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Non-Tariff Measures and Competitiveness of Indonesia's Natural Rubber Export in Destination Countries

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ABSTRACT

In the last few decades, the implementation of tariff policies between countries has declined. As a result, the enforcement of non-tariff measures (NTMs) experiences an increase. Implementing NTMs raises a new obstacle to trade activities in the global market, including the trade of Indonesia's natural rubber. Therefore, this study was conducted to determine the effect of enforcing NTMs on the export competitiveness of Indonesia's natural rubber. This study utilized secondary data from UN COMTRADE on 1995 to 2019. The data was analyzed using frequency index, coverage ratio, comparative advantage, and two-stage least square regression model. The results revealed that India, China, and the USA enforced the most NTMs of Indonesia's natural rubber. Additionally, the implementation of NTMs in importing countries positively correlated to the export competitiveness of Indonesia's natural rubber in destination countries.

Keywords: Competitiveness; Destination countries; Indonesia; Natural rubber; Non tariff measures

INTRODUCTION

Free trade and protectionism are still being debated (Yeo & Deng, 2019). Relatively established countries desire more open trade and are concerned about the emergence of new trade tariff policies. However, developing countries still want protectionist policies to be enforced to protect their domestic industries. Tariffs on international trade increase deadweight losses, thereby reducing social welfare (Amiti, Redding, & Weinstein, 2019). Conversely, reducing or eliminating tariffs can escalate the growth of domestic consumption and production factors (Phat & Hanh, 2019).

For the last few decades, the World Trade Organization (WTO) has successfully negotiated a tariff reduction within its member countries. Through the formation of the General Agreement on Tariffs and Trade (GATT) in 1947, the WTO continues to encourage free trade between member countries and reduce tariff barriers. In addition, the GATT seeks to liberate trade from quantitative restrictions and subsidies for various goods traded in the international market (Chin & Rusli, 2015).

Countries worldwide, especially WTO member countries, have begun eliminating tariff policies, including Indonesia. At the same time, implementing non-tariff measures (NTMs) to protect domestic producers experiences a rise (Jordaan, 2017; Ronen, 2017). NTMs refer to policy measures other than tariffs impacting international trade in goods (United Nations Conference on Trade and Development [UNCTAD], 2021). This impact takes the form of changes in the number of goods traded, the price of goods, or a combination of the two. NTMs can be categorized into Sanitary and Phytosanitary (SPS), Technical Barriers to Trade (TBT), Pre-shipment inspection (INSP), Contingent Trade Protective Measures (CTPM), Quantity control measures (QC), Price control measures (PC), Export-related measures (EXP), and other measures (UNCTAD, 2020).

Implementing NTMs raises varied impacts on the export performance of a commodity. NTMs positively influence the export performance of Indonesia's tuna commodity to several major export destination countries (Rindayati & Kristriana, 2018). Furthermore, implementing NTMs with the TBT type positively affected Indonesia's natural rubber export in various destination countries (Virginia & Novianti, 2020). On the other hand, research on NTMs and the export performance of RCEP countries unveiled that the implementation of NTMs by importing countries reduced the export performance of the health sector (Zainuddin, Sarmidi, & Khalid, 2020). It is supported by a study concerning NTMs and the export performance of Indonesia's fishery commodities, uncovering that NTMs harmed the export performance of these commodities (Permata & Handoyo, 2019). Moreover, research in Africa revealed that the application of NTMs by importing countries significantly reduced the volume of trade in agricultural products (Liu, Lin, Liu, & Li, 2019).

As one of the largest natural rubber exporters, Indonesia faces the challenges of NTMs. Indonesia contributed a market share of 28.06% of world's total natural rubber export in 2019 (Trademap, 2021). Indonesia's natural rubber export in the international market can be divided into several specifications: natural rubber latex, natural rubber smoked sheets (RSS), and technically specified natural rubber (TSNR). Respectively, each specification contributes 1.22%, 2.30%, and 97.48% of the total export (Statistics Indonesia, 2019). The high export of Indonesia's natural rubber demonstrates the potential to enhance this commodity's competitiveness in the international market (Erkan & Yildirimci, 2015; Wiranthi & Mubarok, 2017).

Furthermore, the efforts to enhance the export competitiveness of the natural rubber commodity should consider NTMs applied in the destination countries. The major export destination countries for Indonesia's natural rubber commodity are the USA, Japan, China, India, and the Republic of Korea. These five countries have implemented NTMs for the natural rubber commodity with TSNR specifications. Accordingly, the imposition of NTMs by these countries can limit Indonesia's natural rubber trade and affect the competitiveness of this commodity.

Several studies investigated factors affecting to NTMs and the competitiveness of agricultural commodities. Several research which utilized the Ordinary Least Square (OLS model) in Indonesia revealed that export competitiveness was influenced by productivity, the

export price of agricultural commodities, and trade openness (Sa'diyah & Darwanto, 2020; Yanita, Napitupulu, & Rahmah, 2019; Yulhar & Darwanto, 2019). Another study on Indonesia's cocoa commodity analyzed using the ECM model discovered that the export competitiveness was affected by the exchange rate, the world price of cocoa, and the export duty (Hapsari & Yuniasih, 2020). In addition, another research uncovered that the export competitiveness of the rubber commodity was influenced by the implementation of NTMs, encompassing SPS, TBT, and quota policy (Purnomowati, Darwanto, Widodo, & Hartono, 2015; Virginia & Novianti, 2020). Moreover, another study using the OLS model concluded that the application of NTMs was influenced by the Gross Domestic Product (GDP) and dummy membership of the WTO (Chin & Rusli, 2015; Zhang, Sun, Gordon, & Munn, 2020).

Previous research analyzed the effect of NTMs on agricultural commodities' volume and export value. Therefore, the effect on export competitiveness was unknown, especially for natural rubber. In addition, previous studies employed OLS and ECM models for the analysis. However, these models could not overcome the endogeneity problem in the variable of NTMs. Export competitiveness, in this case, was assessed using the RCA index, allegedly influenced by the application of NTMs.

Furthermore, NTMs are influenced by an instrument variable of GDP and a dummy variable of WTO membership. Therefore, this study was conducted using the Two Stage Least Square (TSLS) model to fill the gaps that emerged from previous studies. This study aims to determine the effect of the imposition of NTMs by importing countries on the export competitiveness of Indonesia's natural rubber commodity with TSNR specifications and identify the factors affecting the competitiveness of this commodity in five major export destination countries.

RESEARCH METHOD

This study employed panel data that consisted of time series and cross-section data. The time series data were from 1995 to 2019. The cross-section data were sourced from five major export destination countries of Indonesia's natural rubber commodity with TSNR specifications (HS code 400122), comprising the USA, Japan, China, India, and the Republic of Korea. These five countries were determined as the main destinations due to the high proportion of TSNR imports from Indonesia, as displayed in Table 1.

TABLE 1. AVERAGE OF INDONESIA'S TSNR EXPORT IN FIVE DESTINATION COUNTRIES FROM 1995 TO 2019

Country	Import Quantity (tonnes)	Share of Import (%)	Rank
USA	563,296.83	31.24	1
Japan	230,688.45	12.79	2
China	191,344.34	10.61	3
Republic of Korea	93,075.35	5.16	4
India	75,325.12	4.18	5
Indonesia's Total Export	1,803,041.23	100.00	

The variables in this study comprised revealed comparative advantage (RCA), real GDP at a constant price of importing countries (GDP), Indonesia's real exchange rate (RER), the

dummy of WTO membership, and the number of NTMs of the natural rubber commodity imposed by importing countries. The data were gathered from UN COMTRADE, UNCTAD, and the Federal Reserve Bank of St. Louis. RCA refers to a comparison between the export share of a commodity from a country to the share of commodity export in the world market (Muzayyin, Masyhuri, Darwanto, & Junaidi, 2019). Formula 1 was used to calculate RCA (Balassa, 1965).

$$RCA_{ij} = \frac{X_{ij}/X_t}{W_{ij}/W_t} \quad (1)$$

RCA_{ij} is revealed comparative advantage of product j produced by country i . X_{ij} represents the country i 's export value of product j to the destination country. X_t implies the country i 's total export value to the destination country. W_{ij} refers to the world export value of product j . W_t signifies the total world export value. The RCA lies in the interval between 0 and positive infinity ($0 \leq RCA \leq +\infty$) (Hailay, 2017; Jagdambe, 2019). The RCA can be grouped into four categories (Erkan & Saricoban, 2014): (1) no comparative advantage ($0 < RCA \leq 1$), (2) weak comparative advantage ($1 < RCA \leq 2$), (3) moderate comparative advantage ($2 < RCA \leq 4$), and (4) strong comparative advantage ($4 < RCA$). In addition, Indonesia's real exchange rate was determined using the following formula.

$$RER = NER \times \frac{CPI_i}{CPI_{Indonesia}} \quad (2)$$

RER refers to Indonesia's real exchange rate (IDR/USD). NER represents Indonesia's nominal exchange rate (IDR/USD). CPI_i signifies the consumer price index in country i . Meanwhile, $CPI_{Indonesia}$ is the Indonesian consumer price index.

Moreover, the frequency index could be utilized to determine the percentage of the import transaction concerning NTMs of the exporting country. In other words, the frequency ratio could determine the percentage of product k applying one or more NTMs. The higher frequency indexes will affect more NTMs forced by importing countries on Indonesia's natural rubber commodity and conversely. The following formula was employed for calculating the frequency index (Disdier & Fugazza, 2019):

$$F_j = [\sum_i D_i M_i / \sum_i M_i] \quad (3)$$

F_j is the frequency index of NTMs imposed by country j . D_i illustrates a dummy variable reflecting one or more NTMs on product i ; 1 if a country imposes one or more NTMs and 0 if otherwise. M_i represents a dummy variable indicating whether there are imports of product i . Furthermore, the trade value for Indonesia's TSNR subject to NTMs in an importing country can be seen from the coverage ratio. The coverage ratio can demonstrate the reach of NTMs and their importance for imported goods (Zainuddin et al., 2020). The coverage ratio was examined using the following formula (Disdier & Fugazza, 2019).

$$C_j = [\sum_i D_i V_i / \sum_i V_i] \quad (4)$$

C_j is the coverage ratio of NTMs applied in country j . D_i is defined like before. V_i indicates the import value of product i . The higher coverage ratio value signifies that

Indonesia's natural rubber commodity is getting bigger, affected by NTMs in importing countries (Virginia & Novianti, 2020; Zainuddin et al., 2020).

After collecting all data, it was necessary to pay attention to the nature of time series data. Time series data could generate bias due to not stationary data over time (Prasada, Dhamira, & Nugroho, 2021). Therefore, before performing data analysis, a stationarity test on the panel data should be run using Levin-Lin-Chu (LLC) unit root test (Prasada, Dhamira, & Nugroho, 2022). As Table 2 exhibits, the stationarity test revealed that the variables of RCA, real GDP at a constant price, and NTMs were significant at the first difference stage, while Indonesia's real exchange rate (RER) was significant at the level stage.

TABLE 2. STATIONARITY TEST

Variable	Stage	LLC Statistic	Prob.	Information
RCA	1 st Difference	-5.505	0.000	Stationary
RER	Level	-1.296	0.098	Stationary
GDP	1 st Difference	-3.240	0.001	Stationary
NTMs	1 st Difference	-3.535	0.000	Stationary

Note: RCA = Revealed comparative advantage;
 RER = Indonesia's real exchange rate toward USD;
 GDP = Real GDP at constants price; NTMs = Number of NTMs imposed

After obtaining stationary data over time, the regression analysis was carried out properly. This study employed a two-stage least square (TSLS) regression model. This regression model can be applied when the variable possesses endogeneity problems, in this case, NTMs. The variable of NTMs was expected to influence the competitiveness of Indonesia's natural rubber export. However, at the same time, this variable was influenced by other variables: the real GDP at a constant price and WTO membership. Therefore, the variables of the real GDP at a constant price and WTO membership affecting NTMs were modeled, which then NTMs influenced the competitiveness of Indonesia's rubber export.

A single equation was unable to solve the relationship between these variables. Nevertheless, simultaneous equations using the TSLS model could solve it (Greene, 2002). The first-stage regression models are written as Formula 5.

$$NTMs_i^t = \gamma_0 + \gamma_1 GDP_i^t + \gamma_2 WTO + u \tag{5}$$

While, the second-stage regression models are written as the Formula 6.

$$RCA_i^t = \beta_0 + \beta_1 RER_i^t + \beta_2 NTMs_i^t + v \tag{6}$$

Where RCA_i^t is Revealed comparative advantage for country i in year t ; $NTMs_i^t$ represents the number of NTMs imposed by country i in year t ; GDP_i^t shows the real GDP at a constant price for country i in year t (Millions USD); WTO is the dummy of WTO membership (1=Member; 0=Non member); and RER_i^t shows Indonesia's real exchange rate toward USD for country i in year t (IDR/USD).

The model in this study was compiled based on various previous studies. Research on forest products using the OLS method disclosed that NTMs influenced a country's GDP and WTO membership status (Chin & Rusli, 2015; Zhang et al., 2020). However, other studies

revealed that NTMs and a country's real exchange rate affected RCA (Hapsari & Yuniasih, 2020; Purnomowati et al., 2015; Virginia & Novianti, 2020).

This study modeled that NTMs were influenced by the equation's GDP and WTO membership status. This modeling was based on several theories on economic globalization and international trade. Adam Smith stated that when a country has an absolute advantage (can produce a product more efficiently) over another country but at the same time has an absolute disadvantage (not more efficient than other countries) in producing other products, then the two countries will benefit each other when exchanging their products (Salvatore, 2013). It only happens if there is minimum government intervention in the economic system (a *laissez-faire* policy) (Nugroho, Bhagat, Magda, & Lakner, 2021).

The facts indicate that government intervention in the economic system is substantial in both developed and developing countries. Developed countries tend to apply restrictive non-tariff policies. Conversely, developing countries have a tendency to impose tariff policies. The implementation of non-tariff policies by high-income countries has increased more rapidly than in upper-middle-income, lower-middle-income, and low-income countries (Niu, Liu, Gunessee, & Milner, 2018). Scholte (2005) revealed that developed countries tend to state ambiguous policies; on the one hand, they claim to encourage world trade liberalization, but on the other hand, they also establish protective policies to protect their domestic industries. Furthermore, trade policies between countries are also interfered with by the WTO, where WTO membership consists of both developed and developing countries. The policies established by the WTO are likely to favor developed countries, causing them to have failed to integrate the interests of developing countries in developing an ideal trading system (Ukpe & Khorana, 2021).

The analysis using the TSLS model generated an R^2 value of 0.66, meaning that the independent variables could explain 66% of the variation in the dependent variable in the model. The TSLS model in this study was valid with an F-statistic value of 37.36 and significant at a 1% alpha level. The endogeneity test yielded a significant value at 1% alpha, indicating that the variable of NTMs was endogenous. Furthermore, the Anderson canon. corr. LM test was also significant at a 1% alpha level. Meanwhile, the Sargan test was insignificant at the same alpha level, implying that the model could be precisely identified. In addition, the Stock-Yogo test unveiled an eigenvalue statistic of 80.36. It was higher than the 2SLS Wald test at 5% (19.93), confirming that the GDP and WTO were strong instrumental variables.

RESULTS AND DISCUSSION

Figure 1a displays Indonesia's natural rubber export to the USA, reaching an annual average of 0.57 million tonnes from 1995 to 2019. Figure 1b exhibits that, during the same period, the average export of Indonesia's natural rubber to Japan reached 0.27 million tonnes per year. It was higher than Indonesia's natural rubber export to China, which averaged 0.23 million tonnes yearly, as illustrated in Figure 1c. As demonstrated in Figures 1d and 1e, the

Republic of Korea and India could absorb an annual average of 0.11 million and 0.07 million tonnes of Indonesia's natural rubber, respectively.

Indonesia is one of the leading exporters of natural rubber to these five countries. It was recorded that Indonesia's natural rubber export to the USA contributed 73.11% of its total demand. Moreover, Indonesia's natural rubber export to Japan met 66.16% of its total demand. Subsequently, Indonesia's natural rubber contributed 74.57% of India's total demand for this commodity. Similarly, Indonesia's natural rubber commodity could meet the demand in China and the Republic of Korea by 26.82% and 46.14%. The high contribution of Indonesia's natural rubber demonstrated significant potential to increase its competitiveness in central destination countries. It is closely related to the penetration and expansion of Indonesia's rubber commodity in these five countries (Cvetković & Petrovic-Randelovic, 2017; Yulhar & Darwanto, 2019). The high volume of Indonesia's natural rubber export depicted its high capacity for producing this commodity.

Indonesia's natural rubber export in various central destination countries also fluctuated considerably. The export volume of Indonesia's natural rubber to the USA fluctuated with a positive trend following the demand for this commodity. The USA's lowest demand for natural rubber occurred in 2009, at only 0.55 million tonnes. Simultaneously, Indonesia's export to the USA reached 0.38 million tonnes, as illustrated in Figure 1a. This export volume met 69.38% of the USA's total demand for natural rubber. Within this period, the RCA of Indonesia's natural rubber export to the USA reached 85.61, slightly lower than the average export competitiveness from 1995 to 2018, which was 94.90. The export competitiveness of Indonesia's natural rubber commodity in the USA fell into the category of strong competitiveness, with an average RCA value of greater than 4.

As Figure 1b displays, Indonesia's natural rubber export to Japan depicted a positive trend, signifying an annual export increase. Indonesia's natural rubber export to China, India, and the Republic of Korea also exhibited the same trend. Figure 1c illustrates that Indonesia's natural rubber export to China increased by 0.02 million tonnes yearly. Meanwhile, Figure 1d demonstrates an annual export increase of 0.01 million tonnes in India. On the other hand, as portrayed in Figure 1e, Indonesia's natural rubber export to the Republic of Korea relatively increased by 0.001 million tonnes per year. The high volume of Indonesia's natural rubber export to Japan, China, India, and the Republic of Korea boosted the export competitiveness of this commodity. The export competitiveness of Indonesia's natural rubber reached an average of 18.08 in Japan and 18.70 in the Republic of Korea. Furthermore, the export competitiveness of Indonesia's natural rubber to India and China acquired average RCA values of 29.89 and 21.98. The RCA value in each destination country was greater than 4, implying strong competitiveness in Indonesia's natural rubber export performance.

Despite having strong competitiveness, RCA tended to decline in the USA and China. The RCA for Indonesia's natural rubber export to the USA generated a negative trend, signifying an annual export decline of 0.15. Similarly, the RCA in China also demonstrated a relative decline of 0.47 yearly. The decline in these two countries was driven by their prolonged trade war. The trade war between these two countries caused a decline in demand

for natural rubber due to slowing global production and international trade (Iqbal, Elianda, Akbar, & Nurhadiyanti, 2020; Kapustina, Lipková, Silin, & Drevalev, 2020). Accordingly, it forced Indonesia to diversify the natural rubber market to other countries to reduce the trade war's negative impact on the economy and the performance of natural rubber export (Taufikurahman & Firdaus, 2019; Wangke, 2020). This export market diversification led to a decline in the share of Indonesia's natural rubber in China and the USA, resulting in a relative decline in the competitiveness of Indonesia's natural rubber export.

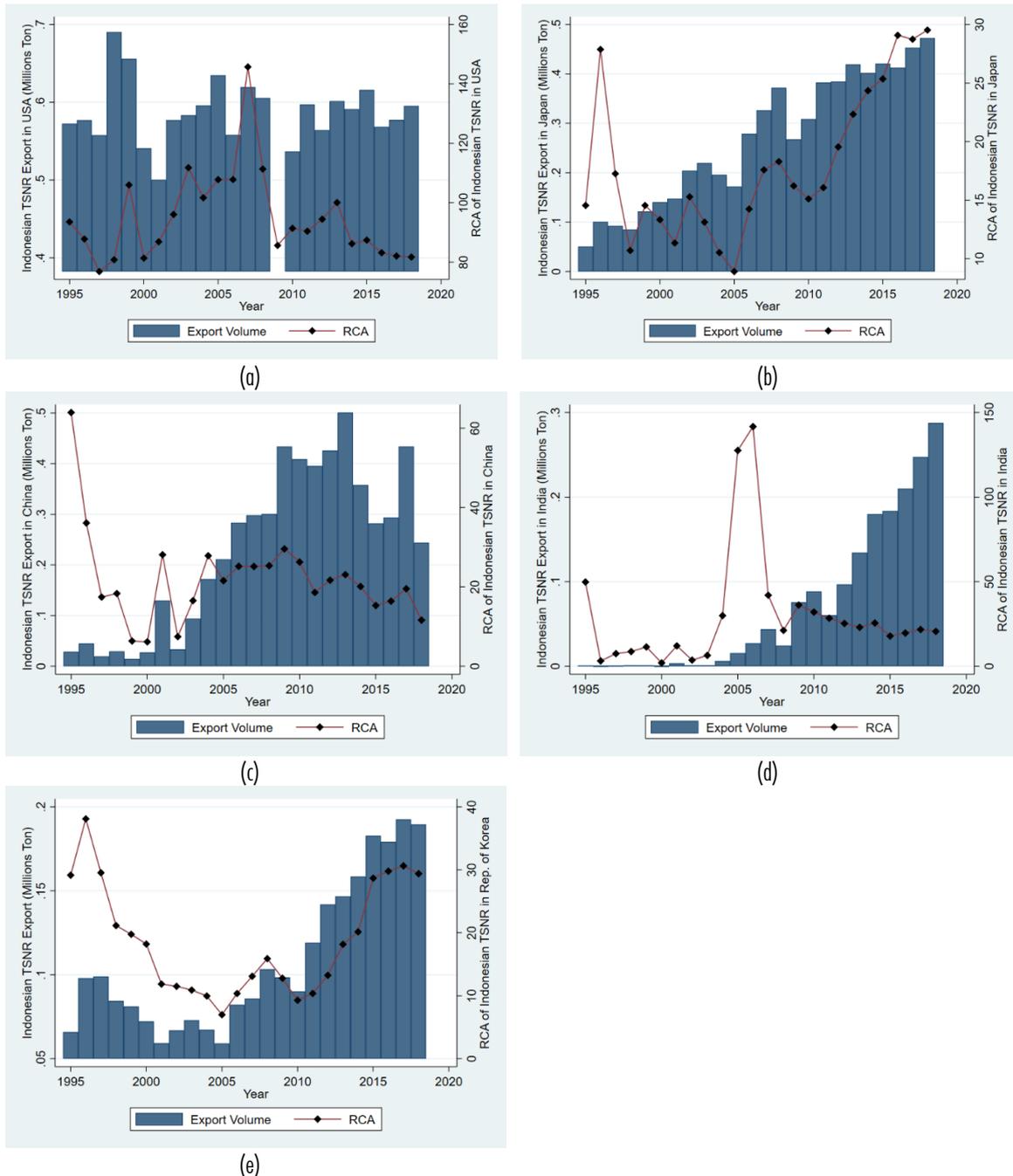


FIGURE 1. (A) INDONESIA'S TSNR EXPORT VOLUME VS RCA IN THE USA; (B) INDONESIA'S TSNR EXPORT VOLUME VS RCA IN JAPAN; (C) INDONESIA'S TSNR EXPORT VOLUME VS RCA IN CHINA; (D) INDONESIA'S TSNR EXPORT VOLUME VS RCA IN INDIA; (E) INDONESIA'S TSNR EXPORT VOLUME VS RCA IN THE REPUBLIC OF KOREA

Increasing the export competitiveness of Indonesia's natural rubber in various major destination countries was inseparable from tariff and non-tariff barriers. Relative tariff barriers have decreased, but non-tariff barriers have increased with the emergence of NTMs. These NTMs are applied to various commodities marketed in the international market, including vegetables, animal products, and natural rubber. Natural rubber commodity has experienced the implementation of NTMs in multilateral or bilateral agreements between Indonesia and importing countries.

The analysis revealed that India imposed the most NTMs, with a frequency index of 78.67%, as displayed in Figure 2. NTMs implemented by India for Indonesia's natural rubber products included sanitary and phytosanitary (SPS) measures, technical barriers to trade (TBT), and export-related measures. In addition, the USA and China also employed many NTMs to Indonesia's natural rubber commodity, with a frequency index of 72.80% and 65.71%, respectively. The Republic of Korea and Japan utilized fewer NTMs on Indonesia's rubber commodity, with the lowest frequency index value.

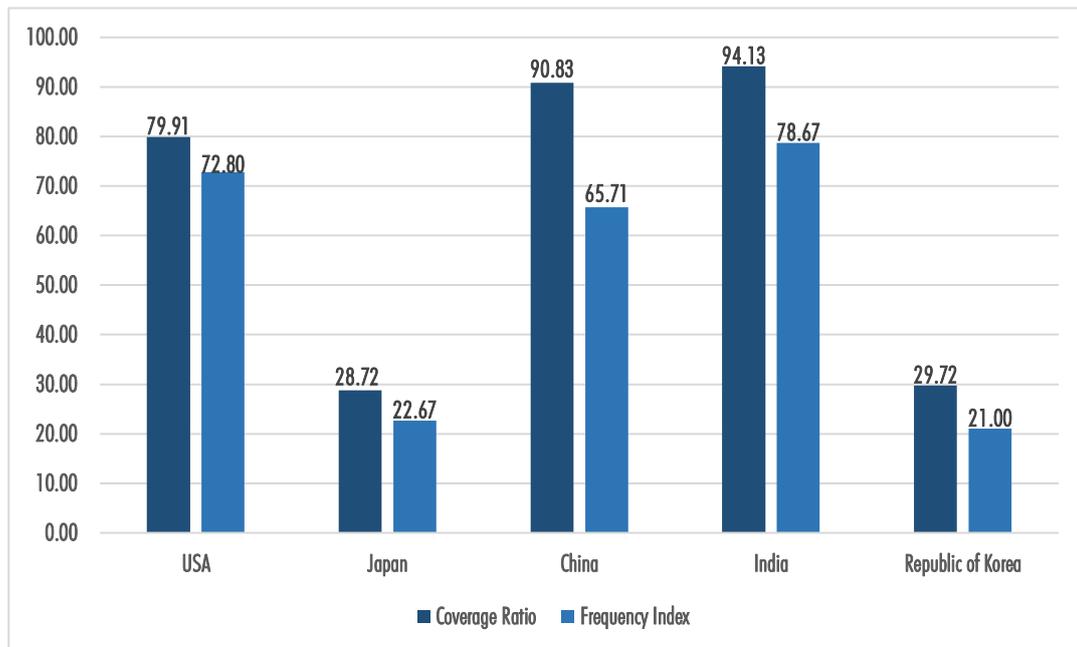


FIGURE 2. FREQUENCY INDEX AND COVERAGE RATIO OF INDONESIA'S TSNR COMMODITY IN DESTINATION COUNTRIES

The coverage ratio from the largest to the smallest were demonstrated sequentially by India, China, the USA, the Republic of Korea, and Japan. The order was slightly different from the frequency index, sequentially starting from India, the USA, China, Japan, and the Republic of Korea. The coverage ratio greater than the frequency index implied that NTMs by importing countries significantly affected the export of Indonesia's natural rubber commodity (Gourdon, 2014). China's frequency index was smaller than the USA's. However, China's coverage ratio was more significant than the USA's, meaning that the NTMs in China had an enormous impact on Indonesia's natural rubber export than the NTMs imposed by the USA. China has implemented NTMs in all classifications, from SPS, and TBT, to export-related measures, generating tighter NTMs and impacting the performance of Indonesia's natural rubber export. The same happened to Japan and the Republic of Korea's frequency

index and coverage ratio. The coverage ratio of the Republic of Korea was more considerable than Japan's. However, it had a lower frequency index than Japan. This result was driven by more classifications of NTMs implemented by the Republic of Korea, tightening trade. These results are consistent with research conducted in Europe, America, Asia, and Africa, revealing an increase in the use of NTMs as protective measures for domestic products (Niu et al., 2018). In addition, research on the agri-food trade between the US and EU discovered that removing NTMs could loosen and expand trade by 11.6 billion dollars (Arita et al., 2017).

TABLE 3. FACTORS AFFECTING THE COMPETITIVENESS OF INDONESIA'S NATURAL RUBBER IN DESTINATION COUNTRIES

Variable	Coefficient	Std. Error	t-Statistic	Prob
First-stage regression:				
Dependent variable of NTMs				
GDP	2.19E-06***	1.76E-07	12.48	0.00
WTO	4.41 ^{ns}	3.79	1.16	0.25
RER	-7.43E-04***	1.02E-04	-7.29	0.00
Cons.	1.59 ^{ns}	3.94	0.40	0.69
Second-stage regression:				
Dependent variable of RCA				
RER	2.19E-03***	2.64E-04	8.30	0.00
NTMs	0.82***	0.24	3.46	0.00
Cons.	-8.91 ^{ns}	5.85	-1.52	0.13
R ²	=0.66			
F-statistic	=37.36			
Anderson canon. corr. LM test	=71.31			
Sargan test	=0.07			
Stock-Yogo test	=80.36			
Endogeneity test	=27.96			

Where: *** Significant at 1 percent alpha; ^{ns} Not significant

Note: RCA = Revealed comparative advantage; GDP = Real GDP at the constant price; WTO = Dummy of WTO membership; RER = Indonesia's real exchange rate toward USD; NTMs = Number of NTMs imposed.

Furthermore, the impact of implementing NTMs was modeled in a structural equation system on the export competitiveness of Indonesia's natural rubber in the major destination countries. The analysis unveiled that the number of NTMs imposed by the importing countries on Indonesia's natural rubber was influenced by the real GDP at a constant price in each country, as described in Table 3. The GDP variable was significant at the level of 1% with a positive regression coefficient, illustrating that since higher real GDP of a country will increase the number of implemented NTMs. High-income countries tend to use NTMs in commodity trading (Heal & Palmioli, 2015) due to their incredible and efficient market forces (Chin & Rusli, 2015). In addition, high-income countries do not have as much dependence on international trade as low-income countries, making them more effective in implementing NTMs to gain more benefits. Research related to trade in the wine commodity uncovered that developed countries with higher GDP than developing countries tended to implement more product-specific NTMs, triggering the emergence of a non-transparent trading environment (Santeramo, Lamonaca, Nardone, & Seccia, 2019). In addition, developed countries often play a role as policymakers of restrictive policies on international trade in agricultural

products, while developing countries play a role as policy takers of these policies (Santeramo & Lamonaca, 2022). It caused the implementation of NTMs to be preferred by developed countries.

As described in Table 3, the TSLs analysis revealed that the real exchange rate (RER) variable significantly affected the competitiveness of Indonesia's natural rubber export at the level of 1%. The positive RER coefficient indicated that as higher RER would increase Indonesia's rubber competitiveness. A higher RER implied the depreciation of IDR against USD, causing the price of Indonesia's natural rubber in the destination country to be relatively lower and increasing export competitiveness. The commodity price influenced a consumer's purchase intention (Wong & Zeng, 2015). In addition to RER, the NTMs variable was significant at the level of 1% and showed a positive regression coefficient. The value meant that an increase in NTMs by importing countries boosted the export competitiveness of Indonesia's natural rubber. In other words, importer countries' implementation of NTMs provided an opportunity to increase the competitiveness of Indonesia's rubber export. NTMs mainly imposed by importing countries for the natural rubber commodity were SPS and TBT.

Indonesia currently applies a natural rubber standardization system of TSNR specifications as stated in SNI 1903 (Indonesian Rubber Standard) since 2000, amended by the National Standardization Agency (known as Badan Standarisasi Nasional in Indonesian or BSN) in 2011 (Virginia & Novianti, 2020). SNI 1903 refers to ISO standards to ascertain that Indonesia's natural rubber quality meets the appropriate international natural rubber standards. The ability of Indonesia to maintain and improve natural rubber quality will enhance its export competitiveness. These results are consistent with research on the wine trade in 24 countries, which revealed that NTMs increased imports of bottled wine of importer countries (Santeramo et al., 2019). Other research discovered that the implementation of NTMs in importer countries positively affected the quality of products of exporter countries. This quality improvement was driven by "coercion" to meet all product requirements specified in NTMs (Cipollina & Demaria, 2020; Santeramo & Lamonaca, 2022).

Indonesia is well-prepared to face non-tariff barriers than its primary competitor, Thailand. The standardization of natural rubber in Thailand only to be explored in 2013. In this phase, Thailand did not apply a standard for testing natural rubber (Thailand Productivity Institute, 2013). Nevertheless, Thailand's natural rubber productivity increased annually, and causes the country as world's leading natural rubber exporter. In contrast to Indonesia, although it applies internationally recognized standardization of natural rubber, its natural rubber productivity was relatively lower than in Thailand. The productivity of Thailand's natural rubber was double of Indonesia's. The average of Indonesia's natural rubber productivity from 1995 to 2019 was 7,961.20 hectogram per hectare, while the average productivity of Thailand's natural rubber in the same period reached 15,836.80 hectogram/hectare (Food and Agriculture Organization, 2021). Several reasons underlay the low productivity of natural rubber in Indonesia, such as the low quality of seeds and coagulants as well as the low use of fertilizers and stimulants in cultivating rubber plants

(Springfield Centre, 2020). Maintaining and improving the quality of Indonesia's natural rubber and raising productivity by utilizing certified superior rubber clones was essential to reclaiming the export share of natural rubber in the world by exporter countries. Moreover, applying high-quality coagulants, fertilizers and stimulants contributed to increase the productivity and quality of natural rubber.

Following the analysis results, the Indonesian government is suggested to implement several policies to increase the export of natural rubber in the major destination countries. Firstly, Indonesia should maintain the exchange rate of IDR against USD at a low level. So, Indonesian natural rubber products in the major destination countries are more favorable than other exporters' natural rubber products (Husaini & Lean, 2021; Kayamo, 2021). Additionally, Indonesia should be more adaptive in implementing restrictive trade policies. Hence, natural rubber products exported could meet the requirements set by the importing countries. The fulfillment of these various requirements could boost the competitiveness of Indonesian natural rubber products in the central destination countries (Bashir, Khwaja, Rashid, Turi, & Waheed, 2020; Ha, 2021; Nekomahmud & Fekete-Farkas, 2020). Indeed, fulfilling these trade conditions has become a strategic step Indonesia take to overcome trade barriers from importing countries (Prasada, Nugroho, & Lakner, 2022).

CONCLUSION

Indonesia's natural rubber export to the major destination countries is categorized as strongly competitive. This competitiveness was influenced by the number of NTMs imposed by importer countries. At the same time, NTMs was influenced by the real GDP. The number of NTMs positively affected to export competitiveness of natural rubber. Indonesia has been well-prepared to face non-tariff barriers by implementating the SNI 1903 on Standard Indonesian Rubber than its competitors. However, Indonesia faced the challenge of low productivity. The productivity of Indonesia's natural rubber should be escalated by utilizing certified superior seeds, high-quality coagulants, fertilizers, and stimulants suitable for rubber plants. In addition, the export of Indonesian natural rubber to major destination countries should be enhanced by implementing a strategy to maintain the IDR exchange rate against the USD in a favorable position for increasing export. Furthermore, Indonesia's export competitiveness could be improved by increasing its adaptability to restrictive trade policies. This adaptability could be demonstrated by the fast and precise fulfillment of various requirements set by the importer countries.

Authors' contribution: I.Y.P served as a conceptor, data analysis, data interpretation, and writing the manuscript; A.D. performing as data seekers, tabulating data, writing manuscript, and reviewing final manuscript.

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