

## **NON-TARIFF MEASURES (NTMS) AND INDONESIAN NATURAL RUBBER EXPORT TO THE MAIN EXPORT DESTINATION COUNTRIES**

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### **ABSTRACT**

*The value of natural rubber exports is declining continuously every year. One of the reasons for the decline in the value of natural rubber exports is due to the implementation of Non-Tariff Measures (NTMs) by the main export destination countries in international trade. The most widely applied NTMs policies in trading countries are Sanitary and Phytosanitary (SPS) and Technical Barrier to Trade (TBT). This study aims to analyze the impact of NTMs on Indonesia's natural rubber exports from 2012 to 2016. The estimation result shows the GDP coverage ratio of SPS and coverage ratio of TBT significantly affect the export value of the natural rubber of Indonesia. SPS variable shows a negative coefficient value while the TBT variable shows a positive coefficient value.*

**Keywords:** Natural Rubber, Gravity Model, Inventory Approach, NTMs

**JEL Classification:** F13, F14, Q17

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### **Introduction**

Exports are a driving force for accelerating economic growth. The role of exports has become increasingly important as the industrialization strategy changes from an import substitution industry to an export promotion industry. Rubber is one of the export commodities of the plantation sub-sector besides oil palm, coffee, and cocoa. In addition to playing a role in contributing foreign exchange and employment opportunities, rubber is also a provider of industrial raw materials and O2 producers. From its sizable contribution to GDP, the Indonesian government classifies rubber as the leading export commodity which is the back bone of the national economy. Rubber commodity ranks second in the production and export value of Indonesian plantation commodities after oil palm. Indonesia's total rubber production reached 3.77 million tons in 2018 or 26 percent of total world production ([Indonesia EximBank, 2019](#)), with a market share reaching 65.9 percent in 2017.

Indonesia's natural rubber exports in 2017 grew 51.45 percent from 2016, namely amounting to USD 5.1 billion ([Indonesia EximBank, 2019](#)). The volume and value of Indonesia's natural rubber exports place Indonesia as the second-largest producer and exporter of

natural rubber after Thailand with high exports to several major destination countries including the United States, Japan, China, India, South Korea, Brazil, Canada, and Germany. The development of the value of natural rubber exports to these main destination countries can be seen in Table 1.

**Table 1: Export Indonesian Natural Rubber to Main Destination Countries, 2012-2016 (US Dollar)**

Country	2012	2013	2014	2015	2016
Amerika Serikat	1835843	1563789	1074514	874988	743091
Jepang	1256315	1092585	732687	598140	551956
Cina	1416809	1307400	681517	404325	401027
India	345065	361145	354515	289933	306422
KoreaSelatan	456960	378788	285098	257775	232406
Brazil	228162	223329	184453	133780	126503
Kanada	247062	185489	133478	109380	96620
Jerman	192847	182852	135155	99544	91724

Source: UN Comtrade (2018)

Based on Table 1 it can be seen that the value of FOB for rubber exports to destination countries has declined in value. In 2012 the value was 7,626.7 million US \$ to 4,958.3 million US \$ (Statistics Indonesia, 2019). This is the impact of the recent decline in international rubber prices. Changes in volume and the continued decline in the value of Indonesia's natural rubber exports, apart from being influenced by prices, can also be affected by production disruptions in the form of weather uncertainty, excess supply at a relatively stable world level, and obstacles imposed on Indonesia's natural rubber export commodities. One of the obstacles that are currently being imposed by importing countries is the non-tariff barriers commonly known as Non-Tariff Measures (NTMs). From 2010 to 2017, the five main world rubber producers were Thailand, Indonesia, Vietnam, India, and China. The five countries produce almost 70 percent of the world's rubber. The share of Indonesia's rubber production to the total world rubber production is relatively stagnant, ranging from 22.3 percent to 24.1 percent. While Thailand ranged from 26.5 percent to 32.4 percent. Based on ANRPC (2018), world natural rubber production increased from 12.60 million tons in 2016 to 13.55 million tons in 2017.

From the demand side, the current demand for natural rubber in the world is increasing, especially from industrial countries, influenced by the flexibility and physical elasticity of natural rubber which makes it a raw material that can be used in a variety of industrial products. The top four natural rubber consumer countries are China, India, the US, and Japan, which contribute around 70 percent of the total world demand for natural rubber. Most of the natural rubber is needed as the main raw material for the car and car tire industry. Based on IRSG data (2018), China is the world's largest natural rubber consumer country that has experienced a significant increase in consumption from year to year, with a total consumption of 5.3 million tons in 2018 expected to continue to increase to 5.8 million tons in 2021. This due to the development of China's industry which also continues to grow, where natural rubber imports by 90 percent are reused as raw materials for the radial tire industry.

Apart from the purpose of implementing trade policy as protection or overcoming market failures, NTMs are expected to have a distorting effect to reduce the potential benefits of international trade. The application of NTMs by importing countries will limit trade because

of the many requirements related to the health and safety of imported products so that exporting countries will compete with each other to improve the quality and safety of products exported to importing countries.

Indonesia as the second-largest exporter of natural rubber in the world and is a significant contributor to foreign exchange has experienced problems in natural rubber production. This can be seen in the data of Indonesia's natural rubber production which has decreased in several years, namely in 2014 and 2015. According to The Rubber Association of Indonesian (GAPKINDO), this decline is caused by climate and haze that occur in several natural rubber producing regions in Indonesia. Besides, Indonesia is only able to produce approximately 3 million tons of natural rubber annually. While Thai plantations can produce around 76 tons of natural rubber per year and Malaysia can increase the added value of its natural rubber production commodities. Indonesia's natural rubber export production which tends to rise is not followed by export volumes whose value has fluctuated, export volumes only increased in 2013 and 2015 while for other years it declined. While the value of natural rubber exports has a value that has been declining from year to year. Table 2 shows the development of the value and volume of exports and natural rubber production in Indonesia 2012-2016.

**Table 2: Production, Export Volume, and Indonesian Value Export Natural Rubber, 2012-2016**

Description	2012	2013	2014	2015	2016
Production (million ton)	3 012	3 237	3 153	3 145	3 158*
Export (million ton)	2 444.4	2 702.0	2 623.5	2 630.3	2 578.1
Export Value (million USD)	7 861.4	6 907.0	4 741.6	3 699.1	3 369.6

Source: [The Rubber Association of Indonesian-GAPKINDO \(2018\)](#)

Non Tariff Measures can increase trade costs, divert managerial attention, and pressure small exporters, especially in developing countries where access to legal and regulatory information tends to be difficult. Therefore NTMs can become obstacles to international trade (UNCTAD 2012). Sanitary and Phytosanitary (SPS) and Technical Barriers to Trade (TBT) are forms of NTMs that are widely used by countries in the world in limiting their imports. The impact of NTMs on import restrictions can be both negative and positive. The negative impact of the enactment of NTMs can cause demand for products on the imported markets to be lower due to high production standards and an increase in trade costs from exporters as a result of NTMs. While the positive impact of setting quality standards that must be met by exporters can reduce information asymmetry between countries.

With the enactment of NTMs implemented by export destination countries will affect developing countries such as Indonesia in fulfilling their exports to these countries. NTMs that are applied in export destination countries require Indonesia to develop standards and quality in the export of its natural rubber to meet the specified requirements. Therefore, it is necessary to further investigate the NTMs that are applied by the destination countries of Indonesia's natural rubber exports and their effects on the development of Indonesia's natural rubber exports.

## Data and Research Methods

The data used in this study are secondary in the form of panel data covering the 2012-2016 time-series and cross-section of eight main export destination countries including the United States, Japan, China, South Korea, Brazil, Canada, India, and Germany. The data used include the volume and value of Indonesian natural rubber exports and imports, NTMs data in the form of SPS and TBT, GDP per capita of the importing country, population of the importing country, economic distance and the real exchange rate of Indonesia against the currencies of the main export destination countries. Data obtained from several data sources, including the World Trade Organization (WTO), the United Nations Commodity Trade (UNComtrade), Trade Map, International Trade Center (ITC), Market Access Map, World Bank, Central Statistics Agency (BPS), Ministry of Agriculture, Directorate General of Plantation, Association of Indonesian Rubber Companies (GAPKINDO), Center d'Etudes Prospectives et d'Informations Internationales (CEPII), World Integrated Trade Solution (WITS), and the Ministry of Trade.

Data were analyzed with descriptive qualitative analysis using an inventory approach and quantitative panel data analysis. The inventory approach is used to carry out an inventory of non-tariff policies, especially in the form of SPS and TBT carried out by the importing country by calculating the frequency index and coverage ratio in the period that has been adjusted to the availability of data. According to UNCTAD (2013) Frequency index is an approach that only calculates the presence or absence of an NTMs and the percentage of frequent products that use NTMs. The frequency index provides information in the form of index magnitude that can be used as a measure of the level of a country's constraints. While the coverage ratio is a percentage of the trade in a product that is subject to NTMs in the importing country and provides a measure of the importance of imported NTMs as a whole. The frequency index is calculated by the proportion of 6 digit HS (Harmonized System) commodities applied based on the total number of natural rubber commodities. Whereas the Coverage Ratio is calculated using consideration of the export value of natural rubber commodities. Referring to the methodology carried out by Bora et al, (2002) the two indicators can be formulated into the following equation:

$$F_{ijt} = \left[ \frac{\sum (D_{kt} M_{kT})}{\sum M_{kT}} \right] \times 100 \quad (1)$$

$$C_{ijt} = \left[ \frac{\sum (D_{kt} V_{kT})}{\sum V_{kT}} \right] \times 100 \quad (2)$$

When:

- $F_{ijt}$  = Frequency index export countries i to import countries j on year t (%)
- $C_{ijt}$  = Coverage ratio export countries i to import countries j on year t (%)
- $D_{kt}$  = Dummy variable yes or no NTMs at product k on year t (1 or >1 =yes NTM, 0 no NTMs)
- $M_{kt}$  = Volume of export product k with total year from import volume
- $V_{kt}$  = Volume of import commodity from countries i to countries j
- j = Import countries
- i = Export countries
- k = Import product
- t = Year on NTMs
- T = Total year from import volume from destination countries

The frequency index and coverage ratio values will be in the range of 0 to 100. If the

frequency index value is close to 0, it will indicate that there is less use of NTMs by a country. Conversely, if the frequency index value is close to 100, it indicates that more and more countries are using NTMs. The smaller coverage ratio value indicates the less coverage of products affected by NTMs policy, while the greater coverage ratio shows the wider coverage of products affected by NTMs policy.

Panel data analysis is used to illustrate the impact of NTMs, especially SPS and TBT in obtaining the best model, using several independent variables including GDP per capita of the importing country, the population of the importing country, the economic distance between the exporting country and the importing country, the real exchange rate of Indonesia against the eye money of the main export destination country, and the enactment of NTMs (SPS and TBT). As for the dependent variable that is using the value of Indonesia's natural rubber exports to the main export destination countries. The model used in this study refers to the research model of Fontagne *et al* (2005)

$$\ln NEX_{ijt} = \alpha + \beta_1 \ln GDP_{jt} + \beta_2 \ln POP_{jt} + \beta_3 \ln EDIST_{ij} + \beta_4 \ln RER_{ijt} + \beta_5 CR TBT_{ijt} + \beta_6 CR SPS_{ijt} + \varepsilon_{ijt} \quad (3)$$

where:

$NEX_{ijt}$	= Export value Indonesian natural rubber to countries $j$ on year $t$ (million US\$)
$GDP_{jt}$	= GDP per capita from import countries $j$ on year $t$ (million US\$)
$POP_{jt}$	= Population import countries $j$ on year $t$ (people)
$EDIST_{ij}$	= economic distance Indonesia with destination countries (km)
$RER_{ijt}$	= Indonesia Real Exchange rate to import countries currency $j$ on year $t$ (Rp/ LCU)
$CR TBT_{ijt}$	= Coverage ratio TBT import countries $j$ to Indonesian natural Rubber on year $t$ (%)
$CR SPS_{ijt}$	= Coverage ratio SPS import countries $j$ to Indonesian Natural Rubber on year $t$ (%)

## Finding and Discussion

The plantation sector is one sector that has a lot of implementing NTM policies so the Indonesian government needs to educate exporters so that exporters can meet the standards applied by the main export destination countries. The implementation of NTMs policies that are widely applied in Indonesia especially in the plantation sector is Sanitary and Phytosanitary (SPS) and Technical Barriers on Trade (TBT). The following are the number of SPS and TBT policies implemented by the main export destination countries to TSNR type natural rubber exporting countries including Indonesia from 2012 to 2016 which are presented in Table 1. Table 3 explains that the main destination countries for the export of natural rubber TSNR (Technically Specified Natural Rubber) impose SPS and TBT policies except for China, South Korea, and Germany. China applies NTMs to natural rubber products only to natural rubber with HS400121 code (smoked sheets of natural rubber) and HS400129 code (natural rubber in primary forms or plates). The destination countries for exporting natural rubber that mostly apply NTMs policies are Brazil with a total of 16 NTMs, followed by Japan implementing 13 NTMs, then the United States by implementing 12 NTMs policies for TSNR natural rubber. Brazil as the most country that implements NTMs by applying TBT policies of 14 and SPS policies of two. TBT policies that are widely applied are restricted use of certain substances, production or post-production requirements, n.e.s, and TBT measures. The second main export

destination country that has implemented the most NTM policies on natural rubber TSNR is Japan, with a total of 13 items consisting of four SPS policies and nine TBT policies. The SPS policy adopted by Japan is cold/head treatment and furnace. While the TBT policies most widely applied by Japan include the authorization requirements for TBT reason, certification requirements, inspection requirements, traceability information requirements, and TBT measures, n.e.s.m.

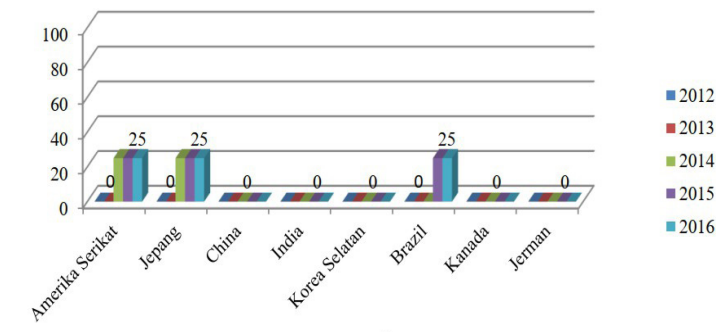
**Table 3: NTMs SPS and TBT Imposed of Indonesian Natural Rubber (TSNR) by Major Destination Export Countries 2012-2016**

Country	SPS	TBT	Total
Amerika Serikat	4	9	13
Jepang	6	6	12
China	0	0	0
India	0	4	4
Korea Selatan	0	0	0
Brazil	2	14	16
Kanada	0	3	3
Jerman	0	0	0
Total	10	36	48

Source: I-TIPS WTO and WITS 2018

The United States implements 12 NTMs consisting of six SPS and six TBT. The SPS policies most widely applied to TSNR natural rubber are tolerance limits for residues of or contamination by certain (non-microbiological) substances, microbiological criteria of the final product, and pressing history. Whereas the most widely applied TBT policies are authorization of procurement for TBT reasons, labeling requirements, TBT regulations for transport and storage, and product-quality or performance requirements. As for India and Canada, only NTT TBT policies are implemented. India implements NTM policies including registration requirements for TBT reason and Canada applies TBT policy, labeling requirements.

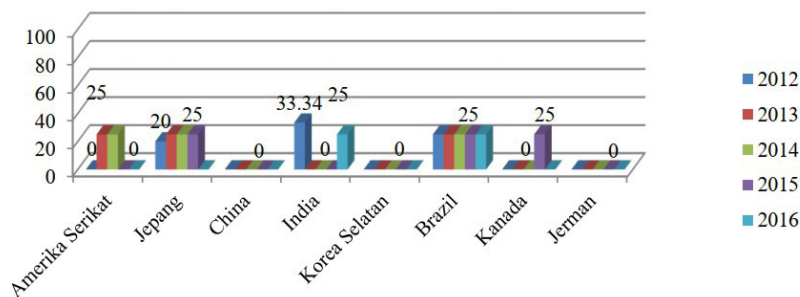
The measurement results of NTMs policy measures that can be implemented can be seen in Figure 1 which shows that the results of the calculation of SPS frequency index of natural rubber type TSNR to the main export destination countries in 2012-2016 ranged from 0.1% to 25%. Countries implementing SPS policies are the United States and Japan, each at 25% in 2014 (United States) and 2014 and 2015 for Japan. Whereas the other main export destination countries did not apply the SPS policy for TSNR type natural rubber.



**Figure 1: Frequency Index SPS (%) of Natural Rubber Export to Major Destination Countries, 2012-2016**

Source: I-TIP WTO 2018

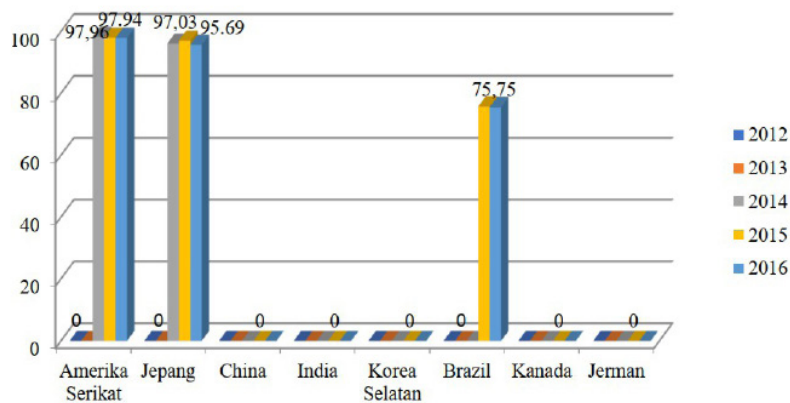
Figure2 shows the frequency index value of natural rubber TBT type TSNR to the main export destination countries from 2011 to 2016. The frequency index value ranges between 0.1% to 33.34%. The country that mostly implemented TBT policies was India with a value of 33.34% in 2012. While the United States, Japan, Brazil, and Canada implemented the most TBT policies by 25%. Brazil is a country that implements TBT policies every year, from 2012 to 2016 by 25%. As for the countries of China, South Korea, Germany, Belgium, and Turkey, they did not apply the TBT policy to the natural rubber commodity type TSNR.



**Figure: 2. Frequency Index TBT (%) at Natural Rubber Export (TSNR) to Major Destination Countries 2012-2016**

Source: I-TIP WTO 2018

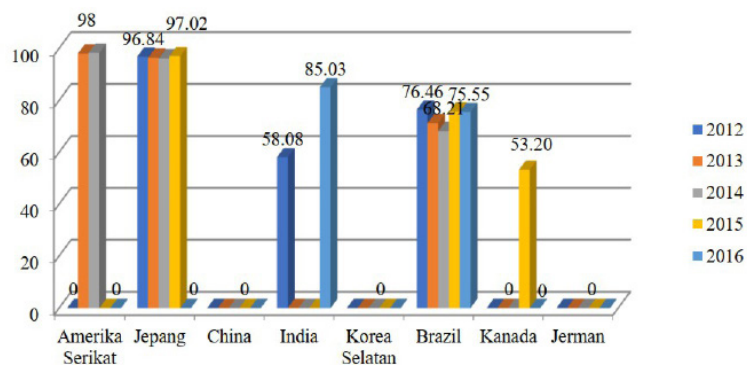
SPS coverage ratio calculation results range from 0.1% to 98%. The United States adopted the SPS policy only in 2014 and 2015 with a value of 96.11% and 97.03% respectively. While Japan also implemented the NTMs policy in 2015 with a coverage ratio of 97.03% and for the eight other main export destination countries it did not apply the SPS policy to the export commodity of natural rubber type TSNR.



**Figure 3: Coverage Ratio SPS (%) at Natural Rubber Export (TSNR) to Major Destination Countries 2012-2016**

Source: I-TIP WTO 2018

The imposition of the impact of TBT imposed on natural rubber commodity type TSNR Indonesia from 2012 to 2016 is presented in Figure 4. The use of NTMs policies, especially TBT based on the value of coverage ratio, is most widely applied in Japan where Japan uses TBT for four years, namely from 2012 up to 2015 with the highest TBT value in 2015, amounting to 97.03%, the use of TBT in Japan tends to be constant with a value of 96%. The United States is the second-largest country using TBT with the largest use of TBT in 2014, amounting to 98.34%. The United States wears a TBT policy in 2013 and 2014. India imposes a TBT policy in 2012 and 2016 with values of 58.09% and 85.04% respectively, where in 2016 the use of TBT policy tends to increase this means more and more imported products TSNR type natural rubber entering India which has regulations in the form of TBT policy. Brazil applies TBT policy every year from 2012 to 2016 with the lowest value in 2014 of 68.24% and the highest value of 76.47% in 2012. Canada only absorbs TBT policy in 2015 with a value of 53.02%. As for China, South Korea, and Germany, they did not apply the TBT policy during this period.



**Figure 4: Coverage Ratio TBT (%) at Natural Rubber Export TSNR to Major Destination Countries 2012-2016**

Source: I-TIP WTO 2018

**Impact of Ntms on Indonesia’s Natural Rubber Exports to The Main Export Destination Countries**

Model estimation to get the model is done through three model approaches, namely Polled Least Square (PLS), Fixed Effect Model (FEM), and Random Effect Model (REM). The



determination of the best model is done by passing the Chow test and the Hausman Test. The test results show the best model is the FEM model.

**Table 4: Chow Test and Hausman Test**

Test the Best Model	Probability Value	Hypothesis Results
Uji Chow	0.0000	Reject Ho, then FEM
Uji Hausman	0.0155	Reject Ho, then FEM

Based on the estimation results in Table 5 shows the R-squared value in the model of 0.9909 which shows that changes in the value of Indonesia's natural rubber exports can be explained by the GDP per capita variable of the importing country, the population of the importing country, economic distance between Indonesia and the importing country, the real exchange rate (RER), SPS coverage index, and TBT coverage index, while the rest is explained by other factors outside the model. Based on the results of the t-test showed that the NTMs policy in the form of SPS which was applied to natural rubber type TSNR had a negative effect of 0.0034. It means when there is a 1% increase in the policy of SPS constraints it will reduce the value of Indonesia's natural rubber export sby 0.0034%. These results are consistent with the initial hypothesis which states that non-tariff barriers will reduce the value of Indonesia's natural rubber exports. The SPS policy adopted by the importing country includes tolerance of residual and contaminant limits, microbial criteria of the final product, the production process, and the need for labeling.

While NTMs policy in the form of TBT has a significant effect on the level of 5% with a coefficient of 0.0011. That is when there is a 1% increase in the policy of TBT barriers will increase the value of Indonesia's natural rubber exports by 0.0011%. This shows that NTMs policies in the form of TBT imposed by the main export destination countries do not always harm international trade carried out by the two countries. The TBT policy adopted by the importing country includes processing, labeling, production packaging, production and post-production requirements, transportation and storage, production quality or performance requirements, and TBT measurement. This, of course, will encourage Indonesia to produceexport products that are following the standards adopted by the main export destination countries. If Indonesia's natural rubber export products are following the standards, it willbenefit Indonesia where Indonesian rubber products will be accepted in other countries'markets, especially in the markets of the main export destination countries.

**Table 5: NTMs Impact**

Vari- able	Coefficient	Probabil- ity
C	229.6207	0.0009
LN_GDP	0.649091	0.0292
LN_POP	-9.977276	0.0071
LN_EDIST	-4.116174	0.0000
LN_RER	-0.291463	0.5710
CR_SPS	-0.003386	0.0000

Variable	Coefficient	Probability
CR_TBT	0.001089	0.0485
<b>Weighted Statistics</b>		
R-squared		0.990916
Prob(F-statistic)		0.000000
Sum squared resid		1.015650
Durbin-Watson stat		1.561031
<b>Unweighted Statistic</b>		
R-squared		0.952198
Sum squared resid		1.367448
Durbin-Watson stat		0.894064

The positive TBT policy proves that Indonesia can face problems related to NTMs, especially TBT policies, and can meet the standards and all forms of regulations imposed by its trading partner countries. This is because Indonesia has implemented TSNR product quality specifications that refer to SNI 1903: 2000-Indonesian Rubber Standard. The good quality of SIR rubber must meet SIR specifications according to SNI 1903 standards. The National Standardization Agency (BSN) issued a reference to the amendment of specification standards namely SNI1903:2011 technical specifications rubber which took effect in July 2012. Besides that the Ministry of Trade also conducted a study on Indonesian Rubber Standards through diplomacy in trading partner countries to increase its acceptance so that Indonesia's natural rubber exports are no longer subject to discounts by buyers and also establish policies governing the national rubber sector included in Trade Minister No. 10 / M-DAG / PER /4/2008 concerning the provisions of Indonesian Natural Rubber Technical Specifications (SIR) which are traded abroad and the Minister of Trade Regulation No.53/M-DAG/PER/10/2009 concerning Supervision of the Quality of Standardized Indonesian Commodity Rubber (SIR) Exported Commodity Materials. In international forums, Indonesia is also part of the International Tripartite Rubber Council (ITRC) and International Rubber Consortium (IRCo) along with the world's major rubber producers, Thailand, and Malaysia. This cooperation is expected that international cooperation can be developed by embracing emerging rubber producing countries at the ASEAN level such as Vietnam, Laos, and Cambodia through the plan to establish the ASEAN Rubber Committee.

Other estimation results show that the GDP per capita of the importing country significantly influences the export of Indonesia's natural rubber TSNR type at a significant level of 5% with a positive coefficient on the model of 0.649. This indicates that an increase in GDP per capita of importing countries by 1% will increase the value of TSNR Indonesia's natural rubber exports by 0.649%, *ceteris paribus*. This is consistent with the hypothesis that the per capita GDP of the importing country has a positive relationship on trade.

The population of the importing country on the model has a significant effect on the 5% significance level with a negative coefficient value. This indicates that a 1% increase in the population of the importing country will reduce exports by 9,977%, *ceteris paribus*. The results obtained in this study are in line with research conducted by [Safriani \(2016\)](#) who obtained a significant importing country population value with a negative coefficient.

Economic distance indicates that the further distance between Indonesia and the main export destination countries by 1% will reduce the export of Indonesia's natural rubber TSNR type by 4.116%, *ceteris paribus*. Increased transportation costs will increase production costs on exported commodities such as natural rubber so that selling prices become more expensive and will eventually lead to a decline in the value of Indonesia's natural rubber exports.

## Conclusion

The performance of Indonesia's natural rubber trade based on the trade balance from 2012 to 2016 shows good conditions, this is evidenced by the national trade balance that is positive (surplus) every year in all major export destination countries. The United States is Indonesia's largest natural rubber importer.

Based on the types/types of Non-Tariff Measures, TBT policies are much more widely used by Indonesia's major importing countries compared to SPS policies. The application of the SPS policy for Indonesia's natural rubber exports based on the coverage ratio calculation is only applied by the United States, Japan, and Brazil. The main export destination countries that mostly impose NTMs on SPS and TBT policies based on the calculation of coverage ratio are Brazil.

Factors that significantly affect the value of Indonesia's natural rubber exports are the GDP per capita of the importing country, the population of the importing country, the economic distance of the importing country, and the NTMs (SPS and TBT) policies measured by calculating the coverage ratio. The TBT policy measured by the coverage ratio approach has a significant positive effect on Indonesia's natural rubber exports, while the policy has a significantly negative effect on the value of Indonesia's natural rubber exports.

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