovine cattle, sheep and goats, horses	**lea**	Leather products	**cns**	Construction		
Oap	Animal products nec	**lum**	Wood products	**trd**	Trade		
Rmk	Raw milk	**ppp**	Paper products, publishing	**afs**	Accommodation, Food and service activities		
Wol	Wool, silk-worm cocoons	**p_c**	Petroleum, coal products	**otp**	Transport nec		
Frs	Forestry	**chm**	Chemical products	**wtp**	Water transport		
Fsh	Fishing	**bph**	Basic pharmaceutical products	**atp**	Air transport		
Coa	Coal	**rpp**	Rubber and plastic products	**whs**	Warehousing and support activities		
Oil	Oil	**nmm**	Mineral products nec	**cmn**	Communication		
Gas	Gas	**i_s**	Ferrous metals	**ofi**	Financial services nec		
Oxt	Other Extraction (formerly omn Minerals nec)	**nfm**	Metals nec	**ins**	Insurance (formerly isr)		
Cmt	Bovine meat products	**fmp**	Metal products	**rsa**	Real estate activities		
omt	Meat products nec	**ele**	Computer, electronic and optical products	**obs**	Business services nec		

Source: GTAP.

4.3. Simulation scenario

The Philippines is yet to join CPTPP, thus and as with other countries that expressed interest to join CPTPP, it does not have tariff commitments yet. This paper assumes that countries that expressed willingness to join CPTPP such as the Philippines accept all agreed upon tariff commitments in the trade deal. In essence, CPTPP aims to eliminate tariffs in almost all goods. This is translated in the simulation as a reduction in tariffs for all goods of CPTPP participants to zero. This paper also assumes that new entrants to the CPTPP will also eliminate all their tariffs.

There are four simulation scenarios in this study. First, Philippines and other countries forgo joining the CPTPP. Second, Philippines joins CPTPP, but no other countries that expressed interest. Third, both the Philippines and other countries join CPTPP. Finally, only other countries join CPTPP.

This study employs a static simulation. Although simulations are conducted over several periods in many trade-oriented CGE models, in this paper, a static model is preferred due to its parsimony. The results of simulations are interpreted as instantaneous reaction of the economy that disregards the time when the changes will occur assuming that all shocks have been accounted.

4.4 Microsimulation model

The CGE model used in this study does not incorporate a detailed labor market, thus, impacts on employment can only be assessed at the macro level. One approach to improve labor market modeling in CGE models is through microsimulation (Boeters and Savard, 2011). In this paper, an employment microsimulation based on Tiberti, Cicowiez and Cockburn (2017) and Robilliard, Bourguignon and Robinson (2008) is used and is discussed below.

In the CGE model, unemployment is voluntary. In the microsimulation model, individuals choose whether to participate in the labor market or not. Let Z_{ih} be an individual i's utility from participating in the labor market given by the logistic model

$$Z_{ih} = \alpha_i + \sum_{j=1}^{J} \beta_{ij} X_{ij} = \ln \frac{P(E)}{1 - P(E)} \qquad (1)$$

where X_{ij} are the individual characteristics which include wages and income earned from employment. In the Philippines, workers are employed either as wage and salary worker, self-employed with no paid employee, employer, or unpaid family worker. In this paper, these workers are treated as follows: wage and salary workers earn daily wages; self-employed and employers earn entrepreneurial income; unpaid family work share in a household's entrepreneurial income. Using the logistic model above, the probability that a worker is employed or not is predicted. If the probability of being in the labor market exceeds the probability of non-participation, the worker is considered a participant in the labor market.

However, not all workers who have higher probability of participation in the labor market are employed. Workers to be employed are chosen based on a queuing procedure proposed by

Tiberti, Cicowiez and Cockburn (2017). In this approach, the individuals are ranked based on their probability of participating in the labor market. A cutoff that is based on the results of the CGE model determines which workers will be employed.

The approach discussed above should work if information about the wage and entrepreneurial incomes of individual workers are known. The Labor Force Survey (LFS), a quarterly survey undertaken by the Philippine Statistics Authority, the government statistics agency, provides information about wages for workers who are employed in wage and salary work. Meanwhile, the earnings of self-employed, employers, and unpaid family workers can be derived from another data set, the Family Income and Expenditure Survey, a government survey on household sources and uses of incomes, which is undertaken every three years. This study utilizes the July 2018 LFS and the 2018 FIES. Thus, while wage and salary workers have wage data, the self-employed, employers, unpaid family workers, do not have such information. In a similar way, wage and salary workers do not have data about their entrepreneurial income. Meanwhile, the unemployed and workers not in the labor force do not have both wage and entrepreneurial income data. The bias that is likely to emerge from the estimation of equation (1) given the issue about missing wages and entrepreneurial income is addressed using the Heckman correction technique.

Simulation occurs in three stages. First, equation (1) is estimated using data from the Labor Force Survey-Family Income and Expenditure Survey. Second, in equation (1), the wage variables are adjusted based on CGE simulation results of changes in real wages of skilled and unskilled workers. Meanwhile, the earnings of self-employed workers, employers and unpaid family workers are adjusted according to CGE simulation result for returns to capital. Lastly, the probabilities of participating in the labor market are predicted using the adjusted wages and entrepreneurial incomes.

5. Results of the Empirical Simulation

As already discussed, the empirical analysis is organized around two basic sections representing the mechanism of how trade can affect the labor market outcomes. The first examines the effect of trade on aggregate factors such as output which is dependent on exports and imports. In this section, the effect of trade on household welfare which is measured in terms of the equivalent variation, which is the value of the monetary gain or loss on households given a change in policy, in this case the change in tariff, is considered. Given these factors, the impact on employment can now be assessed. The second section focuses on the microeconomic factors looking particularly at the factor returns discussed in the theoretical framework.

5.1. Macroeconomic Simulations

Output and GDP

Table 4 presents the percentage change in output of sectors under the different scenarios simulated. Under the status quo, that is, tariff elimination is limited only to those who originally joined CPTPP, sectors that experienced growth are shown by positive growth rates. The biggest winners are computer, electronic and optical products (ele), machinery and equipment nor elsewhere classified (ome), ang vegetable oils and fats, which grew by 0.15 percent, 0.13 percent, and 0.12 percent respectively. Meanwhile the biggest losers in terms of output are motor vehicles and parts (mvh), leather products (lea), and word products, which lost 0.6 percent, 0.3 percent and 0.17 percent of their output, respectively. In terms of absolute value, the economy marginally grew as total output increased by less than 0.01 percent.

If Philippines joins CPTPP and removes its tariffs, the sectors that will experience the highest increase in output are metals (nfm), wearing and apparel (wap), vegetables and fruits (v_f), wool (wol), and leather (lea). These sectors are expected to grow by 3.37 percent, 3.1 percent 2.99 percent, 2.75 percent and 2.03 percent, respectively. This finding shows evidence of export diversification as a result of CPTPP. Meanwhile, sectors that will experience largest decline in output are processed rice (pcr), which will decline by 3.69 percent; paddy rice (pdr), -3.64 percent; and motor vehicles (mvh), -2.55 percent.

With other countries in CPTPP, the market faced by participants is bigger. The fourth column of Table 5 presents the percentage in output when the Philippines joins the bigger CPTPP bloc. Sectors that will benefit the most are vegetables and fruits with 6.11 percent growth, wool with 4.85 percent, metals (nfm) with 3.9 percent, and wearing and apparel with 3.46 percent. Motor vehicles processed rice and rice paddy remain losing sectors, this time, with higher losses: -4.38 percent growth for motor vehicles, -4.62 percent for processed rice, and -4.63 percent for paddy rice. If the Philippines does not join the bigger CPTPP bloc (fifth column), losses in terms of output are tamed, however, so are gains.

As expected, there are gainers and losers in each scenario, with the same sectors experiencing greater gains or losses. In terms of agriculture, the rice sector may experience losses, but vegetables and fruits seem to gained more. In industry, despite the losses in motor vehicles sector, there appear to substantial gains in metals and wearing apparel. The gainers are sectors where we seem to have comparative advantage, and where firms do not require relatively higher skills in labor. The losing sectors are where labor seems to be more intensive but are not highly valued abroad.

Table 4. Percentage change in output by sector by scenario

Sector		Without Philippines in current CPTPP	Without Philippine in CPTPP and others who want to join	With Philippines in current CPTPP	With Philippines in CPTPP and others who want to join
Pdr	Paddy rice	0.04	0.12	-3.64	-4.63
Wht	Wheat	-0.02	0.53	0.52	0.17
Gro	Cereal grains nec	-0.01	0.17	0.19	0.07
v_f	Vegetables, fruit, nuts	0.02	0.11	2.99	6.11
Osd	Oil seeds	0	0.28	0.12	0.09
c_b	Sugar cane, sugar beet	-0.03	0.1	0.5	0.12
Pfb	Plant-based fibers	-0.01	0.49	0.61	-0.04
Ocr	Crops nec	0.03	0.1	0.66	-0.14
Ctl	Bovine cattle, sheep and goats, horses	-0.02	-0.29	0.33	0.38
Oap	Animal products nec	-0.05	-0.22	-0.17	-0.63
Rmk	Raw milk	-0.04	-0.49	0.36	0.31
Wol	Wool, silk-worm cocoons	-0.05	0.03	2.75	4.85
Frs	Forestry	-0.01	0.08	-0.66	-0.66
Fsh	Fishing	-0.01	-0.02	-0.05	-0.02
Coa	Coal	0.01	0.21	-0.02	0.12
Oil	Oil	0.01	0.2	-0.04	0.16
Gas	Gas	0.01	0.15	-0.05	-0.05
Oxt	Other Extraction (formerly omn Minerals nec)	0.03	0.43	0.25	0.58
Cmt	Bovine meat products	-0.03	0.21	-0.09	0.07
Omt	Meat products nec	-0.05	-0.04	-0.45	-1.13
Vol	Vegetable oils and fats	0.12	1.41	0.48	0.64
Mil	Dairy products	0.01	0.44	-0.08	0.37
Pcr	Processed rice	0.04	0.12	-3.69	-4.62
Sgr	Sugar	-0.03	0.11	0.57	0.15
Ofd	Food products nec	-0.04	-0.02	0.23	0.51
b_t	Beverages and tobacco products	-0.03	-0.11	0.41	0.5
Tex	Textiles	-0.01	-0.06	0.71	-1.27
Wap	Wearing apparel	-0.06	-1.74	3.1	3.46
Lea	Leather products	-0.3	-2	2.03	-2.14
Lum	Wood products	-0.17	0.65	-0.39	0.48
Ppp	Paper products, publishing	0.05	0.65	-0.14	-0.15
p_c	Petroleum, coal products	0	0.15	-0.04	0.19
Chm	Chemical products	0.05	0.49	-0.35	-0.37
Bph	Basic pharmaceutical products	0.02	0.41	-0.13	-0.17

Rpp	Rubber and plastic products	0	0.24	0.08	-2.8
Nmm	Mineral products nec	-0.01	-0.14	0.15	0.19
i_s	Ferrous metals	0.03	0.51	0.05	0.34
Nfm	Metals nec	0	0.6	3.37	3.9
Fmp	Metal products	0.06	0.41	-0.39	-1.11
Ele	Computer, electronic and optical products	0.15	0.45	-0.04	0.41
Eeq	Electrical equipment	0.02	-0.27	0.54	1.39
Ome	Machinery and equipment nec	0.13	0.01	0.12	0.24
Mvh	Motor vehicles and parts	-0.6	-2.14	-2.55	-4.38
Otn	Transport equipment nec	0.02	0.6	-0.05	-0.09
Omf	Manufactures nec	0.02	0.2	0.55	1
Ely	Electricity	0	0.01	0.04	-0.01
Gdt	Gas manufacture, distribution	0	0.01	0.04	-0.01
Wtr	Water	0	-0.02	-0.03	-0.1
Cns	Construction	-0.06	-0.68	0.48	0.45
Trd	Trade	0	0	0.01	-0.01
afs	Accommodation, Food and service activities	-0.01	-0.11	0.06	-0.06
Otp	Transport nec	0.01	0.15	-0.03	0.08
Wtp	Water transport	0.03	0.33	-0.07	0.11
Atp	Air transport	0.03	0.39	-0.06	0.23
Whs	Warehousing and support activities	0.02	0.21	0.0	0.2
Cmn	Communication	0.01	0.09	-0.02	0.02
Ofi	Financial services nec	0	0	-0.06	-0.11
Ins	Insurance (formerly isr)	0	0.05	-0.04	-0.04
Rsa	Real estate activities	0	0.05	-0.02	-0.03
Obs	Business services nec	0.03	0.6	-0.14	0.19
Ros	Recreational and other services	0	0.03	-0.02	-0.01
Osg	Public Administration and defense	-0.01	-0.08	-0.09	-0.24
Edu	Education	0	-0.04	-0.07	-0.18
Hht	Human health and social work activities	-0.01	-0.08	-0.06	-0.2
Dwe	Dwellings	-0.01	-0.17	0	-0.16

Source: Authors' calculations

Table 5 presents the percentage change in GDP by scenario. In all scenarios, Philippine GDP falls marginally. The economy however losses more if all other countries who expressed interest in CPTPP actually joined the trade bloc. This is to be expected. Since we opened our markets to globalization, the country's economic performance is now dependent on world economic conditions. Albeit insignificant, the country nonetheless stands to lose even without

participating in CPIPP as economic conditions within the CPTPP are expected to change the structure of their economies. These losses are greater once the greater bloc of the CPTPP is formed. Given the expected losses, this means that whether or not we become part of the CPTPP, we still need to restructure the economy.

Table 5. Percentage change in GDP

Scenario	Change in GDP
Without Philippines in CPTPP	-0.036
Without Philippines in CPTPP and others who want to join	-0.550
With Philippines in CPTPP	-0.099
With Philippines in CPTPP and others who want to join	-0.551

Source: Authors' calculations

Based on the theoretical framework, three reasons can explain for the decline in GDP. First, because of the changes in tariff and thus the relative prices of global and domestic products, the country is forced to shift to other products and in the process drawn towards export diversification. As it specializes in the production of goods using the more abundant resources, the marginal costs of production increases. In effect, limits to export diversification are expected as the costs of shifting to other products are experienced. Second, the necessary requirements to counter the limits of export diversification from, such as higher government expenditures and investments, are assumed constant in these estimates. This will again lead to an underestimation of the benefits of CPTPP if government spending and investments are constants. Third, as a result of export diversification, the value-added from the observed changes in output are expected to be lower compared to the previous goods which tended to be more import dependent. While the value-added of the winning sectors may be low, there is a need to consider carefully the reassessment of the value-added of the losing products.

Sectoral exports, imports and trade balance

The decline in the GDP can be seen in the trade balance of the country. Table 6 presents how sectoral exports will perform in the given simulation scenarios. If the Philippines does not join CPTPP, the meat sector (cmt, omt), wheat sector (wht), dairy (mil), and motor vehicles lose the most in terms of exports. The decline in exports is largest in the bovine meat sector and other meat products whose output declined by 7.21 percent and 5.28 percent, respectively.

If the Philippines joins CPTPP and reduces its tariff only for the current participants of the trade deal, the sectors that will experience increase in exports include paddy rice (pdr), sugar (sgr), wearing apparel (wap), other meat products (omt), wool (wol), vegetables and fruits (v_f), among others. This is an indication of greater export diversification under CPTPP. Under a bigger trading bloc with others who expressed interest in CPTPP, these sectors will have higher increase in exports.

It is important to note that although there is increase in exports in these sectors, some of them still had declining output. For instance, paddy rice had the highest increase in exports, however, it is also among the sectors that suffered highest output loss. Thus, despite increase in exports, it may still be possible for sectors to export their goods even as the output declne.

Table 6. Percentage change in exports by sector by scenario

Sector	Without Philippines in CPTPP	Without Philippines in CPTPP and others who want to join	With Philippines in CPTPP	With Philippines in CPTPP and others who wants to join
pdr	2.21	6.28	15.52	15.78
wht	-5.04	-4.28	-3.08	-4.36
gro	-0.14	0.22	0.72	-0.26
v_f	0.06	0.29	6.77	14.47
osd	0.1	1.12	2.33	-0.16
c_b	0.01	1.43	1.21	0.16
pfb	-0.03	1.25	0.76	0.79
ocr	-0.04	0.47	2.28	0.95
ctl	-0.29	0.39	0.24	-0.24
oap	0.38	0.62	1.28	0.44
rmk	-0.12	2.05	1.27	0.81
wol	0.02	-0.83	6.97	12.56
frs	0.17	2.24	0.79	2.09
fsh	-0.11	0.39	0.39	3.65
coa	0.04	0.53	-0.05	0.43
oil	0.01	0.16	-0.01	0.02
gas	0.07	3.64	-0.94	7.3
oxt	0.04	0.47	-0.25	0.04
cmt	-7.21	-9.2	-7.74	-10.77
omt	-5.28	-4.27	7.5	16.66
vol	0.13	1.75	0.63	0.64
mil	-1.83	-1.1	2.39	14
pcr	-0.89	-2.03	4.72	9.38
sgr	-0.26	-0.01	9.85	12.72
ofd	-0.36	-0.36	2.77	8.52
b_t	-0.31	-0.68	4.72	6.2
tex	0.01	-3.46	1.85	1.07
wap	-0.13	-4.51	7.5	8.65
lea	-0.8	-5.98	5.49	4.48
lum	-0.69	1.39	-0.42	1.28
ppp	0.11	1.34	0.83	2.66
p_c	-0.1	-0.29	-0.1	1.64
chm	0.01	-0.23	0.81	1.65
bph	0.12	2.11	0.03	1.39
rpp	-0.18	-1.16	3.69	4.98
nmm	0.09	-0.81	0.29	0.55
i_s	-0.07	0.52	-0.19	0.84
nfm	-0.02	0.54	3.58	4.2
fmp	0.09	-0.35	1.9	2.97
ele	0.15	0.3	-0.03	0.37
eeq	-0.02	-0.75	1.08	2.16
ome	0.16	-0.49	0.02	-0.22
mvh	-1.03	-3.92	-0.73	-0.59

otn	0.13	1.55	-0.33	2.64
omf	0.06	0.5	2.52	4.17
ely	0.06	1.5	-0.55	0.13
gdt	0.04	1.61	-0.66	0.13
wtr	0.16	2.49	-0.57	0.88
cns	0.08	1.27	-0.14	0.73
trd	0.12	1.83	-0.41	0.64
afs	0.05	1.39	0.05	0.83
otp	0.06	1.22	-0.27	0.55
wtp	0.11	1.42	-0.26	0.58
atp	0.06	0.89	-0.12	0.55
whs	0.08	1.33	-0.15	0.98
cmn	0.07	1.47	-0.42	0.42
ofi	0.09	1.7	-0.47	0.48
ins	0.11	1.68	-0.4	0.62
rsa	0.07	1.66	-0.5	0.41
obs	0.09	1.6	-0.42	0.45
ros	0.1	1.63	-0.32	0.81
osg	0.11	1.74	-0.43	0.5
edu	0.12	1.86	-0.44	0.54
hht	0.11	1.79	-0.39	0.57
dwe	-0.01	-0.14	0.11	0.01

Source: Authors' calculations

A more open trade policy will encourage importation. Although some domestic sectors may be hurt especially those that cannot compete with imported goods, there are also other sectors that will benefit from cheaper imports. These sectors are those that use imported goods as intermediate inputs.

Table 7 presents the percentage change of imports under the different scenarios. If the Philippines does not join CPTPP, imports in most economic activities will fall slightly. With Philippines in CPTPP, imports will increase mostly for industrial goods and services. Processed rice (pcr) has the highest increase at 46.4 percent, followed by meat products (omt) at 8.36 percent. If the Philippines joins a bigger trading bloc with all the countries that expressed willingness to join CPTPP, imported processed rice (pcr) is expected to increase by 57.3 percent, followed by paddy rice (pdr) which increases by 17.6 percent, and other meat products (omt) which increases by 17.1 percent. If the Philippines misses the bigger trading bloc, imports in almost all sectors will only fall slightly.

Table 7. Percentage change in imports

Sector	Without Philippines in CPTPP	Without Philippines in CPTPP and others who want to join	With Philippines in CPTPP	With Philippines in CPTPP and others who want to join
pdr	0.176	-0.634	-4.35	17.6
wht	-0.031	-0.045	0.118	0.179
gro	-0.018	-0.374	-0.165	0.964
v_f	-0.039	-0.708	0.93	3.64
osd	0.071	0.244	-0.669	0.483
c_b	-0.045	-0.576	-0.145	0.067
pfb	-0.021	-0.271	0.021	-0.372
ocr	-0.239	-1.03	-0.247	-0.278
ctl	-0.447	-2.39	-0.584	-1.06
oap	-0.084	-0.719	-0.134	0.133
rmk	0.057	-0.517	-0.743	-1.1
wol	-0.006	-0.141	-0.122	-1.72
frs	-0.243	-0.927	-0.605	-0.759
fsh	-0.027	-0.774	-0.012	6.89
coa	0.002	-0.032	0.101	0.049
oil	0.001	0.146	-0.04	0.19
gas	-0.023	-1.67	1.87	-2.06
oxt	-0.033	0.097	2.89	3.1
cmt	-0.143	-2.24	0.415	-1.21
omt	-0.068	-1.59	8.36	17.1
vol	-0.106	-0.663	-0.133	-0.394
mil	-0.127	-1.76	0.592	-0.618
pcr	-0.651	-2.44	46.4	57.3
sgr	-0.027	-0.997	0.534	5.89
ofd	-0.003	-0.854	0.359	1.16
b_t	-0.016	-0.411	-0.201	-0.406
tex	-0.044	-1.19	0.93	2.41
wap	-0.016	-1.01	0.332	0.834
lea	-0.023	-1.01	1.51	5.15
lum	-0.217	-2.13	2.72	1.47
ppp	-0.042	-0.62	0.443	0.669
p_c	0.006	0.032	-0.006	-0.005
chm	-0.037	-0.412	0.296	-0.05
bph	-0.055	-0.82	0.159	-0.062
rpp	-0.079	-0.795	1.15	5.5
nmm	-0.069	-1.05	0.75	0.713
i_s	-0.038	-0.692	0.33	0.229
nfm	0.042	-0.029	0.183	0.482
fmp	-0.037	-0.726	1.05	1.99
ele	0.071	-0.131	0.153	0.37
eeq	-0.097	-1.04	0.774	0.864
ome	-0.116	-1.35	0.407	-0.072
mvh	-0.041	-0.617	1.29	2.05

otn	-0.046	-0.85	0.477	1.41
omf	-0.094	-1.39	0.699	0.295
ely	-0.01	-0.605	0.305	0.009
gdt	0.009	-0.188	0.278	0.138
wtr	-0.068	-1.12	0.255	-0.428
cns	-0.106	-1.4	0.549	0.024
trd	-0.029	-0.737	0.236	-0.164
afs	-0.028	-0.788	0.043	-0.429
otp	-0.029	-0.574	0.189	-0.173
wtp	-0.046	-0.746	0.168	-0.279
atp	-0.029	-0.473	0.106	-0.217
whs	0.007	0.113	0.035	0.1
cmn	-0.041	-0.831	0.314	-0.095
ofi	-0.041	-0.844	0.193	-0.328
ins	-0.043	-0.655	0.155	-0.268
Rsa	-0.017	-0.391	0.139	-0.048
Obs	-0.032	-0.586	0.184	-0.134
Ros	-0.042	-0.694	0.2	-0.219
Osg	-0.043	-0.805	0.143	-0.344
Edu	-0.044	-0.857	0.188	-0.312
Hht	-0.047	-0.836	0.155	-0.352
Dwe	-0.014	-0.137	0.107	0.01

Source: Authors' calculations

Considering the changes in exports and imports, Table 8 summarizes the country's trade balance under the different scenarios. The Philippines gains positive trade balance when it does not join CPTPP. If it joins, trade deficits are felt due to increases in imports. These deficits however is less under a bigger trading bloc.

Table 8. Change in trade balance, million USD

Scenario	Exports-Imports
Without Philippines in CPTPP	42.3
Without Philippines in CPTPP and others who want to join	541
With Philippines in CPTPP	-271
With Philippines in CPTPP and others who want to join	-122

Source: Authors' Calculations

Welfare

We measure the impact on welfare using equivalent variation (EV). EV measures the change in income that results in terms of utility if the shock happened. A positive EV implies that an increase in welfare measured in terms of consumption increases following a shock. Meanwhile, a negative EV refers to a decrease in welfare. In this case, a negative economic change occurs, and EV would be the amount of income that would be taken away to lower the consumer's utility to the level that would happen if the change had occurred.

In Table 10, non-participation in CPTPP lowers the level of utility as shown by a negative EV while participation in CPTPP raises utility. If the trading bloc includes more countries, the Philippines lose regardless of whether it joins or not. The inclusion of the other countries into the CPTPP that wish to join will divert trade from the Philippines to these other countries, thus resulting in a negative level of utility. Note however that utility loss is lower when Philippines joins the bigger trading bloc. The losses become greater when other countries become part of the CPTPP but can be mitigated if the country joins as well. This forms the rationale for joining the CPTPP.

Table 9. Equivalent variation, million USD.

Scenario	Equivalent variation
Without Philippines in CPTPP	-27.6
Without Philippines in CPTPP and others who want to join	-401
With Philippines in CPTPP	115
With Philippines in CPTPP and others who want to join	-185

Source: Authors' Calculations

Demand for labor

Some sectors win and some sectors lose when Philippines joins CPTPP. The impact of more liberalized trade on sectoral employment is summarized in Tables 10 and 11. Although total employment may increase when the Philippines joins the trade bloc, some sectors may experience decline in employment.

Table 11 presents the changes in employment of unskilled labor under different simulation scenarios. The cells highlighted show the sectors that lose employment. When the Philippines does not join CPTPP, sectors that will lose employment are motor vehicles and parts (mvh), leather products (lea) and wood products (lum). However, the change in employment in each of these sectors is less than one percent. Overall, the increase in employment in other sectors will offset the jobs loss resulting in slight increase in total employment of unskilled labor.

When Philippines joins CPTPP, the net effect on employment of unskilled workers remains positive. Sectors that will be hurt the most in terms of employment are paddy rice (pdr), processed rice (pcr) and motor vehicles and parts (mvh) declining by 5 percent, 4.7 percent,

and 4.4 percent, respectively. Note that paddy rice is among the biggest in terms of employment. Eight out of the top 10 biggest sectors in terms of employment will create more jobs, thus offsetting whatever employment losses that may emerge.

With a bigger market under the third scenario, there are more sectors that will lose employment of unskilled workers. Paddy rice, processed rice and motor vehicles continue to suffer losses, albeit deeper this time. Seven of the top sectors in terms of employment are bound to lose jobs. Job creation in vegetables and fruits (v_f), metals nec (nfm), and wearing apparel (wap) are among those that will help offset job losses. If Philippines does not join CPTPP when all other countries that expressed interest joins, the number of sectors that gain employment exceeds the number of losers. Note also that the losers have shallower losses compared to when the Philippines joins the trading bloc.

Table 10. Impact on employment of unskilled workers

		Percentage change			Employment of unskilled workers			
Sector	Without Philippines in CPTPP	Without Philippines in CPTPP and others who want to join	With Philippines in CPTPP	With Philippines in CPTPP and others who want to join	Without Philippines in CPTPP	Without Philippines in CPTPP and others who want to join	With Philippines in CPTPP	With Philippines in CPTPP and others who want to join
1 pdr	0.045	0.162	-4.13	-5.05	1,904,788	1,907,015	1,825,299	1,807,782
2 wht	-0.023	0.614	0.399	0.192	-	-	-	-
3 gro	-0.008	0.213	0.036	0.082	1,129,567	1,132,063	1,130,064	1,130,583
4 v_f	0.02	0.153	3.09	6.66	2,148,844	2,151,701	2,214,800	2,291,499
5 osd	0.006	0.342	-0.035	0.096	-	-	-	-
6 c_b	-0.033	0.14	0.381	0.129	279,226	279,709	280,382	279,678
7 pfb	-0.014	0.563	0.496	-0.04	61,586	61,942	61,901	61,570
8 ocr	0.034	0.14	0.545	-0.152	1,132,882	1,134,082	1,138,669	1,130,775
9 ctl	-0.024	-0.289	0.185	0.416	119,892	119,575	120,143	120,420
10 oap	-0.051	-0.203	-0.353	-0.681	557,449	556,601	555,765	553,935
11 rmk	-0.047	-0.507	0.226	0.337	5,193	5,169	5,207	5,213
12 wol	-0.055	0.061	2.83	5.29	-	-	-	-
13 frs	-0.011	0.093	-0.724	-0.735	128,320	128,454	127,405	127,391
14 fsh	-0.014	-0.022	-0.065	-0.032	1,065,899	1,065,814	1,065,355	1,065,707
15 coa	0.026	0.375	-0.038	0.194	2,581	2,590	2,579	2,585
16 oil	0.016	0.313	-0.052	0.224	719	721	719	720
17 gas	0.018	0.234	-0.062	-0.086	-	-	-	-
18 oxt	0.034	0.5	0.286	0.651	161,591	162,344	161,998	162,588
19 cmt	-0.021	0.284	-0.06	0.013	-	-	-	-
20 omt	-0.043	0.028	-0.423	-1.18	145,547	145,651	144,994	143,892
21 vol	0.127	1.49	0.514	0.58	33,105	33,556	33,233	33,255
22 mil	0.016	0.517	-0.053	0.311	25,247	25,373	25,230	25,321
23 pcr	0.048	0.201	-3.66	-4.68	66,849	66,951	64,371	63,690
24 sgr	-0.027	0.168	0.592	0.101	35,935	36,005	36,157	35,981
25 ofd	-0.034	0.05	0.26	0.459	362,023	362,327	363,088	363,808
26 b_t	-0.025	-0.033	0.442	0.44	106,613	106,604	107,111	107,109

27 tex	-0.001	0.015	0.734	-1.33	92,275	92,290	92,953	91,049
28 wap	-0.053	-1.68	3.12	3.4	364,158	358,230	375,719	376,739
29 lea	-0.295	-1.93	2.06	-2.2	45,289	44,546	46,358	44,423
30 lum	-0.168	0.722	-0.364	0.416	273,684	276,124	273,147	275,285
31 ppp	0.053	0.733	-0.11	-0.209	80,161	80,705	80,030	79,951
32 p_c	0.01	0.244	-0.006	0.123	1,661	1,665	1,661	1,663
33 chm	0.054	0.574	-0.32	-0.438	33,857	34,033	33,730	33,690
34 bph	0.026	0.503	-0.101	-0.234	11,146	11,199	11,132	11,117
35 rpp	0.009	0.307	0.105	-2.86	87,400	87,661	87,484	84,893
36 nmm	0.001	-0.065	0.178	0.13	96,194	96,131	96,364	96,318
37 i_s	0.04	0.597	0.083	0.278	26,028	26,173	26,039	26,090
38 nfm	0.005	0.69	3.41	3.84	1,461	1,471	1,511	1,517
39 fmp	0.068	0.488	-0.363	-1.17	168,759	169,468	168,033	166,672
40 ele	0.159	0.532	-0.006	0.349	205,547	206,313	205,209	205,937
41 eeq	0.024	-0.19	0.57	1.32	57,037	56,915	57,348	57,776
42 ome	0.135	0.087	0.149	0.178	37,380	37,362	37,385	37,396
43 mvh	-0.592	-2.05	-2.52	-4.44	27,172	26,774	26,645	26,120
44 otn	0.03	0.667	-0.021	-0.154	46,164	46,458	46,141	46,079
45 omf	0.023	0.278	0.579	0.937	173,909	174,353	174,876	175,499
46 ely	0.012	0.101	0.076	-0.076	25,227	25,249	25,243	25,204
47 gdt	0.012	0.107	0.074	-0.076	3,944	3,948	3,947	3,941
48 wtr	0.002	0.051	0	-0.173	37,232	37,250	37,231	37,167
49 cns	-0.051	-0.614	0.506	0.401	3,491,207	3,471,541	3,510,663	3,506,995
50 trd	0.01	0.115	0.056	-0.106	5,718,342	5,724,346	5,720,972	5,711,709
51 afs	0.001	-0.004	0.095	-0.15	1,154,323	1,154,266	1,155,408	1,152,580
52 otp	0.019	0.264	0.01	-0.009	2,285,552	2,291,151	2,285,346	2,284,912
53 wtp	0.037	0.452	-0.025	0.016	31,586	31,717	31,566	31,579
54 atp	0.037	0.513	-0.016	0.136	7,313	7,348	7,309	7,320
55 whs	0.029	0.332	0.044	0.112	246,305	247,052	246,342	246,510
56 cmn	0.013	0.174	0.009	-0.048	132,271	132,484	132,266	132,190
57 ofi	0.006	0.093	-0.023	-0.173	76,061	76,127	76,039	75,925
58 ins	0.011	0.143	-0.005	-0.106	10,719	10,733	10,717	10,706
59 rsa	0.009	0.148	0.011	-0.099	85,333	85,451	85,334	85,240
60 obs	0.04	0.685	-0.115	0.116	640,353	644,482	639,361	640,840
61 ros	0.006	0.102	0.003	-0.059	2,698,289	2,700,879	2,698,208	2,696,535
62 osg	-0.001	-0.018	-0.062	-0.315	1,047,367	1,047,189	1,046,728	1,044,078
63 edu	0.002	0.021	-0.044	-0.263	68,843	68,856	68,811	68,660
64 hht	-0.001	-0.015	-0.039	-0.281	95,995	95,982	95,959	95,726
65 dwe	-0.003	-0.073	0.037	-0.223	-	-	-	-
Total					29,159,398.16	29,168,163.80	29,183,683.12	29,209,535.95

Source: Authors' Calculations

Table 11 presents the changes in employment of skilled workers under the different simulation scenarios. If the Philippines does not join the trade deal, the change in employment of skilled workers is negligible. If the Philippines joins, employment in paddy rice, processed rice, and motor vehicles will suffer the sharpest decline, which is aggravated when more countries join

CPTPP with the Philippines. Without the Philippines in the extended CPTPP, there are less sectors that will suffer decline in employment and the magnitude of job losses is less. The number of skilled jobs created is likewise tamed.

Table 11. Impact on employment of skilled workers

Sector	Percentage change				Employment of Skilled Workers			
	Without Philippines in CPTPP	Without Philippines in CPTPP and others who want to join	With Philip-pines in CPTPP	With Philippines in CPTPP and others who want to join	Without Philippines in CPTPP	Without Philippines in CPTPP and others who want to join	With Philippines in CPTPP	With Philippines in CPTPP and others who want to join
1 pdr	0.044	0.148	-4.14	-5.02	238,224	238,471	228,261	226,165
2 wht	-0.024	0.6	0.394	0.213	-	-	-	-
3 gro	-0.009	0.199	0.03	0.103	67,305	67,445	67,331	67,380
4 v_f	0.019	0.138	3.08	6.68	172,399	172,604	177,675	183,880
5 osd	0.005	0.327	-0.04	0.118	-	-	-	-
6 c_b	-0.035	0.126	0.376	0.151	13,203	13,224	13,257	13,227
7 pfb	-0.015	0.549	0.491	-0.018	2,389	2,402	2,401	2,389
8 ocr	0.033	0.126	0.54	-0.13	62,865	62,924	63,184	62,763
9 ctl	-0.025	-0.303	0.18	0.437	12,204	12,171	12,229	12,261
10 oap	-0.052	-0.218	-0.358	-0.659	133,025	132,804	132,618	132,217
11 rmk	-0.049	-0.521	0.22	0.359	168	167	168	168
12 wol	-0.056	0.046	2.82	5.31	-	-	-	-
13 frs	-0.012	0.082	-0.728	-0.717	6,685	6,691	6,637	6,638
14 fsh	-0.015	-0.034	-0.069	-0.015	71,176	71,162	71,137	71,176
15 coa	0.025	0.364	-0.042	0.212	503	505	503	504
16 oil	0.015	0.301	-0.056	0.241	800	802	800	802

17 gas	0.017	0.223	-0.066	-0.069	173	174	173	173
18 oxt	0.033	0.489	0.281	0.668	31,534	31,677	31,612	31,734
19 cmt	-0.027	0.22	-0.084	0.11	-	-	-	-
20 omt	-0.049	-0.035	-0.447	-1.08	37,961	37,966	37,809	37,569
21 vol	0.121	1.43	0.49	0.677	9,146	9,265	9,179	9,197
22 mil	0.01	0.453	-0.077	0.408	16,171	16,243	16,157	16,236
23 pcr	0.042	0.137	-3.68	-4.58	16,322	16,338	15,715	15,568
24 sgr	-0.033	0.104	0.568	0.198	23,018	23,049	23,156	23,071
25 ofd	-0.04	-0.014	0.236	0.556	149,679	149,718	150,092	150,571
26 b_t	-0.031	-0.097	0.418	0.537	64,668	64,625	64,959	65,036
27 tex	-0.008	-0.057	0.707	-1.23	19,315	19,305	19,453	19,078
28 wap	-0.06	-1.75	3.1	3.51	83,287	81,879	85,920	86,262
29 lea	-0.301	-2	2.03	-2.09	15,216	14,956	15,571	14,942
30 lum	-0.174	0.65	-0.391	0.525	22,321	22,505	22,272	22,477
31 ppp	0.047	0.661	-0.137	-0.099	60,469	60,840	60,358	60,381
32 p_c	0.004	0.173	-0.033	0.232	3,798	3,804	3,796	3,806
33 chm	0.047	0.502	-0.347	-0.329	29,802	29,937	29,684	29,690
34 bph	0.02	0.431	-0.128	-0.124	21,286	21,373	21,254	21,255
35 rpp	0.003	0.236	0.078	-2.75	32,252	32,327	32,276	31,364
36 nmm	-0.006	-0.136	0.151	0.239	25,493	25,460	25,533	25,556
37 i_s	0.034	0.525	0.056	0.387	13,225	13,290	13,228	13,272
38 nfm	-0.001	0.618	3.38	3.95	3,146	3,165	3,252	3,270
39 fmp	0.061	0.416	-0.39	-1.06	59,752	59,964	59,483	59,083
40 ele	0.152	0.46	-0.033	0.459	193,897	194,493	193,539	194,491
41 eeq	0.018	-0.261	0.543	1.43	46,840	46,710	47,086	47,502

42 ome	0.128	0.015	0.122	0.287	28,288	28,256	28,287	28,333
43 mvh	-0.599	-2.12	-2.55	-4.33	23,977	23,610	23,507	23,077
44 otn	0.023	0.596	-0.048	-0.045	16,879	16,976	16,867	16,867
45 omf	0.016	0.206	0.552	1.05	43,093	43,175	43,324	43,539
46 ely	0.006	0.029	0.049	0.033	49,971	49,983	49,993	49,985
47 gdt	0.006	0.035	0.047	0.033	3,449	3,450	3,450	3,450
48 wtr	-0.004	-0.021	-0.027	-0.064	29,648	29,643	29,641	29,630
49 cns	-0.058	-0.694	0.476	0.523	557,331	553,784	560,308	560,570
50 trd	0.002	0.02	0.02	0.04	2,619,301	2,619,772	2,619,772	2,620,296
51 afs	-0.008	-0.1	0.059	-0.004	705,192	704,543	705,665	705,220
52 otp	0.01	0.168	-0.026	0.137	527,118	527,951	526,929	527,788
53 wtp	0.028	0.356	-0.061	0.162	24,929	25,011	24,907	24,963
54 atp	0.028	0.417	-0.052	0.281	21,203	21,285	21,186	21,256
55 whs	0.021	0.236	0.008	0.258	120,680	120,940	120,665	120,966
56 cmn	0.006	0.102	-0.018	0.062	353,529	353,868	353,444	353,727
57 ofi	-0.001	0.021	-0.05	-0.064	429,709	429,803	429,498	429,438
58 ins	0.004	0.071	-0.032	0.003	67,123	67,168	67,099	67,122
59 rsa	0.003	0.077	-0.016	0.01	151,617	151,729	151,588	151,627
60 obs	0.033	0.614	-0.142	0.225	1,251,189	1,258,456	1,249,000	1,253,590
61 ros	0	0.03	-0.024	0.05	579,508	579,682	579,369	579,798
62 osg	-0.007	-0.089	-0.089	-0.206	1,635,396	1,634,055	1,634,055	1,632,141
63 edu	-0.005	-0.051	-0.071	-0.153	1,270,123	1,269,539	1,269,285	1,268,243
64 hht	-0.007	-0.087	-0.066	-0.172	418,592	418,257	418,345	417,901
65 dwe	-0.01	-0.144	0.01	-0.114	-	-	-	-
Total					12,687,559.99	12,691,373.72	12,683,943.28	12,690,684.28

Source: Authors' Calculations

5.2. Microsimulation results

Labor Market Returns

We assess the labor market effects of the CPTPP through the general equilibrium effects of the changes in factor prices and sectoral output on households. Table 12 shows the changes in primary factor returns among the four scenarios. In general, the table shows that there is an increase in factor prices under the scenarios where the Philippines will join in the trading bloc. The increases are larger if the Philippines joins the trading bloc together with other countries.

Table 12. Percentage change on primary factor returns

Factor	Without Philippines in CPTPP	Without Philippines in CPTPP and others who want to join	With Philippines in CPTPP	With Philippines in CPTPP and others who want to join
Unskilled Labor	-0.015	-0.215	0.281	0.40
Skilled Labor	-0.01	-0.158	0.302	0.313
Capital	-0.008	-0.134	0.31	0.347

Source: Authors' Calculations

With these effects, we consider two scenarios for the labor market effects. Table 13 shows the changes in the different segments of the labor force should these changes be unbounded by labor demand of firms. While these results may deviate from reality given the actual limitations set by labor demand on the movements in the labor supply, it substantiates the evidence of a possible increase in formal labor market participants and formal labor market opportunities in the existence of the trading bloc. As seen below, the number of self-employed individuals went down by about 8 million across all the scenarios. Meanwhile, wage laborers increase by about 4 million.

Table 13. Number of individuals in labor market segments without labor demand limitations, in millions

Indicator	Baseline	Without Philippines in CPTPP	Without Philippines in CPTPP and others who want to join	With Philippines in CPTPP	With Philippines in CPTPP and others who want to join
Unemployed and Out of the Labor Force	33.744	37.366	37.365	37.366	37.367
Self-Employed	12.345	4.272	4.272	4.272	4.271
Wage Labor	29.252	33.703	33.703	33.703	33.702
Total	75.341	75.341	75.341	75.341	75.341

Note: [a]The table presumes no limitations in labor demand
Source: Authors' Calculations

However, if we consider the labor demand of firms who may experience increases or decreases in demand following the effects of CPTPP on their output, we can observe an increase in overall employment for all scenarios by about 100 thousand individuals as shown in Table 14. Slightly higher increases are observed when the Philippines joins the trading bloc, especially when the trading bloc is bigger. Moreover, during these scenarios, the number of unemployed and non-participants are relatively lower than in counterfactual scenarios without the Philippines. We use these employment results to further inspect the effects of the trading bloc on the Philippine labor market.

Table 14. Number of individuals in labor market segments with labor demand limitations, in millions

Indicator	Baseline	Without Philippines in CPTPP	Without Philippines in CPTPP and others who want to join	With Philippines in CPTPP	With Philippines in CPTPP and others who want to join
Employed	41.597	41.597	41.605	41.616	41.656
Unemployed and Out of the Labor Force	33.744	33.744	33.736	33.725	33.685
Total	75.341	75.341	75.341	75.341	75.341

Source: Authors' Calculations

Employment Effects by Region and Age

Disaggregating the employment effects of CPTPP, we see the regional effects of the trading bloc, as shown in Table 15. As expected, the positive employment effects of the CPTPP are observed in the National Capital Region, where employment increases by nearly 200 thousand under the scenarios when the Philippines participates the trading bloc. An increase in employment is also recorded for Central Luzon, Western Visayas, Eastern Visayas, Western Mindanao, and the Bangsamoro Autonomous Region in Muslim Mindanao. However, for the rest of the country, participating in CPTPP reduces employment. Possible distributive effects across regions can also inferred from the simulated effects below, where welfare is expected to be greater in regions where employment effects are positive.

Table 15. Number of employed individuals by region, in millions

	Without Philippines in CPTPP	Without Philippines in CPTPP and others who want to join	With Philippines in CPTPP	With Philippines in CPTPP and others who want to join
National Capital Region	5.743	5.744	5.746	5.755
Cordillera Administrative Region	0.740	0.740	0.740	0.741
Region I - Ilocos Region	2.160	2.161	2.161	2.164
Region II - Cagayan Valley	1.469	1.469	1.469	1.471
Region III - Central Luzon	4.772	4.774	4.777	4.778
Region IVa - Calabarzon	6.252	6.254	6.256	6.260
Region IVb - Mimaropa	1.134	1.134	1.135	1.135
Region V - Bicol Region	2.174	2.175	2.175	2.178
Region VI - Western Visayas	3.129	3.130	3.131	3.134
Region VII - Central Visayas	3.068	3.069	3.069	3.072
Region VIII - Eastern Visayas	1.755	1.755	1.755	1.756
Region IX - Western Mindanao	1.355	1.355	1.355	1.356
Region X - Northern Mindanao	1.812	1.812	1.813	1.815
Region XI - Southern Mindanao	1.941	1.942	1.942	1.945
Region XII - Central Mindanao	1.779	1.779	1.779	1.782
Region XIII - Caraga	1.027	1.027	1.028	1.028
Bangsamoro Autonomous Region in Muslim Mindanao	1.285	1.285	1.285	1.285

Source: Authors' Calculations

Demographically, employment shifts towards unskilled labor in all scenarios, where unskilled labor increases by about 600 thousand from the baseline (see Table 16). This shift is slightly higher under the scenarios where the Philippines joins the CPTPP. However, under the case where the Philippines joins the bigger trading bloc, the slightly higher increase in unskilled employment may also be attributed with the increase in unskilled labor compensation (see Table 11), where their wages are expected to increase by 0.40 percent. This is in contrast to the 0.31 percent increase in the wages of skilled labor.

Table 16. Number of employed individuals by skill level, in millions

	Baseline	Without Philippines in CPTPP	Without Philippines in CPTPP and others who want to join	With Philippines in CPTPP	With Philippines in CPTPP and others who want to join
Unskilled	28.909	29.547	29.550	29.555	29.575
Skilled	12.687	12.050	12.055	12.061	12.081

Source: Authors' Calculations

Finally, we also look into the effects of joining the trading bloc on youth employment (see Table 18). We define youth employment as those who are employed whose ages are within the range of 15 to 25 years old. From this, the table shows that under all scenarios, employment opportunities for the youth seem to increase. However, this increase cannot be substantially differentiated between the scenarios where the Philippines participates in CPTPP from the scenarios where the country does not participate. Furthermore, employment among those who are ages 26 years old and above declines by about 4 million across all scenarios. It can be inferred that the employment effects of the trading bloc is skewed towards the benefit of the youth.

Table 17. Number of employed youth, in millions

	Baseline	Without Philippines in CPTPP	Without Philippines in CPTPP and others who want to join	With Philippines in CPTPP	With Philippines in CPTPP and others who want to join
Non-Youth	34.417	30.426	30.434	30.445	30.485
Youth	7.180	11.171	11.171	11.171	11.171

Source: Authors' Calculations

6. Conclusion and Policy Recommendations

Participation in the CPTPP would seem to take full advantage of the abundant unskilled labor resources in the country. Unskilled labor inputs are shown to have higher returns relative to other inputs from a larger trading bloc. In which case, the CPTPP offers an opportunity to bring about greater wage equality.

The results indicate the sectors favored by the engagement with the trading bloc are unskilled-labor intensive as opposed to capital and skilled-intensive sectors. It can also be noted that this does not involve the development of agriculture-based activities for export competition is crucial in reducing this inequality. The industry sector, particularly metals (nfm), wearing and apparel (wap), vegetables and fruits (v_f), wool (wol), and leather (lea) has been shown to obtain a higher output, which then resulted in greater demand for unskilled labor. This indicate a movement towards more export diversification, a situation that is missing in the country's economic development. Given additional government subsidies as well foreign and domestic investments, the limits to export diversification can be decreased. In which case, the returns to unskilled labor can be expected to be higher, thus further reducing inequality produced by the current industries.

Despite the increased returns in unskilled labor, however, the displacement of other industries where skills are highly valued will result in lower GDP and welfare for the whole economy. Apart from the limits of export diversification, another explanation is the low value-added of the winning sectors compared to the losing ones. Nevertheless, it is likely that the value of added of the losing export sector, which is fundamentally import-dependent, may be overvalued. In addition, the opportunity costs of not being able to use more labor in these losing sectors constitutes additional opportunity costs which are not taken into account in the estimates.

The country's current globalization process measured in terms of changing world market prices and technology, not the existing skill/education accumulation processes, is the main explanation for the existing wage inequality. Currently, despite the effort to open markets to the international market, the coun*t*ry's high exporting manufac*tu*ring industries have remained too dependent on capital, and imported inputs, as the world prices tend to favor the use of such imported inputs. With more competition however, as indicated in the CPTPP, the international prices can induce more investments in both skilled and unskilled labor.

In addition to government subsidies and investments, technological innovation, which is seen to favor skilled labor, can be another way of pushing the limits of export diversification. There are the two ways of improving technology. The first is referred to as inside-the-frontier technology which pertains to producing more efficiently goods that are already in the market and consequently selling them at a lower price. The second is called on-the frontier innovation which is associated with the creation of new products and is often reflected in patents. Klinger and Lederman (2006) performed empirical analysis on these two types of technology and found that lower-income countries benefit more from inside-the-frontier innovations in contrast to higher income countries that gain more from on-the-frontier innovation. These reflect the importance of identifying market failures that limit the current capacity of the country to produce already existing products. In particular, the increased consumption of renewal energy can allow greater production of existing products without incurring additional costs (Sharma, et. al, 2021). Market failures that limit innovation in the energy sector can thus be addressed. Furthermore, learning more the technologies used in other countries will allow the Philippines to imitate existing technologies that will push the country's production frontier further.

In summary, export diversification is best served under the CPTPP. The country will have to consider restructuring its technological system, especially in the basic sectors, like energy, if high- paying forms of labor is to benefit from the trade agreements and if wage inequality is to be reduced.

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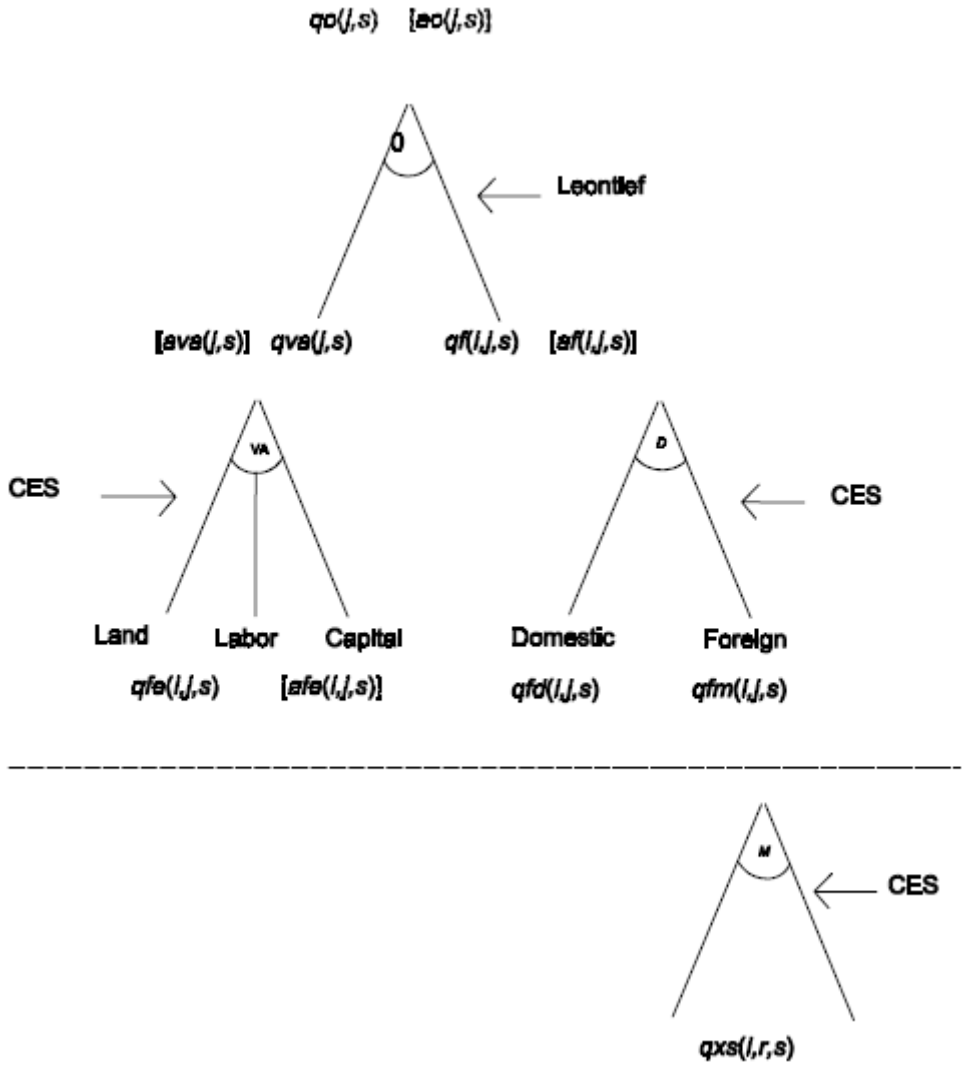
Appendix

GTAP aggregation structure and demand for factors of production

We give a brief overview of the structure of the GTAP model as presented in Hertel and Tsigas (1997). The full GTAP model and its behavioral equations are discussed in Hertel and Tsigas (1997). We also present the closed form equations for the factor demands as derived by Gohin and Hertel (2003).

Figure A1 summarizes the production of value in the GTAP model. In this aggregation structure, $qfe(i,j,s)$ is the primary factors which is composed of land, labor and capital; $qfd(i,j,s)$ is the intermediate input produced locally, $qfm(i,j,s)$ is the imported intermediate input, and $qf(i,j,s)$ is the composite intermediate input; $qva(j,s)$ is value added; and $qo(j,s)$ is output.

Figure A1. Firms' production structure



Source: Hertel and Tsigas (1997)

We illustrate Gohin and Hertel's (2003) derivation of factor demands in a CES production function with two factors. The production decision of firms expressed as a nonlinear programming problem is given by

$$\begin{aligned} &\text{Min} && p_1 x_1 + p_2 x_2 \\ &\text{subject to} && y = \alpha\left(\delta_1 x_1^{-\rho} + \delta_2 x_2^{-\rho}\right)^{-\frac{1}{\rho}} \end{aligned}$$

where x_1 and x_2 are the factors, p_1 and p_2 are the prices, y is value added, δ_1 and δ_2 are distribution parameters, $\alpha > 0$ is an efficiency parameter, and $\sigma = \frac{1}{1+\rho}$ is the elasticity of substitution, with $\rho > -1$.

The first order conditions require that

$$\frac{p_1}{p_2} = \frac{\delta_1 x_1^{-\rho-1}}{\delta_2 x_2^{-\rho-1}}$$

Solving for one variable, we obtain

$$x_2 = x_1 \left(\frac{p_1 \delta_2}{p_2 \delta_1}\right)^{\frac{1}{1+\rho}}$$

Substituting this expression into the CES production function and manipulating algebraically the resulting function yield the conditional demand functions for x_1 and x_2:

$$x_1 = \frac{y}{\alpha}\left(\frac{\delta_1}{p_1}\right)^{\frac{1}{1+\rho}} \left(\delta_1^{\frac{1}{1+\rho}} p_1^{\frac{\rho}{1+\rho}} + \delta_2^{\frac{1}{1+\rho}} p_2^{\frac{\rho}{1+\rho}}\right)^{\frac{1}{\rho}}$$

$$x_2 = \frac{y}{\alpha}\left(\frac{\delta_2}{p_2}\right)^{\frac{1}{1+\rho}} \left(\delta_1^{\frac{1}{1+\rho}} p_1^{\frac{\rho}{1+\rho}} + \delta_2^{\frac{1}{1+\rho}} p_2^{\frac{\rho}{1+\rho}}\right)^{\frac{1}{\rho}}$$

To simply the conditional demands further, one can construct the unit cost c_y defined as

$$c_y = \frac{p_1 x_1 + p_2 x_2}{y}$$

Note that the unit cost equals the marginal cost because the unit cost is invariant to the level of production following the assumption of constant returns to scale. After some manipulation, one can obtain the conditional demand equations as a functions of the marginal cost, which simplify as

$$x_1 = y\left(\frac{\delta_1 c_y}{p_1}\right)^{\sigma} \alpha^{\sigma-1}$$

$$x_2 = y\left(\frac{\delta_2 c_y}{p_2}\right)^{\sigma} \alpha^{\sigma-1}$$

Microsimulation Appendix

The microsimulation model in the paper uses the empirical strategy outlined in Tiberti, Cicowiez and Cockburn (2017). The model further uses the 2018 FIES-LFS as its main microsimulation database. However, for the paper, we use two types of models: the microsimulation model with three employment outcomes (i.e., wage labor, self-employed, non-participant and unemployed) and the model with two employment outcomes (i.e., participant and non-participant/unemployed). The first set of employment outcomes do not account for the limitations imposed by labor demand as derived from GTAP, while the second set of employment outcomes aggregate wage labor and the self-employed under one category. This is done in order to account for the labor demand limitations imposed by sectors in GTAP, also noting the limitations on the results that GTAP can produce. Nevertheless, in both instances, the estimation of wage income and entrepreneurial income undergo the same selection model.

Particularly, since not all observations have wage and entrepreneurial income, we create a Mincer model and estimate it as follows. For the wage income estimation, we establish a selection model where being in the wage labor sector is determined by individual z_{wi} characteristics such as family size, marital status, age, and sex.

$$s_{wi}^{*} = \gamma z_{wi} + u_{wi},$$
$$s_{wi} = \begin{cases} 1 & if\ s_{wi}^{*} > 0 \\ 0 & if\ s_{wi}^{*} \leq 0 \end{cases} \tag{A1}$$

From this, the wage equation is estimated using equation (A2), where wages are determined by age, region of residence, skill level (as a proxy for educational attainment), and relationship to the household head.

$$w_i = \begin{cases} \beta x_{wi} + \varepsilon_{wi} & if\ s_{wi}^{*} > 0 \\ . & if\ s_{wi}^{*} \leq 0 \end{cases} \tag{A2}$$

Upon estimating equation (A2) using the Heckman selection model, we predict a wage level $\widehat{w_i}$ for all datapoints in the 2018 FIES-LFS. The table below shows the outcome of the estimation from the Heckman selection model of equations (A1) and (A2).

Table A1. Heckman Selection Model on Wage Income Estimation.

VARIABLES	(1) Wage Income	(2) Selection Indicator	(3) Mills
Age	318.268	0.142***	
	(255.434)	(0.001)	
Age^2	7.038**	-0.002***	
	(3.135)	(0.000)	
Region of Residence (base: Ilocos Region)			
Cagayan Valley	6,323.926***		
	(1,893.190)		
Central Luzon	16,087.621***		
	(1,634.529)		
Calabarzon	27,316.451***		
	(1,768.648)		
Bicol Region	1,450.706		
	(1,875.486)		
Western Visayas	-4,634.899***		
	(1,688.084)		
Central Visayas	6,125.827***		
	(1,739.545)		
Eastern Visayas	1,611.117		
	(1,803.254)		
Zamboanga Peninsula	-6,517.330***		
	(2,058.730)		
Northern Mindanao	-3,656.957**		
	(1,756.494)		
Davao Region	-3,505.380*		
	(1,803.194)		
SOCCSKSARGEN	-11,387.869***		
	(1,886.425)		
National Capital Region	47,921.455***		
	(1,518.240)		
Cordillera Administrative Region	17,506.057***		
	(1,808.777)		
Bangsamoro Autonomous Region of Muslim Mindanao	-15,929.178***		
	(2,455.652)		
Caraga	1,992.464		
	(1,841.649)		
Mimaropa	-2,598.268		
	(1,879.997)		

Skill Level (base: Low Skilled)		
High Skilled	101,074.222***	
	(593.385)	
Relationship to the Household Head (base: Head)		
Wife/Spouse	-3,024.319***	
	(986.155)	
Children	-9,825.109***	
	(842.407)	
Siblings	-16,734.504***	
	(1,986.705)	
Son/daughter-in-law	-2,778.580**	
	(1,387.277)	
Grandchildren	-14,232.304***	
	(2,370.714)	
Parents	-24,911.285***	
	(4,585.947)	
Other Relative	-16,360.120***	
	(1,620.708)	
Boarder	26.837	
	(14,937.816)	
Domestic Helper	-54,394.426***	
	(2,887.276)	
Non-relative	-26,368.395***	
	(3,315.948)	
Family Size		-0.012***
		(0.001)
Marital Status (base: Single)		
Married		-0.135***
		(0.006)
Widowed		0.068***
		(0.012)
Divorce/Separate		0.094***
		(0.014)
Annulled		0.179
		(0.145)

Unknown		0.318*** (0.088)	
Sex (base: Male)			
Female		-0.476*** (0.004)	
lambda			-32,086.027*** (2,089.251)
Constant	101,274.030*** (6,623.067)	-2.552*** (0.016)	
Observations	467,155	467,155	467,155

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Meanwhile, for the entrepreneurial income of self-employed individuals, we establish a selection model where being self-employed is determined by individual z_{yi} characteristics similar to equation (A1).

$$s_{yi}^{*} = \gamma z_{yi} + u_{yi},$$

$$s_{yi} = \begin{cases} 1 & if\ s_{yi}^{*} > 0 \\ 0 & if\ s_{yi}^{*} \leq 0 \end{cases} \tag{A3}$$

Using equation (A3), the self-employment income equation is estimated in a similar manner as the wage equation. However, self-employment income is determined by household withdrawals from savings or business equity, household interest income from bank deposits, the region of employment, skill level, whether the household head has a job, the household building type, the main material for the housing unit, and the tenure status of the household. These are used as dependent variables since the self-employed income variable is derived from the entrepreneurial income variable that is measured at the household level.

$$y_i = \begin{cases} \beta x_{yi} + \varepsilon_{yi} & if\ s_{yi}^{*} > 0 \\ . & if\ s_{yi}^{*} \leq 0 \end{cases} \tag{A4}$$

Upon estimating equation (A4) using the Heckman selection model, we predict a self-employed income level $\widehat{y_i}$ for all datapoints in the 2018 FIES-LFS. The table below shows the outcome of the estimation from the Heckman selection model of equations (A3) and (A4).

Table A2. Heckman Selection Model on Self-Employment Income Estimation.

VARIABLES	(1) Self-employed Income	(2) Selection Indicator	(3) Mills
Withdrawals from savings or business equity	0.364***		
	(0.017)		
Interest income from bank deposits	0.576***		
	(0.057)		
Family Size	1,105.311	0.061***	
	(772.919)	(0.001)	
Region of Residence (base: Ilocos Region)			
Cagayan Valley	22,758.861***		
	(6,094.217)		
Central Luzon	62,286.133***		
	(5,514.787)		
Calabarzon	48,032.440***		
	(6,146.562)		
Bicol Region	14,632.132**		
	(5,718.228)		
Western Visayas	24,045.393***		
	(5,493.396)		
Central Visayas	55,042.670***		
	(5,852.087)		
Eastern Visayas	20,279.602***		
	(5,529.697)		
Zamboanga Peninsula	33,801.469***		
	(6,148.326)		
Northern Mindanao	24,972.298***		
	(5,716.277)		
Davao Region	48,703.971***		
	(5,883.702)		
SOCCSKSARGEN	48,869.132***		
	(5,812.814)		
National Capital Region	56,269.350***		
	(5,607.277)		
Cordillera Administrative Region	38,176.524***		
	(5,528.064)		
Bangsamoro Autonomous Region of Muslim Mindanao	48,756.570***		
	(5,502.598)		
Caraga	32,982.463***		
	(5,852.635)		
Mimaropa	49,031.887***		
	(5,816.269)		
Skill Level			
High Skilled	51,941.677***		
	(2,145.437)		

Household Head has no job (base: has job)	-23,308.121***		
	(2,880.141)		
Marital Status			
Married		-0.066***	
		(0.005)	
Widowed		-0.283***	
		(0.010)	
Divorce/Separate		-0.284***	
		(0.014)	
Annulled		-0.328**	
		(0.142)	
Unknown		-0.268***	
		(0.087)	
Age	129.867	0.006***	
	(253.429)	(0.001)	
Age^2	-2.915	-0.000*	
	(2.816)	(0.000)	
Sex (base: Male)			
Female		-0.005	
		(0.004)	
lambda			10,169.996
			(18,632.431)
Constant	43,854.398**	-0.530***	
	(19,724.688)	(0.012)	
Observations	467,155	467,155	467,155
Housing materials and tenure variables considered?	Yes	No	-

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Using the predicted wage and self-employment income from equations (A1) to (A4), Table A3 shows the baseline results of the multinomial logistic regression model. The counterfactual runs undergo a similar procedure, but accounting for the changes in factor returns. The multinomial logistic regression results are the labor market outcomes that do not consider the limitations imposed by labor demand.

Table A3. Baseline Multinomial Logistic Regression Run.

VARIABLES	(1) Wage Laborer	(2) Self-Employed
Predicted Wage Income[a]	0.000***	0.000***
	(0.000)	(0.000)
Predicted Self-employment Income[a]	0.000***	0.000***
	(0.000)	(0.000)
Sex (base: Male)		
Female	-1.247***	-1.300***
	(0.010)	(0.008)
Skill Level (base: Low Skilled Labor)		
High Skilled Labor	-7.251***	-0.163*
	(0.137)	(0.084)
Age	0.260***	0.290***
	(0.002)	(0.002)
Age^2	-0.003***	-0.003***
	(0.000)	(0.000)
Region of Residence (base: Ilocos Region)		
Cagayan Valley	-0.450***	0.004
	(0.033)	(0.027)
Central Luzon	-1.634***	-0.232***
	(0.036)	(0.027)
Calabarzon	-2.295***	-0.159***
	(0.049)	(0.034)
Bicol Region	-0.057*	-0.102***
	(0.030)	(0.025)
Western Visayas	0.240***	-0.003
	(0.029)	(0.024)
Central Visayas	-0.539***	0.011
	(0.032)	(0.025)
Eastern Visayas	-0.028	-0.063***
	(0.029)	(0.024)
Zamboanga Peninsula	0.325***	-0.404***
	(0.033)	(0.027)
Northern Mindanao	0.088***	-0.090***
	(0.030)	(0.024)
Davao Region	0.079***	-0.158***
	(0.031)	(0.025)
SOCCSKSARGEN	0.797***	-0.065**
	(0.034)	(0.027)
National Capital Region	-4.226***	-0.251***
	(0.071)	(0.045)
Cordillera Administrative Region	-1.044***	0.002
	(0.038)	(0.028)
Bangsamoro Autonomous Region of Muslim Mindanao	1.203***	-1.044***
	(0.035)	(0.029)
Caraga	-0.190***	-0.071***

	(0.030)	(0.025)
Mimaropa	0.221***	-0.069***
	(0.030)	(0.025)
Marital Status		
Married	0.387***	0.059***
	(0.019)	(0.012)
Widowed	0.739***	0.307***
	(0.027)	(0.023)
Divorce/Separate	0.643***	0.378***
	(0.036)	(0.028)
Annulled	0.242	0.213
	(0.352)	(0.267)
Unknown	0.472*	0.377**
	(0.266)	(0.161)
Constant	-12.968***	-5.120***
	(0.126)	(0.079)
Observations	467,155	467,155

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Pseudo-R-squared: 17.96%

Note: [a]Coefficients and standard errors are too small.

Column (1) shows the coefficients for the wage laborer category, while (2) shows the coefficients for the self-employed category of the multinomial logistic regression model.

The baseline category of the multinomial logistic model regression is being a non-participant or unemployed.

Meanwhile, since GTAP does not generate labor demand for self-employment on different sectors, we also consider a logistic regression model to predict the labor market outcomes of the labor force in the baseline scenarios and in the three counterfactual cases. Table A4 shows the baseline logistic regression run of the model.

Table A4. Baseline Logistic Regression Run.

VARIABLES	(1) Labor Force Participant
Predicted Wage Income[a]	0.000***
	(0.000)
Predicted Self-employment Income[a]	0.000***
	(0.000)
Sex (base: Male)	
Female	-1.295***
	(0.007)
Skill Level (base: Low Skilled Labor)	
High Skilled Labor	-1.979***
	(0.084)
Age	0.263***
	(0.001)
Age^2	-0.003***
	(0.000)
Region of Residence (base: Ilocos Region)	
Cagayan Valley	-0.116***
	(0.025)
Central Luzon	-0.601***
	(0.026)
Calabarzon	-0.715***
	(0.033)
Bicol Region	-0.081***
	(0.023)
Western Visayas	0.057***
	(0.022)
Central Visayas	-0.134***
	(0.024)
Eastern Visayas	-0.043*
	(0.022)
Zamboanga Peninsula	-0.191***
	(0.024)
Northern Mindanao	-0.049**
	(0.022)
Davao Region	-0.095***
	(0.023)
SOCCSKSARGEN	0.162***
	(0.025)
National Capital Region	-1.243***
	(0.045)
Cordillera Administrative Region	-0.264***
	(0.027)
Bangsamoro Autonomous Region of Muslim Mindanao	-0.273***
	(0.025)
Caraga	-0.102***
	(0.023)

Mimaropa	0.017
	(0.023)
Marital Status	
Married	0.115***
	(0.011)
Widowed	0.430***
	(0.020)
Divorce/Separate	0.406***
	(0.027)
Annulled	0.137
	(0.250)
Unknown	0.421***
	(0.158)
Constant	-6.209***
	(0.078)
Observations	467,155

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Pseudo-R-squared: 19.66%

Note: [a]Coefficients and standard errors are too small.

The baseline category of the logistic model regression is being a non-participant or unemployed.