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Impact of Trade Liberalisation in APEC's Development Products on APEC Economies and Rural Development and Poverty Alleviation in Indonesia

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Impact of Trade Liberalisation in APEC's Development Products on APEC Economies and Rural Development and Poverty Alleviation in Indonesia

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I. BACKGROUND

APEC is a strategic forum which accomodates international economic partnership influencing regional and international economy. It is membered of 21 economies in Asia and Pacific, which are Australia; Brunei Darussalam; Canada; Chile; China; Hong Kong, China; Indonesia; Japan; Korea; Malaysia; Mexico; New Zealand; Papua New Guinea; Peru; the Philippines; Russia; Singapore; Chinese Taipei; Thailand; the United States; and Viet Nam. APEC creates a market of 2.8 billion people or about 41 per cent of the world population, 59 per cent of world GDP, 49 per cent of world trade and 45 per cent of world foreign direct investment (FDI) in 2015 (APEC 2016).

Bringing the region closer together, APEC succeded in faciliting regional integration to promoting trade and economic growth in the Asia-Pacific. Reducing trade barriers and smoothing out differences in regulations in APEC region have boosted trade over 6.7 times between 1989 and 2015 (APEC 2016). Moreover, people of APEC economies have increased by 74 per cent, lifting millions of poverty and creating a growing middle class in the same period.

APEC Leaders commited to achieve the 'Bogor Goals' of free and open trade and investment through reducing trade barriers in the Asia-Pacific. In order to achieve the goals, APEC suggests to promoting the free flow of goods, services and capital among APEC economies.

One of the priorities of APEC is creating 'sustainable growth and with equity' in Asia-Pacific when trade and investment liberalisation is proposed. Thus, it can help economies in Asia-Pacific to achieve sustainable and inclusive growth in a way that enhances rural development and alleviates poverty. In 2013, APEC endorsed a **proposal on Promoting Products which Contribute to Sustainable and Inclusive Growth through Rural Development and Poverty Alleviation** and instructed APEC *Policy Support Unit* (PSU) to carry out the study on this topic. List of products which is assessed by PSU includes 157 products (6 HS digits)[1].

The results of the PSU study (APEC PSU 2015) suggest that the list of the nominated products for APEC, then called as development products (devpro), is relevant

[1] SOM2 APEC 2014

from both trade and tariff perspectives. Moreover the study shows that trade liberalisation only cannot be expected to result in wholesale rural development. To calculating and predicting the impacts of trade liberalisation in the development products on rural development and poverty alleviation, the APEC PSU suggests a deep analysis on micro-level and using sub-economy data for each APEC economy. Using those analysis, the direct relationship between trade in the development products and larger issues such as GDP, employment, or poverty can be identified.

In order to measure the impact of trade liberalisation in the development products and to overcome the lack of the APEC PSU study, this study is conducted. This study focuses on a case study of Indonesia which aims to analyze the impacts of trade liberalisation in APEC development products on rural development and poverty alleviation. Moreover, this study also analyzes the impacts of the development products liberalisation on macro performances of the APEC economies.

Applying some tools of economic analysis, this study employs three steps of estimation. Firstly, the impact of liberalisation on development products is measured by GTAP model estimation. Then in the second step, the results from GTAP model is used as an exgenous shock in an Indonesian CGE model in order to calculate the impact of the development products liberalisation on the Indonesian economy, rural development and household real income. Lastly, the results from the Indonesian CGE model estimation (household real income by 7 groups in urban and rural area) is used as shocks on microsimulation model to measure the impact of development products on Indonesia poverty alleviation.

This study report is organised into six chapters as follows. First chapter explains the background of the study which includes the study gap and objectives. Chapter 2 reviews APEC concernings, the fundaments of trade and empirical studies regarding impacts of trade liberalisation on rural development and poverty alleviation. In Chapter 3, methodology of the study is deeply explained. Results of this study are reported in Chapter 4 and 5. Chapter 4 reviews the APEC development Products of APEC economies. Meanwhile, Chapter 5 explains impacts of APEC's development products liberalisation on rural development and poverty alleviation in Indonesia and Chapter 6 elaborates impacts of APEC's development products liberalisation on macro performance of APEC economies. In the last chapter the conclusion and implications/recommendations of the study are given.

II. LITERATURE REVIEW: TRADE, RURAL DEVELOPMENT AND POVERTY ALLEVIATION

APEC's agenda is based on three pillars to its cooperative work i.e. trade and investment liberalisation, trade facilitation, and economic and technical cooperation. On the first pillar, trade and investment liberalisation, it works on the basis of unilateral liberalisation where each APEC member voluntarily agrees to liberalize in trade and investment. The first pillar is essential for APEC's ability to achieve its Bogor Goal of free trade in the APEC region by the year 2020. On the pillar of trade facilitation, it is aimed at making doing business in the region easier and less costly. APEC Leaders at their meeting in Shanghai in 2001 set a goal of reducing transaction costs throughout the APEC region by five percent by 2006. The third pillar, economic and technical cooperation (ecotech) means the activities and programs of APEC aimed at achieving its overall goals of attaining sustainable growth, broadening the benefits of that growth to improve the economic and social well-being of all the member people and deepen the spirit of community in APEC.

It is assured that trade and investment liberalisation create economic and social benefits to lead to sustainable and inclusive growth. Broader economic and social welfare gains from trade between economies such as welfare gains, creating **e**conomies of scale, market contestability, dynamic efficiency gains from innovation, access to new technology and inflows of new knowledge, rising living standards and a reduction in poverty. Through trade and private investment, a powerful development can create jobs, build skills, spur innovation, provide essential infrastructure and services, boost economies and strengthen standards in public and corporate governance. Welfare gains are achieved by specialising in goods where economies have a lower opportunity cost, there can be an increase in economic welfare for all economies (Kemp 2003; Krugman 1987). A study by Bouet (2006) using several computable general equilibrium (CGE) models find an increasing of world welfare from 0.3 percent to 3.1 percent due to global trade liberalisation. Trade enables economies to specialise in particular goods where they have a comparative advantage creating benefits for consumers importing goods and firms exporting goods. Trade and investment encourage firms to achieve scale economies leading to lower average costs and promotes increased competition performing competitive market contestability. Moreover, trade facilitation has brought concrete benefits to the trading community in the form of lower trade costs and

higher volumes (OECD 2015). Afterward trade enhances choice and stimulates dynamic innovations bringing better products and stimulates to the exchange of ideas and inflow of human capital, technology and knowledge (Krugman 1981). A growing body of evidence shows economies that are more open to trade grow faster and have higher national income than those that remain closed (OECD 2012).

However, some scholars propose cons of trade liberalisation as one of the tools to improve economic development. Trade liberalisation results changes in the relative prices of products, in turn it can create winners and losers in the economy. Liberalisation which decreases the price of particular commodities, may cause gain for net importers and loss for net exporters. Likewise, if liberalisation cuts down the prices of labor-intensive products, producers of those products may not be able to maintain wages, which could lead to lower wages for workers or even layoffs. The elimination of trade barriers will cause a shift of resources, from those inefficient sectors having no comparative advantage to those the efficient ones (UN 2009). This shows that there will be some economies benefit from trade, while the others might loose or there will be winner and loser sectors of commodities. For example, Bhagwati (1958) show a decleaning of term of trade outweigh the benefits of growth for a trading economy, as known as immiserising growth phenomenon. Stolper and Samuelson (1941) find that "international trade necessarily lowers the real wage of the scarce factor expressed in terms of any good". They state that the scarce factor of production in United States, was conceived to gain from protection instead of free trade. Moreover, Santos-Paulino (2012) reveals that trade liberalisation in developing economies improves aggregate welfare meanwhile the benefits are small and there is no equal distribution.

Considering the three pillars of APEC's agenda, APEC has formulated APEC Growth Strategy. One of the APEC's Growth Strategies is promoting inclusive growth involves enabling all segments of economies to participate in the economy and global trade. This implicates that implementation of trade and investment liberalisation that lead to sustainable growth rates should consider participation all groups in society to benefit from economic growth and government policies. Rural areas and their people are no exclusion and portray a critical role in any development strategy. They play roles as the main source of food and suppliers natural resources to industries. Hence, rural development is basic in any comprehensive plan and policy to reduce poverty and attain ecological sustainability.

Numerous study has been written about the effect of trade on poverty reduction and alleviation. Economic growth contributed from trade generally is an important contributor

to poverty reduction. The sector mix of growth matters substantially with growth in rural incomes being especially important. While for remote rural areas such as mountainous and semi-arid regions the promotion of high-value non commodity crops has demonstrated significant benefits. Reductions of tariffs and nontariff barriers for rural and associated products will have large follow-on effects for raising incomes in rural areas. Bouet (2006) estimates a reduction of poverty about 72 - 440 million people lifted out of poverty due to trade liberalisation.

A study by APEC PSU (2015) states that trade could assist to promote rural development and poverty alleviation for APEC member to contribute to sustainable and inclusive growth. In some results of studies, economies of APEC member show positif impacts of trade liberalisation on rural development and poverty alleviation. A study of Cello et al. (2010) reveal that during the deepening of trade liberalisation in Viet Nam (2002-2006), poverty significantly decrease. Vietnamese producers who are specialization in the main exported crops (such as coffee, tea, cashew, pepper and rubber) mostly gain from the liberalisation. In a case of Philippine, global trade liberalisation helps reduces of national poverty and for all urban and rural areas of the different regions (Cororaton 2003). In addition, Chinese rural society has proved a better use of its potential benefits of liberalisation and able to withstand the risks of a more open economy (Cristiano 2007).

However, study results showing negative impacts of trade liberalisation on rural development and poverty alleviation have also been found. Trade-driven growth may not automatically benefit the poor. The links between trade-driven growth and poverty reduction can be complicated. The different pattern of growth matters for poverty reduction because of differences in the pattern of work by the poor across sectors. For example, a study by Harrison (2006) shows a misleading linkage between globalization and poverty, if not “downright wrong”. The study suggests that the gains from trade are highly unequal, and the poor do not always benefit from globalization. Cello et al. (2010) suggest that trade openness also increases inequality among rice producers in Viet Nam particularly for small net producers. In China, there is a weak part of rural society, marginalized rural groups, that suffering under the liberalisation process (Cristiano 2007).

III. METHOD

This study uses mostly secondary data. Various models are applied in order to achieve the study's aims and to get a deep analysis on micro-level and using sub-economy data for each APEC economy. Using those models, the direct relationship between trade in the development products and some important variables of macroeconomic and RDPA such as GDP, employment, and poverty can be analysed. The models, analysis and the use of data are explained below.

3.1. Linking Multi Region Model and National Model

In order to analyse the impacts of trade in development products on rural development and poverty alleviation, we set up the market access scenario to be specifically translated as the reduction of import tariffs and export subsidies on the 157 products listed as APEC development products. Several stages involved in the methodology are as the followings:

a. Running the simulation of the reduction of both import tariffs and export subsidies of development products for all 21 participating members of the APEC economies. The results are obtained using the GTAP model and becoming the basis for a cross economy analysis of the policy on macroeconomic performance (real GDP, trade balance, and investment).
b. Moreover, focusing on Indonesia as a specific case study, a rigorous methodology on linking the results on global trade (GTAP Model) and national economy (Indonesian CGE Model) is crucially needed. Following Oktaviani (2001) and Oktaviani (2009), Indonesia is treated to be a small open economy, showing that the economy's performance on trade and investment, by assumption, has no effects on the world market. Therefore, the linkage of these two models is represented by simulating the changes of export and import prices from the GTAP model as exogenous shocks on all of the sectors available in the Indonesian CGE model. The micro level (sectoral and household) results are expected to give a strong indication on how the development products will contribute for rural development. Furthermore, a microsimulation extension on the household groups is expected to present rigorous results on poverty changes.

3.2. The GTAP Model for Multi Region Analysis

The first stage of the methodology utilizes the Global Trade Analysis Project (GTAP) model. GTAP model is a computable general equilibrium (CGE) model with multi-economy and multi-sectoral specification. Each region in the model is related due to international trade (imports and exports of goods and services) and savings-investments. It is assumed that all identical commodities in different region are imperfect substitutes based on the value of the Armington elasticities and changes in relative prices (Armington 1969).

According to Hertel (1997), the economic agents involved in each region consists producers in each sector where production are generated from intermediate goods and primary factors of land, labour, capital and natural resources, one representative household, one government, and one global investor. Essentially, output could be utilized as intermediates for other industries, investment and government in both domestic and other economies. The production process follows the Constant Elasticity of Substitution in aggregating the primary factors, whereas the combination of intermediate goods and primary factors refers to fixed proportions assumption. Even though that the substitution between intermediate inputs and primary factors do not occurred, the model allows a substitution between domestic and imports from each region. Some important notes on factors mobility in the model include the perfect mobility of capital and labour between sectors within region, but not amongst regions.

3.2.1. The Database of GTAP

The study uses the main database of the GTAP version 9 with the base year of 2011. The database shows numerous details on interregional and intersectoral linkages on trade flows as well as taxes and subsidies for 140 regions and 57 sectors. For the purpose of the study, the 140 regions are aggregated into 21 regions, constituting the members of the APEC (Table 3.1). On the other hand, the sectors are being kept in details for 57 sectors, so that the results could be pass on to Indonesian CGE Model.

Table 3.1. Sectoral and regional aggregation

Regions		Sectors					
No	**Description**	**No**	**Description**	**No**	**Description**	**No**	**Description**
1	Australia	1	Paddy rice	22	Dairy products	43	Electricity
2	New Zealand	2	Wheat	23	Processed rice	44	Gas manufacture, distribution
3	China	3	Cereal grains nec	24	Sugar	45	Water
4	Hong Kong, China	4	Vegetables, fruit, nuts	25	Food products nec	46	Construction

Regions		Sectors					
No	**Description**	**No**	**Description**	**No**	**Description**	**No**	**Description**
5	Japan	5	Oil seeds	26	Beverages and tobacco products	47	Trade
6	Korea	6	Sugar cane, sugar beet	27	Textiles	48	Transport nec
7	Chinese Taipei	7	Plant-based fibers	28	Wearing apparel	49	Sea transport
8	Brunei Darussalam	8	Crops nec	29	Leather products	50	Air transport
9	Indonesia	9	Cattle,sheep, goats,horses	30	Wood products	51	Communication
10	Malaysia	10	Animal products nec	31	Paper products, publishing	52	Financial services nec
11	Philippines	11	Raw milk	32	Petroleum, coal products	53	Insurance
12	Singapore	12	Wool, silk-worm cocoons	33	Chemical,rubber,plastic prods	54	Business services nec
13	Thailand	13	Forestry	34	Mineral products nec	55	Recreation and other services
14	Viet Nam	14	Fishing	35	Ferrous metals	56	PubAdmin/Defence/ Health/ Educat
15	Canada	15	Coal	36	Metals nec	57	Dwellings
16	United States	16	Oil	37	Metal products		
17	Mexico	17	Gas	38	Motor vehicles and parts		
18	Chile	18	Minerals nec	39	Transport equipment nec		
19	Peru	19	Meat: cattle,sheep,goats,horse	40	Electronic equipment		
20	Russia	20	Meat products nec	41	Machinery and equipment nec		
21	Rest of the World	21	Vegetable oils and fats	42	Manufactures nec		

Source: GTAP database ver.9

3.2.2. GTAP Simulation

The simulation performed in the model represents a shock of trade liberalisation in 157 APEC's development products in APEC area. The shock in GTAP is represented by a combination of reduction on import tariffs and export subsidies by 95 percent for 157 development products which are submitted by all member economies of APEC.

3.3. The Indonesian CGE Model

3.3.1. The Structure of the Indonesian CGE Model

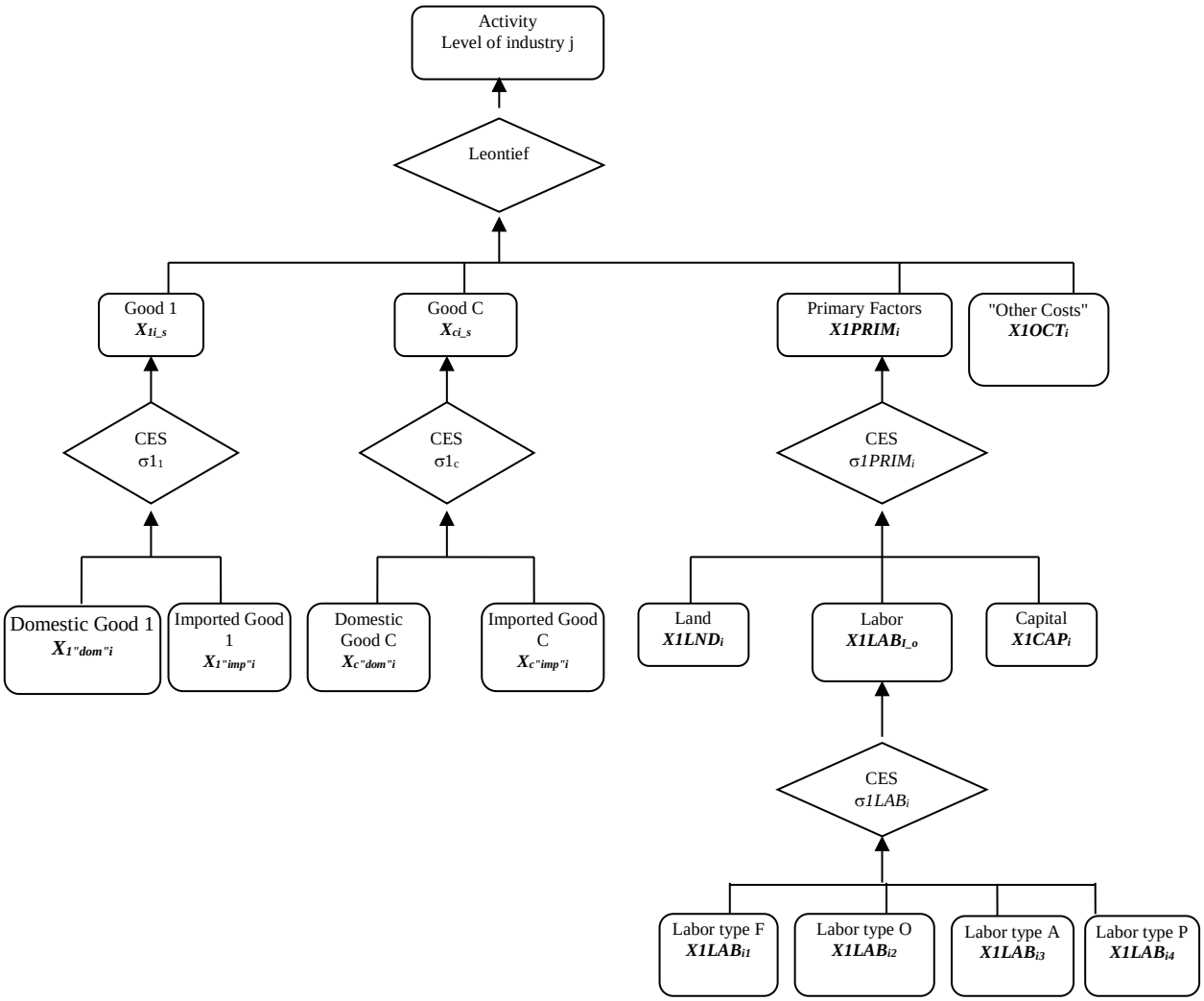
The overall structure of the Indonesian CGE Model used in this study is classified as a comparative static general equilibrium model. It is linear in proportional changes and usually considered as a Johansen type model (Dixon et al. 1992). The model enables a macro and micro interdependencies as it covers all of the agents and activities in the wide economy. The economic relationships could be defined specifically among industries, households, investors, governments, importers and exporters and between different markets. The general assumption used in the model stated that each and every market in the economy follows market clearing and refers to numerous and particular of equations underlying the

equilibrium. In terms of the model improvement, Indonesian CGE Model has been widely developed extensively for Indonesian economy. The majority of structural forms which are used in this study are combined from features from INDOF – Indonesian Forecasting Model (Oktaviani 2001 and Oktaviani 2009), WAYANG model for Indonesian Economy (Warr 1998), and ORANI general equilibrium model of the Australian economy (Dixon et al. 1982). More specifically, the equation systems are classified into 18 blocks as the followings:

1. demands for labor
2. demands for primary factor
3. demands for intermediate inputs
4. demands for composite primary factor and intermediate input
5. commodity composite of industry output
6. demands for investment goods
7. household demands
8. export and other final demands
9. demands for margin
10. purchaser's prices
11. market clearing condition
12. indirect taxes
13. GDP from the income and expenditure sides
14. trade balance and other aggregates
15. rates of return, indexation
16. investment-capital accumulation equation
17. debt accumulation equations
18. regional extension

How the production structure works in a general equilibrium setting is one of the main theoretical backgrounds that need to be understood. Each industry is assumed to able to produce several commodities with utilizing both intermediate and factor inputs (labor, capital, and land). The most important highlight which is related to trade in the production structure is that each intermediate input used could be originated from domestic production and imports. Several assumptions that hold are input-output separability and the constant elasticity of substitution (transformation) production functions. Meanwhile, the combination of intermediate goods and aggregate primary factors adopts the Leontief function (fixed

proportions technology). It is also considerable that the producers and in the economy are purely price takers and follow the profit maximization assumption, therefore producer will decide the most efficient combination of inputs in terms of the production. The ratios in which the various inputs must be combined are parameters of the Leontief production function. These ratios, together with the prices of the inputs will determine the cost or expenditure shares in the industry. Vice versa, information on these shares and prices effectively define the production function. Since the industry under competition must operate with zero profits, revenue equals costs. ure of production in a given industry is depicted in Figure 3.1 while other structure in detail can be seen in Oktaviani (2001) and Oktaviani (2009).



Source: Oktaviani (2009)

Figure 3.1. Production structure of Indonesian CGE nodel

3.3.1.1. Data and Sectors of Indonesian CGE Model

The model utilizes the 2010 Indonesian Input-Output (I-O) and the 2008 Indonesian Social Accounting Matrix (SAM) and other behavioural parameters. The Indonesian CGE Model consists a very disaggregated sectoral features, namely: 185 goods and services produced by 185 corresponding industries-36 agricultural sectors, 13 mining sectors, 89 manufacturing and utility sectors and 47 services. However, the focus of reporting will be set up specifically for 96 sectors that are equivalent with 157 APEC development products.

3.3.1.2. Households

The model has seven household groups consist of four household groups in rural areas and three household groups in urban area, according to the 2008 Indonesian Social Accounting Matrix (SAM). The detailed explanation regarding the household groupings can be identified below:

1. **Rural 1**: Rural non-labor households, consisting of non-labor force and unclassified households in rural areas.
2. **Rural 2**: Agricultural Workers
3. **Rural 3**: Agricultural workers with land
4. **Rural 4**: Rural low income - non-agricultural households, consisting of small retail store owners, small entrepreneurs, small personal service providers, and clerical and manual workers in rural areas and Rural l high-income - non-agricultural households consisting of managers technicians, professionals, military officers, teachers, large entrepreneurs, large retail store owners, large personal service providers, and skilled clerical workers in rural areas.
5. **Urban 1**: Urban non-labor households, consisting of non-labor force and unclassified households in urban areas.
6. **Urban 2**: Urban low-income households, consisting of small retail store owners, small entrepreneurs, small personal service providers, and clerical and manual workers in urban areas.
7. **Urban 3**: Urban high income households, consisting of managers, technicians, professionals, military officers, teachers, large entrepreneurs, large personal service providers, and skilled clerical workers in urban areas.

3.3.1.4. Factors of Production

Referring to the 2008 Indonesian Social Accounting Matrix (SAM), the labour as factor of productions are classified into has four labour categories, namely farmers, operators, administrators, and professionals.

3.3.1.5. Closure of Indonesian CGE Model

The standard closure in the Indonesian CGE Model is modified by exogenizing the sectoral export and import prices variables so that it can generate the results of reduction on import tariff and export subsidy in development products

3.3.1.6. Simulation of Indonesian CGE Model

The simulation to analyse impact of reduction on import tariff and export subsidy in development products on rural development and poverty alleviation is a combination of changes in import prices and export prices from GTAP simulation results particularly in Indonesia. The export and import prices' shocks are performed on all of the 185 sectors available in the Indonesian CGE Model.

3.4. The Indonesian Poverty Microsimulation

The simulation of the implementation of the development products proposal on changes in household group poverty was performed using household survey data which is available on National Socioeconomic Survey in 2016 (Susenas Core 2016). The approach used to assess the impacts on poverty is by analyzing the changes on household income proxied by expenditure. Susenas Core 2016 data covers 1,109,749 households, which are then mapped or integrated according to the classification used in the 2008 Social Accounting Matrix's household classification in the CGE Model. Thus, the information on changes in income expenditure in each household, which are derived CGE model simulation results, can be utilized to simulate the impact of changes in the level of income (expenditure) on poverty levels in each household group.

As described in the methodology section, there are 7 (seven) household groups in the Indonesian CGE model consisting 3 (three) groups of households in urban areas and 4 (four) groups in rural area. Furthermore, the definition of household group used in the group CGE model is also used to classify the data in the Susenas Core 2016.

In the literature, there are numerous approaches that could be used to measure poverty. Most of the common approaches used are generally expressed in index form,

including: *Headcount Index, poverty gap index, poverty severity gap index, Foster-Greer-Thorbecke (FGT) Index, Sen-Shorrock-Thon (SST) index, and the Watts Index*. This study applies these approaches to identify the level of poverty in Indonesia, as well as to analyze the changes on income levels and the changes on the household groups' poverty level.

In general, each of approach requires the availability of two key indicators, namely income (proxied by expenditure) of individuals in household group and the poverty line. The expenditure data of individuals in each household group was obtained from Susenas Core 2016. Meanwhile, according to Central Bureau of Statistics data, the poverty line was Rp 354,386 / capita / month in March 2016. Based on the two indicators, the baseline poverty rate can be calculated by using various approaches.

In brief, the formulation of all indices used is explained as follows:

a) Headcount Index

Headcount index is one measure that is used widely to measure poverty level. Simply put, the headcount index measuring the level of poverty as the proportion of poor people in a population, namely:

$$P_o = \frac{N_p}{N} \tag{1}$$

With P_o is *headcount index*, N_p is number of poor, and N is the total population. If the poverty is bounded by a value of income (expenditure) or z equals to *poverty line*, then equation (1) can be rewritten as :

$$P_o = \frac{1}{N}\sum_{i=1}^{N} I\left(y_i < z\right) \tag{2}$$

With $I(.)$ is a function which has value of 1 if meet the condition in the range (.), otherwise the value is 0. Thus, I(.) equals to 1 if $y_i < z$ or if the household or individuals are below the poverty line.

b) Poverty Gap Index

Another measure of poverty which is also widely used is the poverty gap index, which describes the extent to which people on average fall below the poverty line, and expressed as a percentage of poverty. Specifically, poverty gap (Gi) is expressed as the poverty line (z) minus the income (or current expenditure) of poor people (yi), and that gap is equal to zero for individuals who are not poor. As a function, that gap is expressed as:

$$G_i = \left(z - y_i\right) I\left(y_i < z\right) \tag{3}$$

Based on equation (3), can be defined as the followings:

$$P_1 = \frac{1}{N}\sum_{i=1}^{N}\frac{G_i}{z} \tag{4}$$

c) Poverty Severity Index

Poverty severity index is a measure of poverty that can take into account the existence of inequality among the poor. Simply put, the poverty severity index is expressed as a weighted sum of the poverty gap (the proportion of the poverty line), where the weight of the amount charged proportionally depending poverty gap itself. This is in contrast with the poverty gap index is calculated based on the identical weight. The poverty severity index is calculated by squaring the poverty gap, as the following:

$$P_1 = \frac{1}{N}\sum_{i=1}^{N}\left(\frac{G_i}{z}\right)^2 \tag{5}$$

d) Foster-Greer-Thorbecke (FGT) Index

Foster, Greer, and Thorbecke (1984) presents a more general measure of poverty, which is able to cover all three poverty measures discussed earlier. In general, FGT index is formulated as:

$$P_\alpha = \frac{1}{N}\sum_{i=1}^{N}\left(\frac{G_i}{z}\right)^\alpha \;;\alpha > 0 \tag{6}$$

with α is a measure that shows the level of sensitivity of the poverty index. When α = 0, then the equation (6) will be equivalent with (2) which is the headcount index. While at α = 1, then the equation (6) will be equal to the equation (4) which is the poverty gap index. And when α = 2, then the equation (6) will be equivalent to the equation (5) which is the poverty severity index.

e) Sen-Shorrock-Thon Index

Sen (1976) proposed a poverty index, which is a combination of three indicators, namely: number of poor (headcount measure), depth of poverty (poverty gap measure), and the distribution of poverty in the group (inequality amongst the poor). Here, Sen index is formulated as follow:

$$P_S = P_0\left(1-\left(1-G^P\right)\frac{\mu^P}{z}\right) \tag{7}$$

with P_0 is *headcount index,* μ^P is the average of income or expenditure of the poor individuals, and G^P is the the inequality index amongst the poor individuals. As the gini index G^P will has the value in between 0 and 1, then *Sen index* formula in equation (7) can be written with *headcount measure* (P_0) and *poverty gap measure* (P_1), added with the gini coefficient amongst poor individuals (G^P) :

$$P_S = P_0 G^P + P_1\left(1-G^P\right) \tag{8}$$

According Osberg and Xu (2001), Sen index which is stated in the equation (8) can be rewritten as the following:

$$P_S = P_0 P_1^P\left(1+G^{PP}\right) \tag{9}$$

G^{PP} is the Gini coefficient of poverty gap ratio which is calculated only for poors, and P_1^P is the poverty gap index which is calculated only for the poors. Poverty measurement framework proposed Sen (1976) has been widely discussed in the literature, since this index has some advantages because it includes the distribution of income (or expenditure) among poor individuals. However, according to Deaton (1997) Sen index, on the other hand, has a disadvantage because it can not be used for decomposition of poverty based on the contribution of each of the different sub-groups. The literature then develop the Sen index. A modified version that is often used in the literature is Sen-Shorrock-Thon Index (Shorrock 1995). This index is basically developed based on a measurement framework proposed by Sen (1976) and Thon (1979). SST index is formulated as the following:

$$P_{SST} = P_0 P_1^P\left(1+\hat{G}^P\right) \tag{10}$$

Based on Equation (10), SST index is the multiplication of *headcount index* (P_0), *poverty gap index which is calculated only for poor people* (P_1^P), and a term involving the gini coefficient and *poverty gap ratio* on total population ($\hat{G}^P$).

f) Watts Index

Another poverty measure is proposed by Watts (1968). This measure is the first to take into account the sensitivity of the distribution size of poverty (Zheng 1993). Here, Watts index is formulated as the followings:

$$W = \frac{1}{N}\sum_{i=1}^{q}\left[\ln(z) - \ln(y_i)\right] \tag{11}$$

where N is the number of individuals in a population that is indexed based on income (expenditure) with increasing order. While summation notation q explains the number of individuals who have high levels of income (expenses), and y_i are people who fall below the poverty line z.

IV. REVIEW OF THE DEVELOPMENT PRODUCTS

APEC Leaders in 2013 were committed to explore trade in products which contribute to sustainable and inclusive growth through rural development and poverty alleviation. APEC PSU was instructed to empirically analyze the list of products that contribute to sustainable and inclusive growth through rural development and poverty alleviation, as known as development products or Devpro (APEC PSU 2015). Devpro was resulted by extensive discussions in the Committee on Trade and Investment during 2013 and 2014. By June 2014, about 13 interested APEC industrialized and developing economies nominated a list of 157 products using the Harmonized System (HS) nomenclature 2012 at the six-digit level (sub-headings).

The list of Devpro comprises a wide array of products. Most of Devpro (95 products or about 60.5% of Devpro) are identified as agricultural products as agreed in Annex 1 of the WTO Agreement on Agriculture (APEC PSU 2015; WTO 2015). The remains (62 products or about 39.5%) are considered non-agricultural products, such as manufacturing.

Rationale of the Devpro nomimations are varried by each nominating economy. In the context of promoting trade for inclusive and sustainable growth in order to contribute to rural development and poverty alleviation, the products are related to (1) contribution to the economy (source of foreign exchange, income for small-scale farmers, jobs for rural communities); (2) providing employment of workers/households where their quality of life can improve for rural households by having access to markets to sell those products; (3) important inputs for the global value chain of several industries; (4) important production of renewable energies such as biofuels, which can lead to a more sustainable green growth; and (5) contribution to gender issues by assisting for improvement of women's participation in the economy (APEC PSU 2015).

Based on the contribution of export, the top ten of Devpro is listed on Table 4.1. Lubricating oil feedstock nominated by Singapore is almost half of those exports. Most of the top 10 Devpro are agricultural commodities for instance soybeans, wheat, palm oil, maize and rice. Some of them are manufacturing products such as chemical products, gasoline/diesel engine and wooden furniture.

Table 4.1. The top 10 development products APEC exports

Rank*)	HS 2007 code	Commodity Description**)	Economy*)
1	271019	Lubricating Oil Feedstock (TNE)	Singapore (SGP)
2	120110	Soybeans	Canada (CDA)
3	100199	Wheat and Meslin	Canada (CDA), the United States (US), Russia (RUS)
4	151190	Palm oil and its fractions, whether or not refined (excl. chemically modified or crude)	Indonesia (INA)
5	382490	Other Chemical Products & Preparations of the Chemical or Allied Industries nes or Incl (KGM)	Singapore (SGP)
6	840734	Gasoline/Diesel Engine	Korea (ROK)
7	151110	Palm Oil, Crude	Indonesia (INA)
8	940360	Other Wooden Furniture, nes	Philippines (PH)
9	100590	Other Maize	Canada (CDA), Peru (PE), Russia (RUS)
10	100630	Rice	Canada (CDA)

**) The rank is based on its contribution to export values of APEC member in 2007 and 2012
*) Economy which nominates the product
Source: APEC PSU (2015)

If 157 development products are calculated based on their trade performance (export value, export growth, market size, market share and trade balance) and market access, this results produce a weighted index of development products. Based on the weighted index, the top 10 development products are presented in Table 4.2. The method and resulted calculation index of development products are explained in Appendix 1 and 2.

From Table 4.2 it is shown that lubricating oil feedstock is on the highest weighted index as like the top 10 nominated products APEC exports. The remains of the development products in Table 4.2 are completely different than the development products in Table 4.1. There are manufacture products listed such as machine, tractor and machine. However the manufacture products are related to agricultural sectors.

Table 4.2. The top 10 development products having the highest weighted index of trade performaces

No	HS 2007 code	Commodity Description	Economy
1	271019	Lubricating Oil Feedstock (TNE)	Singapore (SGP)
2	870190	Tractor (more than 50 horsepower)	Korea (ROK)
3	841931	Drying machine for agricultural produce	Korea (ROK)
4	90412	Pepper of the genus Piper; dried or crushed or ground fruits of the genus Capsicum (peppers) or of the genus Pimenta (e.g., allspice):-- Pepper of	Malaysia (MAS)

No	HS 2007 code	Commodity Description	Economy
		the genus Piper (black and white): Crushed or ground	
5	90111	Coffee, whether or not roasted or decaffeinated; coffee husks and skins; coffee substitutes containing coffee in any proportion: coffee, not roasted, not decaffeinated	Viet Nam (VN)
6	180690	Other Chocolate and other food preparations containing cocoa	Peru (PE) and Singapore (SGP)
7	110620	Flour, meal and powder of sago or of roots or tubers of heading 07.14	Peru (PE)
8	843490	A part for an oil press	Korea (ROK)
9	847920	Machinery for the Extraction/Preparation of Animal/Fixed Vegetables fats/Oils having Individual Functions, N.E.S. in CH.84	Singapore (SGP)
10	210111	Extracts, essences and concentrates, of coffee, tea or mate, and preparations with a basis of these products or with a basis of coffee, tea or mate, roasted chicory and other roasted coffee substitutes, and extracts, essences and concentrates thereof: extracts, essences and concentrates (ex-out: 21011110)	Viet Nam (VN)

Notes: the Index is calculated by authors considering trade performance and market access factors

From 157 development products, Indonesia proposes 15 (fifteen) products in the list of Devpro as described in Table 4.2.. They can be classified into five commodities i.e., CPO, rubber, paper, rattan, and fisheries. Two products include as the top 10 nominated products APEC Exports i.e., palm oil and its fractions (151190) and palm oil crude (151110). Most of nomination rational is the contribution of the Devpro to rural development and poverty alleviation in terms of offering more benefits for farmers, creation of jobs in rural areas, source of food and energy, and development of rural areas.

Based on Zone classification analysed by APEC PSU, eight commodities includes in Zone I which shows the products are heading to capitalizing market opportunities, since their exports are growing at a faster pace than the benchmark. The commodities are mostly CPO products, fisheries (skipjack), rubber, and paper products. However two commodities include Zone II which are not headings capitalizing global export opportunities. They are rattan and paper products. Other two commodities, rattan products, are in Zone III which reveals the products could be considered to be in decline, since their global demand is weakening and APEC exports are growing slowly (or falling). The worst is commodities in Zone IV, i.e., fisheries (anchovies) and paper products (toilet or facial tissue, towel or

napkin, and paper and paperboard used for writing). They are facing decreasing world demand and it may be difficult for APEC exports to continue growing fast in the years to come. From this analysis it shows that although Indonesia proposes some trade commodities having strong positive export trend and strengthen comparative advantage, the other commodites are threaten to be in decline or growing slowly.

Table 4.3. The list of development products nominated by Indonesia

HS 2007 Code	Commodity description	Rationale of Products	Zone of PSU Analysis
030343*)	Skipjack or stripe-bellied bonito	Contribution to rural development and poverty alleviation of producers particularly small-scale farmers	Zone I
030563	Anchovies, salted and in brine, but not dried or smoked	Most important products which support rural development and poverty alleviation	Zone IV
151110**)	Palm oil, crude	An important role as sources of income and employment (creation of jobs), poverty alleviation, regional development, source of food and energy, support domestic/national industry, export earning of non oil and gas sector	Zone I
151190	Palm oil and its fractions, whether or not refined (excl. chemically modified and crude)	Largely driven by private sector investment and engages a large number of smallholder farmers	Zone I
291619	Unsaturated acyclic monocarboxylic acids, their anhydrides, halides, peroxides, peroxy acids and halogenated, sulphonated, nitrated or nitrosated derivatives	An essential role on the supply-demand vegetable oil including CPO and offering more benefits for the farmers.	Zone I
382313	Fatty acids, industrial, monocarboxylic; acid oils from refining (excl. stearic acid, oleic acid and tall oil fatty acids)	An important Biomass as fuel, which is mostly produced in rural areas. Therefore, it enhances rural development particularly on transportation matters	Zone I
400110**)	Natural rubber latex, whether or not prevulcanised	Important role in contributing to sustainable agricultural development and it can assist rural development	Zone I
460122	Mats, matting and screens, of rattan plaiting materials, flat-woven or bound together in parallel	It will contribute to the development of rural areas	Zone III
460193	Plaits and similar products, of rattan plaiting materials, whether or not assembled into strips; plaiting materials, plaits and similar products of rattan flat-woven or bound together in parallel	It will contribute to the development of rural areas	Zone II
460212	Basketwork, wickerwork and other articles, made up from plaiting materials or rattan	It will contribute to the development of rural areas	Zone III
480255	Uncoated paper and paperboard, in rolls of any size, not containing fibres obtained by a mechanical or chemi-mechanical process or of which <= 10% by weight of the total fibre content consists of such fibres, and weighing 40 g to 150 g/m², n.e.s.	It can be an important force for optimal rural development as well as poverty reduction	Zone II
480256	Uncoated paper and paperboard, of a kind used for writing, printing or other graphic purposes, andnon-perforated punch card sand punch-tape paper, insquare or rectangular sheets with one side<= 435 mm and the other side<=297 mm in	It can be an important force for optimal rural development as well as poverty reduction	Zone I

HS 2007 Code	Commodity description	Rationale of Products	Zone of PSU Analysis
	the unfolded state, not containing fibres obtained by a mechanical or chemi-mechanical process or of which<=10% by weigh tof the total fibre content consists of such fibres, and weighing 40 g to150g/m²,n.e.s.		
480257	Uncoated paper and paper board, of a kind used forwriting, printing or other graphic purposes, and non-perforated punch cards and punch-tape paper, in square or rectangular sheets with one side> 435 mm or with one side<=435 mm and the other side > 297 mm in the unfolded state, not containing fibres obtained by a mechanical or chemi-mechanical process or of which<= 10 % by weight of the total fibre content consists of such fibres,and weighing 40 g to 150 g/m², n.e.s.	It can be an important force for optimal rural development as well as poverty reduction	Zone I
480300	Toilet or facial tissue stock, towel or napkin stock and similar paper for household or sanitary purposes, cellulose wadding and webs of cellulose fibres	It can be an important force for optimal rural development as well as poverty reduction	Zone IV
481029	Paper and paperboard used for writing, printing or other graphic purposes	It can be an important force for optimal rural development as well as poverty reduction	Zone IV

Notes: *) Nominated by Indonesia (INA) and Brunei Darussalam (BD); **) Nominated by Indonesia (INA) and Chinese Taipei (CT)

Zone 1: Zone where the products in which APEC in which APEC is capitalizing market opportunities, since their exports are growing at a faster pace than the benchmark.

Zone 2: Zone where the products in which APEC is not capitalizing global market opportunities, as their exports are growing slowly (or falling).

Zone 3: Zone where the products could be considered to be in decline, since their global demand is weakening and APEC exports are growing slowly (or falling).

Zone 4: Zone where the products are facing decreasing world demand and it may be difficult for APEC exports to continue growing fast in the years to come.

Source: APEC PSU (2015)

V. IMPACT OF TRADE LIBERALISATION IN DEVELOPMENT PRODUCTS ON RURAL DEVELOPMENT AND POVERTY ALLEVIATION: CASE STUDY OF INDONESIA

5.1. Impact of the Trade on Rural Development

This section discusses the impact of trade liberalisation based on reduction on import tariff and export subsidy of development products on sectoral performance in Indonesia. The results can be seen from Table 5.1. Based on the table, commodities can be classified into two groups: (1) commodities produced in rural areas and (2) commodities produced in urban areas. The result shows it is expected that improving performance of commodities produced in rural areas will impact positively on the development of rural areas. In general, the proposal of reduction on import tariff and export subsidy of development products has positive impacts particularly on the five sectors proposed by Indonesia.

Table 5.1. The impact of trade liberalisation in APEC's development products on sectoral performance of Indonesia (percentage change)

No	Sector	Group	Output	Export	Import	Trade Balance	Employment
1	Rubber	Rural	1.462	4.254	2.173	2.081	2.068
2	Palm oil	Rural	0.620	6.956	-1.291	8.247	0.817
3	Coffee	Rural	1.348	4.543	0.627	3.916	2.012
4	Tea	Rural	-0.455	14.739	0.000	14.739	-0.771
5	Cocoa	Rural	0.907	6.493	-0.129	6.622	1.381
6	Cashew	Rural	1.124	4.873	-0.045	4.919	1.742
7	Services for agriculture, forestry and fisheries	Urban	0.243	0.000	-4.017	4.017	0.077
8	Wood	Rural	0.210	9.809	-2.243	12.052	0.156
9	Other forest products	Rural	0.765	7.182	-1.271	8.453	1.051
10	Fish	Rural	-0.030	4.277	-0.955	5.232	-0.204
11	Shrimp and other crustaceans	Rural	-0.067	4.533	-1.137	5.670	-0.315
12	Other aquatic biota	Rural	-0.003	4.134	-0.568	4.703	-0.130
13	Seaweed and others	Rural	0.047	3.972	-0.800	4.772	-0.031
14	Dried fish and salted fish	Rural	-0.785	3.626	6.873	-3.247	-1.077
15	Processed and preserved fish	Urban	0.933	2.512	4.395	-1.883	1.554
16	Animal and vegetable oils	Urban	0.492	1.289	-1.188	2.477	1.471
17	Copra	Rural	0.202	-0.728	0.000	-0.728	0.551
18	Other flour	Urban	-0.884	4.127	5.946	-1.819	-1.362
19	Wheat flour	Urban	-1.057	2.595	7.243	-4.648	-1.725
20	Sugar	Urban	0.327	5.996	-3.242	9.238	0.574
21	Paper pulp	Urban	0.730	2.137	0.998	1.139	1.817

No	Sector	Group	Output	Export	Import	Trade Balance	Employment
22	Paper	Urban	0.346	2.825	0.460	2.365	0.890
23	Products made from paper and cardboard	Urban	0.215	3.430	0.493	2.937	0.570
24	Basic chemicals except fertilizers	Urban	0.395	3.227	1.375	1.852	0.657
25	Synthetic resins, plastics material and synthetic fibers	Urban	0.554	5.535	1.947	3.588	0.879
26	Pesticide	Urban	0.964	3.951	0.489	3.462	1.381
27	Varnishes and lak	Urban	0.032	5.585	2.940	2.645	0.166
28	Soap and other cleaning products	Urban	1.214	4.432	1.341	3.091	1.796
29	Cosmetics	Urban	0.431	6.557	1.000	5.558	0.703
30	Other chemical goods	Urban	0.539	3.503	0.775	2.728	0.850
31	Traditional medicine	Urban	0.632	3.774	1.746	2.029	1.050
32	Tire	Urban	0.788	2.280	1.111	1.169	1.275
33	Crumb rubber and rubber smoke	Urban	1.345	1.523	0.000	1.523	2.085
34	Other products of rubber	Urban	1.252	3.104	0.674	2.430	1.938
35	Plastics products	Urban	0.215	6.182	1.751	4.431	0.442
36	Other goods of wood, cork, bamboo and rattan	Urban	0.325	3.512	-0.584	4.096	0.878
37	Plant engineering and electric motors	Urban	-2.458	-6.295	0.151	-6.446	-3.258
38	Electrical engineering and its equipment	Urban	-2.577	-5.097	0.914	-6.011	-3.435
39	Battery and accu	Urban	-4.082	-7.044	1.026	-8.070	-5.446
40	Other machinery and equipment	Urban	-1.563	-5.376	-0.345	-5.031	-2.010
41	Other motorcycles vehicles	Urban	-1.724	8.619	5.747	2.872	-2.535
42	Processed coffee	Urban	-0.449	5.174	7.052	-1.878	-1.011
43	Processed tea	Urban	-0.336	2.704	7.485	-4.782	-0.778

From sectoral analysis it is shown that output of *palm oil sector* increases by about 0.62% when trade liberalisation of the development products is applied. In order to increase its output, this sector increases the number of employment (0.82%). Trade balance of palm oil sector is surplus (8.25%) which export increases by 6.96% and import reduces by 1.29%. Since this palm oil produced in rural areas, it is expected that improving the performances of this sector has a significant impact on rural development. Benefits from trade liberalisation also occur for the sectors having strong linkages with palm oil sector, i.e. animal and vegetable oils, varnishes and lak, soap products, and cosmetic. The performance of animal and vegetable oil sector improve in terms of output (increase by 0.49%), employment absorption (1.47%), and trade balance (2.47%). Similar situations occur to the sectors of varnishes and lak, soap products, and cosmetic in which their output, employment absorption and trade balance increase.

Rubber and its related sectors also gain benefits from the proposal of the trade liberalisation through reducing import tariff and export subsidy. Based on Table 5.1, output,

employment absorption and trade balance in rubber sector increase about 1.46%, 2.07%, and 2.08%, respectively. Four sectors that have strong linkages with rubber sector (tire, crumb rubber and rubber smoke, other products of rubber, and plastics products) also gain benefits from the trade liberalisation as indicated by increasing of output, employment absorption and trade balance of these sectors.

Similar situations occur in paper sector and its related sectors in which they gain benefits from the proposal of the trade liberalisation of the development products. Output of paper sector increases by about 0.35%. In order to increase its output, this sector increases its labor absorption by 0.89%. The trade balance also increases by 2.37% which export and import increase by about 2.83% and 0.46%, respectively. As the sectors having strong backward linkages to paper sector, the performance of the sectors of paper pulp and wood will also improve. This is as indicated by increasing in output, employment absorption, and trade balance of these two sectors. Besides, sector having strong forward linkage with paper (products made from paper and cardboard) will also gain benefit from the proposal of reducing import tariff and export subsidy.

As one of the commodities includes in the proposal of the trade liberalisation of the development products, the performance of rattan sector will also improve. In this study rattan sector includes in the sector of other goods of wood, cork, bamboo and rattan. Based on Table 5.1, output, employment absorption and trade balance of this sector increases by 0.33%, 0.88%, and 4.09%. Goods made from rattan sector needs input from raw rattan produced in the rural area. In this study, raw rattan includes in other forest products which also gains benefit if the trade liberalisation of the development products occurs.

Unlike four development products proposed by Indonesia, in the case of fish sector seems that Indonesia does not receive significant benefits from the proposal of trade liberalisation of the development products. It can be seen from Table 5.1, output and employment absorption of fish sector reduce by 0.03% and 0.20%, respectively. Though, export of fish sector still increases by 4.28%. Meanwhile, import of fish sector reduces by 0.955%. This brings to surplus of trade balance of fish sector by 5.23%. Similar situation occurs in the sector of dried and salted fish, the sector that have strong forward linkage with fish sector, in which its output and employment absorption reduce by 0.78% and 1.08%. The performance of this sector even worse compared to fish sector as indicated by reducing in its trade balance. Other sectors having strong forward linkage with fish sector, i.e., processed

and preserved fish obtains benefits from trade liberalisation in terms of output and employment absorption. However, similar to fish sector, trade balance of processed and preserved fish sector will deficit by about 1.88% since the volume of import exceed the volume of export. This indicates that Indonesia does not receive benefit for all the five sectors proposed in the proposal of the trade liberalisation of the development products.

If we look at other 10 development products proposed by other economies, coffee and cacao sectors in Indonesia gain benefits from trade liberalisation. As indicated in Table 5.1, the performance of coffee and cocoa sectors with respect to output, employment absorption, and trade balance improve. However, improving in the coffee sector is not followed by its processing sector. With the proposal of the trade liberalisation of the development products, the sector of processed coffee will experience negative impact on output, employment absorption and trade balance. In this sector the volume of import exceed the export volume.

It is important to note that Indonesia does not always get benefit from the trade liberalisation in APEC region. While the majority sectors will have positive experience from trade liberalisation, other sectors however experience decline in their performance when trade liberalisation of development products occurs. These sectors include tea, processed tea, plant engineering and electric motors, electrical engineering and its equipment, battery and accu, other machinery and equipment and other motorcycles vehicles. This condition must be anticipated by the government and stakeholders in these industries in order to anticipate the negative impacts of the trade liberalisation.

5.2. Impact of the Trade Liberalisation on Poverty Alleviation

Prior to the measurement of the impact of development products on poverty level, the study firstly calculates the baseline poverty measurement. The results of the baseline poverty measurement of each household group using various measurements are presented in Table 5.2.

Tabel 5.2. Baseline poverty level

Poverty Index	All	Rural 1	Rural 2	Rural 3	Rural 4	Urban 1	Urban 2	Urban 3
Headcount (α=0)	0.1291	0.1891	0.0966	0.1992	0.1170	0.1002	0.0512	0.1023
Poverty Gap	0.0248	0.0389	0.0182	0.0425	0.0207	0.0171	0.0081	0.0172

(α =1)								
Poverty Severity (α =2)	0.0071	0.0119	0.0052	0.0133	0.0058	0.0043	0.0020	0.0043
Watts Index	0.0295	0.0471	0.0217	0.0517	0.0246	0.0198	0.0094	0.0199
Sen-Shorrock-Thon Index	0.0476	0.0734	0.0353	0.0798	0.0401	0.0331	0.0160	0.0334

Several poverty indicators that are showed in Table 5.2, the poverty level for each household group in Indonesia could also be presented in the form of FGT curves. In general, Figure 5.1 shows that the poverty line for households in rural areas is lower than in urban households. Households group that had the lowest poverty line is Rural 3. Conversely, the household group that has the highest poverty line is the Urban 2.

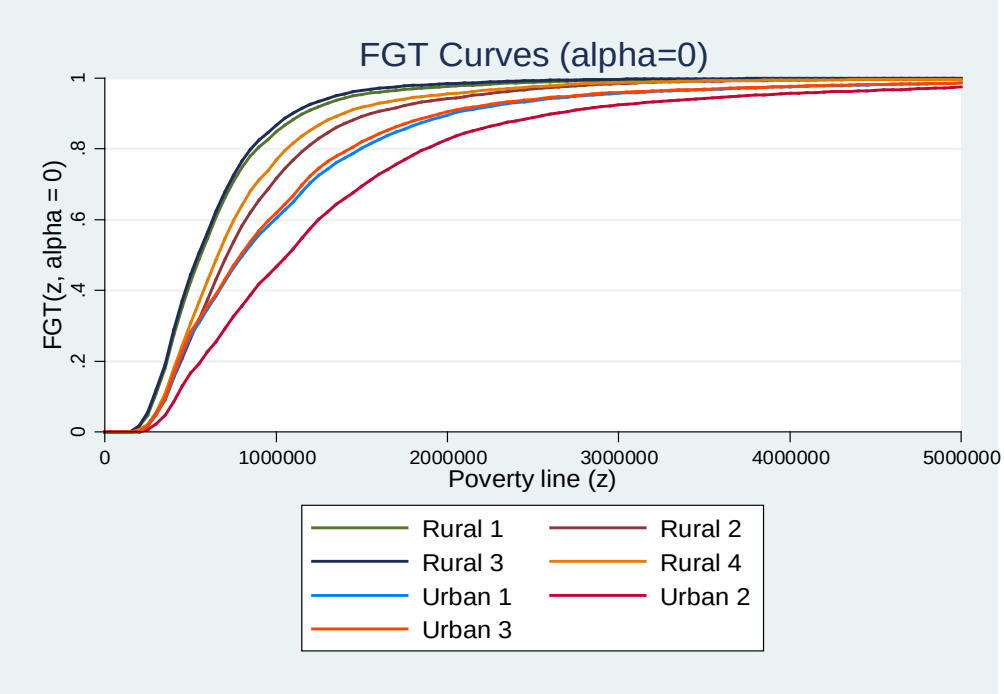


Figure 5.1. FGT (α=0) curve according to household groups

The CGE simulation model and microsimulation model are used to see how the changes in poverty as a result of reducing tariff and export subsidy as trade barriers for 157 development products (which represented by the changes in real income) on each household (HH) group. Based on the CGE model, the amount of change in real income (expense) is presented in each HH group. The amount of changes in real income (expense) is used to simulate the changes in the level of poverty in each HH group using *Susenas Core* Data, 2016. Thus, the impact of reducing tariff and export subsidy as trade barriers for 157 development products on poverty level is calculated based on the difference in the level of poverty before and after the changes on income (baseline). To that end, the poverty rate will

be recalculated using various approaches based on the data changes in real income (CGE simulation results).

Table 5.3 shows the magnitude of the shock that are used in micro simulation is in line with the CGE model (based on the HH groups). It is predicted that the real income of all groups of households are increased due to the tariff reduction of 157 development products. Thus, to simulate the impact of reducing import tariff and export subsidy as trade barriers for 157 development products proposed by APEC member economies, the shock is positive for all HH groups. However, the magnitude varies across household groups.

Table 5.3. The changes of real income for each HH group

HH Groups	Changes in Real Income (in percent)
Rural 1 (rural non-labor households, consisting of non-labor force and unclassified households in rural areas)	0.003130
Rural 2 (agricultural workers)	0.029190
Rural 3 (agricultural workers with land)	0.257300
Rural 4 (rural low income - non-agricultural households, consisting of small retail store owners, small entrepreneurs, small personal service providers, and clerical and manual workers in rural areas)	0.127050
Urban 1 (urban non-labor households, consisting of non-labor force and unclassified households in urban areas.)	0.223180
Urban 2 (urban low-income households, consisting of small retail store owners, small entrepreneurs, small personal service providers, and clerical and manual workers in urban areas.)	0.313260
Urban 3 (urban high income households, consisting of managers, technicians, professionals, military officers, teachers, large entrepreneurs, large personal service providers, and skilled clerical workers in urban areas)	0.119470

In general, the import tariff dan export subsidy reduction of 157 development products is predicted to reduce the level of poverty in Indonesia (see Table 5.4). In aggregate, reducing import tariff and export subsidy as trade barriers for 157 development products will reduce the level of poverty (with the size of the headcount ratio) by 0.00070 or 0.07 percentage points. Moreover, the reduction of poverty rate occurred not only on aggregate, but also for all HH groups. These imply that the development products proposal will not only positive for poverty level in rural area but also urban area. The highest reduction in poverty rates is experienced by the Rural 3 (agricultural workers with land), which is equal to 0.00168 or 0.16 percentage points. In opposite, the smallest positive impact is estimated to be

experienced by the Rural 1 (Rural non-labor households, consisting of non-labor force and unclassified households in rural areas) and Rural 2 (Agricultural Workers).

Although it is really informative and easy to calculate, headcount ratio does not measure the intensity of poverty and how poor the poor are. Thus, poverty gap and poverty severity are two alternative indicators that are useful to be analysed. Reducing import tariff and export subsidy as trade barriers for 157 development products is expected to reduce poverty gap and poverty severity by 0.00017 and 0.00003 respectively. These means that tariff reduction of 157 development products will reduce the cost of eliminating poverty and also reduce the income inequality among the poor in Indonesia. Indeed the magnitude looks really small.

By considering group of households, the impact of import tariff and export subsidy reduction of 157 development products on poverty gap and poverty severity is similar with the impact on headcount ratio. Group of household that will received the largest benefit in terms of lower poverty gap and poverty severity is Rural 3 (Agricultural workers with land). Poverty gap and poverty severity is expected to drop by 0.00039 and 0.00014 respectively.

Table 5.4. Changes of poverty indicator

		Headcount (a=0)	Poverty Gap (a=1)	Poverty Severity (a=2)	Watt Index	Sen-Shorrock-Thon Index
All HH	Before	0.12910	0.02480	0.00710	0.02950	0.04760
	After	0.12840	0.02463	0.00707	0.02938	0.04734
	Change	-0.00070	-0.00017	-0.00003	-0.00012	-0.00026
Rural 1	Before	0.18910	0.03890	0.01190	0.04710	0.07340
	After	0.18909	0.03894	0.01189	0.04711	0.07338
	Change	-0.00001	0.00004	-0.00001	0.00001	-0.00002
Rural 2	Before	0.09660	0.01820	0.00520	0.02170	0.03530
	After	0.09658	0.01817	0.00520	0.02168	0.03529
	Change	-0.00002	-0.00003	0.00000	-0.00003	-0.00001
Rural 3	Before	0.19920	0.04250	0.01330	0.05170	0.07980
	After	0.19752	0.04211	0.01316	0.05122	0.07911
	Change	-0.00168	-0.00039	-0.00014	-0.00048	-0.00069
Rural 4	Before	0.11700	0.02070	0.00580	0.02460	0.04010
	After	0.11636	0.02061	0.00576	0.02448	0.03984
	Change	-0.00064	-0.00009	-0.00004	-0.00012	-0.00026
Urban 1	Before	0.10020	0.01710	0.00430	0.01980	0.03310
	After	0.09923	0.01689	0.00420	0.01955	0.03274
	Change	-0.00097	-0.00022	-0.00010	-0.00025	-0.00036
Urban 2	Before	0.05120	0.00810	0.00200	0.00940	0.01600

		Headcount (a=0)	Poverty Gap (a=1)	Poverty Severity (a=2)	Watt Index	Sen-Shorrock-Thon Index
	After	0.05033	0.00800	0.00193	0.00922	0.01576
	Change	-0.00087	-0.00010	-0.00007	-0.00018	-0.00024
Urban 3	Before	0.10230	0.01720	0.00430	0.01990	0.03340
	After	0.10150	0.01712	0.00426	0.01983	0.03319
	Change	-0.00080	-0.00008	-0.00004	-0.00007	-0.00021

The results that are presented above are the estimated impact of import tariff and export subsidy reduction of 157 development products. Those 157 development products are proposed by 13 APEC economies based on their own justification, as previously mentioned in the Chapter 4. Therefore, there is a possibility of trade off between one particular economy's interest with others which can be shown by the small impact on poverty level. If we consider only one particular product of one particular economy, the impact on poverty level might be larger. As an example, PASPI (2014) shows that an increase in palm oil production in Indonesia is expected to reduce poverty level. Joni (2012) and Goenadi (2008) also found empirical evidence that support the positive impact of Indonesian palm oil production on poverty level. It is expected that more than 6 millions labor have better living (no longer categorized as poor) after working in palm oil industry (Goenadi, 2008). In addition, Syahza (2007) found that Indonesian palm oil industry is not only improve the income of households but also reduce the income inequality among household groups.

VI. IMPACT OF TRADE LIBERALISATION IN DEVELOPMENT PRODUCTS ON APEC ECONOMIES

In order to know the impact of trade liberalisation through reduction of import tariff and export subsidy in development products on APEC economies performance, it can be anlysed from the global economy-wide model of the Global Trade Analysis Project (GTAP) results. The results of the GTAP simulation focuses on 21 APEC economies, which are Australia (AUS); Brunei Darussalam (BD); Canada (CDA); Chile (CHL); China (PRC); Hong Kong, China (HKC); Indonesia (INA); Japan (JPN); Korea (ROK); Malaysia (MAS); Mexico (MEX); New Zealand (NZ); Peru (PE); the Philippines (PH); Russia (RUS); Singapore (SGP); Chinese Taipei (CT); Thailand (THA); United States (USA); Viet Nam (VN); and Rest of the world (RAW). The shock simulation is trade liberalisation through reduction of import tariff and export subsidy for the 157 development products in APEC economies.

Figure 6.1 shows the impact of trade liberalisation in the development products on real GDP of every APEC member economies. In general the simulation causes mostly positive impacts of real GDP. The highest impact will be gained by China and followed by Korea; Thailand; Malaysia; and Viet Nam. Indonesia will get almost no impact on real GDP (-0.008). Interestingnly, some developed economies of APEC which do not list their development products such as Australia; Japan and New Zealand will gain from the liberalisation. This implicates that the APEC proposal of promoting trade in development products which contribute to sustainable and inclusive growth through rural development and poverty alleviation should not get any objection from APEC members. The benefits of that growth improve the economic of all the members and deepen the spirit of community in APEC.

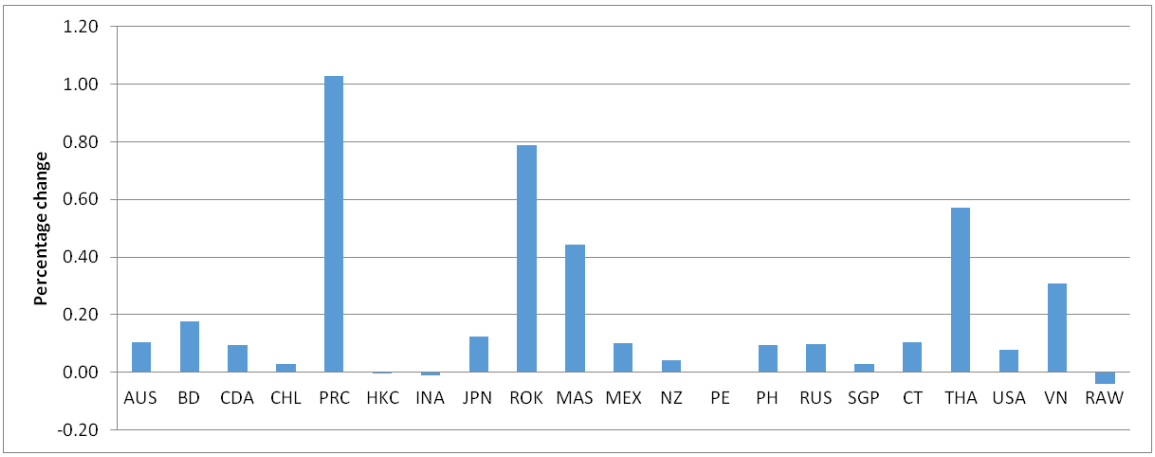


Figure 6.1. Impact of trade liberalisation in development products on real GDP of APEC economies (percentage change)

Another impact of trade liberalisation which improve economic development is on investment. Figure 6.2 reveals that generally all economies increase their investment, except Canada; Hong Kong, China; Indonesia and Peru. Although the four economies will get negative impacts of investment, the magnitudes are relatively lightly about -0.06 and -0.29 per cent. The positive impacts got by the other 17 APEC economies constitute ranges from 0.12 to 7.17 per cent. This parallel with the study of Dowrick and Golley (2004) which result that most of the dynamic benefits of trade are received through productivity growth and a small contribution coming through increased investment.

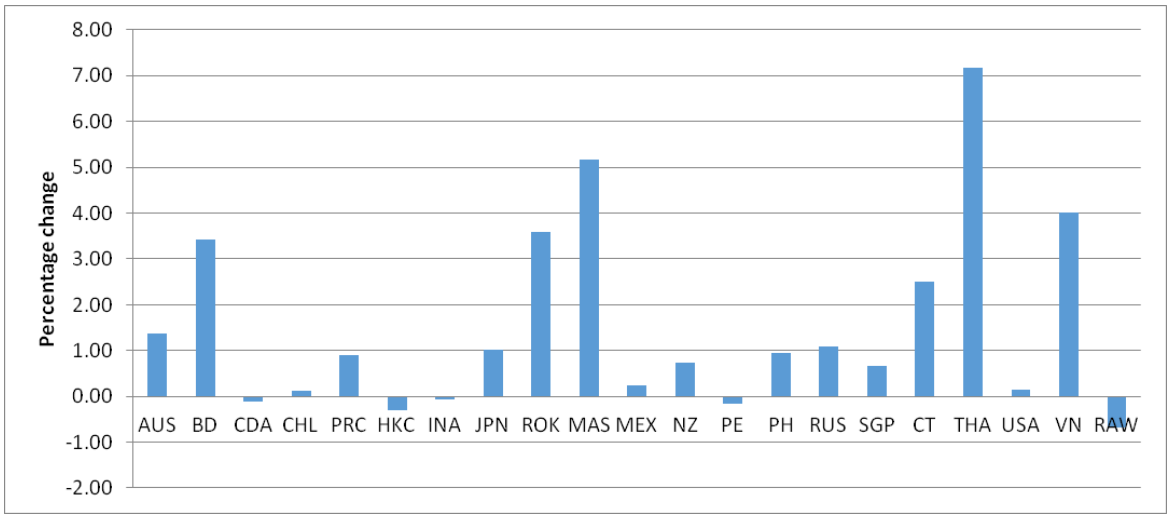


Figure 6.2. Impact of trade liberalisation in development products on investment of APEC economies (percentage change)

Tariff reduction obviously leads to higher imports and exports. The net imports and exports for each economy vary depend on response of local and imported goods substitution, response of transformation between exports and local sales and scale effects of tariff

reduction. The impact of trade liberalisation in development products on export and import of APEC economies is shown by Figure 6.3. The overall decline in domestic prices due to efficiency of trade liberalisation, will create an effective real exchange depreciation, in which then increases export competitiveness. Thus, overall exports of APEC economies increases by between +0.22 to +5.87 per cent. Only HKC (Hong Kong, China) and BD (Brunei Darussalam) will slightly suffer. More open to trade will generate more import. If production for the domestic market flates or declines, the total supply of goods available in the market improves due to liberalisation, it will create higher imports. Mostly import will increase, and export will increase more. Consequently it will generate positive trade balance for Canada; Indonesia; the Philippines; Mexico and Peru.

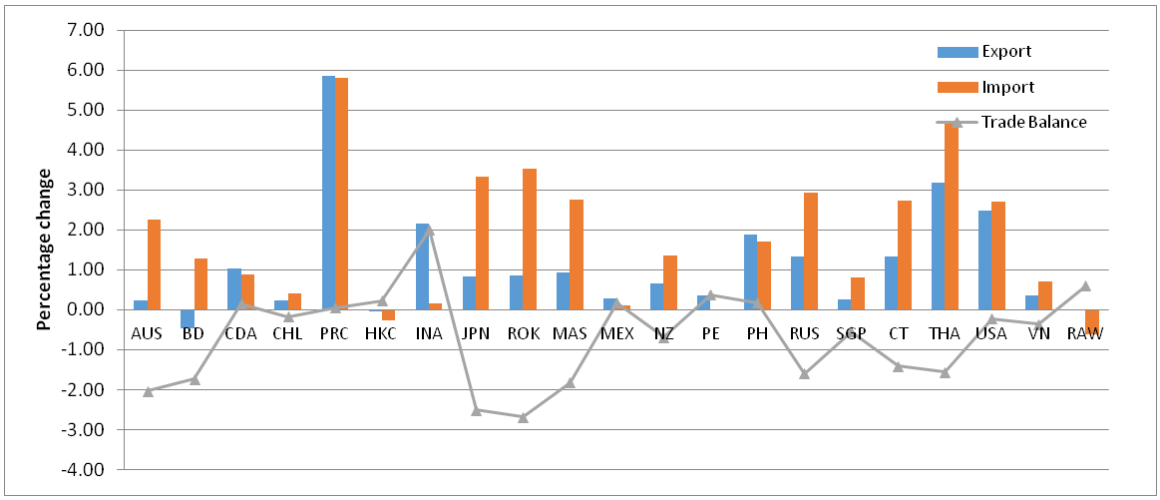


Figure 6.3. Impact of trade liberalisation in development products on export and import of APEC economies (percentage change)

VII. CONCLUDING REMARKS

Trade liberalisation through generates an increase of imports and exports as a result of impor tariff and export subsidy reduction of 157 development product proposed by APEC members. The former is due to lower import prices, while the latter to improved export competitiveness.

Trade liberalisation for 157 development product increase the benefit of four development products proposed by Indonesia (palm oil, rubber, rattan and paper) in term of increasing output, employment, and trade balance. Benefits from trade liberalisation also occur for the sectors having strong linkages with palm oil sector, i.e. animal and vegetable oils, varnishes and lak, soap products, and cosmetic, and also having strong linkages with rubber, rattan and paper. In the case of fish sector, there is a positive trade balance although reduce the output and employment absorption by small amount (0.03% and 0.20%, respectively). Those commodities are located in the rural area and related to the rural development.

If we look at other 10 development products proposed by other economies, coffee and cacao sectors in Indonesia gain benefits from trade liberalisation. It is important to note that Indonesia does not always get benefit from the trade liberalisation in APEC region. These sectors include tea, processed tea, plant engineering and electric motors, electrical engineering and its equipment, battery and accu, other machinery and equipment and other motorcycles vehicles, which are mostly in urban area. It seems that several sectors are expected to gain advantages from the liberalisation while some others might experience negative impacts.

The implementation of development products liberalization is expected to reduce poverty level in Indonesia, not only in aggregate data but also for all household groups. However, the impact on poverty level is small in magnitude. Economy-specific complementary policies should be allowed to cope with the possible negative impacts such as improvement of infrastructure, health, education and access to finance. Group of household that is expected to receive the largest benefit is agricultural worker with land in the rural area.

Trade liberalisation in the development products causes mostly positive impacts of real GDP, investment and trade balance in almost all APEC economies. The highest impact

of real GDP will be gained by China and followed by Korea; Thailand; Malaysia; and Viet Nam, while Indonesia will get almost no impact on real GDP (-0.008 per cent). Generally all economies (17 APEC economies) increase their investment, except Canada; Hong Kong, China; Indonesia and Peru, with the magnitudes are relatively lightly. Increasing the exports and imports in trade liberalisation will affect the positive of trade balance for Canada; Indonesia; the Philippines; Peru and Mexico, while in other economies, there is a small deficit trade balance. Some developed countries of APEC which do not list their development products such as Australia, Japan and New Zaeland will gain from the liberalization (GDP and investment growth). The benefits of the growth should deepen the spirit of community in APEC to improve the quality of life through sustainable and inclusive growth.

Based on the results that are mentioned above, proposal on development products need to be supported by other measures. Those measures could be investment and trade facilitation that could reduce the cost and complexity gap among APEC economies. Another issue that need to be emphasized is the definition of development products itself. Properties and quantitative measurements of the commodities are needed as a justification of a commodity to be categorized as development products, which is related to rural development and poverty alleviation. For an economy, a commodity which is listed as development products can be a protected product of liberalisation by another economy. It seems that attempts to liberalise the development products will face numerous obstacles. However, promoting products which contribute to sustainable and inclusive growth through RDPA should be continously risen. The facts that increasing trade of agricultural products can directly improve the income of rural households and make better rural utilities and facilities in some developing economies cannot be denied.

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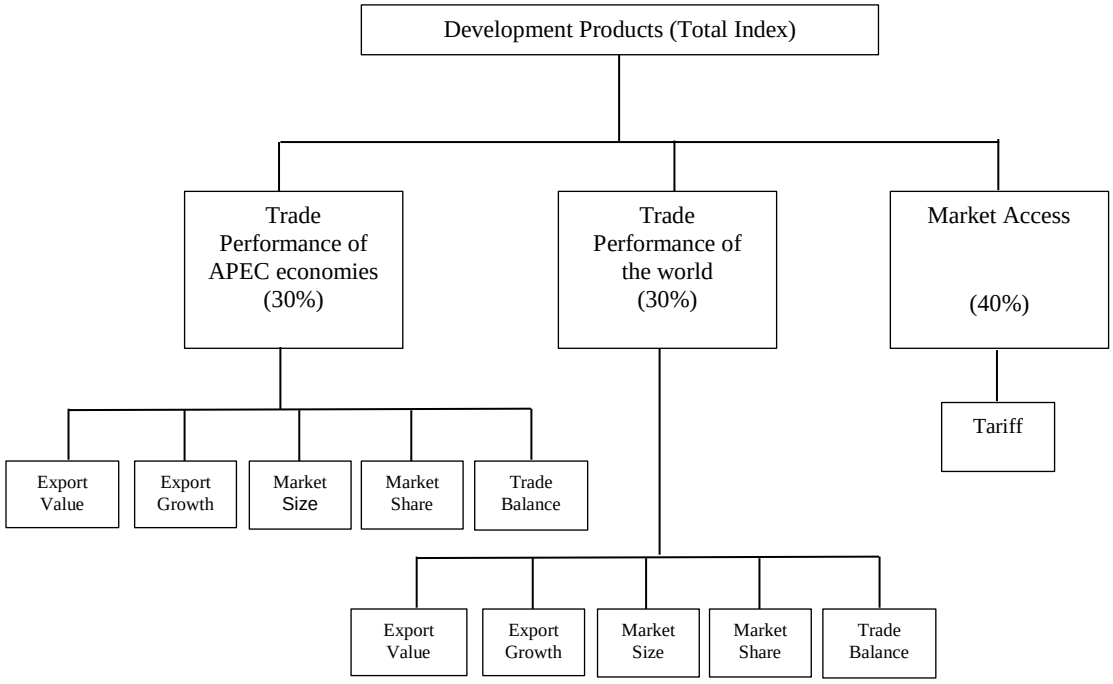
Appendix 1. Method of weighted index of development products

Method to calculate weighted index of development products applies a weight of 100% which is included into some indicators as follows:

- *Trade perfomance of APEC economies* applying weight of 30%
- *Trade perfomance of World* applying weight of 30 %
- *Market access* using data of tariff among APEC economies 40%.

The trade performance factor includes *export value, export growth, market size, market share* and *trade balance*. The weight on each indicator of trade performance and market access is presented on the Figure below. The weight does not calculate factors of *Non Tarriff Barrier* (NTBs) because of limited study time.



An index score which is similar to UNCTAD ICT development index is computed for each of the indicators with the following methodology:

$$5 - \left(\frac{Vmax - Vn}{Vmax - V\min}\right) * 4$$

V_{max} is the maximum value achieved and V_{min} is the minimum value. Hence, the maximum index will be 5 and the lowest index will be zero.

Appendix 2. Weighted index of development products

HS Code	Eco-nomy	Trade Performance in APEC					Trade Performance in WLD					Market Access (tariff)	Index
		Export	Export Growth	Market Size	Market Share	Trade Balance	Export	Export Growth	Market Size	Market Share	Trade Balance		
		Weight of 30%					Weight of 30%					Weight of 40%	
271019	SGP	5.00	2.00	5.00	5.00	5.00	5.00	2.00	5.00	5.00	1.00	3.99	3.76
870190	ROK	5.00	2.00	5.00	5.00	4.97	5.00	3.00	5.00	5.00	5.00	2.39	3.35
841931	ROK	3.52	4.00	2.29	3.52	5.00	3.09	4.00	3.41	3.09	2.93	3.87	3.16
90412	MAS	1.77	2.00	4.19	1.77	1.88	2.12	2.00	5.00	2.12	2.20	4.61	3.11
90111	VN	3.23	3.00	4.73	3.23	3.21	5.00	4.00	5.00	5.00	5.00	2.46	3.05
180690	PE	1.17	3.00	1.97	1.17	2.59	1.41	2.00	2.65	1.41	4.44	4.90	2.97
110620	PE	1.57	4.00	1.01	1.57	3.06	1.56	4.00	1.00	1.56	4.57	5.00	2.95
843490	ROK	1.57	3.00	1.34	1.57	1.97	1.81	2.00	1.52	1.81	2.22	5.00	2.83
847920	SGP	1.00	1.00	1.00	1.00	1.08	1.00	1.00	1.00	1.00	4.93	5.00	2.72
210111	VN	1.46	2.00	1.85	1.46	1.43	1.42	2.00	2.02	1.42	1.41	4.94	2.72
382600	MAS	1.68	2.00	1.67	1.68	1.82	1.99	2.00	1.91	1.99	2.09	4.51	2.69
220421	USA	1.12	3.00	1.94	1.12	1.01	1.20	2.00	2.64	1.20	1.00	5.00	2.67
90121	VN	1.03	2.00	1.95	1.03	1.04	1.02	2.00	2.75	1.02	1.03	5.00	2.65
120110	CDA	5.00	2.00	1.45	5.00	5.00	4.38	3.00	1.85	4.38	4.34	1.90	2.64
152000	SGP	1.00	1.00	1.00	1.00	1.05	1.00	1.00	1.00	1.00	4.91	4.75	2.62
401699	SGP	1.01	3.00	1.08	1.01	1.06	1.01	3.00	1.08	1.01	4.92	4.58	2.56
130239	PE	1.28	1.00	1.09	1.28	2.75	1.82	1.00	1.13	1.82	4.57	4.04	2.56
400280	MAS	3.47	4.00	1.45	3.47	3.45	3.87	4.00	2.01	3.87	3.86	2.57	2.55
100620	CDA	1.00	3.00	1.36	1.00	1.00	1.00	3.00	1.79	1.00	1.00	5.00	2.55
20220	CDA	2.08	3.00	1.24	2.09	1.90	1.91	3.00	1.66	1.91	1.78	4.15	2.53
180632	SGP	1.00	4.00	1.02	1.00	1.05	1.00	4.00	1.03	1.00	4.90	4.52	2.53
20319	CDA	1.71	4.00	1.49	1.71	1.17	1.61	4.00	1.91	1.61	1.20	4.42	2.51
20311	CDA	1.88	2.00	1.65	1.88	2.01	1.86	2.00	1.72	1.86	1.96	4.05	2.51
90411	MAS	1.00	1.00	1.02	1.00	1.21	1.00	1.00	1.02	1.00	1.18	5.00	2.51
30332	RUSA	1.02	3.00	1.00	1.02	1.02	1.00	3.00	1.00	1.00	1.13	5.00	2.49
90122	VN	1.00	1.00	1.07	1.00	1.01	1.01	1.00	1.11	1.01	1.01	4.97	2.48
180690	SGP	1.01	3.00	1.06	1.01	1.11	1.01	3.00	1.08	1.01	4.95	4.34	2.47
382490	SGP	1.04	4.00	1.28	1.04	1.12	1.04	3.00	1.26	1.04	4.97	4.25	2.47
100610	CDA	1.00	1.00	1.02	1.00	1.18	1.00	2.00	1.08	1.00	1.19	4.87	2.46
151110	CT	0.99	4.00	5.00	1.00	3.36	1.00	1.00	4.32	1.00	3.29	3.14	2.45
180631	SGP	1.00	1.00	1.01	1.00	1.06	1.00	1.00	1.03	1.00	4.88	4.30	2.44
180610	SGP	1.00	4.00	1.00	1.00	1.06	1.00	4.00	1.00	1.00	4.92	4.29	2.43
30311	RUSA	1.76	1.00	1.04	1.76	1.76	1.20	1.00	1.03	1.20	1.33	4.42	2.43
180620	SGP	1.02	4.00	1.02	1.02	1.15	1.02	4.00	1.03	1.02	5.00	4.23	2.43
90190	VN	1.00	1.00	1.00	1.00	1.01	1.00	1.00	1.02	1.00	1.01	4.86	2.43
120190	USA	5.00	4.00	5.00	5.00	5.00	5.00	3.00	5.00	5.00	5.00	NA	2.40
90112	VN	1.02	4.00	1.22	1.02	1.03	1.03	4.00	1.15	1.03	1.04	4.69	2.39
100640	CDA	1.14	4.00	1.80	1.14	1.18	1.14	3.00	1.95	1.14	1.18	4.35	2.38
110100	RUS	1.00	4.00	1.12	1.00	1.00	1.05	1.00	1.48	1.05	1.16	4.57	2.36
120510	CDA	1.01	3.00	1.00	1.01	1.20	1.01	3.00	1.16	1.01	1.21	4.58	2.35
180500	SGP	1.01	2.00	1.01	1.01	1.11	1.01	2.00	1.01	1.01	4.96	4.02	2.34
20329	CDA	1.10	3.00	1.07	1.10	1.28	1.08	2.00	1.07	1.08	1.28	4.48	2.33
100630	CDA	1.07	3.00	1.06	1.07	1.09	1.06	3.00	1.30	1.06	1.12	4.48	2.32
20130	CDA	1.00	1.00	1.00	1.00	1.19	1.00	1.00	1.00	1.00	1.20	4.48	2.30
30331	RUS	1.19	3.00	1.02	1.19	1.18	1.05	2.00	1.06	1.05	1.17	4.36	2.28
440810	CT	1.09	2.00	1.16	1.10	3.74	1.12	2.00	1.17	1.12	3.58	3.56	2.27
480524	CT	1.01	1.00	1.12	1.02	3.75	1.13	1.00	1.78	1.13	3.62	3.46	2.26
20230	CDA	1.00	4.00	1.00	1.00	1.19	1.00	4.00	1.19	1.00	1.20	4.35	2.26
20110	CDA	1.22	4.00	1.08	1.22	1.40	1.18	4.00	1.30	1.18	1.37	4.15	2.26
180310	SGP	1.01	3.00	1.01	1.01	1.07	1.00	2.00	1.01	1.00	4.92	3.82	2.25
20210	CDA	1.11	1.00	1.04	1.11	1.30	1.11	2.00	1.04	1.11	1.31	4.25	2.25
200410	USA	1.15	3.00	1.16	1.15	1.08	1.16	3.00	1.36	1.16	1.53	4.13	2.24
480525	CT	1.00	4.00	1.19	1.01	3.73	1.04	2.00	1.41	1.04	3.56	3.42	2.21
140490	PE	1.99	2.00	1.08	1.99	3.29	2.70	2.00	1.09	2.70	4.70	2.58	2.21
180400	SGP	1.01	4.00	1.01	1.01	1.09	1.01	4.00	1.02	1.01	4.96	3.69	2.20
110900	RUS	1.02	1.00	1.06	1.02	1.01	1.00	4.00	1.09	1.00	1.13	4.23	2.19
151620	SGP	1.01	3.00	1.01	1.01	1.07	1.01	3.00	1.02	1.01	4.93	3.63	2.18
310100	CT	1.10	2.00	1.09	1.11	3.81	1.12	3.00	1.31	1.12	3.61	3.29	2.17
170112	THA	1.00	4.00	1.00	1.00	1.00	1.00	2.00	1.25	1.00	1.00	4.19	2.17
30617	VN	5.00	3.00	5.00	5.00	5.00	4.17	3.00	3.74	4.17	3.90	NA	2.16
20120	CDA	1.00	4.00	1.00	1.00	1.19	1.00	4.00	1.00	1.00	1.20	4.05	2.12
230120	RUS	1.29	3.00	1.43	1.29	1.28	1.07	3.00	1.38	1.07	1.12	3.69	2.07
180310	MAS	1.16	3.00	1.70	1.16	1.18	1.17	2.00	2.18	1.17	1.13	3.49	2.05
30559	MAS	1.36	1.00	1.11	1.36	1.56	1.28	1.00	1.08	1.28	1.45	3.52	2.04
200799	MAS	1.23	1.00	1.08	1.23	1.42	1.22	1.00	1.12	1.22	1.38	3.57	2.02
51191	RUS	1.03	2.00	1.03	1.03	1.03	1.00	2.00	1.04	1.00	1.13	3.71	1.98

HS Code	Eco-nomy	Trade Performance in APEC					Trade Performance in WLD					Market Access (tariff)	Index
		Export	Export Growth	Market Size	Market Share	Trade Balance	Export	Export Growth	Market Size	Market Share	Trade Balance		
		Weight of 30%					Weight of 30%					Weight of 40%	
400110	CT	1.05	1.00	1.96	1.06	1.06	1.05	1.00	1.88	1.05	1.59	3.27	1.95
30617	BD	5.00	3.00	5.00	5.00	1.34	5.00	3.00	5.00	5.00	1.00	NA	1.94
81090	PE	1.54	3.00	1.45	1.54	3.04	1.88	3.00	1.33	1.88	4.61	2.26	1.94
460122	INA	1.31	3.00	1.45	1.31	1.33	1.14	3.00	1.73	1.14	1.14	3.25	1.93
170114	THA	4.33	4.00	5.00	4.33	4.33	3.06	4.00	5.00	3.06	3.06	NA	1.93
80122	PE	2.63	2.00	1.02	2.63	3.66	2.43	2.00	1.02	2.43	4.67	1.74	1.93
100850	PE	5.00	4.00	1.03	5.00	5.00	5.00	4.00	1.02	5.00	5.00	NA	1.92
848690	CT	5.00	3.00	4.96	5.00	1.00	5.00	4.00	5.00	5.00	1.00	NA	1.92
151211	RUS	1.00	4.00	1.18	1.00	1.00	2.20	2.00	1.30	2.20	2.31	2.95	1.91
180320	MAS	1.10	3.00	1.32	1.10	1.23	1.09	3.00	1.60	1.09	1.13	3.32	1.91
100590	PE	1.48	1.00	5.00	1.48	1.00	1.82	1.00	5.00	1.82	1.00	1.95	1.90
100199	RUS	2.12	1.00	5.00	2.12	2.12	5.00	4.00	5.00	5.00	5.00	NA	1.88
151219	SGP	1.00	1.00	1.00	1.00	1.05	1.00	1.00	1.02	1.00	4.90	2.87	1.87
20322	CDA	3.64	2.00	2.03	3.64	3.76	5.00	2.00	2.99	5.00	5.00	NA	1.86
460199	MAS	1.69	4.00	1.29	1.69	1.29	1.57	4.00	1.68	1.57	1.21	2.86	1.86
30343	INA	1.74	3.00	2.13	1.74	1.77	1.37	4.00	2.30	1.37	1.38	2.50	1.83
151411	SGP	1.00	3.00	1.04	1.00	1.05	1.00	2.00	1.03	1.00	4.91	2.74	1.82
20321	CDA	1.36	1.00	2.20	1.36	1.43	1.38	1.00	2.97	1.38	1.46	2.47	1.80
81040	PE	1.70	3.00	1.23	1.70	3.14	1.85	3.00	1.20	1.85	4.60	1.90	1.80
180620	MAS	1.40	1.00	1.16	1.40	1.13	1.32	1.00	1.17	1.32	1.06	2.96	1.78
180400	MAS	1.37	3.00	1.41	1.37	1.31	1.31	3.00	1.57	1.31	1.27	2.77	1.76
81340	PE	1.00	4.00	1.08	1.00	2.73	1.00	4.00	1.07	1.00	4.49	2.37	1.75
940169	MAS	1.03	2.00	1.11	1.03	1.00	1.02	3.00	1.14	1.02	1.00	3.04	1.72
480257	INA	1.00	2.00	1.04	1.00	1.04	1.00	1.00	1.07	1.00	1.01	3.07	1.72
120190	CDA	1.00	4.00	1.03	1.00	1.15	1.00	4.00	1.09	1.00	1.17	2.97	1.70
940340	MAS	3.69	3.00	5.00	3.69	2.64	3.17	3.00	4.66	3.17	2.19	NA	1.69
170113	THA	5.00	1.00	1.09	5.00	5.00	3.29	1.00	1.41	3.29	3.29	NA	1.64
460212	INA	1.35	3.00	1.38	1.35	1.39	1.18	3.00	1.62	1.18	1.19	2.43	1.61
51199	PE	1.30	1.00	1.20	1.30	2.86	1.22	1.00	1.24	1.22	4.51	1.79	1.61
291619	INA	1.25	2.00	1.48	1.25	1.27	1.09	3.00	1.84	1.09	1.10	2.36	1.57
460193	INA	1.18	1.00	1.50	1.18	1.21	1.09	1.00	1.75	1.09	1.10	2.34	1.54
100590	CDA	1.00	2.00	1.02	1.00	1.19	1.00	1.00	1.04	1.00	1.20	2.43	1.48
840734	ROK	1.00	1.00	1.04	1.00	1.02	1.30	1.00	1.18	1.30	1.51	2.29	1.48
100510	CDA	2.13	2.00	5.00	2.13	2.20	2.59	1.00	5.00	2.59	2.61	NA	1.45
151110	INA	1.01	1.00	1.00	1.01	1.05	1.00	1.00	1.01	1.00	1.01	2.38	1.44
30367	RUS	5.00	2.00	1.19	5.00	5.00	2.10	1.00	1.11	2.10	2.23	NA	1.42
480255	INA	1.00	4.00	1.92	1.00	1.00	1.00	2.00	1.61	1.00	1.00	2.00	1.37
100590	RUS	1.29	4.00	2.30	1.29	1.26	1.67	4.00	3.63	1.67	1.79	1.00	1.29
80510	USA	1.10	2.00	1.11	1.10	1.17	1.09	1.00	1.31	1.09	1.57	1.78	1.28
100890	PE	1.13	2.00	1.00	1.13	2.82	1.18	3.00	1.01	1.18	4.52	1.00	1.24
843710	ROK	1.09	1.00	1.00	1.09	1.14	1.13	1.00	1.02	1.13	1.21	1.77	1.24
382313	INA	1.00	4.00	1.11	1.00	1.03	1.01	4.00	1.12	1.01	1.01	1.84	1.23
100199	USA	2.09	1.00	2.02	2.09	2.01	2.88	1.00	2.97	2.88	3.08	NA	1.20
140120	CT	1.00	4.00	1.00	1.01	3.63	1.03	3.00	1.00	1.03	3.49	1.00	1.19
81010	USA	1.05	3.00	1.05	1.05	1.08	1.05	3.00	1.12	1.05	1.51	1.57	1.17
180500	MAS	1.59	4.00	1.40	1.59	1.65	1.59	4.00	1.50	1.59	1.64	1.01	1.16
870590	ROK	1.03	4.00	1.00	1.03	1.08	1.03	4.00	1.00	1.03	1.00	1.65	1.15
441231	CT	1.52	4.00	2.24	1.52	4.00	1.85	4.00	2.05	1.85	3.99	NA	1.14
120929	SGP	1.00	1.00	1.00	1.00	1.05	1.00	1.00	1.00	1.00	4.91	1.03	1.13
120999	SGP	1.00	2.00	1.00	1.00	1.05	1.00	2.00	1.00	1.00	4.91	1.00	1.12
80550	USA	1.00	4.00	1.04	1.00	1.04	1.00	4.00	1.13	1.00	1.47	1.49	1.12
80232	USA	1.05	4.00	1.01	1.05	1.14	1.10	4.00	1.04	1.10	1.60	1.39	1.10
80610	USA	1.17	2.00	1.30	1.17	1.00	1.17	2.00	1.51	1.17	1.46	1.21	1.08
80290	USA	1.02	4.00	1.04	1.02	1.05	1.04	4.00	1.05	1.04	1.49	1.37	1.07
80212	USA	1.20	3.00	1.07	1.20	1.30	1.56	4.00	1.23	1.56	2.02	1.00	1.07
80810	USA	1.13	2.00	1.18	1.13	1.18	1.17	2.00	1.47	1.17	1.63	1.00	1.00
60290	VN	1.01	2.00	1.41	1.01	1.01	1.01	3.00	2.40	1.01	1.00	1.01	0.99
80231	USA	1.04	1.00	1.00	1.04	1.14	1.09	1.00	1.00	1.09	1.60	1.12	0.99
80211	USA	1.04	1.00	1.00	1.04	1.14	1.13	3.00	1.02	1.13	1.63	1.07	0.98
151190	INA	1.10	1.00	1.68	1.10	1.14	1.03	1.00	1.39	1.03	1.04	1.00	0.97
940330	MAS	1.09	3.00	1.10	1.09	1.25	1.07	3.00	1.14	1.07	1.20	1.00	0.94
100199	CDA	1.09	1.00	1.13	1.09	1.12	1.08	1.00	1.23	1.08	1.15	1.00	0.94
30324	BD	1.04	2.00	1.01	1.05	4.67	1.03	2.00	1.01	1.04	4.77	NA	0.94
30271	BD	0.99	3.00	1.00	1.00	4.76	1.00	3.00	1.01	1.00	4.84	NA	0.94
170191	THA	1.17	2.00	1.03	1.17	1.17	1.10	3.00	1.00	1.10	1.10	1.00	0.93
30272	BD	0.99	3.00	1.00	1.00	4.61	1.00	3.00	1.00	1.00	4.73	NA	0.92
60210	VN	1.01	3.00	1.06	1.01	1.02	1.01	2.00	1.10	1.01	1.02	1.00	0.89
840733	ROK	1.00	3.00	1.00	1.00	1.00	1.00	3.00	1.08	1.00	1.01	1.00	0.89

HS Code	Eco-nomy	Trade Performance in APEC					Trade Performance in WLD					Market Access (tariff)	Index
		Export	Export Growth	Market Size	Market Share	Trade Balance	Export	Export Growth	Market Size	Market Share	Trade Balance		
		Weight of 30%					Weight of 30%					Weight of 40%	
160420	MAS	1.27	4.00	2.21	1.27	1.45	1.52	4.00	3.65	1.52	1.67	NA	0.87
441232	RUS	1.67	4.00	1.66	1.67	1.53	2.11	4.00	1.51	2.11	2.19	NA	0.87
20312	CDA	1.41	2.00	1.08	1.41	1.59	2.23	4.00	1.40	2.23	2.38	NA	0.82
382600	SGP	1.01	2.00	1.04	1.01	1.00	1.01	4.00	1.06	1.01	4.87	NA	0.72
30351	RUS	1.76	1.00	1.05	1.76	1.76	1.22	1.00	1.08	1.22	1.18	NA	0.66
30363	RUS	1.32	2.00	1.08	1.32	1.32	1.19	3.00	1.08	1.19	1.32	NA	0.59
30627	BD	1.00	4.00	1.15	1.01	1.00	1.00	4.00	1.15	1.00	2.24	NA	0.57
80251	USA	1.09	1.00	1.06	1.09	1.19	1.16	1.00	1.09	1.16	1.66	NA	0.57
30389	RUS	1.17	3.00	1.39	1.17	1.07	1.05	3.00	1.39	1.05	1.00	NA	0.56
100119	CDA	1.03	1.00	1.02	1.03	1.22	1.03	1.00	1.01	1.03	1.22	NA	0.52
30324	VN	1.04	4.00	1.01	1.04	1.05	1.14	3.00	1.01	1.14	1.15	NA	0.51
940350	MAS	1.00	4.00	1.00	1.00	1.22	1.00	4.00	1.01	1.00	1.18	NA	0.50
940161	MAS	1.00	4.00	1.00	1.00	1.21	1.00	4.00	1.00	1.00	1.18	NA	0.50
30627	VN	1.01	4.00	1.15	1.01	1.00	1.01	4.00	1.10	1.01	1.00	NA	0.50
400110	INA	1.02	1.00	1.03	1.02	1.06	1.02	3.00	1.03	1.02	1.02	NA	0.49
481029	INA	1.00	2.00	1.00	1.00	1.04	1.00	2.00	1.00	1.00	1.01	NA	0.48
30563	INA	1.00	4.00	1.00	1.00	1.04	1.00	4.00	1.00	1.00	1.01	NA	0.48
30272	VN	1.00	1.00	1.00	1.00	1.01	1.00	1.00	1.00	1.00	1.01	NA	0.48
470700	SGP	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.00

Notes:
NA = not available data
The data of export and import used in the calculation is from 2011 to 2015 (source: WITS Worldbank http://wits.worldbank.org/)
The data of tariff used in the calculation is from 2010 to 2014 (source: UN Comtrade 2017)

Appendix 3. The impact of reducing import tariff and export subsidy on sectoral performance of Indonesia

No	CGE	Group	Output	Export	Import	Trade Ballance	Employment
1	Rice	Rural	-0.550	0.000	-6.192	6.192	-1.017
2	Corn, maize	Rural	-0.754	31.710	-4.867	36.577	-1.384
3	Sweet potato	Rural	-0.286	26.975	-5.244	32.219	-0.645
4	Cassava	Rural	-0.242	25.441	-5.060	30.501	-0.548
5	Others tubers	Rural	-0.164	25.933	-4.971	30.904	-0.468
6	Peanuts	Rural	-0.004	23.574	-4.174	27.747	-0.192
7	Soybean	Rural	0.253	24.312	-1.199	25.511	0.244
8	Other nuts	Rural	-0.493	-0.998	0.000	-0.998	-0.871
9	Grains and others foodstuff	Rural	1.663	5.708	-1.033	6.741	2.482
10	Vegetables	Rural	-0.125	8.824	-4.361	13.185	-0.340
11	Decorative plants	Rural	-0.508	9.361	-3.273	12.634	-0.799
12	Tobacco	Rural	0.343	6.180	-1.326	7.505	0.497
13	Other plantation	Rural	1.128	3.836	0.087	3.749	1.630
14	Fruits	Rural	-0.508	10.628	-5.048	15.677	-1.015
15	Medicinal plant	Rural	-0.009	7.983	-1.570	9.554	-0.117
16	Rubber	Rural	1.462	4.254	2.173	2.081	2.068
17	Coconut	Rural	-0.131	10.876	-5.197	16.073	-0.366
18	Palm oil	Rural	0.620	6.956	-1.291	8.247	0.817
19	Coffee	Rural	1.348	4.543	0.627	3.916	2.012
20	Tea	Rural	-0.455	14.739	0.000	14.739	-0.771
21	Cacao	Rural	0.907	6.493	-0.129	6.622	1.381
22	Clove	Rural	-1.237	22.269	0.000	22.269	-2.197
23	Cashew	Rural	1.124	4.873	-0.045	4.919	1.742
24	Poultry and its products	Rural	-0.421	7.542	-0.483	8.025	-0.675
25	services for agriculture, forestry and fisheries	Urban	0.243	0.000	-4.017	4.017	0.077
26	Wood	Rural	0.210	9.809	-2.243	12.052	0.156
27	Other forest products	Rural	0.765	7.182	-1.271	8.453	1.051
28	Fish	Rural	-0.030	4.277	-0.955	5.232	-0.204
29	Shrimp and other crustaceans	Rural	-0.067	4.533	-1.137	5.670	-0.315
30	Other aquatic biota	Rural	-0.003	4.134	-0.568	4.703	-0.130
31	Seaweed and others	Rural	0.047	3.972	-0.800	4.772	-0.031
32	Slaughterhouse products	Urban	-0.596	4.498	2.105	2.393	-0.867
33	Meat processing and preservation products	Urban	-1.186	3.843	1.225	2.618	-1.623
34	Dried fish and salted fish	Rural	-0.785	3.626	6.873	-3.247	-1.077
35	Processed and preserved fish	Urban	0.933	2.512	4.395	-1.883	1.554
36	Fruit processing and preservation products	Urban	-1.017	3.719	6.344	-2.625	-1.370
37	Animal and vegetable oils	Urban	0.492	1.289	-1.188	2.477	1.471
38	Copra	Rural	0.202	-0.728	0.000	-0.728	0.551
39	Other flour	Urban	-0.884	4.127	5.946	-1.819	-1.362

No	CGE	Group	Output	Export	Import	Trade Ballance	Employment
40	Wheat flour	Urban	-1.057	2.595	7.243	-4.648	-1.725
41	Rice milling products	Urban	-0.561	24.280	-4.130	28.410	-0.870
42	Bread, biscuits and others	Urban	-0.357	10.032	7.415	2.617	-0.439
43	Sugar	Urban	0.327	5.996	-3.242	9.238	0.574
44	Chocolate and cotton candy	Urban	-0.512	5.994	5.080	0.914	-1.160
45	Noodle, macaroni and others	Urban	-0.788	5.605	6.985	-1.380	-1.537
46	Processed coffee	Urban	-0.449	5.174	7.052	-1.878	-1.011
47	Processed tea	Urban	-0.336	2.704	7.485	-4.782	-0.778
48	Processed soybean	Urban	-0.707	-1.434	6.660	-8.094	-1.586
49	Others food	Urban	-0.641	3.497	6.807	-3.310	-1.600
50	Processed animal food	Urban	-0.782	4.934	5.182	-0.247	-1.994
51	Alcohol drinks	Urban	-1.821	3.309	5.264	-1.955	-2.384
52	Non-alcohol drinks	Urban	-0.850	2.606	10.462	-7.856	-1.078
53	Cigarette	Urban	-0.532	5.643	10.031	-4.388	-0.689
54	Processed tobacco	Urban	-2.448	6.562	7.099	-0.537	-3.513
55	Textile stuff other than clothes	Urban	-1.002	5.999	3.274	2.725	-1.381
56	Knitted goods	Urban	-1.913	8.214	0.978	7.235	-2.809
57	Clothes	Urban	0.177	1.966	7.899	-5.933	0.334
58	Sawnwood and its processed	Urban	0.535	2.895	0.301	2.594	1.425
59	Plywood and others	Urban	0.491	2.206	0.604	1.603	1.312
60	Building materials from wood	Urban	0.290	2.078	0.387	1.692	0.788
61	Other goods of wood, cork, bamboo and rattan	Urban	0.325	3.512	-0.584	4.096	0.878
62	Paper pulp	Urban	0.730	2.137	0.998	1.139	1.817
63	Paper	Urban	0.346	2.825	0.460	2.365	0.890
64	Products made from paper and cardboard	Urban	0.215	3.430	0.493	2.937	0.570
65	Printed goods	Urban	-0.742	8.044	-1.016	9.060	-1.765
66	Oil and gas refineries products	Urban	-0.181	1.517	1.220	0.297	-0.140
67	Basic chemicals except fertilizers	Urban	0.395	3.227	1.375	1.852	0.657
68	Fertilizers	Urban	-0.153	4.262	1.425	2.837	-0.132
69	Basic chemicals except fertilizers	Urban	0.554	5.535	1.947	3.588	0.879
70	Pesticide	Urban	0.964	3.951	0.489	3.462	1.381
71	Paints and printing inks	Urban	-0.004	5.221	2.723	2.497	0.116
72	Varnishes and lak	Urban	0.032	5.585	2.940	2.645	0.166
73	Soap and other cleaning products	Urban	1.214	4.432	1.341	3.091	1.796
74	Cosmetics	Urban	0.431	6.557	1.000	5.558	0.703
75	Other chemical goods	Urban	0.539	3.503	0.775	2.728	0.850
76	Pharmaceutical products	Urban	-0.575	6.837	1.233	5.604	-0.666
77	Traditional medicine	Urban	0.632	3.774	1.746	2.029	1.050
78	Tire	Urban	0.788	2.280	1.111	1.169	1.275
79	Crumb rubber and rubber smoke	Urban	1.345	1.523	0.000	1.523	2.085

No	CGE	Group	Output	Export	Import	Trade Ballance	Employment
80	Other products of rubber	Urban	1.252	3.104	0.674	2.430	1.938
81	Plastics products	Urban	0.215	6.182	1.751	4.431	0.442
82	Plant engineering and electric motors	Urban	-2.458	-6.295	0.151	-6.446	-3.258
83	Electrical engineering and its equipment	Urban	-2.577	-5.097	0.914	-6.011	-3.435
84	Battery and accu	Urban	-4.082	-7.044	1.026	-8.070	-5.446
85	Other machinery and equipment	Urban	-1.563	-5.376	-0.345	-5.031	-2.010
86	Other motorcycles vehicles	Urban	-1.724	8.619	5.747	2.872	-2.535
87	Motorcycle	Urban	-1.165	6.504	9.854	-3.350	-1.681
88	Music instruments	Urban	-2.697	-4.038	0.459	-4.497	-3.802
89	Sports equipment	Urban	-1.580	-4.097	1.017	-5.114	-2.173
90	Game tools and toys	Urban	-2.136	-3.099	0.218	-3.317	-2.989
91	Medical devices	Urban	-1.654	-4.971	1.065	-6.035	-2.283
92	Natural and artificial gas products, provision of water vapor/hot water, cold air and ice products	Urban	0.164	7.204	-1.179	8.383	0.512