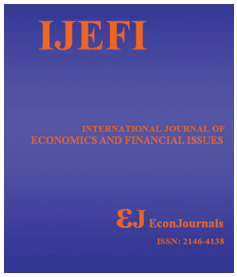

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Assessing Market Power, Impact of Import Tariff Reductions and Weakening Demand for Rubber Products (HS Code 4011) in the Australian Market

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ABSTRACT

The purpose of this research is (1) to compare the market power of the rubber product industry (HS code 4011) between Australia and similar industries from the exporting country; (2) to analyze the impact of import tariff reduction on rubber product trade especially price, demand, export, import, export value and import value of rubber product for exporting country and importing country; and (3) to analyze the impact of weakening the demand of importing countries on the trade of rubber products (tire) especially price, demand, export, import, export value and import value for exporting country and importing country. The ability of exporters of Indonesian rubber products for mark-up prices is lower than similar industry capabilities from Thailand, China and Japan, but higher than similar industries in Australia. The decline in import tariffs has the effect of lowering import prices of rubber products in Australia, as well as export prices of rubber products from exporting countries to export markets in Australia. The decline in import tariffs for rubber products provides more benefits received by China, Thailand and Indonesia compared to benefits received by Japan and similar industries from Australia. The decline in tariffs on rubber products on the condition of weakening demand has an impact on the decline in import prices and consumer prices of these products. Export prices of rubber products from exporting countries tend to decrease if market demand weakens, and production of domestic rubber products in Australia also decreased.

Keywords: Market Power, Rubber Product, Import Tariff, Weakening Demand
JEL Classifications: F12, F17, L13

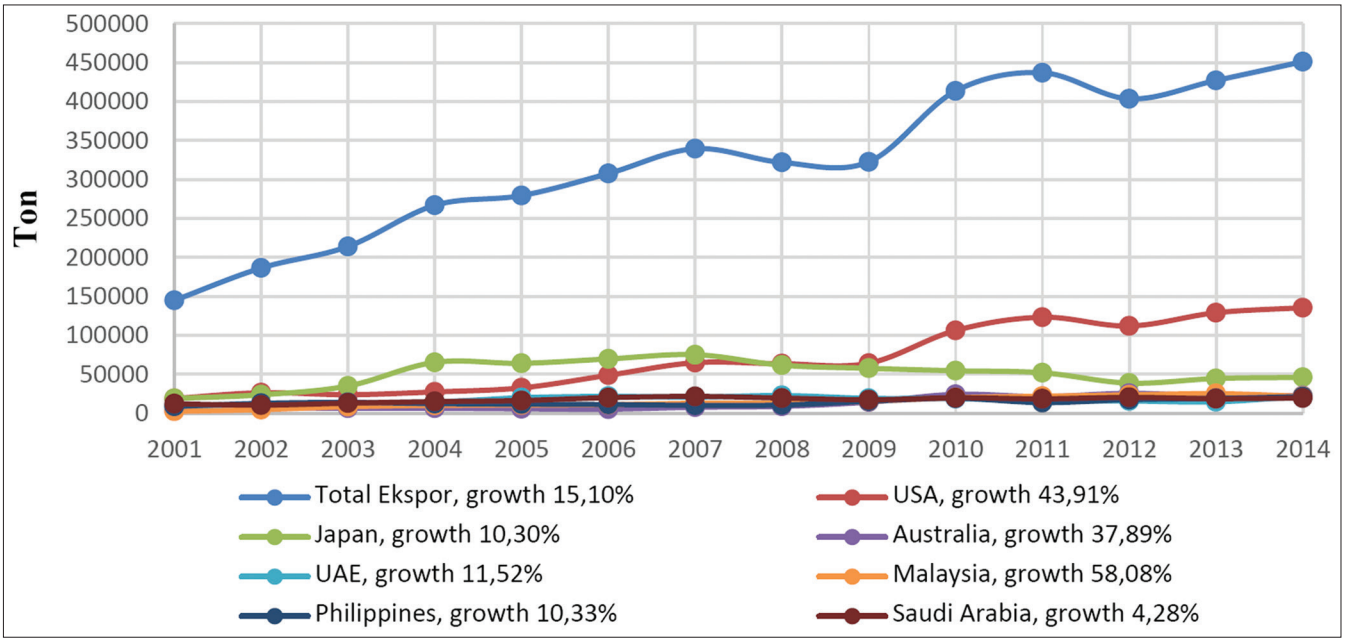
1. INTRODUCTION

The development of manufacturing industry especially rubber products is quite encouraging when viewed from several aspects of its development. The number of companies reached 46 in 2000–2001 increased to 72 in 2011–2013. The value added of the rubber products industry increased from Rp. 5,411 trillion in 2000 to 2001–Rp. 42.698 trillion in 2011–2013. The industry is able to absorb labor 144,610,000 people in 2000-2001 increased to 172,620,000 people in 2011–2013 (Indonesia's Ministry of Industry, 2016). Total production of rubber products for export destinations to various countries averaged 84.06% in 2000-2001 declining to 76.81% in 2011-2013. The decline in exported shares is likely to be related to the growing domestic market share, especially the types of tires, inner tubes, footwear and components, apparel and clothing accessories, gloves, and more. Besides, there is also the possibility of competition in the export market is getting tighter so that the export share decreases.

The domestic rubber products industry is being driven by the growth of tire product exports with the code of HS 4011 (new pneumatic tires of rubber) to various countries. Tire products such as sedans, truck and bus tires, heavy equipment tires, motorcycle tires and bicycles; saw an increase in exports from 2001 to 2014. Competitors came from Thailand, China, Japan, South Korea, India, USA, and European countries.

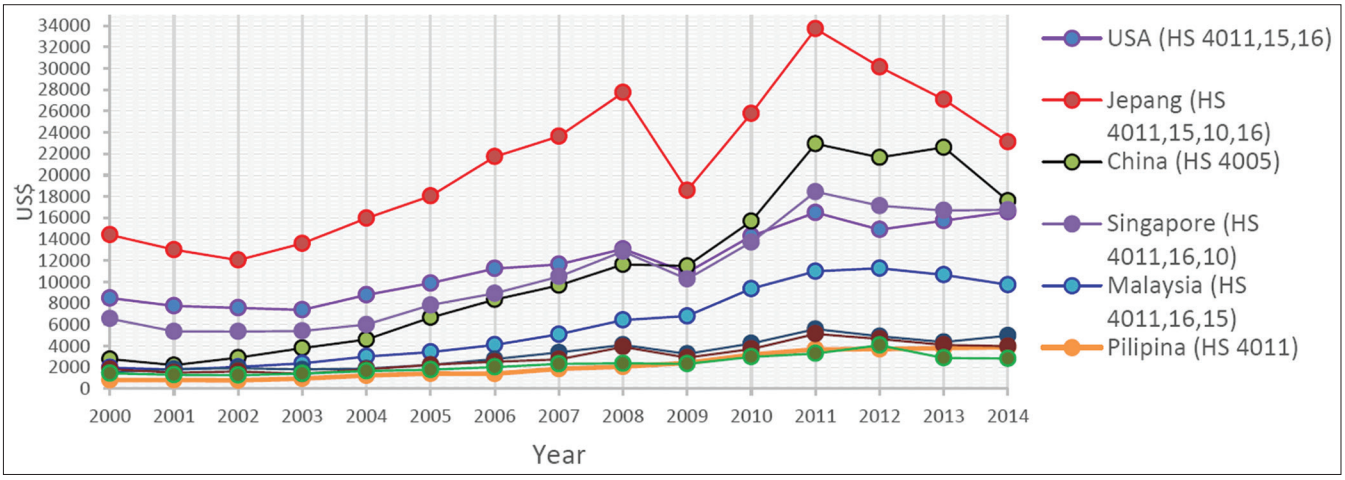
Indonesia and the country of rubber products producers take advantage of export opportunities in addition to domestic demand. This is closely related to economic growth that encourages the development of the automotive and transportation sector. Malaysia develops rubber manufacturing industry by segmentation of main rubber product is latex product (glove, condom, catheters, rubber thread), followed by tire and inner tubes, footwear and component, industrial rubber goods and general rubber goods. The Malaysian Rubber Board Report (2015) shows that the export value of Malaysian rubber industry is dominated by rubber products by 54%, rubber wood product by 24%, natural rubber by 14%, and the rest of other products. Indonesia and Thailand are not as successful as Malaysia to build rubber manufacturing industry so far the export value of rubber products is only 10-20% of total rubber and processed rubber exports (UN Comtrade, 2015). When viewed from the export destination, Indonesia's rubber products and other producing countries are directed to the export markets of the United States, Japan, Australia, the European Union, the Middle East, Russia, Canada and ASEAN as shown in Figure 1. Although the trend of exports of rubber products in Indonesia has increased, in the last 5 years (2011–2015) it has decreased (measured from export value) to most export markets as shown in Figure 2. In the same period, imports of rubber products by major importing countries in the world market shows an upward trend as shown in Figure 3. This means that there is a decline in the share of Indonesian rubber products in export markets of destination

Figure 1: Export of rubber products (tire) to partner countries



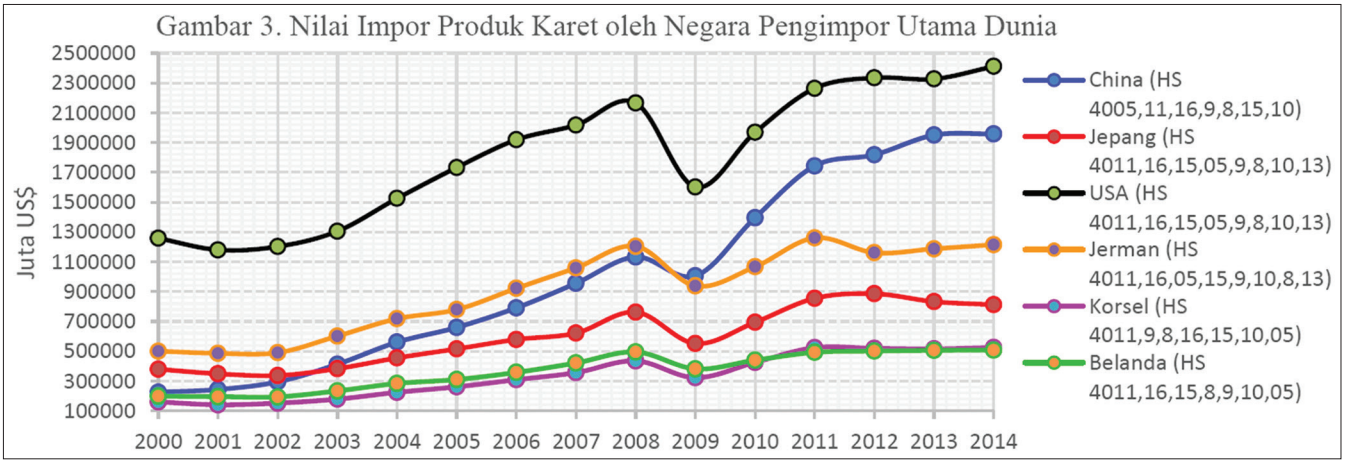
Source: UN com trade

Figure 2: Value of export of rubber products Indonesia to partner countries



Source: UN com trade

Figure 3: Value of imported rubber products by major importing countries of the world



Source: UN com trade

countries compared to other exporting countries in that period. The decline in export share of processed rubber products can be caused by the inability to compete with similar industries in export destination countries and from other exporting countries. It is possible that a number of Indonesian firms exit the export market and temporarily move in the domestic market and other exporting companies remain in export markets but by reducing the export intensity of processed rubber products.

Various rubber products are exported Indonesia such as HS code 4005, 4011, 4013, 4015, and 4016, only HS code 4011 is more prominent in terms of volume, value, export growth, and number of export destination countries. In a relatively long period (more than 20 years) Indonesia has exported relatively large volumes of new pneumatic tires of rubber to the United States, Japan, Germany, Australia, Malaysia and the Philippines. In addition, the development of export destinations in the last 10 years with smaller volumes has been made to potential markets such as Asia (India, China, Taiwan, South Korea, Saudi Arabia, United Arab Emirates and Iran), EU-Africa region (Netherlands, France, Britain, Belgium, Italy, Turkey, Russia, and Egypt), and Brazil (UN Comtrade, 2016). Indonesia's rubber processing industry benefited from the availability of domestic natural rubber raw materials at relatively lower prices compared to similar industries in the country of importing natural rubber and rubber products HS 4011 code. However, export markets of these products are subject to tariff escalation with different variations across countries to protect similar industries in the domestic market of importing countries. Facts show that over 30 years develop rubber industry especially product with code of HS 4011, natural rubber producer country only ranked 6th-12th biggest exporter country of rubber especially new pneumatic tyres of rubber, while rank 1-5 is occupied by China, Japan, United States, Germany, and South Korea. It is shown that rubber industry products Indonesia, Malaysia and Thailand compete with domestic industry and other supplier countries in export market. Since the number of producers is relatively small both in the domestic level of Indonesia and in the importing country, the producer's decision in the industry is identical with the oligopoly market behavior. In relation to the ability to enter export markets in various importing countries, it is necessary to question how market power of Indonesian rubber products industry and other exporting countries with similar industries in importing countries.

The problem of entering the export market of rubber products in various countries often occur friction tariffs. Generally, rubber products importers have tariff escalation practices on imports of rubber products compared to imports of natural rubber commodities. For example, the US rubber export market does not apply import duties for natural rubber commodities (SIR and RSS), but applies import duties for various rubber products ranging from 0% to 9.3% of product value based on rate of duty (general) in 1996 until 2015. Furthermore, Australia is an export market of rubber products large enough for Indonesia. After the free trade agreement between Australia-New Zealand and ASEAN (ASEAN-Australia-New Zealand) the import duty of natural rubber.and rubber processing products from 2012 dropped dramatically to 0% to 5%. In the period of 1996-2011, the tariffs are relatively high in the range of 5.0-15.0% for rubber processing products, while for rubber natural rubber, technical specifications and smoked sheets are not subject to import duty (World Trade Organization, 2016). Rubber product trade flows are likely to increase when tariff barriers are reduced to a minimum level that does not incriminate trade flows. The export market as if still isolated by import duties is still considered large enough so that the product becomes uncompetitive. Therefore, it is necessary to examine the impact of import tariff reduction on trade of Indonesian rubber products and other exporting countries and similar industries in Australia.

The purpose of this research is (1) to compare market power of rubber product industry (HS code 4011) between Australia and similar industry of exporting country origin; (2) to analyze the impact of import tariff reduction on trade of rubber products especially price, demand, export, import, export value and import value of rubber product for exporting country and importing country; and (3) to analyze the impact of the weakening of the demand of the importing country market to the trade of rubber products especially the price, demand, export, import, export value and import value for exporting country and importing country.

2. REVIEW LITERATURE

2.1. Analysis of Tariff Reduction on Trade of Rubber Products (Tire) to Australian Market

Models built to analyze the impact of import tariff reductions follow a model of trade strategy that has been widely used in previous research (Bresnahan, 1982; Brander, 1995; Chilimoniuk, 2003; Reimer and Stiegert, 2006; Luckstead et al., 2015). Manufacturers of Indonesian rubber products (tire) offer products to the domestic market and export markets in *j* (*j* = Australia). At the same time a number of domestic manufacturers manufacturing rubber products (tires) in country j also produce production for domestic market country *j*. Manufacturers of Indonesian rubber products (tire) and similar manufacturers in country *j* are faced with a downward sloping demand curve that allows to harness market power because the structure of competition is assumed to resemble oligopoly. Manufacturers of Indonesia's rubber products (tire) and other producer countries have cost advantages compared to similar producers in j country because the cost of material inputs and labor wages is relatively lower, but it costs shipping and export duty transportation to export markets in *j*. State j applies import tariff for every type of rubber product (tire) imported from other country. Illustrative can be illustrated trade relationship of rubber product (tire) between Indonesia with country *j* (importer) and country *k* (export competitor). The profit function of domestic manufacturers manufacturing rubber products (tire) in country *j* is:

$$\pi^j = P^j\left(Q^j\right)Q^j_{DOM} - C^j\left(Q^j_{DOM}; X^j_S\right) - F^j \quad (1)$$

P^j is the price of the rubber product (tire) in country j, P^j (.) is the demand for rubber products (tire) in *j*, C^j and F^j respectively variable costs and fixed costs in country *j*. Total rubber product (tire) supplied to country market *j* is the sum of domestic production (Q^j_{DOM}) plus import from Indonesia (Q^j_{idn}), import from country k (Q^j_k) and import from the rest of the world (Q^j_{OTH}). The profit function for Indonesian rubber product manufacturers which export rubber products (tire) to export markets *j* is (π^j_{idn}):

$$\pi^j_{idn} = \sum_{j=1}^{m-1}\left\{\begin{array}{l}\dfrac{P^j(Q^j)}{\left(1+\tau^j_{av}\right)}Q^j_{idn} + \\ \sum_{j=m}^{n}\left[P^j\left(Q^j\right)-\tau^j_{st}\right] \\ Q^j_{idn} - C^j_{idn}\left(Q^j_{idn}; X^{IDN}_S; Tr^j\right) - F^j_{idn}\end{array}\right\} \quad (2)$$

Where,

$$Q^j = Q^j_{DOM} + Q^j_{idn} + Q^j_k + Q^j_{OTH}$$

τ^j_{av} and τ^j_{st} are respectively ad valorem and specific tariff rates for rubber products (tires) to *j* market. (Q^j_{idn}) is the number of Indonesian rubber products (tire) for the market *j*.

Tr^j T is the cost of shipping transportation to country *j*. X^{IDN}_S is the sliding factor of supply of Indonesian rubber products (tire).

Furthermore, the profit function of rubber product manufacturing (tire) of *k* (k = Japan, China, Thailand) exporting rubber product to market *j* is (π^j_{idn}):

$$\pi^j_{idn} = \sum_{j=1}^{m-1}\left\{\begin{array}{l}\dfrac{P^j(Q^j)}{\left(1+\tau^j_{av}\right)}Q^j_{idn} + \\ \sum_{j=m}^{n}\left[P^j\left(Q^j\right)-\tau^j_{st}\right] \\ Q^j_{idn} - C^j_{idn}\left(Q^j_{idn}; X^{IDN}_S; Tr^j\right) - F^j_{idn}\end{array}\right\} \quad (3)$$

Where, $Q^j = Q^j_{DOM} + Q^j_{idn} + Q^j_k + Q^j_{OTH}$

Deferential profit functions (1), (2) and (3) to Q^j_{DOM} Q^j_{idn}, dan Q^j_k are obtained by first order condition which is implicitly a reaction or a trade response function of rubber products. The above reaction or response function has a unique solution when the function is downward sloping and satisfies the second order condition. To analyze the impact of the reduction of import tariff on the amount of rubber product (tire) in market *j*, it is done by deferential total response function or response above and arranged in the following three matrix equation (Ax = b) system:

$$\begin{pmatrix}\dfrac{\partial\pi^j}{\partial Q^j_{DOM}\partial Q^j_{DOM}} & \dfrac{\partial\pi^j}{\partial Q^j_{DOM}\partial Q^j_{idn}} & \dfrac{\partial\pi^j}{\partial Q^j_{DOM}\partial Q^j_k} \\ \dfrac{\partial\pi^{idn}}{\partial Q^j_{idn}\partial Q^j_{DOM}} & \dfrac{\partial\pi^{idn}}{\partial Q^j_{idn}\partial Q^j_{idn}} & \dfrac{\partial\pi^{idn}}{\partial Q^j_{idn}\partial Q^j_k} \\ \dfrac{\partial\pi^j_k}{\partial Q^j_k\partial Q^j_{DOM}} & \dfrac{\partial\pi^j_k}{\partial Q^j_k\partial Q^j_{idn}} & \dfrac{\partial\pi^j_k}{\partial Q^j_k\partial Q^j_k}\end{pmatrix}\begin{pmatrix}dQ^j_{DOM} \\ dQ^j_{idn} \\ dQ^j_k\end{pmatrix} = \begin{pmatrix}\dfrac{\partial\pi^j}{\partial Q^j_{DOM}\tau^j_{av}}d\tau^j_{av} + \dfrac{\partial\pi^j}{\partial Q^j_{DOM}\tau^j_{st}}d\tau^j_{st} \\ \dfrac{\partial\pi^j}{\partial Q^j_{idn}\tau^j_{av}}d\tau^j_{av} + \dfrac{\partial\pi^j}{\partial Q^j_{idn}\tau^j_{st}}d\tau^j_{st} \\ \dfrac{\partial\pi^j}{\partial Q^j_k\tau^j_{av}}d\tau^j_{av} + \dfrac{\partial\pi^j}{\partial Q^j_k\tau^j_{st}}d\tau^j_{st}\end{pmatrix} \quad (4)$$

The determinant of matrix A is positive as shown |A| > 0. The use of Cramer'rule on matrix (4) generates equations for changes in import tariffs in market *j* as follows:

$$\frac{dQ^j_{idn}}{d\tau^j_{av}} < 0, \frac{dQ^j_{idn}}{d\tau^j_{st}} < 0, \frac{dQ^j_k}{d\tau^j_{av}} < 0, \frac{dQ^j_k}{d\tau^j_{st}} < 0 \frac{dQ^j_{DOM}}{d\tau^j_{av}} > 0,$$

$$\frac{dQ^j_{DOM}}{d\tau^j_{st}} > 0, \frac{dQ^j_{idn}}{d\tau^h_{av}} > 0, \frac{dQ^j_{idn}}{d\tau^h_{st}} > 0,$$

$$\frac{dQ^j_k}{d\tau^h_{av}} > 0, \frac{dQ^j_k}{d\tau^h_{st}} > 0, \frac{dQ^j_{DOM}}{d\tau^h_{av}} > 0, \frac{dQ^j_{DOM}}{d\tau^h_{st}} > 0,$$

Where h ≠ j

A decrease in the trade tariff of rubber products will increase the quantity exported to the market *j* either from Indonesia or originating from the country k. Conversely, the decline in trade tariffs will reduce the quantity of supply of rubber products (tire) by domestic producers in country *j*. The effect of trade tariff reduction on the quantity of supply of rubber products (tire) in country *j* depends on which is more dominant direct effect or indirect effect due to tariff reduction as the following equation.

$$\frac{dQ^j}{d(\tau_{av}^{j-h}+\tau_{st}^{h})}=\left(\frac{dQ_{ina}^{j-h}}{d\tau_{av}^{j-h}}+\frac{dQ_{ina}^{h}}{d\tau_{st}^{h}}\right)$$

DirectEffect

$$+\left(\frac{dQ_{l}^{j-h}}{d\tau_{av}^{j-h}}+\frac{dQ_{l}^{h}}{d\tau_{st}^{h}}\right)+\left(\frac{dQ_{D}^{j-h}}{d\tau_{av}^{j-h}}+\frac{dQ_{D}^{h}}{d\tau_{st}^{h}}\right) \quad (5)$$

IndirectEffect

2.2. Analysis of Weakening Demand on the Trade of Rubber Products (Tire) to Australia Market

Models built to analyze the impact of declining shifting demand for importing countries follow a previous model of trade strategy. Manufacturers manufacturing Indonesian rubber products sell their products to the domestic market and to export markets *j* (*j* = Australia). At the same time a number of domestic manufacturers manufacturing rubber products in country *j* also produce production mainly for sale in domestic market of each country *j* and they also export the same processed rubber products to other countries. Manufacturers Indonesian rubber products and country *j* are faced with a downward sloping demand curve that allows them to harness market power because the structure of competition is assumed to resemble oligopoly. Manufacturers manufacturing Indonesian rubber products have cost advantages compared to similar companies in *j j j* state countries utilizing the purchasing power of domestic consumers in country *j*. The trade relations of rubber products between Indonesia and country *j* (importer) and country *k* (export competitor). The profit function of domestic manufacturers manufacturing rubber country *j* products are:

$$\pi^j = P^j\left(Q^j, Z^D\right)Q_{DOM}^j - C^j\left(Q_{DOM}^j; X_S^j\right) - F^j \quad (6)$$

P^j is the price of the processed rubber product in country *j*, $P^j(.)$ is the inverse demand of the rubber product (tire) in country *j*. Z^D, $C^j(.)$ and F^j are the demand sliders, variable costs and fixed costs in country *j*. The profit function of Indonesian rubber product manufacturing exporting rubber products (tire) to market j is (π_{idn}^j) :

$$\pi_{idn}^{j}=\sum_{j=1}^{m-1}\left\{\begin{array}{l}\dfrac{P^{j}(Q^{j},Z^{D})}{\left(1+\tau_{av}^{j}\right)}Q_{idn}^{j}+\\ \sum_{j=m}^{n}\left[P^{j}\left(Q^{j},Z^{D}\right)-\tau_{st}^{j}\right]\\ Q_{idn}^{j}-C_{idn}^{j}\left(Q_{idn}^{j};X_{S}^{IDN};Tr^{j}\right)-F_{idn}^{j}\end{array}\right\} \quad (7)$$

τ_{av}^j and τ_{st}^j are respectively ad velorem and specific import tariffs of processed rubber products to market *j* (Australia). (Q_{DOM}^j) is the number of Indonesian rubber products sold in the domestic market. Tr^j is the shipping cost of transportation to country *j*. X_S^{IDN} is the sliding factor of supply of Indonesian rubber products (tire). Furthermore, the profit function for manufacturing rubber products (tire) of countries k exporting these products to market j is (π_k^j):

$$\pi_k^j=\sum_{k=1}^{m-1}\left\{\frac{P^j(Q^j,Z^D)}{\left(1+\tau_{av}^j\right)}Q_k^j+\sum_{k=m}^{n}\begin{array}{l}\left[P^j\left(Q^j,Z^D\right)-\tau_{st}^j\right]\\ Q_k^j-C_k^j\left(Q_k^j;X_S^k;Tr^j\right)-F_k^j\end{array}\right\} \quad (8)$$

Where, $Q^j = Q_{DOM}^j + Q_{idn}^j + Q_k^j + Q_{OTH}^j$

The profit functions (6), (7) and (8) are differentiated against a number of factors that weakening demand Z^D so as to obtain a first order condition. The first derivative has a unique solution when the function is downward sloping and satisfies second order condition. To analyze the impact of weakening demand on rubber products (tire) on export markets of countries *j*, total deferentials are arranged in the following three matrix equation (Bx = z) systems:

$$\begin{pmatrix}\frac{\partial\pi^{dom}}{\partial Z^D\partial Q^{dom}} & \frac{\partial\pi^{dom}}{\partial Z^D\partial Q^{idn}} & \frac{\partial\pi^{dom}}{\partial Z^D\partial Q^{k}}\\ \frac{\partial\pi^{idn}}{\partial Z^D\partial Q^{dom}} & \frac{\partial\pi^{idn}}{\partial Z^D\partial Q^{idn}} & \frac{\partial\pi^{idn}}{\partial Z^D\partial Q^{k}}\\ \frac{\partial\pi^{k}}{\partial Z^D\partial Q^{dom}} & \frac{\partial\pi^{k}}{\partial Z^D\partial Q^{idn}} & \frac{\partial\pi^{k}}{\partial Z^D\partial Q^{k}}\end{pmatrix}\begin{pmatrix}dQ^{dom}\\ dQ^{idn}\\ dQ^{k}\end{pmatrix}=\begin{pmatrix}\frac{\partial\pi^{dom}}{\partial Z^D\partial Z^D}dZ^D\\ \frac{\partial\pi^{idn}}{\partial Z^D\partial Z^D}dZ^D\\ \frac{\partial\pi^{k}}{\partial Z^D\partial Z^D}dZ^D\end{pmatrix} \quad (9)$$

and

$$\frac{\partial\pi^{idn}}{\partial Z^D\partial Q^k}=\frac{\partial\pi^{k}}{\partial Z^D\partial Q^{idn}}=0$$

The determinant of matrix B is positive as shown |B| > 0. The use of Cramer'rule on matrix (9) generated an equation of the impact of weakening demand for rubber products (tires) in market *j* as follows:

$$\frac{dQ^{dom}}{dZ^D}><0,\frac{dQ^{idn}}{dZ^D}><0,\frac{dQ^{k}}{dZ^D}><0$$

The impact of the weakening of demand on the trade of rubber products (tire) cannot be determined can decrease or increase the export of rubber products (tire) to market *j* whether originating from Indonesia or coming from competitor country *k*. Nor can the impact be determined on the quantity of supply of rubber products (tire) by the domestic producers of the country *j*.

2.3. Market Power of Rubber Products (Tire) of Importing and Exporting Countries

The derivative of profit function (1-3) of the rubber product industry (tire) of the importing and exporting country to the quantity of

production and the quantity of exports is obtained perceived or effective marginal revenue equal to the marginal cost as follows:

$$p^j = \frac{\partial C^j(....)}{\partial q_j^{dom}} + \theta^j \varepsilon^j p^j \quad (10)$$

$$p^j = \left(\frac{1+\tau_{av}^j}{2+\tau_{av}^j}\right)\left(\tau_{st}^j + \frac{\partial C^{IDN}(....)}{\partial q_j^{IDN}}\right) + \theta^{j.IDN} \varepsilon^j p^j \quad (11)$$

$$p^j = \left(\frac{1+\tau_{av}^j}{2+\tau_{av}^j}\right)\left(\tau_{st}^j + \frac{\partial C^k(....)}{\partial q_j^k}\right) + \theta^{j.k} \varepsilon^j p^j \quad (12)$$

θ^j is the conjectural elasticity of domestic rubber products (tire) in country *j*.

$\theta^{j.IDN}$ is the conjectural elasticity of Indonesian rubber products in the country market *j*. $\theta^{j.k}$ is the conjectural elasticity of *k* country rubber products in the country market *j*. ε^j is the flexibility of demand for rubber products (tires) in the country market *j*. τ^j is the import tariff of rubber products in country *j*. p^j is price of rubber products in importing country *j*.

In order to obtain supply relations, the first is defined as the marginal cost function and demand function by considering the demand and supply coefficients and conjectural elasticities. The marginal cost functions of the domestic industries of importing countries of rubber products (tire) and the marginal cost functions of the rubber products exporting industries are:

$$\frac{\partial C^j}{\partial q_{dom}^j} = c_q(q_j^{dom}, X_S^j) \quad (13)$$

$$\frac{\partial C^{IDN}}{\partial q_j^{IDN}} = c_q(q_j^{IDN}, X_S^{IDN}, Tr^j) \quad (14)$$

$$\frac{\partial C^k}{\partial q_j^k} = c_q(q_j^k, X_S^k, Tr^j) \quad (15)$$

X_S^j is the factors of supply of rubber products (tire) of exporting countries. Tr^j is transportation or shipping costs to the port of destination.

The inverse demand function of rubber products by importing country *j* represents the demand for products from Indonesian exporting origin, country exporter *k*, domestic production of country *j* and other countries:

$$p^j = d^j(Q^j, X_D^j) \quad (16)$$

$$Q^j = q_j^{dom} + q_j^{IDN} + q_j^k + q_j^{OTH}$$

are the factors of demand for rubber products (tires) in importing countries *j*. q_j^{dom} is the quantity of production of rubber products by domestic industry country *j*. q_j^{IDN} is the quantity of imported rubber products by country *j* from Indonesia. $q^k{}_j$ is the quantity of import of rubber product by country *j* from country *k*.

q_j^{OTH} is the quantity of imported rubber product by country *j* from other country.

By using the first order conditions, the marginal cost and demand flexibility function can be derived the supply relations model for rubber products in the importing country (16) and the exporting country (17 and 18) as follows:

$$p^j = s^j(q_j^{dom}, X_S^j, Q^j) \quad (17)$$

$$p^j = s_{idn}^j(q_j^{IDN}, X_S^{IDN}, Tr^j, \tau^j, Q^j) \quad (18)$$

$$p^j = s_k^j(q_j^k, X_S^k, Tr^j, \tau^j, Q^j) \quad (19)$$

If the plexibility of demand for rubber products (tire) in country market *j* is ε^j, the conjectural elasticity of domestic rubber product of importing country j is θ^j, the conjuctural elasticity of Indonesian rubber products in export market of country *j* is $\theta^{j.IDN}$, and the conjuctural elasticity of the rubber product of the country *k* in country market *j* is $\theta^{j.k}$ can be formulated the capability of the importing country and the exporting country of the rubber product (tire) to set the price over the marginal cost as follows (Motta, 2004 and Luckstead et al., 2015): Manufacture of rubber products (tires) in importing country *j* is:

$$\frac{p^j - MC^j}{p^j} = \theta^j \varepsilon^j$$

Similar Indonesian industry in importing country *j* is:

$$\frac{p^j - \left(\frac{1+\tau_{av}^j}{2+\tau_{av}^j}\right)\left(\tau_{st}^j + MC^{IDN}\right)}{p^j} = \theta^{j.IDN} \varepsilon^j$$

The same industry of country *k* in the importing country *j* is:

$$\frac{p^j - \left(\frac{1+\tau_{av}^j}{2+\tau_{av}^j}\right)\left(\tau_{st}^j + MC^k\right)}{p^j} = \theta^{j.k} \varepsilon^j$$

3. METHODOLOGY

3.1. Types and Data Sources

This study uses annual time series data from 1995 to 2015 for data of rubber products especially HS 4011 code. Other data associated

with this study also use the same time range. The sources of data used in this study come from various government institutions, associations, and international institutions such as the Central Bureau of Statistics, the Ministry of Agriculture, Industry and Trade, the Association of Indonesian Rubber Agents, Comtrade Statistics, Malaysian Rubber Board, Thai Rubber Association, Japan Tyres Manufactures Association (JATMA) and others.

3.2. Model, Estimation, Validation and Simulation

Furthermore, the econometric model constructed to analyze the trade of rubber products (HS code 4011) Indonesia and other exporting countries on the Australian market uses simultaneous equations system because of the interrelated behavioral considerations between price, demand, exports, imports and production in trading of rubber products between exporting countries with the importing country. The developed econometric model is:

Prices of consumer for rubber products (tire) in Australia:

$$RPRPAUS5=a_0+a_1*LQDRPAUS+a_2*RGDPAUS+a_3*(QAUTAUS-L_3QAUTAUS)+a_4*RPOILAU+e_1$$

Supply relations of rubber products (tire) by domestic industry in Australia:

$$RPRPAUS4=b_0+b_1*QRPAUS+b_2*(RPMRUBAU/RPSBRAU)+b_3*RPCBAUS+b_4*RPNGASAU+b_5*(RPMRUBAU/RWAGEAU)+b_6*T+B_7*QDRPAUS+e_2$$

Production of rubber products by domestic industry in Australia:

$$QRPAUS=c_0+c_1*RPRPAUS4+c_2*(RPMRUBAU/RPSBRAU)+c_3*RPNGASAU+c_4*(RPMRUBAU/RPCBAUS)+c_5*LMRPAUS+e_3$$

Supply relations rubber products exporting country of Indonesia to Australia:

$$RPRPIAUS=d_0+d_1*(XRPIAUS-L_2XRPIAUS)+d_2*(RPMRUBID/RPSBRID)+d_3*RUPAHTRI+d_4*RPCBID+d5*RPNGASID+d6*RPOILIDN +d7*NTRRPUSD+d_8*(QDRPAUS/(TFRPAUS1+1))+e_4$$

Supply relations rubber products exporting country Thailand to Australia:

$$RPRPTAUS=e_0+e_1*L_2XRPTAUS+e_2*RPSBRTH+e_3*RPCBTH+e_4*HRUBGASTH+e_5*NTRBAHTUSD+e_6*(QDRPAUS/(TFRPAUS1+1))+e_5$$

Supply relations rubber products exporting country of China to Australia:

$$RPRPCAUS=f_0+f_1*LXRPCAUS+f_2*(RPMRUBCN/RPSBRCN)+f_3*RWAGECN+f_4*RPOILCN+f_5*NTRYNUSD+f_6*(QDRPAUS/(TFRPAUS1+1))+e_6$$

Supply relations rubber products exporting countries of Japan to Australia:

$$RPRPJAUS=g_0+g_1*L_2XRPJAUS+g_2*(RPMRUBJP/RPSBRJP)+g_3*RPNGASJP+g_4*RPCBJP+g5*RWAGEJP+g_6*NTRYENUSD+g_7*(QDRPAUS/(TFRPAUS1+1))+e_7$$

Export of Indonesian rubber products (tires) to Australia:

$$XRPIAUS=l_0+l_1*(RPXRPIAUS/(TFRPAUS1+1))+l_2*(RPMRUBID/RPSBRID)+l3*HRUBUPAHTRI + l4*QRPAUS+l5*T+e_8$$

Export of Thailand rubber products (tires) to Australia:

$$XRPTAUS=m_0+m_1*(RPXRPTAUS/(TFRPAUS1+1))+m_2*(RPMRUBTH/RPSBRTH)+m_3*(RPMRUBTH/RPCBTH)+m_4*L_2QRPAUS+m_5*RPOILTHA+m_6*T+e_9$$

Export of China's rubber products (tires) to Australia:

$$XRPCAUS=n_0+n_1*(RPXRPCAUS/(TFRPAUS1+\mathbf{1}))+n_2*(RPMRUBCN/RPSBRCN)+n_3*RPNGASCN+n_4*RWAGECN+n_5*L_2QRPAUS+n_6*RPOILCN+e_{10}$$

Export of Japan's rubber products (tires) to Australia:

$$XRPJAUS=o_0+o_1*RPRPJAUS*NTRYENUSD+o_2*SRPSBRJP+o_3*(RPMRUBJP/RPCBJP)+o_4*RPOILJP+o_5*RWAGEJP+o_6*QRPAUS+e_{11}$$

The demand equation for rubber products (tires) in Australia:

$$QDRPAUS=QRPAUS+MRPAUS–XRPAUS$$

Equation of Australian import is the same as the export of world rubber products to Australia:

$$MRPAUS=XRPWAU$$

Export of rubber products (tires) of the world to Australia:

$$XRPWAU=XRPIAUS+XRPTAUS+XRPCAUS+XRPJAUS+XRPOTHAU$$

The export price of Indonesian rubber products (tire) to Australia:

$$RPXRPIAUS=RPRPIAUS*(TFRPAUS1+\mathbf{1})$$

The export price of Thailand rubber products (tire) to Australia:

$$RPXRPTAUS=RPRPTAUS*(TFRPAUS1+\mathbf{1})$$

The export price of Chinese rubber products (tire) to Australia:

$$RPXRPCAUS=RPRPCAUS*(TFRPAUS1+\mathbf{1})$$

The export price of Japanese rubber products (tire) to Australia:

RPXRPJAUS=RPRPJAUS*(TFRPAUS1+**1**)

The value of imports of rubber products (tires) by Australia:

NMRPAUS=1000*(MRPAUS*RPRPAUS4)

The export value of Indonesian rubber products (tire) to Australia:

NXRPIDN=1000*(XRPIAUS*RPXRPIAUS)

The export value of Thailand rubber products (tire) to Australia:

NXRPTHA=1000*(XRPTAUS*RPXRPTAUS)

The export value of Chinese rubber products (tire) to Australia:

NXRPCN=1000*(XRPCAUS*RPXRPCAUS)

The export value of Japanese rubber products (tire) to Australia:

NXRPJP=1000*(XRPJAUS*RPXRPJAUS)

The demand and supply relationship function is built using simultaneous equations system and estimated using two stages least squares (2SLS) in order to estimate consistency and efficiency with consideration of endogeneity problem in equation (Sitepu and Sinaga, 2018; Verbeek, 2012). To find out if a model is valid enough for a simulation then it is necessary to validate the model with the purpose of how far the ability and reliability of the model can represent real-world behavior. The statistical criteria used in validating the model are Root Mean Square Percent Error (RMSPE) and Theil's Inequality Coefficients (U). A simulation was then conducted to study the effect of exogenous variables on endogenous variables in the model. The purpose of the simulation in this study is to explain the impact of the slowdown in market demand and trade deregulation through the decline of import tariffs in Australia using historical simulation (ex-post simulation) as shown in Table 1.

4. RESULTS AND DISCUSSION

4.1. The Market Power of the Tire Industry in Australia and Exporting Country

The Lerner Index can be used to measure price mark-ups beyond the marginal cost of the exporting and domestic industries in Australia. The measurement of how much the price mark-up is calculated by multiplying the price plexibility by the conjectural elasticity. According to Luckstead et al. (2015) that the ability of an industry to utilize oligopolistic forces and determine prices exceeds the marginal cost (mark-up) depends on supply conditions (conjunction elasticity) and demand (price flexibility). Measurement of price flexibility, conjunctional elasticity and price mark-up exceeds marginal cost by domestic industry in Australia and rubber exporting country industries using simultaneous equations system.

The price pricing estimation, the conjectural elasticity and the price-up marks are presented in Table 2. The plexibility of tire prices in Australia Toyo Tire and Rubber Company and Bridgeston Corporation.

The conjectural elasticity of domestic rubber products in Australia shows magnitude 0.3570. This elasticity is more than the conjectural elasticity of imported tire products ranging from 0.50 to 0.75 or closer to 1. As Luckstead et al. (2015) states there are four possible forms of market competition. First, the situation of perfect collusion where the producer acts as a monopoly. Conjectural variation is equal to one and the market share is also equal to one so that the conjunction of elasticity equals one. As a result, the mark-up capability of prices is determined by only the plexibility of demand. Second, the situation in the competition cournot. Conjuctural variation equals one and a small market share of one. The arrival of the price mark-up capability depends on the placement of demand and market share. Third, the situation operates in a fully plexible market structure where the ability to mark-up prices is determined by the conjunction of elasticity weighs with demand flexibility. Fourth, the situation in the perfect competition where the market share is so small that it is not strong enough to affect the price so that the conjectural elasticity is equal to zero and the price mark-up is also equal to zero or the price equals the marginal cost. The form of competition on the market is not strong enough to affect the price so that the conjectural elasticity is equal to zero and the price mark-up is also equal to zero or the price equals the marginal cost. The form of competition in the export markets of rubber products in Australia is closer to the market setuasi pleksibel structure because the choice of origin

Table 1: Scenario model simulation of rubber product trade (tire) Indonesia

Simulation scenario	Change size (%)
	A1-A2
Decrease in tariff on imported products rubber	−35.0−700
	B1-B2-B3
Weakening demand on rubber products in Australia:	
1. GDP per capita	0.5−1.5−3.0
2. Automotive production	−2.0−4.0−6.0
3. Price of crude oil	−10.0−20.0−30.0

Table 2: Capability of mark-up of rubber products of importing and exporting countries 1985-2015 period

Importing country market (*j*)	Exporting country (*h*)	Demand flexibility dan conjectural elasticity		
		ε^j	θ^j	$\theta^{j,h}$
Australia		1.462	0.082	
	Indonesia			0.133
	Thailand			0.255
	China			0.269
	Japan			0.333
			Mark-up	
			$\theta^j \varepsilon^j$	$\theta^{j,h}\varepsilon^j$
Australia			0.1199	
	Indonesia			0.195
	Thailand			0.373
	China			0.394
	Japan			0.487

Demand flexibility of tire in Australia (ε^j) where *j*=Australia. Tire conjectural elasticity in Australia (θ^j) where *j*=Australia. Tire conjectural elasticities are exported to Australia ($\theta^{j,h}$) Where, *h*=Indonesia, Thailand, Cina, dan Jepang
Sources: Processed data

of products and brands are also available at any time and not so limited. As Table 2 shows that the ability of the exporting country (Indonesia, Thailand, China and Japan) determines the price to exceed the higher marginal cost (mark-up) than similar industries in Australia. The domestic tire industry in Australia only marks up 12%, while Indonesia 20% Thailand 37%, China 39%, and Japan 48%. The Australian rubber (tire) product industry is protected by an average import tariff of 12% in the period 1985 to 2015 (World Bank, 2016). However, import tariff charges tend to decrease trend. The average tariff on rubber products (tires) in Australia was about 15% in the period 1985 to 2004. The import tariffs dropped to an average of about 10% in the period 2005 to 2009, and about 5% in the last 6 years. Australia protects the domestic rubber industry by not imposing import tariffs on natural rubber raw materials (zero tariff). Australia prefers to strengthen the domestic industry's competitiveness of rubber products (tires) in response to compete with similar industries from other countries.

Indonesia's and Thailand's rubber industries benefit from the abundance of natural rubber raw materials, relatively lower labor costs, and possibly lower shipping costs to Australian ports. However, some other input materials (synthetic rubber, carbon black, etc.) must be imported. In contrast, the Japanese rubber industry is faced with relatively high labor costs but has the advantage of manufacturing operational efficiency as a source of innovation and technological improvement. China's rubber products industry benefits from relatively low labor costs but they are faced with higher natural rubber raw material costs due to the imposition of natural rubber tariff rates of around 20%.

4.2. The Impact of Import Tariff Reduction on Rubber Products Industry in Australia and Exporting Country

Australia developed a rubber product processing industry that is mostly aimed at fulfilling domestic demand and the remaining 22.10% in exports to various countries. The needs of natural rubber raw materials are mostly imported from ASEAN countries. Production of Australian domestic rubber products (tire) at least through major rubber industry companies such as Sumitomo Rubber Industries, Toyo Tire and Rubber Company, Bridgeston Corporation and Fukushima Rubber Corporation, and others. The production of Australian rubber products (tire) is an average of 42924 tons from 1985 to 2015 and has tended to decline since 2002 so that the average domestic production of these products amounts to 18430 tons per year in the period 2002 to 2015 (UN Comtrade, 2016). The decline in domestic production led to an increase in Australian imports from a number of countries. In the period 1985 to 2015 the import of these products was an average of 171201 tons per year, doubled in the last 6 years (2010 to 2015) is an average of 342522 tonnes (UN Comtrade, 2016).The exporting countries of rubber products (tire) to Australia such as China, Japan, Indonesia, Thailand, South Korea, United States, India, and others. However, the consideration and relevance of continuous export in the last 30 years is the exporting countries of Indonesia, Thailand, China and Japan. The exporting country of rubber products entering the Australian export market is faced with the protection of import tariffs. Through globalization and trade cooperation both bilaterally and multilaterally always refers to the reduction of trade barriers, both tariff and non-tariff forms. Reduction of trade barriers is considered to increase the volume of trade, increased consumption, economic growth and welfare of the community. This is in accordance with Erwidodo (2013) on international trade, globalization, and protection. Feenstra (2003) concerning the effect of tariff reduction on international trade.

Through the spirit of globalization and trade cooperation agreement simulated the impact of the reduction of tariff on the import of rubber products (tire) on export markets in Australia as listed in Table 3. If tariffs on Australian imports of rubber products (tire) fell 50% and 75%, import of tire products by −2.61% and −7.22%. The decline in the price of rubber products (tire) reduced the production of rubber products (tire) in the Australian domestic industry by 23.56% and 65.29%. Conversely, the impact of increased imports of rubber products (tire) by Australia by 12.15% and 33.47%. The decline in import prices of rubber products (tire) also impacted the decline in prices of rubber products (tire) consumer level is large enough that demand increased by 9.91% and 27.26%.

The result of simulation of tariff reduction of tire product by 50% and 75% has an impact on the decline of export prices of rubber products (tire) from most exporting countries. This simulation also gives an impact of the total increase of world rubber (tire) exports to Australia. Exports of rubber products (tire) from various countries to Australia also experienced a relatively large increase if the decline in import tariffs by Australia except Japan's exports decreased. This suggests an indication that the demand behavior of rubber products (tire) in Australia is renewal of price changes. The decline in import tariffs lowered the price of imported rubber products (tire) including Australian domestic tire products. The possibility of substitution between rubber products (tire) from Indonesia, Thailand, China with similar products from Australia and Japan. As a result, the export supply of Japanese rubber products to Australia has decreased and the production of similar products in Australia has also decreased if import tariffs are lowered. Meaning that can be lifted from these facts is the reduction of import tariffs rubber products (tire) in Australia provide more benefits to the increase in export of these products from China, Thailand and Indonesia compared to the benefits received by the Japanese and Australian domestic similar industry.

This simulation result gives an impact to the increase of import value of rubber products (tire) by Australia. The export value of rubber products (tire) from exporting countries of Thailand and China tends to increase if the decrease of import tariff in Australia, on the contrary export value of rubber products (tire) from exporting country of Indonesia and Japan decrease. The decline in export value of Japanese rubber products is still related to the decline of Japanese product exports to Australia due to to lower import tariffs. The high surge from the increase in export value of tire products in Australia experienced by the exporting countries of China and Thailand, while Indonesia decreased.

4.3. The Impact of Weakening Demand for Rubber Products (Tire) in Australia

The decline in demand for rubber products in Australia is affected by slowing growth in GDP per capita, declining automotive production and weakening global crude prices. In the last 3 years

Table 3: The impact of reduced tariffs on imports of rubber products (tire) in Australia

Exporter/variable	Decrease of import tariff of rubber products		
	Basic value	50%	75%
		Changes (%)	
Imported tire prices in Australia (US$/kg)	4.521	−2.61	−7.22
Consumer tire prices in Australia (US$/kg)	4.334	−20.49	−56.77
Tire production in Australia (ton)	21089	−23.56	−65.29
Real prices of Indonesian tire exports to Australia (US$/kg)	5.138	−28.17	−38.92
Real prices of Thai tire exports to Australia (US $/kg)	4.670	−11.92	−10.51
Real prices of Chinese tire exports to Australia (US $/kg)	1.958	40.98	81.59
Real prices of Japanese tire exports to Australia (US $/kg)	5.610	−2.96	4.88
Indonesian tire export price is divided by import tariff+1	0.724	26.83	73.50
Thailand tire export price is divided into import tariffs+1	0.687	54.80	150.71
Chinese tire export price is divided by import tariffs+1	0.284	151.66	417.09
Japan tire export price is divided by import tariff+1	0.837	69.02	189.57
Tire demand in Australia (ton)	335031	9.91	27.26
Australian tire imports (tonnes)	313943	12.15	33.47
Indonesian tire exports to Australia (tonnes)	18010	17.22	47.22
Thailand tire exports to Australia (tonnes)	33371	26.88	73.88
China's tire exports to Australia (tonnes)	113374	35.54	97.67
Japan's tire exports to Australia (tonnes)	41750	-34.03	-92.95
World tire exports to Australia (tonnes)	313943	12.15	33.47
	Basic value	**50 persen**	**75 persen**
		Changes (value)	
Value of Australian tire imports (million US $)	1428.90	131.40	338.30
Value of Indonesia's tire exports to Australia (million US $)	91.00	−14.09	−8.03
Value of Thai's tire exports to Australia (million US $)	156.04	20.81	94.18
Value of China's tire exports to Australia (million US $)	216.85	217.26	616.88
Value of Japan's tire exports to Australia (million US $)	230.74	−85.07	−221.73

Australia's Gross National Income per capita growth experienced a downward trend of −2.76% in 2013-2015. The decline in national income per capita is related to the global economic downturn with a negative GNI per capita growth of −0.77% in 2013 until 2015. A number of countries that become main trading partners of Australia also experienced a decrease in GNI per capita growth in the period 2013 to 2015 such as the EU −1.01%, Japan −6.53% and China's slowdown from 12.58% in 2010 to 2012–5.53% in 2013 to 2015 and the United States also slows from 2.43% in 2010 to 2012–1.46% in 2013-2015 (World Bank, 2016). The interdependence through trade between Australia and its major partner spawned a difficult setback to reverse its economic trend in the next few years, except more than expected from domestic consumption with lower GDP growth risks and relatively high unemployment.

The weakening demand for rubber products (tire) in Australia in the sense that there will be market pessimism due to the possibility of a decline in purchasing power in the Australian market. The slower GNI growth per capita and the decline in world crude oil prices will push the personal income after tax (disposable income) with the growth slows down. This situation will affect the personal expenditures such as in the purchase of durable goods such as vehicles and equipment (motor vehicle and parts). The impact on the trade of rubber products (tire) was analyzed in the presence of moderate market A1 conditions (average RGDP per capita rose 0.5%, Australian automotive production fell −2% and crude oil prices on the world market decreased −10%); pessimists A2 with RGDP per capita down −1.5%, Australian automotive production down −4% and world crude oil prices down −20%) and very pessimistic A3 (average RGDP per capita decreased −3.0%, automotive production Australia fell −6% and crude oil prices in the world market fell −30%) as listed in Table 4.

The increasing market pessimism has a sensitive impact on the decline in prices of rubber products (tire) in the Australian market. This simulation has had an impact on the decline in prices of consumer rubber products (tire) in Australia by −5.87%, −6.44% and −8.08% if market demand further weakens. The weakening of demand also has an impact on the decline in export prices of Indonesian, Thailand, Chinese and Japanese rubber products. This simulation resulted in an increase in the production of the domestic industrial rubber products (tire) of Australia by 2.01%, 4.03% and 6.05% followed by falling demand for rubber products (tire) in the Australian market. An increasingly weakening demand condition is likely to lead to stronger substitution of rubber products (tire) from imported origin to domestic tire products. As a result of weakening demand in the Australian market, the impact of decline in imports of rubber products (tire) by Australia amounted to −0.99%, −1.99% and −2.98%. The decline in export prices and demand for rubber products (tire) in the Australian market has impacted the decline of exports of these products from various countries such as Indonesia, Thailand and China, while the export of tire products from Japan tend to be stable.

This simulation has an impact on the decline in the value of imports of rubber products (tire) by Australia, as well as the export value of rubber products (tire) from exporting countries also experienced a relatively large decline. In contrast, the export value of rubber products (tire) from Japan tend to be stable in case of weakening demand in Australia. The excessive decline in export value of Chinese and Thailand rubber products may be related to the high

Table 4: The impact of weakening demand for rubber products (tire) in Australia

Exporter/variable	Weakening demand for rubber products (tire)			
	Basic value	A1	A2	A3
		Changes (%)		
Imported tire prices in Australia (US$/kg)	4.521	0.22	0.43	0.65
Consumer tire prices in Australia (US$/kg)	4.334	5.87	6.44	8.08
Tire production in Australia (ton)	21089	2.01	4.03	6.05
Real prices of Indonesian tire exports to Australia (US$/kg)	5.138	−3.11	−6.22	−9.34
Real prices of Thai tire exports to Australia (US $/kg)	4.670	−0.97	−1.94	−2.91
Real prices of Chinese tire exports to Australia (US$/kg)	1.958	−7.17	−14.33	−21.50
Real prices of Japanese tire exports to Australia (US$/kg)	5.610	−0.61	−1.21	−1.82
Indonesian tire export price is divided by import tariff+1	0.724	−2.86	−5.72	−8.60
Thailand tire export price is divided into import tariffs+1	0.687	−1.05	−2.08	−3.11
Chinese tire export price is divided by import tariffs+1	0.284	−6.87	−13.74	−20.65
Japan tire export price is divided by import tariff+1	0.837	−0.59	−1.18	−1.77
Tire demand in Australia (ton)	335031	−0.80	−1.61	−2.41
Australian tire imports (tonnes)	313943	−0.99	−1.99	−2.98
Indonesian tire exports to Australia (tonnes)	18010	−1.81	−3.62	−5.42
Thailand tire exports to Australia (tonnes)	33371	−4.02	−8.04	−12.07
China's tire exports to Australia (tonnes)	113374	−1.38	−2.77	−4.15
Japan's tire exports to Australia (tonnes)	41750	0.29	0.57	0.86
World tire exports to Australia (tonnes)	313943	−0.99	−1.99	−2.98
	Basic value	A1	A2	A3
		Changes (value)		
Value of Australian tire imports (million US$)	1428.90	−11.40	−22.80	−34.30
Value of Indonesia's tire exports to Australia (million US$)	91.00	−4.40	−8.68	−12.83
Value of Thai's tire exports to Australia (million US$)	156.04	−7.79	−15.45	−22.98
Value of China's tire exports to Australia (million US$)	216.85	−17.92	−35.38	−52.38
Value of Japan's tire exports to Australia (million US$)	230.74	−0.73	−1.48	−2.23

A1: Australian GDP rose 0.5%; Australian automotive production fell 2%; price of crude oil on the world market fell 10% A2: Australian GDP down 1.5%; Australian automotive production 4%; price of crude oil on the world market fell 20% A3: Australian GDP down 3%; Australian automotive production 6%; and price of crude oil on the world market fell 30%. Sources: Processed data

substitution of imported tire products with domestic tire products due to lower import tariffs.

4.4. Impact of Import Tariff Reduction on Rubber Products (Tire) on Conditions of Weakening Demand in Australia

The impact of trade deregulation policy through reduced import tariffs on rubber products is analyzed for weakening market demand in Australia that is moderate (A1), pessimistic (A2) to very pessimistic (A3) are listed in tables 5 and 6. This combination simulation has an impact on decline in import prices and consumer price levels of rubber products (tires) in Australia. Although import tariffs are lowered but export prices of rubber products (tire) from exporting countries in Australian markets tend to decrease if market demand weakens. The simulation also affects the decline in production of rubber products in Australian domestic industries if import tariffs are lowered in conditions of weakening market demand. The impact of the tariff reduction on rubber products (tires) by importing countries despite demand conditions is weakening in accordance with the theoretical framework about the effects of tariff reductions on international trade flows (Tweeten, 1992; Chacholiades, 1978; Houck, 1986). Sorenson (1975) in his analysis argument states that the benefits of trade liberalization through the decline of trade barriers is the possibility of diversification of export products from primary commodities to agricultural processed products of the majority of developing countries. Under conditions of weakening market demand a relatively large impact on production declines in the Australian tire industry if import tariffs are lowered. This is consistent with Li and Carter (2009) which states that the decline in TRQs quotas can improve market access in international trade. Hacault (2011) states that the decrease of tariff-rate import quotas in the Canadian dairy industry has resulted in an increase in import volume so that domestic prices fall and subsequent impacts are detrimental to producers and benefit domestic consumers. ÜNÜVAR and Dellal (2017) stated that the reduction in tariffs on sugar affects the decline of production and producer welfare in Turkey, but increase in sugar consumption and consumer welfare. Mohan et al. (2013) suggest that escalation rates do not become a major barrier to the flow of agricultural processed products exports but the prevalence of non-tariff barriers (including domestic non-tariff barriers) also plays such important roles norms for size, quality, labeling, marketing, traceability (EU), conformity certification, rules of origin, customs, private standards and other. Joramo (2016) found an insignificant effect of tariff reductions on imports of agricultural products in Norway. This fact is in contrast to other empirical results and possibly due to elasticity of elasticity and so small share of the consumer budget for agricultural product expenditure in Norway.

It is possible to substitute imported tire products with Australian domestic tires because of falling prices due to lower import tariffs. Australian domestic tire products are less competitive with similar products of import origin. Demand for rubber products (tire) in Australia has increased, followed by the increase in global exports of rubber products (tire) to Australia. In the condition of weakening

Table 5: The impact of reduced tariff on imports of rubber products (tire) in the condition of weakening demand is moderate to pessimistic (A1-A2) in Australia

Exporter/variable	Decrease in tariffs on imports of rubber products				
	Basic value	A1		A2	
		50%	75%	50%	75%
		Changes (%)			
Imported tire prices in Australia (US$/kg)	4.521	−2.38	−6.94	−0.42	−5.02
Consumer tire prices in Australia (US$/kg)	4.334	−14.46	−50.43	−23.46	−55.10
Tire production in Australia (ton)	21089	−21.34	−62.73	56.71	−22.80
Prices of Indonesian tire exports to Australia (US$/kg)	5.138	−30.04	−40.20	−0.76	−14.70
Prices of Thai tire exports to Australia (US $/kg)	4.670	−12.73	−11.29	−10.21	−8.70
Prices of Chinese tire exports to Australia (US$/kg)	1.958	36.21	77.86	−18.85	7.51
Prices of Japanese tire exports to Australia (US$/kg)	5.610	−3.62	4.11	−0.36	7.59
Tire demand in Australia (ton)	335031	9.02	26.24	9.76	27.09
Australian tire imports (tonnes)	313943	11.06	32.21	3.56	23.32
Indonesian tire exports to Australia (tonnes)	18010	15.28	45.05	3.85	30.91
Thailand tire exports to Australia (tonnes)	33371	22.65	69.28	18.19	64.35
China's tire exports to Australia (tonnes)	113374	33.87	95.51	15.10	68.34
Japan's tire exports to Australia (tonnes)	41750	−33.48	−91.95	−34.32	−91.14
World tire exports to Australia (tonnes)	313943	11.06	32.21	3.56	23.32
	Basic value	A1		A2	
		50%	75%	50%	75%
		Changes (value)			
Value of Australian tire imports (million US$)	1428.90	119.80	326.50	108.10	314.70
Value of Indonesia's tire exports to Australia (million US$)	91.00	−17.31	−10.93	−20.45	−13.77
Value of Thai's tire exports to Australia (million US$)	156.04	13.37	85.53	6.04	77.01
Value of China's tire exports to Australia (million US$)	216.85	198.42	592.13	179.94	567.75
Value of Japan's tire exports to Australia (million US$)	230.74	−84.85	−219.42	−84.66	−217.15

Table 6: The impact of reduced tariff on imports of rubber products (tire) in the condition of weakening demand is very pessimistic (A3) in Australia

Exporter/variable	Decrease in tariffs on imports of rubber products		
	Basic value	A3	
		50%	75%
		Changes (%)	
Imported tire prices in Australia (US$/kg)	4.521	−1.90	−6.39
Consumer tire prices in Australia (US$/kg)	4.334	−11.89	−47.25
Tire production in Australia (ton)	21089	−16.92	−57.60
Prices of Indonesian tire exports to Australia (US$/kg)	5.138	−33.80	−42.77
Prices of Thai tire exports to Australia (US $/kg)	4.670	−14.35	−12.87
Prices of Chinese tire exports to Australia (US$/kg)	1.958	26.69	70.42
Prices of Japanese tire exports to Australia (US$/kg)	5.610	−4.95	2.58
Tire demand in Australia (ton)	335031	7.26	24.20
Australian tire imports (tonnes)	313943	8.88	29.69
Indonesian tire exports to Australia (tonnes)	18010	11.40	40.70
Thailand tire exports to Australia (tonnes)	33371	14.18	60.07
China's tire exports to Australia (tonnes)	113374	30.54	91.19
Japan's tire exports to Australia (tonnes)	41750	−32.39	−89.95
World tire exports to Australia (tonnes)	313943	8.88	29.69
	Basic value (million US$)	A3	
		50%	75%
		Changes (value)	
Value of Australian tire imports	1428.90	96.30	302.80
Value of Indonesia's tire exports to Australia	91.00	−23.50	−16.55
Value of Thai's tire exports to Australia	156.04	−1.19	68.60
Value of China's tire exports to Australia	216.85	161.82	543.74
Value of Japan's tire exports to Australia	230.74	−84.48	−214.91

demand, exports of rubber products (tire) from various countries to Australia increased if the decrease in import tariffs unless Japanese exports decreased. This suggests an indication that the demand behavior of rubber products (tire) in Australia is renewal of price changes. The decline in import tariffs tends to reduce the price of rubber products of various origin of rubber products including Australian domestic tire products. The possibility of substitution between tire products from Indonesia, Thailand, China with tire

products from Japan. As a result, the supply of tire exports from Japan to Australia has decreased if import tariffs are lowered in conditions of weakening market demand. Moreover, the average price of tire products from Japan in Australia is higher than similar products from other exporting countries.

This simulation resulted in an increase in the value of imports of rubber products (tires) by Australia with greater value if market demand is weakened. The export value of rubber products (tire) from the exporting country of Indonesia decreased, while Thailand and China increased export value of rubber products (tire) to the Australian market. The value of exports of rubber products (tire) from Japan has decreased. The decline in export value of Japanese tire products is still related to the decline of Japanese product exports to Australia due to lower import tariffs on conditions of weakening demand.

5. CONCLUSION

The decline in import tariffs has the effect of lowering the prices of imported rubber products (tire) in Australia, as well as the export prices of rubber products from exporting countries to export markets in Australia. The decline in tariffs on imported rubber products in Australia has a negative impact on Japanese exports compared to competitors (China, Indonesia, Thailand). The export of rubber products from Japan is more sensitive because of price changes compared to its competitors. The decline in import tariffs for rubber products in Australia has benefited more from the increase in exports of these products from China, Thailand and Indonesia compared to the benefits received by Japan and similar industries from Australia. The decline in tariffs also had an impact on the decline in the value of imports of Australian rubber products. In contrast, the export value of tire products from Thailand and China tends to increase relatively large. On the contrary, the export value of similar products from Indonesia and Japan decreased.

Demand weakening has had a sensitive impact on the decline in consumer tire prices in Australia. Similarly, the export prices of rubber products from Indonesia, Thailand and China. The export price of Japanese rubber products to the Australian market tends to be stable. The impact of weakening demand on the Australian market lowered exports of rubber products from exporting countries. The weakening demand also has an impact on the decline in the value of imported rubber products (tire) by Australia. Similarly, the export value of rubber products (tire) from Indonesia, Thailand and China also decreased. On the contrary, the export value of similar products from Japan tends to be stable.

The decline in tariffs on rubber products (tire) on the condition of weakening demand has an impact on the decline in import prices and prices of consumers of these products. Export prices of rubber products (tire) from exporting countries tend to decrease if market demand weakens, as well as production of domestic rubber products (tire) in Australia has decreased. Demand and imports of rubber (tire) products by Australia have increased with smaller increases if demand conditions weaken. Exports of rubber products (tire) from exporting countries to the Australian market increased unless Japanese exports declined. This shows an indication that the demand behavior of rubber products (tire) in Australia is responding to price changes. The decline in import tariff tends to reduce the price of rubber products (tire) of various origin of imports of these products including Australian domestic tire products. The possibility of substitution between tire products from Indonesia, Thailand, China and Australia with tire products from Japan. As a result, the export of rubber products (tire) from Japan to Australia has decreased if the import tariffs are lowered in the condition of increasingly weakening market demand.

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