A CGE Analysis of Indonesia’s Free Trade Agreements

Galuh Narulita Yutiningsari a

a Universitas Indonesia, Depok, West Java, Indonesia

Using the Global Trade Analysis Project (GTAP) CGE model of the global economy, this essay analyses how much trade agreements between Indonesia and its top three trading partners – China, Japan, and the USA – could benefit Indonesia and those trading partners. In addition, an analysis of unilateral trade liberalization in Indonesia is included to provide a comparison of alternative trade liberalization policy strategies. The study conducts experiments by simulating the potential effect of the removal tariffs on imported merchandise under each liberalization scenario. The result suggests that the impact of trade liberalization is variable between strategies, but the greatest economic benefit is from the unilateral scenario. However, the restrictiveness of preferential RoO and other regulations in bilateral agreements would limit the scope for achieving the full benefit projected for the bilateral liberalization scenarios – discount rates of around 25 percent have been suggested.

INTISARI

Dengan menggunakan Global Trade Analysis Project (GTAP) CGE model ekonomi global, penelitian ini menganalisis tingkat keuntungan yang diperoleh Indonesia dengan tiga mitra dagangnya—Tiongkok, Jepang, dan Amerika—dari perjanjian perdagangan antara Indonesia dengan negara mitra tersebut. Selain itu, termasuk dalam lingkup penelitian ini adalah analisis terhadap perjanjian unilateral di Indonesia untuk digunakan sebagai pembanding liberalisasi kebijakan bilateral. Penelitian ini dilakukan dengan mensimulasikan akibat yang mungkin terjadi dari setiap kebijakan penghapusan tarif barang impor. Hasil penelitian menunjukkan adanya perbedaan akibat yang terjadi dari setiap kebijakan liberalisasi perdagangan, namun manfaat ekonomi terbesar dapat diperoleh dari kebijakan unilateral. Namun, tingkat keuntungan maksimal dimungkinkan tidak diperoleh karena keunikan kebijakan ROO dari masing-masing negara partner—yang mengakibatkan berkurangnya keuntungan sebesar kurang lebih 25%.

Keywords: Computable General Equilibrium, removal tariff, imported merchandise, economic benefit, rules of origin

1. Introduction

Conceptually, as mentioned by Adam Smith in 1776, each country would gain profit in international trade by specializing in production (Bhagwati, 1988). That concept was applied in the General Agreement on Tariffs and Trade (GATT), as a legally binding international trade agreement established in 1947 to regulate world trade in goods and reduce tariffs and other barriers. The World Trade Organization (WTO) assumed responsibility for that agreement in January 1995 adding trade in services and intellectual property in the
regulations administered by the WTO (WTO, 2018). The failure to solve differential treatment issues among the members in the Doha Round 2001, however, has significantly undermined the credibility of the WTO, leaving the WTO in motion and leading to the proliferation of bilateral, regional, and multilateral trade agreements (Figure 1).

Indonesia also pursued international trade by unilaterally introducing economic liberalization in the early 1990s. Some policies were focused on tariff reductions while others were of a broader nature such as greater openness to foreign investment. The country also participated in bilateral and regional trade agreements like the Association of Southeast Asian Nations (ASEAN) which came into force in 1967 and the Asia-Pacific Economic Cooperation (APEC) formed in 1989. An acknowledged action taken by the APEC, the Bogor Declaration in 1994, and other policies have encouraged Indonesia to reinforce trade liberalization by unilaterally reducing barriers in trade and investment. Nowadays, an effective trade-weighted average tariff barrier in Indonesia has been dropped to around 5.5 percent for all traded goods from about around 15 percent in 1995 and a spike of over 20 percent at the time of financial crisis (World Bank 2017) (Figure 2).

Tariff barriers is an economic policy that restrict imports. Bhagwati (1988) states two possibilities in which tariffs could give positive impacts. First, imposed tariffs could be used to threaten other countries to reduce their protection. Meanwhile, if they refuse to do so, this could harm the economy. Second, profitable tariff protection would only work for a country that has a monopoly power. However, Corden (1970) mentions that industries if the increasing price could not offset the inefficient cost of nurturing infant-industries.

By imposing an average rate as shown in Figure 1.2, Indonesia has three major trading partners: China, Japan, and the United States of America (USA) which have entered into different schemes of agreements. Brief profiles of them are given below:

a) Indonesia – China. A legal binding trade agreement that includes Indonesia as participating member is provided by the ASEAN-China Free Trade Area (ACFTA). Member countries signed the Agreement on Trade in Goods and Services in 2004 and 2007, respectively (ASEAN, 2015). However, there is no separate bilateral agreement between Indonesia and China and some bilateral tariffs remain in effect.

b) Indonesia – Japan. A legally binding trade agreement was signed in late 2007 called Indonesia-Japan Economic Partnership Agreement (IJEPA). It came into force in July 2008. As a member of the ASEAN, Indonesia also participates in the ASEAN-Japan Comprehensive Economic Partnership (AJCEP), which came into force in December 2008. Both agreements cover investment, trade in goods and services, and other economic cooperation. Under these agreements, some bilateral tariffs remain in effect.

c) Indonesia – USA. A Trade and Investment Framework Agreement (TIFA) in 1996. The TIFA is a framework for expanding trade and resolving outstanding disputes between USA and partner countries. It does not specify precise tariffs. Applied tariffs for trade in goods and services are based on the WTO most favoured nation (MFN) rates.

Every agreement always has distinctive rules of origin (RoO). RoO are essential criteria to attribute the country of origin to each product and to define how traded items can enter other country under trade agreements (Krueger, 1993). Therefore, different scenarios of RoO lead to different tariffs between countries which could determine economic benefits, values, and the quantity trade under the agreements (Brenton, 2003). Careful consideration on creating and applying the RoO and tariffs in each agreement is crucial. Instead of gaining more benefits, restrictive rules and inconsistency in tariffs could reduce or eliminate a potential trade and other economic benefits.

Many studies about the impact of trade agreements have been conducted in different areas using two main methods: the gravity model and a computable general equilibrium (CGE) model. However, the results of those analyses are varied. By using a CGE model, Productivity Commission (2010) projects that removing tariff between Australia and a large country could increase trade between them by 14 percent and world trade by 0.02 percent, while Perali et al. (2012) finds that trade agreements provide large benefits, and that removing all tariffs would lead to a significant increase in economic activity.
liberalization decreases agricultural production in European regions. In addition, by using the gravity model, other studies find positive benefits or trade creation for each participant (Park et al. 2008; Susanto et al. 2007), while, others like Solaoga and Winters (2001) discovers negative impacts or trade diversion in European Union in the 1990s. Recently, Magee (2008) mentions that the gravity model results are sensitive to the variables included and the time period covered in the regressions.

Due to the varying results of previous studies, analysing and observing a pattern of trade agreements become a major concern of international economists. Therefore, the purpose of this study is to identify how much trade agreements between Indonesia and its top three trading partners: China, Japan, and the USA benefit each country. In addition, an analysis of unilateral trade liberalization strategies will also be included as comparison. To address this question, a quantitative analysis called the Global Trade Analysis Project (GTAP) is used to estimate the direct and indirect impact those agreements to each country.

2. Theory

2.1 International Trade and Tariffs

Specializing in production by Adam Smith is the concept of absolute advantage, that is when one country is more efficient in terms of producing one particular commodity than another but is less efficient in producing second commodity. The specialization in production indicates that countries are different from each other so they can benefit from their differences. This distinctive condition is one of two reasons why countries engage in international trade (Krugman et al. 2012). The second reason is to achieve economies of scale in production. That is when each country produces such limited variants of output, the production tends to be at a larger scale by utilizing its own resources in the most effective and efficient way. Each of those reasons has to contribute to gain most from trade. However, there are strong assumptions behind this concept. Transportation costs, tariffs, import quotas, or other barriers and policies are not reckoned.

The world is dynamic, so is the world trade. Current condition and composition of world trade is different from what it was years ago. Nowadays, practically, some trade restrictions and policies are imposed to maximize the output to gain more from trade and to protect particular domestic sectors (Krugman et al. 2012). Tariffs are the oldest and the simplest form of trade restrictions and policies. Although the implementation of tariffs has declined recently, but they are still applicable (Figure 2), especially in developing countries.

Imposing different tariff rates to different countries is not allowed by the GATT. However, if countries have legally agreed to do so, then imposing different tariffs among participants would be acceptable. This is one of the reason why two or more countries sign agreements, whether establishing preferential trade arrangements, free trade areas, or customs unions. The effect of forming those agreements can be depicted into partial equilibrium analysis to measure whether they may lead to trade creation or trade diversion.

2.2 Partial Equilibrium Analysis

Suppose there are two group countries: importing and exporting countries. Supply and demand curves for both of them are shown in the Figure 3. When there are no imposed tariffs, the price would be in the world price (Pw). When countries implement an importing tariff, it will cause an increase in the price of the goods on domestic market, denoted by Pm. Due to higher price, quantity demanded by domestic consumer changes to the level of Q1 and quantity of domestic supply now is in the level Q3. In this case, consumers in the importing country suffer a reduction in well-being as a result of higher price. On the other hand, local producers gain as price in the domestic market increases. While for the government, imported tariffs raise its revenue that is shown in Figure 3 by the rectangular of abcd. When trade agreements exist, barriers like imported tariffs to international trade and investment are reduced or even eliminated between agreement partners. Suppose, as part of an agreement, the government has lower bilateral imported tariffs. This causes the price of the imported goods to decrease. These lower tariffs potentially reduce the revenue of the home government, assuming as big as the square of a'b'dc. On the other hand, lower prices also lead to higher demand. Since domestic producers cannot meet this excess demand at the new lower bilateral price, either extra supply needs to be generated locally by new lower cos suppliers or imported from the partner country. Consequently, the exporting country gains extra revenue as demand increases, represented by efgh. In this diagram, the size of a'b'dc and efgh are equal.

Trade agreements are more likely having a preferential tariff system which reduce the existing tariffs on various products. If tariff preferences lead to further decrease of price of the goods, which may lead to new trade flow creation between countries under the agreements and increase their efficiency of economic integration, then the agreements could generate economic benefit. On the other hand, if the increasing of trade flow between countries does not lead to the increasing of efficiency economic integration, that offsets the economic cost of diversion of trade from non-partners. In the end, the net effect of trade agreements is the net difference between trade creation and trade diversion. Positive net effect means that the agreements afford...
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Figure 3 Welfare Effects of Effective Rate of Protection
Source: Corden (1985)

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In the negotiation of trade agreements, Krueger (1993) argues that RoO are crucial concerns. If they are neglected, results in the analysis of potential benefits of trade agreements may be biased. RoO have several forms like change in tariff classification, substantial transformation of commodities, additional value added of the sales price in the partner country, and certain proportion of commodities that must be purchased from other members. Non-compliance of RoO may result in delays, extra cost, litigation, and even prohibition of commodities entering a partner economy with full tariff preferences. However, at some points, these RoO could be really complicated which can be associated with economic cost as high as 25 percent (Productivity Commission 2010b, cited in Gretton, 2017). When compliance with RoO is costly, it may be more cost effective for importers to pay the applied tariff rather than seek tariff concessions for some products.

3. Research Methods

The impact of trade agreements can be analysed by two methodologies. First, an empirical study applies the gravity model. It mainly applies variables like Gross Domestic Product (GDP), distance between country, and dummies to depict trade flows (Tinbergen, 1962). A coefficient shown by these dummies represents positive (net trade creation) or negative (net trade diversion) impacts of preferential trade agreements. However, the model cannot capture impacts in other aspects of economy. In addition, the model is sensitive to the time period covered. Conducting studies before and after global financial crisis could give different magnitude of impact on trade agreements (Brun et al. 2005).

This essay uses the second methodology, a simulation analysis by a CGE model. Unlike the gravity model, the result from projection can be used to see direct and indirect impacts on various aspects of the economy. This study will apply the GTAP comparative-static CGE model of the global economy. Simulations using a CGE approach present a comparison between one point in time before and another point in time after the introduction of a policy to project the economic effects of that policy. However, this comparative static modelling approach does not try to project the time path of adjustment. To establish such a time, path a dynamic model would be needed.

This study will analyse the potential impact of merchandise trade alternative liberalization strategies by performing four experiments: removing remaining bilateral merchandise import protection between (i) Indonesia and China, (ii) Indonesia and Japan, and (iii) Indonesia and the USA, respectively, while maintaining the protection between Indonesia and the rest of the world; and (iv) unilaterally removing all import protection in Indonesia with respect to all trading partners as a benchmark for comparing reform strategies. The unilateral approach is consistent with the WTO trade liberalization principle of non-discrimination that, in this case, Indonesia can control and effect such a liberalization policy unilaterally. Each of those experiments will be presented in two economic environments: a short run environment where national capital is assumed fixed and a longer run environment which national capital is assumed to vary and be mobile between regions, subject to regional rates of return being maintained at region-specific equilibrium levels. In the evaluation of results, this study will also take account of the possible negative effects of preferential rules of origin as part of the impact of bilateral agreements.

3.1 The Modelling Approach

The GTAP model is multi-country and multi-sector general equilibrium model of the global economy (Hertel 1997). The model is particularly useful to operationalize large data base such as trade, tariffs, environment and energy, and others so they are ready to be applied for analysing various issues and topics. Similar to any economic model, the GTAP model also applies some
simplifying assumptions as presented in the following section.

### 3.1.1 Regional Income Structure

For each country, regional income is allocated into three main categories: private, government, and saving (Hertel 1997). Figure 4 provides a visual display of regional income structure and its assumption. Allocation between those three categories is under the assumption of Cobb-Douglas (CD) utility function for private and government and Leontief function for saving. Moreover, in the comparative static GTAP model, the CD specification implies that national saving rates are assumed fixed. That is why saving has Leontief function which has zero elasticity of substitution.

![Regional Income Structure](Figure 4 Regional Income Structure Source: Hertel (1997))

Computation of private household consumption is closely related to utility and preferences on a per capita basis. For practical reason, the allocation of private consumption uses a constant difference in elasticities (CDE) function. The CDE was firstly proposed by Hanoch in 1975. This approach allows price and income elasticities of the demand system may vary in response to change in aggregate expenditure and prices. It can be classified as somewhere between the non-homothetic constant elasticity of substitution (CES) and fully flexible functional forms.

The allocations of government expenditures on composite goods apply Cobb-Douglas function. Since in each region government expenditure varies in response to household income, government budgets and taxes and subsidies imposed are not defined explicitly in the GTAP model.

### 3.1.2 Production Structure

Intermediate inputs come from two sources: produced domestically and imported. In the import case, the source of all of inputs comes from exporters. The value from country A to B must be the same with the import value of country B from A. Therefore, there is a direct link between import and export. In the GTAP 9 data base, there are 140 countries. However, for the purpose of this essay, the suppliers from which Indonesia has imported commodities are aggregated into seven national economies (Figure 5).

![Production Structure](Figure 5 Production Structure Source: Hertel (1997))

The GTAP model uses the Armington assumption to treat imported demand and other international trade data. The assumption implies that commodities across nations are substituted imperfectly. In other words, the same name supplies of commodities and immobile input factors have different prices in different countries. Both, imported goods from different countries and domestically produced goods, are formed with CES function under this assumption. The demand of imported and domestic goods from producers, households, and government are determined by their behavioural functions, relative prices, and relevant elasticity of substitution. In the GTAP, percentage change of quantity of import demand is calculated using following equation.

\[
q_{xs}(i,r,s) = -ams(i,r,s) + qim(i,s) - ESUBM(i) \times [pms(i,r,s) - ams(i,r,s) - pim(i,s)]
\]

where:

- \(q_{xs}(i,r,s)\) : percentage change in bilateral trade flows of commodity \(i\) from country \(r\) to country \(s\).
- \(ams(i,r,s)\) : percentage change of technology of commodity \(i\) from country \(r\) in country \(s\), which is assumed to be 0.
- \(qim(i,s)\) : percentage change in total imports of commodity \(i\) into country \(s\).
- \(ESUBM(i)\) : elasticity of substitution among imports of commodity \(i\).
- \(pms(i,r,s)\) : percentage change in price of imports of commodity \(i\) from country \(r\) in country \(s\).
- \(pim(i,s)\) : percentage change in average import price of commodity \(i\) in country \(s\).

All of inputs stated above will be combined to produce output which each producer is assumed to minimise costs subject to a constant return to scale of technology. The percentage change of industry output of commodity is calculated using following equation.

\[
qo(i,r) = SHRDM(i,r) \times qds(i,r) + \text{sum}(s, \text{REG}, \text{SHRXMD}(i,r,s) \times q_{xs}(i,r,s)) + \text{tradsslack}(i,r)
\]

where:
ally in apply of effective labor, as well as land and resources. For the purpose of this essay, commodities are also aggregated into ten groups: Agriculture (AGR), Mining (MIN), Other manufacturing (MAN), Clothing (CLG), Chemicals (CRP), Machinery (MCH), Electronic equipment (ELE), Trade (TRD), Transport (TRA), and Other services (SER). (See Appendix I for detailed countries and Appendix II for commodities). In the following part, general description about data base for experiments in this essay: Primary factors, average tariff rates, and supply of commodities will be presented.

4.1 Primary Factors

The supply of effective labor, as well as land and natural resources, are fixed. However, those primary factors have different mobility. Land and natural resources are categorized as sluggish, while labor and capital are categorized as mobile. This study projects two terms of mobility of capital: short and longer run. They are not directly connected to a time frame counted in years. First, in the short term, capital and labor would be treated as sluggish factors rather than mobile as they only move across industries in an economy to maximize regional returns. While in the long term, the capital is allowed to move across industry and across economies, without any restrictions. The capital is projected to adjust to its long-run equilibrium rate of returns. In this circumstance, labor is also assumed to be mobile between industries to response to differences in wages. If there is a shock such as a tariff reduction, average industry of returns to capital would increase in the short run in response to changes in demand as industry output varies in response to changes in industry competitiveness. In the long run, the capital could be allocated to other regional industries which depends on relative competitiveness and the capital stocks would vary to equilibrate capital returns to their longer-run values.

4.1.2 Average Tariff Rates

As mentioned before, the Bogor Declaration encouraged its participants countries, to reduce or eliminate import tariff. However, some tariff for particular commodities still exist and remain high for some products. In general, these tariffs increase total cost of imports for both sides, producers and consumers. They also generate government revenue. Table 1 shows average imported tariff to Indonesia for several commodities. Indonesia imposes different average tariff for different commodities and different regions of origins. The average range of the tariff starts from zero from several commodities to maximum 12.3 percent for imported agriculture commodities from Japan.

4. Results and Discussion

4.1 Data Base

The most current database, GTAP 9, year 2011, will be applied in the simulation. This is a global database in various sectors including macroeconomic, bilateral trade, protection linkages, and other features such as behavioral and switch parameters. The database is a combination from many sources namely World Bank: World Development Indicators (WDI), United Nations Statistics Division (COMTRADE), Penn World Table (PWT), and others (Aguir et al. 2016). Those data are not just documented and combined but reconciled to minimize inconsistency and unreliability problems, especially in trade data when sometimes, exports (imports) data from country A and imports (exports) data from country B as a partner are reported differently to the United Nations (UN) (GTAP, 2019).

The database consists of 140 countries and 57 sectors commodities. For the purpose of this essay, countries are aggregated into eight national economies: Indonesia (IDN), China (CHN), Japan (JPN), Malaysia (MYS), Singapore (SGP), Thailand (THA), United States of America (USA), and Rest of the World (ROW). Moreover, commodities are also aggregated into ten groups: Agriculture (AGR), Mining (MIN), Other manufacturing (MAN), Clothing (CLG), Chemicals (CRP), Machinery (MCH), Electronic equipment (ELE), Trade (TRD), Transport (TRA), and Other services (SER). (See Appendix I for detailed countries and Appendix II for commodities). In the following part, general description about data base for experiments in this essay: Primary factors, average tariff rates, and supply of commodities will be presented.

4.1.1 Primary Factors

| Commodity       | CHN | JPN | USA | MYS | SGP | THA | ROW |
|-----------------|-----|-----|-----|-----|-----|-----|-----|
| Agriculture     | 3.48| 9.47| 4.13| 3.56| 12.3| 6.82| 5.26|
| Mining          | 0.03| 1.8 | 4.11| 0   | 5   | 0   | 0.15|
| Other manufacturing | 1.52| 6.22| 1.45| 0   | 2.05| 0   | 2.27|
| Clothing        | 0.87| 6.69| 7.21| 0   | 7.03| 0   | 3.8 |
| Chemicals       | 1.92| 7.24| 5.58| 0.01| 5.97| 0   | 4.43|
| Machinery       | 0.63| 8.61| 6.86| 0   | 5.26| 0   | 5.97|
| Electronic      | 0.07| 0.81| 1.14| 0   | 0.11| 0   | 0.31|
| Trade           | 0   | 0   | 0   | 0   | 0   | 0   | 0   |
| Transport       | 0   | 0   | 0   | 0   | 0   | 0   | 0   |
| Other services  | 0   | 0   | 0   | 0   | 0   | 0   | 0   |
| Trade-weighted  | 0.85| 4.08| 3.03| 0.36| 3.77| 0.68| 2.22|

Source: GTAP Data Base (2011)

Agriculture is one of the key sectors of the economy in Indonesia. In this case, agriculture commodities also include forestry, fishing, and other food processed product. Although in the last three decades its role has
significantly decreased, but recently agriculture still supports Indonesian Gross Domestic Product (GDP) around 14 percent (World Bank, 2017). Indonesian government imposes as low as possible importing tariff of agriculture if the country cannot produce them domestically. On the other hand, higher import tariff will be imposed if domestic production is abundant so competitiveness of domestic output can be protected (Laksani & Putri, 2015).

4.1.3 Supply of Commodities

As shown in Table 2, most commodities in Indonesia are supplied mainly by domestic output rather than import, except for two: machinery and electronic equipment which have been imported shares in total supply 61.07 and 56.73 percent, respectively. However, Indonesia is not a substantial producer for those two commodities and draws more than half of its supplies from imported sources. Some big companies or producers in machinery, especially automotive, and electronics have their manufacturing industry in Indonesia. This is mostly because Indonesia has more relatively lower price of labor to do assemble process. Indonesia imports small pieces or parts of machines and electronics and assembles them to become semi-finished products (Molnar & Lesher, 2009).

Table 2 Supply of Commodities to Indonesia, 2011 (%)

| Commodity       | Domestic Supply | Imports | Total Supply | Less Exports | Total Domestic Supply |
|-----------------|-----------------|---------|--------------|--------------|----------------------|
| Agriculture     | 91.42           | 8.58    | 100          | 11.74        | 88.26                |
| Mining          | 84.23           | 15.77   | 100          | 99.70        | 0.30                 |
| Other manufacturing | 76.33         | 23.67   | 100          | 14.26        | 85.74                |
| Clothing        | 79.79           | 20.21   | 100          | 37.28        | 62.72                |
| Chemicals       | 77.66           | 22.34   | 100          | 23.26        | 76.74                |
| Machinery       | 38.93           | 61.07   | 100          | 18.22        | 81.78                |
| Electronic      | 43.27           | 56.73   | 100          | 40.76        | 59.24                |
| Trade           | 93.39           | 6.61    | 100          | 5.66         | 94.34                |
| Transport       | 98.14           | 1.86    | 100          | 0.52         | 99.48                |
| Other services  | 97.69           | 2.31    | 100          | 1.01         | 98.99                |

Source: GTAP 9 Data Base (2011)

However, machines and electronics have different case. Table 2 displays comparison between domestic and import supply of those two commodities and their export. Although having roughly the same proportion of domestic and import, the export value share of electronic equipment is more than double that of machinery. The reason is Indonesia and some other Southeast Asian countries like Vietnam and Thailand usually assemble part of electronics based on orders from licensed electronics companies from downstream manufacturers such as China and South Korea. Once those parts are finished, only a few are used for domestic market because plenty of them will be exported to where the orders come from. The key players for this global supply chain of electronics industries are Samsung and Apple. While for machines commodity, Indonesia has several major automotive assembly industries, especially Japanese industries, namely Honda and Toyota. The assemblies are not only for semi-finished products but also for finished products like cars and motorcycles. Some of these finished products are used by the domestic market and some others will be exported (Ministry of Industry, 2010).

One commodity that is quite remarkable is mining. The amount of exported mining is estimated at 99.7 percent of local productions. Since Indonesia is rich in mineral resources, this reflects that Indonesia has become the world supply of mining, especially for coal, copper, gold, and natural gas. With its export focus, the mining industry is one of the major contributors to the foreign account of the Indonesian economy. In the past decade, its direct value-added contribution to Indonesian Gross Domestic Products (GDP) is approximately six to seven percent (World Bank, 2017).

Imported commodities in Table 2 can be classified to regions of origin as shown in Table 3. Although more than 45 percent of commodity imports come from the ROW grouping of regions, but as a single country, Indonesia has mostly imported commodities from China. The main products imported from China are part of machine and electronic and raw metal (Ministry of Industry, 2012). However, commodities like machinery, especially for automotive industry, is mainly imported from Japan which is used for material inputs to production for export. On the other hand, the biggest share for imported agriculture commodity like cotton, wheat, and soybean is from the USA (Statistic Indonesia, 2017).

Table 3 Quantity Commodities Imported to Indonesia by Regions of Origin at Market’s Price, 2011 (%)

| Commodity       | CHN | JPN | USA | MYS | SGP | THA | ROW | Total |
|-----------------|-----|-----|-----|-----|-----|-----|-----|-------|
| Agriculture     | 1.19| 0.03| 1.84| 0.44| 0.16| 1.16| 6.11| 10.94 |
| Mining          | 0.07| 0.03| 0.02| 0.07| 0.01| 0.03| 0.03| 0.46  |
| Other manufacturing | 4.68| 2.03| 1.71| 5.33| 0.77| 13.7| 22.06|
| Clothing        | 1.65| 0.16| 0.08| 0.09| 0.07| 0.16| 1.68| 13.40 |
| Chemicals       | 1.89| 1.38| 0.91| 0.9 | 1.77| 1.16| 5.39| 22.06 |
| Machinery       | 3.91| 5.43| 1.32| 0.62| 3.59| 2.14| 5.04| 5.21  |
| Electronic      | 1.43| 0.28| 0.14| 0.31| 1.94| 0.07| 1.03| 4.84  |
| Trade           | 0.07| 0.04| 0.25| 0.03| 0.02| 0.05| 1.28| 2.38  |
| Transport       | 0.14| 0.11| 0.06| 0.01| 0.05| 0.02| 1.12| 1.52  |
| Other services  | 0.16| 0.16| 0.94| 0.05| 0.15| 0.03| 4.87| 6.37  |
| **Total**       | 15.15| 9.66| 7.27| 3.31| 13.11| 5.61| 45.45| 100   |

Source: GTAP 9 Data Base (2011)

Although Indonesia is well-known for its agriculture sector, the country still imports quite a lot agriculture product, almost 11 percent of supply coming from imports, according to 2011 data. Its importing partners are primarily from the ROW countries, the USA, and...
China. The ROW countries such as Australia, New Zealand, and Middle East countries are main importing partners of Indonesia especially for fruits, nuts, and animal products such as meat and milk. This also confirms the fact about high average imported tariff for agriculture commodity rather than other commodities. On one side, government wants to fulfil high demand of imported fruits and vegetables, while, on the other hand Indonesia also has a policy of protecting its farmers in traditional areas of agriculture.

Another significant imported commodity is machinery, which the first source is Japan with around 5.43 percent from total imported commodities. This confirms the previous paragraph that machinery commodity is mostly used for Japanese automotive assembly industry. The second source is the ROW countries, like Germany, Italy, and South Korea, which around 5.04 percent. The imported machinery from European countries includes automotive machines and parts, electrical equipment and mechanical equipment.

4.2 Projected Results

There are two types of projections for each experiment: short run and longer-run. They are applied to four experiments: the first three experiments are applied to three different agreements and one experiment is removing all import protection unilaterally. The results of each projection show the effects of tariff removal on macroeconomic, quantity import, and quantity of output. All of those effects are shown below.

4.2.1 Longer-run Impacts of Liberalization Scenarios

First, longer run projection is allowing capital to move freely, across industries and across economies. In Table 4 below will be shown the longer-term projection result on macroeconomic indicators and factors of production from four experiments.

As can be seen in Table 4, the impact of tariff removal under longer-term projection is modest with the biggest projected impact coming from unilateral tariff removal. Under unilateral experiments, Indonesian GDP is projected to increase by 0.88 percent, while the experiments of China, Japan, and the USA only give 0.09, 0.35, and 0.37 percent, respectively. That is because volume of both trades, exports and imports, are projected to increase. Once tariffs are removed, price of imports is relatively lower than before which lead to the increasing of volume of imports. However, this is also followed by the increasing volume of exports as local firms become more competitive, roughly by the same percentage number. In other words, imports mostly are being used as production inputs that are then exported which eventually improves the competitive position of Indonesian exporters and exports. Thereby, by removing tariff unilaterally, Indonesia is also estimated to expand its exports. Another reason is the increasing of level of investment as capital is allowed to move freely, enabling the now more competitive local firms to expand operations.

Table 4 Long-term Projected Effects of Tariff Removal for Indonesia, 2011 (%)

| Macroeconomic indicators | Bilateral Removal | Unilateral |
|--------------------------|-------------------|------------|
| Real GDP                 | 0.09              | 0.37       | 0.88       |
| Volume of exports        | 0.61              | 2.04       | 4.55       |
| Volume of imports        | 0.77              | 2.64       | 4.62       |
| Price of exports         | 0.11              | 0.36       | -0.72      |
| Price of imports         | 0.00              | 0.00       | 0.00       |
| Terms of trade           | 0.11              | 0.37       | -0.72      |
| Real Income              | 0.10              | 0.43       | 0.54       |

Factors of production

| Capital stocks           | 0.18              | 0.70       | 0.71       | 1.67       |
| Real wages              | 0.19              | 0.36       | 0.68       | 1.14       |
| Unskilled worker        | 0.15              | 0.35       | 0.68       | 1.22       |
| Skilled worker          |                   |            |            |

Source: analysis result, 2020

Terms of trade (TOT) calculates index ratio of relative export prices to import prices. It is used as an indicator of an economic health of a country. An increase of TOT generally means that export prices have gone up as import prices have dropped or maintained. In other words, Indonesia can purchase more imported goods for every exported good. This is what happened in the bilateral experiments between Indonesia - China and Indonesia - the USA where market access associated with lower import tariffs and higher demand on Indonesia’s exports to those destinations outweighs the downward pressure on export prices associated with lower input costs to Indonesian firms and consumers. On the other hand, the converse results apply under the experiments of unilateral removal and bilateral removal between Indonesia - Japan when export prices have dropped with improved competitiveness of local producers on international markets. With increased demand for imports, import prices are projected to increase. Lower export prices and higher import prices are reflected in a decline in the projected TOT.

Productive resources, capital and labor, are estimated to move to the most highly valued activities and be more productive, in the longer run. National capital stocks are estimated to increase to all of experiments. The projections of the USA and Japan give roughly the same rate, 0.7 percent. While for unilateral removal, by attracting investment from the rest of the world, capital stocks are projected to increase by 1.67 percent. Higher net exports raise demand for the fixed factor labor leading to higher real wages for both, skilled and unskilled workers.
The increasing volume of trades, both exports and imports, has caused level of real wages in an economy to rise. However, who will benefit the most between skilled and unskilled workers depends on the situation of that country itself. In case of Indonesia, the country is labor-intensive where number of unskilled workers exceeds number of skilled workers. In terms of real wages of unskilled workers are relatively higher than skilled workers for bilateral removal tariff projections, that is presumably because there is a significant increasing trade in the industries that employ unskilled workers. On the other hand, the unilateral projection is estimated to increase trade in the sector that need more skilled workers which is reflected in the increase in real wages for skilled being projected to be 0.08 percent higher than unskilled.

In more specific way, as can be seen in Table 4, Indonesian economy relies mostly on its relation to the USA than to any other country. However, all of the experiments do not take into account any RoO and their structure which can be complicated. As noted, the complexity and restrictiveness of RoO could reduce the projected result substantially, with estimates suggesting discount of by as high as 25 percent reasonable. Unfortunately, Indonesia still pretty much depends on the USA once that discount has been applied. In fact, between those two countries so far do not have a bilateral agreement. Regarding to this experiment projection, it is important for Indonesian government to persuasively approach the USA government to arrange a legally binding trade agreement.

4.2.2 Short Run Impacts of Liberalization Scenarios

Second projection is allowing capital to move only across industries in an economy, called short-term projections. This projection is also applied to four experiments, just like in the previous long-term projections. The results of these four experiments are shown in the Table 5. As can be seen in that table, capital stocks do not change as it stays in one economy, shown as zero percent.

Table 5 Short-term Projected Effects of Tariff Removal for Indonesia, 2011 (%)

| Macroeconomic indicators | Bilateral Removal | Unilateral |
|--------------------------|------------------|-----------|
|                          | IDN-CHN | IDN-JPN | IDN-USA | IDN-CHN | IDN-JPN | IDN-USA |
| Real GDP                 | 0.09    | 0.35    | 0.37    | 0.88    | 0.37    | 0.68    |
| Volume of exports        | 0.61    | 1.12    | 2.04    | 4.55    | 1.12    | 2.35    |
| Volume of imports        | 0.77    | 1.20    | 2.64    | 4.62    | 1.20    | 2.92    |
| Price of exports         | 0.11    | -0.13   | 0.36    | -0.72   | 0.11    | -0.37   |
| Price of imports         | 0.00    | 0.00    | 0.00    | 0.00    | 0.00    | 0.00    |
| Terms of trade           | 0.11    | -0.13   | 0.37    | -0.72   | 0.11    | -0.37   |
| Real Income              | 0.10    | 0.21    | 0.43    | 0.54    | 0.21    | 0.68    |

Sources: analysis result, 2020

As expected, when national capital is fixed, the impact of the key economic indicators is projected to be less than long-term projection. However, all of those impacts are still in the same magnitude. Indonesian GDP and volume of exports and imports are estimated to positively increase, on the bilateral and unilateral import tariff removal scenarios. As can be seen, the projected results vary in price of exports, imports, and TOT. In light of Indonesian government needs to plan how to create scenarios and plans to deal with its trade dependent on primary commodities like agriculture especially for its supply. Since Indonesia is a tropical country, it is important to maintain supply under all of circumstances, namely weather, droughts, floods, etc (Harmoni, 2005).

Real income, under the short-term experiments, is projected to decrease by 0.01 percent. There are four major components to calculate real income: primary factors, indirect taxes, regional income, and price of household consumption. In this circumstance, when capital and other primary factors and taxes are relatively fixed, regional income is estimated to decline, as well as the goods and services purchased by household. However, regional income is projected to drop bigger than the decreasing of price of household consumption. Since the potential expansion effect of increased competitiveness from lower input cost could not offset the income loss from lower tariff revenue, the short-term projection of real income is estimated to be negative.

Furthermore, in terms of real wage, bilateral and unilateral removal tariff projections give similar results, real wages of unskilled workers have a slightly smaller magnitude than skilled workers. In the short-term projections, when capital only moves inside a country so that workers is the only mobile factor. Under these conditions, many unskilled workers do not have many choices to adjust and switch to other sectors, especially for those who self-employed and work full-time in agriculture. Therefore, real wages impact on them are smaller than skilled workers.

4.2.3 Quantity of Import

Once tariff is removed, price of import is projected to be lower. The removal may lead to the increasing of quantity of import. The first projection applies unilateral removal of imported tariff. The results are shown in Table 6. Other than China, Japan, and the USA, some commodities are projected to be imported more from Singapore, Thailand, and other countries in the ROW group of countries.

Under zero imported tariff scenario, Indonesia is projected to import more commodities like agriculture from Thailand, machinery from European countries like Germany, and chemical from European Union countries.
The increasing projection result on imported agriculture and mining commodities from Singapore is notable since it is a tiny country with barely any natural resources. This is because Singapore has strategic geographic location supported by good infrastructures and services. Most of fully loaded cargo ships transporting imported commodities from any country are not driven directly to Indonesia but anchored at the Singapore port. Their purpose is simply to avoid too much cost while waiting for finishing imports administration process to get into Indonesian customs and, consequently, those commodities are registered coming from Singapore. Therefore, it is crucial for Indonesia to build well-equipped infrastructures and reform the importing bureaucracy to improve competitiveness of Indonesia in international market.

Table 6 Long-term Projected Effects of Unilateral Tariff Removal for Quantity Import of Major Commodities in Indonesia (%)

| Commodities | CHN | JPN | USA | MYS | SGP | THA | ROW |
|-------------|-----|-----|-----|-----|-----|-----|-----|
| Agriculture | 1.71 | 34.16 | 4.81 | 2.22 | 52.01 | 18.89 | 10.58 |
| Mining      | -0.55 | 20.89 | 57.35 | -0.70 | 59.74 | -0.81 | 0.78 |
| Other manufacturing | -0.47 | 33.32 | -1.04 | -9.71 | 2.79 | -9.71 | 4.33 |
| Clothing    | -6.08 | 41.97 | 47.73 | -11.70 | 45.77 | -11.60 | 16.10 |
| Chemicals   | -5.22 | 31.96 | 17.93 | -16.23 | 22.14 | -16.22 | 11.12 |
| Machinery   | -23.20 | 32.55 | 18.45 | -26.48 | 5.96 | -26.48 | 11.50 |
| Electronic  | -0.76 | 5.14  | 8.85  | -1.17 | -0.74 | -1.14 | 1.22 |
| Trade       | -0.69 | -1.09 | -0.80 | -0.56 | -1.06 | -0.52 | -0.79 |
| Transport   | -0.25 | -0.69 | -0.37 | -0.12 | -0.72 | -0.05 | -0.37 |
| Services    | -0.13 | -0.55 | -0.25 | 0.03  | -0.64 | 0.19 | -0.24 |

Source: analysis result, 2020

Table 7 shows the projection results after removing imported tariff from China. Agriculture and chemicals commodities are projected to have the biggest impacts. Zero tariffs that may lead to lower price commodities from China are estimated to divert trade in imported supplies of agriculture commodities from other countries, by 18.14 percent. This means that Indonesia and China have efficient economic integration especially for agricultural commodities like fruits and vegetables (Statistics Indonesia, 2017).

Moreover, the diversion of trade from other countries to China is also projected to happen for chemicals commodities, increase by 12.73 percent. Ministry of Industry (2012) states that the dependency of Indonesia on importing raw materials of chemical industries can be worsen in the following years if Indonesia cannot reconstruct upstream chemical industries that are integrated with the downstream. For example, almost all of pharmaceutical suppliers in Indonesia import their ingredients to produce medicines for its domestic consumption from China, India, and some other countries in European Union. Therefore, in 2011, chemical and pharmacies industries investment and development are one of the top priorities so Indonesia can improve its competitiveness in international market (Ministry of Industry, 2012).

Table 7 Long-term Projected Effects of Tariff Removal between Indonesia – China for Quantity Import of Major Commodities in Indonesia (%)

| Commodities | CHN | JPN | USA | MYS | SGP | THA | ROW |
|-------------|-----|-----|-----|-----|-----|-----|-----|
| Agriculture | 18.14 | -0.43 | -0.43 | -0.43 | -0.45 | -0.40 | -0.44 |
| Mining      | 0.28  | 0.03  | -0.02 | 0.00  | 0.09  | 0.04  | -0.03 |
| Other manufacturing | 9.44  | -0.83 | -0.83 | -0.83 | -0.84 | -0.82 | -0.83 |
| Clothing    | 4.65  | -1.87 | -1.87 | -1.87 | -1.85 | -1.83 | -1.87 |
| Chemicals   | 12.73 | -0.59 | -0.59 | -0.60 | -0.59 | -0.57 | -0.59 |
| Machinery   | 4.09  | -0.49 | -0.49 | -0.49 | -0.49 | -0.49 | -0.50 |
| Electronic  | 0.71  | 0.21  | 0.20  | 0.21  | 0.21  | 0.21  | 0.20 |
| Trade       | 0.22  | 0.27  | 0.27  | 0.28  | 0.28  | 0.28  | 0.27 |
| Transport   | 0.48  | 0.54  | 0.53  | 0.54  | 0.55  | 0.56  | 0.53 |
| Services    | 0.37  | 0.43  | 0.43  | 0.45  | 0.45  | 0.47  | 0.43 |

Source: analysis result, 2020

Major Commodities in Indonesia (%)
The results shown in Table 8 are projection result after removing imported tariff between Indonesia - Japan. In this case, machinery commodities are estimated to get the major impacts. Imported supply of machinery other countries is estimated to decline, in average, 14 percent while from Japan is projected to increase by around 54.82 percent. Once zero imported tariff is applied, almost all imported machinery commodities from around the world have been diverted to Japan. It is estimated that Indonesia relies on machinery commodities supply from Japan too much. Between Indonesia and Japan, economic integration is likely to be more efficient, especially for machinery commodities.

Table 8 Long-term Projected Effects of Tariff Removal Between Indonesia – Japan for Quantity Import of Major Commodities in Indonesia (%)

| Commodities | CHN | JPN | USA | MYS | SGP | THA | ROW |
|-------------|-----|-----|-----|-----|-----|-----|-----|
| Agriculture | 0.26 | 56.74 | 0.22 | 0.26 | 0.43 | 0.33 | 0.23 |
| Mining      | 0.38 | 22.11 | 0.38 | 0.44 | 0.44 | 0.45 | 0.39 |
| Other manufacturing | -2.07 | 44.57 | -2.09 | -2.03 | -1.96 | -2.00 | -2.09 |
| Clothing    | -1.46 | 58.46 | -1.48 | -1.41 | -1.12 | -1.27 | -1.49 |
| Chemicals   | -3.61 | 51.89 | -3.64 | -3.57 | -3.42 | -3.51 | -3.64 |
| Machinery   | -14.06 | 54.82 | -14.08 | -14.02 | -13.80 | -14.05 | -14.08 |
| Electronic  | -0.22 | 5.98  | -0.23 | -0.15 | 0.08  | -0.16 | -0.24 |
| Trade       | 0.01  | -0.54 | -0.01 | 0.05  | 0.18  | 0.10  | -0.01 |
| Transport   | 0.21  | -0.40 | 0.18  | 0.24  | 0.43  | 0.32  | 0.18 |
| Services    | 0.13  | -0.46 | 0.11  | 0.18  | 0.39  | 0.30  | 0.11 |

Source: analysis result, 2020

In general, what will happen on the trade projection after imported tariffs removal between Indonesia - the USA is shown in Table 9 and it is the same with what has happened to Japan in the previous paragraph. Mining and chemicals commodities are projected to get substantial effects, which are around 40 until 50 percent, respectively but the calculation is based on small base share of import in Table 3. For example, the data base shows that share
of imported mining commodities is 0.02 percent and projected to increase by almost 60 percent. Therefore, the share does not change materially. After the experiment, the share is still only around 0.03 percent.

As seen on Table 9, the clothing commodities are estimated to increase substantially, compared to other commodities. The imported supply of clothing from the USA is projected to be almost doubled, 98.41 percent. In practice, under zero imported tariff, some well-known brand of wearing apparels will get in to Indonesian market freely like Nike and Fossil. However, the outstanding increasing of quantity import of clothing commodities from the USA still cannot outperform the domination of China. Although imported clothing from China is projected to increase only by 17 percent (Table 7), but using comparison with Table 3, the total share of quantity import of clothing from China is 2 percent, while clothing from the USA is roughly 0.16 percent. The reason is, in general, GDP per capita of Indonesia is relatively small (World Bank, 2017). Although imported tariff has been removed and some of branded products from the USA is relatively cheaper, but low-price clothing products from China will still be in the high demand compared to others region origin.

Table 9 Long-term Projected Effects of Tariff Removal Between Indonesia – USA for Quantity Import of Major Commodities in Indonesia (%)

| Commodities       | Regions CHN JPN USA MY SGP THA ROW |
|-------------------|-----------------------------------|
| Agriculture       | 0.63 0.59 23.14 0.48 0.52 0.56 0.58 |
| Mining            | 0.21 0.25 58.97 0.07 0.05 0.19 0.08 |
| Other manufacturing | 0.92 0.88 10.88 0.81 0.82 0.84 0.88 |
| Clothing          | 17.47 17.41 98.41 17.31 17.33 17.40 17.41 |
| Chemicals         | 0.86 0.82 42.46 0.75 0.78 0.80 0.82 |
| Machinery         | -2.21 -2.24 50.05 -2.31 -2.31 -2.30 -2.25 |
| Electronic        | 0.91 0.87 11.42 0.80 0.80 0.83 0.85 |
| Trade             | 1.29 1.27 1.24 1.23 1.25 1.25 1.25 |
| Transport         | 1.95 1.93 1.89 1.89 1.92 1.92 1.92 |
| Services          | 1.65 1.63 1.60 1.60 1.63 1.64 1.62 |

Source: analysis result, 2020

4.2.4 Quantity of Output

By removing imported tariff and introducing trade liberalization, imports are cheaper and demand for the now cheaper imports is projected to increase, especially for some of commodities (Table 10). However, that demand also depends on how those imports as intermediate inputs and final goods are substituted by domestic production, and vice versa and how local industry responds to changes in international competitiveness on account of tariff changes.

Based on data base in Table 1 and 2, it can be seen that Indonesia gives relatively higher tariffs protection to agriculture sector compared to other commodities because the government needs to protect domestic supply. As one of key sectors of Indonesian economy, agriculture output is estimated to decrease reasonably, once unilateral and bilateral import tariff with the USA are applied. In this circumstance, production in Indonesia more likely has been moved to more productive industries with the implementation of tariff removal. For example, clothing industry which is projected to increase by roughly 20 percent as exports expand. Although quantity of import of clothing commodities from the USA is relatively small, but as labor-intensive country and part of global supply chain, Indonesia is a crucial partner for wearing apparel industry in the USA.

Table 10 Long-term Projected Effects of Tariff Removal for Output of Commodities in Indonesia, 2011 (%)

| Bilateral Removal | Unilateral |
|-------------------|------------|
|                   | IDN-CHN    | IDN-JPN    | IDN-USA    |
| Agriculture       | 0.18       | 0.15       | -0.39      | -0.19       |
| Mining            | -0.16      | 0.22       | -0.43      | 0.75        |
| Other manufacturing | -0.19      | 0.52       | -0.11      | 0.77        |
| Clothing          | -0.22      | 0.72       | 21.15      | 4.62        |
| Chemicals         | 0.86       | 0.21       | -1.51      | 0.55        |
| Machinery         | -0.34      | -0.59      | -1.75      | 0.51        |
| Electronic        | 0.14       | 2.00       | -1.77      | 7.09        |
| Trade             | 0.09       | 0.35       | 0.47       | 0.87        |
| Transport         | 0.09       | 0.34       | 0.03       | 1.08        |
| Services          | 0.12       | 0.46       | 0.43       | 1.08        |

Source: analysis result, 2020

4.2.5 Rules of Origins (RoO)

Trade agreements do not only depend on tariffs applied for commodities. RoO also defines how those commodities can be traded under trade agreements between countries (Krueger, 1993). All of results shown above have not included RoO in the discussion. When complex RoO are applied on trade agreements and eventually those need greater cost to comply and interpret, then the trade agreements need higher economic cost to be associated with.

Unfortunately, the structure of RoO is difficult to be quantified and calculated so it is hard for countries to prepare what they need to do to face the complexity. Referring to the article of the Productivity Commission (2010b, cited in Gretton, 2017), based on the analysis of Australia and the United States Free Trade Agreements (AUSFTA), complicated RoO could reduce as high as 25 percent of the GDP gains to Australia. If that result can be generalized, then results shown above need to be discounted by at least 25 percent due to the complexity of the RoO and rule structures.

To illustrate, we can use the result of longer-term projection on macroeconomic indicators in Table 4. Under the experiment between Indonesia and the USA, GDP is projected to increase by 0.37 percent. This is the result of the experiment without considering any applied RoO. However, in reality, the USA applies quite
complicated RoO to protect its domestic market. If the result from previous study can be applied to this essay, then the increasing GDP would be only around 0.27 percent. Therefore, although the USA has crucial role to Indonesia but its influence towards Indonesia could be lower than implied by analysis that does not account for RoO and other regulatory impairments.

5. Conclusion

This paper uses quantitative analysis called the GTAP CGE model of the global economy to identify the potential impacts trade agreements between Indonesia and its top three trading partners and unilateral trade liberalization in Indonesia. Economic gains are projected to be available from trade liberalizing with unilateral merchandise trade liberalization potentially increasing Indonesian GDP around 0.88 percent in the longer run. With higher activity levels, real wages to skilled and unskilled workers and real national income are projected to increase. The bilateral liberalization strategies, representing only partial liberalization, are projected to afford lower potential gains. Between three bilateral trade liberalizations, the USA is projected to have the highest potential economic gain by 0.37 percent. When capital is relatively fixed in the short run, as expected, the projection result is lower than the longer run. Unilateral trade liberalization is projected to rise Indonesian GDP by only 0.08 percent. Limited activity levels of capital have led to the smaller extent of the projections of the increase on real wages for both, skilled and unskilled workers. However, real national income is estimated to decrease since potential expansion effect as the result of higher competitiveness from cheaper input cost could not offset the total income loss from lower tariff revenue.

As the consequence of different patterns trade protection between Indonesia and each of its main trading partners, the impact of trade liberalization through the bilateral and unilateral options is different in each projection. Removing tariffs is estimated to benefit the agriculture and mining industries less than other activities and, thereby, they expand less than others. Chemicals, electronic, and clothing are three output commodities that are projected to increase substantially a between Indonesia and China, Japan, and the USA, respectively.

However, the experiments are projected in the absence of RoO and other regulations which can be so complicated. Unfortunately, quantifying RoO is a challenging task although available estimates suggest that the discount could be substantial, at around 25 percent of potential benefits. Possible ways to simplify and liberalize RoO are crucial for the achievement of the full potential benefits of bilateral agreements and closing the gap between bilateral and unilateral reform strategies. Future research would be worthwhile to consider RoO in these agreements so net impact of those bilateral and unilateral trade liberalizations can be derived.

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